TEXAS INSTRUMENTS

Standard Linear, Interface, Opto, Speech, Telecommunications

Selection Guide

1988

Linear Products

Linear Products Selection Guide

1988

Standard Linear, Interface, Optoelectronics and Image Sensors, Speech, Telecommunications

TEXAS INSTRUMENTS

IMPORTANT NOTICE

Texas Instruments (TI) reserves the right to make changes to or to discontinue any semiconductor product or service identified in this publication without notice. TI advises its customers to obtain the latest version of the relevant information to verify, before placing orders, that the information being relied upon is current.

TI warrants performance of its semiconductor products to current specifications in accordance with TI's standard warranty. Testing and other quality control techniques are utilized to the extent TI deems necessary to support this warranty. Unless mandated by government requirements, specific testing of all parameters of each device is not necessarily performed.

TI assumes no liability for TI applications assistance, customer product design, software performance or infringement of patents or services described herein. Nor does TI warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right of TI covering or relating to any combination, machine, or process in which such semiconductor devices might be or are used.

Information contained in this data book supersedes all data for this technology published by TI in the United States of America before January 1988.

Linear Products Selection Guide

The Linear Products Division of Texas Instruments presents this Selection Guide as a multi-purpose index to its broad product line encompassing four major data books and many smaller publications. The four data books are:

Linear Circuits Data Book (SLYD001)
Interface Circuits Data Book (SLYD002)
Telecommunications Circuits Data Book (SCTD001)
Optoelectronics and Image Sensor Data Book (SOYD002)

The Selection Guide includes a functional description of each product. To assist the design engineer, the Guide is organized into sections containing information on key parameters and packaging. Included are cross-references to other manufacturers showing the direct TI replacement or the nearest functional replacement. The Table of Contents and the Alphanumeric Index will help locate the right page in the data section either by family or by part number.

Other TI publications are referred to by literature numbers like those above. Complete and up-to-date technical information is available from your nearest TI field sales office, local authorized distributor, or by writing to:

Texas Instruments Incorporated
Literature Response Center
P.O. Box 809066
Dallas, TX 75380-9066

The part numbers listed in this Guide are those standard products available at the time of publication. We believe that the addition of this 1988 Linear Products Division Selection Guide to your collection of technical literature will enhance your library of leading edge technologies from Texas Instruments.

Contents

Contents (Continued)

General Information

Part and Literature Numbers

General

TI Linear Products Division devices in current production are listed by part number and general description. Included are type and literature order numbers and the the specific TI publication (either a data sheet or a data book) which contains technical information. The references reflect the most current technical data available.

Technical Source

In each section, the NOTES refer to the latest technical source available on a specific device. Most of TI's technical literature is identified by a seven- or eight-character alphanumeric code consisting of four (4) alpha characters and three (3) numeric characters, with a revision letter if applicable. The fourth alpha character designates a particular type of literature as follows:

CODES	DESCRIPTION
D	Data Books
S	Data Sheets, Data Manuals on Single Products

As an example, literature code SLY**D**001 identifies a data book, code SLA**S**014 a data sheet, and code SLN**S**002A a revised data sheet. TBA literature listings are currently in preparation. Please contact the factory.

Data sheets and data books are available for most of the products listed in the Linear Products Division Selection Guide. Application reports are available upon request.

Section Locator

Major sections are listed in the Contents by family type. The right-hand column indicates the tab section and page number. In addition, the alphanumeric listing provides the tab section and page numbers by device type.

ALPHANUMERIC INDEX

ALPHANUMERIC INDEX

ALPHANUMERIC INDEX

ALPHANUMERIC INDEX

ALPHANUMERIC INDEX

ALPHANUMERIC INDEX

Replacements are based on similarity of electrical and mechanical characteristics as shown in currently published data. Interchangeability in particular applications is not guaranteed. Before using a device as a substitute, the user should compare the specifications of the substitute device with the specifications of the original.

Texas Instruments makes no warranty as to the information furnished and buyer assumes all risk in the use thereof. No liability is assumed for damages resulting from the use of the information contained herein.

Manufacturers are arranged in alphabetical order.

LINEAR TECHNOLOGY	SUGGESTED TI REPLACEMENT	PAGE NO.
LT1011A	LT1011A	2-6
LT1011	LT1011	2-6

NATIONAL	SUGGESTED TI REPLACEMENT	PAGE NO.
LM311	LM311	2-6
LM339	LM339 or TLC339	2-7
LM393	LM393 or TLC393	2-6
LM2901	LM2901	2-4
LM3302	LM3302	2-4
LP339	LP339 or TLC339	2-7

PMI	SUGGESTED TI REPLACEMENT	PAGE NO.
CMP04F	LM339 or LM3302 or LM2901 or TLC339	2-7

DATA ACQUISITION AND CONVERSION CIRCUITS CROSS REFERENCE GUIDE

Replacements are based on similarity of electrical and mechanical characteristics as shown in currently published data. Interchangeability in particular applications is not guaranteed. Before using a device as a substitute, the user should compare the specifications of the substitute device with the specifications of the original.

Texas Instruments makes no warranty as to the information furnished and buyer assumes all risk in the use thereof. No liability is assumed for damages resulting from the use of the information contained herein.

Manufacturers are arranged in alphabetical order.

ANALOG DEVICES	DIRECT TI REPLACEMENT	SUGGESTED TI REPLACEMENT	PAGE NO.
AD570JN		ADC0803CN	3-4
AD7512DIJN		TL182CN	3-7
AD7512DIJQ		TL182IN	3-7
AD7512DIKN		TL182CN	3-7
AD7512DIKQ		TL182IN	3-7
AD7512DISD		TL182MJ	3-7
AD7512DITD		TL182MJ	3-7
AD7520	TLC7533, AD7533B		3-6
AD7524AD	AD7524AN	TLC7524IN	3-6
AD7524JN	AD7524JN	TLC7524CN	3-6
AD7528BQ	AD7528BN	TLC7528IN	3-6
AD7528KN	AD7528KN	TLC7528CN	3-6
AD7533	TLC7533, AD7533		3-6
AD7820K/B/T	TLC0820A, ADC0820CC		3-6
AD7820L/C/U	TLC0820B, ADC0820BC		3-6

BURR-BROWN	DIRECT TI REPLACEMENT	SUGGESTED TI REPLACEMENT	PAGE NO.
AD7533	TLC7533, AD7533		3-6
AD7820	TLC0820, ADC0820		3-6
ADC82AG		TLC0820BIN, ADC0820BCIN	3-4
ADC82AM		TLC0820AIN, ADC820CCIN	3-4

DATA ACQUISITION AND CONVERSION CIRCUITS CROSS REFERENCE GUIDE

DATEL	DIRECT TI REPLACEMENT	SUGGESTED TI REPLACEMENT	PAGE NO.
ADC-830C	ADC0803CN		3-3
ADC-EK12DC		TL500/1/3CN	3-3
		TLC7135CN	3-3
		TLC7135CFN	3-3
		ICL7135CN	3-3
		ICL7135CFN	3-3
ADC-EK12DR		TL500/1/3CN	3-3
		TLC7135CN	3-3
		TLC7135CFN	3-3
		ICL7135CN	3-3
		ICL7135CFN	3-3

DIGITAL	DIRECT TI REPLACEMENT	PAGE NO.
78808	TCM78808	11-9

FUJITSU	SUGGESTED TI REPLACEMENT	PAGE NO.
MB4053P	TL507IN	3-3

HARRIS	DIRECT TI REPLACEMENT	PAGE NO.
HF10	TLC10	3-7

INTERSIL	DIRECT TI REPLACEMENT	SUGGESTED TI REPLACEMENT	PAGE NO.
ADC0803LCD	ADC0803IN		3-4
ADC0803LCN	ADC0803CN		3-4
ADC0804LCD	ADC0804IN		3-4
ADC0804LCN	ADC0804CN		3-4
DGM182AK	TL182MN	TL604MP	3-7
DGM182BJ	TL182CN/IN	TL604CP/IP	3-7
DGM185AK	TL185MN	TL604MP	3-7
DGM185BJ	TL185CN/IN	TL604CP/IP	3-7
DGM188AK	TL188MN	TL610MP	3-7
DGM188BJ	TL188CN/IN	TL610CP/IP	3-7
DGM191AK	TL191MN	TL610MP	3-7
DGM191BJ	TL191CN/IN	TL610CP/IP	3-7

(Continued)

INTERSIL	DIRECT TI REPLACEMENT	PAGE NO.
ICL7135CPI	ICL7135CN	3-3
	ICL7135CFN	3-3
	TLC7135CN	3-3
	TLC7135CFN	3-3

LINEAR TECHNOLOGY	DIRECT TI REPLACEMENT	PAGE NO.
LTC1060ACN	TLC10N	3-7
LTC1060CN	TLC20N	3-7

MAXIM	DIRECT TI REPLACEMENT	PAGE NO.
MF10BN	TLC10N	3-7
MF10CN	TLC20N	3-7

MICRO NETWORKS	SUGGESTED TI REPLACEMENT	PAGE NO.
MN5100/5101	TLC0820ACN/TLC0820BCN, ADC0820BCN/ADC0820CCN	3-4
MN5120/5130/5140	TLC0820ACN/TLC0820BCN, ADC0820BCN/ADC0820CCN	3-4

MICRO POWER SYSTEMS	SUGGESTED TI REPLACEMENT	PAGE NO.
MP7138AN	TL500/1/3CN	3-3
	TLC7135CN	3-3
	TLC7135CFN	3-3
	ICL7135CN	3-3
	ICL7135CFN	3-3
MP7574AD/BD	ADC0805IN series	3-4
MP7574JN/KN	ADC0804CN or	3-4
	ADC0805CN series	3-4
MP7581/JN/KN/AD/BD	ADC0808N/ADC809N	3-4

DATA ACQUISITION AND CONVERSION CIRCUITS CROSS REFERENCE GUIDE

MOTOROLA	DIRECT TI REPLACEMENT	SUGGESTED TI REPLACEMENT	PAGE NO.
MC1405L		TL500CN/TL501CN/	3-3
		TL505CN	3-3
MC14433P		TL500/1/3CN	3-3
		TLC7135CN	3-3
		TLC7135CFN	3-3
		ICL7135CN	3-3
		ICL7135CFN	3-3
MC14442L	TLC533AMJ	TLC532AMJ	3-4
MC14442P	TLC533AIN	TLC532AIN	3-4
MC14443P		TL507IN	3-3
MC14444P		TLC546IN	3-5
MC14447P		TL507IP	3-3
MC145040FN	TLC541MFN	TLC540MFN	3-5
MC145040L	TLC541MJ	TLC540MJ	3-5
MC145040P	TLC541MN	TLC540MN	3-5
MC54HC4016J	TLC4016MJ		3-7
MC74HC4016J	TLC4016IN		3-7
MC74HC4016N	TLC4016IN		3-7
MC54HC4066J	TLC4066MJ		3-7
MC74HC4066J	TLC4066IN		3-7
MC74HC4066N	TLC4066IN		3-7

NATIONAL	DIRECT TI REPLACEMENT	SUGGESTED TI REPLACEMENT	PAGE NO.
ADC0803LCD	ADC0803IN		3-4
ADC0803LCN	ADC0803IN		3-4
ADC0804LCD	ADC0804IN		3-4
ADC0804LCN	ADC0804CN		3-4
ADC0805LCN	ADC0805IN		3-4
ADC0808CCJ	ADC0808N/		3-4
	TL0808N		3-4
ADC0808CCN	ADC0808N/		3-4
	TL0808N		3-4
ADC0809CCN	ADC0809N/		3-4
	TL0809N		3-4
ADC0811BCJ	TLC541IN	TLC540IN	3-5
ADC0811BCN	TLC541IN	TLC540IN	3-5
ADC0811BCV	TLC541IFN	TLC540IFN	3-5
ADC0811BJ	TLC541MJ	TLC540MJ	3-5
ADC0811CCJ	TLC541IN	TLC540IN	3-5
ADC0811CCN	TLC541IN	TLC540IN	3-5
ADC0811CCV	TLC541IFN	TLC540IFN	3-5
ADC0811CJ	TLC541MJ	TLC540MJ	3-5

(Continued)

NATIONAL	DIRECT TI REPLACEMENT	SUGGESTED TI REPLACEMENT	PAGE NO.
ADC0820BCD	TLC0820BIN, ADC0820BCIN		3-4
ADC0820BCN	TLC0820BCN, ADC0820BCN		3-4
ADC0820BD	TLC0820BMJ, ADC0820BJ		3-4
ADC0820CCD	TLC0820AIN, ADC0820CCIN		3-4
ADC0820CCN	TLC0820ACN, ADC0820CCN		3-4
ADC0820CD	TLC0820AMJ, ADC0820CJ		3-4
ADC0829BCN	TLC533AIN	TLC532AIN	3-4
ADC0829CCN	TLC533AIN	TLC532AIN	3-4
ADC0830BCN		TLC546IN	3-5
ADC0830CCN		TLC546IN	3-5
ADC0831BCJ	ADC0831BIP	TLC549IN	3-5
ADC0831BCN	ADC0831BCP	TLC549IN	3-5
ADC0831CCJ	ADC0831AIP	TLC549IN	3-5
ADC0831CCN	ADC0831ACP	TLC549IN	3-5
ADC0832BCJ	ADC0832BIP		3-5
ADC0832BCN	ADC0832BCP		3-5
ADC0832CCJ	ADC0832AIP		3-5
ADC0832CCN	ADC0832ACP		3-5
ADC0834BCJ	ADC0834BIN		3-5
ADC0834BCN	ADC0834BCN		3-5
ADC0834CCJ	ADC0834AIN		3-5
ADC0834CCN	ADC0834ACN		3-5
ADC0838BCJ	ADC0838BIN		3-5
ADC0838BCN	ADC0838BCN		3-5
ADC0838CCJ	ADC0838AIN		3-5
ADC0838CCN	ADC0838ACN		3-5
ADC1001CCJ		TLC1541IN	3-5
ADC1005BCJ		TLC1541IN	3-5
ADC1005CCJ		TLC1541IN	3-5
ADC3511CCN		TL500/1/3CN	3-3
		TLC7135CN	3-3
		TLC7135CFN	3-3
		ICL7135CN	3-3
		ICL7135CFN	3-3
ADC3711CCN		TL500/1/3CN	3-3
		TLC7135CN	3-3
		TLC7135CFN	3-3
		ICL7135CN	3-3
		ICL7135CFN	3-3
ADD3501CCN		TL500/1/2CN	3-3
ADD3701CCN		TL500/1/2CN	3-3

DATA ACQUISITION AND CONVERSION CIRCUITS CROSS REFERENCE GUIDE

(Continued)

NATIONAL	DIRECT TI REPLACEMENT	PAGE NO.
MF10BN	TLC10CN	3-7
MF10CN	TLC20CN	3-7
MM54HC4016J	TLC4016MJ	3-7
MM54HC4066J	TLC4066MJ	3-7
MM74HC4016N/J	TLC4016IN	3-7
MM74HC4066N/J	TLC4066IN	3-7
MF4-50	TLC04	3-7
MF4-100	TLC14	3-7

PRECISION MONOLITHICS	SUGGESTED TI REPLACEMENT	PAGE NO.
PM7524FQ	TLC7524IN, AD7524AN	3-6
PM7524FP	TLC7524CN, AD7524IN	3-6
PM7528	TLC7528, AD7528	3-6
PM7533	TLC7533, AD7533B	3-6

RCA	DIRECT TI REPLACEMENT	SUGGESTED TI REPLACEMENT	PAGE NO.
CD4016AD	TLC4016MJ		3-7
CD4016AE	TLC4016IN		3-7
CD4066AD	TLC4066MJ		3-7
CD4066AE	TLC4066IN		3-7
CA3162E		TL501CN/TL503CN	3-3

SIGNETICS	DIRECT TI REPLACEMENT	SUGGESTED TI REPLACEMENT	PAGE NO.
ADC0803/4/5-1LCN	ADC0803/4/5IN		3-4
ADC0804-1CN	ADC0804CN		3-4
NE5034F		TLC532AIN	3-4
NE5036FE/N/D		TLC549CN/CD	3-5
NE5037F/N/D		TLC549CN/CD	3-5

DATA ACQUISITION AND CONVERSION CIRCUITS
CROSS REFERENCE GUIDE

SILICONIX	DIRECT TI REPLACEMENT	SUGGESTED TI REPLACEMENT	PAGE NO.
DG182AP	TL182MN	TL610MP	3-7
DG182BP	TL182CN/IN	TL610CP/IP	3-7
DG185AP	TL185MN	TL604MP	3-7
DG185BP	TL185CN/IN	TL604CP/IP	3-7
DG188AP	TL188MN	TL604MP	3-7
DG188BP	TL188CN/IN	TL604CP/IP	3-7
DG191AP	TL191MN	TL604MP	3-7
DG191BP	TL191CN/IN	TL604CP/IP	3-7
LD110CJ		TL503CN	3-3
		TLC7135CN	3-3
		TLC7135CFN	3-3
		ICL7135CN	3-3
		ICL7135CFN	3-3
LD111ACJ		TL501CN	3-3
		TLC7135CN	3-3
		TLC7135CFN	3-3
		ICL7135CN	3-3
		ICL7135CFN	3-3
LD120CJ		TL500CN	3-3
		TLC7135CN	3-3
		TLC7135CFN	3-3
		ICL7135CN	3-3
		ICL7135CFN	3-3
LD121ACJ		TL503CN	3-3
		TLC7135CN	3-3
		TLC7135CFN	3-3
		ICL7135CN	3-3
		ICL7135CFN	3-3
Si520DJ		ADC0808N/	3-4
		ADC0809N	3-4
Si7135CJ	TLC7135CN		3-3
	TLC7135CFN		3-3
	ICL7135CN		3-3
	ICL7135CFN		3-3

SMC	DIRECT TI REPLACEMENT	PAGE NO.
78808	TCM78808	11-9

DATA ACQUISITION CONVERSION CIRCUITS CROSS REFERENCE GUIDE

TELEDYNE	DIRECT TI REPLACEMENT	SUGGESTED TI REPLACEMENT	PAGE NO.
TSC7135CPI	TLC7135CN		3-3
	TLC7135CFN		3-3
	ICL7135CN		3-3
	ICL7135CFN		3-3
TSC8700		ADC0808N	3-4
TSC8701		TLC1541IN	3-5
TSC8703		ADC0808N	3-4
TSC8704		TLC1541IN	3-5
TSC14433CN		TLC7135CN	3-3
		TLC7135CFN	3-3
		ICL7135CN	3-3
		ICL7135CFN	3-3

Replacements are based on similarity of electrical and mechanical characteristics as shown in currently published data. Interchangeability in particular applications is not guaranteed. Before using a device as a substitute, the user should compare the specifications of the substitute device with the specifications of the original.

Texas Instruments makes no warranty as to the information furnished and buyer assumes all risk in the use thereof. No liability is assumed for damages resulting from the use of the information contained herein.

Manufacturers are arranged in alphabetical order.

GOULD/AMI	SUGGESTED TI REPLACEMENT	PAGE NO.
S4535	SN75518	4-6

SILICONIX	SUGGESTED TI REPLACEMENT	PAGE NO.
SI9551	SN75551	4-3
SI9552	SN75552	4-3
SI9553	SN75553	4-4
SI9554	SN75554	4-4

SPRAGUE	SUGGESTED TI REPLACEMENT	PAGE NO.
UCN5810A	TL4810B	4-5
UCN5812A	TL5812	4-5
UCN5818A	SN75518	4-6
UCN5851A	SN75551	4-3
UCN5852A	SN75552	4-3
UCN5853A	SN75553	4-4
UCN5854A	SN75554	4-4

SUPERTEX	SUGGESTED TI REPLACEMENT	PAGE NO.
HV51	SN75551	4-3
HV52	SN75552	4-3
HV53	SN75553	4-4
HV54	SN75554	4-4

LINE DRIVERS AND RECEIVERS CROSS REFERENCE GUIDE

Replacements are based on similarity of electrical and mechanical characteristics as shown in currently published data. Interchangeability in particular applications is not guaranteed. Before using a device as a substitute, the user should compare the specifications of the substitute device with the specifications of the original.

Texas Instruments makes no warranty as to the information furnished and buyer assumes all risk in the use thereof. No liability is assumed for damages resulting from the use of the information contained herein.

Manufacturers are arranged in alphabetical order.

AMD	SUGGESTED TI REPLACEMENT	PAGE NO.
AM26LS31C	AM26LS31C	5-3
AM26LS32C	AM26LS32AC	5-5
AM26LS33C	AM26LS33AC	5-6
AM26S10C	AM26S10C	5-7
AM26S10M	AM26S10M	5-7
AM26S11C	AM26S11C	5-7
AM26S11M	AM26S11M	5-7

FAIRCHILD	SUGGESTED TI REPLACEMENT	PAGE NO.
uA1488C	SN75188	5-3
uA1489AC	SN75189A	5-5
uA1489C	SN75189	5-5
uA26LS31C	AM26LS31C	5-3
uA26LS32C	AM26LS32AC	5-5
uA3486C	MC3486	5-5
uA3487C	MC3487	5-3
uA55107AM	SN55107A	5-6
uA55107BM	SN55107B	5-6
uA55108AM	SN55108A	5-6
uA55108M	SN55108B	5-6
uA55110M	SN55110A	5-4
uA55121M	SN55121	5-4
uA55122M	SN55122	5-6
uA75107AC	SN75107A	5-6
uA75108AC	SN75108A	5-6
uA75108BC	SN75108B	5-6
uA75108C	SN75107B	5-6
uA75110C	SN75110A	5-4
uA75150C	SN75150	5-3
uA75154C	SN75154	5-5
uA8T13C	SN75ALS121	5-4

LINE DRIVERS AND RECEIVERS CROSS REFERENCE GUIDE

(Continued)

FAIRCHILD	SUGGESTED TI REPLACEMENT	PAGE NO.
uA8T13C	SN75121	5-4
uA8T13M	SN55121	5-4
uA8T14C	SN75122	5-6
uA8T14M	SN55122	5-6
uA8T23C	SN75ALS123	5-3
uA8T23C	SN75123	5-3
uA8T24C	SN75124	5-6
uA9614C	SN75114	5-4
uA9614M	SN55114	5-5
uA9615C	SN75115	5-6
uA9615M	SN55115	5-6
uA96172C	SN75172	5-3
uA96173C	SN75173	5-5
uA96174C	SN75174	5-3
uA96175C	SN75175	5-5
uA96176	SN75176B	5-7
uA96177	SN75177B	5-7
uA96178	SN75178B	5-7
uA9636AC	uA9636AC	5-3
uA9637AC	uA9637AC	5-5
uA9637AM	uA9637AM	5-5
uA9638C	uA9638C	5-3
uA9639AC	uA9639C	5-5
uA9640C	AM26S10C	5-7
uA9640M	AM26S10M	5-7
uA9641C	AM26S11C	5-7
uA9641M	AM26S11M	5-7

MOTOROLA	SUGGESTED TI REPLACEMENT	PAGE NO.
AM26LS31	AM26LS31C	5-3
AM26LS32	AM26LS32AC	5-5
MC1488	SN75188	5-3
MC1489	SN75189	5-5
MC1489A	SN75189A	5-5
MC26S10	AM26S10C	5-7
MC26S11	AM26S11C	5-7
MC3446A	MC3446	5-7
MC3450	MC3450	5-6
MC3452	MC3452	5-6
MC3453	MC3453	5-4
MC3481	SN75ALS126	5-3
MC3485	SN75ALS130	5-3

(Continued)

MOTOROLA	SUGGESTED TI REPLACEMENT	PAGE NO.
MC3486	MC3486	5-5
MC3487	MC3487	5-3
MC55107	SN55107A	5-6
MC55108	SN55108A	5-6
MC75107	SN75107A	5-6
MC75108	SN75108A	5-6
MC75125	SN75ALS125	5-6
MC75125	SN75125	5-6
MC75127	SN75ALS127	5-6
MC75127	SN75127	5-6
MC75128	SN75128	5-6
MC75129	SN75129	5-6
MC75140	SN75140	5-6
MC75S110	SN75110A	5-4
SN75172	SN75172	5-3
SN75173	SN75173	5-5
SN75174	SN75174	5-3
SN75175	SN75175	5-5
SN75176	SN75176B	5-7
SN75177	SN75177B	5-7
SN75178	SN75178B	5-7

NATIONAL	SUGGESTED TI REPLACEMENT	PAGE NO.
DS1488	SN75188	5-3
DS1489	SN75189	5-5
DS1489A	SN75189A	5-5
DS26LS31	AM26LS31C	5-3
DS26LS32	AM26LS32AC	5-5
DS26LS32M	AM26LS32AM	5-5
DS26LS33C	AM26LS33AC	5-6
DS26LS33M	AM26LS33AM	5-6
DS26S10C	AM26S10C	5-7
DS26S11C	AM26S11C	5-7
DS26S11M	AM26S11M	5-7
DS3486	MC3486	5-5
DS3487	MC3487	5-3
DS55107	SN55107B	5-6
DS55108	SN55108B	5-6
DS55109	SN55109A	5-4
DS55110	SN55110A	5-4
DS55113	SN55113	5-4
DS55114	SN55114	5-4

LINE DRIVERS AND RECEIVERS CROSS REFERENCE GUIDE

(Continued)

NATIONAL	SUGGESTED TI REPLACEMENT	PAGE NO.
DS55115	SN55115	5-6
DS55121	SN55121	5-4
DS55122	SN55122	5-6
DS75107	SN75107B	5-6
DS75108	SN75108B	5-6
DS75109	SN75109A	5-4
DS75110	SN75110A	5-4
DS75113	SN75113	5-4
DS75114	SN75114	5-4
DS75115	SN75115	5-6
DS75121	SN75ALS121	5-4
DS75121	SN75121	5-4
DS75122	SN75122	5-6
DS75123	SN75ALS123	5-3
DS75123	SN75123	5-3
DS75124	SN75124	5-6
DS75125	SN75ALS125	5-6
DS75125	SN75125	5-6
DS75127	SN75ALS127	5-6
DS75127	SN75127	5-6
DS75128	SN75128	5-6
DS75129	SN75129	5-6
DS75150	SN75150	5-3
DS75154	SN75154	5-5
DS75207	SN75207B	5-6
DS75207	SN75207	5-6
DS75208	SN75208	5-6
DS75208	SN75208B	5-6
DS75108	SN75108B	5-6
DS7820A	SN55182	5-6
DS78220	SN55182	5-6
DS7830	SN55183	5-4
DS8820	SN75182	5-6
DS8820A	SN75182	5-6
DS8830	SN75183	5-4

SIGNETICS	SUGGESTED TI REPLACEMENT	PAGE NO.
8T125	SN75ALS125	5-6
8T125	SN75125	5-6
8T126	SN75ALS126	5-3
8T127	SN75ALS127	5-6
8T127	SN75127	5-6

(Continued)

SIGNETICS	SUGGESTED TI REPLACEMENT	PAGE NO.
8T128	SN75128	5-6
8T129	SN75129	5-6
8T13	SN75ALS121	5-4
8T13	SN75121	5-4
8T14	SN75122	5-6
8T23	SN75ALS123	5-3
8T23	SN75123	5-3
8T24	SN75124	5-6
DM7820	SN55182	5-6
DM7830	SN55183	5-4
DM8820	SN75182	5-6
DM8830	SN75183	5-4
MC1488	SN75188	5-3
MC1489	SN75189	5-5
MC1489A	SN75189A	5-5

Replacements are based on similarity of electrical and mechanical characteristics as shown in currently published data. Interchangeability in particular applications is not guaranteed. Before using a device as a substitute, the user should compare the specifications of the substitute device with the specifications of the original.

