

***Standard Linear,
Interface, Opto, Speech,
Telecommunications***

*Selection
Guide*

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Linear Products Selection Guide

1988

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



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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

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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.

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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 SLYD001 identifies a data book, code SLAS014 a data sheet, and code SLNS002A 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.

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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.

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Manufacturers are arranged in alphabetical order.

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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.

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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.

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Comparators

COMPARATORS SELECTION GUIDE

military temperature range

(Values specified at $T_A = 25^\circ\text{C}$)

DESCRIPTION	POWER SUPPLY		V_{IO} MAX (mV)	I_{IB} MAX (μA)	I_{OL} MIN (mA)	RESPONSE TIME TYP (ns)	TYPE	PACKAGE
	V_{CC+} NOM (V)	V_{CC-} NOM (V)						

single channel

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.

2

Comparators

COMPARATORS SELECTION GUIDE

automotive temperature range

(Values specified at $T_A = 25^\circ\text{C}$)

DESCRIPTION	POWER SUPPLY		V_{IO} MAX (mV)	I_{IB} MAX (μA)	I_{OL} MIN (mA)	RESPONSE	TYPE	PACKAGE
	V_{CC+} NOM (V)	V_{CC-} NOM (V)				TIME TYP (ns)		

2

Comparators

dual channel

Automotive LM393	5	0	7	0.25	6	300	LM2903	D,J,G,P
High Speed, LinCMOS	5	0	10	†	6	200	TLC372I	D,J,G,P
Ultra Low Power, Open Drain Output	5	0	5	†	6	1100	TLC393I	D,J,G,P
Ultra Low Power, Push Pull Output	5	0	5	†	4	1300	TLC3702I	D,J,G,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.

COMPARATORS SELECTION GUIDE

industrial temperature range

(Values specified at $T_A = 25^\circ\text{C}$)

DESCRIPTION	POWER SUPPLY		V_{IO} MAX (mV)	I_{IB} MAX (μA)	I_{OL} MIN (mA)	RESPONSE TIME TYP (ns)	TYPE	PACKAGE
	V_{CC+} NOM (V)	V_{CC-} NOM (V)						

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.

2

Comparators

COMPARATORS SELECTION GUIDE

commercial temperature range

(Values specified at $T_A = 25^\circ\text{C}$)

DESCRIPTION	POWER SUPPLY		V_{IO} MAX (mV)	I_{IB} MAX (μA)	I_{OL} MIN (mA)	RESPONSE	TYPE	PACKAGE
	V_{CC+} NOM (V)	V_{CC-} NOM (V)				TIME TYP (ns)		

2

Comparators

single channel

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.

COMPARATORS SELECTION GUIDE

commercial temperature range

(Values specified at $T_A = 25^\circ\text{C}$)

DESCRIPTION	POWER SUPPLY		V_{IO} MAX (mV)	I_{IB} MAX (μA)	I_{OL} MIN (mA)	RESPONSE TIME TYP (ns)	TYPE	PACKAGE
	V_{CC+} NOM (V)	V_{CC-} NOM (V)						

quad channel

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.

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Comparators

2

Comparators

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3

Data Acquisition/Conversion Circuits

DATA ACQUISITION AND CONVERSION CIRCUITS SELECTION GUIDE

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	80	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.)

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Data Acquisition/Conversion Circuits

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 (μ s) [‡]	POWER DISSIPATION (mW TYP)	UNADJUSTED ERROR (MAX) \pm LSB	TYPE	PACKAGE		
	ANALOG DEDICATED	ANALOG [†] DIGITAL								
PARALLEL	1 [§]		8	100	10	0.5	ADC0803	N		
						1.0	ADC0804			
		ADC0805								
	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.

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Data Acquisition/Conversion Circuits

DATA ACQUISITION AND CONVERSION CIRCUITS SELECTION GUIDE

successive-approximation and semi-flash A/D converters

ADDRESS AND DATA I/O FORMAT	SIGNAL INPUTS		RESOLU- TION (BITS)	CONVER- SION SPEED (μ s) [‡]	POWER DISSI- PATION (mW TYP)	UNAD- JUSTED ERROR (MAX) \pm LSB	TYPE	PACKAGE
	ANALOG DEDICATED	ANALOG [†] DIGITAL						
SERIAL	1 [§]	0	8	84	10	1.0	ADC0831A	P
						0.5	ADC0831B	
	1.0					ADC0832A		
	0.5					ADC0832B		
	1.0					ADC0834A	N	
	0.5					ADC0834B		
	1.0					ADC0838A	FN,N	
	0.5					ADC0838B		
	11					TLC540		
						TLC541		
	19			TLC545				
				TLC546				
	1			TLC548	D,P			
				TLC549				
	11			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.

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Data Acquisition/Conversion Circuits

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 CHARAC- TERISTIC	DYNAMIC RANGE	RESOLU- TION	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 (μ -Law)	12 Bits	8 Bits	8 kHz	Yes	TCM29C18 TCM29C19
High- Perform- ance 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.

