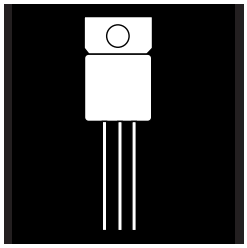
RADIATION HARDENED POWER MOSFETS IN HERMETIC ISOLATED PACKAGE P-CHANNEL



100V, 10 Amp, P-Channel, Radiation Hardened Power MOSFET In A Hermetic Metal Package

FEATURES

- Rated As Radiation Hard
- Avalanche Energy Rated
- Isolated Hermetic Package
- Low $R_{DS(on)}$
- High Switching Speeds
- Screened to TX, TXV And S Levels

DESCRIPTION

This P-Channel Power MOSFET product is in a hermetic package and features the latest radiation hard power semiconductor. This semiconductor die is processed to achieve hardened characteristics. Total dose hardness is available at 100K and 1000K rads with neutron hardness at 1E14 N/CM^2. Dose rate hardness, without current limiting, is to rates of 1E9 rads/sec, and with current limiting 2E12 rads/sec. The heavy ion survival rate, from a single event drain burn out, is a linear energy transfer (LET) of 35 at 80 Volts.

ABSOLUTE MAXIMUM RATINGS T_C = 25°C

Drain Source Voltage, V_{DS} . . . . . - 100 V
Drain Gate Voltage (R_{GS} = 20KW), V_{DGR} . . . . . - 100 V
Continuous Drain Current, I_D . . . . . - 10.2 A
Continuous Drain Current, I_D @ 100°C . . . . . - 6.4 A
Pulsed Drain Current, I_{DM} . . . . . - 41 A
Max. Power Dissipation, P_D . . . . . 70 W
Max. Power Dissipation, P_D @ 100°C . . . . . 32 W
Linear Derating Factor . . . . . .51 W/°C
Operating Temperature, T_J . . . . . -55°C TO +150°C
Storage Temperature, T_{stg} . . . . . -55°C TO +175°C
Lead Temperature - 1/16” from case for 10 sec . . . . . 300°C

3.1

RAD HARDNESS RATING T_C = 25°C

		POST RADIATION - RADS		
CHARACTERISTIC	**INITIAL**	**10K**	**100K**	**1MEG**
BV_{DSS}	100V	100V	100V	95V
$R_{DS(on)}$	.60W	.60W	.60W	.86W
V_{GS}	2.0 - 4.0V	2.0 - 4.0V	2.0 - 4.0V	2.0 - 4.0V

ELECTRICAL CHARACTERISTICS: (T_C = 25°C unless otherwise noted)

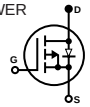
STATIC P/N OM9130STC (100V, P-Channel)

Parameter		Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS}	Drain-Source Breakdown Voltage	100			V	V_{GS} = 0, I_D = 250 mA
$V_{GS(th)}$	Gate-Threshold Voltage	2.0		4.0	V	V_{DS} = V_{GS}, I_D = 250 mA
I_{GSS}	Gate-Body Leakage			± 100	nA	V_{GS} = ± 20 V
I_{DSS}	Zero Gate Voltage Drain Current		0.1	0.25	mA	V_{DS} = Max. Rat., V_{GS} = 0
			0.2	1.0	mA	V_{DS} = 0.8 Max. Rat., V_{GS} = 0, T_C = 125° C
$I_{D(on)}$	On-State Drain Current[1]	10.2			A	V_{DS} 2 $V_{DS(on)}$, V_{GS} = 10 V
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]			0.34		V_{GS} = 10 V, I_D = 6 A
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]			0.68		V_{GS} = 10 V, I_D = 6 A,, T_C = 125 C

DYNAMIC

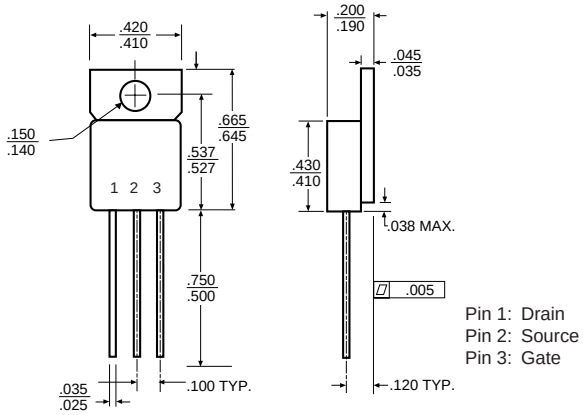
g_{fs}	Forward Transductance[1]	2.0			S(M)	V_{DS} 2 $V_{DS(on)}$, I_D = 6 A
C_{iss}	Input Capacitance		500		pF	V_{GS} = 0
C_{oss}	Output Capacitance		460		pF	V_{DS} = 25 V
C_{rss}	Reverse Transfer Capacitance		100		pF	f = 1 MHz
$t_{d(on)}$	Turn-On Delay Time		50		ns	V_{DD} = 50 V, I_D @ 6 A
t_r	Rise Time		115		ns	R_g = 50 W, V_{DS} = 10 V
$t_{d(off)}$	Turn-Off Delay Time		115		ns	
t_f	Fall Time		115		ns	

BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS

I_S	Continuous Source Current (Body Diode)			12	A	Modified MOSPOWER symbol showing the integral P-N Junction rectifier. 
I_{SM}	Source Current[1] (Body Diode)			48	A	
V_{SD}	Diode Forward Voltage[1]		1.7		V	T_C = 25 C, I_S = -12 A, V_{GS} = 0
						T_C = 25 C, I_S = -12 A, V_{GS} = 0
t_{rr}	Reverse Recovery Time		400		ns	T_J = 25 C, I_F = -12A, dI_F/ds = 100 A/ms

1 Pulse Test: Pulse Width 300msec, Duty Cycle 2%.

MECHANICAL OUTLINE



ORDERING INFORMATION

Omnirel Part Number
OM9130S TCDS

Substrate Type
- S = Insulated Standard
- N = Non-Isolated

Package - TO-257AA

Feedthrough construction ceramic

Screening Level
- M = Commercial
- T = TX
- S = Space

Radiation Level - rads
- D = 10K
- R = 100K
- H = 1Meg

3.1