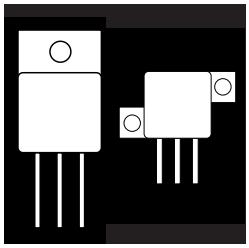
POWER MOSFET IN HERMETIC ISOLATED TO-254AA PACKAGE



100V Thru 500V, Up To 25 Amp, N-Channel MOSFET In Hermetic Metal Package

FEATURES

- Isolated Hermetic Metal Package
- Fast Switching
- Low $R_{DS(on)}$
- Available Screened To MIL-S-19500, TX, TXV And S Levels
- Same as IRFM 150 - 450 Series
- Ceramic Feedthroughs Available

DESCRIPTION

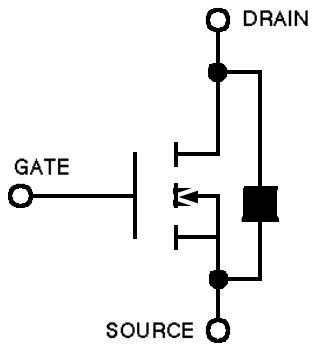
This series of hermetically packaged products feature the latest advanced MOSFET and packaging technology. They are ideally suited for Military requirements where small size, high performance and high reliability are required, and in applications such as switching power supplies, motor controls, inverters,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

MAXIMUM RATINGS @ 25 C

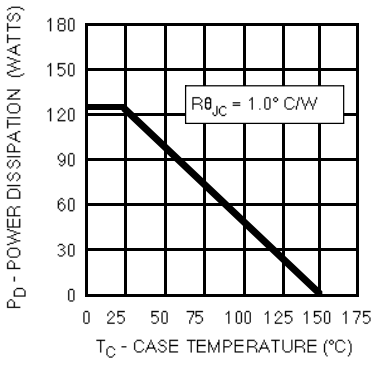
PART NUMBER	V_{DS}	$R_{DS(on)}$	I_D
OM6017SA	100 V	.065	25 A
OM6018SA	200 V	.100	25 A
OM6019SA	400 V	.33	13 A
OM6020SA	500 V	.42	11 A

3.1

SCHEMATIC



POWER RATING



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

STATIC P/N OM6017SA

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_{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		0.1	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]	35			A	V_{DS} 2 $V_{DS(on)}$, V_{GS} = 10 V
$V_{DS(on)}$	Static Drain-Source On-State Voltage[1]		1.1	1.3	V	V_{GS} = 10 V, I_D = 20 A
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]		0.55	0.65		V_{GS} = 10 V, I_D = 20 A
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]		.09	0.11		V_{GS} = 10 V, I_D = 20 A, T_C = 125 C

DYNAMIC

g_{fs}	Forward Transductance[1]	9.0			S(M)	V_{DS} 2 $V_{DS(on)}$, I_D = 20 A
C_{iss}	Input Capacitance		2700		pF	V_{GS} = 0
C_{oss}	Output Capacitance		1300		pF	V_{DS} = 25 V
C_{rss}	Reverse Transfer Capacitance		470		pF	f = 1 MHz
$t_{d(on)}$	Turn-On Delay Time		28		ns	V_{DD} = 30 V, I_D @ 20 A
t_r	Rise Time		45		ns	R_g = 5.0 W, V_G = 10V
$t_{d(off)}$	Turn-Off Delay Time		100		ns	(MOSFET switching times are essentially independent of operating temperature.)
t_f	Fall Time		50		ns	

BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS

I_S	Continuous Source Current (Body Diode)			- 40	A	Modified MOSPOWER symbol showing the integral P-N Junction rectifier.
I_{SM}	Source Current[1] (Body Diode)			- 160	A	
V_{SD}	Diode Forward Voltage[1]			- 2.5	V	T_C = 25 C, I_S = -40 A, V_{GS} = 0
t_{rr}	Reverse Recovery Time		400		ns	T_J = 150 C, I_F = I_S, dI_F/ds = 100 A/ms

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

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

STATIC P/N OM6018SA

Parameter		Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS}	Drain-Source Breakdown Voltage	200			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		0.1	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]	30			A	V_{DS} 2 $V_{DS(on)}$, V_{GS} = 10 V
$V_{DS(on)}$	Static Drain-Source On-State Voltage[1]		1.36	1.60	V	V_{GS} = 10 V, I_D = 16 A
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]		.085	.100		V_{GS} = 10 V, I_D = 16 A
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]		0.14	0.17		V_{GS} = 10 V, I_D = 16 A, T_C = 125 C

