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General Information

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)	I_{IB} (nA)	A_{VD} (V/mV)	B_1 (MHz)	SR (V/ μ s)	TYPE	PACKAGES	PAGE NO.
	MIN	MAX	MAX	MAX	MIN	TYP	TYP			
High Performance, Bipolar	± 5	± 22	2	75	50	1	0.5	LM101A	FK,JG,U,W	2-13
High Performance, Low Bias Current, Bipolar	± 2	± 20	2	2	50	1	0.3	LM108	L	2-21
High Performance, Low Bias Current, Bipolar	± 2	± 20	0.5	2	80	1	0.3	LM108A	L	2-21
Low Power	± 3.5	± 18	6	0.2	4	1	3.5	TL060M	JG	2-357
BIFET, General Purpose	± 3.5	± 18	6	0.2	25	3	13	TL080M	JG	2-387
General Purpose, Precision Input, Bipolar	± 9	± 18	2	200	Typ 45	1	0.3	μ A709AM	J,JG,U,W	2-833
General Purpose, Bipolar	± 9	± 18	5	500	Typ 45	1	0.3	μ A709M	J,JG,U,W	2-833
General Purpose, Bipolar	± 2	± 22	5	500	50	1	0.5	μ A748M	JG,U	2-851

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	PAGE NO.
	MIN	MAX	MAX	MAX	MIN	TYP	TYP			
High Performance, Bipolar	± 5	± 22	2	75	50	1	0.5	LM101A	D,JG,P	2-13
Low Power	± 3.5	± 18	6	0.2	4	1	3.5	TL060I	D,JG,P	2-357
BIFET, Low Noise	± 3.5	± 18	6	200	50	3	13	TL070I	D,JG,P	2-387
BIFET, Low Power	± 3.5	± 18	6	400	25	3	13	TL080I	D,JG,P	2-403

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	PAGE NO.
	MIN	MAX	MAX	MAX	MIN	TYP	TYP			
High Performance	± 5	± 18	7.5	2	15	1	7.5	LM301A	D,JG,P	2-13
High Performance	± 2	± 18	7.5	2	25	1	0.3	LM101	D,JG,P	2-21
High Performance	± 2	± 18	0.5	2	80	1	0.3	LM108	D,JG,P	2-21
Low Power	± 3.5	± 18	6	0.2	4	1	3.5	TL060	D,JG,P	2-357
BIFET, Low Power	± 3.5	± 18	3	0.2	4	1	3.5	TL070	D,JG,P	2-387
BIFET, Low Power	± 3.5	± 18	15	0.4	3	1	3.5	TL080	D,JG,P	2-403
BIFET, Low Noise	± 3.5	± 18	6	0.2	50	3	13	TL070	D,JG,P	2-387
BIFET, Low Noise	± 3.5	± 18	10	0.2	25	3	13	TL080	D,JG,P	2-403
BIFET, General Purpose	± 3.5	± 18	6	0.2	50	3	13	TL080	D,JG,P	2-403
BIFET, General Purpose	± 3.5	± 18	15	0.4	25	3	13	TL080	D,JG,P	2-403
General Purpose, Bipolar	± 9	± 18	7.5	1500	15	1	0.3	μ A709	D,JG,P	2-833
General Purpose, Bipolar	± 2	± 18	6	200	20	1	0.5	μ A748	D,JG,P	2-851

General Information

OPERATIONAL AMPLIFIERS SELECTION GUIDE

internally compensated, single

military temperature range

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

General Information

DESCRIPTION	SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_{IB} (nA)	AVD (V/mV)	B_1 (MHz)	SR (V/ μ s)	TYPE	PACKAGES	PAGE NO.
	MIN	MAX								
High Performance	± 5	± 22	2	75	50	1	0.5	LM107	J,JG,U,W	2-17
Precision	± 5	± 22	0.015	2	450	0.8	0.25	LT1001AM	JG,L	2-63
Precision	± 5	± 22	0.06	4	300	0.8	0.25	LT1001M	JG,L	2-63
Low Noise, High Speed, Precision Input	± 2.5	± 22	0.025	35	7000	8	2.5	LT1007M	JG,L	2-83
Low Noise, High Speed, Precision Input	± 2.5	± 22	0.1	55	5000	8	2.5	LT1007M	JG,P	2-83
Ultra Precision	± 2.5	± 20	0.001	0.1	1000	0.8	2	LT1001M	L	2-123
Low Noise, High Performance	± 4.5	± 16	0.12	150	3000	25	15	LT1001M	D,JG,L,P	2-127
Low Noise, High Performance	± 4.5	± 20	0.18	150	3000	25	15	LT1001M	D,JG,L,P	2-127
Low Noise, High Speed, Noncompensated, $AV_L \geq 5$	± 2.5	± 22	0.025	35	7000	60	15	LT1037AM	JG,L	2-83
Low Noise, High Speed, Noncompensated, $AV_L \geq 5$	± 2.5	± 22	0.060	55	5000	60	15	LT1037M	JG,L	2-83
Chopper-Stabilized	± 1.9	± 8	0.005	0.03	1000	1.2	4	LTC1052M	J,JG,L	5-5
Low Noise, High Speed	± 3.5	± 22	0.1	40	1000	8	2.8	OP-27A	JG,L	2-151
Low Noise, High Speed	± 3.5	± 22	0.1	80	1000	8	2.8	OP-27C	JG,L	2-151
Low Noise, High Speed Noncompensated, $AV_L \geq 5$	± 4	± 22	0.025	40	1000	40	17	OP-37A	JG,L	2-151
Low Noise, High Speed, Noncompensated, $AV_L \geq 5$	± 4	± 22	0.1	80	700	40	17	OP-37C	JG,L	2-151
Low Noise, High Performance	± 3	± 22	2	800	50	10	13	SE5534	FK,JG	2-181
Low Noise, High Performance	± 3	± 22	2	800	50	10	13	SE5534A	FK,JG	2-181
Low Noise, Low Power, Precision	± 3.5	± 18	0.8	0.2	5	1.1	2.9	TL031AM	FK,JG,L	2-191
BIFET, Low-Power, Precision	± 3.5	± 18	1.5	0.2	5	1.1	2.9	TL031M	FK,JG,L	2-191
BIFET, Precision	± 3.5	± 18	0.8	0.2	50	3.1	20	TL061M	FK,JG,L	2-273
BIFET, Precision	± 3.5	± 18	1.5	0.2	50	3.1	20	TL061M	FK,JG,L	2-273
BIFET, Low Power	± 1.5	± 18	6	0.2	4	1	3.5	TL061M	FK,JG,U	2-357
BIFET, Adjustable, Low-Power	± 1.2	± 18	6	0.2	4	1	3.5	TL061M	FK,JG	2-373
BIFET, Low Noise	± 3.5	± 18	6	0.2	35	3	13	TL081M	FK,JG	2-387
BIFET, General Purpose	± 3.5	± 18	6	0.2	25	3	13	TL081M	FK,JG	2-403
BIFET, Low V_{IO}	± 3.5	± 18	3	0.4	50	3	13	TL088M	JG,U	2-417
LinCMOS, Programmable, Low Bias	4	18	10	Typ 0.007	50	0.11	0.04	TLC271M	FK,JG	2-479
LinCMOS, Programmable, Medium Bias	4	18	10	Typ 0.007	25	0.64	0.56	TLC271M	FK,JG	2-479
LinCMOS, Programmable, High Bias	4	18	10	Typ 0.007	10	2.2	4.6	TLC271M	FK,JG	2-479
LinCMOS, Low Noise, Precision	4.6	16	0.2	Typ 0.001	400	1.9	2.7	TLC2201AM	D,FK,JG,L,P	2-763

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 _B (nA)	A _{VD} (V/mV)	B ₁ (MHz)	SR (V/ μ s)	TYPE	PACKAGES	PAGE NO.
	MIN	MAX	MAX	MAX	MIN	TYP	TYP			
LinCMOS, Low Noise, Precision, 100% Noise Tested	4.6	16	0.2	Typ 0.001	400	1.9	2.7	TLC2201BM	D,FK,JG,L,P	2-763
LinCMOS, Low Noise, Precision	4.6	16	0.5	Typ 0.001	400	1.9	2.7	TLC2201M	D,FK,JG,L,P	2-763
LinCMOS, Precision, Chopper Stabilized	3.8	16	0.001	Typ 0.004	5600	1.9	2.8	TLC2652AM	D,FK,J,JG,L,N,P	2-789
LinCMOS, Precision Chopper Stabilized	3.8	16	0.003	Typ 0.004	1000	1.9	2.8	TLC2652M	D,FK,J,JG,L,N,P	2-789
LinCMOS, Low Noise, Precision, Chopper Stabilized	4.6	16	0.01	Typ 0.05	5600	1.9	2	TLC2654AM	D,FK,J,JG,L,N,P	2-811
LinCMOS, Low Noise, Precision, Chopper Stabilized	4.6	16	0.02	Typ 0.05	1000	2.2	2	TLC2654M	D,FK,J,JG,L,N,P	2-811
Excalibur, High-Speed, Precision	4	40	0.5	25	1	2	0.9	TLC2654M	D,FK,J,JG,L,N,P	5-9
General Purpose	± 2	± 22	5	500	1	1	0.5	TLC2654M	FK,J,JG,U	2-837

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General Information



OPERATIONAL AMPLIFIERS SELECTION GUIDE

internally compensated, single
automotive temperature range

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

General Information

DESCRIPTION	SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_{IB} (nA)	A_{VD} (V/mV)	B_1 (MHz)	SR (V/ μ s)	TYPE	PACKAGES	PAGE NO.
	MIN	MAX	MAX	MAX	MIN	TYP	TYP			
High Performance	± 5	± 22	2	75	50	1	0.5	LM207	D,J,JG,N,P,W	2-17
High Performance	± 5	± 20	4	75	50	15	70	LM207	D,J,JG,N,P,W	2-51
Chopper-Stabilized	± 1.9	± 8	0.005	0.005	1	1.2	4	LM207	J,L,N,P	5-5
Chopper-Stabilized	± 1.9	± 8	0.005	0.03	1	1.2	4	LM207	L	5-5
Low Noise, High Speed	± 3.5	± 22	0.1	40	700	8	2.8	OP-27G	JG,L,P	2-151
Low Noise, High Speed	± 3.5	± 22	0.1	80	700	8	2.8	OP-27G	JG,L,P	2-151
Low Noise, High Speed Noncompensated, $A_{VL} \geq 5$	± 4	± 22	0.025	40	1000	40	17	OP-37E	JG,L,P	2-151
Low Noise, High Speed, Internally Compensated, $A_{VL} \geq 5$	± 4	± 22	0.1	80	700	40	17	OP-37G	JG,P	2-151
Low Power, Precision	± 3.5	± 18	0.8	0.2	5	1.1	2.9	TL081	D,JG,L,P	2-191
BIFET, Low Power, Precision	± 3.5	± 18	1.5	0.2	5	1.1	2.9	TL081	D,JG,L,P	2-191
BIFET, Precision	± 3.5	± 18	0.8	0.2	50	3.1	20	TL081	D,JG,L,P	2-191
BIFET Precision	± 3.5	± 18	1.5	0.2	50	3.1	20	TL081	D,JG,L,P	2-191
BIFET Low Power	± 3.5	± 18	6	0.2	4	1	3.5	TL081	D,JG,P	2-191
BIFET Adjustable, Low Power	± 1.2	± 18	6	0.2	4	1	3.5	TL081	D,JG,P	2-191
BIFET, Low Noise	± 3.5	± 18	6	0.2	50	3	13	TL081	D,JG,P	2-191
BIFET, General Purpose	± 3.5	± 18	6	0.2	50	3	13	TL081	D,JG,P	2-191
BIFET, Low Offset Voltage	± 3.5	± 18	0.5	0.2	50	3	13	TL0871	D,JG,P	2-417
BIFET, Low Offset Voltage	± 3.5	± 18	1	0.2	50	3	13	TL0881	D,JG,P	2-417
LinCMOS, Programmable, Low Bias	4	18	5	T_{YP} 0.007	50	0.11	0.04	TLC271AI	D,JG,P	2-479
LinCMOS, Programmable, Medium Bias	4	18	5	T_{YP} 0.007	25	0.64	0.56	TLC271AI	D,JG,P	2-479
LinCMOS, Programmable, High Bias	4	18	5	T_{YP} 0.007	10	2.2	4.6	TLC271AI	D,JG,P	2-479
LinCMOS, Programmable, Low Bias	4	18	2	T_{YP} 0.007	50	0.11	0.04	TLC271BI	D,JG,P	2-479
LinCMOS, Programmable, Medium Bias	4	18	2	T_{YP} 0.007	25	0.64	0.56	TLC271BI	D,JG,P	2-479
LinCMOS, Programmable, High Bias	4	18	2	T_{YP} 0.007	10	2.2	4.6	TLC271BI	D,JG,P	2-479
LinCMOS, Programmable, Low Bias	4	18	10	T_{YP} 0.007	50	0.11	0.04	TLC271I	D,JG,P	2-479
LinCMOS, Programmable, Medium Bias	4	18	10	T_{YP} 0.007	25	0.64	0.56	TLC271I	D,JG,P	2-479
LinCMOS, Programmable, High Bias	4	18	10	T_{YP} 0.007	10	2.2	4.6	TLC271I	D,JG,P	2-479
LinCMOS, Low Noise Precision	4.6	16	0.2	T_{YP} 0.001	400	1.9	2.7	TLC2201AI	D,JG,L,P	2-763

