



JUNE 1996

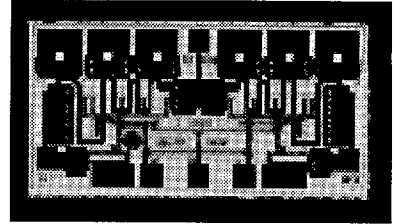
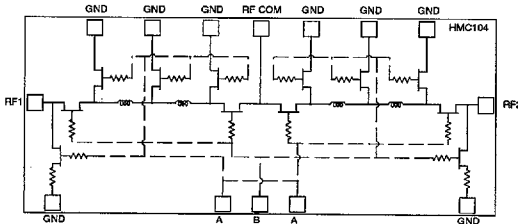
Features

- BANDWIDTH:** DC-6 GHz
- LOW INSERTION LOSS :** <1 dB
- HIGH ISOLATION:** > 40 dB

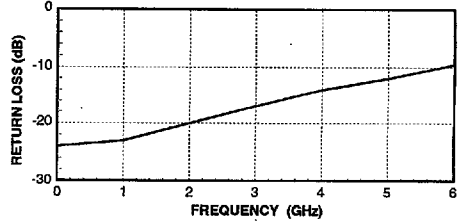
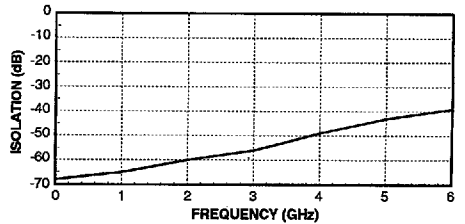
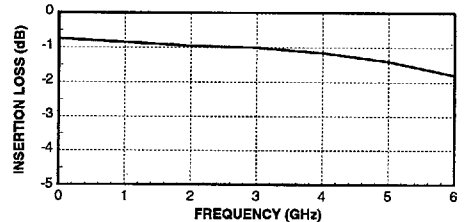
General Description

The HMC104 chip is a fast, broadband SPDT switch. It features RF and control port bondpads conveniently located for easy interface.

Schematic



Typical Performance



**Electrical Performance
with 0V/-5V Control**

PARAMETER	Freq.	Min.	Typ.	Max.	Units
Insertion Loss	DC - 3 GHz		1.0	1.3	dB
	DC - 6 GHz		1.9	2.2	dB
Isolation	DC - 3 GHz	40	45		dB
	DC - 6 GHz	35	38		dB
Return Loss	DC - 3 GHz	15	18		dB
	DC - 6 GHz	9	10		dB
Input Power for 1 dB Compression	0.5 - 6 GHz		+27		dBm
Input Third Order Intercept	0.5 - 6 GHz		+40		dBm
Switching Characteristics tRISE, tFALL (10/90% RF) tON, tOFF (50% CTL to 10/90% RF)	DC - 6 GHz		3		ns
			6		ns

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Handling Precautions

Follow these precautions to avoid permanent damage.

Cleanliness: Handle the chips in a clean environment. DO NOT attempt to clean the chip using liquid cleaning systems.

Static Sensitivity: Follow ESD precautions.

Transients: Suppress instrument and bias supply transients while bias is applied. Use shielded signal and bias cables to minimize inductive pick-up.

General Handling: Handle the chip along the edges with a vacuum collet or with a sharp pair of bent tweezers. The surface of the chip has fragile air bridges and should not be touched with vacuum collet, tweezers, or fingers.

Mounting

The chip is not back-metallized and can be die mounted with electrically/thermally conductive epoxy only. The mounting surface should be clean and flat.

Epoxy Die Attach:

Apply a minimum amount of epoxy to the mounting surface so that a thin epoxy fillet is observed around the perimeter of the chip once it is placed into position.

Cure epoxy per the manufacturer's schedule.

Wire Bonding

Ball or wedge bond with 1.0 diameter pure gold wire. Thermoionic wirebonding with a nominal stage temperature of 150 deg. C and a ball bonding force of 40 to 50 grams or wedge bonding force of 18 to 22 grams is recommended. Use the minimum level of ultrasonic energy to achieve reliable wirebonds.

Wirebonds should be started on the chip and terminated on the package. RF bonds should be as short as possible.