Texas Instruments makes no warranty as to the information furnished and buyer assumes all risk in the use thereof. No liability is assumed for damages resulting from the use of the information contained herein.

Manufacturers are arranged in alphabetical order.

ADVANCED LINEAR DEVICES	SUGGESTED TI REPLACEMENT	PAGE NO.
ALD1701, ALD1702, or ALD1703	TLC271	7-12

ANALOG DEVICES	SUGGESTED TI REPLACEMENT	PAGE NO.
AD510 or AD517	OP-07	7-9

FAIRCHILD	SUGGESTED TI REPLACEMENT	PAGE NO.
uA714	OP-07C	7-9
uA714E	OP-07E	7-9
uA714L	OP-07D	7-9
uA741	uA741	7-12
uA747	uA747	7-19
uA748	uA748	7-4
uA771	TLO71	7-10
uA771A	TLO71B or TLO81B	7-10
uA771B	TLO71A or TLO81A	7-10
uA771L	TLO81	7-11
uA772	TLO72	7-17
uA772A	TLO72B	7-17
uA772B	TLO72A or TLO82A	7-16
uA772L	TLO82	7-17
uA774	TLO74	7-24
uA774B	TLO74A or TLO74B	7-24
uA774L	TLO84	7-24

OPERATIONAL AMPLIFIERS CROSS REFERENCE GUIDE

GENERAL ELECTRIC	SUGGESTED TI REPLACEMENT	PAGE NO.
ICL7611, ICL7612, or ICL7613	TLC271	7-12
ICL7621	TLC272	7-18
ICL7641	TLC274 or TLC27L9	7-25
ICL7642	TLC27M9	7-26

HARRIS	SUGGESTED TI REPLACEMENT	PAGE NO.
HA2515	LM318	7-8
HA5130-5	OP-07E	7-9
HA5135-5	OP-07C	7-9

INTERSIL	SUGGESTED TI REPLACEMENT	PAGE NO.
ICL7611, ICL7612, or ICL7613	TLC271	7-12
ICL7621	TLC272	7-18
ICL7641	TLC274 or TLC27L9	7-25
ICL7642	TLC27M9	7-26

LINEAR TECHNOLOGY	SUGGESTED TI REPLACEMENT	PAGE NO.
LT1001	OP-07C, OP-07D, or OP-07E	7-9
LT1007	LT1007	7-8
LT1007A	LT1007A	7-8
LT1037	LT1037	7-8
LT1037A	LT1037A	7-8

MAXIM	SUGGESTED TI REPLACEMENT	PAGE NO.
ICL7611, ICL7612, or ICL7613	TLC271	7-12
ICL7621	TLC272	7-18
ICL7641	TLC274 or TLC27L9	7-25
ICL7642	TLC27M9	7-26

MOTOROLA	SUGGESTED TI REPLACEMENT	PAGE NO.
MC748	uA748	7-4
MC1458	MC1458	7-16
MC1558	MC1558	7-13
MC1709	uA709	7-4
MC1741	uA741	7-12
MC1747	uA747	7-19
MC3303	MC3303	7-21
MC3403	MC3403 or RC4136	7-23
MC4558	RC4558	7-16
MC4741	LM348	7-23
MC34001	TL071 or LF351	7-10
MC34002	TL072 or LF353	7-17
MC34004	TL074 or LF347	7-24
MC34004B	TL074A or LF347B	7-24

NATIONAL	SUGGESTED TI REPLACEMENT	PAGE NO.
LF347	LF374, TL074, or TL084	7-24
LF347B	LF347B, TL074A, TL074B, or TL084A	7-24
LF351	LF351, TL071, or TL081A	7-10
LF353	LF353, TL072, or TL072A	7-17
LF411	LF411 or TL081A	7-10
LF411A	TL071A, TL071B, TL081A, or TL081B	7-10
LF412	LF412, TL072A, TL082A, or TL082B	7-17
LF441	TL061	7-10
LF441A	TL061A or TL061B	7-10
LF442	TL062	7-16
LF442A	TL062B	7-16
LF444	TL064	7-24
LF444A	TL064A	7-23
LH0044	OP-07C	7-9
LH0044B	OP-07D	7-9
LH0044C	OP-07E	7-9
LM201A	LM201A	7-3
LM207	LM207	7-6
LM218	LM218	7-6
LM224	LM224	7-22
LM248	LM248	7-22
LM258	LM258	7-15

OPERATIONAL AMPLIFIERS CROSS REFERENCE GUIDE

(Continued)

NATIONAL	SUGGESTED TI REPLACEMENT	PAGE NO.
LM301A	LM301A	7-4
LM307	LM307	7-8
LM318	LM318	7-8
LM324	LM324	7-23
LM348	LM348	7-23
LM358	LM358 or TL022	7-16
LM709	uA709	7-4
LM741	uA741	7-12
LM883	RC4558	7-16
LM1458	MC1458	7-16
LM2900	LM2900	7-21
LM2902	LM2902	7-21
LM2904	LM2904	7-14
LM3900	LM3900	7-23
LMC660	TLC274	7-25

NEC	SUGGESTED TI REPLACEMENT	PAGE NO.
uPC159	LM318	7-8
uPC251	MC1458	7-16
uPC354	OP-07	7-9
uPC801	TL071, TL081A, or LF351	7-10

PMI	SUGGESTED TI REPLACEMENT	PAGE NO.
OP-02	uA741	7-12
OP-04	uA747	7-19
OP-07C	OP-07C	7-9
OP-07D	OP-07D	7-9
OP-07E	OP-07E	7-9
OP-07F	RC4136	7-23
OP-14C or OP-14E	MC1458	7-16
OP-14J	MC1558	7-13
OP-15F	TL071, TL081A, or LF351	7-10
OP-27E	OP-27E	7-10
OP-27G	OP-27G	7-10
OP-37E	OP-37E	7-10
OP-37G	OP-37G	7-10
OP-215F	TL072, TL082A, or LF353	7-17

RAYTHEON	SUGGESTED TI REPLACEMENT	PAGE NO.
RC4136	RC4136	7-23
RC4156	LM348	7-23
RC4157	LM348	7-23
RC4558	RC4558	7-16
RC4559	RC4559	7-16

RCA	SUGGESTED TI REPLACEMENT	PAGE NO.
CA081	TL081	7-11
CA081A	TL081A	7-10
CA082	TL082	7-17
CA082A	TL082A	7-17
CA084	TL084	7-24

SIGNETICS	SUGGESTED TI REPLACEMENT	PAGE NO.
NE532	LM358 or TL022	7-16
NE5532	NE5532	7-16
NE5532A	NE5532A	7-16
NE5534	NE5534	7-8
NE5534A	NE5534A	7-8
SE5534	SE5534	7-5
SE5534A	SE5534A	7-5

OPERATIONAL AMPLIFIERS CROSS REFERENCE GUIDE

SGS-THOMSON	SUGGESTED TI REPLACEMENT	PAGE NO.
TS271	TLC271	7-12
TS271A	TLC271A	7-12
TS271B	TLC271B	7-12
TS272	TLC272	7-18
TS272A	TLC272A	7-18
TS272B	TLC272B	7-18
TS274	TLC274	7-25
TS274A	TLC274A	7-25
TS274B	TLC274B	7-25
TS27L2	TLC27L2	7-19
TS27L2A	TLC27L2A	7-19
TS27L2B	TLC27L2B	7-19
TS27L4	TLC27L4	7-26
TS27L4A	TLC27L4A	7-26
TS27L4B	TLC27L4B	7-26
TS27M2	TLC27M2	7-19
TS27M2A	TLC27M2A	7-19
TS27M2B	TLC27M2B	7-19
TS27M4	TLC27M4	7-26
TS27M4A	TLC7M4A	7-26
TS27M4B	TLC27M4B	7-26

OPTOELECTRONICS AND IMAGE SENSORS CROSS REFERENCE GUIDE

Replacements are based on similarity of electrical and mechanical characteristics as shown in currently published data. Interchangeability in particular applications is not guaranteed. Before using a device as a substitute, the user should compare the specifications of the substitute device with the specifications of the original.

Texas Instruments makes no warranty as to the information furnished and buyer assumes all risk in the use thereof. No liability is assumed for damages resulting from the use of the information contained herein.

Manufacturers are arranged in alphabetical order.

CLAIREX	SUGGESTED TI REPLACEMENT	PAGE NO.
CL12	TIL118	8-3
CL13	4N37	8-3
CL15	TIL116	8-3
CL16	TIL117	8-3
CL17	TIL118	8-3
CL18	TIL116	8-3

CLAIREX	SUGGESTED TI REPLACEMENT	PAGE NO.
CL19	TIL116	8-3
CL112	TIL157	8-4
CL10506A	TIL116	8-3
CL1506	TIL118	8-3
CL1510	4N37	8-3
CL1511	4N37	8-3
CLT3160	TIL602	8-8
CLT3170	TIL604	8-8

DIALIGHT CORPORATION	DIRECT TI REPLACEMENT	PAGE NO.
441-0002	TIL111	8-3
551-0003	TIL112	8-3
745-0004	TIL304	8-7
745-0005	TIL305	8-7
745-0006	TIL302	8-7
745-0007	TIL311	8-7
745-0008	TIL308	8-7
745-0009	TIL306	8-7

OPTOELECTRONICS AND IMAGE SENSORS CROSS REFERENCE GUIDE

EG&G RETICON	SUGGESTED TI REPLACEMENT	PAGE NO.
RL128G	TC102	8-9
RL2048	TC103	8-9

FAIRCHILD	SUGGESTED TI REPLACEMENT	PAGE NO.
CCD111	TC102	8-9
CCD142	TC103	8-9
CCD143	TC103	8-9

GENERAL ELECTRIC	DIRECT TI REPLACEMENT	SUGGESTED TI REPLACEMENT	PAGE NO.
GE3009	MOC3009		8-6
GE3010	MOC3010		8-6
GE3011	MOC3011		8-6
GE3012	MOC3012		8-6
GE3020	MOC3020		8-6
GE3021	MOC3021		8-6
GE3022	MOC3022		8-6
GE3023	MOC3023		8-6
H11A1	TIL117		8-3
H11A2	TIL112		8-3
H11A3	TIL116		8-3
H11A3	TIL114		8-3
H11A3	TIL116		8-3
H11A4	TIL111		8-3
H11A5	TIL116		8-3
H11B2	TIL113		8-3
H11B3	TIL119		8-3
H11A520	TIL125		8-4
H11A590	TIL126		8-4
LI5AX601	TIL601		8-8
LI5AX604	TIL604		8-8
H11A3		TIL115	8-3
H11A3		TIL114	8-3
H11A5		TIL118	8-3
H11B1		TIL113	8-3
H11B1		TIL187	8-4
H11B1		TIL188	8-4
H11B2		TIL119	8-3
H11G2		TIL156	8-3
H11AA1		TIL186	8-3
H11A520		TIL124/TIL154	8-4
H11A550		TIL126/TIL155	8-4

GENERAL INSTRUMENTS	DIRECT TI REPLACEMENT	SUGGESTED TI REPLACEMENT	PAGE NO.
MAN1A	TIL302		8-7
MAN2A	TIL305		8-7
MAN10A	TIL302		8-7
MAN101A	TIL304		8-7
MAN1001A	TIL304		8-7
MCP3009	MOC3009		8-6
MCP3010	MOC3010		8-6
MCP3011	MOC3011		8-6
MCP3012	MOC3012		8-6
MCP3020	MOC3020		8-6
MCP3021	MOC3021		8-6
MCP3022	MOC3022		8-6
MCP3023	MOC3023		8-6
MCT2	MCT2		8-3
MCT2E	MCT2E		8-3
MCT4	TIL120		8-4
MCT26	TIL111		8-3
MCA230		TIL113	8-3
MCA231		TIL113	8-3
MCT271		TIL126	8-4
MCT272		TIL126	8-4
MCT273		TIL127	8-4
MCT274		TIL128	8-4
MCT275		TIL127	8-4
MCT277		TIL117	8-3

HEWLETT-PACKARD	DIRECT TI REPLACEMENT	SUGGESTED TI REPLACEMENT	PAGE NO.
6N135	6N135		8-5
6N136	6N136		8-5
6N137	6N137		8-5
6N138	6N138		8-5
6N139	6N139		8-5
HCPL2502	HCPL2502		8-5
HCPL2601	HCPL2601		8-5
HCPL2630	HCPL2630		8-5
5082-7100		TIL305	8-7
5082-7101		TIL305	8-7
5082-7300		TIL309	8-7
5082-7300		TIL307	8-7
5082-7302		TIL308	8-7
5082-7302		TIL306	8-7
5082-7340		TIL311	8-7

OPTOELECTRONICS AND IMAGE SENSORS CROSS REFERENCE GUIDE

HONEYWELL	DIRECT TI REPLACEMENT	SUGGESTED TI REPLACEMENT	PAGE NO.
SD2440-1	TIL601		8-8
SD2440-2	TIL602		8-8
SD2440-3	TIL603		8-8
SD2440-4	TIL604		8-8
SE2450-1	TIL23		8-8
SE2450-2	TIL23		8-8
SE2450-3	TIL25		8-8
SE2460-3	TIL24		8-8
SPX6	TIL126		8-4
SPX26	TIL153		8-4
SPX53	TIL155		8-4
SCD11B2		TIL156	8-4
SCD11B2		TIL119	8-3
SCD11B2		TIL113	8-3
SCD11B2		TIL128	8-4
SCD11B2		TIL157	8-4
SCD11B2		TIL127	8-4
SE2460-1		TIL23	8-8
SE2460-2		TIL23	8-8
SPX2E		TIL125	8-4
SPX2E		TIL124	8-4
SPX26		TIL118	8-3
SPX26		TIL115	8-3
SPX33		TIL154	8-4
SPX33		TIL153	8-4
SPX33B2		TIL116	8-3
SPX33B2		TIL114	8-3
SPX53		TIL117	8-3

INDUSTRIAL ELECTRONIC ENGINEERS	DIRECT TI REPLACEMENT	PAGE NO.
1704R	TIL305	8-7
1705R	TIL306	8-7
1705R	TIL308	8-7
1707R	TIL311	8-7
1717R	TIL309	8-7

JEDEC REGISTERED	DIRECT TI REPLACEMENT	PAGE NO.
4N22A	4N22	8-3
4N23A	4N23	8-3
4N24A	4N24	8-3
4N25	4N25	8-3

(Continued)

JEDEC REGISTERED	DIRECT TI REPLACEMENT	SUGGESTED TI REPLACEMENT	PAGE NO.
4N25A	TIL154		8-4
4N26	4N26		8-3
4N27	4N27		8-3
4N28	4N28		8-3
4N29A	TIL156		8-4
4N30	TIL113		8-3
4N31	TIL119		8-3
4N33	TIL113		8-3
4N34	TIL113		8-3
4N35	4N35		8-3
4N36	4N36		8-3
4N37	4N37		8-3
3N243		TIL120	8-4
3N245		TIL120	8-4
3N244		TIL120	8-4

MOTOROLA	DIRECT TI REPLACEMENT	SUGGESTED TI REPLACEMENT	PAGE NO.
MLED910	TIL23		8-8
MOC1000	TIL116		8-3
MOC1001	TIL116		8-3
MOC1002	TIL116		8-3
MOC1100	TIL113		8-3
MOC1200	TIL113		8-3
MOC3009	MOC3009		8-6
MOC3010	MOC3010		8-6
MOC3011	MOC3011		8-6
MOC3012	MOC3012		8-6
MOC3020	MOC3020		8-6
MOC3021	MOC3021		8-6
MOC3022	MOC3022		8-6
MOC3023	MOC3023		8-6
MOC8020	TIL190		8-4
MRD601	TIL601		8-8
MRD602	TIL602		8-8
MRD603	TIL603		8-8
MRD604	TIL604		8-8
MOC119		TIL119	8-3
MOC1000		4N26	8-3
MOC1001		4N25	8-3
MOC1002		4N27	8-3
MOC1003		4N28	8-3
MOC1005		TIL118	8-3

OPTOELECTRONICS AND IMAGE SENSORS CROSS REFERENCE GUIDE

(Continued)

MOTOROLA	SUGGESTED TI REPLACEMENT	PAGE NO.
MOC1006	TIL118	8-3
MOC8050	TIL113	8-3
MRD603	TIL604	8-8

SIEMENS	DIRECT TI REPLACEMENT	SUGGESTED TI REPLACEMENT	PAGE NO.
DL1A	TIL302		8-7
DL10	TIL302		8-7
DL10A	TIL302		8-7
DL57	TIL305		8-7
DL101	TIL304		8-7
DL101A	TIL304		8-7
IL-1	TIL114		8-3
IL-5	TIL155		8-4
IL-15	TIL112		8-3
BPX62I		TIL602	8-8
BPX62II		TIL602	8-8
BPX62III		TIL603	8-8
CNY17-1		TIL126	8-4
CNY17-2		TIL126	8-4
CNY17-3		TIL127	8-4
CNY17-4		TIL128	8-4
CNY18-2		TIL120	8-4
CNY18-3		TIL121	8-4
IL-5		TIL117	8-3
IL-12		TIL111	8-3
IL-16		TIL118	8-3
IL-30		TIL113	8-3
IL-74		TIL111	8-3
IL-94		TIL153	8-4
IL-203		TIL127	8-4
IL-501		TIL125	8-4
IL-505		TIL126	8-4
IL-512		TIL124	8-4
SFH600		TIL117	8-3
SFH600-0		TIL117	8-3
SFH601-1		TIL155	8-4

OPTOELECTRONICS AND IMAGE SENSORS CROSS REFERENCE GUIDE

TRW	DIRECT TI REPLACEMENT	SUGGESTED TI REPLACEMENT	PAGE NO.
OP102	TIL102		8-3
OP103	TIL103		8-3
OP122	TIL23		8-8
OP123	TIL23		8-8
OP124	TIL24		8-8
OP600	LS600		8-8
OP601	TIL601		8-8
OP602	TIL602		8-8
OP603	TIL603		8-8
OP604	TIL604		8-8
OP640	LS600		8-8
OP641	TIL601		8-8
OP642	TIL602		8-8
OP643	TIL603		8-8
OPI102	TIL102/4N22		8-8
OPI103	TIL103/4N24		8-3
OPI2150	TIL112		8-3
OPI3009	MOC3009		8-6
OPI3010	MOC3010		8-6
OPI3011	MOC3011		8-6
OPI3012	MOC3012		8-6
OPI3020	MOC3020		8-6
OPI3021	MOC3021		8-6
OPI3022	MOC3022		8-6
OPI3023	MOC3023		8-6
OPI3151	TIL113		8-3
OPI8012	OPI8012		8-6
OPI8013	OPI8013		8-6
OPI8014	OPI8014		8-6
OPI8015	OPI8015		8-6
OPI140		TIL120	8-4
OPI2252		TIL116	8-3
OPI2253		TIL117	8-3

Replacements are based on similarity of electrical and mechanical characteristics as shown in currently published data. Interchangeability in particular applications is not guaranteed. Before using a device as a substitute, the user should compare the specifications of the substitute device with the specifications of the original.

Texas Instruments makes no warranty as to the information furnished and buyer assumes all risk in the use thereof. No liability is assumed for damages resulting from the use of the information contained herein.

Manufacturers are arranged in alphabetical order.

FAIRCHILD	SUGGESTED TI REPLACEMENT	PAGE NO.
uA75451	SN75451B	9-3
uA75452	SN75452B	9-3
uA75453	SN75453B	9-3
uA75454	SN75454B	9-3
uA75461	SN75461	9-3
uA75462	SN75462	9-3
MC1412	ULN2002A	9-4
MC1413	ULN2003A	9-4
uA3680	DS3680	11-9
uA9665	ULN2001A	9-4
uA9666	ULN2002A	9-4
uA9667	ULN2003A	9-4
uA9668	ULN2004A	9-4

MOTOROLA	SUGGESTED TI REPLACEMENT	PAGE NO.
MC1411	ULN2001A	9-4
MC1412	ULN2002A	9-4
MC1413	ULN2003A	9-4
MC1413T	SN75468	9-5
MC1416	ULN2004A	9-4
MC1471	SN75476	9-4
MC1473	SN75478	9-4
MC1474	SN75479	9-4
SN75451B	SN75451B	9-3
SN75452B	SN75452B	9-3
SN75453B	SN75453B	9-3
SN75454B	SN75454B	9-3
UDN2841	UDN2841	9-3
UDN2845	UDN2845	9-3
ULN2001	ULN2001A	9-4
ULN2002	ULN2002A	9-4

PERIPHERAL DRIVERS/ACTUATORS CROSS REFERENCE GUIDE

(Continued)

MOTOROLA	SUGGESTED TI REPLACEMENT	PAGE NO.
ULN2003	ULN2003A	9-4
ULN2004	ULN2004A	9-4
ULN2064	ULN2064	9-3
ULN2065	ULN2065	9-4
ULN2066	ULN2066	9-3
ULN2067	ULN2067	9-4
ULN2068	ULN2068	9-3
ULN2069	ULN2069	9-4
ULN2074	ULN2074	9-3
ULN2075	ULN2075	9-4

NATIONAL	SUGGESTED TI REPLACEMENT	PAGE NO.
DS3611	SN75471	9-4
DS3612	SN75472	9-4
DS3613	SN75473	9-4
DS3658	SN75437A	9-3
DS3668	SN75435	9-4
DS3669	SN75440	9-3
DS3680	DS3680	11-9
DS75361	SN75372	9-3
DS75365	SN75374	9-3
DS75451	SN75451B	9-3
DS75452	SN75452B	9-3
DS75453	SN75453B	9-3
DS75454	SN75454B	9-3
DS75461	SN75461	9-3
DS75462	SN75462	9-3
DS75463	SN75463	9-3
LM3611	SN75471	9-4
LM3612	SN75472	9-4
LM3613	SN75473	9-4
LM75453	SN75453B	9-3

RIFA	SUGGESTED TI REPLACEMENT	PAGE NO.
PBD352301	ULN2001A	9-4
PBD352302	ULN2004A	9-4
PBD352303	ULN2003A	9-4
PBD352304	ULN2002A	9-4
PBD352311	SN75466	9-5

(Continued)

RIFA	SUGGESTED TI REPLACEMENT	PAGE NO.
PBD352312	SN75469	9-5
PBD352313	SN75468	9-5
PBD352314	SN75467	9-5
UC3717	PBL3717A	9-5

SGS-ATES	SUGGESTED TI REPLACEMENT	PAGE NO.
L201	ULN2001A	9-4
L202	ULN2002A	9-4
L203	ULN2003A	9-4
L204	ULN2004A	9-4
L293	L293	9-5
L293	SN754411	9-5
L293D	L293D	9-5
L293D	SN754410	9-5
L298	L298	9-5
LP298	TLP298	9-5
ULN2001	ULN2001A	9-4
ULN2002	ULN2002A	9-4
ULN2003	ULN2003A	9-4
ULN2004	ULN2004A	9-4
ULN2064	ULN2064	9-3
ULN2065	ULN2065	9-4
ULN2066	ULN2066	9-3
ULN2067	ULN2067	9-4
ULN2068	ULN2068	9-3
ULN2069	ULN2069	9-4
ULN2074	ULN2074	9-3
ULN2075	ULN2075	9-4
PBL3717A	PBL3717A	9-5

SILICON GENERAL	SUGGESTED TI REPLACEMENT	PAGE NO.
SG2001	ULN2001A	9-4
SG2002	ULN2002A	9-4
SG2003	ULN2003A	9-4
SG2004	ULN2004A	9-4
SG2022	SN75467	9-5
SG2023	SN75468	9-5

PERIPHERAL DRIVERS/ACTUATORS CROSS REFERENCE GUIDE

(Continued)

SILICON GENERAL	SUGGESTED TI REPLACEMENT	PAGE NO.
SG2024	SN75469	9-5
SG75451	SN75451B	9-3
SG75452	SN75452B	9-3
SG75453	SN75453B	9-3
SG75454	SN75454B	9-3
SG75461	SN75461	9-3
SG75462	SN75462	9-3
SG75463	SN75463	9-3
SG75473	SN75473	9-4

SPRAGUE	SUGGESTED TI REPLACEMENT	PAGE NO.
UDN-5732	SN75407	9-4
UDN-2541	SN75437A	9-3
UDN-2841	UDN2841	9-3
UDN-2845	UDN2845	9-3
UDN-2949	SN75605	9-5
UDN-2950	SN75605	9-5
UDN-3611	SN75471	9-4
UDN-3612	SN75472	9-4
UDN-3613	SN75473	9-4
UDN-5711	SN75476	9-4
UDN-5713	SN75478	9-4
UDN-5714	SN75479	9-4
UDN-5722	SN75477	9-4
ULN-2001	ULN2001A	9-4
ULN-2002	ULN2002A	9-4
ULN-2003	ULN2003A	9-4
ULN-2004	ULN2004A	9-4
ULN-2005	ULN2005A	9-4
ULN-2021	SN75466	9-5
ULN-2022	SN75467	9-5
ULN-2023	SN75468	9-5
ULN-2024	SN75469	9-5
ULN-2025	SN75465	9-5
ULN-2064	ULN2064	9-3
ULN-2065	ULN2065	9-4
ULN-2066	ULN2066	9-3
ULN-2067	ULN2067	9-4
ULN-2068	ULN2068	9-3
ULN-2069	ULN2069	9-4
ULN-2074	ULN2074	9-3

UNITRODE	SUGGESTED TI REPLACEMENT	PAGE NO.
L293	L293	9-5
L293	SN754411	9-5
L293D	L293D	9-5
L293D	SN754410	9-5
L298	L298	9-5
PBL3717A	PBL3717A	9-5
PBD352313	SN75468	9-5
PBD352314	SN75467	9-5

General Information

Replacements are based on similarity of electrical and mechanical characteristics as shown in currently published data. Interchangeability in particular applications is not guaranteed. Before using a device as a substitute, the user should compare the specifications of the substitute device with the specifications of the original.

Texas Instruments makes no warranty as to the information furnished and buyer assumes all risk in the use thereof. No liability is assumed for damages resulting from the use of the information contained herein.

Manufacturers are arranged in alphabetical order.

INTERSIL	SUGGESTED TI REPLACEMENT	PAGE NO
ICM7555	TLC555	10-3

MOTOROLA	DIRECT TI REPLACEMENT	SUGGESTED TI REPLACEMENT	PAGE NO.
MC1445	MC1445		10-6
MC1545	MC1545		10-6
MC1733		uA733	10-6
MC3470	MC3470		10-5
NE555	NE555		10-3
NE592	NE592		10-6

SIGNETICS	DIRECT TI REPLACEMENT	SUGGESTED TI REPLACEMENT	PAGE NO.
NE555	NE555	TLC555	10-3
NE556	NE556	TLC556	10-3
NE592	NE592		10-6
SA555		SA555 or TLC555	10-3
SA556		SA556 or TLC556	10-3
SE555		SE555 or TLC555	10-3
SE555C		SE555C or TLC555	10-3
SE556		SE556 or TLC556	10-3
SE556C		SE556C or TLC556	10-3
uA733		uA733	10-6

SPRAGUE	SUGGESTED TI REPLACEMENT	PAGE NO.
UGN3019	TL3019C	10-4
UGS3019	TL3019I	10-4
UGN3020	TL3020C	10-4
UGS3020	TL3020I	10-4

General Information

Replacements are based on similarity of electrical and mechanical characteristics as shown in currently published data. Interchangeability in particular applications is not guaranteed. Before using a device as a substitute, the user should compare the specifications of the substitute device with the specifications of the original.