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)	AVD (V/mV)	B_1 (MHz)	SR (V/ μ s)	TYPE	PACKAGES	PAGE NO.
	MIN	MAX	MAX	MAX	MIN	TYP	TYP			
LinCMOS, Low Noise Precision, 100% Noise Tested	4.6	16	0.2	Typ 0.001	400	1.9	2.7	TLC2201BI	D,JG,L,P	2-763
LinCMOS, Low Noise Precision	4.6	16	0.5	Typ 0.001	400	1.9	2.7	TLC2201I	D,JG,L,P	2-763
LinCMOS, Precision, Chopper Stabilized	3.8	16	0.001	Typ 0.004	5600	1.9	2.8	TLC2652AI	D,J,JG,L,N,P	2-789
LinCMOS, Precision, Chopper Stabilized	3.8	16	0.003	Typ 0.004	1000	1.9	2.8	TLC2652I	D,J,JG,L,N,P	2-789
LinCMOS, Low Noise, Precision, Chopper Stabilized	4.6	16	0.01	Typ 0.05	5600	1.9	2	TLC2654AI	D,J,JG,L,N,P	2-811
LinCMOS, Low Noise, Precision, Chopper Stabilized	4.6	16	0.02	Typ 0.05	1000	1.9	2	TLC2654I	D,J,JG,L,N,P	2-811
Excalibur, High-Speed, Precision	4	40	0.5	25	1000	2	0.9	TLC2654I	D,FK,JG,L,P	5-9

General Information

OPERATIONAL AMPLIFIERS SELECTION GUIDE

internally compensated, single
industrial temperature range

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

General Information

DESCRIPTION	SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_{IB} (nA)	AV_D (V/mV)	B_1 (MHz)	SR (V/ μ s)	TYPE	PACKAGES	PAGE NO.
	MIN	MAX	MAX	MAX	MIN	TYP	TYP			
Chopper-Stabilized	± 1.9	± 8	0	0.03		1.2	4	OP	J,JG,L,N,P	5-5
Chopper-Stabilized	± 1.9	± 8	0	0.03		1.2	4	OP	L	5-5
Low Noise, High Speed	± 3.5	± 22	0.025	40		8	2.8	OP	JG,L,P	2-151
Low Noise, High Speed	± 3.5	± 22	0.1	80		8	2.8	OP	JG,L,P	2-151
Low Noise, High Speed, Bipolar, Noncompensated, $AV_{L} \geq 5$	± 4	± 22	0.025	40	1000	40	17	OP-37E	JG,L,P	2-151
Low Noise, High Speed, Bipolar, Noncompensated, $AV_{L} \geq 5$	± 4	± 22	0.1	80	700	40	17	OP-37G	JG,L,P	2-151
Low Power, Precision	± 3.5	± 18	0.8	0.2	5	1.1	2.9	TL081	D,JG,L,P	2-191
BIFET, Low Power, Precision	± 3.5	± 18	1.5	0.2	5	1.1	2.9	TL081	D,JG,L,P	2-191
BIFET, Precision	± 3.5	± 18	0.8	0.2	50	3.1	20	TL081	D,JG,L,P	2-417
BIFET, Precision	± 3.5	± 18	1.5	0.2	50	3.1	20	TL081	D,JG,L,P	2-417
BIFET, Low Power	± 3.5	± 18	6	0.2	4	1	3.5	TL081	D,JG,P	2-417
BIFET, Adjustable, Low-Power	± 1.2	± 18	6	0.2	4	1	3.5	TL081	D,JG,P	2-417
BIFET, Low Noise	± 3.5	± 18	6	0.2	50	3	13	TL081	D,JG,P	2-417
BIFET, General Purpose	± 3.5	± 18	6	0.2	50	3	13	TL081	D,JG,P	2-417
BIFET, Low Offset Voltage	± 3.5	± 18	0.5	0.2	50	3	13	TL081	D,JG,P	2-417
BIFET, Low Offset Voltage	± 3.5	± 18	1	0.2	50	3	13	TL081	D,JG,P	2-417
Single LM324, High Performance	S/S D/S	3 ± 1.5	5	-150	50	0.6	0.3	TL3211	JG,P	2-441
LinCMOS, Programmable, Low Bias	4	18	5	Typ 0.007	50	0.11	0.04	TLC271AI	D,JG,P	2-479
LinCMOS, Programmable, Medium Bias	4	18	5	Typ 0.007	25	0.64	0.56	TLC271AI	D,JG,P	2-479
LinCMOS, Programmable, High Bias	4	18	5	Typ 0.007	10	2.2	4.6	TLC271AI	D,JG,P	2-479
LinCMOS, Programmable, Low Bias	4	18	2	Typ 0.007	50	0.11	0.04	TLC271BI	D,JG,P	2-479
LinCMOS, Programmable, Medium Bias	4	18	2	Typ 0.007	25	0.64	0.56	TLC271BI	D,JG,P	2-479
LinCMOS, Programmable, High Bias	4	18	2	Typ 0.007	10	2.2	4.6	TLC271BI	D,JG,P	2-479
LinCMOS, Programmable, Low Bias	4	18	10	Typ 0.007	50	0.11	0.04	TLC271I	D,JG,P	2-479
LinCMOS, Programmable, Medium Bias	4	18	10	Typ 0.007	25	0.64	0.56	TLC271I	D,JG,P	2-479
LinCMOS, Programmable, High Bias	4	18	10	Typ 0.007	10	2.2	4.6	TLC271I	D,JG,P	2-479
LinCMOS, Precision, Low Noise	4.6	16	0.2	Typ 0.001	400	1.9	2.7	TLC2201AI	D,JG,L,P	2-763
LinCMOS, Precision, Low Noise, 100% Noise Tested	4.6	16	0.2	Typ 0.001	400	1.9	2.7	TLC2201BI	D,JG,L,P	2-763
LinCMOS, Precision, Low Noise	4.6	16	0.5	Typ 0.001	400	1.9	2.7	TLC2201I	D,JG,L,P	2-763
LinCMOS, Precision, Chopper Stabilized	3.8	16	0.001	Typ 0.004	5600	1.9	2.8	TLC2652AI	D,J,JG,L,N,P	2-789
LinCMOS, Precision, Chopper Stabilized	3.8	16	0.003	Typ 0.004	1000	1.9	2.8	TLC2652I	D,J,JG,L,N,P	2-789
LinCMOS, Low-Noise, Precision, Chopper Stabilized	4.6	16	0.01	Typ 0.05	5600	1.9	2	TLC2654AI	D,J,JG,L,N,P	2-811
LinCMOS, Low-Noise, Precision, Chopper Stabilized	4.6	16	0.02	Typ 0.05	1000	1.9	2	TLC2654I	D,J,JG,L,N,P	2-811
Excalibur, High-Speed, Precision	4	40	0.5	25	1000	2	0.9	TLE2021I	D,FK,JG,L,P	5-9

OPERATIONAL AMPLIFIERS SELECTION GUIDE

internally compensated, single

commercial temperature range

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

DESCRIPTION	SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_B (nA)	A_{VD} (V/mV)	B_1 (MHz)	SR (V/ μ s)	TYPE	PACKAGES	PAGE NO.
	MIN	MAX	MAX	MAX	MIN	TYP	TYP			
BIFET	± 3.5	± 18	10	0.2	25	3	13	LF351	D, JG, P	2-5
BIFET	± 3.5	± 18	2	0.2	25	3	13	LF357	D	2-9
High Performance	± 2	± 18	7.5	250	25	1	0.5	LM307	D, J, JG, N, P, W	2-17
High Performance	± 5	± 20	10	250	25	15	70	LM318	D, JG, P	2-51
Precision	± 5	± 22	0.025	2	450	0.8	0.25	LT1001AC	JG, L, P	2-63
Precision	± 5	± 22	0.06	4	400	0.8	0.25	LT1001C	P	2-63
Low Noise, High Speed, Precision Input	± 2.5	± 22	0	35	7000	8	1.7	LT1007AC	JG, P	2-83
Low Noise, High Speed, Precision Input	± 2.5	± 22	0	55	5000	8	1.7	LT1007C	JG, P	2-83
Ultra Precision	± 2.5	± 20	0.05	0.15				LT1028C	L, P	2-123
Low Noise, High Performance	± 4.5	± 18	0.08	120		75	15	LT1028C	D, JG, L, P	2-127
Low Noise, High Performance	± 4.5	± 18	0.13	240	300	75	15	LT1028	D, JG, L, P	2-127
Low Noise, High Speed, Noncompensated, $A_{VL} \geq 5$	± 2.5	± 22	0.025	35	7000	60	15	LT1037AC	JG, P	2-83
Low Noise, High Speed, Noncompensated, $A_{VL} \geq 5$	± 2.5	± 22	0.060	55	5000	60	15	LT1037C	JG, P	2-83
Low Noise, High Performance	± 3	± 22	4	1500	25	10	13	NE5534	D, JG, P	2-181
Low Noise, High Performance	± 3	± 22	4	1500	25	10	13	NE5534A	D, JG, P	2-181
Ultra-Low Offset Voltage	± 3	± 22	0.15	7		0.6	0.3	OP-07C	D, JG, P	2-147
Ultra-Low Offset Voltage	± 3	± 22	0.15	12		0.6	0.3	OP-07D	D, JG, P	2-147
Ultra-Low Offset Voltage	± 3	± 22	0.075	4	200	0.6	0.3	OP-07E	D, JG, P	2-147

