

1.0 SCOPE

This specification covers the detail requirements for a low-noise precision high speed operational amplifier.

It is highly recommended that this data sheet be used as a baseline for new military or aerospace spec control drawings.

1.2 Part Number. The complete part numbers per Table I of this specification follow:

<u>Device</u>	<u>Part Number</u>	<u>Package</u>
A	OP-27AJ/883	J
B	OP-27BJ/883	J
A	OP-27AZ/883	Z
B	OP-27BZ/883	Z
B	OP-27BRC/883	RC

1.2.3 Case Outline.

<u>Letter</u>	<u>Case Outline (Lead finish per MIL-M-38510)</u>
J	8-lead metal can (TO-99)
Z	8-lead ceramic dual-in-line package (CERDIP)
RC	20-contact hermetic leadless chip carrier (LCC)

1.3 Absolute Maximum Ratings. ($T_A = 25^\circ\text{C}$, unless otherwise noted)

Supply Voltage.....	$\pm 22\text{V}$
Internal Power Dissipation	500mW
Input Voltage (Note 1)	$\pm 22\text{V}$
Output Short-Circuit Duration	Indefinite
Differential Input Voltage (Note 2)	$\pm 0.7\text{V}$
Differential Input Current (Note 2)	$\pm 25\text{mA}$
Storage Temperature Range	-65°C to $+150^\circ\text{C}$
Operating Temperature Range	-55°C to $+125^\circ\text{C}$
Lead Temperature (Soldering, 60 sec).....	$+300^\circ\text{C}$
DICE Junction Temperature Range (T_j)	-65°C to $+150^\circ\text{C}$

NOTES:

- For supply voltages less than $\pm 22\text{V}$, the absolute maximum input voltage is equal to the supply voltages.
- The OP-27 inputs are protected by back-to-back diodes. Current limiting resistors are not used in order to achieve low noise. If differential input voltage exceeds $\pm 0.7\text{V}$, the input current should be limited to 25mA .

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1.5 Thermal Characteristics:

Thermal Resistance, TO-99 (J) package:

Junction-to-Case (θ_{JC}) = 45°C/W MAX

Junction-to-Ambient (θ_{JA}) = 150°C/W MAX

Thermal Resistance, CERDIP (Z) package:

Junction-to-Case (θ_{JC}) = 26°C/W MAX

Junction-to-Ambient (θ_{JA}) = 119°C/W MAX

Thermal Resistance, LCC (RC) package:

Junction-to-Case (θ_{JC}) = 35°C/W MAX

Junction-to-Ambient (θ_{JA}) = 110°C/W MAX

TABLE 1

$V_S = \pm 15V$; $R_S = 50\Omega$; $T_A = 25^\circ C$ unless otherwise specified.

Characteristics	Symbol	Special Conditions	OP-27/883				Units
			LIMITS A		LIMITS B		
			Min	Max	Min	Max	
Input Offset Voltage	V_{OS}	$-55^\circ C \leq T_A \leq +125^\circ C$	-	25	-	60	μV
			-	60	-	200	μV
Average Input Offset Voltage	TCV_{OS}	Unnulled $-55^\circ C \leq T_A \leq +125^\circ C$	-	0.6	-	1.3	$\mu V/^\circ C$
Input Offset Current	I_{OS}	$-55^\circ C \leq T_A \leq +125^\circ C$	-	35	-	50	nA
			-	50	-	85	nA
Average Input Bias Current	I_B	$-55^\circ C \leq T_A \leq +125^\circ C$	-	± 40	-	± 55	nA
			-	± 60	-	± 95	nA
Input Voltage Range (Note 1)	IVR	$-55^\circ C \leq T_A \leq +125^\circ C$	± 11	-	± 11	-	V
			± 10.3	-	± 10.3	-	V
Common-Mode Rejection	CMR	$V_{CM} = IVR = \pm 11V$ $V_{CM} = IVR = \pm 10.3V$ $-55^\circ C \leq T_A \leq +125^\circ C$	114	-	106	-	dB
			108	-	100	-	dB
Power Supply Rejection Ratio	PSRR	$V_S = \pm 4V$ to $\pm 18V$ $V_S = \pm 4.5V$ to $\pm 18V$ $-55^\circ C \leq T_A \leq +125^\circ C$	-	10	-	10	$\mu V/V$
			-	16	-	20	$\mu V/V$
Large-Signal Voltage Gain	A_{VO}	$V_O = \pm 10V, R_L \geq 2k\Omega$ $V_O = \pm 10V, R_L \geq 600\Omega$ $V_O = \pm 10V, R_L \geq 2k\Omega$ $-55^\circ C \leq T_A \leq +125^\circ C$	1000	-	1000	-	V/mV
			800	-	800	-	V/mV
			600	-	500	-	V/mV
Output Voltage Swing	V_O	$R_L \geq 2k\Omega$ $R_L \geq 600\Omega$ $R_L \geq 2k\Omega$ $-55^\circ C \leq T_A \leq +125^\circ C$	± 12	-	± 12	-	V
			± 10	-	± 10	-	V
			± 11.5	-	± 11.0	-	V

