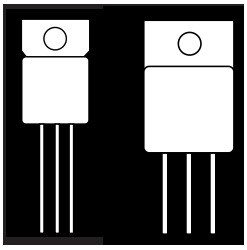
POWER MOSFET IN HERMETIC ISOLATED JEDEC PACKAGE



1000V, Up To 6 Amp, N-Channel MOSFET In Hermetic Metal Package

FEATURES

- Isolated Hermetic Metal Package
- Fast Switching
- Low $R_{DS(on)}$
- Available Screened To MIL-19500, TX, TXV And S
- Ceramic Feedthroughs Also Available

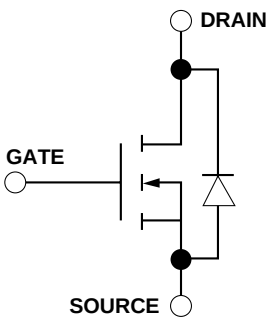
DESCRIPTION

This series of hermetically packaged products feature the latest advanced MOSFET and packaging technology. They are ideally suited for Military requirements where small size, high performance and high reliability are required, and in applications such as switching power supplies, motor controls, inverters, choppers, audio amplifiers and high energy pulse circuits.

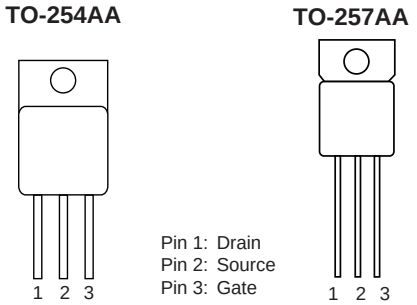
MAXIMUM RATINGS

PART NUMBER	$R_{DS(on)}$	I_D
OM1N100SA	8.0	1.0A
OM3N100SA	5.2	3.5A
OM5N100SA	3.0	5.0A
OM6N100SA	2.0	6.0A
OM3N100ST	5.4	3.5A
OM1N100ST	8.2	1.0A

SCHEMATIC



PIN CONNECTION



Omnirel

ELECTRICAL CHARACTERISTICS: T_C = 25° unless otherwise noted

STATIC P/N OM1N100SA (See Note 3)

Parameter		Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS}	Drain-Source Breakdown Voltage	1000			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_{GSSF}	Gate-Body Leakage Forward			100	nA	V_{GS} = 20 V, V_{DS} = 0
I_{GSSR}	Gate-Body Leakage Reverse			-100	nA	V_{GS} = - 20 V, V_{DS} = 0
I_{DSS}	Zero Gate Voltage Drain Current			0.25	mA	V_{DS} = Max. Rat., V_{GS} = 0
				1.0	mA	V_{DS} = 0.8 x Max. Rat., V_{GS} = 0, T_C = 125° C
$I_{D(on)}$	On-State Drain Current	1.0			A	$V_{DS} > I_{D(on)} \times R_{DS(on)}$ Max. V_{GS} = 10 V
$R_{DS(on)}$	Static Drain-Source On-State Resisitance[1, 3]		SA	8.0		V_{GS} = 10 V
			ST	8.2		I_D =.5A
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1, 3]		SA	15.0		V_{GS} = 10 V
			ST	15.4		I_D =.5A, T_C = 100° C

DYNAMIC

g_{fs}	Forward Transductance	1.0			S	V_{DS} = 10V, I_D = 1 A
C_{iss}	Input Capacitance		950		pF	V_{GS} = 0
C_{oss}	Output Capacitance		110		pF	V_{DS} = 25 V
C_{rss}	Reverse Transfer Capacitance		40		pF	f = 1 MHz
$T_{d(on)}$	Turn-On Delay Time		90		ns	
t_r	Rise Time		90		ns	
$T_{d(off)}$	Turn-Off Delay Time		115		ns	V_{DD} = 600 V, I_D = 3.5
t_f	Fall Time		75		ns	R_G = 50W, V_{GS} = 10 V

BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS

I_S	Continuous Source Current (Body Diode)			3.5	A	Modified MOSPOWER symbol showing the integral P-N Junction rectifier.
I_{SM}	Source Current[1] (Body Diode)			14	A	
V_{SD}	Diode Forward Voltage[2]			2.5	V	T_C = 25 C, I_S = 3.5 A, V_{GS} = 0
t_{rr}	Reverse Recovery Time		900		ns	$I_F = I_S$, V_{DD} = 100 V dI_F/ds = 100 A/ms, T_J = 150 C

1 Pulse Test: Pulse Width 300msec, Duty Cycle 1.5%.
2 Pulse Width limited by safe operating area.
3 OM1N100ST - All characteristics the same except $R_{DS(on)}$

ELECTRICAL CHARACTERISTICS: T_C = 25° unless otherwise noted

STATIC P/N OM3N100SA (See Note 3)

Parameter		Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS}	Drain-Source Breakdown Voltage	1000			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_{GSSF}	Gate-Body Leakage Forward			100	nA	V_{GS} = 20 V
I_{GSSR}	Gate-Body Leakage Reverse			- 100	nA	V_{GS} = - 20 V
I_{DSS}	Zero Gate Voltage Drain Current			0.25	mA	V_{DS} = Max. Rat., V_{GS} = 0
				1.0	mA	V_{DS} = 0.8 x Max. Rat., V_{GS} = 0, T_C = 125° C
$I_{D(on)}$	On-State Drain Current	3.5			A	$V_{DS} > I_{D(on)} \times R_{DS(on)}$ Max V_{GS} = 10 V
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1, 3]		SA	5.2		V_{GS} = 10 V
			ST	5.4		I_D =.5A
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1, 3]		SA	10.0		V_{GS} = 10 V
			ST	10.4		I_D =.5A, T_C = 100° C

DYNAMIC

g_{fs}	Forward Transductance	1.0			S	V_{DS} = 10, I_D = 1.5 A
C_{iss}	Input Capacitance		950		pF	V_{GS} = 0
C_{oss}	Output Capacitance		110		pF	V_{DS} = 25 V
C_{rss}	Reverse Transfer Capacitance		40		pF	f = 1 MHz
$T_{d(on)}$	Turn-On Delay Time		90		ns	
t_r	Rise Time		90		ns	
$T_{d(off)}$	Turn-Off Delay Time		115		ns	V_{DD} = 600 V, I_D = 3.5
t_f	Fall Time		75		ns	R_G = 50W, V_{GS} = 10 V

BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS

I_S	Continuous Source Current (Body Diode)			3.5	A	Modified MOSPOWER symbol showing the integral P-N Junction rectifier.
I_{SM}	Source Current[1] (Body Diode)			14	A	
V_{SD}	Diode Forward Voltage[2]			2.5	V	T_C = 25 C, I_S = 3.5 A, V_{GS} = 0
t_{rr}	Reverse Recovery Time		900		ns	$I_F = I_S$, V_{DD} = 100 V dI_F/ds = 100 A/ms, T_J = 150 C

1 Pulse Test: Pulse Width 300msec, Duty Cycle 1.5%.
2 Pulse Width limited by safe operating area.
3 OM3N100ST - All characteristics the same except $R_{DS(on)}$

ELECTRICAL CHARACTERISTICS: T_C = 25° unless otherwise noted

STATIC P/N OM5N100SA (See Note 3)

Parameter		Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS}	Drain-Source Breakdown Voltage	1000			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_{GSSF}	Gate-Body Leakage Forward			100	nA	V_{GS} = 20 V, V_{DS} = 0
I_{GSSR}	Gate-Body Leakage Reverse			-100	nA	V_{GS} = - 20 V, V_{DS} = 0
I_{DSS}	Zero Gate Voltage Drain Current			0.25	mA	V_{DS} = Max. Rat., V_{GS} = 0
				1.0	mA	V_{DS} = 0.8 x Max. Rat., V_{GS} = 0, T_C = 125° C
$I_{D(on)}$	On-State Drain Current	5.0			A	V_{DS} > $I_{D(on)}$ x $R_{DS(on)}$Max., V_{GS} = 10 V
$R_{DS(on)}$	Static Drain-Source On-State Resisitance[1]			3.0		V_{GS} = 10 V, I_D = 2.5 A
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]			6.0		V_{GS} = 10 V, I_D = 2.5 A T_C = 100 C