Absolute Maximum Ratings

Control Voltage Range	+0.5 to -8.5 Vdc
Storage Temperature	-65 to +150 deg C
Operating Temperature	-55 to +125 deg C

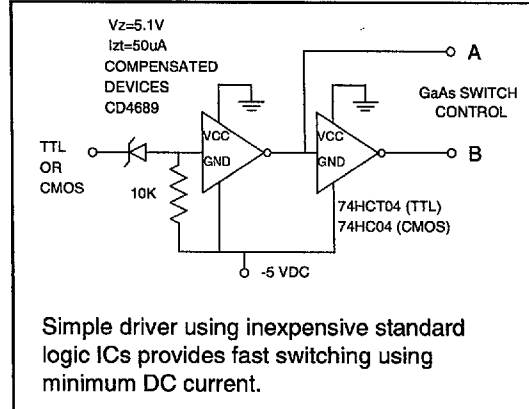
Control Voltages

State	Bias Condition
Low	0 to -0.2V @ 20uA Max
High	-5V @ 50uA Typ to -8V @ 300uA Max

Truth Table

Control Input		Signal Path State	
A	B	RF to RF1	RF to RF2
High	Low	ON	OFF
Low	High	OFF	ON

Suggested Driver Circuit



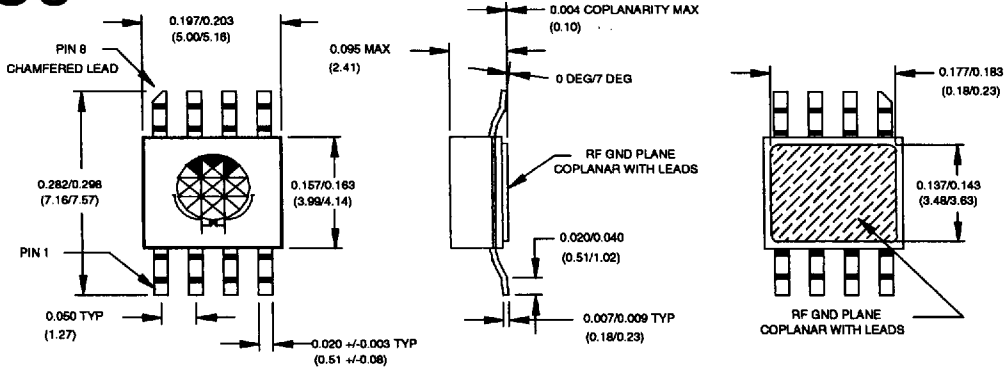
Dimensions

Die Size	0.034 x 0.067 x 0.005 in. 0.875 x 1.690 x 0.125 mm
Signal Bondpads	0.004 x 0.004 in. 0.100 x 0.100 mm
Gnd Bondpads	0.004 x 0.008 in. 0.100 x 0.200 mm



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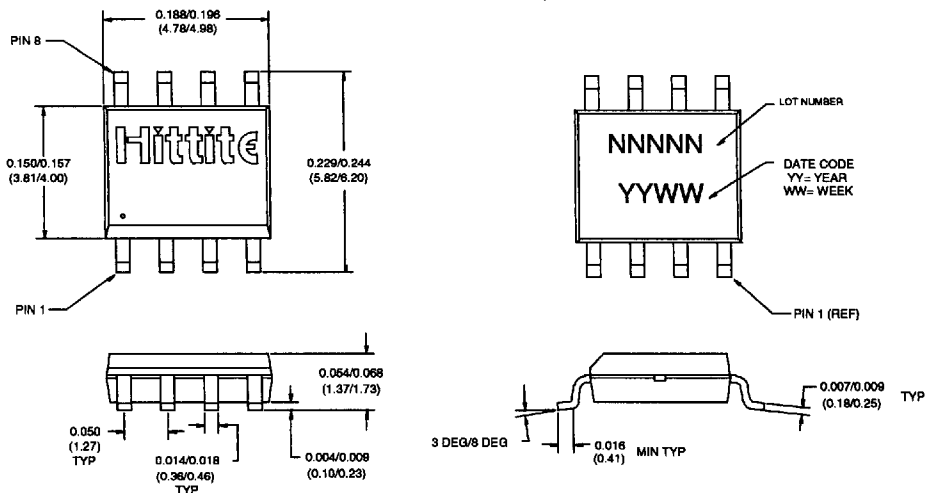
C8