DATA ACQUISITION AND CONVERSION CIRCUITS SELECTION GUIDE

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.

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4

Display Drivers

DISPLAY DRIVERS SELECTION GUIDE

electroluminescent display drivers

DESC.	PRODUCT FEATURES	DRIVERS PER PKG	INPUT COMPAT- IBILITY	POWER SUPPLY	TYPE	PKG
ROW DRIVERS	<ul style="list-style-type: none"> ● 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
	<ul style="list-style-type: none"> ● Monolithic BIFET integrated circuits ● Very low steady-state power consumption ● 300-mA output capability ● High-voltage open-collector N-P-N outputs 				SN65551 SN65552 SN75551 SN75552	FN
	<ul style="list-style-type: none"> ● 225-V totem-pole BIFET 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.

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Display Drivers

DISPLAY DRIVERS SELECTION GUIDE

electroluminescent display drivers (continued)

DESC.	PRODUCT FEATURES	DRIVERS PER PKG	INPUT COMPATIBILITY	POWER SUPPLY	TYPE	PKG	
4 Display Drivers COLUMN DRIVERS	<ul style="list-style-type: none"> ● 60-V totem-pole BIFET output structures ● Serial-in, parallel-out architecture ● 15-mA sink or source output capability ● Top (SNXX553) and bottom (SNXX554) drivers enhance circuit layout 	32	CMOS	V_{CC1} (logic) = 10.8 V to 15 V	SN55553	FD	
					SN55554		
	<ul style="list-style-type: none"> ● 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 					SN65553	FN
					SN65554	SN75553	SN75554
	<ul style="list-style-type: none"> ● 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 BIFET 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	SN65555	FN	
					SN65556		
					SN75555		
					SN75556		
					SN75556	FN	
					SN75556		

NOTE: The applicable literature number is SLYD002.

DISPLAY DRIVERS SELECTION GUIDE

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	<ul style="list-style-type: none"> 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,	SN65512B	DW,N
				V_{CC2} (display) = 0 V to 60 V	SN75512B	
	All features same as SN65512B except: <ul style="list-style-type: none"> Shift register reset replaces latches 	32	CMOS, TTL	V_{CC1} (logic) = 5 V to 15 V,	SN65513B	DW,N
				V_{CC2} (display) = 0 V to 60 V	SN75513B	
	All features same as SN65512B except: <ul style="list-style-type: none"> 32 bits for large format displays 	10	CMOS, TTL	V_{CC1} (logic) = 5 V to 15 V,	SN65518	FN,N
				V_{CC2} (display) = 0 V to 130 V	SN75518	
	<ul style="list-style-type: none"> Serial-in, parallel-out architecture 60-V totem-pole outputs 40-mA current source output capability Second source to Sprague UCN4810A 	10	CMOS	V_{CC1} (logic) = 5 V to 15 V,	UCN4810A	N
				V_{CC2} (display) = 0 V to 60 V		
<ul style="list-style-type: none"> Serial-in, parallel-out architecture 60-V totem-pole outputs 40-mA current source output Improved direct replacement for UCN4810A and TL4810A 	20	CMOS	V_{CC1} (logic) = 5 V to 15 V,	TL4810B	DW,N	
			V_{CC2} (display) = 0 V to 60 V	TL4810BI		
<ul style="list-style-type: none"> 70-V output voltage swing capability Drives up to 20 lines Direct replacement for Sprague UCN5812 				TL5812	FN,N	
				TL5812I		

NOTE: The applicable literature number is SLYD002.

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Display Drivers

DISPLAY DRIVERS SELECTION GUIDE

dc plasma and gas discharge display drivers

DESC.	PRODUCT FEATURES	DRIVERS PER PKG	INPUT COMPATIBILITY	POWER SUPPLY	TYPE	PKG
SCAN LINE DRIVERS	<ul style="list-style-type: none"> ● 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	FT
					SN751516	
DATA LINE DRIVERS	<ul style="list-style-type: none"> ● - 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 	32	CMOS	V_{CC} (logic) = 4.5 V to 5.5 V	SN751508	FT
					SN751518	

NOTE: The applicable literature number is SLYD002.

DISPLAY DRIVERS SELECTION GUIDE

ac plasma display drivers

DESC.	PRODUCT FEATURES	DRIVERS PER PKG	INPUT COMPATIBILITY	POWER SUPPLY	TYPE	PKG
AXIS DRIVERS	<ul style="list-style-type: none"> 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	
	<ul style="list-style-type: none"> 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	N
					SN55501E	FD, JD
	<ul style="list-style-type: none"> 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	

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Display Drivers

NOTE: The applicable literature number is SLYD002.

