

1.0 SCOPE

This specification covers the detail requirements for a high-speed voltage follower/buffer.

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	BUF-03AJ/883	J
B	BUF-03BJ/883	J

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)

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

Supply Voltage.....	$\pm 18\text{V}$
Internal Power Dissipation	
In Still Air Without Heat Sink (Note 1).....	1.00W
Input Voltage (Note 2).....	$\pm 18\text{V}$
Continuous Output Current (Note 3).....	70mA
Peak Output Current (Note 3).....	100mA
Short-Circuit Protection (Note 3).....	Indefinite (Note 4)
Maximum Junction Temperature (T_J).....	$+175^\circ\text{C}$
Operating Temperature Range (Note 5).....	-55°C to $+125^\circ\text{C}$
Storage Temperature Range.....	-65°C to $+175^\circ\text{C}$
Lead Temperature (Soldering, 60 sec).....	$+300^\circ\text{C}$
DICE Junction Temperature Range (T_J).....	-65°C to $+175^\circ\text{C}$

NOTES:

- Based on MIL-STD-38510 published thermal resistance specification for 8 lead can-case outline C.
- When $V_{CC} < \pm 18\text{V}$, the maximum input voltage is equal to the supply voltages.
- The maximum P_d or T_J are not to be exceeded.
- At 80mA.
- When operating at $T_A > +25^\circ\text{C}$, heat sinking is required to insure $T_{J\text{max}} = 175^\circ\text{C}$ specification is not exceeded using the equation $T_{J\text{max}} = T_A + (P_d \cdot \Theta_{JC\text{max}} = \Theta_{SA})$ where Θ_{SA} = sink to ambient thermal resistance. PMI recommends using either the Thermalloy 2227 or 1101 or equivalent when operating up to $T_A = +125^\circ\text{C}$.

1.5 Thermal Characteristics:

Thermal Resistance, TO-99 (J) package:

Junction-to-Case (Θ_{JC}) = 40°C/W MAX

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

TABLE 1

$V_S = \pm 15V$; $R_S = 0\Omega$; $T_A = T_J = 25^\circ C$ unless otherwise specified. (Note 1)

Characteristics	Symbol	Special Conditions	BUF-03/883				Units
			LIMITS A		LIMITS B		
			Min	Max	Min	Max	
Input Offset Voltage (Note 2)	V_{OS}	$R_S \leq 20k\Omega$	-	6	-	15	mV
		$R_S \leq 20k\Omega$ $-55^\circ C \leq T_A \leq +125^\circ C$	-	20	-	35	mV
Input Bias Current	I_B	$T_A = +125^\circ C$	-	± 400	-	± 700	pA
			-	± 75	-	± 90	nA
Nonlinearity (Note 3)	NL	$V_{IN} = \pm 10V, R_L \geq 2k\Omega$	-	0.023	-	0.030	%F.S.
		$V_{IN} = \pm 7V, R_L \geq 1k\Omega$	-	0.023	-	0.030	%F.S.
Maximum Output Error (Note 2)	OUT error	$V_{IN} = +10V, 0V, -10V$ $R_L \geq 2k\Omega, R_S \leq 20k\Omega$	-	60	-	85	mV
Voltage Gain	A_{VO}	$V_{IN} = \pm 10V, \text{No Load}$	0.9960	-	0.9940	-	V/V
		$V_O = \pm 10V, R_L \geq 2k\Omega$	0.9945	-	0.9930	-	V/V
		$V_O = \pm 10V, R_L \geq 1k\Omega$	0.9925	-	0.9905	-	V/V
		$V_O = \pm 10V, R_L \geq 2k\Omega$ $-55^\circ C \leq T_A \leq +125^\circ C$	0.9920	-	0.9902	-	V/V
Power Supply Rejection Ratio	PSRR	$V_S = \pm 6V \text{ to } \pm 18V$	-	0.71	-	1.42	mV/V
		$V_S = \pm 6V \text{ to } \pm 18V$ $-55^\circ C \leq T_A \leq +125^\circ C$	-	1.26	-	2.24	mV/V
Supply Current	I_{SY}	No Load	-	25	-	25	mA
		No Load, $T_A = \pm 125^\circ C$	-	24	-	24	mA
Slew Rate (Note 4)	SR	$C_L = 50pF, R_L \geq 2k\Omega$ $T_J = T_A = +75^\circ C$	220	-	180	-	V/ μs

NOTES:

1. Electrical parameters are pulse tested on automated test equipment. Total test time at each temperature is limited to less than one second maximum to keep T_J approximately equal to T_A .
2. Parameters specified with $R_S \leq 20k\Omega$ are tested at $R_S = 0\Omega$. Limits in test program are adjusted to take into account worst case voltage offset induced by $R_S = 20k\Omega$, i.e., $I_B \text{ max} \cdot 20k\Omega$.
3. Nonlinearity is computed using linear regression techniques with data from five points (e.g., -10V, -5V, 0V, +5V, +10V for $\pm 10V$ full-scale linearity; -7V, -3.5V, 0V, +3.5V, and +7V for $\pm 7V$ full-scale linearity).
4. Slew Rate is specified at a Subgroup 8 nonstandard temperature, requiring a separate pass pulse test on automated test equipment. 100% Group A test is required.