Texas Instruments makes no warranty as to the information furnished and buyer assumes all risk in the use thereof. No liability is assumed for damages resulting from the use of the information contained herein.

Manufacturers are arranged in alphabetical order.

LINEAR TECHNOLOGY	DIRECT TI REPLACEMENT	PAGE NO.
LM317	LM317	12-4
LM337	LM337	12-4
LT1009	LT1009	12-4
LT1070	LT1070	12-6
SG3524	SG3524	12-5
UC3846	UC3846	12-6
UC3847	UC3847	12-6

MOTOROLA	DIRECT TI REPLACEMENT	PAGE NO.
LM217, LM317	LM217, LM317	12-4
LM237, LM337	LM237, LM337	12-4
LM340-5	LM340-5	12-7
LM340-12	LM340-12	12-7
LM340-15	LM340-15	12-8
MC1723	UA723	12-4
MC3423	MC3423	12-3
MC34060	MC34060	12-5
MC78L00 Series	uA78L00 Series	12-7
MC78M00 Series	uA78M00 Series	12-7
MC79L00 Series	MC79L00 Series	12-9
TL431	TL431	12-4
TL494	TL494	12-5
TL495	TL495	12-5
TL780-5	TL780-5	12-7
TL780-12	TL780-12	12-7
TL780-15	TL780-15	12-8

VOLTAGE REGULATORS CROSS REFERENCE GUIDE

NATIONAL	DIRECT TI REPLACEMENT	SUGGESTED TI REPLACEMENT	PAGE NO.
LM217, LM317	LM217, LM317		12-4
LM237, LM337	LM237, LM337		12-4
LM317L	TL317		12-4
LM330	LM330		12-7
LM336-2.5		LT1009	12-4
LM723	uA723		12-4
LM2930-5	LM2930-5		12-7
LM2930-8	LM2930-8		12-7
LM340-5	LM340-5		12-7
LM340-12	LM340-12		12-7
LM340-15	LM340-15		12-8
LM3524	SG3524		12-5
LM7800 Series	uA7800 Series		12-7
LM78L00 Series	uA78L00 Series		12-7
LM78M00 Series	uA78M00 Series		12-7
LM7900 Series	uA7900 Series		12-9
LM79L00 Series	MC79L00 Series		12-9
LM79M00 Series	uA79M00 Series		12-9

SILICON GENERAL	DIRECT TI REPLACEMENT	PAGE NO.
SG3524	SG3524	12-5

SPRAGUE	DIRECT TI REPLACEMENT	PAGE NO.
ULN8194	TL594	12-5
ULN8195	TL595	12-5

UNITRODE	DIRECT TI REPLACEMENT	SUGGESTED TI REPLACEMENT	PAGE NO.
TL431	TL431		12-4
UC317	LM317		12-4
UC337	LM337		12-4
UC494	TL494		12-5
UC494A	TL594		12-5
UC495	TL495		12-5
UC495A	TL595		12-5
UC3846	UC3846		12-6
UC3847	UC3847		12-6
UC7800 Series	uA7800 Series		12-7
UC7800A Series		TL780-00 Series	12-7
UC7900 Series	uA7900 Series		12-9

Comparators

military temperature range (Values specified at T_A = 25°C)

single channel

DESCRIPTION	POWER SUPPLY V_{CC+} NOM (V)	POWER SUPPLY V_{CC-} NOM (V)	V_{IO} MAX (mV)	I_{IB} MAX (uA)	I_{OL} MIN (mA)	RESPONSE TIME TYP (ns)	TYPE	PACKAGE
Strobe	15	−15	3	0.1	8	115	LM111	FK,J,JG,U
Ultra Low Power, Strobe	15	−15	7.5	0.1	1.6	1200	LP111	FK,JG
Strobe	15	−15	1.5	50		150	LT1011M	JG,L
Strobe	15	−15	0.5	25		150	LT1011AM	JG,L
Single LM339	5	0	5	−0.1	6	300	TL331M	JG

dual channel

Low Power, Bipolar	5	0	5	0.1	6	300	LM193	JG
Dual TL510M	12	−6	2	15	2	30	TL514M	J
High Speed, LinCMOS	5	0	10	†	6	200	TLC372M	FK,JG
Ultra Low Power, Open-Drain Output	5	0	5	†	6	1100	TLC393M	FK,JG
Ultra Low Power, Push-Pull Output	5	0	5	†	4	1300	TLC3702M	FK,JG

quad channel

Low Power, Bipolar	5	0	5	−0.1	6	300	LM139	FK,J,W
Precision Input	5	0	2	−0.1	6	300	LM139A	FK,J,W
Ultra Low Power, Open-Drain Output	5	0	5	†	6	1100	TLC339M	FK,J
High Speed, LinCMOS	5	0	10	†	6	200	TLC374M	FK,J
Ultra Low Power, Push-Pull Output	5	0	5	†	4	1300	TLC3704M	FK,J

†Typically 5 pA.

NOTE: The applicable literature number is SLYD001, except the following: LP111 which is SLCS003, LT1011 Series which is SLVS014, TLC372M which is SLN002A, TLC393M which is SLNS017, TLC3702M which is SLNS015, TLC339M which is SLNS018, TLC374M which is SLNS003A, and TLC3704M which is SLNS016.

COMPARATORS
SELECTION GUIDE

automotive temperature range

(Values specified at T_A = 25°C)

DESCRIPTION	POWER SUPPLY V_{CC+} NOM (V)	POWER SUPPLY V_{CC-} NOM (V)	V_{IO} MAX (mV)	I_{IB} MAX (uA)	I_{OL} MIN (mA)	RESPONSE TIME TYP (ns)	TYPE	PACKAGE
dual channel								
Automotive LM393	5	0	7	0.25	6	300	LM2903	D,JG,P
High Speed, LinCMOS	5	0	10	†	6	200	TLC372I	D,JG,P
Ultra Low Power, Open Drain Output	5	0	5	†	6	1100	TLC393I	D,JG,P
Ultra Low Power, Push Pull Output	5	0	5	†	4	1300	TLC3702I	D,JG,P
quad channel								
Automotive Temp. LM339	5	0	7	−0.25	6	300	LM2901	D,J,N
Low-Cost LM2901	5	0	20	0.5	6	300	LM3302	D,J,N
Ultra Low Power, Automotive LP339, Bipolar	5	0	±5	−0.025	20	8000	LP2901	D,J,N
Open-Drain Output	5	0	5	†	6	1100	TLC339I	D,J,N
High Speed, LinCMOS	5	0	10	†	6	200	TLC374I	D,J,N
Push-Pull Output	5	0	5	†	4	1300	TLC3704I	D,J,N

†Typically 5 pA

NOTE: The applicable literature number is SLYD001, except the following: TLC372I which is SLNS002A, TLC374I which is SLN003A, TLC3702I which is SLNS015, TLC393I which is SLNS017, LP2901 which is SLCS004, TLC339I which is SLNS018, and the TLC3704I which is SLNS016.

industrial temperature range

(Values specified at T_A = 25°C)

DESCRIPTION	POWER SUPPLY V_{CC+} NOM (V)	POWER SUPPLY V_{CC-} NOM (V)	V_{IO} MAX (mV)	I_{IB} MAX (uA)	I_{OL} MIN (mA)	RESPONSE TIME TYP (ns)	TYPE	PACKAGE
single channel								
Strobe	15	−15	3	0.1	8	115	LM211	D,JG,P
Ultra Low Power, Strobe	15	−15	7.5	0.1	1.6	1200	LP211	D,JG,P
Single LM339	5	0	5	−0.1	6	300	TL331I	D,JG,P
dual channel								
Industrial LM393	5	0	5	0.25	6	300	LM293	D,JG,P
Industrial LM393, Low Offset	5	0	2	0.25	6	300	LM293A	D,JG,P
quad channel								
Industrial LM339	5	0	5	−0.25	6	300	LM239	D,J,N
Industrial LM339, Low Offset	5	0	2	−0.25	6	300	LM239A	D,J,N
Ultra Low Power, Industrial LP339, Bipolar	5	0	±5	−0.025	20	8000	LP239	D,J,N

NOTE: The applicable literature number is SLYD001, except the following: LP211 which is SLCS003, and LP239 which is SLCS004.

COMPARATORS
SELECTION GUIDE

commercial temperature range (Values specified at T_A = 25°C)

single channel

DESCRIPTION	POWER SUPPLY V_{CC+} NOM (V)	POWER SUPPLY V_{CC-} NOM (V)	V_{IO} MAX (mV)	I_{IB} MAX (uA)	I_{OL} MIN (mA)	RESPONSE TIME TYP (ns)	TYPE	PACKAGE
Strobe	12	−6	5	40	100	28	LM306	D,J,JG, N,P
Strobe	15	−15	7.5	0.25	8	115	LM311	D,JG,P
Ultra Low Power, Strobe	15	−15	7.5	0.1	1.6	1200	LP311	D,JG,P
Strobe	15	−15	0.5	25		150	LT1011AC	JG,L,P
Strobe	15	−15	1.5	50		150	LT1011C	JG,L,P
Single LM339	5	0	5	−0.25	6	300	TL331C	D,JG,P
Output Enable	5	0	±1		MAX 16	25	TL712	D,P
High Speed	0	−5.2	±1		MAX 16	Max 12	TL721	D,P

dual channel

VCC: 2 V to 36 V	5	0	5	0.25	6	300	LM393	D,JG,P
VCC: 2 V to 36 V	5	0	2	0.25	6	300	LM393A	D,JG,P
Ultra Low Offset, LinCMOS	5	0	10	†	6	200	TLC352C	D,P
High Speed, LinCMOS	5	0	10	†	6	200	TLC372C	D,JG,P
Ultra Low Power, Open Drain Output, CMOS	5	0	5	†	6	1100	TLC393C	D,JG,P
Ultra Low Power, Push-Pull Output, CMOS	5	0	5	†	4	1300	TLC3702C	D,JG,P

†Typically 5 pA

NOTE: The applicable literature number is SLYD001, except the following: LP311 which is SLCS003, LT1011 Series which is SLVS014, TLC352C which is SLOS007, TLC372C which is SLNS002A, TLC393C which is SLNS017, and TLC3702C which is SLNS015.

commercial temperature range (Values specified at T_A = 25°C)

quad channel

DESCRIPTION	POWER SUPPLY V_{CC+} NOM (V)	POWER SUPPLY V_{CC-} NOM (V)	V_{IO} MAX (mV)	I_{IB} MAX (uA)	I_{OL} MIN (mA)	RESPONSE TIME TYP (ns)	TYPE	PACKAGE
VCC: 2 V to 36 V	5	0	5	−0.25	6	300	LM339	D,J,N
VCC: 2 V to 36 V	5	0	2	−0.25	6	300	LM339A	D,J,N
Ultra Low Power, Bipolar	5	0	±5	−0.025		8000	LP339	D,J,N
Ultra Low Power, Open Drain Output, CMOS	5	0	5	†	6	1100	TLC339C	D,J,N
Ultra Low Offset, LinCMOS	5	0	10	†	6	200	TLC354C	D,N
High Speed, CMOS	5	0	10	†	6	200	TLC374C	D,J,N
Ultra Low Power, Push-Pull Output, CMOS	5	0	5	†	4	1300	TLC3704C	D,J,N

†Typically 5 pA.

NOTE: The applicable literature number is SLYD001, except the following: LP339 which is SLCS004, TLC339C which is SLNS018, TLC354C which is SLOS008, TLC374C which is SLNS003A, and TLC3704C which is SLNS016.

Data Acquisition/Conversion Circuits

single-slope and dual-slope A/D converters

CONVERSION FUNCTION	RESOLUTION	SPEED (ms)	TYPE	PACKAGE
Dual Slope A/D with BCD Output	4 1/2 Digits	34	ICL7135	FN,N
Dual-Slope Analog Processors	4 1/2 Digits	80	TL500	J
	3 1/2 Digits		TL501	
Digital Processors with Seven-Segment Outputs	4 1/2 Digits		TL502	N
Digital Processors with BCD Outputs	4 1/2 Digits		TL503	
Dual-Slope Analog	10 Bits	50	TL505	
Pulse-Width Modulator for Single-Slope Converter	7 Bits	1	TL507	P
Dual-Slope A/D with BCD Output	4 1/2 Digits	34	TLC7135	FN,N

NOTE: The applicable literature number is SLYD002. (For ICL7135 information, refer to the data section of TLC7135.)

DATA ACQUISITION AND CONVERSION CIRCUITS SELECTION GUIDE

successive-approximation and semi-flash A/D converters

ADDRESS AND DATA I/O FORMAT	SIGNAL INPUTS		RESOLUTION (BITS)	CONVERSION SPEED (μs)‡	POWER DISSIPATION (mW TYP)	UNADJUSTED ERROR (MAX) ±LSB	TYPE	PACKAGE
	ANALOG DEDICATED	ANALOG† DIGITAL						
PARALLEL	1§	0	8	100	10	0.5	ADC0803	N
						1.0	ADC0804	
							ADC0805	
	8					0.75	ADC0808	FN,N
						0.75	ADC0808M	FK,JD
						1.25	ADC0809	FN,N
					0.5	0.75	TL0808	
						1.25	TL0809	
	1§			1	35	1.0	ADC0820BC	DW,FN,N
						0.5	ADC0820CC	
						1.0	TLC0820A	
						0.5	TLC0820B	
	5	6		15	6	0.5	TLC532A	FN,N
				30			TLC533A	

†Analog/digital inputs can be used either as digital logic inputs or inputs for analog to digital conversion. For example: The TLC532/3A can have 11 analog inputs, 5 analog inputs, and 6 digital inputs, or any combination in between.

‡Includes access time

§Differential input

NOTE: The applicable literature number is SLYD002, except ADC0820BC and ADC0820CC which is TBA, and the TLC0820A/B which is SLNS013A.

successive-approximation and semi-flash A/D converters

ADDRESS AND DATA I/O FORMAT	SIGNAL INPUTS		RESOLUTION (BITS)	CONVERSION SPEED (μs)‡	POWER DISSIPATION (mW TYP)	UNADJUSTED ERROR (MAX) ±LSB	TYPE	PACKAGE
	ANALOG DEDICATED	ANALOG† DIGITAL						
SERIAL	1§	0	8	84	10	1.0	ADC0831A	P
						0.5	ADC0831B	
	2§					1.0	ADC0832A	
						0.5	ADC0832B	
	4§					1.0	ADC0834A	N
						0.5	ADC0834B	
	8					1.0	ADC0838A	FN,N
						0.5	ADC0838B	
	11			13	6	0.5	TLC540	
				25			TLC541	
	19			13			TLC545	
				25			TLC546	
	1			22			TLC548	D,P
				25			TLC549	
	11		10	31		0.5	TLC1540	FN,N
						1.0	TLC1541	

† Analog/digital inputs can be used either as digital logic inputs or inputs for analog to digital conversion. For example: The TLC532/3A can have 11 analog inputs, 5 analog inputs, and 6 digital inputs, or any combination in between.

‡Includes access time

§Differential input

NOTE: The applicable literature number is SLYD002, except TLC1540 and TLC1541 which is SLNS010C.

DATA ACQUISITION AND CONVERSION CIRCUITS SELECTION GUIDE

D/A converters (5 V to 15 V)

FUNCTION	RESOLUTION	SETTLING TIME (ns)	TYPE	PACKAGE
Single Multiplying D/A	8 Bits	100	AD7524A AD7524J TLC7524	D,N
Dual Multiplying D/A			AD7528B AD7528K TLC7528	DW,FN,N
Single Multiplying D/A	10 Bits	150	AD7533B AD7533K TLC7533	D,N

analog interface for digital signal processors

FUNCTION	TRANSFER CHARACTERISTIC	DYNAMIC RANGE	RESOLUTION	SAMPLING RATE	ON-BOARD FILTERS	TYPE
Discrete Interfaces A/D and D/A	Linear	8 Bits	8 Bits	1 MHz (A/D)	No	ADC0820 TLC0820
				5 MHz (D/A)		AD7524/TLC7524
				5 MHz (Dual D/A)		AD7528/TLC7528
		10 Bits	10 Bits	4 MHz (D/A)		AD7533 TLC7533
Combo (Coder/ Decoder and Filters)	Companding (u-Law)	12 Bits	8 Bits	8 kHz	Yes	TCM29C18 TCM29C19
High-Performance Combo	Linear	14 Bits	14 Bits	19.2 kHz (Programmable)	Yes (Programmable)	TLC32040† TLC32041†

† The TLC32040 and TLC32041 have two differential inputs for the 14 bit A/D and a serial port input for the 14 bit D/A. The A/D conversion accuracy for this device is measured in terms of signal-to-quantization distortion and also in LSB over certain converter ranges. The package types are FN and N. Please refer to the data sheet.

NOTE: The applicable literature number is SLYD002, except for the TCM29C18 and TCM29C19 which is SCTS021 and the TLC32040 and TLC32041 which is SLAS014A. The AD series numbers are TBA.

analog switches and multiplexers

FUNCTION	POWER SUPPLIES (V)	VOLTAGE RANGE (V)	TYPICAL IMPEDANCE (OHMS)	TYPE	PACKAGE
TWIN SPDT	±15	±10	100	TL182	N
			150	TL185	
DUAL SPST			100	TL188	
TWIN DUAL SPST			150	TL191	
SPDT	±25	−17 to +25	100	TL601	P
DUAL SPDT				TL604	
SPST WITH ENABLE			100	TL607	
SPST WITH LOGIC INPUTS			80	TL610	
QUAD BILATERAL ANALOG SWITCH	12	2 to 12	50	TLC4016	D,J,N
			30	TLC4066	

switched-capacitor filter ICs

FUNCTION	FILTER ORDER	POWER SUPPLIES (V)	TYPE	PACKAGE
DUAL FILTER, GENERAL PURPOSE	2	±4 to ±5	TLC10	FN,N
			TLC20	
LOW PASS, BUTTERWORTH	4	±2.5 to ±6	TLC04	D,P
			TLC14	

NOTE: The applicable literature number is SLYD002.

Display Drivers

electroluminescent display drivers

DESC.	PRODUCT FEATURES	DRIVERS PER PKG	INPUT COMPAT-IBILITY	POWER SUPPLY	TYPE	PKG
ROW DRIVERS	• 225-V open-drain DMOS outputs • Serial-in, parallel-out architecture • 50-mA current sink output capability • Extremely low steady-state power consumption • Left side (SNXX551) and right side (SNXX552) drivers enhance circuit layout	32	CMOS	V_{CC1} (logic) = 10.8 V to 15 V	SN55551 SN55552	FD
					SN65551 SN65552 SN75551 SN75552	FN
	• Monolithic BIDFET integrated circuits • Very low steady-state power consumption • 300-mA output capability • High-voltage open-collector N-P-N outputs				SN75557 SN75558	FN
	• 225-V totem-pole BIDFET output structures • 70-mA output source/sink capability • Very low steady-state power consumption • 3-state capabilities • Selectable open-source or open-drain output	34			SN65563 SN65564 SN75563 SN75564	FN

NOTE: The applicable literature number is SLYD002.

electroluminescent display drivers (continued)

DESC.	PRODUCT FEATURES	DRIVERS PER PKG	INPUT COMPAT-IBILITY	POWER SUPPLY	TYPE	PKG
COLUMN DRIVERS	• 60-V totem-pole BIDFET output structures • Serial-in, parallel-out architecture • 15-mA sink or source output capability • Top (SNXX553) and bottom (SNXX5554) drivers enhance circuit layout	32	CMOS	V_{CC1} (logic) = 10.8 V to 15 V	SN55553 SN55554	FD
					SN65553 SN65554 SN75553 SN75554	FN
	• 90-V output voltage swing capability • 15-mA output source and sink current capability • High-speed serially-shifted data input • Totem-pole outputs • Latches on all driver outputs				SN65555 SN65556 SN75555 SN75556	FN
	• Energy recovery system compatible • 4.5-V to 5.5-V V_{CC1} operation at 5 MHz • Two parallel high-speed 16-bit shift registers • 60-V totem-pole BIDFET output structures • 15-mA sink or source output capability • Top (SNXX567) and bottom (SNXX568) drivers enhance circuit layout			V_{CC1} (logic) = 4.5 V to 5.5 V	SN65567 SN65568 SN75567 SN75568	FN

NOTE: The applicable literature number is SLYD002.

vacuum fluorescent display drivers

DESC.	PRODUCT FEATURES	DRIVERS PER PKG	INPUT COMPAT-IBILITY	POWER SUPPLY	TYPE	PKG
ANODE, GRID DRIVERS FOR SEGMENT OR DOT MATRIX FORMATS	• Serial-in, parallel-out architecture • 60-V totem-pole outputs • 25-mA current source output capability • On-board latches	12	TTL	V_{CC1} (logic) = 5 V to 15 V, V_{CC2} (display) = 0 V to 60 V	SN65512B SN75512B	DW,N
	All features same as SN65512B except: • Shift register reset replaces latches				SN65513B SN75513B	DW,N
	All features same as SN65512B except: • 32 bits for large format displays	32	CMOS, TTL	V_{CC1} (logic) = 5 V to 15 V, V_{CC2} (display) = 0 V to 130 V	SN65518 SN75518	FN,N
	• Serial-in, parallel-out architecture • 60-V totem-pole outputs • 40-mA current source output capability • Second source to Sprague UCN4810A	10	CMOS, TTL	V_{CC1} (logic) = 5 V to 15 V, V_{CC2} (display) = 0 V to 60 V	UCN4810A	N
	• Serial-in, parallel-out architecture • 60-V totem-pole outputs • 40-mA current source output • Improved direct replacement for UCN4810A and TL4810A	10	CMOS	V_{CC1} (logic) = 5 V to 15 V, V_{CC2} (display) = 0 V to 60 V	TL4810B TL4810BI	DW,N
	• 70-V output voltage swing capability • Drives up to 20 lines • Direct replacement for Sprague UCN5812	·20			TL5812 TL5812I	FN,N

NOTE: The applicable literature number is SLYD002.

DISPLAY DRIVERS SELECTION GUIDE

dc plasma and gas discharge display drivers

DESC.	PRODUCT FEATURES	DRIVERS PER PKG	INPUT COMPAT-IBILITY	POWER SUPPLY	TYPE	PKG
SCAN LINE DRIVERS	• 180-V open drain parallel outputs • 220-mA parallel output sink current • Left side (SN751506) and right side (SN751516) drivers enhance circuit layout	32	CMOS	V_{CC} (logic) = 4 V to 6 V	SN751506 SN751516	FT
DATA LINE DRIVERS	• −120-V open collector P-N-P parallel outputs • Two parallel high-speed 16-bit shift registers • Latches on all driver outputs • Top (SN751508) and bottom (SN751518) drivers enhance circuit layout			V_{CC} (logic) = 4.5 V to 5.5 V	SN751508 SN751518	FT

NOTE: The applicable literature number is SLYD002.

ac plasma display drivers

DESC.	PRODUCT FEATURES	DRIVERS PER PKG	INPUT COMPAT-IBILITY	POWER SUPPLY	TYPE	PKG
AXIS DRIVERS	• Independent addressing of each gate for serial and parallel application • High input impedance 1 MΩ typically • 30-mA integral clamp diodes on outputs • Switches 70 V in 1.2 μs • 3-input AND function (SN55426B) NAND function (SN55427B)	4	CMOS	V_{CC1} (logic) = 10 V to 14 V V_{CC2} (display) = 40 V to 90 V	SN55426B	J
					SN55427B	
	• High-speed serial-in, parallel-out architecture (8 MHz) • Fast output transitions (150 ns typ) • 15-mA output current capability • X-axis driver (SNXX500) • Y-axis driver (SNXX501) • Military temperature packages available (SN55500, SN55501)	32 (8 bits with 1 of 4 selectors)		V_{CC1} (logic) = 10.8 V to 13.2 V, V_{CC2} (display) = 0 V to 100 V	SN55500E	FD, JD
					SN65500E	FN, N
					SN75500E	
					SN55501E	FD, JD
					SN65501E	FN, N
					SN75501E	
	• High-speed serial-in, parallel-out architecture • X-axis driver (SN75509) • Y-axis driver (SN75508)	32 32 x 1		V_{CC1} (logic) = 7.65 V to 9.35 V, V_{CC2} (display) = V_{CC1} to 90 V	SN75508	FN
		32 (8-bits plus 2 select bits)		V_{CC1} (logic) = 8 V to 11.4 V, V_{CC2} (display) = V_{CC1} to 90 V	SN75509	FN

NOTE: The applicable literature number is SLYD002.

Display Drivers

line drivers

APPLICATION	OUTPUT	DRIVERS PER PACKAGE	TYPE	PACKAGE
EIA STANDARD RS-422-A	DIFFERENTIAL	2	SN55158	JG
			SN75158	D,JG,P
			SN75159	D,J,N
			uA9638	D,P
			SN75ALS191	D,P
		4	AM26LS31	D,FK,J,N
			MC3487	D,J,N
			SN75151	DW,J,N
			SN75153	J,N
			SN75172	
			SN75174	
			SN55ALS192	J,FK
			SN75ALS192	D,J,N
			SN75ALS194	
EIA STANDARD RS-485	DIFFERENTIAL	4	SN75172	J,N
			SN75174	
EIA STANDARD RS-423-A	SINGLE-ENDED	2	uA9636A	D,JG,P
EIA STANDARD RS-232-C	SINGLE-ENDED	2	SN55150	JG,FK
			SN75150	D,JG,P
			uA9636A	
		4	SN55188	J,FK
			SN75188	D,J,N
IBM 360/370	SINGLE-ENDED	2	SN75123/ SN75ALS123	D,N
		4	SN75ALS126	D,J,N
			SN75ALS130	

NOTE: The applicable literature number is SLYD002, except the SN75ALS191 which is SLLS032 and the SN75ALS123 which is SLLS031.

LINE DRIVERS AND RECEIVERS SELECTION GUIDE

line drivers

APPLICATION	OUTPUT	DRIVERS PER PACKAGE	TYPE	PACKAGE
GENERAL PURPOSE	SINGLE-ENDED	2	SN55121	FK,J
			SN75121/ SN75ALS121	D,N
	DIFFERENTIAL		SN55109A	FK,J
			SN75109A	D,J,N
			SN55110A	FK,J
			SN75110A	D,J,N
			SN75112	
			SN55113	FK,J
			SN75113	D,J,N
			SN55114	FK,J
			SN75114	D,J,N
			SN55183	FK,J
			SN75183	D,J,N
		4	MC3453	D,J,N
			SN75111	D,J,N

NOTE: The applicable literature number is SLYD002, except for SN75ALS121 which is SLLS030.

line receivers

APPLICATION	OUTPUT	RECEIVERS PER PACKAGE	TYPE	PACKAGE
EIA STANDARD RS-422-A	DIFFERENTIAL	2	SN75146	D,JG,P
			SN55157	JG
			SN75157	D,JG,P
			uA9637A	D,JG,P
			uA9639	D,JG,P
		4	AM26LS32A	D,FK,J,N
			MC3486	D,J,N
			SN75173	D,J,N
			SN75175	D,J,N
			SN75ALS193	J
			SN75ALS195	J
EIA STANDARD RS-485	DIFFERENTIAL	4	SN75173	D,J,N
			SN75175	D,J,N
EIA STANDARD RS-423-A	SINGLE-ENDED	2	SN75146	D,JG,P
			SN75157	D,JG,P
			uA9637A	D,JG,P
			uA9639	D,JG,P
		4	AM26LS32A	D,FK,J,N
			MC3486	D,J,N
			SN75173	D,J,N
			SN75175	D,J,N
			SN75ALS193	J
			SN75ALS195	J
EIA STANDARD RS-232-C	SINGLE-ENDED	2	SN55152	J,FK
			SN75152	D,J,N
		4	SN55154	J,FK
			SN75154	D,J,N
			SN55189	J,FK
			SN75189	D,J,N
			SN55189A	J,FK
			SN75189A	D,J,N

NOTE: The applicable literature number is SLYD002.

