High Performance Dual Comparator

DESCRIPTION

The RH119 dual comparator features low input offset voltage and offset current, high voltage gain, guaranteed common mode rejection and input protection diodes.

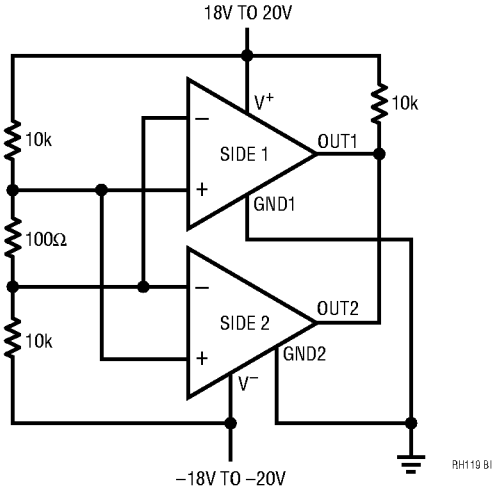
The RH119 is capable of operation over a supply range from 5V to ±15V and can drive 25mV leads from each open collector output. A separate GND pin allows the RH119 to isolate system grounds.

The wafer lots are processed to Linear Technology's in-house Class S flow to yield circuits usable in stringent military applications.

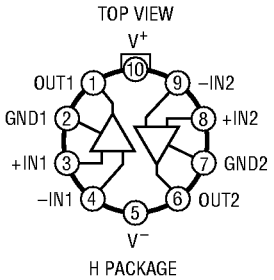
ABSOLUTE MAXIMUM RATINGS

Supply Voltage	36V
Output to Negative Supply Voltage	36V
Ground to Negative Supply Voltage	25V
Ground to Positive Supply Voltage	18V
Diffierential Input Voltage	±5V
Differential Input Current	±5mA
Input Voltage (See Note 1)	
Output Short-Circuit Duration	10 sec
Operating Temperature Range	–55°C to 125°C
Storage Temperature Range	–65°C to 150°C
Lead Temperature (Soldering, 10 sec)	300°C

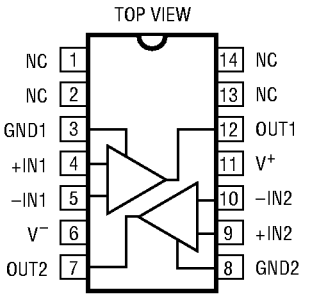
BURN-IN CIRCUIT



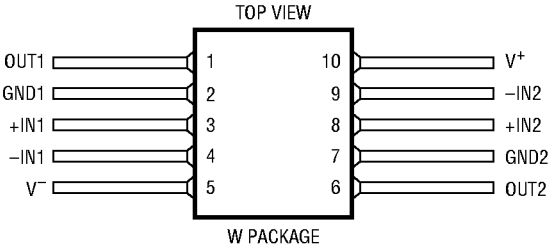
PACKAGE INFORMATION



H PACKAGE
10-LEAD TO-5 METAL CAN



J PACKAGE
14-LEAD CERDIP



W PACKAGE
10-LEAD CERPAC

TABLE 1: ELECTRICAL CHARACTERISTICS (Preirradiation) (Note 2)

SYMBOL	PARAMETER	CONDITIONS	NOTES	T_J = 25°C MIN	TYP	MAX	SUB-GROUP	−55°C T_{AJ} 125°C MIN	TYP	MAX	SUB-GROUP	UNITS
V_{OS}	Input Offset Voltage	V_S = ±15V, V_{CM} = 0V				4	1					mV
			3							7	2,3	mV
CMRR	Common Mode Rejection Ratio			90			1					dB
I_{OS}	Input Offset Current		3			75	1			100	2,3	nA
I_B	Input Bias Current					500	1			1000	2,3	nA
A_V	Voltage Gain			10			4					V/mV
t_R	Response Time		4		80	200	4			200	5,6	ns
V_{SAT}	Saturation Voltage	V_{IN} −5mV, I_O = 25mA				1.5	1					V
		V^+ 4.5V, V^- = 0V V_{IN} −6mV, I_{SINK} 3.2mA										
		T_A 0°C				0.4	1			0.4	2	V
		T_A 0°C								0.6	3	V
	Output Leakage Current	V_{IN} 5mV, V_{OUT} = 35V				2	1			10	2,3	µA
	Input Voltage Range	V_S = ±15V		−12		12	1	−12		12	2,3	V
		V^+ = 5V, V^- = 0V		1		3	1	1		3	2,3	V
	Differential Input Voltage					±5	1			±5	2.3	V
I_S	Supply Current	V^+ = 5V, V^- = 0V			4.3							mA
	Positive Supply Current	V_S = ±15V				11.5	1					mA
	Negative Supply Current	V_S = ±15V				4.5	1					mA