TABLE 2

BUF-03/883

**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, 8

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

TABLE 3

Group A Inspection

$V_S = \pm 15V$; $R_S = 0\Omega$; $T_A = T_J$ unless otherwise specified. (Note 1)

Subgroup	Symbol	Special Conditions	BUF-03/883				Units
			LIMITS A		LIMITS B		
			Min	Max	Min	Max	
Subgroup 1 $T_A = +25^\circ C$	V_{OS}	$R_S \leq 20k\Omega$ (Note 2)	-	6	-	15	mV
	I_B		-	400	-	700	pA
	NL	$V_{IN} = \pm 10V, R_L = 2k\Omega$ (Note 3)	-	0.023	-	0.030	%F.S.
		$V_{IN} = \pm 7V, R_L = 1k\Omega$ (Note 3)	-	0.023	-	0.030	%F.S.
	OUT error	$V_{IN} = +10V, 0V, -10V$ $R_L = 2k\Omega, R_S \leq 20k\Omega$ (Note 2)	-	60	-	85	mV
	PSRR	$V_S = \pm 6V, \pm 18V$	-	0.71	-	1.42	mV/V
	I_{SY}	No Load	-	25	-	25	mA
Subgroup 2 $T_A = +125^\circ C$	V_{OS}	$R_S \leq 20k\Omega$ (Note 2)	-	20	-	35	mV
	I_B		-	75	-	90	nA
	PSRR	$V_S = \pm 7V, \pm 15V$	-	1.26	-	2.24	mV/V
	I_{SY}	No Load	-	24	-	24	mA
Subgroup 3 $T_A = -55^\circ C$	V_{OS}	$R_S \leq 20k\Omega$ (Note 2)	-	20	-	35	mV
	PSRR	$V_S = \pm 7V, \pm 15V$	-	1.26	-	2.24	V/mV
Subgroup 4 $T_A = +25^\circ C$	A_{VO}	$V_{IN} = \pm 10V, \text{No Load}$	0.9960	-	0.9940	-	V/V
		$V_{IN} = \pm 10V, R_L = 2k\Omega$	0.9945	-	0.9930	-	V/V
		$V_{IN} = \pm 10V, R_L = 1k\Omega$	0.9925	-	0.9905	-	V/V
Subgroup 5 $T_A = +125^\circ C$	A_{VO}	$V_{IN} = \pm 10V, R_L = 2k\Omega$	0.9920	-	0.9902	-	V/V
Subgroup 6 $T_A = -55^\circ C$	All Tests, Limits and Conditions are the same as for Subgroup 5.						

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Group A Inspection

$V_S = \pm 15V$; $R_S = 0\Omega$; $T_A = T_J$ unless otherwise specified. (Note 1)

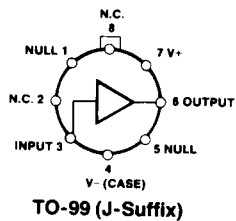
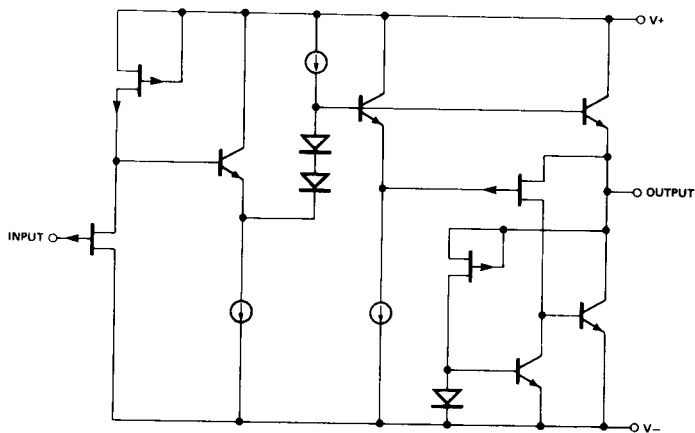
Subgroup	Symbol	Special Conditions	BUF-03/883				Units
			LIMITS A		LIMITS B		
			Min	Max	Min	Max	
Subgroup 8 $T_A = +75^\circ C$	SR	$R_L = 2k\Omega$, $C_L = 50pF$ (Note 4)	220	—	180	—	V/ μs

NOTES:

1. Electrical parameters are pulse tested on automated test equipment. Total test time at each temperature is limited to less than one second maximum to keep T_J approximately equal to T_A .
2. Parameters specified with $R_S \leq 20k\Omega$ are tested at $R_S = 0\Omega$. Limits in test program are adjusted to take into account worst case voltage offset induced by $R_S = 20k\Omega$, i.e., $I_B \text{ max} * 20k\Omega$.
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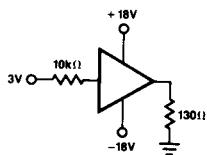
BUF-03

3.2.1 Simplified Schematic and Pin Connections.



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

4.2 Life Test/Burn-In Circuit.



* **Oil Bath Burn-In:** Use the oil bath heated to +125°C to provide the heat sink necessary to maintain the junction temperature at < +175°C.

$$T_{OIL} = +125^{\circ}\text{C}$$

$$T_A = +125^{\circ}\text{C}$$

$$T_J < +175^{\circ}\text{C based on}$$

$$T_A = +125^{\circ}\text{C and } \Theta_{JA} = 58^{\circ}\text{C/W (worst case)}$$