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Line Drivers and Receivers

LINE DRIVERS AND RECEIVERS SELECTION GUIDE

line drivers

APPLICATION	OUTPUT	DRIVERS PER PACKAGE	TYPE	PACKAGE
EIA STANDARD RS-422-A	DIFFERENTIAL	2	SN55158	JG
			SN75158	D,J,G,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 SN75174	J,N
EIA STANDARD RS-423-A	SINGLE-ENDED	2	uA9636A	D,J,G,P
EIA STANDARD RS-232-C	SINGLE-ENDED	2	SN55150	JG,FK
			SN75150	D,J,G,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	
	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			
	DIFFERENTIAL		4	MC3453	D,J,N
				SN75111	D,J,N

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

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Line Drivers and Receivers

LINE DRIVERS AND RECEIVERS SELECTION GUIDE

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.

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Line Drivers and Receivers

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		
		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.

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Line Drivers and Receivers

LINE DRIVERS AND RECEIVERS SELECTION GUIDE

line transceivers

APPLICATION	I/O BUS	TRANSCEIVERS PER PACKAGE	TYPE	PACKAGE
EIA STANDARD RS-232-C	SINGLE-ENDED	1	SN75155	D,J,G,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	DW,N
			SN75162B	
			SN75ALS162	
			SN75164B	
		SN75ALS164	DW,J,N	
SN75ALS165				
IEEE 802.3 1BASE5	DIFFERENTIAL	1	SN75061	DW,N
			SN75062	

NOTE: The applicable literature number is SLYD002.

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Line Drivers and Receivers

LINE DRIVERS AND RECEIVERS SELECTION GUIDE

line transceivers

APPLICATION	I/O BUS	TRANSCIEVERS 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.

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Memory Interface

MEMORY INTERFACE SELECTION GUIDE

core-memory drivers

OUTPUT TYPE	MAX OUTPUT CURRENT (mA)	tpD [†] 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)	tpD [†] 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)	tpD [†] 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.

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Memory Interface

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Memory Interface

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Operational Amplifiers

OPERATIONAL AMPLIFIERS SELECTION GUIDE

noncompensated, single

military temperature range

(Values specified for $T_A = 25^\circ\text{C}$)

DESCRIPTION	SUPPLY VOLTAGE (V)		V_{IO} (mV) MAX	I_{IB} (nA) MAX	A_{VD} (V/mV) MIN	B_1 (MHz) TYP	SR (V/ μ s) TYP	TYPE	PACKAGES
	MIN	MAX							
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	μ A709AM	J,JG,U,W
General Purpose, Bipolar	± 9	± 18	5	500	45 Typ	1	0.3	μ A709M	J,JG,U,W
General Purpose, Bipolar	± 2	± 22	5	500	50	1	0.5	μ A748M	JG,U

industrial temperature range

(Values specified for $T_A = 25^\circ\text{C}$)

DESCRIPTION	SUPPLY VOLTAGE (V)		V_{IO} (mV) MAX	I_{IB} (nA) MAX	A_{VD} (V/mV) MIN	B_1 (MHz) TYP	SR (V/ μ s) TYP	TYPE	PACKAGES
	MIN	MAX							
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.

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Operational Amplifiers

OPERATIONAL AMPLIFIERS SELECTION GUIDE

noncompensated, single

commercial temperature range

(Values specified for $T_A = 25^\circ\text{C}$)

DESCRIPTION	SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_B (nA)	A_{VD} (V/mV)	B_1 (MHz)	SR (V/ μ s)	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	μ A709C	D,JG,P
Bipolar, General Purpose	± 2	± 18	6	500	20	1	0.5	μ A748C	D,JG,P

NOTE: The applicable literature number is SLYD001.

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Operational Amplifiers

OPERATIONAL AMPLIFIERS SELECTION GUIDE

internally compensated, single

military temperature range

(Values specified for $T_A = 25^\circ\text{C}$)

DESCRIPTION	SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_{IB} (nA)	A_{VD} (V/mV)	B_1 (MHz)	SR (V/ μ s)	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, High Performance	S/S	3	32	5	-150	50	0.6	0.3	TL321M	FK,JG
	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	μ A702M	JG,U	
General Purpose	± 2	± 22	5	500	50	1	0.5	μ A741M	FK,J,JG,U	

NOTE: The applicable literature number is SLYD001.

OPERATIONAL AMPLIFIERS SELECTION GUIDE

internally compensated, single

automotive temperature range

(Values specified for $T_A = 25^\circ\text{C}$)

DESCRIPTION	SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_{IB} (nA)	A_{VD} (V/mV)	B_1 (MHz)	SR (V/ μ s)	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.

OPERATIONAL AMPLIFIERS SELECTION GUIDE

internally compensated, single

industrial temperature range

(Values specified for $T_A = 25^\circ\text{C}$)

DESCRIPTION	SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_B (nA)	A_{VD} (V/mV)	B_1 (MHz)	SR (V/ μ s)	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, High Performance	S/S	3	32	5	-150	50	0.6	0.3	TL321I	JG,P
	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 $T_A = 25^\circ\text{C}$)

DESCRIPTION	SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_{IB} (nA)	A_{VD} (V/mV)	B_1 (MHz)	SR (V/ μ s)	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 SLOS014, the LF411 which is SLOS011, and the LT Series which is SLOS017.

