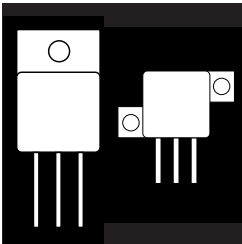


OM6009SA OM6011SA OM6109SA OM6111SA
 OM6010SA OM6012SA OM6110SA OM6112SA

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.

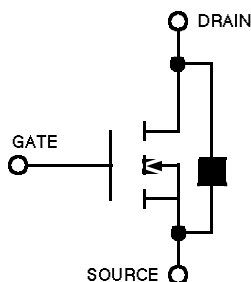
MAXIMUM RATINGS

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

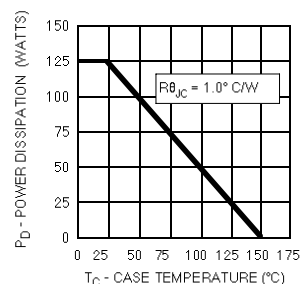
Note: OM61XX Series include gate protection circuitry.

3.1

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	$V_{GS} = 0$, $I_b = 250 \text{ mA}$
$V_{GS(th)}$ Gate-Threshold Voltage	2.0		4.0	V	$V_{DS} = V_{GS}$, $I_b = 250 \text{ mA}$
I_{GSSF} Gate-Body Leakage Forward			100	nA	$V_{GS} = 20 \text{ V}$
I_{GSSR} Gate-Body Leakage Reverse			-100	nA	$V_{GS} = -20 \text{ V}$
I_{GSS} Gate-Body Leakage (OM6109)			± 500	nA	$V_{GS} = \pm 12.8 \text{ V}$
I_{DSS} Zero Gate Voltage Drain Current		0.1	0.25	mA	$V_{DS} = \text{Max. Rat.}$, $V_{GS} = 0$
		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	22			A	$V_{DS} = 2 V_{DS(on)}$, $V_{GS} = 10 \text{ V}$
$V_{DS(on)}$ Static Drain-Source On-State Voltage ¹		1.275	1.425	V	$V_{GS} = 10 \text{ V}$, $I_b = 15 \text{ A}$
$R_{DS(on)}$ Static Drain-Source On-State Resistance ¹		.085	.095		$V_{GS} = 10 \text{ V}$, $I_b = 15 \text{ A}$
$R_{DS(on)}$ Static Drain-Source On-State Resistance ¹		.130	.155		$V_{GS} = 10 \text{ V}$, $I_b = 15 \text{ A}$, $T_C = 125^\circ \text{ C}$

DYNAMIC

g_{fs} Forward Transconductance ¹	10.0			S (M)	$V_{DS} = 2 V_{DS(on)}$, $I_b = 15 \text{ A}$
C_{iss} Input Capacitance		1275		pF	$V_{GS} = 0$
C_{oss} Output Capacitance		550		pF	$V_{DS} = 25 \text{ V}$
C_{rsw} Reverse Transfer Capacitance		160		pF	$f = 1 \text{ MHz}$
$T_{d(on)}$ Turn-On Delay Time		16		ns	$V_{DD} = 30 \text{ V}$, $I_b = 5 \text{ A}$
t_r Rise Time		19		ns	$R_\theta = 5^\circ \text{ W}$, $V_{GS} = 10 \text{ V}$
$T_{d(off)}$ 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	$T_C = 25^\circ \text{ C}$, $I_S = -24 \text{ A}$, $V_{GS} = 0$
t_{rr} Reverse Recovery Time		200		ns	$T_J = 150^\circ \text{ C}$, $I_F = I_S$, $dI_F/dt = 100 \text{ A/ns}$

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

1 Pulse Test: Pulse Width 300nsec, Duty Cycle 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	$V_{GS} = 0$, $I_b = 250 \text{ mA}$
$V_{GS(th)}$ Gate-Threshold Voltage	2.0		4.0	V	$V_{DS} = V_{GS}$, $I_b = 250 \text{ mA}$
I_{GSSF} Gate-Body Leakage Forward			100	nA	$V_{GS} = 20 \text{ V}$
I_{GSSR} Gate-Body Leakage Reverse			-100	nA	$V_{GS} = -20 \text{ V}$
I_{GSS} Gate-Body Leakage (OM6110)			± 500	nA	$V_{GS} = \pm 12.8 \text{ V}$
I_{DSS} Zero Gate Voltage Drain Current		0.1	0.25	mA	$V_{DS} = \text{Max. Rat.}$, $V_{GS} = 0$
		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	18			A	$V_{DS} = 2 V_{DS(on)}$, $V_{GS} = 10 \text{ V}$
$V_{DS(on)}$ Static Drain-Source On-State Voltage ¹		1.4	1.8	V	$V_{GS} = 10 \text{ V}$, $I_b = 10 \text{ A}$
$R_{DS(on)}$ Static Drain-Source On-State Resistance ¹		0.14	0.18		$V_{GS} = 10 \text{ V}$, $I_b = 10 \text{ A}$
$R_{DS(on)}$ Static Drain-Source On-State Resistance ¹		0.28	0.36		$V_{GS} = 10 \text{ V}$, $I_b = 10 \text{ A}$, $T_C = 125^\circ \text{ C}$