LINE DRIVERS AND RECEIVERS SELECTION GUIDE

line receivers

APPLICATION	OUTPUT	RECEIVERS PER PACKAGE	TYPE	PACKAGE
IBM 360/370	SINGLE-ENDED	3	SN75124	D,J,N
		7	SN75125	
			SN75ALS125	
			SN75127	
			SN75ALS127	
		8	SN75128	DW,J,N
			SN75129	
GENERAL PURPOSE	SINGLE-ENDED	2	SN55122	FK,J
			SN75122	D,J,N
			SN75140	D,JG,P
			SN75141	
GENERAL PURPOSE	DIFFERENTIAL	2	SN55107A	FK,J
			SN75107A	D,J,N
			SN55107B	FK,J
			SN75107B	D,J,N
			SN55108A	FK,J
			SN75108A	D,J,N
			SN55108B	FK,J
			SN75108B	D,J,N
			SN55115	FK,J
			SN75115	D,J,N
			SN55182	FK,J
			SN75182	D,J,N
			SN75207	
			SN75207B	
			SN75208	
			SN75208B	
		4	AM26LS33A	D,FK,J,N
			MC3450	D,J,N
			MC3452	

NOTE: The applicable literature number is SLYD002, except for SN75ALS123 which is SLLS031, and for SN75ALS125/127 which is SLLS027A.

line transceivers

APPLICATION	I/O BUS	TRANSCEIVERS PER PACKAGE	TYPE	PACKAGE
EIA STANDARD RS-232-C	SINGLE-ENDED	1	SN75155	D,JG,P
EIA STANDARD RS-422-A AND EIA STANDARD RS-485	DIFFERENTIAL	1	SN65176B	
			SN75176B	
			SN75177B	
			SN75178B	
			SN75179B	
IEEE STANDARD 488 (GPIB)	SINGLE-ENDED	4	MC3446	D,J,N
		8	SN75160B	DW,J,N
			SN75ALS160	
			SN75161B	
			SN75ALS161	
			SN75162B	DW,N
			SN75ALS162	
			SN75164B	
			SN75ALS164	
			SN75ALS165	DW,J,N
IEEE 802.3 1BASE5	DIFFERENTIAL	1	SN75061	DW,N
			SN75062	

NOTE: The applicable literature number is SLYD002.

LINE DRIVERS AND RECEIVERS SELECTION GUIDE

line transceivers

APPLICATION	I/O BUS	TRANSCEIVERS PER PACKAGE	TYPE	PACKAGE
GENERAL PURPOSE	SINGLE-ENDED	4	AM26S10C	D,J,N
			AM26S11C	
			SN75136	
			SN55138	FK,J
			SN75138	D,J,N
		8	SN75163B	DW,J,N
			SN75ALS163	
	DIFFERENTIAL	1	SN55116	FK,J
			SN75116	D,J,N
			SN55117	FK,JG
			SN75117	D,JG,P
			SN55118	J,FK
			SN75118	D,J,N
			SN55119	FK,JG
			SN75119	D,JG,P
IEEE 896.1	SINGLE-ENDED	8	SN75ALS056	DW,N
		4	SN75ALS057	

NOTE: The applicable literature number is SLYD002, except for SN75ALS056/57 which is SLLS028A.

Memory Interface

core-memory drivers

OUTPUT TYPE	MAX OUTPUT CURRENT (mA)	t_{PD}† TYP (ns)	POWER SUPPLIES	TYPE	PKG
DUAL SOURCE, DUAL SINK	600	45	V_{CC1} = 5 V V_{CC2} = 4.5 V to 24 V	SN55325	FK,J
QUADRUPLE SINK	600	40	V_{CC} = 5 V	SN55326	J
QUADRUPLE SOURCE	600	35	V_{CC1} = 5 V V_{CC2} = 4.5 V to 24 V	SN55327	J

core-memory sense amplifiers

OUTPUT TYPE	UNITS PER PACKAGE	THRESHOLD SENSITIVITY (mV)	t_{PD}† TYP (ns)	TYPE	PKG
RESISTOR	1	±15	35	SN5520	J
OPEN COLL OR RESISTOR	1	±15	30	SN5522	J
RESISTOR	2	±15	25	SN5524	J
RESISTOR	2	±15	25	SN55234	J

MOS-memory sense amplifiers

OUTPUT TYPE	UNITS PER PACKAGE	THRESHOLD SENSITIVITY (mV)	t_{PD}† TYP (ns)	TYPE	PKG
TOTEM POLE	2	±25	17	SN55107A	FK,J
				SN75107A	D,J,N
OPEN COLLECTOR	2	±25	19	SN55108A	FK,J
				SN75108A	D,J,N
TOTEM POLE	2	±10	25	SN75207	D,J,N
TOTEM POLE	2	±10	25	SN75207B	D,J,N
OPEN COLLECTOR	2	±10	25	SN75208	D,J,N
OPEN COLLECTOR	2	±10	25	SN75208B	D,J,N

†Propagation Delay Time
NOTE: The applicable literature number is SLYD002.

7 Operational Amplifiers

noncompensated, single

military temperature range (Values specified for T_A = 25°C)

DESCRIPTION	SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_{IB} (nA)	A_{VD} (V/mV)	B_1 (MHz)	SR (V/μs)	TYPE	PACKAGES
	MIN	MAX	MAX	MAX	MIN	TYP	TYP		
High Performance, Bipolar	±5	±22	2	75	50	1	0.5	LM101A	FK,JG,U,W
BIFET, Low Power	±1.5	±18	6	0.2	4	1	3.5	TL060M	JG
BIFET, General Purpose	±3.5	±18	6	0.2	25	3	13	TL080M	JG
General Purpose, Precision Input, Bipolar	±9	±18	2	200	45 Typ	1	0.3	uA709AM	J,JG,U,W
General Purpose, Bipolar	±9	±18	5	500	45 Typ	1	0.3	uA709M	J,JG,U,W
General Purpose, Bipolar	±2	±22	5	500	50	1	0.5	uA748M	JG,U

industrial temperature range (Values specified for TA = 25°C)

DESCRIPTION	SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_{IB} (nA)	A_{VD} (V/mV)	B_1 (MHz)	SR (V/μs)	TYPE	PACKAGES
	MIN	MAX	MAX	MAX	MIN	TYP	TYP		
High Performance, Bipolar	±5	±22	2	75	50	1	0.5	LM201A	D,JG,P,W
BIFET, Low Power	±1.5	±18	6	0.2	4	1	3.5	TL060I	D,JG,P
BIFET, Low Noise	±3.5	±18	6	200	50	3	13	TL070I	D,JG,P
BIFET, Low Power	±3.5	±18	6	400	25	3	13	TL080I	D,JG,P

NOTE: The applicable literature number is SLYD001.

OPERATIONAL AMPLIFIERS
SELECTION GUIDE

noncompensated, single

commercial temperature range (Values specified for TA = 25°C)

DESCRIPTION	SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_{IB} (nA)	A_{VD} (V/mV)	B_1 (MHz)	SR (V/μs)	TYPE	PACKAGES
	MIN	MAX	MAX	MAX	MIN	TYP	TYP		
High Performance	±5	±18	7.5	250	15	1	7.5	LM301A	D,JG,P,W
BIFET, Low Power	±1.5	±18	6	0.2	4	1	3.5	TL060AC	D,JG,P
BIFET, Low Power	±1.5	±18	3	0.2	4	1	3.5	TL060BC	D,JG,P
BIFET, Low Power	±1.5	±18	15	0.4	3	1	3.5	TL060C	D,JG,P
BIFET, Low Noise	±3.5	±18	6	0.2	50	3	13	TL070AC	D,JG,P
BIFET, Low Noise	±3.5	±18	10	0.2	25	3	13	TL070C	D,JG,P
BIFET, General Purpose	±3.5	±18	6	0.2	50	3	13	TL080AC	D,JG,P
BIFET, General Purpose	±3.5	±18	15	0.4	25	3	13	TL080C	D,JG,P
Bipolar, General Purpose	±9	±18	7.5	1500	15	1	0.3	uA709C	D,JG,P
Bipolar, General Purpose	±2	±18	6	500	20	1	0.5	uA748C	D,JG,P

NOTE: The applicable literature number is SLYD001.

internally compensated, single

military temperature range (Values specified for T_A = 25°C)

DESCRIPTION	SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_{IB} (nA)	A_{VD} (V/mV)	B_1 (MHz)	SR (V/μs)	TYPE	PACKAGES
	MIN	MAX	MAX	MAX	MIN	TYP	TYP		
High Performance	±5	±22	2	75	50	1	0.5	LM107	J,JG,U,W
Low Noise, High Performance	±3	±22	2	800	50	10	13	SE5534	FK,JG,U
Low Noise, High Performance	±3	±22	2	800	50	10	13	SE5534A	FK,JG,U
BIFET, Low Power	±1.5	±18	6	0.2	4	1	3.5	TL061M	FK,JG,U
BIFET, Adjustable, Low-Power	±1.2	±18	6	0.2	4	1	3.5	TL066M	FK,JG
BIFET, Low Noise	±3.5	±18	6	0.2	35	3	13	TL071M	FK,JG
BIFET, General Purpose	±3.5	±18	6	0.2	25	3	13	TL081M	FK,JG
BIFET, Low V_{IO}	±3.5	±18	3	0.4	50	3	13	TL088M	JG,U
Single LM324, S/S	3	32	5	−150	50	0.6	0.3	TL321M	FK,JG
High Performance D/S	±1.5	±16							
LinCMOS, Programmable Low Bias	4	16	10	Typ 0.005	30	0.11	0.05	TLC271M	FK,JG
LinCMOS, Programmable Medium Bias	4	16	10	Typ 0.005	20	0.64	0.62	TLC271M	FK,JG
LinCMOS, Programmable High Bias	4	16	10	Typ 0.005	10	2.2	5.3	TLC271M	FK,JG
General Purpose	−7	14	2	5000	6	0.5	11	uA702M	JG,U
General Purpose	±2	±22	5	500	50	1	0.5	uA741M	FK,J,JG,U

NOTE: The applicable literature number is SLYD001.

OPERATIONAL AMPLIFIERS SELECTION GUIDE

internally compensated, single

automotive temperature range (Values specified for T_A = 25°C)

DESCRIPTION	SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_{IB} (nA)	A_{VD} (V/mV)	B_1 (MHz)	SR (V/μs)	TYPE	PACKAGES
	MIN	MAX	MAX	MAX	MIN	TYP	TYP		
High Performance	±5	±22	2	75	50	1	0.5	LM207	D,JG, P,W
High Performance	±5	±20	4	250	50	15	70	LM218	D,JG,P
LinCMOS, Programmable, Low Bias	3	16	5	Typ 0.005	30	0.11	0.05	TLC271AI	D,JG,P
LinCMOS, Programmable, Medium Bias	3	16	5	Typ 0.005	20	0.64	0.62	TLC271AI	D,JG,P
LinCMOS, Programmable, High Bias	4	16	5	Typ 0.005	7	2.2	5.3	TLC271AI	D,JG,P
LinCOMOS, Programmable, Low Bias	3	16	2	Typ 0.005	30	0.11	0.05	TLC271BI	D,JG,P
LinCMOS, Programmable, Medium Bias	3	16	2	Typ 0.005	20	0.64	0.62	TLC271BI	D,JG,P
LinCMOS, Programmable, High Bias	4	16	2	Typ 0.005	7	2.2	5.3	TLC271BI	D,JG,P
LinCMOS, Programmable, Low Bias	3	16	10	Typ 0.005	30	0.11	0.05	TLC271I	D,JG,P
LinCMOS, Programmable, Medium Bias	3	16	10	Typ 0.005	20	0.64	0.62	TLC271I	D,JG,P
LinCMOS, Programmable, High Bias	4	16	10	Typ 0.005	7	2.2	5.3	TLC271I	D,JG,P

NOTE: The applicable literature number is SLYD001, except the TLC Series which is SLO3007.

internally compensated, single

industrial temperature range

(Values specified for T_A = 25°C)

DESCRIPTION		SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_{IB} (nA)	A_{VD} (V/mV)	B_1 (MHz)	SR (V/μs)	TYPE	PACKAGES
		MIN	MAX	MAX	MAX	MIN	TYP	TYP		
BIFET, Low Power		±1.5	±18	6	0.2	4	1	3.5	TL061I	D,JG,P
BIFET, Adjustable, Low-Power		±1.2	±18	6	0.2	4	1	3.5	TL066I	D,JG,P
BIFET. Low Noise		±3.5	±18	6	0.2	50	3	13	TL071I	D,JG,P
BIFET, General Purpose		±3.5	±18	6	0.2	50	3	13	TL081I	D,JG,P
BIFET, Low Offset		±3.5	±18	0.5	0.2	50	3	13	TL087I	D,JG,P
BIFET, Low V_{IO}		±3.5	±18	1	0.2	50	3	13	TL088I	D,JG,P
Single LM324,	S/S	3	32	5	−150	50	0.6	0.3	TL321I	JG,P
High Performance	D/S	±1.5	±16							

NOTE: The applicable literature number is SLYD001.

OPERATIONAL AMPLIFIERS
SELECTION GUIDE

internally compensated, single

commercial temperature range (Values specified for T_A = 25°C)

DESCRIPTION	SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_{IB} (nA)	A_{VD} (V/mV)	B_1 (MHz)	SR (V/μs)	TYPE	PACKAGES
	MIN	MAX	MAX	MAX	MIN	TYP	TYP		
BIFET	±3.5	±18	10	0.2	25	3	13	LF351	D,JG,P
BIFET	±3.5	±18	2	0.2	25	3	13	LF411C	D,JG,P
High Performance	±5	±18	7.5	250	25	1	0.5	LM307	D,JG, P,W
High Performance	±5	±20	10	250	25	15	70	LM318	D,JG,P
Low Noise, High Speed, Precision Input	±2.5	±22	0.025	±35	7000	5	2.5	LT1007AC	JG,L,P
Low Noise, High Speed, Precision Input	±2.5	±22	0.060	±55	5000	5	2.5	LT1007C	JG,L,P
Bipolar, Low Noise, High Speed, Decompensated, $A_{VL} \geq 5$	±4	±22	0.025	±35	7000	12	15	LT1037AC	JG,L,P
Bipolar, Low Noise, High Speed, Decompensated, $A_{VL} \geq 5$	±4	±22	0.060	±55	5000	12	15	LT1037C	JG,L,P
Low Noise, High Performance	±3	±22	4	1500	25	10	13	NE5534	JG,P
Low Noise, High Performance	±3	±22	4	1500	25	10	13	NE5534A	JG,P

NOTE: The applicable literature number is SLYD001, except the LF351 which is SL0S014, the LF411 which is SLOS011, and the LT Series which is SL0S017.

internally compensated, single

commercial temperature range (Values specified for T_A = 25°C)

DESCRIPTION	SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_{IB} (nA)	A_{VD} (V/mV)	B_1 (MHz)	SR (V/μs)	TYPE	PACKAGES
	MIN	MAX	MAX	MAX	MIN	TYP	TYP		
Ultra-Low Offset Voltage	±3	±22	0.15	7	120	0.6	0.3	OP-07C	D,JG,P
Ultra-Low Offset Voltage	±3	±22	0.15	12	120	0.6	0.3	OP-07D	D,JG,P
Ultra-Low Offset Voltage	±3	±22	0.075	4	200	0.6	0.3	OP-07E	D,JG,P
Precision, Low Input Current	±5	±18	0.15	2	80	0.8	0.12	OP-12E	D,JG,P
Precision, Low Input Current	±5	±18	0.3	2	80	0.8	0.12	OP-12F	D,JG,P
Precision, Low Input Current	±5	±18	1	5	40	0.8	0.12	OP-12G	D,JG,P

NOTE: The applicable literature number is SLYD001.

OPERATIONAL AMPLIFIERS
SELECTION GUIDE

internally compensated, single

commercial temperature range (Values specified for T_A = 25°C)

DESCRIPTION	SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_{IB} (nA)	A_{VD} (V/mV)	B_1 (MHz)	SR (V/μs)	DEVICE NUMBER	PACKAGES
	MIN	MAX	MAX	MAX	MIN	TYP	TYP		
Low Noise, High Speed	±3.5	±22	0.025	40	1000	8	2.8	OP-27E	JG,L,P
Low Noise, High Speed	±3.5	±22	0.1	80	700	8	2.8	OP-27G	JG,L,P
Low Noise, High Speed, Decompensated, $A_{VL} \geq 5$	±3.5	±22	0.1	80	700	12	17	OP-37E	JG,L,P
Low Noise, High Speed, Decompensated, $A_{VL} \geq 5$	±3.5	±22	0.1	80	700	12	17	OP-37G	JG,L,P
BIFET, Low Power	±1.5	±18	6	0.2	4	1	3.5	TLO61AC	D,JG,P
BIFET, Low Power	±1.5	±18	3	0.2	4	1	3.5	TLO61BC	D,JG,P
BIFET, Low Power	±1.5	±18	15	0.2	3	1	3.5	TLO61C	D,JG,P
BIFET, Adjustable Low-Power	±1.2	±18	6	0.2	4	1	3.5	TLO66AC	D,JG,P
BIFET, Adjustable, Low-Power	±1.2	±18	3	0.2	4	1	3.5	TLO66BC	D,JG,P
BIFET, Adjustable, Low-Power	±1.2	±18	15	0.4	3	1	3.5	TLO66C	D,JG,P
BIFET, Low Noise	±3.5	±18	6	0.2	50	3	13	TLO71AC	D,JG,P
BIFET, Low Noise	±3.5	±18	3	0.2	50	3	13	TLO71BC	D,JG,P
BIFET, Low Noise	±3.5	±18	10	0.2	25	3	13	TL071C	D,JG,P
BIFFET, General Purpose	±3.5	±18	6	0.2	50	3	13	TL081AC	D,JG,P

NOTE: The applicable literature number is SLYD001, except OP-27E, OP-27G, OP-37E, OP-37G which is SLOS016.

internally compensated, single

commercial temperature range (Values specified for T_A = 25°C)

DESCRIPTION		SUPPLY VOLTAGE (V) MIN	SUPPLY VOLTAGE (V) MAX	V_{IO} (mV) MAX	I_{IB} (nA) MAX	A_{VD} (V/mV) MIN	B_1 (MHz) TYP	SR (V/μs) TYP	DEVICE NUMBER	PACKAGES
BIFFET, General Purpose		±3.5	±18	3	0.2	50	3	13	TLO81BC	D,JG,P
BIFET, General Purpose		±3.5	±18	15	0.4	0.4	25	13	TLO81C	D,JG,P
BIFFET, Low V_{IO}		±3.5	±18	0.5	0.2	50	3	13	TLO87C	D,JG,P
BIFFET, Low V_{IO}		±3.5	±18	1	0.2	50	3	13	TLO88C	D,JG,P
Single LM324, High Performance	S/S	3	32	7	−250	25	0.6	0.3	TL321C	JG,P
	D/S	±1.5	±16							
LinCMOS, Programmable, Low Bias		1	16	5	Typ 0.005	30	0.11	0.05	TLC251AC	D,JG,P
LinCMOS, Programmable, Medium Bias		1	16	5	Typ 0.005	20	0.64	0.62	TLC251AC	D,JG,P
LinCMOS, Programmable, High Bias		1	16	5	Typ 0.005	Typ 10	2.2	5.3	TLC251AC	D,JG,P
LinCMOS, Programmable, Low Bias		1	16	2	Typ 0.005	30	0.11	0.05	TLC251BC	D,JG,P
LinCMOS, Programmable, Medium Bias		1	16	10	Typ 0.005	20	0.64	0.62	TLC251BC	D,JG,P
LinCMOS, Programmable, High Bias		1	16	2	Typ 0.005	Typ 10	2.2	5.3	TLC251BC	D,JG,P
LinCMOS, Programmable, Low Bias		1	16	10	Typ 0.005	30	0.11	0.05	TLC251C	D,JG,P
LinCMOS, Programmable, Medium Bias		1	16	10	Typ 0.005	20	0.64	0.62	TLC251C	D,JG,P

NOTE: The applicable literature number is SLYD001, except the TLC251 Series which is SLOS001B.

OPERATIONAL AMPLIFIERS
SELECTION GUIDE

internally compensated, single

commercial temperature range (Values specified for T_A = 25°C)

DESCRIPTION	SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_{IB} (nA)	A_{VD} (V/mV)	B_1 (MHz)	SR (V/μs)	TYPE	PACKAGES
	MIN	MAX	MAX	MAX	MIN	TYP	TYP		
LinCMOS, Programmable, High Bias	1	16	10	Typ 0.005	Typ 10	2.2	5.3	TLC251C	D,JG,P
LinCMOS, Programmable, Low Bias	3	16	5	Typ 0.005	30	0.11	0.05	TLC271AC	D,JG,P
LinCMOS, Programmable, Medium Bias	3	16	5	Typ 0.005	20	0.64	0.62	TLC271AC	D,JG,P
LinCMOS, Programmable, High Bias	3	16	5	Typ 0.005	Typ 10	2.2	5.3	TLC271AC	D,JG,P
LinCMOS, Programmable, Low Bias	3	16	2	Typ 0.005	30	0.11	0.05	TLC271BC	D,JG,P
LinCMOS, Programmable, Medium Bias	3	16	2	Typ 0.005	20	0.64	0.62	TLC271BC	D,JG,P
LinCMOS, Programmable, High Bias	3	16	3	Typ 0.005	Typ 10	2.2	5.3	TLC271BC	D,JG,P
LinCMOS, Programmable, Low Bias	3	16	10	TYP 0.005	30	0.11	0.05	TLC271C	D,JG,P
LinCMOS, Programmable, Medium Bias	3	16	10	Typ 0.005	20	0.64	0.62	TLC271C	D,JG,P
LinCMOS Programmable, High Bias	3	16	10	Typ 0.005	Typ 10	2.2	5.3	TLC271C	D,JG,P
General Purpose	±2	±18	6	500	20	1	0.5	uA741C	D,JG,P

NOTE: The applicable literature number is SLYD001, except the TLC251C which is SLOS001B, and the TLC271 Series which is SL03007.

internally compensated, dual

military temperature range

(Values specified for T_A = 25°C)

DESCRIPTION		SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_{IB} (nA)	A_{VD} (V/mV)	B_1 (MHz)	SR (V/μs)	TYPE	PACKAGES
		MIN	MAX	MAX	MAX	MIN	TYP	TYP		
High Gain, Low Power, Bipolar	S/S	3	32	5	−150	50	0.6	0.2	LM158	D,FK,JG, P,U
	D/S	±1.5	±16							
General Purpose		±2	±22	5	500	50	1	0.5	MC1558	FK,JG,U
High Performance		±4	±22	5	500	50	3.5	1.7	RM4558	JG
Low Power		±2	±22	5	100	1	0.5	0.5	TL022M	U
BIFET, Low Power		±1.5	±18	6	0.2	4	1	3.5	TL062M	FK,JG,U
BIFET, Low Noise		±3.5	±18	6	0.2	35	3	13	TL072M	FK,JG
BIFET, General Purpose		±3.5	±18	16	0.2	25	3	13	TL082M	FK,JG
BIFET, General Purpose		±3.5	±18	6	0.2	25	3	13	TL083M	FK,J
BIFET, General Purpose		±3.5	±18	3	0.4	50	3	13	TL288M	JG,U
Low Power		±1.5	±18	8	−500	20	1	0.6	TL322M	JG
LinCMOS, High Bias		4	16	10	Typ 0.005	10	2.2	5.3	TLC272M	FK,JG
LinCMOS, High Bias		4	16	0.5	Typ 0.005	10	2.2	5.3	TLC277M	FK,JG
LinCMOS, Low Bias		4	16	10	Typ 0.005	30	0.11	0.05	TLC27L2M	FK,JG
LinCMOS, Low Bias		4	16	0.5	Typ 0.005	30	0.11	0.05	TLC27L7M	FK,JG
LinCMOS, Medium Bias		4	16	10	Typ 0.005	20	0.6	0.6	TLC27M2M	FK,JG
LinCMOS, Medium Bias		4	16	0.5	Typ 0.005	20	0.6	0.6	TLC27M7M	FK,JG

NOTE: The applicable literature number is SLYD001, except the following:
the TLC272M and the TLC277M which is SL03004,
the TLC27L2M and the TLC27L7M which is SL03006, and
the TLC27M2M and TLC27M7M which is SL03003.

OPERATIONAL AMPLIFIERS
SELECTION GUIDE

internally compensated, dual

automotive temperature range (Values specified for T_A = 25°C)

DESCRIPTION		SUPPLY VOLTAGE (V) MIN	SUPPLY VOLTAGE (V) MAX	V_{IO} (mV) MAX	I_{IB} (nA) MAX	A_{VD} (V/mV) MIN	B_1 (MHz) TYP	SR (V/μs) TYP	TYPE	PACKAGES
High Gain, Low Power, Bipolar	S/S	3	26	7	−250	100 Typ	0.6	0.2	LM2904	D,JG,P,U
	D/S	±1.5	±13							
High Performance		±4	±18	6	500	20	3	1.7	RV4558	D,JG,P
Low Power		±1.5	±18	8	−500	20	1	0.6	TL322I	D,JG,P
LinCMOS, High Bias		4	16	5	Typ 0.005	10	2.2	5.3	TLC272AI	D,JG,P
LinCMOS, High Bias		4	16	2	Typ 0.005	10	2.2	5.3	TLC272BI	D,JG,P
LinCMOS, High Bias		4	16	10	Typ 0.005	10	2.2	5.3	TLC272I	D,JG,P
LinCMOS, High Bias		4	16	0.5	Typ 0.005	10	2.2	5.3	TLC277I	D,JG,P
LinCMOS, Low Bias		4	16	5	Typ 0.005	30	0.11	0.05	TLC27L2AI	D,JG,P
LinCMOS, Low Bias		4	6	2	Typ 0.005	30	0.11	0.05	TLC27L2BI	D,JG,P
LinCMOS, Low Bias		4	16	10	Typ 0.005	30	0.11	0.05	TLC27L2I	D,JG,P
LinCMOS, Low Bias		4	16	0.5	Typ 0.005	30	0.11	0.05	TLC27L7I	D,JG,P
LinCMOS, Medium Bias		4	16	5	Typ 0.005	20	0.64	0.62	TLC27M2AI	D,JG,P
LinCMOS, Medium Bias		4	16	2	Typ 0.005	20	0.64	0.62	TLC27M2BI	D,JG,P
LinCMOS, Medium Bias		4	16	10	Typ 0.005	20	0.64	0.62	TLC27M2I	D,JG,P
LinCMOS, Medium Bias		4	16	0.5	Typ 0.005	20	0.64	0.62	TLC27M7I	D,JG,P

NOTE: The applicable literature number is SLYD001, except the following:
TLC272 and the TLC277 Series which is SLO3004, TLC27L2 and the TLC27L7 Series which is SLO3006, and TLC27M2 and the TLC27M7 Series which is SLO3005.

internally compensated, dual

automotive temperature range

(Values specified for T_A = 25°C)

DESCRIPTION		SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_{IB} (nA)	A_{VD} (V/mV)	B_1 (MHz)	SR (V/μs)	TYPE	PACKAGES
		MIN	MAX	MAX	MAX	MIN	TYP	TYP		
High Gain, Low Power, Bipolar	S/S	3	32	5	−150	50	0.6	0.2	LM258	D,JG,P,U
	D/S	±1.5	±16							
BIFET, Low Power		±1.5	±18	6	0.2	4	1	3.5	TL062I	D,JG,P
BIFET, Low Noise		±3.5	±18	6	0.2	50	3	13	TL072I	D,JG,P
BIFET, General Purpose		±3.5	±18	6	0.2	50	3	13	TL082I	D,JG,P
BIFET, General Purpose		±3.5	±18	6	0.2	50	3	13	TL083I	J,N
BIFET, General Purpose		±3.5	±18	0.5	0.2	50	3	13	TL287I	D,JG,P
BIFET, General Purpose		±3.5	±18	1	0.2	50	3	13	TL288I	D,JG,P

NOTE: The applicable literature number is SLYD001.

