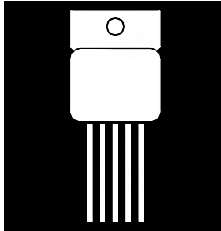


1 M Rad (Si), ULTRA LOW DROPOUT POSITIVE LINEAR REGULATOR



**+3.3V_{in} to +2.5V Output at 3.0A
In Hermetic Packages**

FEATURES

- Total dose and low dose capability to 1M Rad (Si) allows use in space applications
- Ultra low dropout voltage of 0.4V @ 3A out significantly reduces power consumption
- Low noise, higher efficiency
- Remote Shutdown permits power sequencing to be easily implemented
- Hermetic MO-078AA (TO-258) and 8-lead flat pack ensure higher reliability
- K-level screened

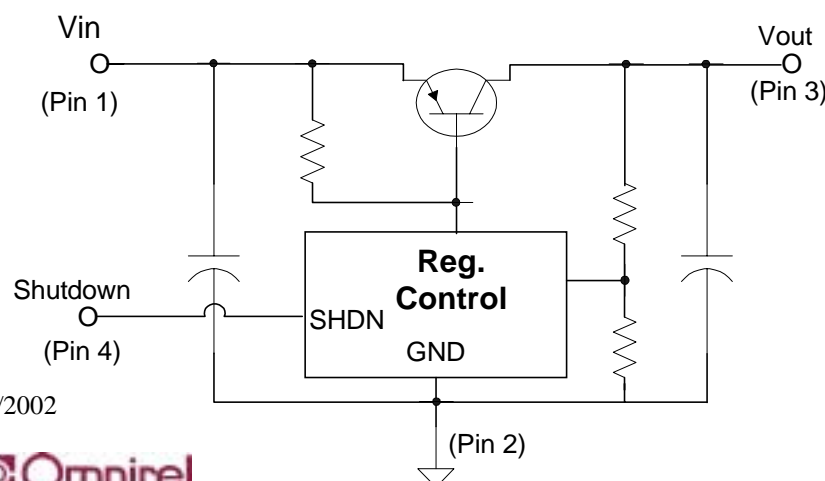
DESCRIPTION

The OMR9601 is a radiation hardened, ultra low dropout linear regulator designed specifically for space applications. This product has been characterized to a total ionizing dose of 1M Rad (Si) per MIL-STD-883, Method 1019, Condition A at both high and low dose rates under biased and unbiased conditions to account for ELDRE effects in bipolar devices. The ultra low dropout voltage of 0.4V @ 3A makes the part particularly useful for applications requiring low noise and higher efficiency.

MAXIMUM RATINGS ($T_j=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Output Current	I_o	3.5	A
Input Voltage	V_{in}	+7.0	V
Lead Temperature	T_l	300	$^{\circ}\text{C}$
Power Dissipation, $T_c=25^{\circ}\text{C}$	P_{TOT}	19	W
Thermal Resistance, Junction to Case – MO-078AA	R_{thJC}	6.5	$^{\circ}\text{C}/\text{W}$
Thermal Resistance, Junction to Case – 8 Lead Flat Pack	R_{thJC}	6.5	$^{\circ}\text{C}/\text{W}$
Operating Temperature	T_j	-55...+125	$^{\circ}\text{C}$
Storage Temperature Range	T_s	-65...+150	$^{\circ}\text{C}$

Block Diagram



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ELECTRICAL CHARACTERISTICS (Ta=25°C unless otherwise specified)

Parameter	Conditions	Symbol	Min.	Typ	Max	Unit
Output Voltage	Vin= 3.3V, Io= 3.0A	Vout	2.475	2.5	2.525	V
Input Voltage Range-Operating	Io= 3.0A		2.9		6.5	V
Line Regulation	3.13 ≤ Vin ≤ 3.46, Io= 3.0A 2.9 ≤ Vin ≤ 3.8, Io= 50mA	Vline	-100 -5		+100 +5	mV mV
Load Regulation	Vin= 3.3V 10ma ≤ Iout ≤ 3.0A	Vload	-20		+20	mV
Dropout Voltage	Io= 3.0A. Vout= 2.5V	Vdrop			0.4	V
Current Limit	Vin= 3.3V Short Circuit	Isc	3.0			A
Ripple Rejection	F= 120 Hz., Vout= Vref		65			dB
Shutdown source current	Vshdn= 5V	Ishdn		200		uA
Shutdown Pin Threshold	Isource= 200uA	Vshdn	1.0		1.6	V
Output Voltage at Shutdown	Vin= 3.3V, Io= 50mA, Shdn= +5.0V	Vout (shdn)	-0.1		+0.1	V