General Information

OPERATIONAL AMPLIFIERS SELECTION GUIDE

General Information

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	PAGE NO.	
	MIN	MAX	MAX	MAX	MIN	TYP	TYP				
BIFET, Low Power, Precision	± 3.5	± 18	0.8	0.2	5	1.1	2.9	TL031AC	D,FK,JG,L,P	2-191	
BIFET, Low Power, Precision	± 3.5	± 18	1.5	0.2	5	1.1	2.9	TL031C	D,FK,JG,L,P	2-191	
BIFET, Precision	± 3.5	± 18	0.8	0.2	50	3.1	20	TL061AC	D,FK,JG,L,P	2-357	
BIFET, Precision	± 3.5	± 18	1.5	0.2	50	3.1	20	TL061C	D,FK,JG,L,P	2-357	
BIFET, Low Power	± 3.5	± 18	6	0.2	4	1	3.5	TL061AC	D,JG,P	2-357	
BIFET, Low Power	± 3.5	± 18	3	0.2	4	1	3.5	TL061BC	D,JG,P	2-357	
BIFET, Low Power	± 3.5	± 18	15	0.2	3	1	3.5	TL061C	D,JG,P	2-357	
BIFET, Adjustable, Low-Power	± 1.2	± 18	6	0.2	4	1	3.5	TL071C	D,JG,P	2-373	
BIFET, Adjustable, Low-Power	± 1.2	± 18	3	0.2	4	1	3.5	TL071AC	D,JG,P	2-373	
BIFET, Adjustable, Low-Power	± 1.2	± 18	15	0.4	3	1	3.5	TL071C	D,JG,P	2-373	
BIFET, Low Noise	± 3.5	± 18	6	0.2	50	3	13	TL071C	D,JG,P	2-387	
BIFET, Low Noise	± 3.5	± 18	3	0.2	50	3	13	TL071AC	D,JG,P	2-387	
BIFET, Low Noise	± 3.5	± 18	10	0.2	25	3	13	TL071C	D,JG,P	2-387	
BIFET, General Purpose	± 3.5	± 18	6	0.2	50	3	13	TL081AC	D,JG,P	2-403	
BIFET, General Purpose	± 3.5	± 18	3	0.2	50	3	13	TL081BC	D,JG,P	2-403	
BIFET, General Purpose	± 3.5	± 18	15	0.4	25	3	13	TL081C	D,JG,P	2-403	
BIFET, Low V_{IO}	± 3.5	± 18	0.5	0.2	50	3	13	TL097C	D,JG,L,P	2-417	
BIFET, Low V_{IO}	± 3.5	± 18	1	0.2	50	3	13	TL097AC	D,JG,L,P	2-417	
Single Supply, High Performance	S/S	3	3	7	-250	25	0.6	0.3	TL321C	JG,P	2-441
	D/S	1.5	15								
LinCMOS, Programmable, Low Bias	1.4	18	5	Typ 0.001	30	0.1	0.04	TLC251AC	D,JG,P	2-451	
LinCMOS, Programmable, Medium Bias	1.4	18	5	Typ 0.001	20	0.7	0.6	TLC251AC	D,JG,P	2-451	
LinCMOS, Programmable, High Bias	1.4	18	5	Typ 0.001	10	2.3	4.5	TLC251AC	D,JG,P	2-451	
LinCMOS, Programmable, Low Bias	1.4	18	2	Typ 0.001	30	0.1	0.04	TLC251BC	D,JG,P	2-451	
LinCMOS, Programmable, Medium Bias	1.4	18	2	Typ 0.001	20	0.7	0.6	TLC251BC	D,JG,P	2-451	
LinCMOS, Programmable, High Bias	1.4	18	2	Typ 0.001	10	2.3	4.5	TLC251BC	D,JG,P	2-451	
LinCMOS, Programmable, Low Bias	1.4	18	10	Typ 0.001	30	0.1	0.04	TLC251C	D,JG,P	2-451	
LinCMOS, Programmable, Medium Bias	1.4	18	10	Typ 0.001	20	0.7	0.6	TLC251C	D,JG,P	2-451	
LinCMOS, Programmable, High Bias	1.4	18	10	Typ 0.001	10	2.3	4.5	TLC251C	D,JG,P	2-451	
LinCMOS, Programmable, Low Bias	3	18	5	Typ 0.007	50	0.11	0.04	TLC271AC	D,JG,P	2-479	
LinCMOS, Programmable, Medium Bias	3	18	5	Typ 0.007	25	0.84	0.56	TLC271AC	D,JG,P	2-479	
LinCMOS, Programmable, High Bias	3	18	5	Typ 0.007	10	2.2	4.6	TLC271AC	D,JG,P	2-479	

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_{IB} (nA) MAX	A_{VD} (V/mV) MIN	B_1 (MHz) TYP	SR (V/ μ s) TYP	TYPE	PACKAGES	PAGE NO.
	MIN	MAX								
LinCMOS, Programmable, Low Bias	3	18	2	Typ 0.007	50	0.11	0.04	TLC271BC	D,JG,P	2-479
LinCMOS, Programmable, Medium Bias	3	18	2	Typ 0.007	25	0.64	0.56	TLC271BC	D,JG,P	2-479
LinCMOS, Programmable, High Bias	3	18	2	Typ 0.007	10	2.2	4.6	TLC271BC	D,JG,P	2-479
LinCMOS, Programmable, Low Bias	3	18	10	Typ 0.007	50	0.11	0.04	TLC271C	D,JG,P	2-479
LinCMOS, Programmable, Medium Bias	3	18	10	Typ 0.007	25	0.64	0.56	TLC271C	D,JG,P	2-479
LinCMOS, Programmable, High Bias	3	18	10	Typ 0.007	10	2.2	4.6	TLC271C	D,JG,P	2-479
LinCMOS, Precision, Low Noise	4.6	16	0.2	Typ 0.001	400	1.9	2.7	TLC2201AC	D,JG,L,P	2-763
LinCMOS, Precision, Low Noise, 100% Noise Tested	4.6	16	0.2	Typ 0.001	400	1.9	2.7	TLC2201BC	D,JG,L,P	2-763
LinCMOS, Precision, Low Noise	4.6	16	0.5	Typ 0.001	400	1.9	2.7	TLC2201C	D,JG,L,P	2-763
LinCMOS, Precision, Chopper Stabilized	3.8	16	0.001	Typ 0.004	5600	1.9	2.8	TLC2652AC	D,J,JG,L,N,P	2-789
LinCMOS, Precision, Chopper Stabilized	3.8	16	0.003	Typ 0.004	1000	1.9	2.8	TLC2652C	D,J,JG,L,N,P	2-789
LinCMOS, Low-Noise, Precision, Chopper Stabilized	4.6	16	0.01	Typ 0.05	5600	1.9	2	TLC2654AC	D,J,JG,L,N,P	2-811
LinCMOS, Low-Noise, Precision, Chopper Stabilized	4.6	16	0.02	Typ 0.05	1000	1.9	2	TLC2654C	D,J,JG,L,N,P	2-811
Excalibur, High-Speed, Precision	4	40	0.5	25	1000	2	0.9	TLC271C	D,FK,P	5-9
General Purpose	± 2	± 18	6	500	20	1	0.5	TLC271C	D,JG,P	2-837

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General Information



OPERATIONAL AMPLIFIERS SELECTION GUIDE

General Information

internally compensated, dual
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	PAGE NO.	
	MIN	MAX	MAX	MAX	MIN	TYP	TYP				
High Gain, Low Power, Bipolar	S/S	3	30	5	-150	50	0.6	0.2	LM158	FK,JG,U	2-43
	D/S	± 1.5	± 15								
General Purpose	± 2	± 22	5	500	50	1	0.5	MC1558	FK,JG,U	2-133	
Precision	± 5	± 22	0.15	20	1500	0.7	0.4	LT1013AM	JG,L	5-3	
Precision	± 5	± 22	0.3	30	500	0.7	0.4	LM158	JG,L	5-3	
High Performance	± 4	± 22	5	500	50	3.5	1.7	RM158	JG	2-177	
Low Power	± 2	± 22	5	100	1	0.5	0.5	LM158	U	2-187	
Low Power, Precision	± 3.5	± 18	0.8	0.2	5	1.1	2.9	TL082M	FK,JG,L	2-219	
BIFET, Low Power, Precision	± 3.5	± 18	1.5	0.2	5	1.1	2.9	TL082M	FK,JG,L	2-219	
BIFET, Precision	± 3.5	± 18	0.8	0.2	50	3	16	TL082M	FK,JG,L	2-219	
BIFET, Precision	± 3.5	± 18	1.5	0.2	50	3	16	TL082M	FK,JG,L	2-219	
BIFET, Low Power	± 3.5	± 18	6	0.2	4	1	3.5	TL082M	FK,JG,U	2-357	
BIFET, Low Noise	± 3.5	± 18	6	0.2	35	3	13	TL082M	FK,JG	2-387	
BIFET, General Purpose	± 3.5	± 18	16	0.2	25	3	13	TL082M	FK,JG	2-403	
BIFET, General Purpose	± 3.5	± 18	6	0.2	25	3	13	TL082M	FK,J	2-403	
BIFET, General Purpose	± 3.5	± 18	3	0.4	50	3	13	TL288M	JG,U	2-417	
BIFET, General Purpose	± 3.5	± 18	3	0.4	50	3	13	TL288M	JG,U	2-417	
LinCMOS, High Bias	4	18	10	Typ 0.005	10	2.2	5.3	TLC272M	FK,JG	2-543	
LinCMOS, High Bias	4	18	0.5	Typ 0.005	10	2.2	5.3	TLC277M	FK,JG	2-543	
LinCMOS, Low Bias	4	18	10	Typ 0.005	50	0.1	0.05	TLC27L2M	FK,JG	2-607	
LinCMOS, Low Bias	4	18	0.5	Typ 0.005	50	0.1	0.05	TLC27L7M	FK,JG	2-607	
LinCMOS, Medium Bias	4	18	10	Typ 0.005	25	0.6	0.6	TLC27M2M	FK,JG	2-671	
LinCMOS, Medium Bias	4	18	0.5	Typ 0.005	25	0.6	0.6	TLC27M7M	FK,JG	2-671	
LinCMOS, Micro Power, Precision	4	18	0.6	Typ 0.007	500	0.11	0.5	TLC1078M	FK,JG	2-735	
Excalibur, High Speed, Precision	4	40	0.5	25	1000	2	0.9	TLE2022M	FK,JG,L	5-9	

OPERATIONAL AMPLIFIERS SELECTION GUIDE

internally compensated, dual
automotive temperature range

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

DESCRIPTION	SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_B (nA)	AVD (V/mV)	B_1 (MHz)	SR (V/ μ s)	TYPE	PACKAGES	PAGE NO.	
	MIN	MAX	MAX	MAX	MIN	TYP	TYP				
High Gain, Low Power, Bipolar		3 ±1.5	30 ±1.5	5	-150	50	0.6	0.2	LM258	D,JG,P,U	2-43
High Gain, Low Power, Bipolar	S/S D/S	3 ±1.5	30 ±1.5	3	-80	50	0.6	0.2	LM258A	D,JG,P,U	2-43
High Gain, Low Power, Bipolar	S/S D/S	3 ±1.5	30 ±1.5	7	-250	Typ 100	0.6	0.2	LM2904	D,JG,P,U	2-43
High Performance		±4	±18	6	-500	20	3	1.7	RV455R	D,JG,P	2-177
Low Power, Precision		±3.5	±18	0.8	0.2	5	1.1	2.9	TL	D,JG,L,P	2-219
Low Power, Precision		±3.5	±18	1.5	0.2	5	1.1	2.9	TL	D,JG,L,P	2-219
Precision		±3.5	±18	0.8	0.2	50	3	16	TL	D,JG,L,P	2
BIFET, Precision		±3.5	±18	1.5	0.2	50	3	16	TL	D,JG,L,P	2
BIFET, Low Power		±3.5	±18	6	0.2	4	1	3.5	T	D,JG,P	2-357
BIFET, Low Noise		±3.5	±18	6	0.2	50	3	13	T	D,JG,P	2-387
BIFET, General Purpose		±3.5	±18	6	0.2	50	3	13	T	D,JG,P	2-403
BIFET, General Purpose		±3.5	±18	6	0.2	50	3	13	T	D,JG,P	2-403
BIFET, General Purpose		±3.5	±18	0.5	0.2	50	3	13	T	D,JG,P	2-417
BIFET, General Purpose		±3.5	±18	1	0.2	50	3	13	TL	D,JG,P	2-417
Low Power		±1.5	±18	8	-	20	1	0.6	TL	D,JG,P	2-445
LinCMOS, High Bias		4	18	5	Typ 0.005	10	2.2	5.3	TLC272AI	D,JG,P	2-543
LinCMOS, High Bias		4	18	2	Typ 0.005	10	2.2	5.3	TLC272BI	D,JG,P	2-543
LinCMOS, High Bias		4	18	10	Typ 0.005	10	2.2	5.3	TLC272I	D,JG,P	2-543
LinCMOS, High Bias		4	18	0.5	Typ 0.005	10	2.2	5.3	TLC277I	D,JG,P	2-543
LinCMOS, Low Bias		4	18	5	Typ 0.005	50	0.1	0.05	TLC27L2AI	D,JG,P	2-607
LinCMOS, Low Bias		4	18	2	Typ 0.005	50	0.1	0.05	TLC27L2BI	D,JG,P	2-607
LinCMOS, Low Bias		4	18	10	Typ 0.005	50	0.1	0.05	TLC27L2I	D,JG,P	2-607
LinCMOS, Low Bias		4	18	0.5	Typ 0.005	50	0.1	0.05	TLC27L7I	D,JG,P	2-607
LinCMOS, Medium Bias		4	18	5	Typ 0.005	25	0.6	0.6	TLC27M2AI	D,JG,P	2-671
LinCMOS, Medium Bias		4	18	2	Typ 0.005	25	0.6	0.6	TLC27M2BI	D,JG,P	2-671
LinCMOS, Medium Bias		4	18	10	Typ 0.005	25	0.6	0.6	TLC27M2I	D,JG,P	2-671
LinCMOS, Medium Bias		4	18	0.5	Typ 0.005	25	0.6	0.6	TLC27M7I	D,JG,P	2-671
LinCMOS, Micro Power, Precision		4	18	0.6	Typ 0.007	500	0.11	0.05	TLC1078I	D,JG,P	2-735
Excalibur, High Speed, Precision		4	40	0.5	25		2	0.9	TLE2022I	D,JG,L,P	5-9