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Operational Amplifiers

OPERATIONAL AMPLIFIERS SELECTION GUIDE

internally compensated, single

commercial temperature range

(Values specified for $T_A = 25^\circ\text{C}$)

DESCRIPTION	SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_{IB} (nA)	A_{VD} (V/mV)	B_1 (MHz)	SR (V/ μ s)	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 $T_A = 25^\circ\text{C}$)

DESCRIPTION	SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_{IB} (nA)	A_{VD} (V/mV)	B_1 (MHz)	SR (V/ μ s)	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	TLO81AC	D,JG,P

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

OPERATIONAL AMPLIFIERS SELECTION GUIDE

internally compensated, single

commercial temperature range

(Values specified for $T_A = 25^\circ\text{C}$)

DESCRIPTION	SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_{IB} (nA)	A_{VD} (V/mV)	B_1 (MHz)	SR (V/ μ s)	DEVICE NUMBER	PACKAGES	
	MIN	MAX	MAX	MAX	MIN	TYP	TYP			
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.

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Operational Amplifiers

OPERATIONAL AMPLIFIERS SELECTION GUIDE

internally compensated, single

commercial temperature range

(Values specified for $T_A = 25^\circ\text{C}$)

DESCRIPTION	SUPPLY VOLTAGE (V)		V_{IO} (mV) MAX	I_B (nA) MAX	A_{VD} (V/mV) MIN	B_1 (MHz) TYP	SR (V/ μ s) TYP	TYPE	PACKAGES
	MIN	MAX							
LinCMOS, Programmable, High Bias	1	16	10	T_{yp} 0.005	Typ 10	2.2	5.3	TLC251C	D,JG,P
LinCMOS, Programmable, Low Bias	3	16	5	T_{yp} 0.005	30	0.11	0.05	TLC271AC	D,JG,P
LinCMOS, Programmable, Medium Bias	3	16	5	T_{yp} 0.005	20	0.64	0.62	TLC271AC	D,JG,P
LinCMOS, Programmable, High Bias	3	16	5	T_{yp} 0.005	Typ 10	2.2	5.3	TLC271AC	D,JG,P
LinCMOS, Programmable, Low Bias	3	16	2	T_{yp} 0.005	30	0.11	0.05	TLC271BC	D,JG,P
LinCMOS, Programmable, Medium Bias	3	16	2	T_{yp} 0.005	20	0.64	0.62	TLC271BC	D,JG,P
LinCMOS, Programmable, High Bias	3	16	3	T_{yp} 0.005	Typ 10	2.2	5.3	TLC271BC	D,JG,P
LinCMOS, Programmable, Low Bias	3	16	10	T_{yp} 0.005	30	0.11	0.05	TLC271C	D,JG,P
LinCMOS, Programmable, Medium Bias	3	16	10	T_{yp} 0.005	20	0.64	0.62	TLC271C	D,JG,P
LinCMOS, Programmable, High Bias	3	16	10	T_{yp} 0.005	Typ 10	2.2	5.3	TLC271C	D,JG,P
General Purpose	± 2	± 18	6	500	20	1	0.5	μ A741C	D,JG,P

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

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(Values specified for $T_A = 25^\circ\text{C}$)

DESCRIPTION	SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_{IB} (nA)	A_{VD} (V/mV)	B_1 (MHz)	SR (V/ μ s)	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 SLO3004,
the TLC27L2M and the TLC27L7M which is SLO3006, and
the TLC27M2M and TLC27M7M which is SLO3003.

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Operational Amplifiers

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automotive temperature range

(Values specified for $T_A = 25^\circ\text{C}$)

DESCRIPTION	SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_B (nA)	A_{VD} (V/mV)	B_1 (MHz)	SR (V/ μ s)	TYPE	PACKAGES	
	MIN	MAX	MAX	MAX	MIN	TYP	TYP			
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.

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(Values specified for $T_A = 25^\circ\text{C}$)

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.

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commercial temperature range

(Values specified for $T_A = 25^\circ\text{C}$)

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	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	7	-250	25	0.6	0.2	LM358	D,JG,P,U
	D/S	± 1.5							
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.

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Operational Amplifiers

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(Values specified for $T_A = 25^\circ\text{C}$)

DESCRIPTION	SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_{IB} (nA)	A_{VD} (V/mV)	B_1 (MHz)	SR (V/ μ s)	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.

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(Values specified for $T_A = 25^\circ\text{C}$)

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.

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commercial temperature range

(Values specified for $T_A = 25^\circ\text{C}$)

DESCRIPTION	SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_{IB} (nA)	A_{VD} (V/mV)	B_1 (MHz)	SR (V/ μ s)	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	μ A747C	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 μ A747C is SLOS009.