TABLE 1A: ELECTRICAL CHARACTERISTICS (Postirradiation) (Note 5)

SYMBOL	PARAMETER	CONDITIONS	NOTES	10Krad(Si) MIN	MAX	20Krad(Si) MIN	MAX	50Krad(Si) MIN	MAX	100Krad(Si) MIN	MAX	200Krad(Si) MIN	MAX	UNITS
V_{OS}	Offset Voltage				4		4		4		4		8	mV
I_{OS}	Input Offset Current		3		75		100		150		300		500	nA
I_B	Input Bias Current		3		500		750		1000		1500		2000	nA
A_{VOL}	Large-Signal Voltage Gain			10		10		10		10		5		V/mV
V_{SAT}	Saturation Voltage	V_{IN} −5mV, I_O = 25mA			1.5		1.5		1.5		1.5		1.5	V
		V^+ 4.5V, V^- = 0V V_{IN} −6mV, I_{SINK} 3.2mA			0.4		0.4		0.4		0.4		0.4	V
CMRR	Common Mode Rejection Ratio			90		90		90		90		90		dB
I_S	Positive Supply Current	V_S = ±15V			11.5		11.5		11.5		11.5		11.5	mA
	Negative Supply Current	V_S = ±15V			4.5		4.5		4.5		4.5		4.5	mA
	Output Leakage Current	V_{IN} 5mV, V_{OUT} 35V			2		2		2		2		2	µA

ELECTRICAL CHARACTERISTICS (Continued)

Note 1: For supply voltages less than ±15V, the maximum input voltage is equal to the supply voltage.

Note 2: Unless otherwise noted, supply voltage equals ±15V and T_A = 25°C. The GND pin is grounded. Note that the maximum voltage allowed between the GND pin and V^+ is 18V. Do not tie the GND pin to V^- when the power supply voltage exceeds ±9V. The offset voltage, offset current and bias current specifications apply for all supply voltages between ±15V and 5V unless otherwise specified.

Note 3: The offset voltages and currents given are the maximum values required to drive the output within 1V of either supply with a 1mA load—thus, these parameters define an error band and take into account the worst-case effects of voltage gain and input impedance.

Note 4: Response time specified for a 100mV input step with 5mV overdrive.

Note 5: V_S = ±15V, V_{CM} = 0V, T_A = 25°C unless otherwise noted.

TABLE 2: ELECTRICAL TEST REQUIREMENTS

MIL-STD-883 TEST REQUIREMENTS	SUBGROUP
Final Electrical Test Requirements (Method 5004)	1*,2,3,4
Group A Test Requirements (Method 5005)	1,2,3,4
Group C and D End Point Electrical Parameters (Method 5005)	1

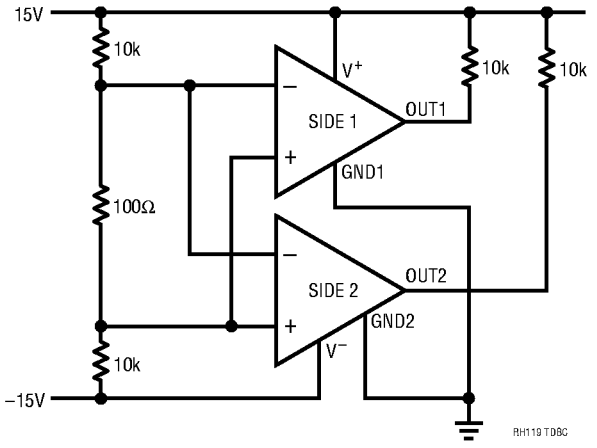
* PDA Applies to subgroup 1. See PDA Test Notes.