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General Information

OPERATIONAL AMPLIFIERS SELECTION GUIDE

internally compensated, dual
industrial temperature range

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

General Information

DESCRIPTION	SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_{IB} (nA)	A_{VD} (V/mV)	B_1 (MHz)	SR (V/ μ s)	TYPE	PACKAGES	PAGE NO.
	MIN	MAX	MAX	MAX	MIN	TYP	TYP			
BIFET, Low Power, Precision	± 3.5	± 18	0.8	0.2	5	1.1	2.9	TLC032AI	D,JG,L,P	2-219
BIFET, Low Power, Precision	± 3.5	± 18	1.5	0.2	5	1.1	2.9	TLC032BI	D,JG,L,P	2-219
BIFET, Precision	± 3.5	± 18	0.8	0.2	50	3	16	TLC072AI	D,JG,L,P	2-219
BIFET, Precision	± 3.5	± 18	1.5	0.2	50	3	16	TLC072BI	D,JG,L,P	2-219
BIFET, Low Power	± 3.5	± 18	6	0.2	4	1	3.5	TLC072AI	D,JG,P	2-219
BIFET, Low Noise	± 3.5	± 18	6	0.2	50	3	13	TLC072BI	D,JG,P	2-219
BIFET, General Purpose	± 3.5	± 18	6	0.2	50	3	13	TLC072AI	D,JG,P	2-417
BIFET, General Purpose	± 3.5	± 18	6	0.2	50	3	13	TLC072BI	D,JG,P	2-417
BIFET, General Purpose	± 3.5	± 18	0.5	0.2	50	3	13	TLC072AI	D,JG,P	2-417
BIFET, General Purpose	± 3.5	± 18	1	0.2	50	3	13	TLC072BI	D,JG,P	2-417
Low Power	± 1.5	± 18	8	-500	20	1	0.6	TLC072AI	D,JG,P	2-445
LinCMOS, High Bias	4	18	5	Typ 0.005	10	2.2	5.3	TLC272AI	D,JG,P	2-543
LinCMOS, High Bias	4	18	2	Typ 0.005	10	2.2	5.3	TLC272BI	D,JG,P	2-543
LinCMOS, High Bias	4	18	10	Typ 0.005	10	2.2	5.3	TLC272I	D,JG,P	2-543
LinCMOS, High Bias	4	18	0.5	Typ 0.005	10	2.2	5.3	TLC277I	D,JG,P	2-543
LinCMOS, Low Bias	4	18	5	Typ 0.005	50	0.1	0.05	TLC27L2AI	D,JG,P	2-607
LinCMOS, Low Bias	4	18	2	Typ 0.005	50	0.1	0.05	TLC27L2BI	D,JG,P	2-607
LinCMOS, Low Bias	4	18	10	Typ 0.005	50	0.1	0.05	TLC27L2I	D,JG,P	2-607
LinCMOS, Low Bias	4	18	0.5	Typ 0.005	50	0.1	0.05	TLC27L7I	D,JG,P	2-607
LinCMOS, Medium Bias	4	18	5	Typ 0.005	25	0.6	0.6	TLC27M2AI	D,JG,P	2-671
LinCMOS, Medium Bias	4	18	2	Typ 0.005	25	0.6	0.6	TLC27M2BI	D,JG,P	2-671
LinCMOS, Medium Bias	4	18	10	Typ 0.005	25	0.6	0.6	TLC27M2I	D,JG,P	2-671
LinCMOS, Medium Bias	4	18	0.5	Typ 0.005	25	0.6	0.6	TLC27M7I	D,JG,P	2-671
LinCMOS, Micro Power, Precision	4	18	0.6	Typ 0.007	500	0.11	0.05	TLC1078I	D,JG,P	2-735
Excalibur, High Speed, Precision	4	40	0.5	25	1000	2	0.9	TLE2022I	D,JG,L,P	5-9

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internally compensated, dual
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	PAGE NO.
	MIN	MAX								
BIFET, General Purpose	± 3.5	± 18	10	0.2	25	3	13	LM101	D,JG,P	2-7
BIFET, Low Offset	± 3.5	± 18	3	0.2	25	3	13	LM101	D,JG,P	2-11
High Gain, Low Power, Bipolar	S/S	3	7	-250	25	0.6	0.2	LM358	D,JG,P,U	2-43
	D/S	± 1.5								
High Gain, Low Power, Bipolar		3	3	-100	25	0.6	0.2	LM358A	D,JG,P,U	2-43
		± 1.5								
Precision	± 5	± 22	0.15	20		0.7	0.4	LT1013AC	JG,L,P	5-3
Precision	± 5	± 22	0.3	30	1200	0.7	0.4	LT1013C	JG,L,P	5-3
Precision	± 5	± 22	0.8	30	1200	0.7	0.4	LT1013D	D,JG,L,P	5-3
General Purpose	± 1.5	± 18	6	500	20	1	0.5	MC1458	D,JG,P,U	2-133
Low Noise	± 3	± 20	4	800	25	10	9	RC401	JG,P	2-143
Low Noise	± 3	± 20	4		25	10	9	RC401	JG,P	2-143
High Performance	± 4	± 18	6		20	3	1.7	RC401	D,JG,P	2-177
High Performance	± 4	± 18	6		20	4	2	RC401	D,P	2-171
Low Power	± 2	± 18	5		1	0.5	0.5	TL022C	D,JG,P	2-187
BIFET, Low Power, Precision	± 3.5	± 18	0.8	0.2	5	1.1	2.9	TL072C	D,JG,L,P	2-219
BIFET, Low Power, Precision	± 3.5	± 18	1.5	0.2	5	1.1	2.9	TL072C	D,JG,L,P	2-219
BIFET, Precision	± 3.5	± 18	1.5	0.2	50	3	16	TL072AC	D,JG,L,P	2-219
BIFET, Precision	± 3.5	± 18	4	0.2	50	3	16	TL072AC	D,JG,L,P	2-219
BIFET, Low Power	± 3.5	± 18	6	0.2	4	1	3.5	TL072C	D,JG,P	2-357
BIFET, Low Power	± 3.5	± 18	3	0.2	4	1	3.5	TL072C	D,JG,P	2-357
BIFET, Low Power	± 3.5	± 18	15	0.4	3	1	3.5	TL072C	D,JG,P	2-357
BIFET, Low Noise	± 3.5	± 18	6	0.2	50	3	13	TL072AC	D,JG,P	2-387
BIFET, Low Noise	± 3.5	± 18	3	0.2	50	3	13	TL072BC	D,JG,P	2-387
BIFET, Low Noise	± 3.5	± 18	10	0.2	25	3	13	TL072C	D,JG,P	2-387
BIFET, General Purpose	± 3.5	± 18	6	0.2	50	3	13	TL082C	D,JG,P	2-403
BIFET, General Purpose	± 3.5	± 18	3	0.2	50	3	13	TL082C	D,JG,P	2-403
BIFET, General Purpose	± 3.5	± 18	15	0.4	25	3	13	TL082C	D,JG,P	2-403
BIFET, General Purpose	± 3.5	± 18	6	0.2	50	3	13	TL083AC	D,JG,N	2-403

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General Information

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internally compensated, dual
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	PAGE NO.
	MIN	MAX	MAX	MAX	MIN	TYP	TYP			
BIFET, General Purpose	± 3.5	± 18	1	0.4	25	3	13	TI	D,JG,N	2-403
BIFET, General Purpose	± 3.5	± 18	1	0.2	50	3	13	TI	D,JG,P	2-417
BIFET, General Purpose	± 3.5	± 18	1	0.2	50	3	13	TI	D,JG,P	2-417
Low Power	± 1.5	± 18	10	0.2	20	1	0.6	TI	D,JG,P	2-445
LinCMOS, High Bias	1.4	18	5	Typ 0.005	10	2.2	5.3	TLC252AC	D,JG,P	2-461
LinCMOS, High Bias	1.4	18	2	Typ 0.005	10	2.2	5.3	TLC252BC	D,JG,P	2-461
LinCMOS, High Bias	1.4	18	10	Typ 0.005	10	2.2	5.3	TLC252C	D,JG,P	2-461
LinCMOS, Low Bias	1.4	18	5	Typ 0.005	30	0.1	0.05	TLC25L2AC	D,JG,P	2-461
LinCMOS, Low Bias	1.4	18	2	Typ 0.005	30	0.1	0.05	TLC25L2BC	D,JG,P	2-461
LinCMOS, Low Bias	1.4	18	10	Typ 0.005	30	0.1	0.05	TLC25L2C	D,JG,P	2-461
LinCMOS, Medium Bias	1.4	18	5	Typ 0.005	20	0.6	0.6	TLC25M2AC	D,JG,P	2-461
LinCMOS, Medium Bias	1.4	18	2	Typ 0.005	20	0.6	0.6	TLC25M2BC	D,JG,P	2-461
LinCMOS, Medium Bias	1.4	18	10	Typ 0.005	20	0.6	0.6	TLC25M2C	D,JG,P	2-461
LinCMOS, High Bias	3	18	5	Typ 0.005	10	2.2	5.3	TLC272AC	D,JG,P	2-543
LinCMOS, High Bias	3	18	2	Typ 0.005	10	2.2	5.3	TLC272BC	D,JG,P	2-543
LinCMOS, High Bias	3	18	10	Typ 0.005	10	2.2	5.3	TLC272C	D,JG,P	2-543
LinCMOS, High Bias	3	18	0.5	Typ 0.005	10	2.2	5.3	TLC277C	D,JG,P	2-543
LinCMOS, Low Bias	3	18	5	Typ 0.005	50	0.1	0.05	TLC27L2AC	D,JG,P	2-607
LinCMOS, Low Bias	3	18	2	Typ 0.005	50	0.1	0.05	TLC27L2BC	D,JG,P	2-607
LinCMOS, Low Bias	3	18	10	Typ 0.005	50	0.1	0.05	TLC27L2C	D,JG,P	2-607
LinCMOS, Low Bias	3	18	0.5	Typ 0.005	50	0.1	0.05	TLC27L7C	D,JG,P	2-607
LinCMOS, Medium Bias	3	18	5	Typ 0.005	25	0.6	0.6	TLC27M2AC	D,JG,P	2-671
LinCMOS, Medium Bias	3	18	2	Typ 0.005	25	0.6	0.6	TLC27M2BC	D,JG,P	2-671
LinCMOS, Medium Bias	3	18	10	Typ 0.005	25	0.6	0.6	TLC27M2C	D,JG,P	2-671
LinCMOS, Medium Bias	3	18	0.5	Typ 0.005	25	0.6	0.6	TLC27M7C	D,JG,P	2-671
LinCMOS, Micro Power, Precision	1.4	18	0.6	Typ 0.007	500	0.11	0.05	TLC1078C	D,JG,P	2-735
Excalibur, High Speed, Precision	4	40	0.5	25	2	0.9	0.5	TLV1078C	D,JG,P	5-9
General Purpose	± 5	± 22	6	500	2	1	0.5	TLV1078C	D,JG,N	2-845

OPERATIONAL AMPLIFIERS SELECTION GUIDE

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	PAGE NO.
	MIN	MAX								
General Purpose	3	30	5	-150	50	0.6	0.13	LM124	FK,J,W	2-33
General Purpose	± 4	± 22	5	100	50	1	0.5	LM148	FK,J	2-39
Quad μ A741, High Performance	± 4	± 22	4	400	50	3.5	1.7	RM4136	FK,J,W	2-173
Low Power, Precision	± 3.5	± 18	1.5	0.2	5	1.1	2.9	TL044M	FK,J	2-245
Low Power, Precision	± 3.5	± 18	4	0.2	5	1.1	2.9	TL044M	FK,J	2-245
Low Power	± 2	± 22	5	100	72	0.5	0.5	TL044M	FK,J,W	2-245
Precision	± 3.5	± 18	1.5	0.2	50	2.7	16	TL044M	FK,J	2-245
BIFET, Precision	± 3.5	± 18	4	0.2	50	2.7	16	TL054M	FK,J	2-327
BIFET, Low Power	± 3.5	± 18	9	0.2	4	1	3.5	TL064M	FK,J,W	2-357
BIFET, Low Noise	± 3.5	± 18	9	0.2	35	3	13	TL074M	FK,J,W	2-387
BIFET, General Purpose	± 3.5	± 18	9	0.2	25	3	13	TL084M	FK,J,W	2-403
LinCMOS, High Bias	4	18	10	Typ 0.005	10	2.2	5.3	TLC274M	FK,J	2-575
LinCMOS, High Bias	4	18	1.2	Typ 0.005	10	2.2	5.3	TLC279M	FK,J	2-575
LinCMOS, Low Bias	4	18	10	Typ 0.005	50	0.1	0.05	TLC27L4M	FK,J	2-639
LinCMOS, Low Bias	4	18	0.9	Typ 0.005	50	0.1	0.05	TLC27L9M	FK,J	2-639
LinCMOS, Medium Bias	4	18	10	Typ 0.005	20	0.6	0.6	TLC27M4M	FK,J	2-703
LinCMOS, Medium Bias	4	18	0.9	Typ 0.005	20	0.6	0.6	TLC27M9M	FK,J	2-703
LinCMOS, Micro Power, Precision	4	18	1.15	Typ 0.007	500	0.11	0.05	TLC1079M	D,J,G,P	2-749
Excalibur, High Speed, Precision	4	40	0.5	25	1000	2	0.9	TLE2024M	FK,J	5-9