OPERATIONAL AMPLIFIERS
SELECTION GUIDE

internally compensated, dual

commercial temperature range (Values specified for T_A = 25°C)

DESCRIPTION		SUPPLY VOLTAGE (V) MIN	SUPPLY VOLTAGE (V) MAX	V_{IO} (mV) MAX	I_{IB} (nA) MAX	A_{VD} (V/mV) MIN	B_1 (MHz) TYP	SR (V/μs) TYP	TYPE	PACKAGES
BIFET, General Purpose		±3.5	±18	10	0.2	25	3	13	LF353	D,JG,P
BIFET, Low Offset		±3.5	±18	3	0.2	25	3	13	LF412	D,JG,P
High Gain, Low Power, Bipolar	S/S	3	32	7	−250	25	0.6	0.2	LM358	D,JG,P,U
	D/S	±1.5	±16							
General Purpose		±1.5	±18	6	500	20	1	0.5	MC1458	D,JG,P,U
Low Noise		±3	±22	4	800	25	10	9	NE5532	JG,P
Low Noise		±3	±22	4	800	25	10	9	NE5532A	JG,P
High Performance		±4	±18	6	500	20	3	1.7	RC4558	D,JG,P
High Performance		±4	±18	6	250	20	4	2	RC4559	D,P
Low Power		±2	±18	5	250	1	0.5	0.5	TL022C	D,JG,P
BIFET, Low Power		±1.5	±18	6	0.2	4	1	3.5	TL062AC	D,JG,P
BIFET, Low Power		±1.5	±18	3	0.2	4	1	3.5	TL062BC	D,JG,P
BIFET, Low Power		±1.5	±18	15	0.4	3	1	3.5	TL062C	D,JG,P
BIFET, Low Noise		±3.5	±18	6	0.2	50	3	13	TL072AC	D,JG,P

NOTE: The applicable literature number is SLYD001, except the LF353 which is SLOS012, and the LF412 which is SLOS010.

internally compensated, dual

commercial temperature range (Values specified for T_A = 25°C)

DESCRIPTION	SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_{IB} (nA)	A_{VD} (V/mV)	B_1 (MHz)	SR (V/μs)	TYPE	PACKAGES
	MIN	MAX	MAX	MAX	MIN	TYP	TYP		
BIFET, Low Noise	±3.5	±18	3	0.2	50	3	13	TL072BC	D,JG,P
BIFET, Low Noise	±3.5	±18	10	0.2	25	3	13	TL072C	D,JG,P
BIFET, General Purpose	±3.5	±18	6	0.2	50	3	13	TL082AC	D,JG,P
BIFET, General Purpose	±3.5	±18	3	0.2	50	3	13	TL082BC	D,JG,P
BIFET, General Purpose	±3.5	±18	15	0.4	25	3	13	TL082C	D,JG,P
BIFET, General Purpose	±3.5	±18	6	0.2	50	3	13	TL083AC	J,N

NOTE: The applicable literature number is SLYD001.

OPERATIONAL AMPLIFIERS
SELECTION GUIDE

internally compensated, dual

commercial temperature range (Values specified for T_A = 25°C)

DESCRIPTION	SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_{IB} (nA)	A_{VD} (V/mV)	B_1 (MHz)	SR (V/μs)	TYPE	PACKAGES
	MIN	MAX	MAX	MAX	MIN	TYP	TYP		
BIFET, General Purpose	±3.5	±18	15	0.4	25	3	13	TL083C	J,N
BIFET, General Purpose	±3.5	±18	0.5	0.2	50	3	13	TL287C	D,JG,P
BIFET, General Purpose	±3.5	±18	1	0.2	50	3	13	TL288C	D,JG,P
Low Power	±1.5	±18	10	−500	20	1	0.6	TL322C	D,JG,P
LinCMOS, High Bias	1	16	5	Typ 0.005	10	2.2	5.3	TLC252AC	D,JG,P
LinCMOS, High Bias	1	16	2	Typ 0.005	10	2.2	5.3	TLC252BC	D,JG,P
LinCMOS, High Bias	1	16	10	Typ 0.005	10	2.2	5.3	TLC252C	D,JG,P
LinCMOS, Low Bias	1	16	5	Typ 0.005	30	0.11	0.05	TLC25L2AC	D,JG,P
LinCMOS, Low Bias	1	16	2	Typ 0.005	30	0.11	0.05	TLC25L2BC	D,JG,P
LinCMOS, Low Bias	1	16	10	Typ 0.005	30	0.11	0.05	TLC25L2C	D,JG,P
LinCMOS, Medium Bias	1	16	5	Typ 0.005	20	0.64	0.62	TLC25M2AC	D,JG,P
LinCMOS, Medium Bias	1	16	2	Typ 0.005	20	0.64	0.62	TLC25M2BC	D,JG,P
LinCMOS, Medium Bias	1	16	10	Typ 0.005	20	0.64	0.62	TLC25M2C	D,JG,P
LinCMOS, High Bias	3	16	5	Typ 0.005	10	2.2	5.3	TLC272AC	D,JG,P
LinCMOS, High Bias	3	16	2	Typ 0.005	10	2.2	5.3	TLC272BC	D,JG,P
LinCMOS, High Bias	3	16	10	Typ 0.005	10	2.2	5.3	TLC272C	D,JG,P

NOTE: The applicable literature number is SLYD001, except the TLC272 Series which is SLO3004.

internally compensated, dual

commercial temperature range (Values specified for T_A = 25°C)

DESCRIPTION	SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_{IB} (nA)	A_{VD} (V/mV)	B_1 (MHz)	SR (V/μs)	TYPE	PACKAGES
	MIN	MAX	MAX	MAX	MIN	TYP	TYP		
LinCMOS, Low Bias	3	16	5	Typ 0.005	30	0.11	0.05	TLC27L2AC	D,JG,P
LinCMOS, Low Bias	3	16	2	Typ 0.005	30	0.11	0.05	TLC27L2BC	D,JG,P
LinCMOS, Low Bias	3	16	10	Typ 0.005	30	0.11	0.05	TLC27L2C	D,JG,P
LinCMOS, Low Bias	3	16	0.5	Typ 0.005	30	0.11	0.05	TLC27L7C	D,JG,P
LinCMOS, Medium Bias	3	16	5	Typ 0.005	20	0.64	0.62	TLC27M2AC	D,JG,P
LinCMOS, Medium Bias	3	16	2	Typ 0.005	20	0.64	0.62	TLC27M2BC	D,JG,P
LinCMOS, Medium Bias	3	16	10	Typ 0.005	20	0.64	0.62	TLC27M2C	D,JG,P
LinCMOS, Medium Bias	3	16	0.5	Typ 0.005	20	0.64	0.62	TLC27M7C	D,JG,P
LinCMOS, High Bias	3	16	0.5	Typ 0.005	Typ 10	2.2	5.3	TLC277C	D,JG,P
General Purpose	±5	±22	6	500	25	1	0.5	uA747C	D,J,N

NOTE: The applicable literature numbers:
The TLC27L2 Series and the TLC27L7 is SLO3006, the TLC27M2 Series and TLC27M7C is SLO3005, the TLC277C is SLO3004, and μA747C is SLOS009.

OPERATIONAL AMPLIFIERS
SELECTION GUIDE

internally compensated, quad

military temperature range (Values specified for T_A = 25°C)

DESCRIPTION		SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_{IB} (nA)	A_{VD} (V/mV)	B_1 (MHz)	SR (V/μs)	TYPE	PACKAGES
		MIN	MAX	MAX	MAX	MIN	TYP	TYP		
General Purpose		3	32	5	−150	50	0.6	0.13	LM124	D,FK,J,N,W
General Purpose		±4	±22	5	100	50	1	0.5	LM148	FK,J
Single/Dual Supplies, Low Power, Bipolar	S/S	3	36	5	−500	50	1	0.6	MC3503	J
	D/S	±1.5	±18							
QUAD uA741, High Performance		±4	±22	4	400	50	3.5	1.7	RM4136	FK,J,W
Low Power		±2	±22	5	100	72	0.5	0.5	TL044M	FK,J,W
BIFET, Low Power		±1.5	±18	9	0.2	4	1	3.5	TL064M	FK,J,W
BIFET, Low Noise		±3.5	±18	9	0.2	35	3	13	TL074M	FK,J,W
BIFET, General Purpose		±3.5	±18	9	0.2	25	3	13	TL084M	FK,J,W
LinCMOS, High Bias		4	16	10	†	10	2.2	5.3	TLC274M	FK,J
LinCMOS, High Bias		4	16	1.2	†	10	2.2	5.3	TLC279M	FK,J
LinCMOS, Low Bias		4	16	10	†	30	0.1	0.05	TLC27L4M	FK,J
LinCMOS, Medium Bias		4	16	10	†	20	0.64	0.62	TLC27M4M	FK,J
LinCMOS, Low Bias		4	16	1.2	†	30	0.11	0.05	TLC27L9M	FK,J
LinCMOS, Medium Bias		4	16	1.2	†	20	0.64	0.62	TLC27M9M	FK,J

†The values of input bias current below 5 pA were determined mathematically and is typically 0.0007 nA.

NOTE: The applicable literature number is SLYD001, except the TLC274M and the TLC279M, which is SLO3001, the TLC27L4M which is SLO3002, the TLC27M4M and the TLC27M9M which is SLO3003, and the TLC27L9M which is SLO3002.

internally compensated, quad

automotive temperature range (Values specified for T_A = 25°C)

DESCRIPTION		SUPPLY VOLTAGE (V) MIN	SUPPLY VOLTAGE (V) MAX	V_{IO} (mV) MAX	I_{IB} (nA) MAX	A_{VD} (V/mV) MIN	B_1 (MHz) TYP	SR (V/μs) TYP	TYPE	PACKAGES
Norton Amplifier, Bipolar	S/S	4.5	32		200	1.2	2.5	0.5	LM2900	J,N
	D/S	±2.2	±16							
Extended Temperature Range LM324		3	26	7	−250	100 Typ	0.6	0.3	LM2902	D,J,N,W
Low Power, Bipolar	S/S	3	36	8	−500	20	1	0.6	MC3303	D,J,N
	D/S	±1.5	±18							
Quad uA741, High Performance		±4.5	±18	6	500	20	3	1.7	RV4136	D,J,N,W
LinCMOS, High Bias		4	16	5	0.001 Typ	10	2.2	5.3	TLC274AI	D,J,N
LinCMOS, High Bias		4	16	2	0.001 Typ	10	2.2	5.3	TLC274BI	D,J,N
LinCMOS, High Bias		4	16	10	0.001 Typ	10	2.2	5.3	TLC274I	D,J,N
LinCMOS, High Bias		4	16	1.2	†	10	2.2	5.3	TLC279I	D,J,N
LinCMOS, Low Bias		4	16	5	†	50	0.11	0.05	TLC27L4AI	D,J,N
LinCMOS, Low Bias		4	16	2	†	50	0.11	0.05	TLC27L4BI	D,J,N
LinCMOS, Low Bias		4	16	10	†	50	0.11	0.05	TLC27L4I	D,J,N
LinCMOS, Low Bias		4	16	5	†	50	0.11	0.05	TLC27L9I	D,J,N
LinCMOS, Medium Bias		4	16	5	†	25	0.64	0.62	TLC27M4AI	D,J,N
LinCMOS, Medium Bias		4	16	2	†	25	0.64	0.62	TLC27M4BI	D,J,N

†The values of input bias current below 5 pA were determined mathematically and is typically 0.0007 nA.

NOTE: The applicable literature number is SLYD001, except the TLC274 Series and the TLC279I which is SLO3001, the TLC274L4 Series and the TLC27L9I which is SLO3002, and the TLC27M4 Series which is SLO3003.

OPERATIONAL AMPLIFIERS
SELECTION GUIDE

internally compensated, quad

automotive temperature range (Values specified for T_A = 25°C)

DESCRIPTION	SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_{IB} (nA)	A_{VD} (V/mV)	B_1 (MHz)	SR (V/μs)	TYPE	PACKAGES
	MIN	MAX	MAX	MAX	MIN	TYP	TYP		
LinCMOS, Medium Bias	4	16	10	†	25	0.64	0.62	TLC27M4I	D,J,N
LinCMOS, Medium Bias	4	16	1.2	†	25	0.64	0.62	TLC27M9I	D,J,N

†The value of input bias current below 5 pA was determined mathematically and is typically 0.0007 nA.

internally compensated, quad

industrial temperature range (Values specified for T_A = 25°C)

DESCRIPTION		SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_{IB} (nA)	A_{VD} (V/mV)	B_1 (MHz)	SR (V/μs)	TYPE	PACKAGES
		MIN	MAX	MAX	MAX	MIN	TYP	TYP		
General Purpose, Bipolar		3	32	5	−150	50	0.6	0.3	LM224	D,J,N,W
General Purpose, Bipolar		±4	±18	6	200	25	1	0.5	LM248	D,J,N
Single Supply, Norton Amplifier, Bipolar	S/S	4	32		200	1.2	2.5	0.5	LM2900	D,J,N
	D/S	±2	±16							
BIFET, Low Power		±1.5	±18	6	0.2	4	1	3.5	TL064I	D,J,N
BIFET, Low Noise		±3.5	±18	6	0.2	50	3	13	TL074I	D,J,N
BIFET, General Purpose		±3.5	±18	6	0.2	50	3	13	TL084I	D,J,N

NOTE: The applicable literature number is SLYD001, except the TLC27M41 and the TLC27M9I which is SLO3003.

internally compensated, quad

commercial temperature range (Values specified for T_A = 25°C)

DESCRIPTION		SUPPLY VOLTAGE (V) MIN	SUPPLY VOLTAGE (V) MAX	V_{IO} (mV) MAX	I_{IB} (nA) MAX	A_{VD} (V/mV) MIN	B_1 (MHz) TYP	SR (V/μs) TYP	TYPE	PACKAGES
BIFET, General Purpose		±3.5	±18	10	0.2	25	3	13	LF347	D,J,N
BIFFET, General Purpose		±5	±18	5	0.2	50	3	13	LF347B	D,J,N
General Purpose		3	32	7	−250	25	0.6	0.3	LM324	D,J,N,W
General Purpose		±4	±18	6	200	25	1	0.5	LM348	D,J,N
Bipolar, Single Supply, Norton Amplifier	S/S	4	32		200	1.2	2.5	0.5	LM3900	D,J,N
	D/S	±2	±16							
BIFET, High Speed		±4	±22	10	0.2	50	8	25	MC34084	D,J,N
Quad uA741, High Performance		±4	±18	6	500	20	3	1.7	RC4136	D,J,N,W
General Purpose		±2	±18	5	250	60	0.5	0.5	TL044C	J,N,W
BIFET, Low Power		±1.5	±18	6	0.2	4	1	3.5	TL064AC	D,J,N

NOTE: The applicable literature number is SLYD001, except the LF347 and LF347B which is SLOS013.

OPERATIONAL AMPLIFIERS
SELECTION GUIDE

internally compensated, quad

commercial temperature range (Values specified for T_A = 25°C)

DESCRIPTION	SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_{IB} (nA)	A_{VD} (V/mV)	B_1 (MHz)	SR (V/μs)	TYPE	PACKAGES
	MIN	MAX	MAX	MAX	MIN	TYP	TYP		
BIFET, Low Power	±1.5	18	3	0.2	4	1	3.5	TL064BC	D,J,N
BIFET, Low Power	±1.5	18	15	0.4	3	1	3.5	TL064C	D,J,N
BIFET, Low Noise	±3.5	±18	6	0.2	50	3	13	TL074AC	D,J,N
BIFET, Low Noise	±3.5	±18	3	0.2	50	3	13	TL074BC	D,J,N
BIFET, Low Noise	±3.5	±18	10	0.2	50	3	13	TL074C	D,J,N
BIFET, Low Noise	±3.5	±18	10	0.2	25	3	13	TL075C	N
BIFET, General Purpose	±3.5	±18	6	0.2	50	3	13	TL084AC	D,J,N
BIFET, General Purpose	±3.5	±18	3	0.2	50	3	13	TL084BC	D,J,N
BIFET, General Purpose	±3.5	±18	15	0.4	25	3	13	TL084C	D,J,N
BIFET, General Purpose	±3.5	±18	15	0.4	25	3	13	TL085C	N
High Performance, Bipolar	±4	±18	6	500	20	3	2	TL136C	D,J,N
LinCMOS, High Bias	1	16	5	0.005 Typ	10	2.2	5.3	TLC254AC	D,J,N
LinCMOS, High Bias	1	16	2	0.005 Typ	10	2.2	5.3	TLC254BC	D,J,N
LinCMOS, High Bias	1	16	10	0.005 Typ	10	2.2	5.3	TLC254C	D,J,N

NOTE: The applicable literature number is SLYD001.

internally compensated, quad

commercial temperature range (Values specified for T_A = 25°C)

DESCRIPTION	SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_{IB} (nA)	A_{VD} (V/mV)	B_1 (MHz)	SR (V/μs)	TYPE	PACKAGES
	MIN	MAX	MAX	MAX	MIN	TYP	TYP		
LinCMOS, High Bias	3	16	5	†	10	2.2	5.3	TLC274AC	D,J,N
LinCMOS, High Bias	3	16	2	†	10	2.2	5.3	TLC274BC	D,J,N
LinCMOS, High Bias	3	16	10	†	10	2.2	5.3	TLC274C	D,J,N
LinCMOS, High Bias	3	16	1.2	†	10	2.2	5.3	TLC279C	D,J,N
LinCMOS, Low Bias	1	16	5	0.005 Typ	30	0.1	0.05	TLC25L4AC	D,J,N
LinCMOS, Low Bias	1	16	2	0.005 Typ	30	0.1	0.05	TLC25L4BC	D,J,N
LinCMOS, Low Bias	1	16	10	0.005 Typ	30	0.1	0.05	TLC25L4C	D,J,N
LinCMOS, Medium Bias	1	16	5	0.005 Typ	20	0.6	0.6	TLC25M4AC	D,J,N

†The values of input bias current below 5 pA were determined mathematically and is typically 0.0007 nA.
NOTE: The applicable literature number for the TLC274 Series and TLC279C is SLO3001, for the TLC25L4 Series SLO3002 and for TLC25M4AC is SLO3003.

OPERATIONAL AMPLIFIERS
SELECTION GUIDE

internally compensated, quad

commercial temperature range **(Values specified for T_A = 25°C)**

DESCRIPTION	SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_{IB} (nA)	A_{VD} (V/mV)	B_1 (MHz)	SR (V/μs)	TYPE	PACKAGES
	MIN	MAX	MAX	MAX	MIN	TYP	TYP		
LinCMOS, Medium Bias	1	16	2	0.005 Typ	20	0.6	0.6	TLC25M4BC	D,J,N
LinCMOS, Medium Bias	1	16	10	0.005 Typ	20	0.6	0.6	TLC25M4C	D,J,N
LinCMOS, Low Bias	3	16	5	†	50	0.11	0.05	TLC27L4AC	D,J,N
LinCMOS, Low Bias	3	16	2	†	50	0.11	0.05	TLC27L4BC	D,J,N
LinCMOS, Low Bias	3	16	10	†	50	0.11	0.05	TLC27L4C	D,J,N
LinCMOS, Low Bias	3	16	0.75	†	50	0.11	0.05	TLC27L9C	D,J,N
LinCMOS, Medium Bias	3	16	5	†	25	0.64	0.62	TLC27M4AC	D,J,N
LinCMOS, Medium Bias	3	16	2	†	25	0.64	0.62	TLC27M4BC	D,J,N
LinCMOS, Medium Bias	3	16	10	†	25	0.64	0.62	TLC27M4C	D,J,N
LinCMOS, Medium Bias	3	16	0.75	†	25	0.64	0.62	TLC27M9C	D,J,N

†The values of input bias current below 5 pA was determined mathematically and is typically 0.0007 nA.

NOTE: The applicable literature numbers for the TLC25M Series and the TLC27M Series is SLO3003, and for the TLC27L Series is SLO3002.

optocouplers, 6-pin plastic DIP and metal can

TYPE	ISOLATION VOLTAGE (kV) f = 60 Hz		MINIMUM CTR (%)	FEATURES
	PEAK	RMS		
3N261	1.0	–	50	JEDEC, Metal Can
3N262	1.0	–	100 (500 max)	
3N263	1.0	–	200 (1000 max)	
4N22†	1.0	–	25	JEDEC, Metal Can
4N23†	1.0	–	60	
4N24†	1.0	–	100	
4N25‡	2.5	–	20	JEDEC, Plastic DIP, UL File E-65085
4N26	1.5	–	20	
4N27	1.5	–	10	
4N28	0.5	–	10	
4N35‡	3.54	2.5	100	JEDEC, Plastic DIP, UL File E-65085
4N36	2.5	1.75	100	
4N37	1.5	1.05	100	
4N47§	1.0	–	50	JEDEC, Metal Can
4N48§	1.0	–	100 (500 max)	
4N49§	1.0	–	200 (1000 max)	
MCT2	1.5	–	20	Plastic DIP, UL File E-65085
MCT2E	3.54	2.5	20	
TIL102	1.0	–	25	Metal Can
TIL103	1.0	–	100	
TIL111	1.5	–	13	Plastic DIP, UL File E-65085
TIL112	1.5	–	2	
TIL113	1.5	–	300	
TIL114	2.5	–	13	
TIL115	2.5	–	2	
TIL116	2.5	–	20	
TIL117	2.5	–	50	
TIL118	1.5	–	10	
TIL119‡	1.5	–	300	
TIL119A	1.5	–	300	The "A" version has no base connection.

†Also available in "A" suffix (all leads electrically insulated from the case; literature number is S00S013) as well as JAN, JANTX, JANTXV levels to MIL-S-19500/486A USAF.

‡Available in PEP3 processing also.

§ JAN, JANTX, JANTXV levels to MIL-S-19500/548 are also available.

NOTE: The applicable literature number is SOYD002.

optocouplers, 6-pin plastic DIP and metal can (continued)

TYPE	ISOLATION VOLTAGE (kV) f = 60 Hz		MINIMUM CTR (%)	FEATURES
	PEAK	RMS		
TIL120	1.0	–	25	Metal Can
TIL121	1.0	–	50	
TIL124	5.0	–	10	High Voltage, Plastic DIP, UL File E-65085
TIL125	5.0	–	20	
TIL126	5.0	–	50	
TIL127	5.0	–	300	High-voltage Darlington, Plastic
TIL128	5.0	–	300	DIP, UL File E-65085
TIL128A	5.0	–	300	The "A" version has no base connection.
TIL153	3.54	2.5	10	High Voltage, Plastic DIP,
TIL154	3.54	2.5	20	UL File E-65085
TIL155	3.54	2.5	50	
TIL156	3.54	2.5	300	High-voltage Darlington, Plastic
TIL157	3.54	2.5	300	DIP, UL File E-65085
TIL157A	3.54	2.5	300	The "A" version has no base connection.
TIL181	3.54	2.5	50	Plastic DIP, UL File E-65085.
TIL186	3.54	2.5	100 (I_F = 10 mA)	AC Input Darlington, Plastic DIP, UL File E-65085
TIL187	3.54	2.5	500	AC Input Darlington, Plastic DIP, UL File E-65085
TIL188	3.54	2.5	500	Same as TIL187 except TIL188 has no base lead connection for high-EMI environment. UL File E-65085.
TIL189	3.54	2.5	500	High Voltage, Plastic DIP, UL File E-65085
TIL190	3.54	2.5	500	Same as TIL189 except TIL190 has no base lead connection for high-EMI environment. UL File E-65085.