ELECTRICAL CHARACTERISTICS (Ta= -55 to +125°C)

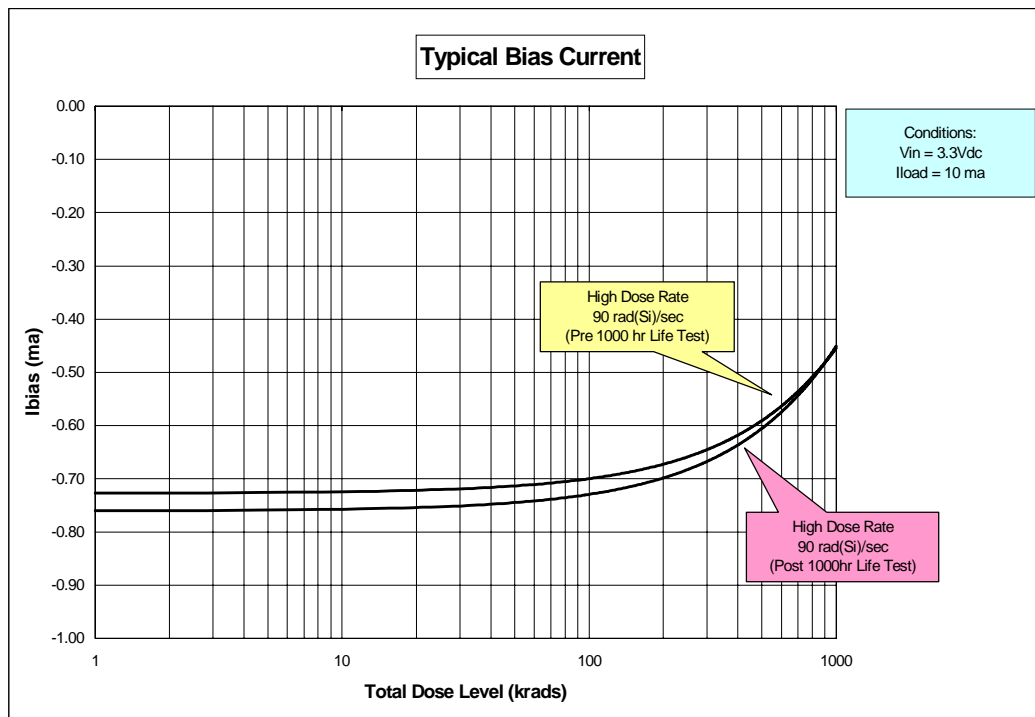
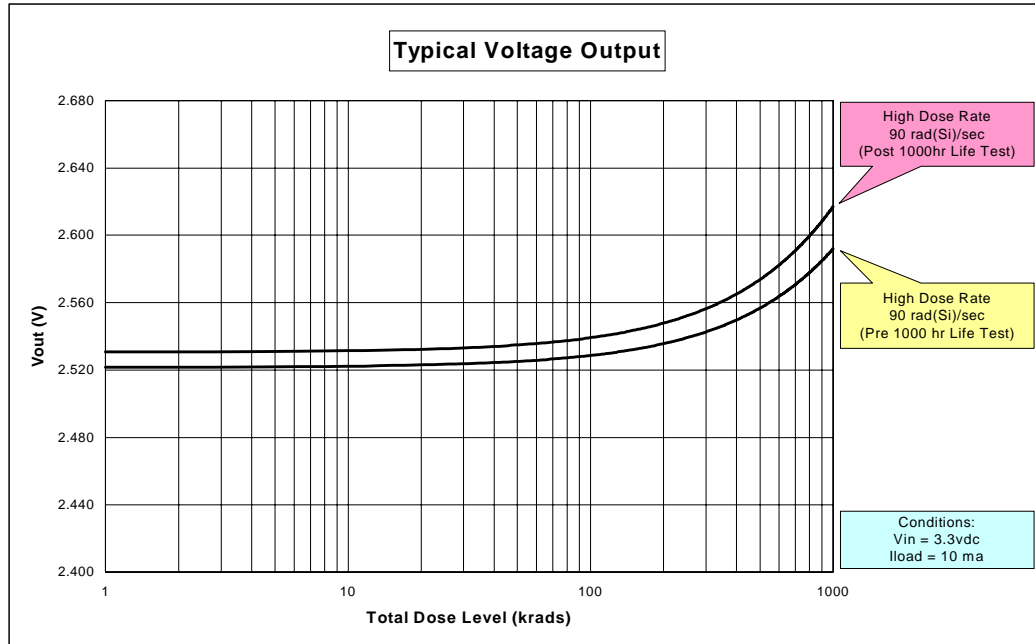
Parameter	Conditions	Symbol	Min.	Typ.	Max	Unit
Output Voltage	Vin= 3.3V, Io= 3.0A	Vout	2.375	2.5	2.625	V
Input Voltage Range-Operating	Io= 3.0A		2.9		6.5	V
Line Regulation	3.13 ≤ Vin ≤ 3.46, Io= 3.0A 2.9 ≤ Vin ≤ 3.8, Io= 50mA	Vline	-150 -150		+150 +150	mV mV
Load Regulation	Vin= 3.3V 10ma ≤ Iout ≤ 3.0A	Vload	-150		+150	mV
Dropout Voltage	Io= 3.0A. Vout= 2.5V	Vdrop			0.4	V
Current Limit	Vin= 3.3V Short Circuit	Isc	3.0			A
Ripple Rejection	F= 120 Hz., Vout= Vref		65			B
Shutdown source current	Vshdn= 5V	Ishdn		200		uA
Shutdown Pin Threshold	Isource= 200uA	Vshdn	1.0		1.6	V
Output Voltage at Shutdown	Vin= 3.3V, Io= 50mA, Shdn= +5.0V	Vout (shdn)	-0.1		+0.1	V