NOTES: FOR 8 LEAD CERAMIC PACKAGE

- MATERIAL:
 - PACKAGE BODY & COVER: WHITE ALUMINA (92%)
 - LEADS & PACKAGE BOTTOM: COPPER
- PLATING: ELECTROLYTIC GOLD 100-200 MICRONS OVER ELECTROLYTIC NICKEL 100 TO 250 MICRONS OVER
- DIMENSIONS ARE IN INCHES (MILLIMETERS), UNLESS OTHERWISE SPECIFIED ALL TOLERANCES ARE ± 0.005 (± 0.13).
- THE PACKAGE BOTTOM, RF GROUND, MUST BE SOLDERED OR CONDUCTIVE EPOXYED TO THE PCB RF GROUND.
- NON-HERMETIC EPOXY SEALED COVER
- CONSULT FACTORY FOR PIN DESIGNATION OF AVAILABLE C8 PACKAGED PRODUCTS.

S8



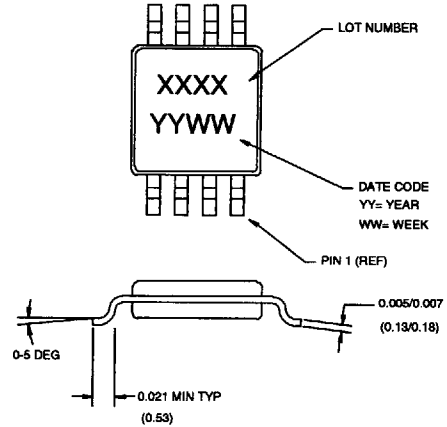
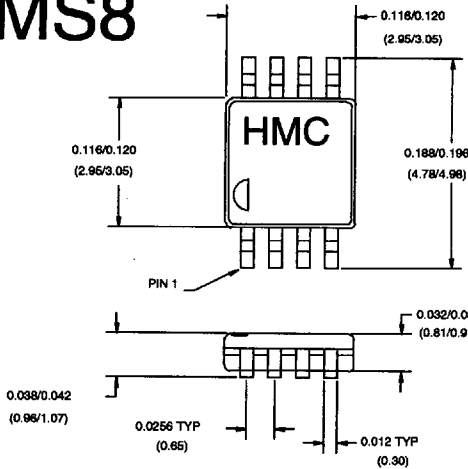
NOTES: FOR 8 LEAD SOIC PACKAGE

- MATERIAL:
 - PACKAGE BODY: LOW STRESS INJECTION-MOLDED PLASTIC, SILICA & SILICONE IMPREGNATED.
 - LEADFRAME MATERIAL: COPPER ALLOY
- PLATING: LEAD-TIN SOLDER PLATE
- DIMENSIONS ARE IN INCHES (MILLIMETERS), UNLESS OTHERWISE SPECIFIED TOLERANCES ARE ± 0.005 (± 0.13)
- CONSULT FACTORY FOR PIN DESIGNATION OF AVAILABLE S8 PACKAGED PRODUCTS.