PDA Test Notes

The PDA is specified as 5% based on failures from group A, subgroup 1, tests after cooldown as the final electrical test in accordance with method 5004 of MIL-STD-883 Class B. The verified failures (including Delta parameters) of group A, subgroup 1, after burn-in divided by the total number of devices submitted for burn-in in that lot shall be used to determine the percent for the lot.

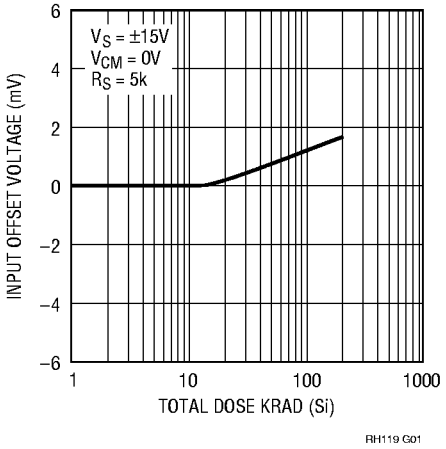
Linear Technology Corporation reserves the right to test to tighter limits than those given.

TOTAL DOSE BIAS CIRCUIT

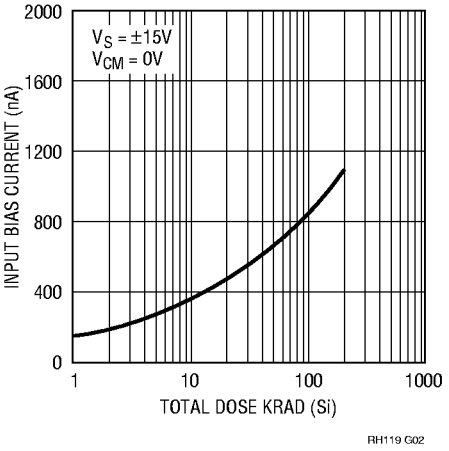