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Post Radiation Characteristics

High Dose Rate Characteristics (90 Rads(Si)/Sec)

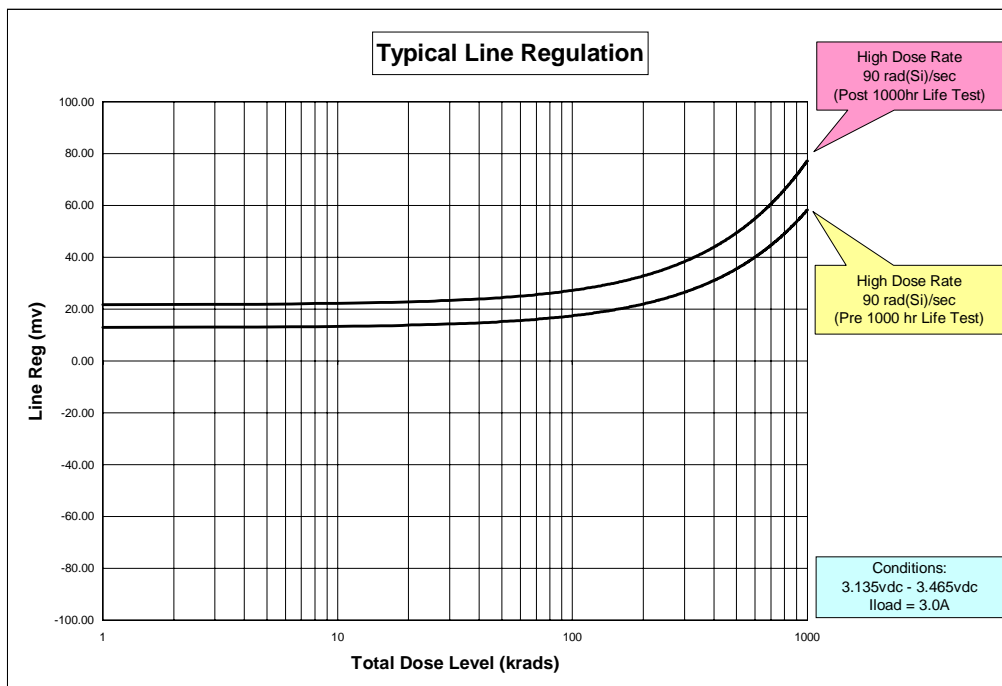
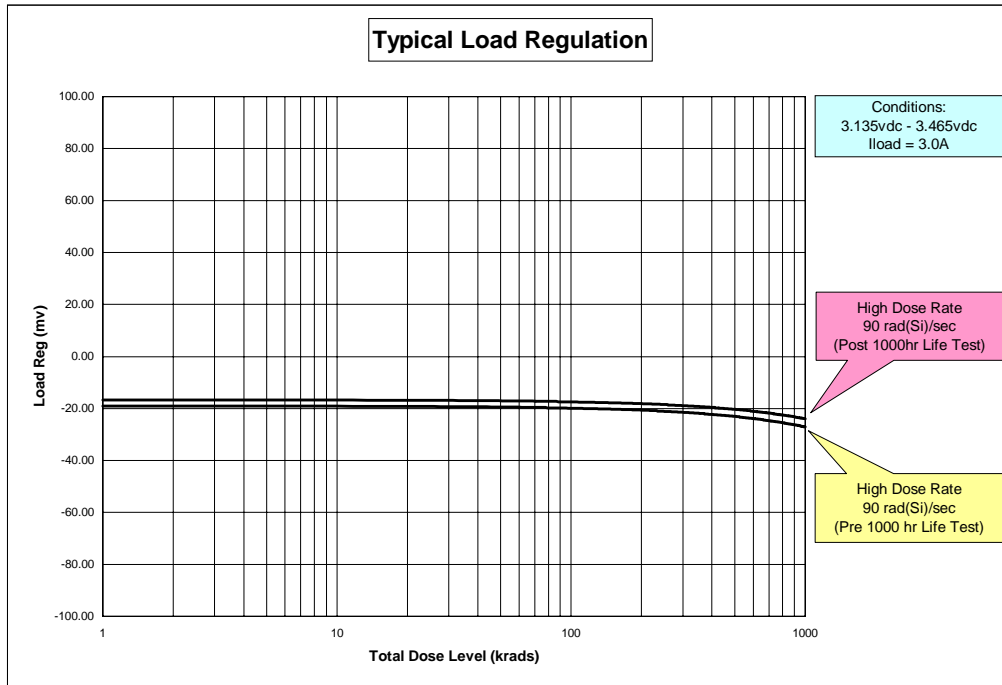