TABLE 1 (Continued)

$V_S = \pm 15V$; $R_S = 50\Omega$; $T_A = +25^\circ C$ unless otherwise specified.

Characteristics	Symbol	Special Conditions	OP-27/883				Units
			LIMITS A		LIMITS B		
			Min	Max	Min	Max	
Supply Current	I_{SY}	No Load	--	4.67	--	4.67	mA
Power Dissipation	P_d	No Load	--	140	--	140	mW
Offset Adjustment Range	V_{OSadj}	$R_p = 10k\Omega$	± 0.5	--	± 0.5	--	mV
Output Short-Circuit Current	I_{SC}^+		--	70	--	70	mA
	I_{SC}^-		-70	--	-70	--	mA
Input Noise Voltage (Note 2)	e_n	$f_O = 1Hz$ to $100Hz$	--	50	--	50	nV_{RMS}
Input Noise Current (Note 2)	i_n	$f_O = 1Hz$ to $100Hz$	--	40	--	40	pA_{RMS}
Slew Rate	SR	$V_O = \pm 5V$, $R_L \geq 2k\Omega$ $C_L = 100pF$	1.7	--	1.7	--	$V/\mu s$
Gain Bandwidth Product	GBW		5.0	--	5.0	--	MHz

NOTES:

1. IVR is defined as the V_{CM} range used for the CMR test.
2. This parameter is 100% tested.

TABLE 2

OP-27/883

**Electrical Test Requirements
For Class B Devices**

MIL-STD-883 Test Requirements	Subgroups (see Table 3)
Interim Electrical Parameters (pre Burn-In)	1
Final Electrical Test Parameters	1*, 2, 3, 4, 5, 6
Group A Test Requirements	1, 2, 3, 4, 5, 6, 7, 8

* PDA applies to Subgroup 1 only.
No other Subgroups are included in PDA.
 V_{OS} is excluded from PDA calculation.

TABLE 3

Group A Inspection

$V_S = \pm 15V$; $R_S = 50\Omega$; $T_A = T_J$ unless otherwise specified.

Subgroup	Symbol	Special Conditions	OP-27/883				Units
			LIMITS A		LIMITS B		
			Min	Max	Min	Max	
Subgroup 1 $T_A = +25^\circ C$	I_{OS}		-	35	-	50	nA
	I_B		-	± 40	-	± 55	nA
	CMR	$V_{CM} = \pm 11V$	114	-	106	-	dB
	PSRR	$V_S = \pm 4V, \pm 18V$	-	10	-	10	$\mu V/V$
	A_{VO}	$R_L = 2k\Omega, V_O = \pm 10V$	1000	-	1000	-	V/mV
	V_O	$R_L = 2k\Omega$ $R_L = 600\Omega$	± 12.0	-	± 12.0	-	V
			± 10.0	-	± 10.0	-	V
	P_d	No Load	-	140	-	140	mW
	V_{OSadj}	$R_p = 10k\Omega$	± 0.5	-	± 0.5	-	mV
	I_{SY}	No Load	-	4.67	-	4.67	mA
	I_{SC}^+		-	70	-	70	mA
I_{SC}^-		-70	-	-70	-	mA	
Subgroup 2 $T_A = +125^\circ C$	I_{OS}		-	50	-	85	nA
	I_B		-	± 60	-	± 95	nA
	CMR	$V_{CM} = \pm 10.3V$	108	-	100	-	dB
	PSRR	$V_S = \pm 4.5V, \pm 18V$	-	16	-	20	$\mu V/V$
	A_{VO}	$R_L = 2k\Omega, V_O = \pm 10V$	600	-	500	-	V/mV
	V_O	$R_L = 2k\Omega$	± 11.5	-	± 11.0	-	V

