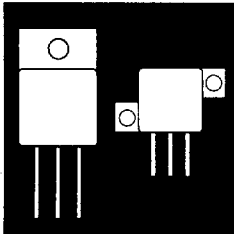


POWER MOSFETS IN HERMETIC ISOLATED TO-254AA PACKAGE



100V Thru 500V, Up To 22 Amp, N-Channel MOSFET In Hermetic Metal Package, With Optional Zener Gate Clamp Protection

FEATURES

- Isolated Hermetic Metal Package
- Fast Switching
- Low $R_{DS(on)}$
- Available Hi-Rel Screened To MIL-S-19500, TX, TXV And S Levels
- Bi-Lateral Zener Gate Protection (Optional)
- Ceramic Feedthroughs Available

DESCRIPTION

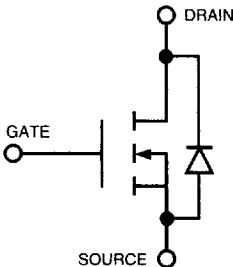
This series of hermetically packaged products feature the latest advanced MOSFET and packaging technology. They are ideally suited for Military requirements where small size, high performance and high reliability are required, and in applications such as switching power supplies, motor controls, inverters, choppers, audio amplifiers and high energy pulse circuits. The MOSFET gates are protected using bi-lateral zeners in the OM6109SA series.

MAXIMUM RATINGS

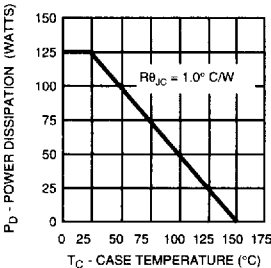
PART NUMBER	V_{DS}	$R_{DS(on)}$	$I_D(MAX)$
OM6009SA, OM6109SA	100V	.095 Ω	22A
OM6010SA, OM6110SA	200V	.18 Ω	18A
OM6011SA, OM6111SA	400V	.55 Ω	10A
OM6012SA, OM6112SA	500V	.85 Ω	8A

Note: OM61XX Series include gate protection circuitry.

SCHEMATIC



POWER RATING



ELECTRICAL CHARACTERISTICS: $T_C = 25^\circ$ unless otherwise noted
STATIC P/N OM6009SA / OM6109SA

Parameter	Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS} Drain-Source Breakdown Voltage	100			V	$V_{GS} = 0$, $I_D = 250\ \mu A$
$V_{GS(th)}$ Gate-Threshold Voltage	2.0	4.0		V	$V_{DS} = V_{GS}$, $I_D = 250\ \mu A$
I_{DSSF} Gate-Body Leakage Forward		100		nA	$V_{GS} = 20\ V$
I_{DSSR} Gate-Body Leakage Reverse		-100		nA	$V_{GS} = -20\ V$
I_{DSS} Gate-Body Leakage (OM6109)		± 500		nA	$V_{GS} = \pm 12.8\ V$
I_{DSS} Zero Gate Voltage Drain Current		0.1 0.2	0.25 1.0	mA	$V_{DS} = \text{Max. Rat.}$, $V_{GS} = 0$, $T_C = 125^\circ\ C$
$I_{D(on)}$ On-State Drain Current ¹	22			A	$V_{DS} \geq 2\ V_{DS(on)}$, $V_{GS} = 10\ V$
$V_{DS(on)}$ Static Drain-Source On-State Voltage ¹		1.275	1.425	V	$V_{GS} = 10\ V$, $I_D = 15\ A$
$R_{DS(on)}$ Static Drain-Source On-State Resistance ¹		.085	.095	Ω	$V_{GS} = 10\ V$, $I_D = 15\ A$
$R_{DS(on)}$ Static Drain-Source On-State Resistance ¹		.130	.155	Ω	$V_{GS} = 10\ V$, $I_D = 15\ A$, $T_C = 125^\circ\ C$

DYNAMIC

g_{fs} Forward Transconductance ¹	10.0			S (S)	$V_{DS} \geq 2\ V_{DS(on)}$, $I_D = 15\ A$
C_{iss} Input Capacitance	1275			pF	$V_{GS} = 0$
C_{oss} Output Capacitance	550			pF	$V_{DS} = 25\ V$
C_{rss} Reverse Transfer Capacitance	160			pF	$f = 1\ \text{MHz}$
$T_{d(on)}$ Turn-On Delay Time	16			ns	$V_{DS} = 30\ V$, $I_D = 5\ A$
t_r Rise Time	19			ns	$R_\theta = 5\ \Omega$, $V_{GS} = 10\ V$
$T_{d(off)}$ Turn-Off Delay Time	42			ns	(MOSFET) switching times are essentially independent of operating temperature.
t_f Fall Time	24			ns	

BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS

I_S Continuous Source Current (Body Diode)		-27	A	Modified MOSPOWER symbol showing the integral P-N Junction rectifier.
I_{SM} Source Current ¹ (Body Diode)		-108	A	
V_{SD} Diode Forward Voltage ¹		-2.5	V	$T_C = 25^\circ\ C$, $I_S = -24\ A$, $V_{GS} = 0$
t_r Reverse Recovery Time	200		ns	$T_J = 150^\circ\ C$, $I_R = I_S$, $dI_F/dt = 100\ A/\mu s$

1 Pulse Test: Pulse Width $\leq 300\ \mu\text{sec}$, Duty Cycle $\leq 2\%$.

ELECTRICAL CHARACTERISTICS: $T_C = 25^\circ$ unless otherwise noted
STATIC P/N OM6010SA / OM6110SA

Parameter	Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS} Drain-Source Breakdown Voltage	200			V	$V_{GS} = 0$, $I_D = 250\ \mu A$
$V_{GS(th)}$ Gate-Threshold Voltage	2.0	4.0		V	$V_{DS} = V_{GS}$, $I_D = 250\ \mu A$
I_{DSSF} Gate-Body Leakage Forward		100		nA	$V_{GS} = 20\ V$
I_{DSSR} Gate-Body Leakage Reverse		-100		nA	$V_{GS} = -20\ V$
I_{DSS} Gate-Body Leakage (OM6110)		± 500		nA	$V_{GS} = \pm 12.8\ V$
I_{DSS} Zero Gate Voltage Drain Current		0.1 0.2	0.25 1.0	mA	$V_{DS} = \text{Max. Rat.}$, $V_{GS} = 0$, $T_C = 125^\circ\ C$
$I_{D(on)}$ On-State Drain Current ¹	18			A	$V_{DS} \geq 2\ V_{DS(on)}$, $V_{GS} = 10\ V$
$V_{DS(on)}$ Static Drain-Source On-State Voltage ¹		1.4	1.8	V	$V_{GS} = 10\ V$, $I_D = 10\ A$
$R_{DS(on)}$ Static Drain-Source On-State Resistance ¹		0.14	0.18	Ω	$V_{GS} = 10\ V$, $I_D = 10\ A$
$R_{DS(on)}$ Static Drain-Source On-State Resistance ¹		0.28	0.36	Ω	$V_{GS} = 10\ V$, $I_D = 10\ A$, $T_C = 125^\circ\ C$

DYNAMIC

g_{fs} Forward Transconductance ¹	6.0			S (S)	$V_{DS} \geq 2\ V_{DS(on)}$, $I_D = 10\ A$
C_{iss} Input Capacitance	1000			pF	$V_{GS} = 0$
C_{oss} Output Capacitance	250			pF	$V_{DS} = 25\ V$
C_{rss} Reverse Transfer Capacitance	100			pF	$f = 1\ \text{MHz}$
$T_{d(on)}$ Turn-On Delay Time	17			ns	$V_{DS} = 75\ V$, $I_D = 18\ A$
t_r Rise Time	52			ns	$R_\theta = 5\ \Omega$, $V_{GS} = 10\ V$
$T_{d(off)}$ Turn-Off Delay Time	36			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)		-18	A	Modified MOSPOWER symbol showing the integral P-N Junction rectifier.
I_{SM} Source Current ¹ (Body Diode)		-72	A	
V_{SD} Diode Forward Voltage ¹		-2	V	$T_C = 25^\circ\ C$, $I_S = -18\ A$, $V_{GS} = 0$
t_r Reverse Recovery Time	350		ns	$T_J = 150^\circ\ C$, $I_R = I_S$, $dI_F/dt = 100\ A/\mu s$