NOTE: The applicable literature number is SOYD002.

optocouplers, 8-pin plastic DIP, high-speed, JEDEC registered (T_A = 25°C unless otherwise noted)

TYPE	CTR (MIN) V_O = 0.4 V, I_F = 16 mA	V_{OL} (MAX) I_F = 16 mA, T_A = 0°C to 70°C	V_F (MAX) I_F = 16 mA	SWITCHING TIMES ((MAX) I_F = 16 mA t_{PLH} OR t_{PHL}	ISOLATION VOLTAGE (MIN)
6N135	7%	0.4 V (I_O = 1.1 mA)	1.7 V	1.5 μs (R_L = 4.1 kΩ)	3 kV dc
6N136	19%	0.4 V (I_O = 2.4 mA)	1.7 V	0.8 μs (R_L = 1.9 kΩ)	3 kV dc
HCPL2502	15%	0.4 V (I_O = 2.4 mA)	1.7 V	0.8 μs (R_L = 1.9 kΩ)	3 kV dc

optocouplers, 8-pin plastic DIP, high-speed logic gate JEDEC registered (T_A = 25°C unless otherwise noted)

TYPE	V_{OL} (MAX) I_F = 5 mA, I_{OL} = 13 mA, T_A = 0°C to 70°C	V_F (MAX) I_F = 10 mA	SWITCHING TIMES (MAX) I_F = 7.5 mA, R_L = 350 Ω, C_L = 15 pF		ISOLATION VOLTAGE (MIN)
			t_{PLH}	t_{PHL}	
6N137	0.6 V	1.75 V	75 ns	75 ns	3 kV dc
HCPL2601	0.6 V	1.75 V	75 ns	75 ns	3 kV dc
HCPL2630 (DUAL-CHANNEL)	0.6 V	1.75 V	75 ns	75 ns	3 kV dc

optocouplers, 8-pin plastic DIP, high-speed, high-gain JEDEC registered (T_A = 25°C unless otherwise noted)

TYPE	CTR (MIN) V_O = 0.4 V, I_F = 1.6 mA, T_A = 0°C to 70°C	V_{OL} (MAX) I_F = 1.6 mA, T_A = 0°C to 70°C	V_F (MAX) I_F = 1.6 mA	SWITCHING TIMES (MAX) I_F = 1.6 mA		ISOLATION VOLTAGE (MIN)
				t_{PLH}	t_{PHL}	
6N138	300%	0.4 V (I_O = 4.8 mA)	1.7 V	35 μs, R_L = 2.2 kΩ	10 μs, R_L = 2.2 kΩ	3 kV dc
6N139	500%	0.4 V (I_O = 6.4 mA)	1.7 V	60 μs, R_L = 4.7 kΩ	25 μs, R_L = 4.7 kΩ	3 kV dc

NOTE: The applicable literature number is SOYD002.

optocouplers, 6-pin plastic DIP, TRIAC driver

(T_A = 25 °C unless otherwise noted)

TYPE	I_{FT} (MAX) V_{TM} = 3 V	V_F (MAX) I_F = 10 mA	V_{TM} (MAX) I_{TM} = 100 mA	I_{DRM} (MAX) RATED V_{DRM}	dv/dt (TYP) (V/μs)	ISOLATION VOLTAGE (MIN)
MOC3009	30 mA	1.5 V	3 V	100 nA	12	7.5 kV dc
MOC3010	15 mA	1.5 V	3 V	100 nA	12	7.5 kV dc
MOC3011	10 mA	1.5 V	3 V	100 nA	12	7.5 kV dc
MOC3012	5 mA	1.5 V	3 V	100 nA	12	7.5 kV dc
MOC3020	30 mA	1.5 V	3 V	100 nA	100	7.5 kV dc
MOC3021	15 mA	1.5 V	3 V	100 nA	100	7.5 kV dc
MOC3022	10 mA	1.5 V	3 V	100 nA	100	7.5 kV dc
MOC3023	5 mA	1.5 V	3 V	100 nA	100	7.5 kV dc
TIL3009	30 mA	1.5 V	3 V	100 nA	12	3.5 kV dc
TIL3010	15 mA	1.5 V	3 V	100 nA	12	3.5 kV dc
TIL3011	10 mA	1.5 V	3 V	100 nA	12	3.5 kV dc
TIL3012	5 mA	1.5 V	3 V	100 nA	12	3.5 kV dc
TIL3020	30 mA	1.5 V	3 V	100 nA	100	3.5 kV dc
TIL3021	15 mA	1.5 V	3 V	100 nA	100	3.5 kV dc
TIL3022	10 mA	1.5 V	3 V	100 nA	100	3.5 kV dc
TIL3023	5 mA	1.5 V	3 V	100 nA	100	3.5 kV dc

optocouplers, 6-pin plastic DIP, Schmitt trigger

(T_A = 25 °C unless otherwise noted)

TYPE	LOGIC FUNCTION	OUTPUT CONFIGURATION	I_{FT+} (MAX)	HYSTERESIS RATIO (MAX)	SWITCHING TIMES (MAX)		ISOLATION VOLTAGE (MIN)
					t_r or t_f	t_{PLH} or t_{PHL}	
OPI8012	Buffer	Totem pole	10 mA	1.4	70 ns	5 μs	3.54 kV dc
OPI8013	Buffer	Open collector	10 mA	1.4	70 ns	5 μs	3.54 kV dc
OPI8014	Inverter	Totem pole	10 mA	1.4	70 ns	5 μs	3.54 kV dc
OPI8015	Inverter	Open collector	10 mA	1.4	70 ns	5 μs	3.54 kV dc

NOTE: The applicable literature number is SOYD002, except the following: TIL3009, TIL3010, TIL3011, TIL3012 which is SOOS015 and TIL30020, TIL3021, TIL3022, TIL3023 which is SOOS014.

hybrid displays

TYPE	TYPE OF CHARACTER(S)	CHARACTER HEIGHT mm (inches)	COLOR OF DISPLAY	PKG	REMARKS
TIL302 TIL302A TIL303 TIL303A	7-segment	6,9 (0.270)	Red	14 N	† † ‡ ‡
TIL304 TIL304A	Polarity and overflow unit	6,9 (0.270)	Red	14 N	‡ ‡
TIL305	5 × 7 alphanumeric	7,6 (0.300)	Red	14 N	†
TIL306 TIL306A TIL307 TIL307A	7-segment	6,9 (0.270)	Red	16 N	† † ‡ ‡ Logic includes counter, latch, and driver with binary latch outputs.
TIL308 TIL308A TIL309 TIL309A	7-segment	6,9 (0.270)	Red	16 N	† † ‡ ‡ Logic includes latch, decoder, and driver with binary latch outputs.
TIL311 TIL311A	Hexadecimal	7,6 (0.300)	Red	14 N	Logic includes latch, decoder, and driver. TIL311 and TIL311A- left and right decimals.

†Left decimal
‡Right decimal

NOTE: The applicable literature number is SOYD002.

OPTOELECTRONICS AND IMAGE SENSORS SELECTION GUIDE

infrared-emitting diodes

TYPE	POWER OUTPUT		θ_{HI}	V_F (MAX) I_F = 50 mA	λp (TYP) (nm)	FEATURES
	P_O (MIN) (mW)	I_F (mA)				
TIL23	0.4	50	35°	1.5 V	940	Pill package for mounting on double-sided printed circuit boards. Compatible with TIL601 series.
TIL24	1.0	50	35°	1.5 V	940	
TIL25	0.75	50	35°	1.5 V	940	
TIL24HR2	1.0	50	35°	1.5 V	940	

phototransistors

TYPE	LIGHT CURRENT V_{CE} = 5 V		DARK CURRENT (MAX) V_{CE} = 30 V	POWER DISSIPATION	FEATURES
	MIN	MAX			
1N5722	0.5 mA	3 mA	25 nA	50 mW	EIA-registered versions of TIL601 and TIL604
1N5723	2 mA	5 mA	25 nA	50 mW	
1N5724	4 mA	8 mA	25 nA	50 mW	
1N5725	7 mA		25 nA	50 mW	
LS600	0.8 mA		25 nA	50 mW	Pill package designed for mounting on double-sided printed board. Compatible with TIL23 series.
TIL601	0.5 mA	3 mA	25 nA	50 mW	
TIL602	2 mA	5 mA	25 nA	50 mW	
TIL603	4 mA	8 mA	25 nA	50 mW	
TIL604	7 mA		25 nA	50 mW	
TIL604HR2	7 mA		25 nA	50 mW	

NOTE: The applicable literature number is SOYD002.

CCD image sensors and support functions

linear arrays

TYPE	PIXELS	PIXEL SIZE	SENSITIVITY	PACKAGE
TC102†	128 × 1	12.7 μm × 12.7 μm	3.5 V/μJ/cm^2	10-pin CDIP (0.300 in)
TC102-1‡	128 × 1	12.7 μm × 12.7 μm	3.5 V/μJ/cm^2	10-pin CDIP (0.300 in)
TC103†	2048 × 1	12.7 μm × 12.7 μm	3.5 V/μJ/cm2	24-pin CDIP (0.600 in)
TC103-1‡	2048 × 1	12.7 μm × 12.7 μm	3.5 V/μJ/cm^2	24-pin CDIP (0.600 in)
TC104†	3456 × 1	10.7 μm × 10.7 μm	2.0 V/μJ/cm^2	24-pin CDIP (0.600 in)
TC104-1‡	3456 × 1	10.7 μm × 10.7 μm	2.0 V/μJ/cm^2	24-pin CDIP (0.600 in)
TC106-1‡	2592 × 1	10.7 μm × 10.7 μm	2.0 V/μJ/cm^2	24-pin CDIP (0.600 in)

†Minimum and typical values of Write Reference (WR) and End of Scan (EOS) are specified.
‡Typical values of WR and EOS are specified.

evaluation boards

PART NO.	DEVICE EVALUATED	REMARKS
PC401	TC103, TC103-1, TC104, TC104-1 and TC106-1	Device socket fits TC103, TC103-1, TC104, TC104-1 and TC106-1 (See TCK Evaluation Kits below)
PC402	TC102 and TC102-1	Device socket fits TC102 and TC102-1 (See TCK102 below)

evaluation kits

PART NO.	CONTENTS	REMARKS
TCK102	TC102 plus PC402	See Application section "Operating Instructions for Linear CCD Image Sensors"
TCK103	TC103 plus PC401	See Application section "Operating Instructions for Linear CCD Image Sensors"
TCK104	TC104 plus PC401	See Application section "Operating Instructions for Linear CCD Image Sensors"
TCK106-1	TC106-1 plus PC401	See Application section "Operating Instructions for Linear CCD Image Sensors"

NOTE: The applicable literature number is SOYD002.

Caution. These devices have limited built-in gate protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates. Avoid shorting either OS or EOS to V_{SS} during operation to prevent damage to the amplifiers.

OPTOELECTRONICS AND IMAGE SENSORS SELECTION GUIDE

area arrays

TYPE	PIXELS	PIXEL SIZE	SENSITIVITY†	PACKAGE
TC210	192 (H) × 165 (V)	13.75 μm × 16.0 μm	30.0 mV/lx	6-pin 5 mm O.D. PLASTIC
TC211	192 (H) × 165 (V)	13.75 μm × 16.0 μm	28.0 mV/lx	6-pin CDIP (0.300 in)
TC240	754 (H) × 488 (V)	11.5 μm × 27.0 μm	See Data Sheet	22-pin CDIP (0.300 in)
TC241	754 (H) × 488 (V)	11.5 μm × 27.0 μm	19.0 mV/lx	22-pin CDIP (0.300 in)

†Measured at 16.6 ms exposure time using 550 ± 5 nm filter.

recommended support functions for TC240 and TC241 CCD area array sensors

TYPE	DESCRIPTION	SUPPLY VOLTAGE, V_{DD}		SUPPLY VOLTAGE, V_{GG}		SUPPLY VOLTAGE, V_{SS}		FEATURES
		MIN	MAX	MIN	MAX	MIN	MAX	
TL1593	Sample and hold	10	13	—	—	—	—	Acquisition time 50 ns typical
TMS3471	Timing generator	4.5	5.5	—	—	—	—	NTSC or RS170 television system compatible
TMS3472	Serial driver			0	2.5	-9	-10.5	NTSC, RS170, or PAL television system compatible
TMS3473	Parallel driver			0	3	-9	-10.5	NTSC, RS170, or PAL television system compatible

NOTE: The applicable literature number is SOYD002.

Caution. These devices have limited built-in gate protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates. Avoid shorting either OS or EOS to V_{SS} during operation to prevent damage to the amplifiers.

general purpose drivers and actuators

FUNCTION	INPUT CAPABILITY	SWITCH OFF VOLT MAX	V_D VOLT MAX	I_{OL} (mA)	DRV PER PKG	V_{OK}	DELAY TIME TYP (ns)	TYPE	PKG
AND	TTL	20	30	300	2	NO	20	SN55450B	FK,J
AND	TTL	20	30	300	2	NO	18	SN55451B	FK,JG
NAND	TTL	20	30	300	2	NO	25	SN55452B	FK,JG
OR	TTL	20	30	300	2	NO	18	SN55453B	FK,JG
NOR	TTL	20	30	300	2	NO	26	SN55454B	FK,JG
AND	TTL	20	30	300	2	NO	18	SN75451B	D,P
NAND	TTL	20	30	300	2	NO	25	SN75452B	D,P
OR	TTL	20	30	300	2	NO	18	SN75453B	D,P
NOR	TTL	20	30	300	2	NO	26	SN75454B	D,P
MOS DRV	TTL	24	24	500	2	YES	35	SN75372	D,P
MOS DRV	TTL	24	24	500	4	YES	35	SN75374	D,N
AND	TTL	30	35	300	2	NO	28	SN55461	FK,JG
NAND	TTL	30	35	300	2	NO	38	SN55462	FK,JG
OR	TTL	30	35	300	2	NO	28	SN55463	FK,JG
NOR	TTL	30	35	300	2	NO	35	SN55464	FK,JG
AND	TTL	30	35	300	2	NO	28	SN75461	D,P
NAND	TTL	30	35	300	2	NO	38	SN75462	D,P
OR	TTL	30	35	300	2	NO	28	SN75463	D,P
INV W/ENAB	TTL,CMOS	35	70	500	4	YES	1050	SN75437A	NE
INV W/ENAB	TTL,CMOS	35	70	600	4	YES	750	SN75435	NE
BUF W/ENAB	TTL,C/MOS	35	70	600	4	YES	1450	SN75440	NE
INV W/ENAB	TTL,CMOS	35	70	1000	4	YES	1050	SN75438	NE
INVERT	TTL	35	50	1250	4	YES	500	SN75064	NE
INVERT	MOS	35	50	1250	4	YES	500	SN75066	NE
INVERT	TTL,5V MOS	35	50	1250	4	YES	500	SN75068	NE
INVERT	TTL,5V MOS	35	50	1500	4	NO	500	UDN2841	NE
INVERT	TTL,5V MOS	35	50	1500	4	NO	500	UDN2845	NE
INVERT	TTL	35	50	1250	4	YES	500	ULN2064	NE
INVERT	MOS	35	50	1250	4	YES	500	ULN2066	NE
INVERT	TTL,CMOS	35	50	1250	4	YES	500	ULN2068	NE
INVERT	TTL,CMOS	35	50	1250	4	NO	500	ULN2074	NE

NOTE: The applicable literature number is SLYD002.

PERIPHERAL DRIVERS/ACTUATORS SELECTION GUIDE

general purpose drivers and actuators (continued)

FUNCTION	INPUT CAPABILITY	SWITCH OFF VOLT MAX	V_D VOLT MAX	I_{OL} (mA)	DRV PER PKG	V_{OK}	DELAY TIME TYP (ns)	TYPE	PKG
AND	TTL,CMOS	55	70	350	2	YES	300	SN75446	D,P
NAND	TTL,CMOS	55	70	350	2	YES	300	SN75447	D,P
OR	TTL,CMOS	55	70	350	2	YES	300	SN75448	D,P
NOR	TTL,CMOS	55	70	350	2	YES	300	SN75449	D,P
NAND	TTL,CMOS	50	70	500	2	YES	500	SN75407	D,P
OR	TTL,CMOS	50	70	500	2	YES	500	SN75408	D,P
INV W/ENAB	TTL,CMOS	50	70	500	4	YES	1050	SN75436	NE
INVERT	TTL,C/PMOS	50	50	350	7	YES	250	ULN2001A	D,N
INVERT	25V PMOS	50	50	350	7	YES	250	ULN2002A	D,N
INVERT	TTL,CMOS	50	50	350	7	YES	250	ULN2003A	D,N
INVERT	15V MOS	50	50	350	7	YES	250	ULN2004A	D,N
INVERT	TTL	50	50	350	7	YES	250	ULN2005A	D,N
INVERT	TTL	50	80	1500	4	YES	500	SN75065	NE
INVERT	MOS	50	80	1500	4	YES	500	SN75067	NE
INVERT	TTL,5V MOS	50	80	1500	4	YES	500	SN75069	NE
INVERT	TTL	50	80	1500	4	YES	500	ULN2065	NE
INVERT	TTL	50	80	1500	4	YES	500	ULN2067	NE
INVERT	TTL,5V MOS	50	80	1500	4	YES	500	ULN2069	NE
INVERT	TTL,5V MOS	50	80	1500	4	NO	500	ULN2075	NE
AND	TTL	55	70	300	2	NO	28	SN55471	FK,JG
NAND	TTL	55	70	300	2	NO	38	SN55472	FK,JG
OR	TTL	55	70	300	2	NO	28	SN55473	FK,JG
NOR	TTL	55	70	300	2	NO	35	SN55474	FK,JG
AND	TTL	55	70	300	2	NO	28	SN75471	D,P
NAND	TTL	55	70	300	2	NO	38	SN75472	D,P
OR	TTL	55	70	300	2	NO	28	SN75473	D,P
AND	TTL,CMOS	55	70	300	2	YES	200	SN75476	D,P
NAND	TTL,CMOS	55	70	300	2	YES	200	SN75477	D,P
OR	TTL,CMOS	55	70	300	2	YES	200	SN75478	D,P
NOR	TTL,CMOS	55	70	300	2	YES	200	SN75479	D,P

NOTE: The applicable literature number is SLYD0002.

general purpose drivers and actuators (continued)

FUNCTION	INPUT CAPABILITY	SWITCH OFF VOLT MAX	V_D VOLT MAX	I_{OL} (mA)	DRV PER PKG	V_{OK}	DELAY TIME TYP (ns)	TYPE	PKG
RELAY DRV	TTL,C/MOS	60	60	100	4	YES	1000	DS3680	D,J,N
INVERT	TTL	60	100	350	7	YES	250	SN75465	D,N
INVERT	TTL,C/PMOS	60	100	350	7	YES	250	SN75466	D,N
INVERT	25V PMOS	60	100	350	7	YES	250	SN75467	D,N
INVERT	TTL,CMOS	60	100	350	7	YES	250	SN75468	D,N
INVERT	15V MOS	60	100	350	7	YES	250	SN75469	D,N

NOTE: The applicable literature number is SLYD0002.

motor drivers and power actuators

FUNCTION	INPUT CAPABILITY	SWITCH OFF VOLT MAX	V_D VOLT MAX	I_{OL} (mA)	DRV PER PKG	V_{OK}	DELAY TIME TYP (ns)	TYPE	PKG
HALF-H DRV	TTL,C/MOS	18	18	500	3	NO		TL376C	NE
HALF-H DRV	TTL	36	36	600	4	YES	600	L293D	NE
HALF-H DRV	TTL	36	36	1000	4	NO	600	L293	NE
HALF-H DRV	TTL,CMOS	36	36	1000	4	YES	600	SN754410	NE
HALF-H DRV	TTL,CMOS	36	36	1000	4	NO	600	SN754411	NE
HALF-H DRV	TTL,CMOS	40	40	2000	1	YES		SN75603	KC,KH,KV
HALF-H DRV	TTL,CMOS	40	40	2000	1	YES		SN75604	KC,KH,KV
HALF-H DRV	TTL,CMOS	40	40	2000	1	YES		SN75605	KC,KH,KV
STEPR. DRV	TTL	46	46	1000	1	YES		PBL3717A	NE
FULL-H DRV	TTL	46	46	2000	2	NO		L298	KV
FULL-H DRV	TTL	46	46	2000	2	NO		TLP298	KV
ACTUATOR	TTL,CMOS	60	60	2500	2	YES	800	TLP609	KV

NOTE: The applicable literature number is SLYD002 except L298 which is SLRS011, TLP298 which is SLRS012, and TLP609 which is SLRS010A.

precision timers

military temperature range (Values specified for T_A = 25°C)

DESCRIPTION	OUTPUT CURRENT	TIMING		TYPE	PACKAGES
		FROM	TO		
Single Timer, Bipolar	±200 mA	1 μs	Hours	SE555	FK,JG
Single Timer, Bipolar	±200 mA	1 μs	Hours	SE555C	FK,JG
Dual Timer, Bipolar	±200 mA	1 μs	Hours	SE556	FK,J
Dual Timer, Bipolar	±200 mA	1 μs	Hours	SE556C	FK,J
LinCMOS, Single High-Speed Timer	100 mA −10 mA	1 μs	Hours	TLC555M	FK,JG
LinCMOS, Dual High-Speed Timer	100 mA −10 mA	1 μs	Hours	TLC556M	FK,J

automotive temperature range (Values specified for T_A = 25°C)

DESCRIPTION	OUTPUT CURRENT	TIMING		TYPE	PACKAGES
		FROM	TO		
Single Timer, Bipolar	±200 mA	10 μs	Hours	SA555	D,JG,P
Dual Timer, Bipolar	±200 mA	10 μs	Hours	SA556	D,J,N
LinCMOS, Single High-Speed Timer	100 mA −10 mA	1 μs	Hours	TLC555I	D,JG,P
LinCMOS, Dual High-Speed Timer	100 mA −10 mA	1 μs	Hours	TLC556I	D,J,N

commercial temperature range (Values specified for T_A = 25°C)

DESCRIPTION	OUTPUT CURRENT	TIMING		TYPE	PACKAGES
		FROM	TO		
Single Timer, Bipolar	±200 mA	10 μs	Hours	NE555	D,JG,P
Dual Timer, Bipolar	±200 mA	10 μs	Hours	NE556	D,J,N
LinCMOS, Single High-Speed Timer, 1-Volt Operation	100 mA −10 mA	1 μs	Hours	TLC551C	D,JG,P
LinCMOS, Dual High-Speed Timer, 1-Volt Operation	100 mA −10 mA	1 μs	Hours	TLC552C	D,J,N
LinCMOS, Single High-Speed Timer	100 mA −10 mA	1 μs	Hours	TLC555C	D,JG,P
LinCMOS, Dual High-Speed Timer	100 mA −10 mA	1 μs	Hours	TLC556C	D,J,N
Programmable Timer/Counter	4 mA	10 μs	Days	uA2240C	N

NOTE: The applicable literature number is SLYD001, except the TLC556 series which is SLNS008.

SPECIAL FUNCTIONS SELECTION GUIDE

current mirrors

(Values specified for T_A = 25°C)

DESCRIPTION	TEMPERATURE RANGE	CURRENT RATIO INPUT TO OUTPUT	INPUT CURRENT RANGE	TYPE	PACKAGES
Programmable	0°C to 70°C	3:1 to 1:15	Variable	TL010C	P
Programmable	−40°C to 85°C	3:1 to 1:15	Variable	TL010I	P
Fixed	0°C to 70°C	1:1	1 μA to 1 mA	TL011C	LP
Fixed	−40°C to 85°C	1:1	1 μA to 1 mA	TL011I	LP
Fixed	0°C to 70°C	1:2	1 μA to 1 mA	TL012C	LP
Fixed	−40°C to 85°C	1:2	1 μA to 1 mA	TL012I	LP
Fixed	0°C to 70°C	1:4	1 μA to 1 mA	TL014C	LP
Fixed	−40°C to 85°C	1:4	1 μA to 1 mA	TL014I	LP
Fixed	0°C to 70°C	1:2	2 μA to 2 mA	TL021C	LP
Fixed	−40°C to 85°C	1:2	2 μA to 2 mA	TL021I	LP

Hall-Effect switches

(Values specified for T_A = 25°C)

RELEASE POINT (GAUSS) MIN	OPERATING POINT (GAUSS) MAX	MINIMUM HYSTERESIS (GAUSS)	TYPE	PACKAGE
−250	250	50	TL170	LP
100	600	230	TL172	LP
25	450	30	TL3013	LU
125	500	50	TL3019	LU
50	350	20	TL3020	LU
−250	250	50	TL3101	LU

Hall-Effect linear circuits

(Values specified for T_A = 25°C)

LINEAR RANGE (GAUSS)	SENSITIVITY (mV/GAUSS)	TYPE	PACKAGE
±500	1.4	TL173	LP
±500	1.4	TL3103	LU

NOTE: The applicable literature number is SLYD001, except the following: TL3013 which is SLFS064, TL3019 which is SLFS005, TL3020 which is SLFS006, TL3101 which is SLFS002, and TL3103 which is SLFS003.

sonar ranging functions (Values specified for T_A = 25°C)

DESCRIPTION		TYPE	PACKAGES
Sonar Ranging Module	Sonar ranging module for measuring distances from a range of 6 inches to 35 feet using the TL851 and TL852	SN28827	
Sonar Ranging Module	Sonar ranging module for measuring distances from a range of 6 inches to 35 feet using the TL852 and TL853	SN28828	
Controller Circuit	Control integrated circuit for use in a sonar ranging module, capable of driving 50-kHz transducers with a simple interface	TL851	N
Receiver Circuit	Receiver integrated circuit for use in a sonar ranging module	TL852	N
Control Circuit	Control integrated circuit for use in a sonar ranging module, capable of driving 40-kHz transducers with a simple interface	TL853	N

floppy-disk control circuits (Values specified for T_A = 25°C)

DESCRIPTION	TYPE	PACKAGES
Read-Amplifier System	MC3470	N
Tape-Read Signal Conditioner	TL041C	DW,NT
Disk-Memory Read-Chain Data Comparator	TL712	D,JG,P
Disk-Memory Read-Chain Data Comparator with MECL III and MECL 1000	TL721	D,JG,P

NOTE: The applicable literature number is SLYD001, except the following:
SN28828 which is SLSS001, TL853 which is SLSS002, TL041C which is SLFS015, TL712 which is SLCS002, and TL721 which is SLCS001.