TABLE 3

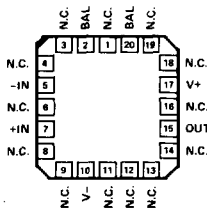
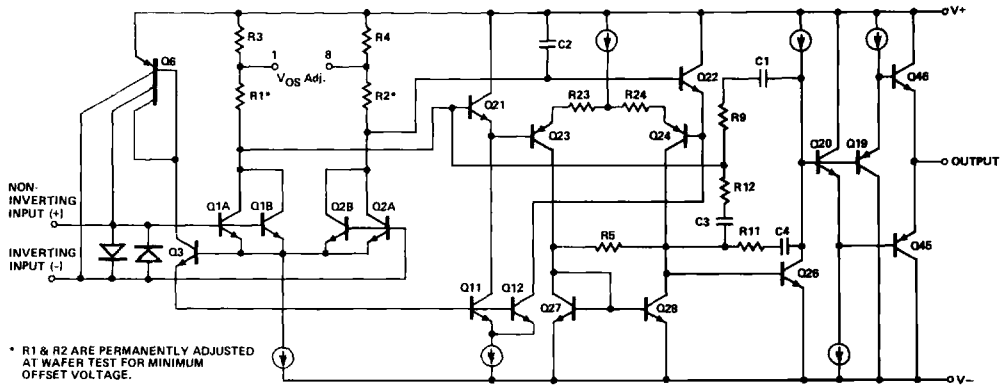
Group A Inspection (Continued)

$V_S = \pm 15V$; $R_S = 50\Omega$; $T_A = T_J$ unless otherwise specified.

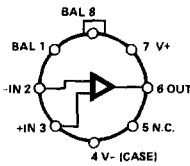
Subgroup	Symbol	Special Conditions	OP-27/883				Units
			LIMITS A		LIMITS B		
			Min	Max	Min	Max	
Subgroup 3 $T_A = -55^\circ C$		All Tests, Limits, and Conditions are the same as for Subgroup 2.					
Subgroup 4 $T_A = +25^\circ C$	V_{OS}		-	25	-	60	μV
Subgroup 5 $T_A = +125^\circ C$	V_{OS}		-	60	-	200	μV
Subgroup 6 $T_A = -55^\circ C$	V_{OS}		-	60	-	200	μV
Subgroup 7 $T_A = +25^\circ C$	SR	$C_L = 100pF$ $R_L = 2k\Omega, V_O = \pm 5V$	1.7	-	1.7	-	$V/\mu s$
Subgroup 8 $-55^\circ C \leq T_A \leq +125^\circ C$	TCV_{OS}		-	0.6	-	1.3	$\mu V/^\circ C$

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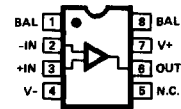
3.2.1 Simplified Schematic and Pin Connections.



**OP-27BRC/883
LCC PACKAGE
(RC-Suffix)**



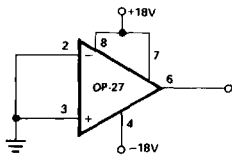
**TO-99
(J-Suffix)**



**8-PIN HERMETIC DIP
(Z-Suffix)**

3.2.4 Microcircuit Group Assignment. This microcircuit is covered by microcircuit group 49.

4.2 Life Test/Burn-In Circuit.



J AND Z PACKAGES

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