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internally compensated, quad
automotive temperature range

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

General Information

DESCRIPTION	SUPPLY VOLTAGE (V)		V_{IO} (mV)	I_B (nA)	A_{VD} (V/mV)	B_1 (MHz)	SR (V/ μ s)	TYPE	PACKAGES	PAGE NO.	
	MIN	MAX									
Norton Amplifier, Bipolar	S/S	4.5	—	200	1.2	2.5	0.5	LM2900	J,N	2-55	
	D/S	± 2.2									± 16
Extended Temperature Range LM324	3	26	7	-250	Typ 100	0.6	0.3	LM2902	D,J,N,W	2-33	
Low Power, Bipolar	S/S	3	8	-500	20	1	0.6	MC3303	D,J,N	2-137	
	D/S	± 1.5									± 18
Quad uA741		± 4.5	± 18	6	500	20	3	1.7	RV4136	D,J,N	2-173
BIFET, Low Power, Precision		± 3.5	± 18	1.5	0.2	5	1.1	2.9	TL034AI	D,J,N	2-245
BIFET, Low Power, Precision		± 3.5	± 18	4	0.2	5	1.1	2.9	TL034BI	D,J,N	2-245
BIFET, Precision		± 3.5	± 18	1.5	0.2	50	2.7	16	TL054AI	D,J,N	2-327
BIFET, Precision		± 3.5	± 18	4	0.2	50	2.7	16	TL054BI	D,J,N	2-327
BIFET, Low Power, Precision		± 3.5	± 18	6	0.2	4	1	3.5	TL064I	D,J,N	2-357
BIFET, Low Noise, Precision		± 3.5	± 18	6	0.2	50	3	13	TL074I	D,J,N	2-387
BIFET, General Purpose		± 3.5	± 18	6	0.2	50	3	13	TL084I	D,J,N	2-403
LinCMOS, High Bias	4	18	5	Typ 0.001	10	2.2	5.3	TLC274AI	D,J,N	2-575	
LinCMOS, High Bias	4	18	2	Typ 0.001	10	2.2	5.3	TLC274BI	D,J,N	2-575	
LinCMOS, High Bias	4	18	10	Typ 0.001	10	2.2	5.3	TLC274I	D,J,N	2-575	
LinCMOS, High Bias	4	18	1.2	Typ 0.005	10	2.2	5.3	TLC279I	D,J,N	2-575	
LinCMOS, Low Bias	4	18	5	Typ 0.005	50	0.1	0.05	TLC27L4AI	D,J,N	2-639	
LinCMOS, Low Bias	4	18	2	Typ 0.005	50	0.1	0.05	TLC27L4BI	D,J,N	2-639	
LinCMOS, Low Bias	4	18	10	Typ 0.005	50	0.1	0.05	TLC27L4I	D,J,N	2-639	
LinCMOS, Low Bias	4	18	0.9	Typ 0.005	50	0.1	0.05	TLC27L9I	D,J,N	2-639	
LinCMOS, Medium Bias	4	18	5	Typ 0.005	25	0.6	0.6	TLC27M4AI	D,J,N	2-703	
LinCMOS, Medium Bias	4	18	2	Typ 0.005	25	0.6	0.6	TLC27M4BI	D,J,N	2-703	
LinCMOS, Medium Bias	4	18	10	Typ 0.005	25	0.6	0.6	TLC27M4I	D,J,N	2-703	
LinCMOS, Medium Bias	4	18	0.9	Typ 0.005	25	0.6	0.6	TLC27M9I	D,J,N	2-703	
LinCMOS, Micro Power, Precision	4	18	1.15	Typ 0.007	500	0.11	0.05	TLC1079I	D,JG,P	2-749	
Excalibur, High Speed, Precision	4	40	0.5	25	1000	2	0.9	TLE2024I	DW,FK,J,N	5-9	

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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/ μs)	TYPE	PACKAGES	PAGE NO.	
	MIN	MAX	MAX	MAX	MIN	TYP	TYP				
General Purpose, Bipolar	3	30	5	-150	50	0.6	0.3	LM224	D,J,N,W	2-33	
General Purpose, Bipolar	3	30	3	-80	50	0.6	0.3	LM224A	D,J,N,W	2-33	
General Purpose, Bipolar		± 4	± 18	6	25	1	0.5	LM248	D,J,N	2-39	
High Gain, Low Power, Bipolar	S/S	3	32	5	-150	50	0.6	0.2	LM258	D,J,N	2-43
	D/S	± 1.5									
High Gain, Low Power, Bipolar	S/S	3	32	3	-80	50	0.6	0.2	LM258A	D,J,N	2-43
	D/S	± 1.5	± 22								
Single Supply, Norton Amplifier, Precision	S/S	4	32	-	200	1.2	2.5	0.5	LM2900	D,J,N	2-55
	D/S	± 2	± 16								
Low Power		± 3.5	± 18	1.5	0.2	5	1.1	2.9	TL034AI	D,J,N	2-245
BIFET, Low Power		± 3.5	± 18	4	0.2	5	1.1	2.9	TL031	D,J,N	2-245
BIFET, Precision		± 3.5	± 18	1.5	0.2	50	2.7	16	TL034AI	D,J,N	2-327
BIFET, Precision		± 3.5	± 18	4	0.2	50	2.7	16	TL054I	D,J,N	2-327
BIFET, Low Power, Precision		± 3.5	± 18	6	0.2	4	1	3.5	TL064I	D,J,N	2-357
BIFET, Low Noise, Precision		± 3.5	± 18	6	0.2	50	3	13	TL074I	D,J,N	2-387
BIFET, General Purpose		± 3.5	± 18	6	0.2	50	3	13	TL084I	D,J,N	2-403
LinCMOS, High Bias	4	18	5	Typ 0.001	10	2.2	5.3	TLC274AI	D,J,N	2-575	
LinCMOS, High Bias	4	18	2	Typ 0.001	10	2.2	5.3	TLC274BI	D,J,N	2-575	
LinCMOS, High Bias	4	18	10	Typ 0.001	10	2.2	5.3	TLC274I	D,J,N	2-575	
LinCMOS, High Bias	4	18	0.9	Typ 0.005	10	2.2	5.3	TLC279I	D,J,N	2-575	
LinCMOS, Low Bias	4	18	5	Typ 0.005	50	0.1	0.05	TLC27L4AI	D,J,N	2-639	
LinCMOS, Low Bias	4	18	2	Typ 0.005	50	0.1	0.05	TLC27L4BI	D,J,N	2-639	
LinCMOS, Low Bias	4	18	10	Typ 0.005	50	0.1	0.05	TLC27L4I	D,J,N	2-639	
LinCMOS, Low Bias	4	18	0.9	Typ 0.005	50	0.1	0.05	TLC27L9I	D,J,N	2-639	
LinCMOS, Medium Bias	4	18	5	Typ 0.005	25	0.6	0.6	TLC27M4AI	D,J,N	2-703	
LinCMOS, Medium Bias	4	18	2	Typ 0.005	25	0.6	0.6	TLC27M4BI	D,J,N	2-703	
LinCMOS, Medium Bias	4	18	10	Typ 0.005	25	0.6	0.6	TLC27M4I	D,J,N	2-703	
LinCMOS, Medium Bias	4	18	0.9	Typ 0.005	25	0.6	0.6	TLC27M9I	D,J,N	2-703	
LinCMOS, Micro Power, Precision	4	18	1.15	Typ 0.007	500	0.11	0.05	TLC1079I	D,JG,P	2-749	
Excalibur, High Speed, Precision	4	40	0.5	25	1000	2	0.9	TL1074I	D,J,K,N	5-9	

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internally compensated, quad

commercial temperature range

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

General Information

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	PAGE NO.	
	MIN	MAX									
BIFET, General Purpose	± 3.5	± 18	10	0.2	25	3	13	LF347	D,J,N	2-3	
General Purpose	3	30	7	-250	25	0.6	0.3	LM324	D,J,N,W	2-33	
General Purpose	3	30	3	-100	25	0.6	0.3	LM324A	D,J,N,W	2-33	
General Purpose	± 4	± 18	6	200	25	1	0.5	LM348	D,J,N	2-39	
Single Supply, Norton Amplifier, Bipolar	S/S	4	32	—	200	1.2	2.5	0.5	LM3900	D,J,N	2-55
	D/S	± 2	± 16								
Low Power, Bipolar	S/S	3	36	10	-500	20	1	0.6	MC3403	D,J,N	2-137
	D/S	± 1.5	± 18								
LM741, High Performance	± 4	± 18	6	500	20	3	1.7	RC4136	D,J,N,W	2-173	
Low Power, Precision	± 3.5	± 18	1.5	0.2	5	1.1	2.9	TL034AC	D,J,N	2-245	
BIFET, Low Power, Precision	± 3.5	± 18	4	0.2	5	1.1	2.9	TL034C	D,J,N	2-245	
General Purpose	± 2	± 18	5	0.2	60	0.5	0.5	TL044C	J,N,W	2-269	
Precision	± 3.5	± 18	1.5	0.2	50	2.7	16	TL054AC	D,J,N	2-327	
BIFET, Precision	± 3.5	± 18	4	0.2	50	2.7	16	TL054C	D,J,N	2-327	
BIFET, Low Power	± 3.5	± 18	6	0.2	4	1	3.5	TL064AC	D,J,N	2-357	
BIFET, Low Power	± 3.5	± 18	3	0.2	4	1	3.5	TL064BC	D,J,N	2-357	
BIFET, Low Power	± 3.5	± 18	15	0.4	3	1	3.5	TL064C	D,J,N	2-357	
BIFET, Low Noise	± 3.5	± 18	6	0.2	50	3	13	TL074AC	D,J,N	2-387	
BIFET, Low Noise	± 3.5	± 18	3	0.2	50	3	13	TL074BC	D,J,N	2-387	
BIFET, Low Noise	± 3.5	± 18	10	0.2	50	3	13	TL074C	D,J,N	2-387	
BIFET, Low Noise	± 3.5	± 18	10	0.2	25	3	13	TL075C	J,N	2-387	
BIFET, General Purpose	± 3.5	± 18	6	0.2	50	3	13	TL082C	D,J,N	2-403	
BIFET, General Purpose	± 3.5	± 18	3	0.2	50	3	13	TL082C	D,J,N	2-403	
BIFET, General Purpose	± 3.5	± 18	15	0.4	25	3	13	TL084C	D,J,N	2-403	
BIFET, General Purpose	± 3.5	± 18	15	0.4	25	3	13	TL085C	J,N	2-403	
High Performance, Bipolar	± 4	± 18	6	500	20	3	2	TL136C	N	2-437	
LinCMOS, High Bias	1.4	18	5	Typ 0.005	10	2.2	5.3	TLC254AC	D,J,N	2-469	
LinCMOS, High Bias	1.4	18	2	Typ 0.005	10	2.2	5.3	TLC254BC	D,J,N	2-469	
LinCMOS, High Bias	1.4	18	10	Typ 0.005	10	2.2	5.3	TLC254C	D,J,N	2-469	
LinCMOS, Low Bias	1.4	18	5	Typ 0.005	30	0.1	0.05	TLC25L4AC	D,J,N	2-469	
LinCMOS, Low Bias	1.4	18	2	Typ 0.005	30	0.1	0.05	TLC25L4BC	D,J,N	2-469	
LinCMOS, Low Bias	1.4	18	10	Typ 0.005	30	0.1	0.05	TLC25L4C	D,J,N	2-469	
LinCMOS, Medium Bias	1.4	18	5	Typ 0.005	20	0.6	0.6	TLC25M4AC	D,J,N	2-469	
LinCMOS, Medium Bias	1.4	18	2	Typ 0.005	20	0.6	0.6	TLC25M4BC	D,J,N	2-469	
LinCMOS, Medium Bias	1.4	18	10	Typ 0.005	20	0.6	0.6	TLC25M4C	D,J,N	2-469	