SPECIAL FUNCTIONS SELECTION GUIDE

differential video amplifiers

military temperature range

(Values specified for T_A = 25°C)

DESCRIPTION	BAND-WIDTH (MHz)	GAIN	TYPICAL NOISE, V_n	TYPE	PKG
Amplifier with 2 multiplexed inputs and wide AGC range	60	100 Max	25 μV	MC1545	J,W
Amplifier with internal frequency compensation and adjustable/selectable gain options	90	600 Max	12 μV	SE592	D,N
Amplifier with internal frequency compensation	200	10, 100, 400	12 μV	uA733M	U

commercial temperature range

(Values specified for T_A = 25°C)

DESCRIPTION	BAND-WIDTH (MHz)	GAIN	TYPICAL NOISE, V_n	TYPE	PKG
Amplifier with 2 multiplexed inputs and wide AGC range	60	100 max	25 μV	MC1445	J,N
Amplifier with internal frequency compensation and adjustable/selectable gain options	90	600 max	12 μV	NE592	D,N
Similar to NE592 but with tighter gain distribution	90	600 max	12 μV	NE592A	D,N
Amplifier with a wide AGC range	50	100	12 μV	TLO26	D,JG,P
Amplifier with a wide AGC range	50	400 max	12 μV	TL027C	D,J,N
2-channel multiplexed Video Amp	20	600 max	<5 μV	TLO40C	D,N
Similar to NE592 but in an 8-pin package	90	600 max	12 μV	TL592	D,P
Similar to NE592A but in an 8-pin package	90	600 max	12 μV	TL592A	D,P
Low-noise version of NE592 and TL592	90	600 max	3 μV	TL592B	D,N,P
Amplifier with internal frequency compensation	200	10, 100, 400	12 μV	uA733C	J,N

NOTE: The applicable literature number is SLYD001, except the following:
TLO40C is SLFS012, TL592A is SLOS015, TL027C which is SLSF008, and TL592B which is SLFS001.

programmable tone/noise generators (Values specified for T_A = 25°C)

DESCRIPTION	TYPE	PACKAGE
• Complex sound generators designed to provide low-cost digital tones or noise. • Programmable white-noise and attenuation functions, and simultaneous sounds under microprocessor control. • TTL compatible.	SN76494 SN76496	N

frequency-to-voltage converters (Values specified for T_A = 25°C)

DESCRIPTION	TYPE	PACKAGE
• Output swings to ground for zero-frequency input • Only one RC network provides frequency doubling for low ripple. • 8-pin version interfaces directly to variable reluctance magnetic pickups.	LM2907 LM2917	D,N,P

NOTE: The applicable literature number is SLYD001 except the following:
SN76494 and SN76496 which is SLFS013, and LM2907 and LM2917 which is SLFS011.

speech synthesis circuits

CATEGORY	DESCRIPTION	PROCESS	LPC	MEMORY	SUPPLY VOLTAGE	MASK CHG	TYPE	PKG
Synthesizer, Micro-processor, and Memory	28-pin speech and control system with 64K-bit ROM and 128-byte RAM memory with 2.5 8-bit interface ports	CMOS	10	64K bytes	4-6 V	Yes	TSP50C40A	N
							TSP50C41	
	40-pin speech and control system with 64K-bit ROM and 128-byte RAM memory with 4 8-bit interface ports						TSP50C42	
	28-pin speech and control system with 128K-bit ROM and 128-byte RAM memory with 2.5 8-bit interface ports			128K bytes			TSP50C43	
	40-pin speech and control system with 128K-bit ROM and 128-byte RAM memory with 4 8-bit interface ports						TSC50C44	
Synthesizer	LPC-10 voice synthesizer with 4-bit control bus	PMOS	10	NA	9 V	No	TSP5110A	N
	LPC-10 voice synthesizer with 8-bit control bus						TSP5220C	
	LPC-12 high-quality voice synthesizer with 6-pole low-pass filter	CMOS	12		4-6 V		TSP50C50	J,N
Memory Serial Output ROM	128-bit ROM for use with the TSP5110A and TSP5220C	PMOS	NA	128K bytes	9 V	Yes	TSP6100	N
	256-bit ROM for use with the TSP50C4X series and TSP50C50	CMOS		256K bytes	4-6 V		TSP60C20	

NOTE: The applicable literature number is SLYD001 except the following:
TSP5110A—SPSS004, TSP5220C—SPSS009, TSP50C40A—SPSS007, TSP50C41, TSP50C42, TSP50C43 and TSP50C44—TBA.

telecommunications circuits

DESCRIPTION	FUNCTION	TECH-NOLOGY	SUPPLY VOLTAGE	PRODUCT FEATURES	TYPE	PKG
AMI/HDB3 Transmission	Encoder/Decoder	NMOS	5 V	AMI or HDB3 encoding Received signal diagnostics Zero to 3 MHz bit rate	TCM2222	16-Pin J
	Equipment Line Interface	Bipolar	5 V	Serial bipolar data rates up to 3 MHz Low-Q clock extraction Two ALBO taps with 42 dB range Phase adjust for recovered clock Direct interface with TCM2222	TCM2203	28-Pin J
PCM Interface	CODEC	NMOS	12 V, ±5 V	Provides μ-law companding Compatible with CCITT recommendations G.711 and G.712 Optional programmable time-slot selection	TCM2909	22-Pin J,N
				Compatible with CCITT recommendations G.711 and G.712 μ-255-Law encoding and 8th-bit signaling Optional programmable time-slot selection	TCM2910A	24-Pin J,N

NOTE: The applicable literature number is SCTD001.

telecommunications circuits (continued)

DESCRIPTION	FUNCTION	TECH-NOLOGY	SUPPLY VOLTAGE	PRODUCT FEATURES	TYPE	PKG
PCM Interface	Line Filter	NMOS	±5 V	High-pass transmit filter for rejection of all low-frequency noise 6th-order low-pass transmit filter CCITT G.172 compatible AT&T D3/D4 compatible Three-state PWRO+ and PWRO− outputs	TCM2912C	20-Pin J
	COMBO			Synchronous, μ-Law, A-Law coding Variable data rate Fixed data rate 1.536 MHz, 1.544 MHz, 2.048 MHz	TCM2913	20-Pin J
				Synchronous/ asynchronous μ-Law, A-Law coding, 8th-bit signaling Variable data rate Fixed data rate 1.536 MHz, 1.544 MHz, 2.048 MHz	TCM2914	24-Pin J, 28-Pin FN
				Synchronous, μ-Law, variable data rate Fixed data rate 2.048 MHz MHz	TCM2916	16-Pin J
				Synchronous, A-law, Variable data rate Fixed data rate 2.048 MHz	TCM2917	16-Pin J

NOTE: The applicable literature number is SCTD001.

telecommunications circuits (continued)

DESCRIPTION	FUNCTION	TECH-NOLOGY	SUPPLY VOLTAGE	PRODUCT FEATURES	TYPE	PKG
PCM Interface	COMBO	CMOS	±5 V	Synchronous, μ-Law, A-Law coding Variable data rate Fixed data rate 1.536 MHz, 1.544 MHz, 2.048 MHz	TCM29C13	20-Pin J,DW
				Synchronous/ asynchronous μ-Law, A-Law coding, 8th-bit signaling Variable data rate Fixed data rate 1.536 MHz, 1.544 MHz, 2.048 MHz	TCM29C14	24-Pin J,DW, 28-Pin FN
				Synchronous, μ-Law, Variable data rate Fixed data rate 2.048 MHz	TCM29C16	16-Pin J
				Synchronous, A-Law, Variable data rate Fixed data rate 2.048 MHz	TCM29C17	16-Pin J
				Low-cost speech band DSP interface μ-Law encoding	TCM29C18 TCM29C19	16-Pin N
Modem	Bell 202/CCITT V.23	CMOS	5 V	Asynchronous Half-duplex operation up to 1200 baud Full-duplex operation 1200/150 baud, reversible	TCM3105	16-Pin J

NOTE: The applicable literature number is SCTD001, except TCM29C18 and TCM29C19 which is SCTS021.

telecommunications circuits (continued)

DESCRIPTION	FUNCTION	TECH-NOLOGY	SUPPLY VOLTAGE	PRODUCT FEATURES	TYPE	PKG
Ringers	Telephone Tone Ringer Drivers	BIDFET	40-150 Vac	Output Center Frequency (Hz): 2000	TCM1531	8-Pin P
				Output Center Frequency (Hz): 2000	TCM1501B	8-Pin P
				Output Center Frequency (Hz): 1250	TCM1532	8-Pin P
				Output Center Frequency (Hz): 1250	TCM1512B	8-Pin P
				Output Center Frequency (Hz): 500	TCM1536	8-Pin P
				Output Center Frequency (Hz): 500	TCM1506B	8-Pin P
				Output Center Frequency (Hz): 2000	TCM1539	8-Pin P
Ring Detector	TTL/MOS Output	BIDFET	40-150 Vac	TTL/MOS output, transient protection	TCM1520A	8-Pin P
Tone Encoder	DTMF Standard	CMOS	3.5-10 V	SPST/DPST keyboard or electronic input Low impedance tone output	TCM5087	16-Pin N
				Transmitter switch and mute output DPST key-board or electronic input Keyboard active output	TCM5089	16-Pin N
					TCM5094	
Suppressor	Transient Voltage Suppressor	Bipolar	58 V	Breakover voltage to common: 82 V max	TISP1082	TO-220
			145 V	Breakover voltage to common: 180 V max	TISP2180	TO-220
			200 V	Breakover voltage to common: 290 V max	TISP2290	TO-220
			145 V	Breakover voltage to common: 180 V max	TISP3180	TO-220
			200 V	Breakover voltage to common: 290 V max	TISP3290	TO-220

NOTE: The applicable literature number is SCDT001, except TCM1531, TCM1501B, TCM1532, TCM1512B, and TCM1536 is SCTS020, TCM5094 is SCTS023, TISP1082 is SLPS019, TISP2000 Series is SLPS018, and the TISP3000 Series is SLPS020.

telecommunications circuits (continued)

DESCRIPTION	FUNCTION	TECH-NOLOGY	SUPPLY VOLTAGE	PRODUCT FEATURES	TYPE	PKG
Suppressor	Transient Voltage Suppressor	Bipolar	145 V	Breakover voltage to common: 180 v max	TISP4180	TO-220
			200 V	Breakover voltage to common: 290 V max	TISP4290	TO-220
			145 V	Breakover voltage to common: 180 V max	TISP7180	TO-220
			200 V	Breakover voltage to common: 290 V max	TISP7290	TO-220
			145 V	Breakover voltage to common: 180 V max	TISP8180	TO-220
			200 V	Breakover voltage to common: 290 V max	TISP8290	TO-220
			145 V	Breakover voltage to common: 180 V max	TISP9180	TO-220
			200 V	Breakover voltage to common: 290 V max	TISP9290	TO-220
Optocoupler	TTL-Compatible	Bipolar	12 V	Peak high-voltage isolation: 3.54 kV	TIL181	6-Pin CP-7
Subscriber Line Control Circuits	TTL-Compatible	CMOS	±5 V	Three selectable balance networks	TCM4204A	24-Pin J
				Three selectable balance networks Three auxiliary relay outputs Ground-start operation	TCM4205A	28-Pin J
				Flux-canceling option Two selectable balance networks	TCM4207A	24-Pin J
	Quad Telephone Relay Driver	Bipolar	5 V, −60 V	50-mA output current capability	DS3680	14-Pin D,J,N
Converter/ Controller	Octal Receiver/ Transmitter	NMOS	5 V	Programmable baud rates: 50 to 19,200	TCM78808	68-Pin FN, HA,HB

NOTE: The applicable literature number is SCDT001, except the TISP4000 Series which is SLPS021, TISP7000 Series which is SLPS022, TISP8000 Series which is SLPS023, TISP9000 Series which is SLPS024, and TCM78808 which is SCTS022.

power supply housekeeping functions (Value specified for T_A = 25°C)

FUNCTION	SENSE INPUT SUPPLY	SENSE INPUT THRESHOLD	THRESHOLD TOLERANCE %	TYPE	PACKAGE
Over Voltage Monitor	†	2.6 V TYP	5	MC3423	D,P
Under Voltage Monitor	†	2.53 V TYP	1	TL7702A	D,P
	5 V	4.55 V TYP		TL7705A	
	9 V	7.6 V TYP		TL7709A	
	12 V	10.8 V TYP		TL7712A	
	15 V	13.5 V TYP		TL7715A	

†Programmable

switched-capacitor voltage converters (Value specified for T_A = 25°C)

CTRL. TOP-OLOGY	OUTPUT SWITCH	SUPPLY VOLTAGE RANGE	QUIESCENT CURRENT NO LOAD	MAXIMUM CONTIN-UOUS I OUT	MAX FREQ.	MINIMUM CONVERSION EFFICIENCY	TYPE	PKG
Voltage Mode	Single	1.5 V - 9 V	200 μA	50 mA	10 kHz	95%	LTC1044 7660	JG,LP

NOTE: The applicable literature number is SLYD001, except for MC3423 which is SLVS006, and the LTC Series which is SLAS013.

VOLTAGE REGULATORS
SELECTION GUIDE

shunt voltage regulators/references (Value specified for T_A = 25°C)

REGULATOR VOLTAGE RANGE (V)	MINIMUM SHUNT CURRENT TO MAINTAIN REG	MAX SHUNT CURRENT	TOL. %	TEMP. COEFF. (TYP) PPM/°C	TYPE	PKG
2.5 (Typ)	400 μA	20 mA	0.2	15	LT1009	LD,LP
2.5 to 30	500 μA (Typ)	150 mA	4	120	TL430	D,LP
2.5 to 36	270 μA (Typ)	150 mA	2	30	TL431	D,LP

adjustable series-pass voltage regulators
(Value specified over operating temperature range)

OUTPUT VOLTAGE	OUTPUT CURRENT	OUTPUT VOLTAGE RANGE (V)	REF. TOL. %	MAX (V_I - V_O) DIFFER. (V)	DEVICE	PKG
Positive	100 mA	1.2 to 32	5	35	TL317	D,LP
Output	750 mA	1.25 to 125	5	125	TL783	KC
Voltage	1.5 A	1.2 to 37	4	40	LM317	KC
Neg Output	1.5 A	−1.2 to −37	4	−40	LM337	KC
Pos or Neg Output	150 mA	2.0 to 37	5	38	uA723	N,D

NOTE: The applicable literature number is SLYD001, except for the following: LT1009—SLVS013; TL431—SLVS005; TL317—SLVS004.

switching power supply controllers and regulators

(Value specified for T_A = 25°C)

CONTROL TOPOLOGY	OUTPUT SWITCH	MAX SW V	MAX CONT A	MAX FREQ (kHz)	ERROR AMPS (A)	LIMIT AMPS (A)	REF %	OT† ST	ULVO	OT‡ CT	TYPE	PKG
Voltage Mode Pulse Width Modulated	Single Uncom.	40	0.25	200	2	–	5	–	–	–	MC34060	D,N
	Dual Uncommitted§	40	0.1	300	2	1	5	–	X	–	SG2524	D,N
								–	–	–	SG3524	
			0.25		1			–	–	X	TL493	
					2	–		–	–	X	TL494	
								X	–	X	TL495	N
							1	–	X	X	TL594	D,N
								X	X	X	TL595	N
	Dual Totem Pole#	35	0.1	500	1	–	1	–	X	–	SG2525A	J,N
								–	X	–	SG3525A	
								–	X	–	SG2527A	
								–	X	–	SG3527A	
Fixed On Time Variable Frequency Voltage Mode	Dedicated¶	20	1.2	40	1	–	10	–	–	–	TL496	P
	Single Uncommitted§	35	0.7	50	1	–	5	–	–	–	TL497A	D,N

†OT ST = Output Steering
‡OT CT = Output Control (single ended or parallel)
§Uncommitted = Open E, Open C
¶Dedicated = Comitted Emitter and Collector
#Totem-Pole = Active Pull Up/Down

NOTE: The applicable literature number is SLYD001 except the following:
MC34060-SLVS008, TL493/4/5-SLFS014, TL496-SLVS012, TL497A-SLVS009,

VOLTAGE REGULATORS
SELECTION GUIDE

switching power supply controllers and regulators

(Value specified for T_A = 25°C)

CONTROL TOPOLOGY	OUTPUT SWITCH	MAX SW V	MAX CONT A	MAX FREQ (kHz)	ERROR AMPS (A)	LIMIT AMPS (A)	REF %	OT† ST	ULVO	OT‡ CT	TYPE	PKG
Pulse-Width Modulated Current Mode	Dedicated¶	60	5	40	1	1	2	–	–	–	LT1070	KJ,KV
	Dual Totem-Pole# Low Off-State	40	0.25	500	1	1	1	–	X	–	UC2846 UC3846	D,N
	Dual Totem-Pole# High Off State							–	X	–	UC2847 UC3847	

†OT ST = Output Steering
‡OT CT = Output Control (single ended or parallel)
§Uncommitted = Open E, Open C
¶Dedicated = Comitted Emitter and Collector
#Totem-Pole = Active Pull Up/Down

NOTE: The applicable literature number is SLYD001 except the following:
LT1070-SLVS015, UC3846-SLVS016, UC3847-SLVS016

positive fixed output series pass voltage regulators
(Values specified over operating temperature range)

OUTPUT VOLTAGE V	OUTPUT CURRENT RATING	OUTPUT VOLTAGE TOLERANCE %	MINIMUM DIFFERENTIAL VOLTAGE (V)	TYPE	PACKAGES
2.6	100 mA	±5	2	uA78L02A	D,LP
		±10		uA78L02	
5	100 mA	±5	2	uA78L05A	
		±10		uA78L05	
	150 mA	±5	0.6	LM330-5	KC
		±10		LM2930-5	
	500 mA	±5	2	uA78M05	
	1.5 A	±5	2	LM340-5	
		±2		TL780-5	
		±5		uA7805	
6	500 mA	±5	2	uA78M06	
6.2	1.5 A	±5	2	uA7806	D,LP
	100 mA	±5	2	uA78L06A	
		±10		uA78L06	
8	100 mA	±5	2	uA78L08A	
		±10		uA78L08	
	150 mA	±10	0.6	LM2930-8	KC
	500 mA	±5	2	uA78M08	
	1.5 A	±5	2	uA7808	
8.5	1.5 A	±5	2	uA7885	
9	100 mA	±5	2	uA78L09A	D,LP
		±10		uA78L09	
10	100 mA	±5	2	uA78L10A	D,LP
		±10		uA78L10	
	500 mA	±5	2	uA78M10	KC
	1.5 A	±5	2	uA7810	
12	100 mA	±5	2	uA78L12A	D,LP
		±10		uA78L12	
	500 mA	±5	2	uA78M12	KC
	1.5 A	±4	2	LM340-12	
		±2		TL780-12	
		±5		uA7812	

NOTE: The applicable literature number is SLYD001, except for the uA78L02, uA78L02A, uA78L05A, uA78L05, uA78L06, uA78L06A, uA78L08, u78L08A, uA78L09, uA78L09A, uA7810A, uA7810, uA78L12A, and the uA78L12, which is SLVS010.

VOLTAGE REGULATORS
SELECTION GUIDE

positive fixed output series pass voltage regulators (continued)

(Value specified over operating temperature range)

OUTPUT VOLTAGE V	OUTPUT CURRENT RATING	OUTPUT VOLTAGE TOLERANCE %	MINIMUM DIFFERENTIAL VOLTAGE (V)	TYPE	PACKAGES
15	100 mA	±5	2	uA78L15A	D,LP
		±10		uA78L15	
15	500 mA	±5	2	uA78M15	KC
	1.5 A	±5	2	LM340-15	
		±2		TL780-15	
		±5		uA7815	
18	1.5 A	±5	2	uA7818	
20	500 mA	±5	2	uA78M20	
24	500 mA	±5	2	uA78M24	
	1.5 A	±5	2	uA7824	

NOTE: The applicable literature number is SLYD001, except for the uA78L15A and the uA78L15, which is SLVS010.

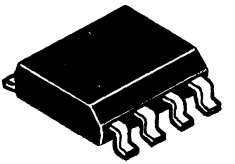
negative fixed output series pass voltage regulators
(Value specified over operating temperature range)

OUTPUT VOLTAGE V	OUTPUT CURRENT RATING	OUTPUT VOLTAGE TOLERANCE %	MINIMUM DIFFERENTIAL VOLTAGE (V)	TYPE	PACKAGES
5	100 mA	±5	1.7	MC79L05A	D,LP
		±10		MC79L05	
	500 mA	±5	2	uA79M05	KC
	1.5 A	±5		uA7905	
5.2	1.5 A	±5	2	uA7952	
6	500 mA	±5	2	uA79M06	
	1.5 A	±5		uA7906	
8	500 mA	±5	2	uA79M08	
	1.5 A	±5		uA7908	
12	100 mA	±10	1.7	MC79L12	D,LP
		±5		MC79L12A	
	500 mA	±5	2	uA79M12	KC
	1.5 A	±5		uA7912	
15	100 mA	±5	1.7	MC79L15A	D,LP
		±10		MC79L15	
	500 mA	±5	2	uA79M15	KC
	1.5 A	±5		uA7915	
18	1.5 A	±5	2	uA7918	
20	500 mA	±5	2	uA79M20	
24	500 mA	±5	2	uA79M24	
	1.5 A	±5		uA7924	

NOTE: The applicable literature number is SLYD001, except for the MC79L05A, MC79L05, MC79L12, MC79L12A, MC79L15A, and the MC79L15 which is SLVS011.

Small Outline Packages

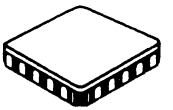
D/DW Each of these "small outline" packages consists of a circuit mounted on a lead frame and encapsulated within a plastic compound. The compound will withstand soldering temperature with no deformation, and circuit performance characteristics will remain stable when operated in high-humidity conditions. Leads require no additional cleaning or processing when used in soldered assembly.



Ceramic Chip Carrier Packages

FD/FK Each of these hermetically sealed leadless square packages consists of a 3-layer ceramic base and a metal lid (gold-plated kovar). Hermetic sealing is accomplished with a gold-tin solder braze. Contact terminations are gold-plated or tin-lead-solder-dipped. These packages are designed for direct PC board mounting by reflow soldering or socket mounting.

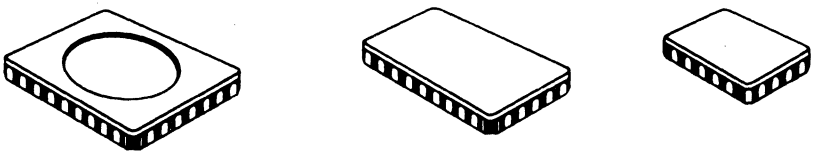
These packages are used for logic, linear, gate array, and microprocessor product families. The FK designation denotes devices that conform to JEDEC pinout standards; the FD designation denotes non-JEDEC defined pinouts.



PACKAGE DESCRIPTIONS

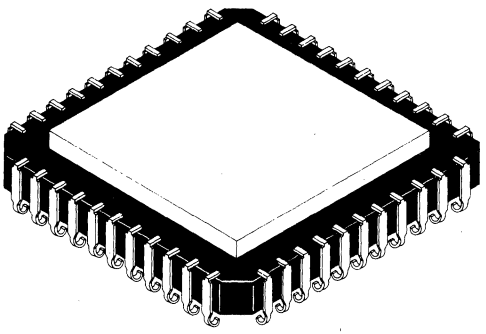
FE/FG/FV Each of these hermetically sealed leadless rectangular packages consists of a 3-layer ceramic base and a metal lid (gold-plated kovar). Hermetic sealing is accomplished with a gold-tin solder braze. Contact terminations are gold-plated or tin-lead-solder-dipped. These packages are designed for direct PC board mounting by reflow soldering or socket mounting.

These packages are used for memory products. The FG and FV designations denote devices that conform to JEDEC standards. The FE designation denotes non-JEDEC pinouts.



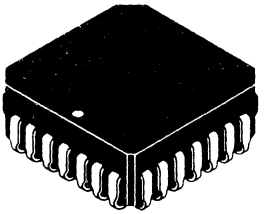
Leaded Ceramic Chip Carrier Packages

FJ This square "J" formed ceramic leaded chip carrier is used for microprocessor, display driver, and ASIC product families. The package consists of a 3-layer alumina ceramic case, a metal lid (gold-plated kovar), and gold-tin-braze-attached lead frame. Hermetic sealing is accomplished with gold-tin solder braze. The lead material is Alloy 42 base with nickel followed by gold plating. The final finish is gold plate or tin-lead solder dip. Leads are spaced on 0.050-inch centers. This package is designed for direct PC board mounting by reflow soldering or socket mounting.



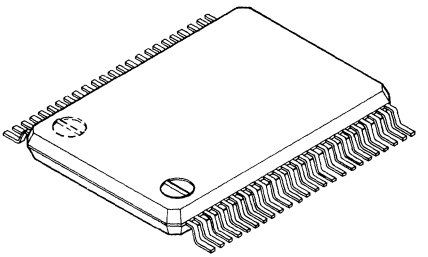
Plastic Chip Carrier Packages

FN/FM/FP Each of these chip carrier packages consists of a circuit mounted on a lead frame and encapsulated within an electrically nonconductive plastic compound. The compound withstands soldering temperatures with no deformation, and circuit performance characteristics remain stable when the devices are operated in high-humidity conditions. The packages are intended for surface mounting. Leads require no additional cleaning and processing when used in soldered assembly.



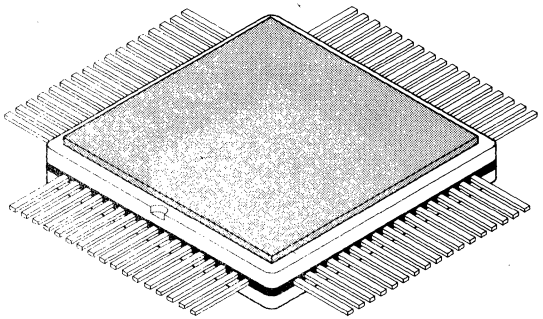
Plastic Flatpack

FT This plastic flat package consists of a circuit mounted on a lead frame and encapsulated within a plastic compound. The compound will withstand soldering temperature with no deformation, and circuit performance characteristics will remain stable when operated in high-humidity conditions. Leads require no additional cleaning or processing when used in soldered assembly.



Quad Ceramic Flatpacks

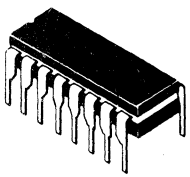
HA/HB This quad flat package is hermetically sealed. It has a 0.050-inch lead spacing configured with gull-wing bent or straight leads suitable for surface mounting. The straight leads are for use with low-profile sockets.



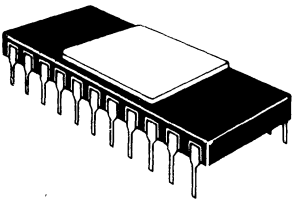
Ceramic Dual-in-Line Packages

J/JT/JW Each of these hermetically sealed dual-in-line packages consists of a ceramic base, ceramic cap, and a lead frame. The circuit bar is alloy-mounted to the base and hermetic sealing is accomplished with glass. Once the leads are compressed and inserted, sufficient tension is provided to secure the package in the board during soldering. Tin-plated or tin-plated-solder dipped leads require no additional cleaning or processing when used in soldering assembly.

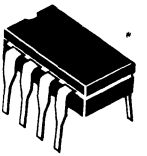
NOTE: For all except 24-pin packages, the letter J is used by itself since only the 24-pin package is available in more than one row-spacing. For the 24-pin package, the 7,62 (0.300) version is designated JT; the 15,24 (0.600) version is designated JW. If no second letter or row spacing is specified, the package is assumed to have 15,24 (0.600) row-spacing.



JD This hermetically sealed ceramic dual-in-line package consists of a metal cap and gold plated side-brazed leads.

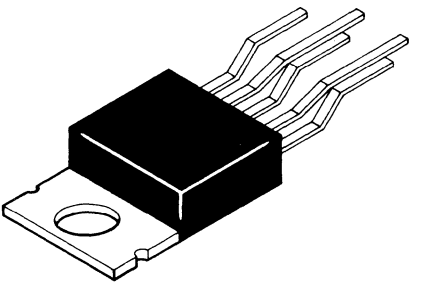


JG This hermetically sealed dual-in-line package consists of a ceramic base, ceramic cap, and 8-pin lead frame. Once the leads are compressed and inserted, sufficient tension is provided to secure the package in the board during soldering. Tin-plated or tin-lead-solder-dipped leads require no additional cleaning or processing when used in soldered assembly.



Plastic Single-In-Line K Packages

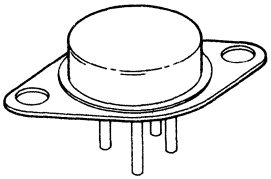
KC/KH/KV Each of these packages comprises a circuit mounted on a lead frame and encapsulated with a plastic compound. The compound will withstand soldering temperature with no deformation, and circuit performance characteristics will remain stable when the package is operated under high-humidity conditions.



PACKAGE DESCRIPTIONS

TO-3 Type Metal Can (Steel) Package

KJ This hermetically sealed package comprises a base and can of nickel-plated steel. The leads are nickel-plated Alloy 52 with solder-dip finish.

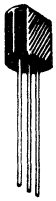


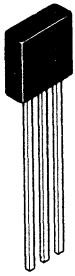
Metal Can L Plug-In Packages

L/LD Each of these hermetically sealed plug-in packages consists of a welded metal base and cap with individual leads secured by an insulating glass sealant. The gold-plated leads (-00) require no additional cleaning or processing when used in soldered assembly.

LP and LU Plastic Packages

These packages each consist of a circuit mounted on a lead frame and encapsulated with a plastic compound. The compound will withstand soldering temperature with no deformation, and circuit performance characteristics remain stable when operated in high-humidity conditions. Leads require no additional cleaning or processing when used in soldered assembly.

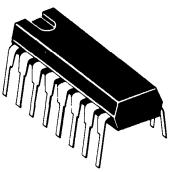




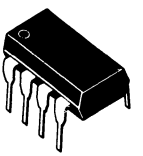
Plastic Dual-In-Line Packages

N/NT/NW Each of these dual-in-line packages consists of a circuit mounted on a lead frame and encapsulated within an electrically nonconductive plastic compound. The compound will withstand soldering temperature with no deformation, and circuit performance characteristics will remain stable when operated under high-humidity conditions. Once the leads are compressed and inserted, sufficient tension is provided to secure the package in the board during soldering. Leads require no additional cleaning or processing when used in soldered assembly.