TYPICAL PERFORMANCE CHARACTERISTICS

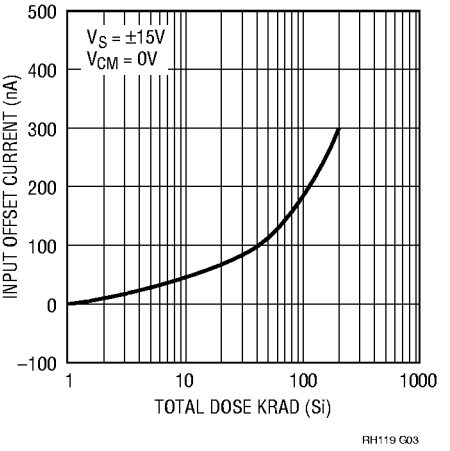
Input Offset Voltage



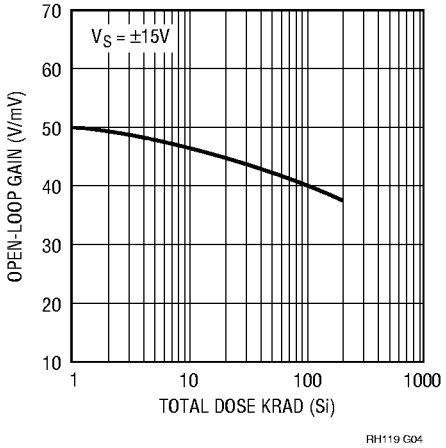
Input Bias Current



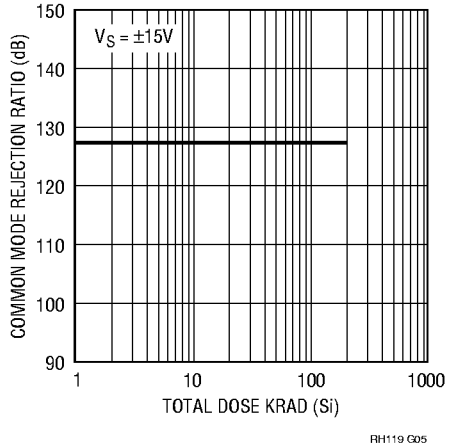
Input Offset Current



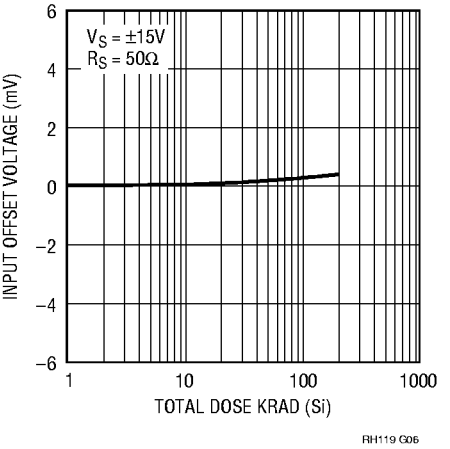
Open-Loop Gain



Common Mode Rejection Ratio



Input Offset Voltage



I.D. No. 66-10-0176 Rev. A 0896

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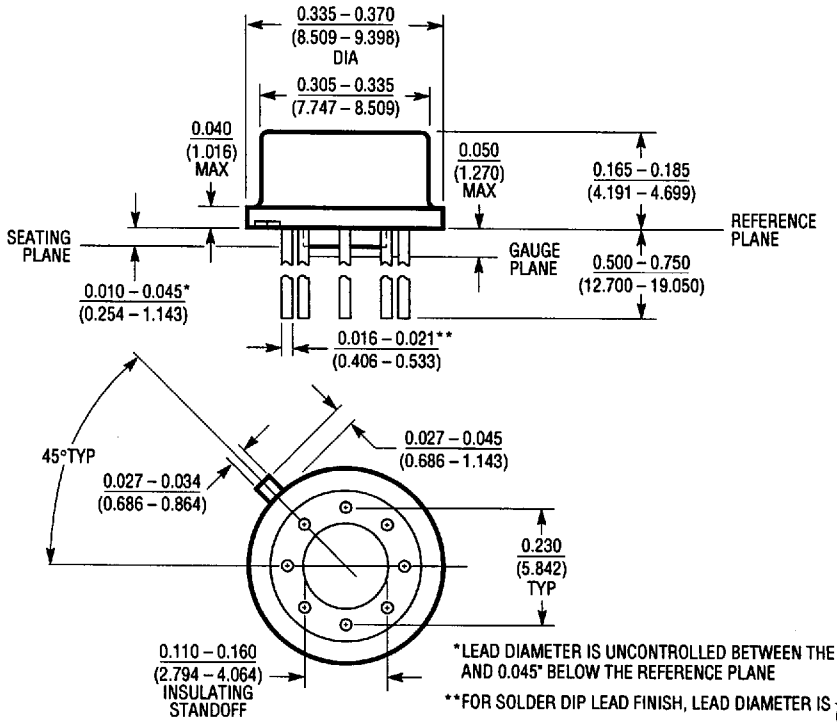
LT/HP 0896 REV A 500 • PRINTED IN USA

H Package
8-Lead TO-5 Metal Can (0.230 PCD)
(LTC DWG # 05-08-1321)