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(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	PAGE NO.
	MIN	MAX	MAX	MAX	MIN	TYP	TYP			
LinCMOS, High Bias	3	18	5	Typ 0.005	10	2.2	5.3	TLC274AC	D,J,N	2-575
LinCMOS, High Bias	3	18	2	Typ 0.005	10	2.2	5.3	TLC274BC	D,J,N	2-575
LinCMOS, High Bias	3	18	10	Typ 0.005	10	2.2	5.3	TLC274C	D,J,N	2-575
LinCMOS, High Bias	3	18	0.9	Typ 0.005	10	2.2	5.3	TLC279C	D,J,N	2-575
LinCMOS, Low Bias	3	18	5	Typ 0.005	50	0.1	0.05	TLC27L4AC	D,J,N	2-639
LinCMOS, Low Bias	3	18	2	Typ 0.005	50	0.1	0.05	TLC27L4BC	D,J,N	2-639
LinCMOS, Low Bias	3	18	10	Typ 0.005	50	0.1	0.05	TLC27L4C	D,J,N	2-639
LinCMOS, Low Bias	3	18	0.9	Typ 0.005	50	0.1	0.05	TLC27L9C	D,J,N	2-639
LinCMOS, Medium Bias	3	18	5	Typ 0.005	25	0.6	0.6	TLC27M4AC	D,J,N	2-703
LinCMOS, Medium Bias	3	18	2	Typ 0.005	25	0.6	0.6	TLC27M4BC	D,J,N	2-703
LinCMOS, Medium Bias	3	18	10	Typ 0.005	25	0.6	0.6	TLC27M4C	D,J,N	2-703
LinCMOS, Medium Bias	3	18	0.9	Typ 0.005	25	0.7	0.6	TLC27M9C	D,J,N	2-703
LinCMOS, Micro Power, Precision	1.4	18	1.15	Typ 0.007	500	0.11	0.05	TLC1079C	D,J,N	2-749
Excalibur, High Speed, Precision	4	40	0.5	25	1000	2	0.9	TLE2024C	DW,FK,J,N	5-9

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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.

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

Manufacturers are arranged in alphabetical order.

<p>ADVANCED LINEAR DEVICES ALD1701 or ALD1702 or ALD1703</p>	<p>SUGGESTED TI REPLACEMENT TLC271</p>	<p>PAGE NO. 2-479</p>
<p>ANALOG DEVICES AD510 or AD517</p>	<p>SUGGESTED TI REPLACEMENT OP-07</p>	<p>PAGE NO. 2-147</p>
<p>FAIRCHILD</p>	<p>DIRECT TI REPLACEMENT</p>	<p>SUGGESTED TI REPLACEMENT</p>
<p>uA714 uA714E uA714L uA741 uA747 uA748 uA771 uA771A uA771B uA771L uA772 uA772A uA772B uA772L uA774 uA774B uA774L</p>	<p>uA741 uA747 uA748</p>	<p>OP-07C OP-07E OP-07D1 TLO71 TLO71B or TLO81B TLO71A or TLO81A TLO81 TLO72 TLO72B TLO72A or TLO82A TLO82 TLO74 TLO74A or TLO74B TLO84</p>
		<p>PAGE NO. 2-147 2-147 2-147 2-837 2-845 2-851 2-387 2-387 2-387 2-403 2-387 2-387 2-387 2-403 2-387 2-387 2-387 2-403</p>

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ICL7641		TLC274 or TLC27L9	2-575
ICL7642		TLC27M9	2-703
HARRIS		SUGGESTED TI REPLACEMENT	PAGE NO.
HA2515		LM318	2-51
HA5130-5		OP-07E	2-147
HA5135-5		OP-07C	2-147
INTERSIL		SUGGESTED TI REPLACEMENT	PAGE NO.
ICL7611, or ICL7612, or ICL7613		TLC271	2-479
ICL7621		TLC272	2-543
ICL7641		TLC274 or TLC27L9	2-575
ICL7642		TLC27M9	2-703
LINEAR TECHNOLOGY	DIRECT TI REPLACEMENT	SUGGESTED TI REPLACEMENT	PAGE NO.
LT1001		OP-07C, OP-07D, or OP-07E	2-147
LT1007	LT1007		2-83
LT1007A	LT1007A		2-83
LT1037	LT1037		2-83
LT1037A	LT1037A		2-83
MAXIM		SUGGESTED TI REPLACEMENT	PAGE NO.
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ICL7621		TLC272	2-543
ICL7641		TLC274 or TLC27L9	2-575
ICL7642		TLC27M9	2-703

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MOTOROLA	DIRECT TI REPLACEMENT	SUGGESTED TI REPLACEMENT	PAGE NO.
MC74B	uA74B		2-851
MC1458	MC1458		2-133
MC1558	MC1558		2-133
MC1709	uA709		2-833
MC1741	uA741		2-837
MC1747	uA747		2-845
MC3303	MC3303		2-137
MC3403	MC3403	RC4136	2-137
MC4558	RC4558		2-177
MC4741	LM348		2-39
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NATIONAL	DIRECT TI REPLACEMENT	SUGGESTED TI REPLACEMENT	PAGE NO.
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LF412	LF412	TL072A, TL082A, or TL082B	2-403
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LM709	uA709		2-833
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LM883		RC4558	2-177
LM1458	MC1458		2-133
LM2900	LM2900		2-55
LM2902	LM2902		2-33
LM2904	LM2904		2-43
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uPC159		LM318	2-51
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uPC801		TL071, TL081A, or LF351	2-387
PMI			
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OP-04		uA747	2-845
OP-07C	OP-07C		2-147
OP-07D	OP-07D		2-147
OP-07E	OP-07E		2-147
OP-07F		RC4136	2-173
OP-14C or OP-14E		MC1458	2-133
OP-14J		MC1558	2-133
OP-15F		TL071, TL081A, or LF351	2-387
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OP-37G	OP-37G		2-151
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RAYTHEON	DIRECT TI REPLACEMENT	SUGGESTED TI REPLACEMENT	PAGE NO.
RC4136	RC4136		2-173
RC4156		LM348	2-39
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RCA		SUGGESTED TI REPLACEMENT	PAGE NO.
CA081A		TL081	2-403
CA081A		TL081A	2-403
CA082		TL082	2-403
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SIGNETICS	DIRECT TI REPLACEMENT	SUGGESTED TI REPLACEMENT	PAGE NO.
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NE5534	NE5534		2-181
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TS272B		TLC272B	2-543
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TS274B		TLC274B	2-575
TS27L2		TLC27L2	2-607
TS27L2A		TLC27L2A	2-607
TS27L2B		TLC27L2B	2-607
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General Information

Input Offset Voltage (V_{IO})

The d-c voltage that must be applied between the input terminals to force the quiescent d-c output voltage to zero or other level, if specified.

Average Temperature Coefficient of Input Offset Voltage (α_{VIO})

The ratio of the change in input offset voltage to the change in free-air temperature. This is an average value for the specified temperature range.

$$\alpha_{VIO} = \left[\frac{(V_{IO} @ T_{A(1)}) - (V_{IO} @ T_{A(2)})}{T_{A(1)} - T_{A(2)}} \right] \text{ where } T_{A(1)} \text{ and } T_{A(2)} \text{ are the specified temperature extremes.}$$

Input Offset Current (I_{IO})

The difference between the currents into the two input terminals with the output at zero volts.

Average Temperature Coefficient of Input Offset Current (α_{IIO})

The ratio of the change in input offset current to the change in free-air temperature. This is an average value for the specified temperature range.

$$\alpha_{IIO} = \left[\frac{(I_{IO} @ T_{A(1)}) - (I_{IO} @ T_{A(2)})}{T_{A(1)} - T_{A(2)}} \right] \text{ where } T_{A(1)} \text{ and } T_{A(2)} \text{ are the specified temperature extremes.}$$

Input Bias Current (I_{IB})

The average of the currents into the two input terminals with the output at zero volts.

Common-Mode Input Voltage (V_{IC})

The average of the two input voltages.

Common-Mode Input Voltage Range (V_{ICR})

The range of common-mode input voltage that if exceeded will cause the amplifier to cease functioning properly.

Differential Input Voltage (V_{ID})

The voltage at the noninverting input with respect to the inverting input.

Maximum Peak Output Voltage Swing (V_{OM})

The maximum positive or negative peak output voltage that can be obtained without waveform clipping when the quiescent d-c output voltage is zero.

Maximum Peak-to-Peak Output Voltage Swing (V_{OPP})

The maximum peak-to-peak output voltage that can be obtained without waveform clipping when the quiescent d-c output voltage is zero.

Large-Signal Voltage Amplification (A_V)

The ratio of the peak-to-peak output voltage swing to the change in input voltage required to drive the output.

Differential Voltage Amplification (A_{VD})

The ratio of the change in output voltage to the change in differential input voltage producing it.

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Maximum-Output-Swing Bandwidth (B_{OM})

The range of frequencies within which the maximum output voltage swing is above a specified value.

Unity-Gain Bandwidth (B_1)

The range of frequencies within which the open-loop voltage amplification is greater than unity.

Phase Margin (ϕ_m)

The absolute value of the open-loop phase shift between the output and the inverting input at the frequency at which the modulus of the open-loop amplification is unity.

Gain Margin (A_m)

The reciprocal of the open-loop voltage amplification at the lowest frequency at which the open-loop phase shift is such that the output is in phase with the inverting input.

Input Resistance (r_i)

The resistance between the input terminals with either input grounded.

Differential Input Resistance (r_{id})

The small-signal resistance between the two ungrounded input terminals.

Output Resistance (r_o)

The resistance between the output terminal and ground.

Input Capacitance (C_i)

The capacitance between the input terminals with either input grounded.

Common-Mode Input Impedance (z_{ic})

The parallel sum of the small-signal impedance between each input terminal and ground.

Output Impedance (z_o)

The small-signal impedance between the output terminal and ground.

Common-Mode Rejection Ratio (k_{CMR} , $CMRR$)

The ratio of differential voltage amplification to common-mode voltage amplification.

NOTE: This is measured by determining the ratio of a change in input common-mode voltage to the resulting change in input offset voltage.

Supply Voltage Sensitivity (k_{SVS} , $\Delta V_{IO}/\Delta V_{CC}$)

The absolute value of the ratio of the change in input offset voltage to the change in supply voltages producing it.

NOTES: 1. Unless otherwise noted, both supply voltages are varied symmetrically.
2. This is the reciprocal of supply voltage rejection ratio.

Supply Voltage Rejection Ratio (k_{SVR} , $\Delta V_{CC}/\Delta V_{IO}$)

The absolute value of the ratio of the change in supply voltages to the change in input offset voltage.

NOTES: 1. Unless otherwise noted, both supply voltages are varied symmetrically.
2. This is the reciprocal of supply voltage sensitivity.

Equivalent Input Noise Voltage (V_n)

The voltage of an ideal voltage source (having an internal impedance equal to zero) in series with the input terminals of the device that represents the part of the internally generated noise that can properly be represented by a voltage source.

Equivalent Input Noise Current (I_n)

The current of an ideal current source (having an internal impedance equal to infinity) in parallel with the input terminals of the device that represents the part of the internally generated noise that can properly be represented by a current source.

Average Noise Figure (\bar{F})

The ratio of (1) the total output noise power within a designated output frequency band when the noise temperature of the input termination(s) is at the reference noise temperature, T_0 , at all frequencies to (2) that part of (1) caused by the noise temperature of the designated signal-input termination within a designated signal-input frequency band.

Short-Circuit Output Current (I_{OS})

The maximum output current available from the amplifier with the output shorted to ground, to either supply, or to a specified point.

Supply Current (I_{CC})

The current into the V_{CC} or V_{CC+} terminal of an integrated circuit.

Total Power Dissipation (P_D)

The total d-c power supplied to the device less any power delivered from the device to a load.

NOTE: At no load: $P_D = V_{CC+} \cdot I_{CC+} + V_{CC-} \cdot I_{CC-}$.