DYNAMIC

g_{fs}	Forward Transductance[1]	10.0			S(M)	V_{DS} 2 $V_{DS(on)}$, I_D = 16 A
C_{iss}	Input Capacitance		2400		pF	V_{GS} = 0
C_{oss}	Output Capacitance		600		pF	V_{DS} = 25 V
C_{rss}	Reverse Transfer Capacitance		250		pF	f = 1 MHz
$t_{d(on)}$	Turn-On Delay Time		25		ns	V_{DD} = 75 V, I_D @ 16 A
t_r	Rise Time		60		ns	R_g = 5.0 W, V_{GS} = 10V
$t_{d(off)}$	Turn-Off Delay Time		85		ns	(MOSFET switching times are essentially independent of operating temperature.)
t_f	Fall Time		38		ns	

BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS

I_S	Continuous Source Current (Body Diode)			- 30	A	Modified MOSPOWER symbol showing the integral P-N Junction rectifier.
I_{SM}	Source Current[1] (Body Diode)			- 120	A	
V_{SD}	Diode Forward Voltage[1]			- 2	V	T_C = 25 C, I_S = -30 A, V_{GS} = 0
t_{rr}	Reverse Recovery Time		350		ns	T_J = 150 C, I_F = I_S, dI_F/ds = 100 A/ms

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

ELECTRICAL CHARACTERISTICS: (T_C = 25°C unless otherwise noted)
STATIC P/N OM6019SA

Parameter		Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS}	Drain-Source Breakdown Voltage	400			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		0.1	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]	15			A	V_{DS} 2 $V_{DS(on)}$, V_{GS} = 10 V
$V_{DS(on)}$	Static Drain-Source On-State Voltage[1]		2.0	2.64	V	V_{GS} = 10 V, I_D = 8.0 A
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]		0.25	.33		V_{GS} = 10 V, I_D = 8.0 A
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]		0.50	0.66		V_{GS} = 10 V, I_D = 8.0 A, T_C = 125 C

DYNAMIC

g_{fs}	Forward Transductance[1]	6.0			S(M)	V_{DS} 2 $V_{DS(on)}$, I_D = 8.0 A
C_{iss}	Input Capacitance		2900		pF	V_{GS} = 0
C_{oss}	Output Capacitance		450		pF	V_{DS} = 25 V
C_{rss}	Reverse Transfer Capacitance		150		pF	f = 1 MHz
$t_{d(on)}$	Turn-On Delay Time		30		ns	V_{DD} = 200 V, I_D @ 8.0 A
t_r	Rise Time		40		ns	R_g =5.0 W, V_{GS} =10V
$t_{d(off)}$	Turn-Off Delay Time		80		ns	(MOSFET switching times are essentially independent of operating temperature.)
t_f	Fall Time		30		ns	

BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS

I_S	Continuous Source Current (Body Diode)			- 15	A	Modified MOSPOWER symbol showing the integral P-N Junction rectifier.
I_{SM}	Source Current[1] (Body Diode)			- 60	A	
V_{SD}	Diode Forward Voltage[1]			- 1.6	V	T_C = 25 C, I_S = -15 A, V_{GS} = 0
t_{rr}	Reverse Recovery Time		600		ns	T_J = 100 C, I_F = I_S, dI_F/ds = 100 A/ms

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

ELECTRICAL CHARACTERISTICS: (T_C = 25°C unless otherwise noted)
STATIC P/N OM6020SA

Parameter		Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS}	Drain-Source Breakdown Voltage	500			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		0.1	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]	13			A	V_{DS} 2 $V_{DS(on)}$, V_{GS} = 10 V
$V_{DS(on)}$	Static Drain-Source On-State Voltage[1]		2.1	2.94	V	V_{GS} = 10 V, I_D = 7.0 A
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]		0.3	0.42		V_{GS} = 10 V, I_D = 7.0 A
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]		0.66	0.88		V_{GS} = 10 V, I_D = 7.0 A, T_C = 125 C