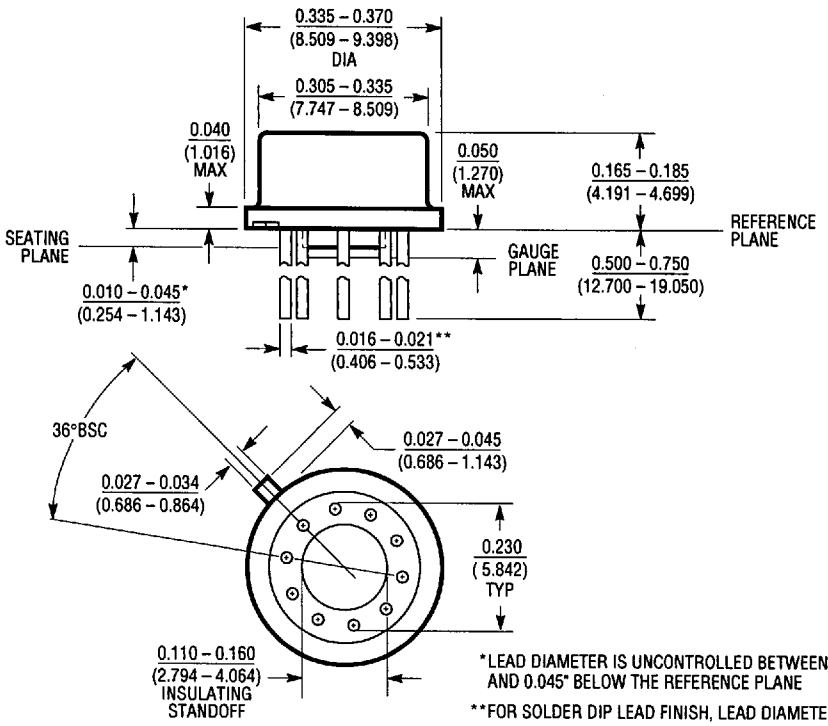


*LEAD DIAMETER IS UNCONTROLLED BETWEEN THE REFERENCE PLANE AND 0.045" BELOW THE REFERENCE PLANE

**FOR SOLDER DIP LEAD FINISH, LEAD DIAMETER IS $\frac{0.016 - 0.024}{(0.406 - 0.610)}$

H8 (TO-5) 0.230 PCD 0595

H Package
10-Lead TO-5 Metal Can
(LTC DWG # 05-08-1322)