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MS8



NOTES: FOR 8 LEAD MSOP

1. MATERIAL:

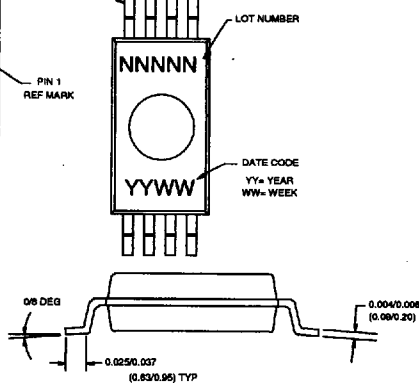
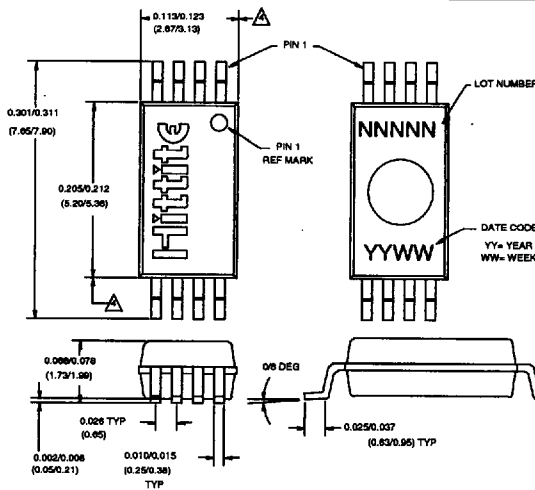
- A. PACKAGE BODY: LOW STRESS INJECTION-MOLDED PLASTIC, SILICA & SILICONE IMPREGNATED.
- B. LEADFRAME MATERIAL: COPPER ALLOY

2. PLATING: LEAD-TIN SOLDER PLATE

- 3. DIMENSIONS ARE IN INCHES (MILLIMETERS), UNLESS OTHERWISE SPECIFIED TOLERANCES ARE ± 0.005 (± 0.13)

- 4. CONSULT FACTORY FOR PIN DESIGNATION OF AVAILABLE MS8 PACKAGED PRODUCTS.

SS8



NOTES: FOR 8 LEAD SSOP

1. MATERIAL:

- A. PACKAGE BODY: LOW STRESS INJECTION-MOLDED PLASTIC, SILICA & SILICONE IMPREGNATED.
- B. LEADFRAME MATERIAL: COPPER ALLOY

2. PLATING: LEAD-TIN SOLDER PLATE

- 3. DIMENSIONS ARE IN INCHES (MILLIMETERS), UNLESS OTHERWISE SPECIFIED TOLERANCES ARE ± 0.005 (± 0.13)

▲ THESE ARE REFERENCE DIMENSIONS AND DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS, BUT DO INCLUDE MOLD MISMATCH AT THE PARTING LINE. MOLD FLASH OR PROTRUSIONS SHALL NOT EXCEED 0.008 (0.13) PER SIDE.

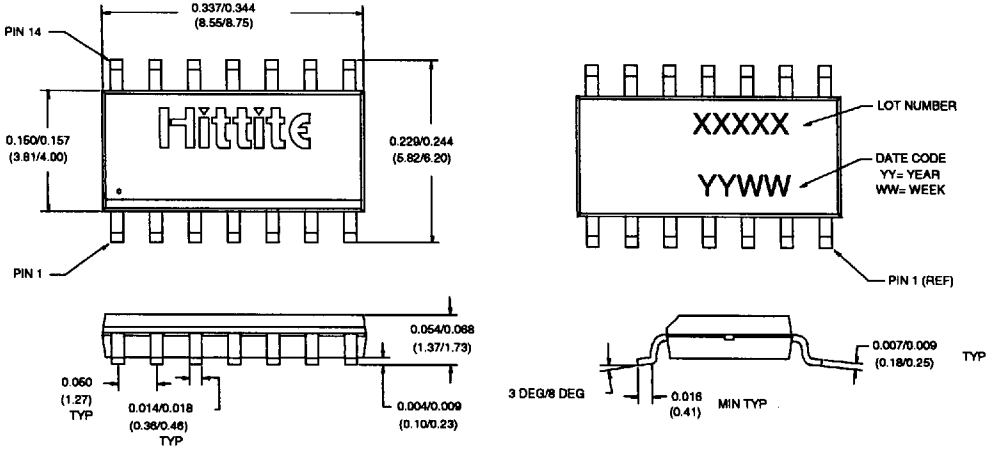
- 5. COPLANARITY: LEADS SHALL BE PLANAR WITH RESPECT TO ONE ANOTHER WITHIN 0.003 (0.08) AT SEATING PLANE.

- 6. CONSULT FACTORY FOR PIN DESIGNATION OF AVAILABLE SS8 PACKAGED PRODUCTS.