1 Pulse Test: Pulse Width $\leq 300\ \mu\text{sec}$, Duty Cycle $\leq 2\%$.

**ELECTRICAL CHARACTERISTICS: $T_C = 25^\circ$ unless otherwise noted
STATIC P/N OM6011SA / OM6111SA**

Parameter	Min.	Typ.	Max.	Units	Test Conditions
BV_{DS} Drain-Source Breakdown Voltage	400			V	$V_{GS} = 0$, $I_D = 250 \mu A$
$V_{GS(th)}$ Gate-Threshold Voltage	2.0		4.0	V	$V_{DS} = V_{GS}$, $I_D = 250 \mu A$
I_{SSSF} Gate-Body Leakage Forward		100	nA	nA	$V_{GS} = 20$ V
I_{SSSR} Gate-Body Leakage Reverse		-100	nA	nA	$V_{GS} = -20$ V
I_{GSS} Gate-Body Leakage (OM6111)		± 500	nA	nA	$V_{GS} = \pm 12.8$ V
I_{OSS} Zero Gate Voltage Drain Current		0.1	0.25	mA	$V_{DS} = \text{Max. Rat.}, V_{GS} = 0$, $T_C = 125^\circ \text{C}$
		0.2	1.0	mA	$V_{DS} = 0.8 \text{ Max. Rat.}, V_{GS} = 0$, $T_C = 125^\circ \text{C}$
$I_{D(on)}$ On-State Drain Current ¹	10			A	$V_{DS} \geq 2 V_{DS(on)}$, $V_{GS} = 10$ V
$V_{DS(on)}$ Static Drain-Source On-State Voltage ¹	2.35	2.75	V	V	$V_{GS} = 10$ V, $I_D = 5$ A
$R_{DS(on)}$ Static Drain-Source On-State Resistance ¹	0.47	0.55	Ω	Ω	$V_{GS} = 10$ V, $I_D = 5$ A
$R_{DS(on)}$ Static Drain-Source On-State Resistance ¹	0.93	1.10	Ω	Ω	$V_{GS} = 10$ V, $I_D = 5$ A, $T_C = 125^\circ \text{C}$

DYNAMIC

g_m Forward Transconductance ¹	4.0			S (r)	$V_{DS} \geq 2 V_{DS(on)}$, $I_D = 5$ A
C_{iss} Input Capacitance		1150		pF	$V_{GS} = 0$
C_{oss} Output Capacitance		165		pF	$V_{DS} = 25$ V
C_{rss} Reverse Transfer Capacitance		70		pF	$f = 1$ MHz
$T_{d(on)}$ Turn-On Delay Time		17		ns	$V_{DD} = 175$ V, $I_D \leq 5$ A
t_r Rise Time		12		ns	$R_g = 5 \Omega$, $V_{GS} = 10$ V
$T_{d(off)}$ Turn-Off Delay Time		45		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)			-10	A	Modified MOSPOWER symbol showing the integral P-N Junction rectifier.
I_{SM} Source Current ¹ (Body Diode)			-40	A	
V_{SD} Diode Forward Voltage ¹			-2	V	$T_C = 25^\circ \text{C}$, $I_S = -10$ A, $V_{GS} = 0$
t_{rr} Reverse Recovery Time		530		ns	$T_J = 150^\circ \text{C}$, $I_R = I_S$, $dI_F/dt = 100 \text{ A}/\mu\text{s}$

1 Pulse Test: Pulse Width $\leq 300 \mu\text{sec}$, Duty Cycle $\leq 2\%$.

**ELECTRICAL CHARACTERISTICS: $T_C = 25^\circ$ unless otherwise noted
STATIC P/N OM6012SA / OM6112SA**

Parameter	Min.	Typ.	Max.	Units	Test Conditions
BV_{DS} Drain-Source Breakdown Voltage	500			V	$V_{GS} = 0$, $I_D = 250 \mu A$
$V_{GS(th)}$ Gate-Threshold Voltage	2.0		4.0	V	$V_{DS} = V_{GS}$, $I_D = 250 \mu A$
I_{SSSF} Gate-Body Leakage Forward		100	nA	nA	$V_{GS} = 20$ V
I_{SSSR} Gate-Body Leakage Reverse		-100	nA	nA	$V_{GS} = -20$ V
I_{GSS} Gate-Body Leakage (OM6112)		± 500	nA	nA	$V_{GS} = \pm 12.8$ V
I_{OSS} Zero Gate Voltage Drain Current		0.1	0.25	mA	$V_{DS} = \text{Max. Rat.}, V_{GS} = 0$, $T_C = 125^\circ \text{C}$
		0.2	1.0	mA	$V_{DS} = 0.8 \text{ Max. Rat.}, V_{GS} = 0$, $T_C = 125^\circ \text{C}$
$I_{D(on)}$ On-State Drain Current ¹	8.0			A	$V_{DS} \geq 2 V_{DS(on)}$, $V_{GS} = 10$ V
$V_{DS(on)}$ Static Drain-Source On-State Voltage ¹		3.2	3.4	V	$V_{GS} = 10$ V, $I_D = 4$ A
$R_{DS(on)}$ Static Drain-Source On-State Resistance ¹		0.8	0.85	Ω	$V_{GS} = 10$ V, $I_D = 4$ A
$R_{DS(on)}$ Static Drain-Source On-State Resistance ¹		1.50	1.65	Ω	$V_{GS} = 10$ V, $I_D = 4$ A, $T_C = 125^\circ \text{C}$

DYNAMIC

g_m Forward Transconductance ¹	4.0			S (r)	$V_{DS} \geq 2 V_{DS(on)}$, $I_D = 4$ A
C_{iss} Input Capacitance		1275		pF	$V_{GS} = 0$
C_{oss} Output Capacitance		200		pF	$V_{DS} = 25$ V
C_{rss} Reverse Transfer Capacitance		85		pF	$f = 1$ MHz
$T_{d(on)}$ Turn-On Delay Time		17		ns	$V_{DD} = 200$ V, $I_D = 4$ A
t_r Rise Time		5		ns	$R_g = 5 \Omega$, $V_{GS} = 10$ V
$T_{d(off)}$ Turn-Off Delay Time		42		ns	(MOSFET) switching times are essentially independent of operating temperature.
t_f Fall Time		14		ns	

BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS

I_S Continuous Source Current (Body Diode)			-8	A	Modified MOSPOWER symbol showing the integral P-N Junction rectifier.
I_{SM} Source Current ¹ (Body Diode)			-32	A	
V_{SD} Diode Forward Voltage ¹			-2	V	$T_C = 25^\circ \text{C}$, $I_S = -18$ A, $V_{GS} = 0$
t_{rr} Reverse Recovery Time		700		ns	$T_J = 150^\circ \text{C}$, $I_R = I_S$, $dI_F/dt = 100 \text{ A}/\mu\text{s}$

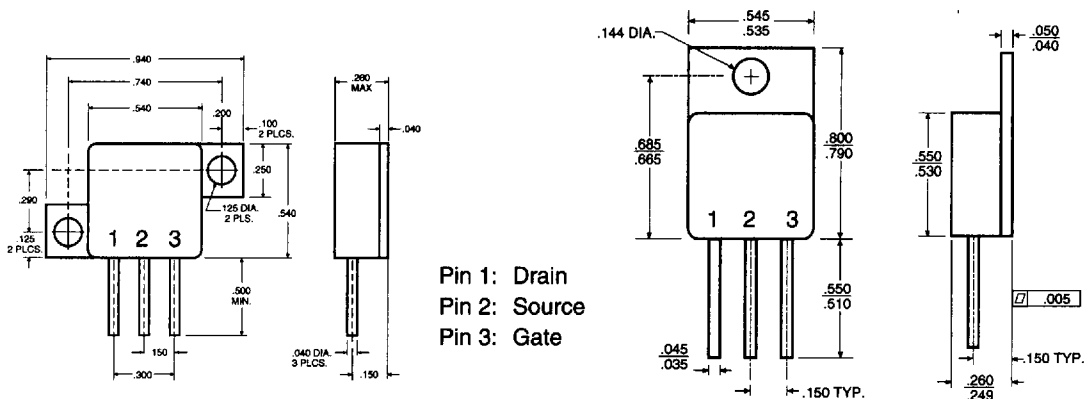
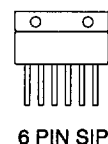
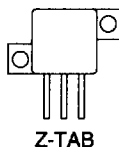
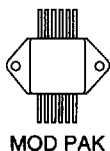
1 Pulse Test: Pulse Width $\leq 300 \mu\text{sec}$, Duty Cycle $\leq 2\%$.

ABSOLUTE MAXIMUM RATINGS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Parameter	OM6009 OM6109	OM6010 OM6110	OM6011 OM6111	OM6012 OM6112	Units
V_{DS} Drain-Source Voltage	100	200	400	500	V
V_{DGR} Drain-Gate Voltage ($R_{GS} = 1\text{ M}\Omega$)	100	200	400	500	V
$I_D @ T_C = 25^\circ\text{C}$ Continuous Drain Current ²	± 22	± 18	± 10	± 8	A
$I_D @ T_C = 100^\circ\text{C}$ Continuous Drain Current ²	± 17	± 11	± 6	± 5	A
I_{DM} Pulsed Drain Current ¹	± 88	± 72	± 40	± 32	A
V_{GS} Gate-Source Volt. (Unclamped Gate)	± 20	± 20	± 20	± 20	V
$P_D @ T_C = 25^\circ\text{C}$ Maximum Power Dissipation	125	125	125	125	W
$P_D @ T_C = 100^\circ\text{C}$ Maximum Power Dissipation	50	50	50	50	W
Junction To Case Linear Derating Factor	1.0	1.0	1.0	1.0	W/ $^\circ\text{C}$
Junction To Ambient Linear Derating Factor	.020	.020	.020	.020	W/ $^\circ\text{C}$
T_J Operating and					
T_{stg} Storage Temperature Range	-55 to 150	-55 to 150	-55 to 150	-55 to 150	$^\circ\text{C}$
Lead Temperature (1/16" from case for 10 secs.)	300	300	300	300	$^\circ\text{C}$

1 Pulse Test: Pulse width $\leq 300\text{ }\mu\text{sec.}$ Duty Cycle $\leq 2\%$.**2 Package Pin Limitation = 25 Amps****THERMAL RESISTANCE**

R_{thJC} Junction-to-Case	1.0	$^\circ\text{C/W}$	
R_{thJA} Junction-to-Ambient	50	$^\circ\text{C/W}$	Free Air Operation

MECHANICAL OUTLINE**PACKAGE OPTIONS**

NOTE: 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.