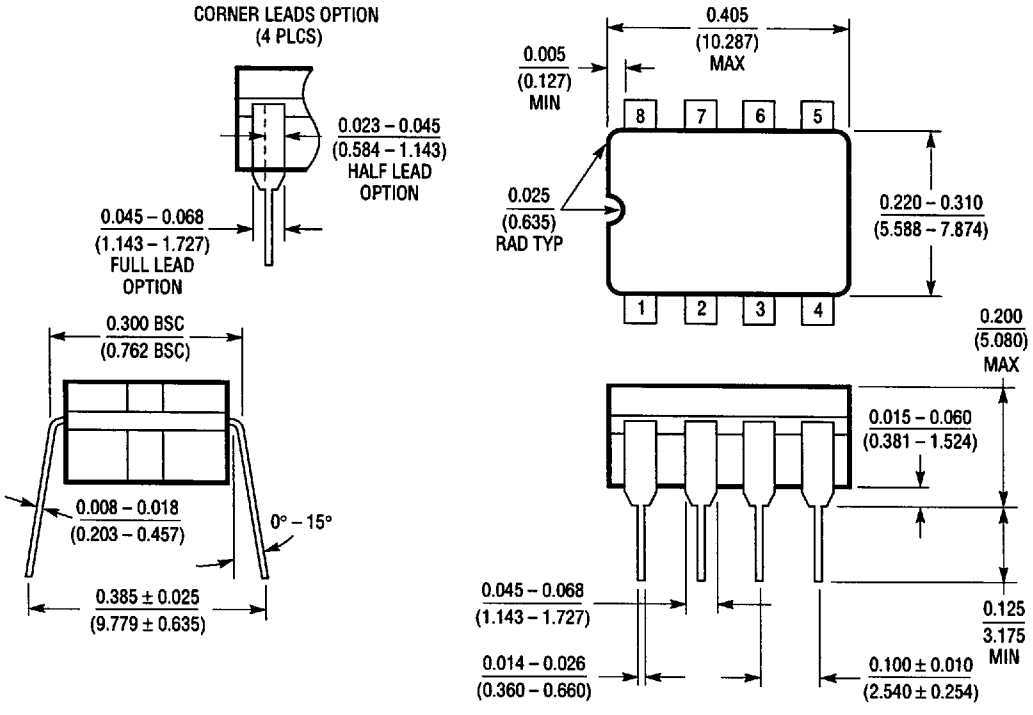


*LEAD DIAMETER IS UNCONTROLLED BETWEEN THE REFERENCE PLANE AND 0.045" BELOW THE REFERENCE PLANE

**FOR SOLDER DIP LEAD FINISH, LEAD DIAMETER IS $\frac{0.016 - 0.024}{(0.406 - 0.610)}$

H10(TO-5) 0595

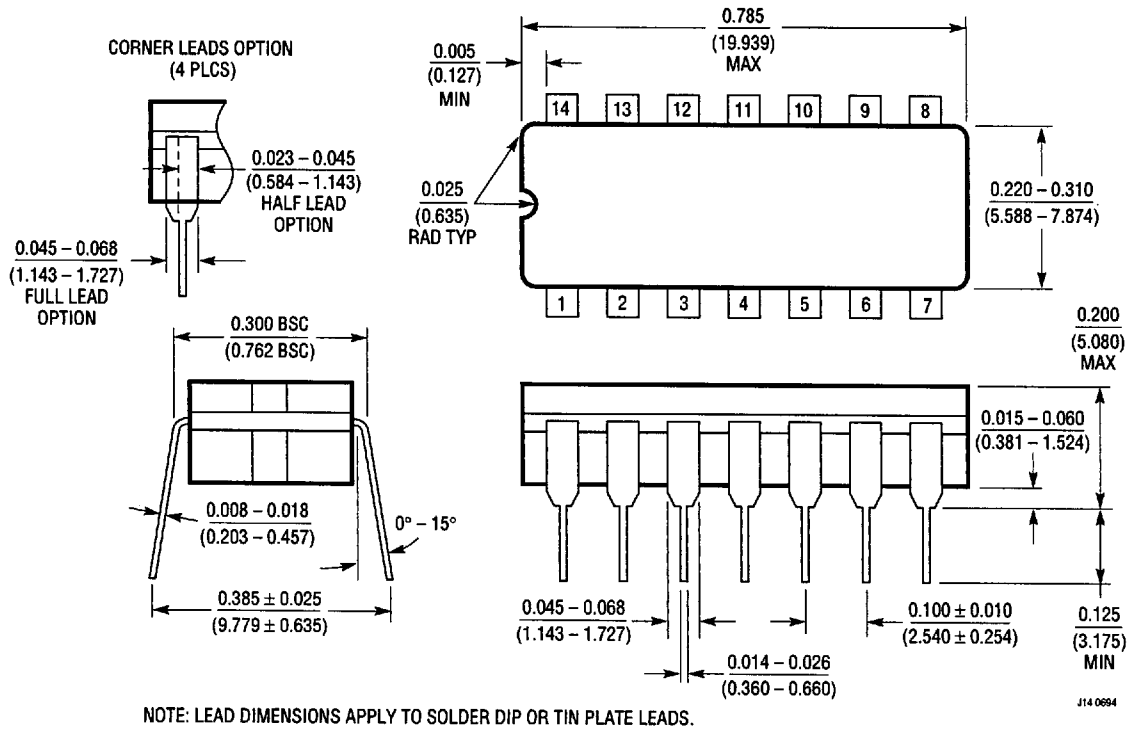
J8 Package
8-Lead CERDIP (Narrow 0.300, Hermetic)
(LTC DWG # 05-08-1110)



NOTE: LEAD DIMENSIONS APPLY TO SOLDER DIP/PLATE OR TIN PLATE LEADS.