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S14



NOTES: FOR 14 LEAD SOIC PACKAGE

1. MATERIAL:

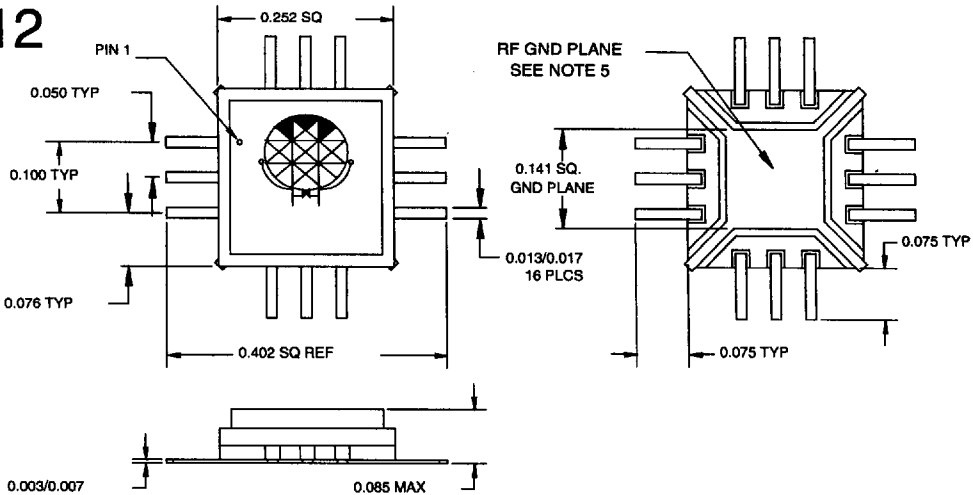
- A. PACKAGE BODY: LOW STRESS INJECTION-MOLDED PLASTIC, SILICA & SILICONE IMPREGNATED.
- B. LEADFRAME MATERIAL: COPPER ALLOY

2. PLATING: LEAD-TIN SOLDER PLATE

3. DIMENSIONS ARE IN INCHES (MILLIMETERS); UNLESS OTHERWISE SPECIFIED TOLERANCES ARE ± 0.005 (± 0.13)

4. CONSULT FACTORY FOR PIN DESIGNATION OF AVAILABLE S14 PACKAGED PRODUCTS.

C12



NOTES: FOR 12 LEAD CERAMIC PACKAGE

1. MATERIAL:

- A. PACKAGE BODY & COVER: WHITE ALUMINA (99%)
- B. LEADS: Kovar (or) ASTM F15 (ALLOY 42) EQUIVALENT
- 2. PLATING (LEADS): ELECTROLYTIC GOLD 25 MICRO-INCHES MINIMUM OVER ELECTROLYTIC NICKEL 100 TO 250 MICRO-INCHES
- 3. DIMENSIONS ARE IN INCHES. UNLESS OTHERWISE SPECIFIED ALL TOLERANCES ARE ± 0.005 .

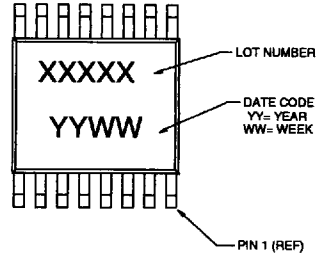
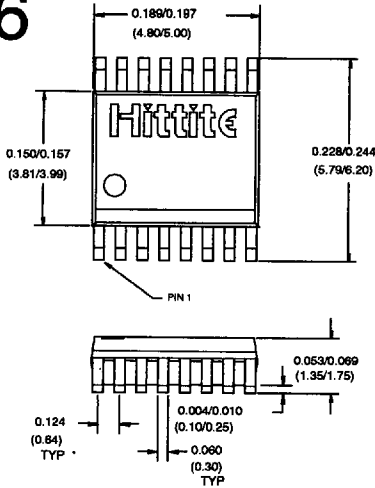
4. NON-HERMETIC EPOXY SEALED COVER.

- 5. THE PACKAGE BOTTOM, RF GROUND, MUST BE SOLDERED OR CONDUCTIVE EPOXIED TO THE RF PCB GROUND
- 6. CONSULT FACTORY FOR PIN DESIGNATION OF AVAILABLE C12 PACKAGED PRODUCTS.