DYNAMIC

g_{fs}	Forward Transductance[1]	6.0			S(M)	V_{DS} 2 $V_{DS(on)}$, I_D = 7.0 A
C_{iss}	Input Capacitance		2600		pF	V_{GS} = 0
C_{oss}	Output Capacitance		280		pF	V_{DS} = 25 V
C_{rss}	Reverse Transfer Capacitance		40		pF	f = 1 MHz
$t_{d(on)}$	Turn-On Delay Time		30		ns	V_{DD} = 210 V, I_D @ 7.0 A
t_r	Rise Time		46		ns	R_g = 5.0 W, V_{GS} = 10 V
$t_{d(off)}$	Turn-Off Delay Time		75		ns	(MOSFET switching times are essentially independent of operating temperature.)
t_f	Fall Time		31		ns	

BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS

I_S	Continuous Source Current (Body Diode)			- 13	A	Modified MOSPOWER symbol showing the integral P-N Junction rectifier.
I_{SM}	Source Current[1] (Body Diode)			- 52	A	
V_{SD}	Diode Forward Voltage[1]			- 1.4	V	T_C = 25 C, I_S = -13 A, V_{GS} = 0
t_{rr}	Reverse Recovery Time		700		ns	T_J = 150 C, I_F = I_S, dI_F/ds = 100 A/ms

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

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

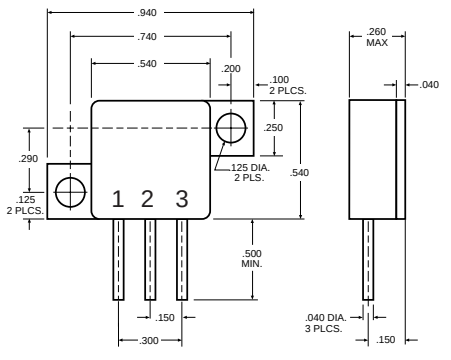
	Parameter	OM6017SA	OM6018SA	OM6019SA	OM6020SA	Units
V_{DS}	Drain-Source Voltage	100	200	400	500	V
V_{DGR}	Drain-Gate Voltage (R_{GS} = 1 M)	100	200	400	500	V
I_D @ T_C = 25°C	Continuous Drain Current[2]	±25	±25	±13	±11	A
I_D @ T_C = 100°C	Continuous Drain Current[2]	±16	±16	±8	±7	A
I_{DM}	Pulsed Drain Current[1]	±100	±80	±54	±40	A
V_{GS}	Gate-Source Voltage	± 20	± 20	±20	± 20	V
P_D @ T_C = 25°C	Maximum Power Dissipation	125	125	125	125	W
P_D @ T_C = 100°C	Maximum Power Dissipation	50	50	50	50	W
Junction To Case	Linear Derating Factor	1.0	1.0	1.0	1.0	W/°C
Junction To Ambient	Linear Derating Factor	.020	.020	.020	.020	W/°C
T_J	Operating and					
T_{stg}	Storage Temperature Range	-55 to 150	-55 to 150	-55 to 150	-55 to 150	°C
Lead Temperature	(1/16" from case for 10 secs.)	300	300	300	300	°C

1 Pulse Test: Pulse width 300 µsec. Duty Cycle 2%.
2 Package Pin Limitation = 15 Amps

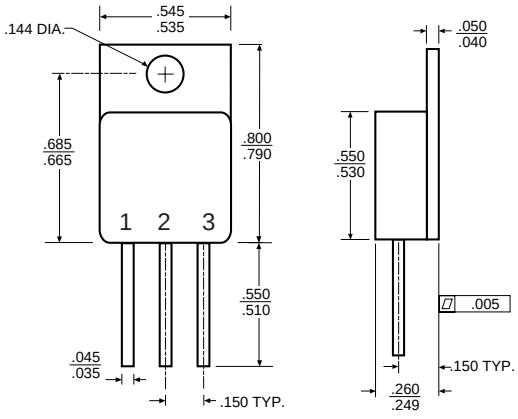
THERMAL RESISTANCE

R_{thJC}	Junction-to-Case	1.0	°C/W
R_{thJA}	Junction-to-Ambient	50	°C/W Free Air Operation

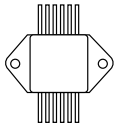
MECHANICAL OUTLINE

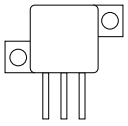


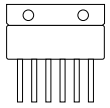
Pin 1: Drain
Pin 2: Source
Pin 3: Gate



PACKAGE OPTIONS


MOD PAK


Z-TAB


6 PIN SIP

NOTES: 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-Tab, dual and quad pak styles - Please call the factory for more information.

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