Crosstalk Attenuation (V_{O1}/V_{O2})

The ratio of the change in output voltage of a driven channel to the resulting change in output voltage of another channel.

Rise Time (t_r)

The time required for an output voltage step to change from 10% to 90% of its final value.

Total Response Time (Settling Time) (t_{TOT})

The time between a step-function change of the input signal level and the instant at which the magnitude of the output signal reaches for the last time a specified level range ($\pm \epsilon$) containing the final output signal level.

Overshoot Factor

The ratio of (1) the largest deviation of the output signal value from its final steady-state value after a step-function change of the input signal, to (2) the absolute value of the difference between the steady-state output signal values before and after the step-function change of the input signal.

Slew Rate (SR)

The average time rate of change of the closed-loop amplifier output voltage for a step-signal input.

military temperature range

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

DESCRIPTION	POWER SUPPLY		V_{OH} EOL (mV)	I_{OH} EOL (μA)	I_{OH} EOL (mA)	RESPONSE t _{PROP} (ns)	TYPE	PACKAGE	REF. NO.
	V_{CC} TYPICAL (V)	V_{EE} TYPICAL (V)							

single channel

Strobe	4-30	0	3	0.1	8	115	LM111	FK,J,JG,U	3-3
Ultra Low Power, Strobe	4-30	0	7.5	0.1	1.6	1	LP111	FK,JG	3-29
Strobe	4-30	0	1.5	0.05	50	10	LT1011M	JG,L	3-37
Strobe	4-30	0	0.5	0.025	50	150	LT1011	JG,L	3-37
Ultra-Fast, Precision	5	-5	± 2	10	10	10	LT1016M	JG,L	3-61

dual channel

Low Power, Bipolar	4-30	0	5	0.1	6	300	LM193	FK,JG,L	3-21
Dual TL510M	12	-6	2	15	2	30	TL514M	FK,J,W	3-69
Ultra Low Supply, CMOS	1.4-18	0	10	†	6	10	TL310	FK,JG	3-109
High Speed, LinCMOS	4-18	0	10	†	6	10	TL314M	FK,JG	3-119
Ultra Low Power, Open-Drain Output	4-18	0	5	†	6	1100	TLC393M	FK,JG	3-135
Ultra Low Power, Push-Pull Output	4-18	0	5	†	4	1300	TLC3702M	FK,JG	3-151

quad channel

Low Power, Bipolar	4-30	0	5	-0.1	6	300	LM199	FK,J	3-17
Precision Input	4-30	0	2	-0.1	6	300	LM199A	FK,J	3-17
Ultra Low Power, Open-Drain Output	4-18	0	5	†	6	1100	TLC399M	FK,J	3-89
Ultra Low Supply, LinCMOS	1.4-18	0	10	†	6	200	TLC364M	FK,J	3-111
High Speed, LinCMOS	4-18	0	10	†	6	200	TLC374M	FK,J	3-127
Ultra Low Power, Push-Pull Output	4-18	0	5	†	4	1300	TLC3704M	FK,J	3-157

† Typically 5 pA

General Information

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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 TIME TYP (ns)	TYPE	PACKAGE	PAGE NO.
	V_{CC+} NOM (V)	V_{CC-} NOM (V)							

dual channel

Automotive LM393	4-30	0	7	0.25	6		LM393	D,J,G,P	3-21
Ultra-Low Supply, LinCMOS	1.4-18	0	10	†	6		TL393	D,J,G,P	3-103
High Speed, LinCMOS	3-18	0	10	†	6	200	TLC393	D,J,G,P	3-119
Ultra Low Power, Open-Drain Output	3-18	0	5	†	6	1100	TLC393I	D,J,G,P	3-135
Ultra Low Power, Push-Pull Output	3-18	0	5	†	4	1300	TLC3702I	D,J,G,P	3-151

quad channel

Automotive Temp. LM339	4-30	0	7	-0.25	6		LM339	D,J,N	3-17
Low-Cost	4-26	0	20	0.5	6		LM339	D,J,N	3-25
Ultra Low Power, Automotive LP339, Bipolar	5	0	± 5	-0.025	20	8000	LP2901	D,J,N	3-33
Ultra Low Supply, LinCMOS	1.4-18	0	10	†	6	200	TLC354I	D,J,N	3-111
Open-Drain Output	3-18	0	5	†	6	1100	TLC354I	D,J,N	3-89
High Speed, LinCMOS	3-18	0	10	†	6	200	TLC354	D,J,N	3-111
Push-Pull Output	3-18	0	5	†	4	1300	TLC354I	D,J,N	3-157

† Typically 5 pA

COMPARATORS SELECTION GUIDE

Industrial temperature range

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

DESCRIPTION	POWER SUPPLY		V_{IO} LinCMOS (mV)	I_{q} LinCMOS (μA)	I_{q} Bipolar (mA)	RESPONSE Time (ns)	Type†	PACKAGE	PART NO.
	Min (V)	Max (V)							

single channel

Strobe	4–30	0	3	0.1	8	115	LM211	D,JG,P	3-3
Ultra Low Power, Strobe	4–30	0	7.5	0.1	1.6	1200	LM211	D,JG,P	3-29
Single LM339	4–30	0	5	-0.1	6	200	TL3311	D,JG,P	3-65

dual channel

Industrial LM293	4–30	0	5	0.25	6	300	LM293	D,JG,P	3-21
Industrial LM293, Low Offset	4–30	0	2	0.25	6	300	LM293	D,JG,P	3-21
Ultra Low Power, LinCMOS	1.4–18	0	10	†	6	200	TL3311	D,JG,P	3-103
High Speed, LinCMOS	3–18	0	10	†	6	200	TL3311	D,JG,P	3-119
Ultra Low Power, Open-Drain Output	3–18	0	5	†	6	1100	TLC393I	D,JG,P	3-135
Ultra Low Power, Push-Pull Output	3–18	0	5	†	4	1300	TLC3702I	D,JG,P	3-151

quad channel

Industrial LM339	4–30	0	5	-0.25	6	200	LM339	D,J,N	3-17
Industrial LM339, Low Offset	4–30	0	2	-0.25	6	200	LM339	D,J,N	3-17
Ultra Low Power, Bipolar	4–30	0	±5	-0.025	20	8000	LP239	D,J,N	3-33
Ultra Low Power, Open-Drain Output	3–18	0	5	†	6	1100	TLC339I	D,J,N	3-89
Ultra Low Supply LinCMOS	1.4–18	0	10	†	6	200	TLC354I	D,J,N	3-111
High Speed, LinCMOS	3–18	0	10	†	6	200	TLC374I	D,J,N	3-127
Ultra Low Power, Push-Pull Output	3–18	0	5	†	4	1300	TLC3704I	D,J,N	3-157

† Typically 5 pA

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)	TYP	PACKAGE	PAGE NO.
	V_{CC+} NOM (V)	V_{CC-} NOM (V)							

single channel

Strobe	4-30	0	7.5	0.25	8	115	LM311	D,JG,P	3-3
Ultra Low Power, Strobe	4-30	0	7.5	0.1	1.6	1200	LP311	D,JG,P	3-29
Strobe	4-30	0	0.6	0.025	50	150	LT1011AC	JG,L,P	3-37
Strobe	4-30	0	1.5	0.05	50	150	LT1011C	JG,L,P	3-37
Ultra-Fast Precision	5	-5	± 3	10	10	10	LT1016C	D,JG,L,P	3-61
Single LM339	4-30	0	5	-0.25	6	300	TL331C	D,JG,P	3-65
Output Enable	5	0	± 1	-	MAX 16	25	TL712	D,JG,P	3-77
High Speed	5	0	-	-	MAX 16	7	TL714C	D,P	3-81
High Speed	0	-5.2	± 1	-	MAX 16	Max 12	TL721	D,JG,P	3-85

dual channel

Low Power, Bipolar	4-30	0	5	0.25	6	300	LM393	D,JG,P	3-21
Precision Input	4-30	0	2	0.25	6	-	LT1011	D,JG,P	3-21
Ultra Low Supply, LinCMOS	1.4-18	0	10	†	6	-	TL331	D,JG,P	3-65
High Speed, LinCMOS	3-18	0	10	†	6	200	TLC372C	D,JG,P	3-119
Ultra Low Power, Open Drain Output, CMOS	3-18	0	5	†	6	1100	TLC393C	D,JG,P	3-135
Ultra Low Power, Push-Pull Output, CMOS	3-18	0	5	†	4	1300	TLC3702C	D,JG,P	3-151

† Typically 5 pA

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General Information

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)	TYP	PACKAGE	PAGE NO.
	V_{CC+} NOM (V)	V_{CC-} NOM (V)							

quad channel

Low Power, Bipolar	4-30	0	5	-0.25	6	D,J,N	3-17
Precision Input	4-30	0	2	-0.25	6	D,J,N	3-17
Ultra Low Power, Bipolar	4-30	0	± 5	-0.25	6	8000	LP339	D,J,N	3-33
Ultra Low Power, Open-Drain Output, CMOS	3-18	0	5	†	6	1100	TLC339C	D,J,N	3-89
Ultra Low Speed, CMOS	1.4-18	0	10	†	6	...	TL3304C	D,J,N	3-111
High Speed, CMOS	3-18	0	10	†	6	...	TL3304C	D,J,N	3-127
Ultra Low Power, Push-Pull Output, CMOS	3-18	0	5	†	4	1300	TLC3704C	D,J,N	3-157

† Typically 5 pA

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General Information



General Information

COMPARATORS CROSS-REFERENCE GUIDE

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

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Manufacturers are arranged in alphabetical order.

LINEAR TECHNOLOGY	DIRECT TI REPLACEMENT	SUGGESTED TI REPLACEMENT	PAGE NO.
LT1011A	LT1011A		3-37
LT1011	LT1011		3-37
LT1016	LT1016		3-61
LT1017		TLC352, TLC392, or TLC3702	3-103
			3-151
LT1018		TLC352, TLC392, or TLC3702	3-103
			3-151
NATIONAL	DIRECT TI REPLACEMENT	SUGGESTED TI REPLACEMENT	PAGE NO.
LM311	LM311		3-3
LM339	LM339	TLC339	3-17
LM393	LM393	TLC393	3-21
LM2901	LM2901	TLC339	3-17
LM3302	LM3302		3-25
LP339	LP339	TLC339	3-33
PMI		SUGGESTED TI REPLACEMENT	PAGE NO.
CMP04F		LM339 or LM3302 or LM2901 or TLC339	3-17 3-25 3-17 3-89

General Information



Input Offset Voltage (V_{IO})

The d-c voltage that must be applied between the input terminals to force the quiescent d-c output voltage to the specified level.

Average Temperature Coefficient of Input Offset Voltage (α_{VIO})

The ratio of the change in input offset voltage to the change in free-air temperature. This is an average value for the specified temperature range.

$$\alpha_{VIO} = \left[\frac{(V_{IO} @ T_{A(1)}) - (V_{IO} @ T_{A(2)})}{T_{A(1)} - T_{A(2)}} \right] \text{ where } T_{A(1)} \text{ and } T_{A(2)} \text{ are the specified temperature extremes.}$$

Input Offset Current (I_{IO})

The difference between the currents into the two input terminals with the output at the specified level.

Average Temperature Coefficient of Input Offset Current (α_{IIO})

The ratio of the change in input offset current to the change in free-air temperature. This is an average value for the specified temperature range.

$$\alpha_{IIO} = \left[\frac{(I_{IO} @ T_{A(1)}) - (I_{IO} @ T_{A(2)})}{T_{A(1)} - T_{A(2)}} \right] \text{ where } T_{A(1)} \text{ and } T_{A(2)} \text{ are the specified temperature extremes.}$$

Input Bias Current (I_{IB})

The average of the currents into the two input terminals with the output at the specified level.

High-Level Strobe Current ($I_{IH(S)}$)

The current flowing into or out of* the strobe at a high-level voltage.

Low-Level Strobe Current ($I_{IL(S)}$)

The current flowing out of* the strobe at a low-level voltage.

High-Level Strobe Voltage ($V_{IH(S)}$)

For a device having an active-low strobe, a voltage within the range that is guaranteed not to interfere with the operation of the comparator.

Low-Level Strobe Voltage ($V_{IL(S)}$)

For a device having an active-low strobe, a voltage within the range that is guaranteed to force the output high or low, as specified, independently of the differential inputs.

Input Voltage Range (V_I)

The range of voltage that if exceeded at either input terminal will cause the comparator to cease functioning properly.