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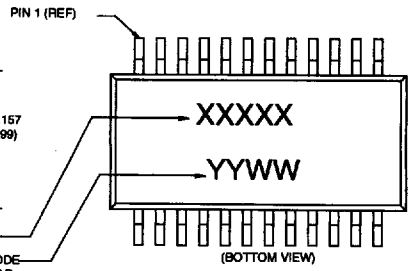
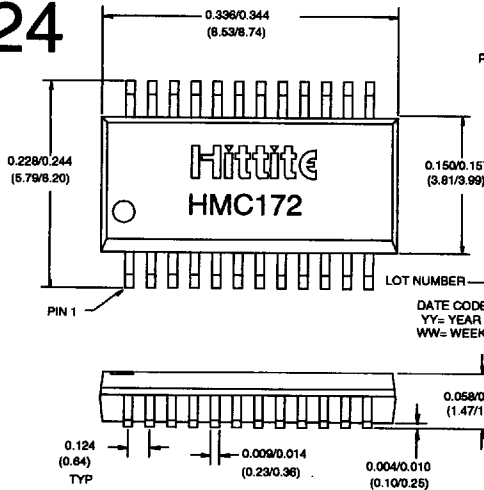
QS16



NOTES: FOR 16 LEAD QSOP PACKAGE

- MATERIAL:
 - PACKAGE BODY: LOW STRESS INJECTION-MOLDED PLASTIC, SILICA & SILICONE IMPREGNATED.
 - LEADFRAME MATERIAL: COPPER ALLOY
- PLATING: LEAD-TIN SOLDER PLATE
- DIMENSIONS ARE IN INCHES (MILLIMETERS), UNLESS OTHERWISE SPECIFIED TOLERANCES ARE ± 0.005 (± 0.13)
- CONSULT FACTORY FOR PIN DESIGNATION OF AVAILABLE QS16 PACKAGED PRODUCTS.

QS24



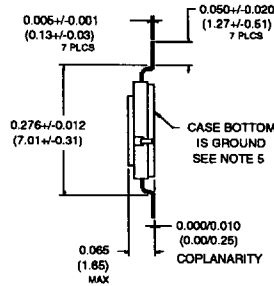
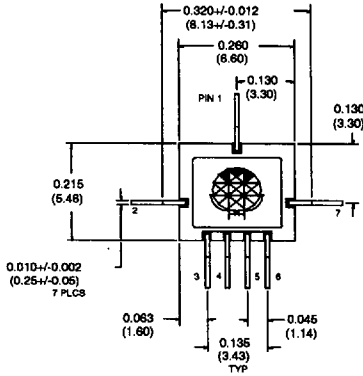
NOTES: FOR 24 LEAD QSOP PACKAGE

- MATERIAL:
 - PACKAGE BODY: LOW STRESS INJECTION-MOLDED PLASTIC, SILICA & SILICONE IMPREGNATED.
 - LEADFRAME MATERIAL: COPPER ALLOY
- PLATING: LEAD-TIN SOLDER PLATE
- DIMENSIONS ARE IN INCHES (MILLIMETERS), UNLESS OTHERWISE SPECIFIED TOLERANCES ARE ± 0.005 (± 0.13)
- CONSULT FACTORY FOR PIN DESIGNATION OF AVAILABLE QS24 PACKAGED PRODUCTS.



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G7



NOTES: FOR 7 LEAD CERAMIC PACKAGE

1. MATERIAL:

1.1 G7 PACKAGE:

- A. PACKAGE BODY - WHITE ALUMINA (92%)
- B. LEADS, BASE, & COVER - ASTM F-15 ALLOY
- C. CONDUCTOR TRACES - TUNGSTEN

2. PLATING: ELECTROLYTIC GOLD 50 MICROINCHES MINIMUM, OVER ELECTROLYTIC NICKEL 50 MICROINCHES MINIMUM.

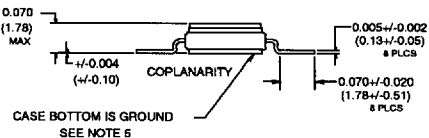
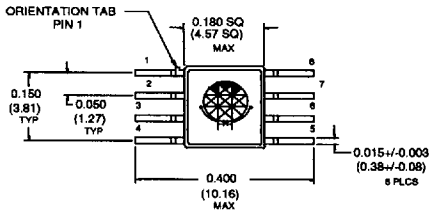
3. DIMENSIONS ARE IN INCHES (MILLIMETERS), UNLESS OTHERWISE SPECIFIED TOLERANCES ARE +/- 0.005 (+/- 0.13)