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Post Radiation Characteristics

High Dose Rate Characteristics (90 Rads (Si)/Sec)

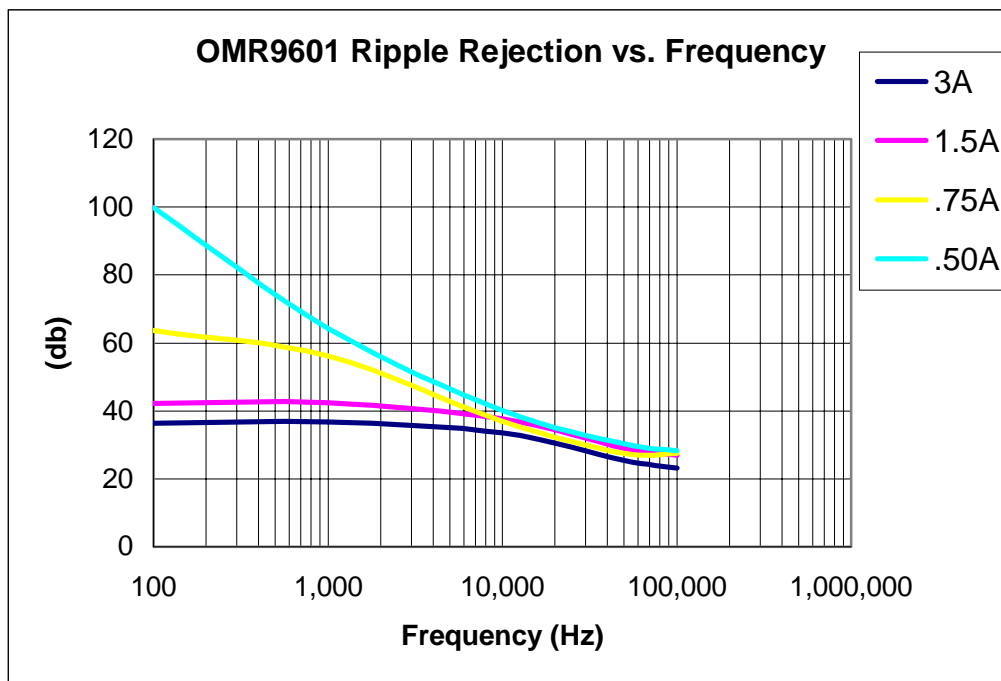
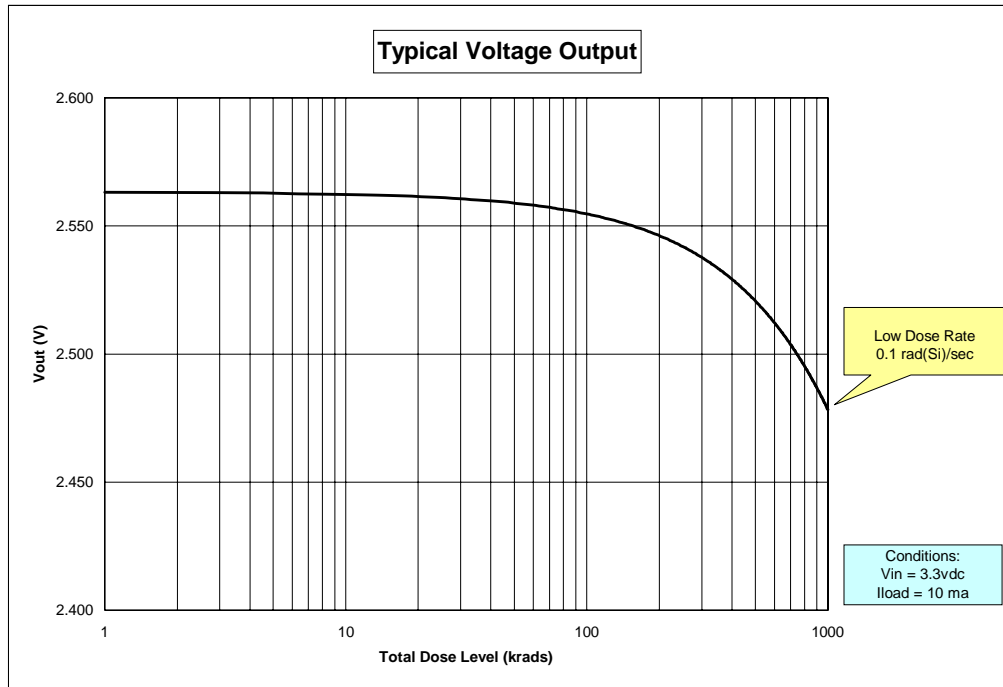