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Operational Amplifiers

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internally compensated, quad

military temperature range

(Values specified for $T_A = 25^\circ\text{C}$)

DESCRIPTION	SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_{IB} (nA)	A_{VD} (V/mV)	B_1 (MHz)	SR (V/ μ s)	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 μ A741, 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.

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internally compensated, quad

automotive temperature range

(Values specified for $T_A = 25^\circ\text{C}$)

DESCRIPTION		SUPPLY VOLTAGE (V)		V_{IO} (mV) MAX	I_{IB} (nA) MAX	A_{VD} (V/mV) MIN	B_1 (MHz) TYP	SR (V/ μ s) TYP	TYPE	PACKAGES
		MIN	MAX							
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 μ A741, 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.

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Operational Amplifiers

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internally compensated, quad

automotive temperature range

(Values specified for $T_A = 25^\circ\text{C}$)

DESCRIPTION	SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_{IB} (nA)	A_{VD} (V/mV)	B_1 (MHz)	SR (V/ μ s)	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 $T_A = 25^\circ\text{C}$)

DESCRIPTION	SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_{IB} (nA)	A_{VD} (V/mV)	B_1 (MHz)	SR (V/ μ s)	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.

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Operational Amplifiers

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internally compensated, quad

commercial temperature range

(Values specified for $T_A = 25^\circ\text{C}$)

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	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 $\mu\text{A}741$, 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.

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commercial temperature range

(Values specified for $T_A = 25^\circ\text{C}$)

DESCRIPTION	SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_{IB} (nA)	AVD (V/mV)	B_1 (MHz)	SR (V/ μ s)	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.

OPERATIONAL AMPLIFIERS SELECTION GUIDE

internally compensated, quad

commercial temperature range

(Values specified for $T_A = 25^\circ\text{C}$)

DESCRIPTION	SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_{IB} (nA)	A_{VD} (V/mV)	B_1 (MHz)	SR (V/ μ s)	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.

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Operational Amplifiers

OPERATIONAL AMPLIFIERS SELECTION GUIDE

internally compensated, quad

commercial temperature range

(Values specified for $T_A = 25^\circ\text{C}$)

DESCRIPTION	SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_{IB} (nA)	A_{VD} (V/mV)	B_1 (MHz)	SR (V/ μ s)	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.

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OPTOELECTRONICS AND IMAGE SENSORS SELECTION GUIDE

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 SOOS013) 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.

OPTOELECTRONICS AND IMAGE SENSORS SELECTION GUIDE

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	
TIL128	5.0	—	300	High-voltage Darlington, Plastic DIP, UL File E-65085 The "A" version has no base connection.
TIL128A	5.0	—	300	
TIL153	3.54	2.5	10	
TIL154	3.54	2.5	20	High Voltage, Plastic DIP, UL File E-65085
TIL155	3.54	2.5	50	
TIL156	3.54	2.5	300	
TIL157	3.54	2.5	300	High-voltage Darlington, Plastic DIP, UL File E-65085 The "A" version has no base connection.
TIL157A	3.54	2.5	300	
TIL181	3.54	2.5	50	
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	
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.

OPTOELECTRONICS AND IMAGE SENSORS SELECTION GUIDE

optocouplers, 8-pin plastic DIP, high-speed, JEDEC registered
($T_A = 25^\circ\text{C}$ unless otherwise noted)

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

optocouplers, 8-pin plastic DIP, high-speed logic gate JEDEC registered
($T_A = 25^\circ\text{C}$ unless otherwise noted)

TYPE	V_{OL} (MAX) $I_F = 5\text{ mA}$, $I_{OL} = 13\text{ mA}$, $T_A = 0^\circ\text{C to } 70^\circ\text{C}$	V_F (MAX) $I_F = 10\text{ mA}$	SWITCHING TIMES (MAX) $I_F = 7.5\text{ mA}$, $R_L = 350\ \Omega$, $C_L = 15\text{ pF}$		ISOLATION VOLTAGE (MIN)
			t_{PLH}	t_{PHL}	
			6N137	0.6 V	
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
($T_A = 25^\circ\text{C}$ unless otherwise noted)

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

NOTE: The applicable literature number is SOYD002.

OPTOELECTRONICS AND IMAGE SENSORS SELECTION GUIDE

optocouplers, 6-pin plastic DIP, TRIAC driver

($T_A = 25^\circ\text{C}$ unless otherwise noted)

Optoelectronics and Image Sensors

TYPE	I_{FT} (MAX) $V_{TM} = 3\text{ V}$	V_F (MAX) $I_F = 10\text{ mA}$	V_{TM} (MAX) $I_{TM} = 100\text{ mA}$	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

($T_A = 25^\circ\text{C}$ 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.

OPTOELECTRONICS AND IMAGE SENSORS SELECTION GUIDE

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	λ_p (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		
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.



OPTOELECTRONICS AND IMAGE SENSORS SELECTION GUIDE

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/cm ²	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.