NOTE: For all except 24-pin packages, the letter N is used by itself since only the 24-pin package is available in more than one row-spacing. For the 24-pin package, the 7,62 (0.300) version is designated NT; the 15,24 (0.600) version is designated NW. If no second letter or row spacing is specified, the package is assumed to have 15,24 (0.600) row-spacing.



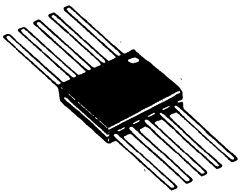
P This dual-in-line package consists of a circuit mounted on a lead frame and encapsulated within an electrically nonconductive plastic compound. The compound will withstand soldering temperature with no deformation, and circuit performance characteristics will remain stable when operated under high-humidity conditions. Once the leads are compressed and inserted, sufficient tension is provided to secure the package in the board during soldering. Leads require no additional cleaning or processing when used in soldered assembly.



PACKAGE DESCRIPTIONS

Ceramic Flatpacks

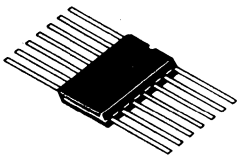
U This flat package consists of a ceramic base and cap, and 10-pin lead frame. Circuit bars are alloy mounted. Hermetic sealing is accomplished with glass. Tin-plated or tin-lead-solder-dipped leads require no additional cleaning or processing when used in soldered assembly.

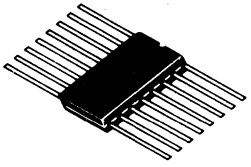


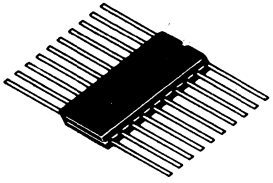
W This hermetically sealed flat package consists of an electrically nonconductive ceramic base and cap and 14-, 16-, 20-, or 24-pin lead frame. Hermetic sealing is accomplished with glass. Tin-plated or tin-lead-solder-dipped leads require no additional cleaning or processing when used in soldered assembly.

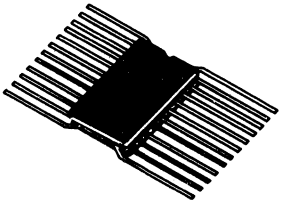
WA This hermetically sealed 14-pin flat package consists of an electrically nonconductive ceramic base and cap. It is a smaller version of the 14-pin W flatpack. Hermetic sealing is accomplished with glass. Tin-plated or tin-lead-solder dipped leads require no additional cleaning or processing when used in soldered assembly.

WC This hermetically sealed 24-pin flat package consists of an electrically nonconductive ceramic base and cap. It is a smaller version of the 24-pin W flatpack. Hermetic sealing is accomplished with glass. Tin-plated or tin-lead-solder dipped leads require no additional cleaning or processing when used in soldered assembly.









TI Sales Offices

ALABAMA: Huntsville (205) 837-7530.

ARIZONA: Phoenix (602) 995-1007;
Tucson (602) 624-3276.

CALIFORNIA: Irvine (714) 660-1200;
Sacramento (916) 929-0197;
San Diego (619) 278-9600;
Santa Clara (408) 980-9000;
Torrance (213) 217-7000;
Woodland Hills (818) 704-7759.

COLORADO: Aurora (303) 368-8000.

CONNECTICUT: Wallingford (203) 269-0074.

FLORIDA: Altamonte Springs (305) 260-2116;
Ft. Lauderdale (305) 973-8502;
Tampa (813) 286-0420.

GEORGIA: Norcross (404) 662-7900.

ILLINOIS: Arlington Heights (312) 640-3000.

INDIANA: Carmel (317) 573-6400;
Ft. Wayne (219) 424-5174.

IOWA: Cedar Rapids (319) 395-9550.

KANSAS: Overland Park (913) 451-4511.

MARYLAND: Baltimore (301) 944-8600.

MASSACHUSETTS: Waltham (617) 895-9100.

MICHIGAN: Farmington Hills (313) 553-1500;
Grand Rapids (616) 957-4200.

MINNESOTA: Eden Prairie (612) 828-9300.

MISSOURI: St. Louis (314) 569-7600.

NEW JERSEY: Iselin (201) 750-1050.

NEW MEXICO: Albuquerque (505) 345-2555.

NEW YORK: East Syracuse (315) 463-9291;
Melville (516) 454-6600; Pittsford (716) 385-6770;
Poughkeepsie (914) 473-2900.

NORTH CAROLINA: Charlotte (704) 527-0930;
Raleigh (919) 876-2725.

OHIO: Beachwood (216) 464-6100;
Dayton (513) 258-3877.

OREGON: Beaverton (503) 643-6758.

PENNSYLVANIA: Blue Bell (215) 825-9500.

PUERTO RICO: Hato Rey (809) 753-8700.

TENNESSEE: Johnson City (615) 461-2192.

TEXAS: Austin (512) 250-6769;
Houston (713) 778-6592; Richardson (214) 680-5082;
San Antonio (512) 496-1779.

UTAH: Murray (801) 266-8972.

VIRGINIA: Fairfax (703) 849-1400.

WASHINGTON: Redmond (206) 881-3080.

WISCONSIN: Brookfield (414) 782-2899.

CANADA: Nepean, Ontario (613) 726-1970;
Richmond Hill, Ontario (416) 884-9181;
St. Laurent, Quebec (514) 336-1860.

TI Regional Technology Centers

CALIFORNIA: Irvine (714) 660-8140;
Santa Clara (408) 748-2220;
Torrance (213) 217-7019.

COLORADO: Aurora (303) 368-8000.

GEORGIA: Norcross (404) 662-7945.

ILLINOIS Arlington Heights (313) 640-2909.

MASSACHUSETTS: Waltham (617) 895-9196.

TEXAS: Richardson (214) 680-5066.

CANADA: Nepean, Ontario (613) 726-1970.

TI Distributors

TI AUTHORIZED DISTRIBUTORS
Arrow/Kierulff Electronics Group
Arrow Canada (Canada)
Future Electronics (Canada)
GRS Electronics Co., Inc.
Hall-Mark Electronics
Marshall Industries
Newark Electronics
Schweber Electronics
Time Electronics
Wyle Laboratories
Zeus Components

– OBSOLETE PRODUCT ONLY –
Rochester Electronics, Inc.
Newburyport, Massachusetts
(617) 462-9332

ALABAMA: Arrow/Kierulff (205) 837-6955;
Hall-Mark (205) 837-8700; Marshall (205) 881-9235;
Schweber (205) 895-0480.

ARIZONA: Arrow/Kierulff (602) 437-0750;
Hall-Mark (602) 437-1200; Marshall (602) 496-0290;
Schweber (602) 997-4874; Wyle (602) 866-2888.

CALIFORNIA: Los Angeles/Orange County:
Arrow/Kierulff (818) 701-7500, (714) 838-5422;
Hall-Mark (818) 716-7300, (714) 669-4100,
(213) 217-8400; Marshall (818) 407-0101, (818) 459-5500,
(714) 458-5395; Schweber (818) 999-4702,
(714) 863-0200, (213) 320-8090; Wyle (213) 322-9953,
(818) 880-9000, (714) 863-9953; Zeus (714) 921-9000;
Sacramento: Hall-Mark (916) 722-8600;
Marshall (916) 635-9700; Schweber (916) 929-9732;
Wyle (916) 638-5282;
San Diego: Arrow/Kierulff (619) 565-4800;
Hall-Mark (619) 268-1201; Marshall (619) 578-9600;
Schweber (619) 450-0454; Wyle (619) 565-9171;
San Francisco Bay Area: Arrow/Kierulff (408) 745-6600,
Hall-Mark (408) 432-0900; Marshall (408) 942-4600;
Schweber (408) 432-7171; Wyle (408) 727-2500;
Zeus (408) 998-5121.

COLORADO: Arrow/Kierulff (303) 790-4444;
Hall-Mark (303) 790-1662; Marshall (303) 451-8383;
Schweber (303) 799-0258; Wyle (303) 457-9953.

CONNETICUT: Arrow/Kierulff (203) 265-7741;
Hall-Mark (203) 269-0100; Marshall (203) 265-3822;
Schweber (203) 748-7080.

FLORIDA: Ft. Lauderdale:
Arrow/Kierulff (305) 429-8200; Hall-Mark (305) 971-9280;
Marshall (305) 977-4880; Schweber (305) 977-7511;
Orlando: Arrow/Kierulff (305) 725-1480, (305) 682-6923;
Hall-Mark (305) 855-4020; Marshall (305) 767-8585;
Schweber (305) 331-7555; Zeus (305) 365-3000;
Tampa: Hall-Mark (813) 530-4543;
Marshall (813) 576-1399.

GEORGIA: Arrow/Kierulff (404) 449-8252;
Hall-Mark (404) 447-8000; Marshall (404) 923-5750;
Schweber (404) 449-9170.

ILLINOIS: Arrow/Kierulff (312) 250-0500;
Hall-Mark (312) 860-3800; Marshall (312) 490-0155;
Newark (312) 784-5100; Schweber (312) 364-3750.

INDIANA: Indianapolis: Arrow/Kierulff (317) 243-9353;
Hall-Mark (317) 872-8875; Marshall (317) 297-0483.

IOWA: Arrow/Kierulff (319) 395-7230;
Schweber (319) 373-1417.

KANSAS: Kansas City: Arrow/Kierulff (913) 541-9542;
Hall-Mark (913) 888-4747; Marshall (913) 492-3121;
Schweber (913) 492-2922.

MARYLAND: Arrow/Kierulff (301) 995-6002;
Hall-Mark (301) 988-9800; Marshall (301) 840-9450;
Schweber (301) 840-5900; Zeus (301) 997-1118.

MASSACHUSETTS Arrow/Kierulff (617) 935-5134;
Hall-Mark (617) 667-0902; Marshall (617) 658-0810;
Schweber (617) 275-5100, (617) 657-0760;
Time (617) 532-6200; Zeus (617) 863-8800.

MICHIGAN: Detroit: Arrow/Kierulff (313) 971-8220;
Marshall (313) 525-5850; Newark (313) 967-0600;
Schweber (313) 525-8100;
Grand Rapids: Arrow/Kierulff (616) 243-0912.

MINNESOTA: Arrow/Kierulff (612) 830-1800;
Hall-Mark (612) 941-2600; Marshall (612) 559-2211;
Schweber (612) 941-5280.

MISSOURI: St. Louis: Arrow/Kierulff (314) 567-6888;
Hall-Mark (314) 291-5350; Marshall (314) 291-4650;
Schweber (314) 739-0526.

NEW HAMPSHIRE: Arrow/Kierulff (603) 668-6968;
Schweber (603) 625-2250.

NEW JERSEY: Arrow/Kierulff (201) 538-0900,
(609) 596-8000; GRS Electronics (609) 964-8560;
Hall-Mark (201) 575-4415, (609) 235-1900;
Marshall (201) 882-0320, (609) 234-9100;
Schweber (201) 227-7880.

NEW MEXICO: Arrow/Kierulff (505) 243-4566.

NEW YORK: Long Island:
Arrow/Kierulff (516) 231-1000; Hall-Mark (516) 737-0600;
Marshall (516) 273-2424; Schweber (516) 334-7555;
Zeus (914) 937-7400;
Rochester: Arrow/Kierulff (716) 427-0300;
Hall-Mark (716) 244-9290; Marshall (716) 235-7620;
Schweber (716) 424-2222;
Syracuse: Marshall (607) 798-1611.

NORTH CAROLINA: Arrow/Kierulff (919) 876-3132,
(919) 725-8711; Hall-Mark (919) 872-0712;
Marshall (919) 878-9882; Schweber (919) 876-0000.

OHIO: Cleveland: Arrow/Kierulff (216) 248-3990;
Hall-Mark (216) 349-4632; Marshall (216) 248-1788;
Schweber (216) 464-2970;
Columbus: Arrow/Kierulff (614) 436-0928;
Hall-Mark (614) 888-3313;
Dayton: Arrow/Kierulff (513) 435-5563;
Marshall (513) 898-4480; Schweber (513) 439-1800.

OKLAHOMA: Arrow/Kierulff (918) 252-7537;
Schweber (918) 622-8003.

OREGON: Arrow/Kierulff (503) 645-6456;
Marshall (503) 644-5050; Wyle (503) 640-6000.

PENNSYLVANIA: Arrow/Kierulff (412) 856-7000,
(215) 928-1800; GRS Electronics (215) 922-7037;
Schweber (215) 441-0600, (412) 963-6804.

TEXAS: Austin: Arrow/Kierulff (512) 835-4180;
Hall-Mark (512) 258-8848; Marshall (512) 837-1991;
Schweber (512) 339-0088; Wyle (512) 834-9957;
Dallas: Arrow/Kierulff (214) 380-6464;
Hall-Mark (214) 553-4300; Marshall (214) 233-5200;
Schweber (214) 661-5010; Wyle (214) 235-9953;
Zeus (214) 783-7010;
Houston: Arrow/Kierulff (713) 530-4700;
Hall-Mark (713) 781-6100; Marshall (713) 895-9200;
Schweber (713) 784-3600; Wyle (713) 879-9953.

UTAH: Arrow/Kierulff (801) 973-6913;
Hall-Mark (801) 972-1008; Marshall (801) 485-1551;
Wyle (801) 974-9953.

WASHINGTON: Arrow/Kierulff (206) 575-4420;
Marshall (206) 747-9100; Wyle (206) 453-8300.

WISCONSIN: Arrow/Kierulff (414) 792-0150;
Hall-Mark (414) 797-7844; Marshall (414) 797-8400;
Schweber (414) 784-9020.

CANADA: Calgary: Future (403) 235-5325;
Edmonton: Future (403) 438-2858;
Montreal: Arrow Canada (514) 735-5511;
Future (514) 694-7710;
Ottawa: Arrow Canada (613) 226-6903;
Future (613) 820-8313;
Quebec City: Arrow Canada (418) 687-4231;
Toronto: Arrow Canada (416) 672-7769;
Future (416) 638-4771;
Vancouver: Future (604) 294-1166;
Winnipeg: Future (204) 339-0554.

Customer Response Center

TOLL FREE: (800) 232-3200

OUTSIDE USA: (214) 995-6611
(8:00 a.m. – 5:00 p.m. CST)

TEXAS INSTRUMENTS

BU

TI Worldwide Sales Offices

ALABAMA: Huntsville: 500 Wynn Drive, Suite 514, Huntsville, AL 35805, (205) 837-7530.

ARIZONA: Phoenix: 8825 N. 23rd Ave., Phoenix, AZ 85021, (602) 995-1007.

CALIFORNIA: Irvine: 17891 Cartwright Rd., Irvine, CA 92714, (714) 660-8187; **Sacramento:** 1900 Point West Way, Suite 171, Sacramento, CA 95815, (916) 929-1521; **San Diego:** 4333 View Ridge Ave., Suite B., San Diego, CA 92123, (619) 278-9601; **Santa Clara:** 5353 Betsy Ross Dr., Santa Clara, CA 95054, (408) 980-9000; **Torrance:** 690 Knox St., Torrance, CA 90502, (213) 217-7010; **Woodland Hills:** 21220 Erwin St., Woodland Hills, CA 91367, (818) 704-7759.

COLORADO: Aurora: 1400 S. Potomac Ave., Suite 101, Aurora, CO 80012, (303) 368-8000.

CONNECTICUT: Wallingford: 9 Barnes Industrial Park Rd., Barnes Industrial Park, Wallingford, CT 06492, (203) 269-0074.

FLORIDA: Ft. Lauderdale: 2765 N.W. 62nd St., Ft. Lauderdale, FL 33309, (305) 973-8502; **Maitland:** 2601 Maitland Center Parkway, Maitland, FL 32751, (305) 660-4600; **Tampa:** 5010 W. Kennedy Blvd., Suite 101, Tampa, FL 33609, (813) 870-6420.

GEORGIA: Norcross: 5515 Spalding Drive, Norcross, GA 30092, (404) 662-7900.

ILLINOIS: Arlington Heights: 515 W. Algonquin, Arlington Heights, IL 60005, (312) 640-2925.

INDIANA: Ft. Wayne: 2020 Inwood Dr., Ft. Wayne, IN 46815, (219) 424-5174; **Indianapolis:** 2346 S. Lynhurst, Suite J-400, Indianapolis, IN 46241, (317) 248-8555.

IOWA: Cedar Rapids: 373 Collins Rd. NE, Suite 200, Cedar Rapids, IA 52402, (319) 395-9550.

MARYLAND: Baltimore: 1 Rutherford Pl., 7133 Rutherford Rd., Baltimore, MD 21207, (301) 944-8600.

MASSACHUSETTS: Waltham: 504 Totten Pond Rd., Waltham, MA 02154, (617) 895-9100.

MICHIGAN: Farmington Hills: 33737 W. 12 Mile Rd., Farmington Hills, MI 48018, (313) 553-1500.

MINNESOTA: Eden Prairie: 11000 W. 78th St., Eden Prairie, MN 55344 (612) 828-9300.

MISSOURI: Kansas City: 8080 Ward Pkwy., Kansas City, MO 64114, (816) 523-2500; **St. Louis:** 11816 Borman Drive, St. Louis, MO 63146, (314) 569-7600.

NEW JERSEY: Iselin: 485E U.S. Route 1 South, Parkway Towers, Iselin, NJ 08830 (201) 750-1050

NEW MEXICO: Albuquerque: 2820-D Broadbent Pkwy NE, Albuquerque, NM 87107, (505) 345-2555.

NEW YORK: East Syracuse: 6365 Collamer Dr., East Syracuse, NY 13057, (315) 463-9291; **Endicott:** 112 Nanticoke Ave., P.O. Box 618, Endicott, NY 13760, (607) 754-3900; **Melville:** 1 Huntington Quadrangle, Suite 3C10, P.O. Box 2936, Melville, NY 11747, (516) 454-6600; **Pittsford:** 2851 Clover St., Pittsford, NY 14534, (716) 385-6770; **Poughkeepsie:** 385 South Rd., Poughkeepsie, NY 12601, (914) 473-2900.

NORTH CAROLINA: Charlotte: 8 Woodlawn Green, Woodlawn Rd., Charlotte, NC 28210, (704) 527-0930; **Raleigh:** 2809 Highwoods Blvd., Suite 100, Raleigh, NC 27625, (919) 876-2725.

OHIO: Beachwood: 23408 Commerce Park Rd., Beachwood, OH 44122, (216) 464-6100; **Dayton:** Kingsley Bldg., 4124 Linden Ave., Dayton, OH 45432, (513) 258-3877.

OREGON: Beaverton: 6700 SW 105th St., Suite 110, Beaverton, OR 97005, (503) 643-6758.

PENNSYLVANIA: Ft. Washington: 260 New York Dr., Ft. Washington, PA 19034, (215) 643-6450; **Coraopolis:** 420 Rouser Rd., 3 Airport Office Park, Coraopolis, PA 15108, (412) 771-8550.

PUERTO RICO: Hato Rey: Mercantil Plaza Bldg., Suite 505, Hato Rey, PR 00919, (809) 753-8700.

TEXAS: Austin: P.O. Box 2909, Austin, TX 78769, (512) 250-7655; **Richardson:** 1001 E. Campbell Rd., Richardson, TX 75080, (214) 680-5082; **Houston:** 9100 Southwest Frwy., Suite 237, Houston, TX 77036, (713) 778-6592; **San Antonio:** 1000 Central Parkway South, San Antonio, TX 78232, (512) 496-1779.

UTAH: Murray: 5201 South Green SE, Suite 200, Murray, UT 84107, (801) 266-8972.

VIRGINIA: Fairfax: 2750 Prosperity, Fairfax, VA 22031, (703) 849-1400.

WASHINGTON: Redmond: 5010 148th NE, Bldg B, Suite 107, Redmond, WA 98052, (206) 881-3080.

WISCONSIN: Brookfield: 450 N. Sunny Slope, Suite 150, Brookfield, WI 53005, (414) 785-7140.

CANADA: Nepean: 301 Moodie Drive, Mallorn Center, Nepean, Ontario, Canada, K2H9C4, (613) 726-1970. **Richmond Hill:** 280 Centre St. E., Richmond Hill L4C1B1, Ontario, Canada (416) 884-9181; **St. Laurent:** Ville St. Laurent Quebec, 9460 Trans Canada Hwy., St. Laurent, Quebec, Canada H4S1R7, (514) 335-8392.

ARGENTINA: Texas Instruments Argentina S.A.I.C.F.: Esmeralda 130, 15th Floor, 1035 Buenos Aires, Argentina, 1 + 394-3008.

AUSTRALIA (& NEW ZEALAND): Texas Instruments Australia Ltd.: 6-10 Talavera Rd., North Ryde (Sydney), New South Wales, Australia 2113, 2 + 887-1122; 5th Floor, 418 St. Kilda Road, Melbourne, Victoria, Australia 3004, 3 + 267-4677; 171 Philip Highway, Elizabeth, South Australia 5112, 8 + 255-2066.

AUSTRIA: Texas Instruments Ges.m.b.H.: Industriestrabe B/16, A-2345 Brunn/Gebirge, 2236-846210.

BELGIUM: Texas Instruments N.V. Belgium S.A.: Mercure Centre, Raketstraat 100, Rue de la Fusee, 1130 Brussels, Belgium, 2/720.80.00.

BRAZIL: Texas Instruments Electronicos do Brasil Ltda.: Rua Paes Leme, 524-7 Andar Pinheiros, 05424 Sao Paulo, Brazil, 0815-6166.

DENMARK: Texas Instruments A/S, Mairelundvej 46E, DK-2730 Herlev, Denmark, 2 · 91 74 00.

FINLAND: Texas Instruments Finland OY: Teollisuuskatu 19D 00511 Helsinki 51, Finland, (90) 701-3133.

FRANCE: Texas Instruments France: Headquarters and Prod. Plant, BP 05, 06270 Villeneuve-Loubet, (93) 20-01-01; Paris Office, BP 67 8-10 Avenue Morane-Saulnier, 78141 Velizy-Villacoublay, (3) 946-97-12; Lyon Sales Office, L'Oree D'Ecully, Batiment B, Chemin de la Foresteire, 69130 Ecully, (7) 833-04-40; Strasbourg Sales Office, Le Sebastopol 3, Quai Kleber, 67055 Strasbourg Cedex, (88) 22-12-66; Rennes, 23-25 Rue du Puits Mauger, 35100 Rennes, (99) 31-54-86; Toulouse Sales Office, Le Peripole—2, Chemin du Pigeonnier de la Cepiere, 31100 Toulouse, (61) 44-18-19; Marseille Sales Office, Noilly Paradis—146 Rue Paradis, 13006 Marseille, (91) 37-25-30.

TEXAS INSTRUMENTS

GERMANY (Fød. Republic of Germany): Texas Instruments Deutschland GmbH: Haggertystrasse 1, D-8050 Freising, 8161 + 80-4591; Kurfuerstendamm 195/196, D-1000 Berlin 15, 30 + 882-7365; III, Hagen 43/Kibbelstrasse, 19, D-4300 Essen, 201-24250; Frankfurter Allee 6-8, D-6236 Eschborn 1, 06196 + 8070; Hamburgerstrasse 11, D-2000 Hamburg 76, 040 + 220-1154, Kirchhorsterstrasse 2, D-3000 Hannover 51, 511 + 648021; Maybachstrabe 11, D-7302 Ostfildern 2-Nelingen, 711 + 547001; Mixikoring 19, D-2000 Hamburg 60, 40 + 637 + 0061; Postfach 1309, Roonstrasse 16, D-5400 Koblenz, 261 + 35044.

HONG KONG (+ PEOPLES REPUBLIC OF CHINA): Texas Instruments Asia Ltd., 8th Floor, World Shipping Ctr., Harbour City, 7 Canton Rd., Kowloon, Hong Kong, 3 + 722-1223.

IRELAND: Texas Instruments (Ireland) Limited: Brewery Rd., Stillorgan, County Dublin, Eire, 1 831311.

ITALY: Texas Instruments Semiconduttori Italia Spa: Viale Delle Scienze, 1, 02015 Cittaducale (Rieti), Italy, 746 694.1; Via Salaria KM 24 (Palazzo Cosma), Monterotondo Scalo (Rome), Italy, 6 + 9003241; Viale Europa, 38-44, 20093 Cologno Monzese (Milano), 2 2532541; Corso Svizzera, 185, 10100 Torino, Italy, 11 774545; Via J. Barozzi 6, 40100 Bologna, Italy, 51 355851.

JAPAN: Texas Instruments Asia Ltd.: 4F Aoyama Fuji Bldg., 6-12, Kita Aoyama 3-Chome, Minato-ku, Tokyo, Japan 107, 3-498-2111; Osaka Branch, 5F, Nissho Iwai Bldg., 30 Imabashi 3- Chome, Higashi-ku, Osaka, Japan 541, 06-204-1881; Nagoya Branch, 7F Daini Toyota West Bldg., 10-27, Meieki 4-Chome, Nakamura-ku Nagoya, Japan 450, 52-583-8691.

KOREA: Texas Instruments Supply Co.: 3rd Floor, Samon Bldg., Yuksam-Dong, Gangnam-ku, 135 Seoul, Korea, 2 + 462-8001.

MEXICO: Texas Instruments de Mexico S.A.: Mexico City, AV Reforma No. 450 — 10th Floor, Mexico, D.F., 06600, 5 + 514-3003.

MIDDLE EAST: Texas Instruments: No. 13, 1st Floor Mannai Bldg., Diplomatic Area, P.O. Box 26335, Manama Bahrain, Arabian Gulf, 973 + 274681.

NETHERLANDS: Texas Instruments Holland B.V., P.O. Box 12995, (Bullewijk) 1100 CB Amsterdam, Zuid-Oost, Holland 20 + 5602911.

NORWAY: Texas Instruments Norway A/S: PB106, Refstad 131, Oslo 1, Norway, (2) 155090.

PHILIPPINES: Texas Instruments Asia Ltd.: 14th Floor, Ba- Lepanto Bldg., 8747 Paseo de Roxas, Makati, Metro Manila, Philippines, 2 + 8188987.

PORTUGAL: Texas Instruments Equipamento Electronico (Portugal), Lda.: Rua Eng. Frederico Ulrich, 2650 Moreira Da Maia, 4470 Maia, Portugal, 2-948-1003.

SINGAPORE (+ INDIA, INDONESIA, MALAYSIA, THAILAND): Texas Instruments Asia Ltd.: 12 Lorong Bakar Batu, Unit 01-02, Kolam Ayer Industrial Estate, Republic of Singapore, 747-2255.

SPAIN: Texas Instruments Espana, S.A.: C/Jose Lazaro Galdiano No. 6, Madrid 16, 1/458.14.58.

SWEDEN: Texas Instruments International Trade Corporation (Sverigefilialen): Box 39103, 10054 Stockholm, Sweden, 8 - 235480.

SWITZERLAND: Texas Instruments, Inc., Reidstrasse 6, CH-8953 Dietikon (Zuerich) Switzerland, 1-740 2220.

TAIWAN: Texas Instruments Supply Co.: Room 903, 205 Tun Hwan Rd., 71 Sung-Kiang Road, Taipei, Taiwan, Republic of China, 2 + 521-9321.

UNITED KINGDOM: Texas Instruments Limited: Manton Lane, Bedford, MK41 7PA, England, 0234 67466; St. James House, Wellington Road North, Stockport, SK4 2RT, England, 61 + 442-7162.

BM

TEXAS
INSTRUMENTS

Printed in U.S.A.
0588—100

SLYC001