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Post Radiation Characteristics

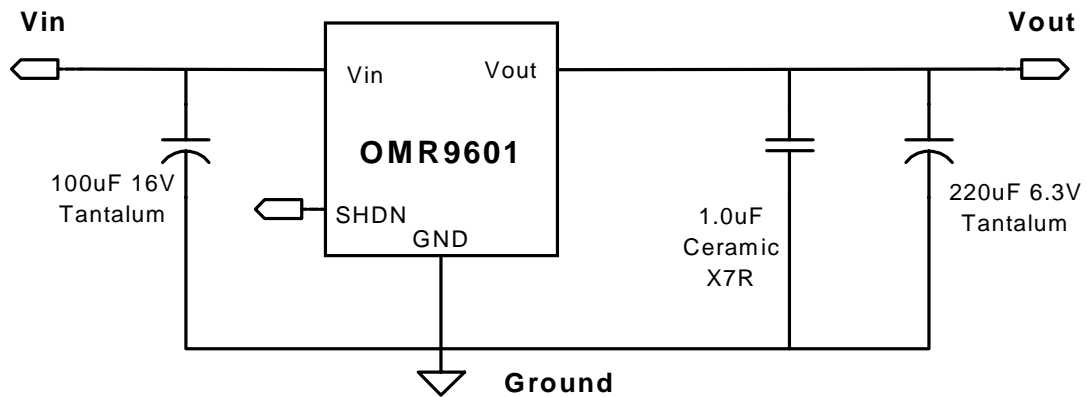
Low Dose Rate Characteristics (0.1 Rads (Si)/Sec)