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Peripheral Drivers/Actuators



PERIPHERAL DRIVERS/ACTUATORS SELECTION GUIDE

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.

Peripheral Drivers/Actuators



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
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		TL378C	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.

Peripheral Drivers/Actuators



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SPECIAL FUNCTIONS SELECTION GUIDE

precision timers

military temperature range

(Values specified for $T_A = 25^\circ\text{C}$)

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 $T_A = 25^\circ\text{C}$)

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 $T_A = 25^\circ\text{C}$)

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 $T_A = 25^\circ\text{C}$)

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 $T_A = 25^\circ\text{C}$)

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 $T_A = 25^\circ\text{C}$)

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.

SPECIAL FUNCTIONS SELECTION GUIDE

sonar ranging functions

(Values specified for $T_A = 25^\circ\text{C}$)

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 $T_A = 25^\circ\text{C}$)

DESCRIPTION	TYPE	PACKAGES
Read-Amplifier System	MC3470	N
Tape-Read Signal Conditioner	TL041C	DW,NT
Disk-Memory Read-Chain Data Comparator	TL712	D,J,G,P
Disk-Memory Read-Chain Data Comparator with MECL III and MECL 1000	TL721	D,J,G,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 $T_A = 25^\circ\text{C}$)

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 $T_A = 25^\circ\text{C}$)

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,J,G,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:

TL040C is SLFS012, TL592A is SLOS015, TLO27C which is SLSF008, and TL592B which is SLFS001.

SPECIAL FUNCTIONS SELECTION GUIDE

programmable tone/noise generators (Values specified for $T_A = 25^\circ\text{C}$)

DESCRIPTION	TYPE	PACKAGE
<ul style="list-style-type: none"> • 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 $T_A = 25^\circ\text{C}$)

DESCRIPTION	TYPE	PACKAGE
<ul style="list-style-type: none"> • 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.

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SPEECH SYNTHESIS SELECTION GUIDE

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			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
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 SELECTION GUIDE

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 SELECTION GUIDE

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	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 SELECTION GUIDE

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 SELECTION GUIDE

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 keyboard or electronic input	TCM5089	16-Pin N
				Keyboard active output	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 SCTSO20, TCM5094 is SCTSO23, TISP1082 is SLPS019, TISP2000 Series is SLPS018, and the TISP3000 Series is SLPS020.

TELECOMMUNICATIONS SELECTION GUIDE

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	TCM4205A	28-Pin J
				Three auxiliary relay outputs Ground-start operation		
	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.

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VOLTAGE REGULATORS SELECTION GUIDE

power supply housekeeping functions (Value specified for $T_A = 25^\circ\text{C}$)

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 $T_A = 25^\circ\text{C}$)

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 $T_A = 25^\circ\text{C}$)

REGULATOR VOLTAGE RANGE (V)	MINIMUM SHUNT CURRENT TO MAINTAIN REG	MAX SHUNT CURRENT	TOL. %	TEMP. COEFF. (TYP) PPM/ $^\circ\text{C}$	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 Output Voltage	100 mA	1.2 to 32	5	35	TL317	D,LP
	750 mA	1.25 to 125	5	125	TL783	KC
	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	$\mu\text{A}723$	N,D

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

VOLTAGE REGULATORS SELECTION GUIDE

switching power supply controllers and regulators

(Value specified for $T_A = 25^\circ\text{C}$)

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	
					1			-	-	-	SG3524	
					-			-	X	TL493		
		-	-	X	TL494							
		X	-	X	TL495	N						
		-	X	X	TL594	D,N						
	Dual Totem Pole [#]	35	0.1	500	1	-	1	-	X	-	SG2525A	
								-	X	-	SG3525A	
								-	X	-	SG2527A	
								-	X	-	SG3527A	
	Fixed On Time	Dedicated [¶]	20	1.2	40	1	-	10	-	-	-	
Variable Frequency Voltage Mode	Single Uncommitted [§]	35	0.7	50	1	-	5	-	-	-	TL497A	D,N

[†]OT ST = Output Steering

[¶]Dedicated = Comitted Emitter and Collector

[‡]OT CT = Output Control (single ended or parallel)

[#]Totem-Pole = Active Pull Up/Down

[§]Uncommitted = Open E, Open C

NOTE: The applicable literature number is SLYD001 except the following:

MC34060-SLVS008, TL493/4/5-SLFS014, TL496-SLVS012, TL497A-SLVS009,

Voltage Regulators

VOLTAGE REGULATORS SELECTION GUIDE

switching power supply controllers and regulators

(Value specified for $T_A = 25^\circ\text{C}$)