J8 0694

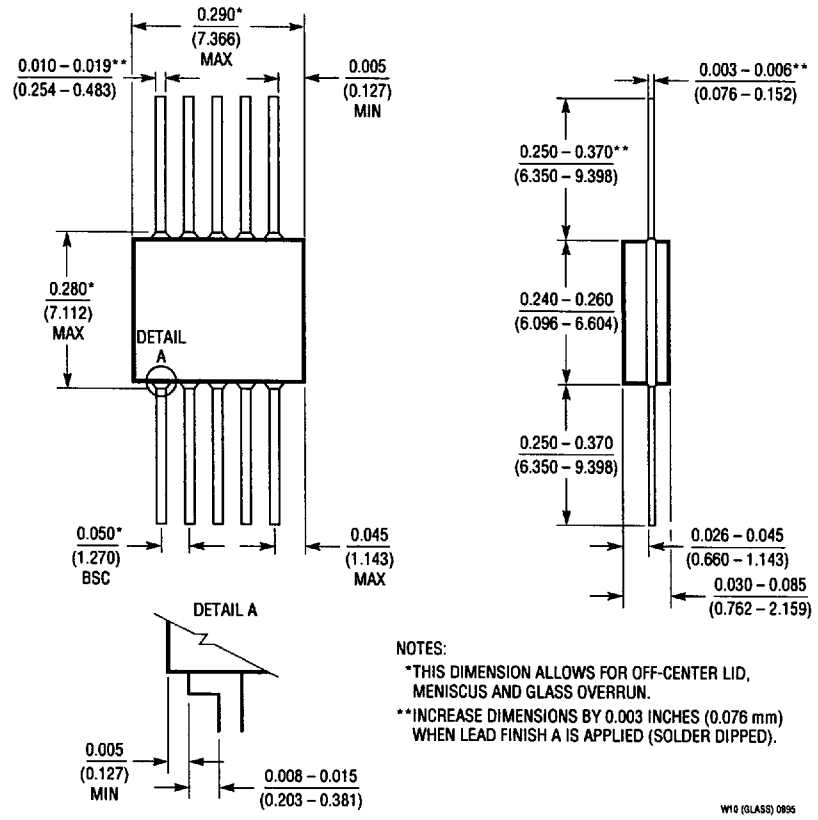
J Package
14-Lead CERDIP (Narrow 0.300, Hermetic)
(LTC DWG # 05-08-1110)



NOTE: LEAD DIMENSIONS APPLY TO SOLDER DIP OR TIN PLATE LEADS.

J14 0694

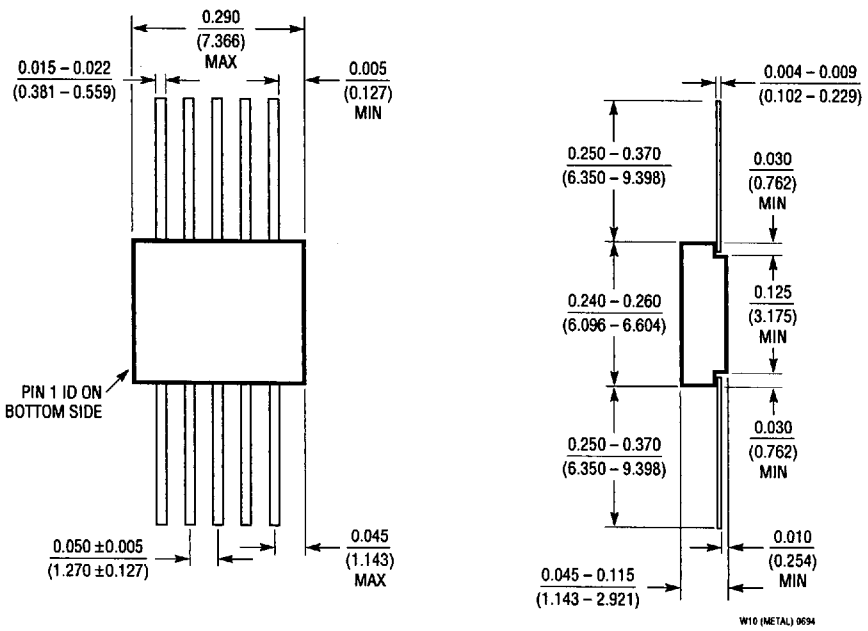
W Package
10-Lead Flatpak Glass Sealed (Hermetic)
(LTC DWG # 05-08-1130)



NOTES:
*THIS DIMENSION ALLOWS FOR OFF-CENTER LID, MENISCUS AND GLASS OVERRUN.
**INCREASE DIMENSIONS BY 0.003 INCHES (0.076 mm) WHEN LEAD FINISH A IS APPLIED (SOLDER DIPPED).

W10 (GLASS) 0695

WB Package
10-Lead Flatpak Metal Sealed Bottom Brazed (Hermetic)
(LTC DWG # 05-08-1230)



W10 (METAL) 0694