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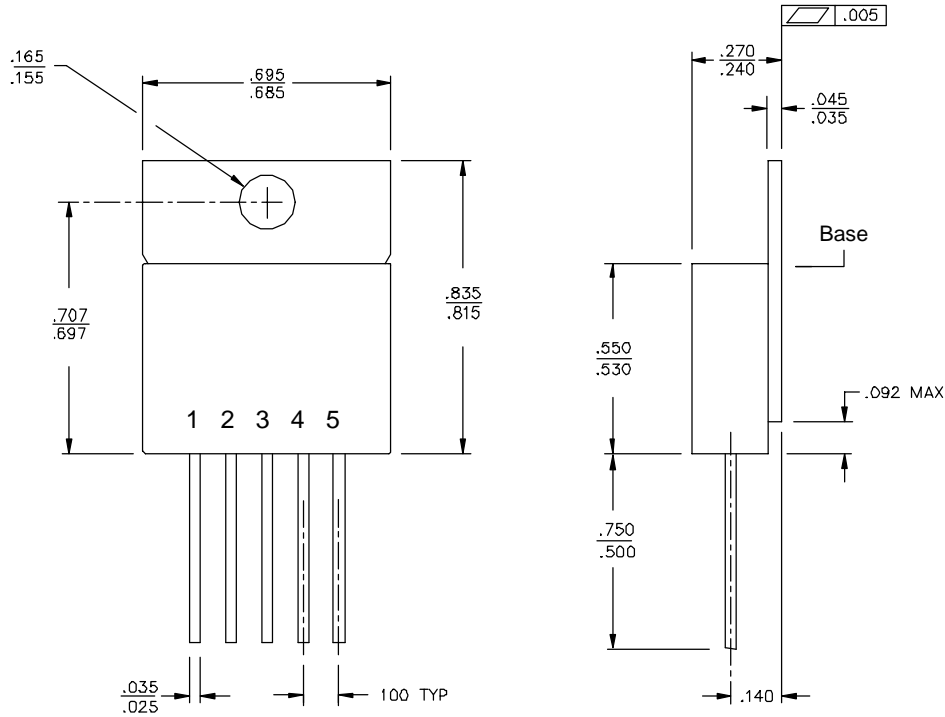
Application Schematic



In order to maintain regulation and stability specified additional input and output bulk capacitors are recommended. Capacitors recommended above should be low ESR tantalums with tolerances of $\pm 20\%$ max. Internal to the product are a 4.7uF input capacitor and a 4.7uF output capacitor in parallel with a 0.33uF ceramic capacitor.

Shutdown: The regulator can be shutdown by applying a voltage $> 1.6V$ to pin 4. The regulator will restart when the SHDN pin is pulled below the shutdown threshold of 1.0V. If remote shutdown is not required, pin 4 should be connected to GND to insure a safe "off" state.