DYNAMIC

g_{fs}	Forward Transductance	4.0			S	V_{DS} = 25 $V_{DS(on)}$, I_D = 2.5 A
C_{iss}	Input Capacitance			2600	pF	V_{GS} = 0
C_{oss}	Output Capacitance			350	pF	V_{DS} = 25 V
C_{rss}	Reverse Transfer Capacitance			150	pF	f = 1 MHz
$T_{d(on)}$	Turn-On Delay Time			65	ns	
t_r	Rise Time			55	ns	
$T_{r(V_{off})}$	Off-Voltage Rise Time			62	ns	V_{DD} = 800 V, I_D =6A
t_f	Fall Time			25	ns	R_G = 7W, V_{GS} = 10 V

BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS

I_S	Continuous Source Current (Body Diode)			6	A	Modified MOSPOWER symbol showing the integral P-N Junction rectifier.
I_{SM}	Source Current[2] (Body Diode)			24	A	
V_{SD}	Diode Forward Voltage[1]			2.5	V	T_C = 25 C, I_S = 6 A, V_{GS} = 0
t_{rr}	Reverse Recovery Time		1100		ns	I_F = I_S,V_{DD} = 100 V dI_F/ds = 100 A/ms

1 Pulse Test: Pulse Width 300msec, Duty Cycle 1.5%.

2 Pulse Width limited by safe operating area.

3. Also available in a TO258AA, TO259AA and dual 6 pin Sip, S-6 package

ELECTRICAL CHARACTERISTICS: T_C = 25° unless otherwise noted

STATIC P/N OM6N100SA (See Note 3)

Parameter		Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS}	Drain-Source Breakdown Voltage	1000			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_{GSSF}	Gate-Body Leakage Forward			100	nA	V_{GS} = 20 V, V_{DS} = 0
I_{GSSR}	Gate-Body Leakage Reverse			- 100	nA	V_{GS} = - 20 V, V_{DS} = 0
I_{DSS}	Zero Gate Voltage Drain Current			0.25	mA	V_{DS} = Max. Rat., V_{GS} = 0
				1.0	mA	V_{DS} = 0.8 x Max. Rat., V_{GS} = 0, T_C = 125° C
$I_{D(on)}$	On-State Drain Current	6.0			A	V_{DS} > $I_{D(on)}$ x $R_{DS(on)}$Max., V_{GS} = 10 V
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]			2.0		V_{GS} = 10 V, I_D = 3.0 A
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]			4.0		V_{GS} = 10 V, I_D = 3.0 A T_C = 100° C

DYNAMIC

g_{fs}	Forward Transductance	4.0			S	V_{DS} = 25V, I_D = 3.0 A
C_{iss}	Input Capacitance			2600	pF	V_{GS} = 0
C_{oss}	Output Capacitance			350	pF	V_{DS} = 25 V
C_{rss}	Reverse Transfer Capacitance			150	pF	f = 1 MHz
$T_{d(on)}$	Turn-On Delay Time			65	ns	
t_r	Rise Time			55	ns	
$T_r(V_{off})$	Off-Voltage Rise Time			62	ns	V_{DD} = 800 V, I_D = 6A
t_f	Fall Time			25	ns	R_G = 7W, V_{GS} = 10 V

BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS

I_S	Continuous Source Current (Body Diode)			6	A	Modified MOSPOWER symbol showing the integral P-N Junction rectifier.
I_{SM}	Source Current[2] (Body Diode)			24	A	
V_{SD}	Diode Forward Voltage[1]			2.5	V	T_C = 25 C, I_S = 6 A, V_{GS} = 0
t_{rr}	Reverse Recovery Time		1000		ns	I_F = I_S,V_{DD} = 100 V dI_F/ds = 100 A/ms, T_J = 150 C

1 Pulse Test: Pulse Width 300msec, Duty Cycle 1.5%.

2 Pulse Width limited by safe operating area.

3. Also available in a TO258AA, TO259AA and dual 6 pin Sip, S-6 package

OM1N100SA/ST Series

ABSOLUTE MAXIMUM RATINGS (T_C = 25°C unless otherwise noted)

Symbol	Parameter	OM1N100SA OM1N100ST	OM3N100SA OM3N100ST	OM5N100SA	OM6N100SA	Units
I_{AR}	Avalanche Current (Repetitive or Non-Repetitive)					
	T_j = 25°C	3.5	3.5	6	6	A
	T_j = 100°C	2	2	3.4	3.4	A
E_{AS}	Single Pulse Avalanche Energy Starting T_j = 25°C, $I_D = I_{AR}$, V_{DD} = 25V	130	130	850	850	mJ
E_{AR}	Repetitive Avalanche Energy (Pulse width limited by T_J max, d < 1%)	6	6	16	16	mJ
V_{DS}	Drain-Source Voltage	1000	1000	1000	1000	V
V_{DGR}	Drain-Source Voltage (R_{GS} = 20k)	1000	1000	1000	1000	V
I_D @ T_C = 25°C	Continuous Drain Current	.50	3.5	5.0	6.0	A
I_D @ T_C = 100°C	Continuous Drain Current	.30	2.0	3.1	3.7	A
I_{DM}	Pulsed Drain Current[1]	14	14	24	24	A
V_{GS}	Gate-Source Voltage	±20	±20	±20	±20	V
P_D @ T_C = 25°C	Maximum Power Dissipation	90	90	130	130	W
P_D @ T_C =100°C	Maximum Power Dissipation	32	32	51	51	W
Junction-To-Case	Linear Derating Factor	.87	.87	2.10	2.10	W/°C
Junction-To-Ambient	Linear Derating Factor	.020	.020	.020	.020	W/°C
T_J T_{stg}	Operating and Storage Temperature Range	-55 to 150	-55 to 150	-55 to 150	-55 to 150	°C
Lead Temperature	(1/16" from case for 10secs.)	300	300	300	300	°C

1 Pulse Test: Pulse width 300 µsec. Duty Cycle 2%.

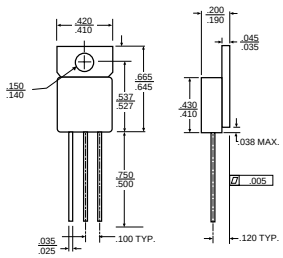
THERMAL RESISTANCE

R_{thJC}	Junction-To-Case	Max.	1.15	1.15	.48	.48	°C/W

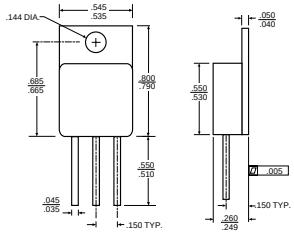
3.1

MECHANICAL OUTLINE

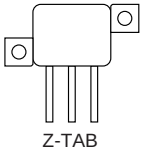
TO-257AA



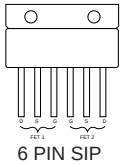
TO-254AA



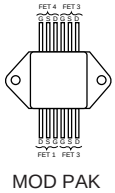
PACKAGE OPTIONS



Z-TAB



6 PIN SIP



MOD PAK

Standard Products are supplied with glass feedthroughs. For ceramic feedthroughs, add the letter “C” to the part number. Example - OMXXXXCSA
MOSFETs are also available in Z-Pak, dual and quad pak styles. Please call the factory for more information.