4. G8 PACKAGE IS AVAILABLE WITH STRAIGHT LEADS, SPECIFY 'P7'.

5. THE PACKAGE BOTTOM, RF GROUND, MUST BE SOLDERED OR CONDUCTIVE EPOXIED TO THE PCB RF GROUND.

6. CONSULT FACTORY FOR PIN DESIGNATION OF AVAILABLE G7 PACKAGED PRODUCTS.

G8



NOTES: FOR 8 LEAD GLASS/METAL PACKAGE

1. MATERIAL:

1.1 G8 PACKAGE:

- A. PACKAGE BODY - ALUMINA LOADED BOROSILICATE GLASS (#7052 CORNING)
- B. LEADS, BASE, & COVER - ASTM F-16 ALLOY

2. PLATING: ELECTROLYTIC GOLD 50 MICROINCHES MINIMUM, OVER ELECTROLYTIC NICKEL 50 MICROINCHES MINIMUM.

3. DIMENSIONS ARE IN INCHES (MILLIMETERS), UNLESS OTHERWISE SPECIFIED TOLERANCES ARE +/- 0.005 (+/- 0.13)

4. G8 PACKAGE IS AVAILABLE WITH STRAIGHT LEADS, SPECIFY 'P8'.

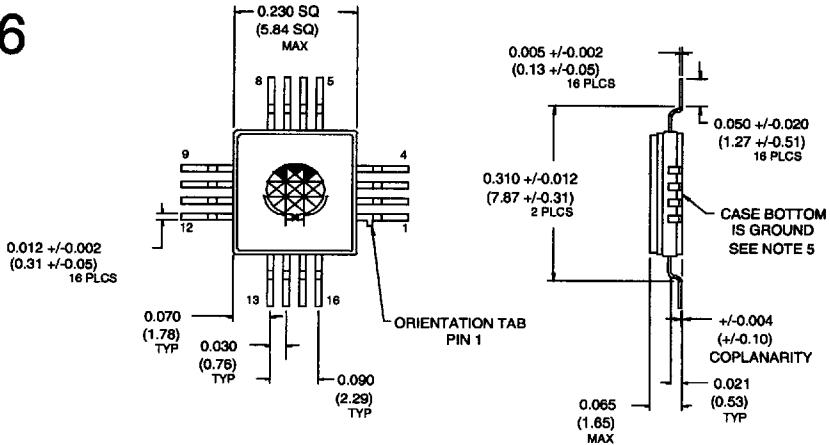
5. THE PACKAGE BOTTOM, RF GROUND, MUST BE SOLDERED OR CONDUCTIVE EPOXIED TO THE PCB RF GROUND.

6. CONSULT FACTORY FOR PIN DESIGNATION OF AVAILABLE G8 PACKAGED PRODUCTS.



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G16



NOTES: FOR 16 LEAD GLASS METAL PACKAGE

1. MATERIAL:
 - 1.1 G16 PACKAGE:
 - A. PACKAGE BODY: ALUMINA LOADED BOROSILICATE GLASS (#7052 CORNING)
 - B. LEADS, BASE, & COVER - ASTM F-15 ALLOY
 2. PLATING: ELECTROLYTIC GOLD 50 MICROINCHES MINIMUM, OVER ELECTROLYTIC NICKEL 50 MICROINCHES MINIMUM.
 3. DIMENSIONS ARE IN INCHES (MILLIMETERS), UNLESS OTHERWISE SPECIFIED TOLERANCES ARE +/- 0.005 (+/- 0.13)
 4. G8 PACKAGE IS AVAILABLE WITH STRAIGHT LEADS, SPECIFY "P16".
 5. THE PACKAGE BOTTOM, RF GROUND, MUST BE SOLDERED OR CONDUCTIVE EPOXIED TO THE PCB RF GROUND.
 6. CONSULT FACTORY FOR PIN DESIGNATION OF AVAILABLE G16 PACKAGED PRODUCTS.