Mechanical Outline MO-78AA



Base: GLIDCOP
 Pins: Copper core, Alloy 52
 Seals: Glass

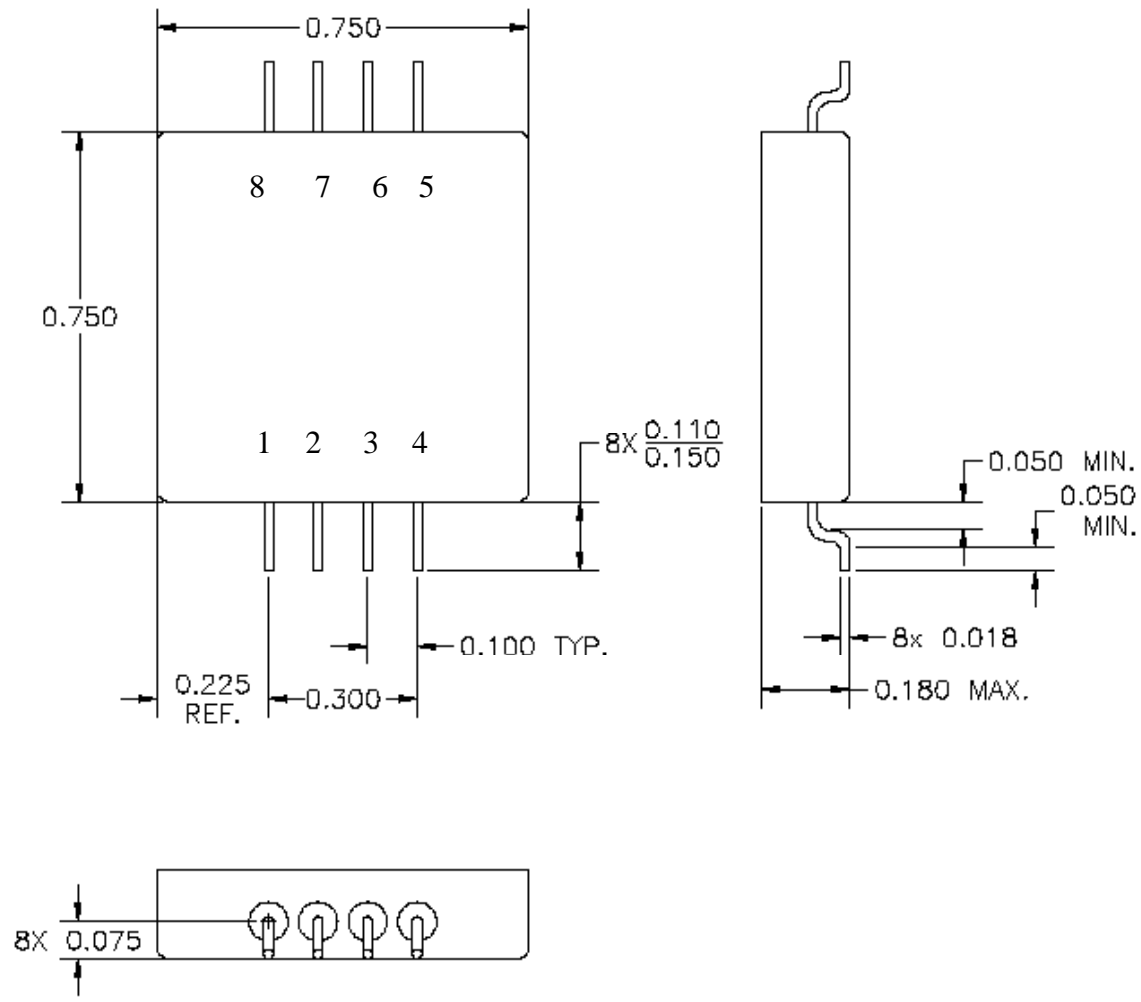
Pin Connections

Terminal	Description
1	Vin
2	GND
3	Vout
4	Shutdown
5	No Connection

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Mechanical Outline 8 Lead Flat Pack



Base: 1010-1018 C.R.S.

Pins: #52 Alloy, Copper Cored

Seals: Glass – 9013 or Equiv.

Finish: 100-250 Microinches Electroless Nickel Over 50-250 Microinches Electrolytic Nickel.

Pin Connections

Terminal	Description
1, 2	GND
3	Shutdown
4	No Connection
5,6	Vout
7,8	Vin

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Omnirel Part Number	Package Description	Screening
OMR9601SCP	MO-078AA 5 - Lead	100% Final Electrical
OMR9601SCH	MO-078AA 5 - Lead	Class H per MIL-PRF-38534
OMR9601SCK	MO-078AA 5 - Lead	Class K per MIL-PRF-38534
OMR9601SFP	8 -Lead Flat Pack	100% Final Electrical
OMR9601SFH	8 -Lead Flat Pack	Class H per MIL-PRF-38534
OMR9601SFK	8 -Lead Flat Pack	Class K per MIL-PRF-38534

Also available in non-rad hard versions

OM**R****9601****X****X****X**

Omnirel

Radiation
Hardened/Tolerant

Device

S=Isolated
N=Non-Isolated

Package

Screening

MIL-PRF-38534 Screening Requirements

TEST/INSPECTION	SCREENING LEVEL		MIL-STD-883
	Class H	Class K (Space Level)	Method
Pre Seal Burn-In	Optional	Optional	1030
Nondestructive Bond Pull	N/A	100%	2023
Internal Visual	100%	100%	2017
Temperature Cycle	100%	100%	1010
Constant Acceleration	100%	100%	2001
Mechanical Shock	100%	100%	2002
PIND	N/A	100%	2020
Pre Burn-In Electrical	Optional	100%	
Burn-In	100%	100%	1015
Final Electrical	100%	100%	
Seal	100%	100%	1014
Radiographic	N/A	100%	2012
External Visual	100%	100%	2009

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