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

VOLTAGE REGULATORS SELECTION GUIDE

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	µA78L02A	D,LP
		± 10		µA78L02	
5	100 mA	± 5	2	µA78L05A	D,LP
		± 10		µA78L05	
	150 mA	± 5	0.6	LM330-5	KC
		± 10		LM2930-5	
	500 mA	± 5	2	µA78M05	
		± 5		LM340-5	
	1.5 A	± 5	2	LM340-5	
		± 2		TL780-5	
± 5		µA7805			
6	500 mA	± 5	2	µA78M06	
6.2	1.5 A	± 5	2	µA7806	D,LP
	100 mA	± 5	2	µA78L06A	
		± 10		µA78L06	
8	100 mA	± 5	2	µA78L08A	D,LP
		± 10		µA78L08	
	150 mA	± 10	0.6	LM2930-8	KC
	500 mA	± 5	2	µA78M08	
	1.5 A	± 5	2	µA7808	
8.5	1.5 A	± 5	2	µA7885	
9	100 mA	± 5	2	µA78L09A	D,LP
		± 10		µA78L09	
10	100 mA	± 5	2	µA78L10A	D,LP
		± 10		µA78L10	
	500 mA	± 5	2	µA78M10	KC
	1.5 A	± 5	2	µA7810	
12	100 mA	± 5	2	µA78L12A	D,LP
		± 10		µA78L12	
	500 mA	± 5	2	µA78M12	KC
	1.5 A	± 4	2	LM340-12	
		± 2		TL780-12	
		± 5		µA7812	

Voltage Regulators

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NOTE: The applicable literature number is SLYD001, except for the µA78L02, µA78L02A, µA78L05A, µA78L05, µA78L06, µA78L06A, µA78L08, µA78L08A, µA78L09, µA78L09A, µA7810A, µA7810, µA78L12A, and the µA78L12, 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.

VOLTAGE REGULATORS SELECTION GUIDE

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	µA79M05	KC
		±5		µA7905	
5.2	1.5 A	±5	2	µA7952	
6	500 mA	±5	2	µA79M06	
		±5		µA7906	
8	500 mA	±5	2	µA79M08	
		±5		µA7908	
12	100 mA	±10	1.7	MC79L12	
		±5		MC79L12A	
	500 mA	±5	2	µA79M12	KC
		±5		µA7912	
15	100 mA	±5	1.7	MC79L15A	D,LP
		±10		MC79L15	
	500 mA	±5	2	µA79M15	KC
		±5		µA7915	
18	1.5 A	±5	2	µA7918	
20	500 mA	±5	2	µA79M20	
24	500 mA	±5	2	µA79M24	
		±5		µA7924	

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

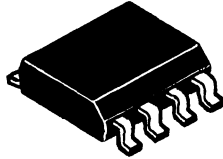


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PACKAGE DESCRIPTIONS

Small Outline Packages

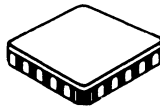
D/DW Each of these "small outline" packages consists of a circuit mounted on a lead frame and encapsulated within a plastic compound. The compound will withstand soldering temperature with no deformation, and circuit performance characteristics will remain stable when operated in high-humidity conditions.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

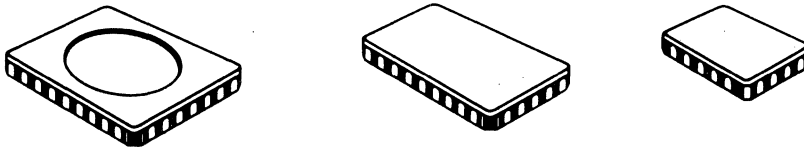
These packages are used for logic, linear, gate array, and microprocessor product families. The FK designation denotes devices that conform to JEDEC pinout standards; the FD designation denotes non-JEDEC defined pinouts.



PACKAGE DESCRIPTIONS

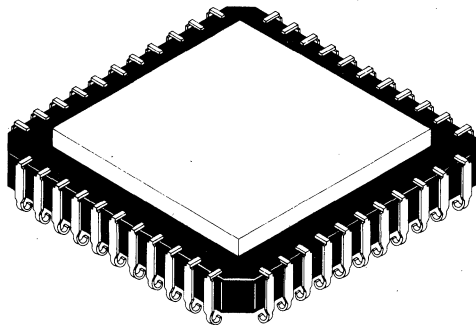
FE/FG/FV Each of these hermetically sealed leadless rectangular packages consists of a 3-layer ceramic base and a metal lid (gold-plated kovar). Hermetic sealing is accomplished with a gold-tin solder braze. Contact terminations are gold-plated or tin-lead-solder-dipped. These packages are designed for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

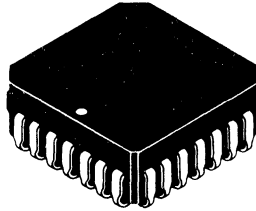
FJ This square "J" formed ceramic leaded chip carrier is used for microprocessor, display driver, and ASIC product families. The package consists of a 3-layer alumina ceramic case, a metal lid (gold-plated kovar), and gold-tin-braze-attached lead frame. Hermetic sealing is accomplished with gold-tin 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.