Common-Mode Input Voltage (V_{IC})

The average of the two input voltages.

*Current out of a terminal is given as a negative value.

COMPARATORS GLOSSARY

Common-Mode Input Voltage Range (V_{ICR})

The range of common-mode input voltage that if exceeded will cause the comparator to cease functioning properly.

Differential Input Voltage (V_{ID})

The voltage at the noninverting input with respect to the inverting input.

Differential Input Voltage Range (V_{ID})

The range of voltage between the two input terminals that if exceeded will cause the comparator to cease functioning properly.

Differential Voltage Amplification (A_{VD})

The ratio of the change in output to the change in differential input voltage producing it with the common-mode input voltage held constant.

High-Level Output Voltage (V_{OH})

The voltage at an output with input conditions applied that according to the product specification will establish a high level at the output.

Low-Level Output Voltage (V_{OL})

The voltage at an output with input conditions applied that according to the product specification will establish a low level at the output.

High-Level Output Current, (I_{OH})

The current into* an output with input conditions applied that according to the product specification will establish a high level at the output.

Low-Level Output Current, (I_{OL})

The current into* an output with input conditions applied that according to the product specification will establish a low level at the output.

Output Resistance (r_o)

The resistance between an output terminal and ground.

Common-Mode Rejection Ratio (k_{CMR} , $CMRR$)

The ratio of differential voltage amplification to common-mode voltage amplification.

NOTE: This is measured by determining the ratio of a change in input common-mode voltage to the resulting change in input offset voltage.

Supply Current (I_{CC+} , I_{CC-})

The current into* the V_{CC+} or V_{CC-} terminal of an integrated circuit.

Total Power Dissipation (P_D)

The total d-c power supplied to the device less any power delivered from the device to a load.

NOTE: At no load: $P_D = V_{CC+} \cdot I_{CC+} + V_{CC-} \cdot I_{CC-}$.

*Current out of a terminal is given as a negative value.

Response Time

The interval between the application of an input step function and the instant the output crosses the logic threshold voltage.

NOTE: The input step drives the comparator from some initial condition sufficient to saturate the output (or in the case of high-to-low-level response time, to turn the output off) to an input level just barely in excess of that required to bring the output back to the logic threshold voltage. This excess is referred to as the voltage overdrive.

Strobe Release Time

The time required for the output to rise to the logic threshold voltage after the strobe terminal has been driven from its active logic level to its inactive logic level.

*Current out of a terminal is given as a negative value.



General Information

precision timers

military temperature range

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

DESCRIPTION	OUTPUT CURRENT	TIMING		TYPE	PACKAGES	PAGE NO.
		FROM	TO			
Single Timer, Bipolar	± 200 mA	1 μs	Hours	SF555	FK,JG	4-37
Single Timer, Bipolar	± 200 mA	1 μs	Hours	100	FK,JG	4-37
Dual Timer, Bipolar	± 200 mA	1 μs	Hours	100	FK,J	4-49
Dual Timer, Bipolar	± 200 mA	1 μs	Hours	100	FK,J	4-49
LinCMOS, Single High-Speed Timer	100 mA -10 mA	1 μs	Hours	TLC555M	FK,JG	4-195
LinCMOS, Dual High-Speed Timer	100 mA -10 mA	1 μs	Hours	TLC556M	FK,J	4-203

automotive temperature range

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

DESCRIPTION	OUTPUT CURRENT	TIMING		TYPE	PACKAGES	PAGE NO.
		FROM	TO			
Single Timer, Bipolar	± 200 mA	10 μs	Hours	SA...	D,JG,P	4-37
Dual Timer, Bipolar	± 200 mA	10 μs	Hours	SA...	D,J,N	4-49
LinCMOS, Single High-Speed Timer	100 mA -10 mA	1 μs	Hours	TLC555I	D,JG,P	4-195
LinCMOS, Dual High-Speed Timer	100 mA -10 mA	1 μs	Hours	TLC556I	D,J,N	4-203

commercial temperature range

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

DESCRIPTION	OUTPUT CURRENT	TIMING		TYPE	PACKAGES	PAGE NO.
		FROM	TO			
Single Timer, Bipolar	± 200 mA	10 μs	Hours	NF555	D,JG,P	4-37
Dual Timer, Bipolar	± 200 mA	10 μs	Hours	100	D,J,N	4-49
LinCMOS, Single High-Speed Timer, 1-Volt Operation	100 mA -10 mA	1 μs	Hours	TLC551C	D,P	4-179
LinCMOS, Dual High-Speed Timer, 1-Volt Operation	100 mA -10 mA	1 μs	Hours	TLC552C	D,N	4-187
LinCMOS, Single High-Speed Timer	100 mA -10 mA	1 μs	Hours	TLC555C	D,JG,P	4-195
LinCMOS, Dual High-Speed Timer	100 mA -10 mA	1 μs	Hours	TLC556C	D,J,N	4-203
Programmable Timer/Counter	4 mA	10 μs	Days	uA2240C	N	4-221

SPECIAL FUNCTIONS SELECTION GUIDE

General Information

current mirrors

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

DESCRIPTION	TEMPERATURE RANGE	CURRENT RATIO INPUT TO OUTPUT	INPUT CURRENT RANGE	TYPE	PACKAGES	PAGE NO.
Programmable	0°C to 70°C	3:1 to 1:15	Variable	TL010C	P	4-81
Programmable	-40°C to 85°C	3:1 to 1:15	Variable	TL010I	P	4-81
Fixed	0°C to 70°C	1:1	1 μA to 1 mA	TL011C	LP	4-85
Fixed	-40°C to 85°C	1:1	1 μA to 1 mA	TL011I	LP	4-85
Fixed	0°C to 70°C	1:2	1 μA to 1 mA	TL012C	LP	4-85
Fixed	-40°C to 85°C	1:2	1 μA to 1 mA	TL012I	LP	4-85
Fixed	0°C to 70°C	1:4	1 μA to 1 mA	TL014AC	LP	4-85
Fixed	0°C to 70°C	1:2	2 μA to 2 mA	T . . .	LP	4-85
Fixed	-40°C to 85°C	1:2	2 μA to 2 mA	T . i	LP	4-85

Hall-Effect switches

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

RELEASE POINT (GAUSS)	OPERATING POINT (GAUSS)	MINIMUM HYSTERESIS (GAUSS)	TYPE	PACKAGES	PAGE NO.
MIN	MAX				
-250	250	50	TL170C	LP	4-121
100	300	230	TL172C	LP	4-123
25	..	30	TL3013C	LU	4-165
125	..	50	TL3013	LU	4-167
50	..	20	T . . .	LU	4-169
-250	..	50	T . . .	LU	4-171

Hall-Effect linear circuits

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

LINEAR RANGE (GAUSS)	SENSITIVITY (mV/GAUSS)	TYPE	PACKAGES	PAGE NO.
..	1.4	TL172	LP	4-172
..	1.4	TL172	LU	4-172

sonar ranging functions

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

DESCRIPTION		TYPE	PACKAGES	PAGE NO.
Sonar Ranging Module	Sonar ranging module for measuring distances from a range of 6 inches to 35 feet using the TL851 and TL852	SN28827		4-61
Sonar Ranging Module	Sonar ranging module for measuring distances from a range of 6 inches to 35 feet using the TL852 and TL853	SN28828		4-67
Controller Circuit	Control integrated circuit for use in a sonar ranging module, capable of driving 50-kHz transducers with a simple interface	TL851	N	4-151
Receiver Circuit	Receiver integrated circuit for use in a sonar ranging module	TL852	N	4-155
Control Circuit	Control integrated circuit for use in a sonar ranging module, capable of driving 40-kHz transducers with a simple interface	TL853	N	4-161

SPECIAL FUNCTIONS SELECTION GUIDE

floppy-disk control circuits

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

DESCRIPTION	TYPE	PACKAGES	PAGE NO.
Read-Amplifier System	MC3470 MC3470A	N	4-29
Tape-Read Signal Conditioner	TL041C	DW,NT	4-113
Disk-Memory Read-Chain Data Comparator	TL712	D,J,P	3-77
Disk-Memory Read-Chain Data Comparator with MECL III and MECL 1000	TL721	D,J,G,P	3-85

differential video amplifiers

military temperature range

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

DESCRIPTION	BANDWIDTH (MHz)	GAIN	TYPICAL NOISE, V_n	TYPE	PACKAGES	PAGE NO.
Amplifier with internal frequency compensation and adjustable/selectable gain options	90	600 Max	12 μV	SE592	D,N	4-53
Amplifier with internal frequency compensation	200	10, 100, 400	12 μV	uA733M	J,U	4-213

commercial temperature range

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

DESCRIPTION	BANDWIDTH (MHz)	GAIN	TYPICAL NOISE, V_n	TYPE	PACKAGES	PAGE NO.
Amplifier with 2 multiplexed inputs and wide AGC range	60	100 max	25 μV	MC1445	J,N	4-27
Amplifier with internal frequency compensation and adjustable/selectable gain options	90	600 max	12 μV	NE592	D,N	4-53
Similar to NE592 but with tighter gain distribution	90	600 max	12 μV	TL027C	D,N	4-53
Amplifier with a wide AGC range	50	100	12 μV	TL027C	D,P	4-91
Amplifier with a wide AGC range	50	400 max	12 μV	TL027C	D,J,N	4-99
2-channel Multiplexed Video Amp	20	100 max	< 5 μV	TL027C	D,N	4-107
Similar to TL027C but in an 8-pin package	90	100 max	12 μV	TL592	D,P	4-143
Similar to TL592A but in an 8-pin package	90	100 max	12 μV	TL592	D,P	4-143
Low-noise version of NE592 and TL027C	90	600 max	3 μV	TL027C	D,N,P	4-147
Amplifier with internal frequency compensation	200	10, 100, 400	12 μV	uA733C	D,N	4-213

logarithmic amplifiers

military temperature range

(Values specified for operating temperature range)

DESCRIPTION	BANDWIDTH	GAIN	TYPE	PACKAGES	PAGE NO.
Logarithmic Amplifier	40 Hz	Logarithmic Curve	TL441AM	J,FK	4-129

General Information

SPECIAL FUNCTIONS SELECTION GUIDE

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General Information

programmable tone/noise generators

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

DESCRIPTION	TYPE	PACKAGES	PAGE NO.
<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/ SN76494A SN76496/ SN76496A	N	4-73

frequency-to-voltage-converters

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

DESCRIPTION	TYPE	PACKAGES	PAGE NO.
<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	4-21

sample-and-hold amplifiers

military temperature range

(Values specified for operating temperature range)

DESCRIPTION	OFFSET VOLTAGE	GAIN ERROR	TYPE	PACKAGES	PAGE NO.
Precision Sample-and-Hold Amplifier	1 mV	0.01%	LF101	L	4-3
	0.5 mV	0.01%	LF101		

commercial temperature range

(Values specified for operating temperature range)

DESCRIPTION	OFFSET VOLTAGE	GAIN ERROR	TYPE	PACKAGES	PAGE NO.
Precision Sample-and-Hold Amplifier	2 mV	0.004%	LF101	JG,L	4-3
	1 mV	0.01%	LF101	L,P	4-3

SPECIAL FUNCTIONS CROSS-REFERENCE GUIDE

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

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Manufacturers are arranged in alphabetical order.

INTERSIL		SUGGESTED TI REPLACEMENT	PAGE NO.
ICM7555		TLC555	4-195
MOTOROLA	DIRECT TI REPLACEMENT	SUGGESTED TI REPLACEMENT	PAGE NO.
MC1445	MC1445		4-27
MC1733		uA733	4-213
MC3470	MC3470		4-29
NE555	NE555		4-37
NE592	NE592		4-53
SIGNETICS	DIRECT TI REPLACEMENT	SUGGESTED TI REPLACEMENT	PAGE NO.
NE555	NE555	TLC555	4-195
NE556	NE556	TLC556	4-203
NE592	NE592		4-53
SA555	SA555	TLC555	4-195
SA556	SA556	TLC556	4-203
SE555	SE555	TLC555	4-195
SE555C	SE555C	TLC555	4-37
SE556	SE556	TLC556	4-203
SE556C	SE556C	TLC556	4-49
uA733	uA733	4-203	
SPRAGUE		SUGGESTED TI REPLACEMENT	PAGE NO.
UGN3019		TL3019C	4-167
UGS3019		TL3019I	4-167
UGN3020		TL3020C	4-169
UGS3020		TL3020I	4-169