PACKAGE DESCRIPTIONS

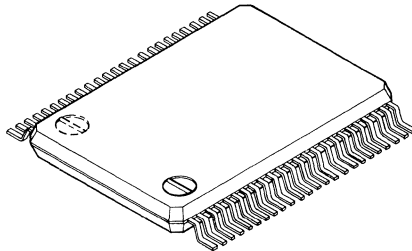
Plastic Chip Carrier Packages

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

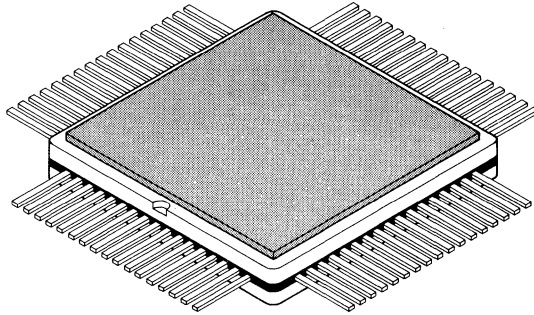
FT This plastic flat package consists of a circuit mounted on a lead frame and encapsulated within a plastic compound. The compound will withstand soldering temperature with no deformation, and circuit performance characteristics will remain stable when operated in high-humidity conditions. Leads require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



PACKAGE DESCRIPTIONS

Quad Ceramic Flatpacks

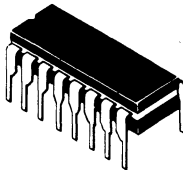
HA/HB This quad flat package is hermetically sealed. It has a 0.050-inch lead spacing configured with gull-wing bent or straight leads suitable for surface mounting. The straight leads are for use with low-profile sockets.



Ceramic Dual-in-Line Packages

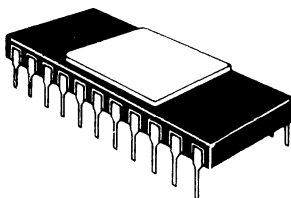
J/JT/JW Each of these hermetically sealed dual-in-line packages consists of a ceramic base, ceramic cap, and a lead frame. The circuit bar is alloy-mounted to the base and hermetic sealing is accomplished with glass. Once the leads are compressed and inserted, sufficient tension is provided to secure 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.

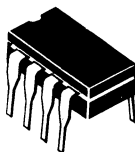


PACKAGE DESCRIPTIONS

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

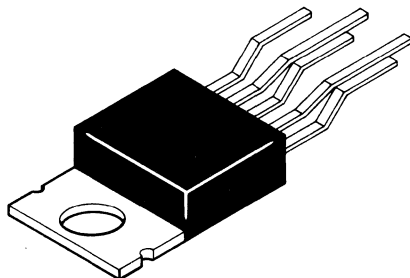


JG This hermetically sealed dual-in-line package consists of a ceramic base, ceramic cap, and 8-pin lead frame. Once the leads are compressed and inserted, sufficient tension is provided to secure the package in the board during soldering. Tin-plated or tin-lead-solder-dipped leads require no additional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



Plastic Single-In-Line K Packages

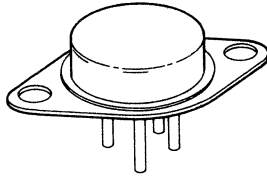
KC/KH/KV Each of these packages comprises a circuit mounted on a lead frame and encapsulated with a plastic compound. The compound will withstand soldering temperature with no deformation, and circuit performance characteristics will remain stable when the package is operated under high-humidity conditions.



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.

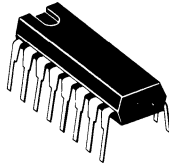


PACKAGE DESCRIPTIONS

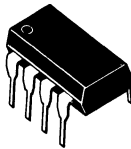
Plastic Dual-In-Line Packages

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.



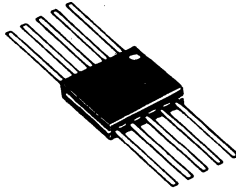
P This dual-in-line package consists of a circuit mounted on a lead frame and encapsulated within an electrically nonconductive plastic compound. The compound will withstand soldering temperature with no deformation, and circuit performance characteristics will remain stable when operated under high-humidity 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

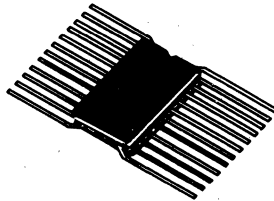
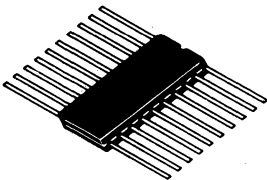
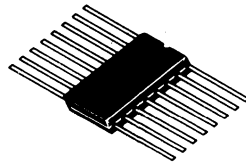
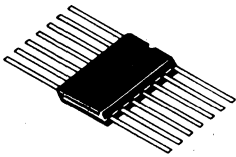
U This flat package consists of a ceramic base and cap, and 10-pin lead frame. Circuit bars are alloy mounted. Hermetic sealing is accomplished with glass. Tin-plated or tin-lead-solder-dipped leads require no additional cleaning or processing when used in soldered assembly.



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.



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