DYNAMIC

g_{fs} Forward Transconductance ¹	6.0			S (M)	$V_{DS} = 2 V_{DS(on)}$, $I_b = 10 \text{ A}$
C_{iss} Input Capacitance		1000		pF	$V_{GS} = 0$
C_{oss} Output Capacitance		250		pF	$V_{DS} = 25 \text{ V}$
C_{rsw} Reverse Transfer Capacitance		100		pF	$f = 1 \text{ MHz}$
$T_{d(on)}$ Turn-On Delay Time		17		ns	$V_{DD} = 75 \text{ V}$, $I_b @ 18 \text{ A}$
t_r Rise Time		52		ns	$R_\theta = 5^\circ \text{ W}$, $V_{GS} = 10 \text{ V}$
$T_{d(off)}$ 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	$T_C = 25^\circ \text{ C}$, $I_S = -18 \text{ A}$, $V_{GS} = 0$
t_{rr} Reverse Recovery Time		350		ns	$T_J = 150^\circ \text{ C}$, $I_F = I_S$, $dI_F/dt = 100 \text{ A/ns}$

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

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

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

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

DYNAMIC

g_{fs} Forward Transconductance ¹	4.0			S (M)	$V_{DS} = 2 V_{DS(on)}$, $I_b = 5 \text{ A}$
C_{iss} Input Capacitance	1150			pF	$V_{GS} = 0$
C_{oss} Output Capacitance	165			pF	$V_{DS} = 25 \text{ V}$
C_{riss} Reverse Transfer Capacitance	70			pF	$f = 1 \text{ MHz}$
$T_{d(on)}$ Turn-On Delay Time	17			ns	$V_{DD} = 175 \text{ V}$, $I_b = 5 \text{ A}$
t_r Rise Time	12			ns	$R_g = 5 \text{ W}$, $V_{GS} = 10 \text{ V}$
$T_{d(off)}$ 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	$T_c = 25^\circ \text{ C}$, $I_S = -10 \text{ A}$, $V_{GS} = 0$
t_{rr} Reverse Recovery Time	530			ns	$T_J = 150^\circ \text{ C}$, $I_F = I_S$, $di_F/ds = 100 \text{ A/ns}$

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

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

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

Parameter	Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS} Drain-Source Breakdown Voltage	500			V	$V_{GS} = 0$, $I_b = 250 \text{ mA}$
$V_{GS(th)}$ Gate-Threshold Voltage	2.0	4.0		V	$V_{DS} = V_{GS}$, $I_b = 250 \text{ mA}$
I_{SSFF} Gate-Body Leakage Forward		100		nA	$V_{GS} = 20 \text{ V}$
I_{SSRF} Gate-Body Leakage Reverse		-100		nA	$V_{GS} = -20 \text{ V}$
I_{SS} Gate-Body Leakage (OM6112)		± 500		nA	$V_{GS} = \pm 12.8 \text{ V}$
I_{DSS} Zero Gate Voltage Drain Current	0.1	0.25		mA	$V_{DS} = \text{Max. Rat.}$, $V_{GS} = 0$
Current	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	$V_{DS} = 2 V_{DS(on)}$, $V_{GS} = 10 \text{ V}$
$V_{DS(on)}$ Static Drain-Source On-State Voltage ¹		3.2	3.4	V	$V_{GS} = 10 \text{ V}$, $I_b = 4 \text{ A}$
$R_{DS(on)}$ Static Drain-Source On-State Resistance ¹		0.8	0.85		$V_{GS} = 10 \text{ V}$, $I_b = 4 \text{ A}$
$R_{DS(on)}$ Static Drain-Source On-State Resistance ¹		1.50	1.65		$V_{GS} = 10 \text{ V}$, $I_b = 4 \text{ A}$, $T_c = 125^\circ \text{ C}$

DYNAMIC

g_{fs} Forward Transconductance ¹	4.0			S (M)	$V_{DS} = 2 V_{DS(on)}$, $I_b = 4 \text{ A}$
C_{iss} Input Capacitance	1275			pF	$V_{GS} = 0$
C_{oss} Output Capacitance	200			pF	$V_{DS} = 25 \text{ V}$
C_{riss} Reverse Transfer Capacitance	85			pF	$f = 1 \text{ MHz}$
$T_{d(on)}$ Turn-On Delay Time	17			ns	$V_{DD} = 200 \text{ V}$, $I_b = 4 \text{ A}$
t_r Rise Time	5			ns	$R_g = 5 \text{ W}$, $V_{GS} = 10 \text{ V}$
$T_{d(off)}$ 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	$T_c = 25^\circ \text{ C}$, $I_S = -18 \text{ A}$, $V_{GS} = 0$
t_{rr} Reverse Recovery Time	700			ns	$T_J = 150^\circ \text{ C}$, $I_F = I_S$, $di_F/ds = 100 \text{ A/ms}$

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

OM6009SA - OM6112SA

OM6009SA - OM6112SA

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

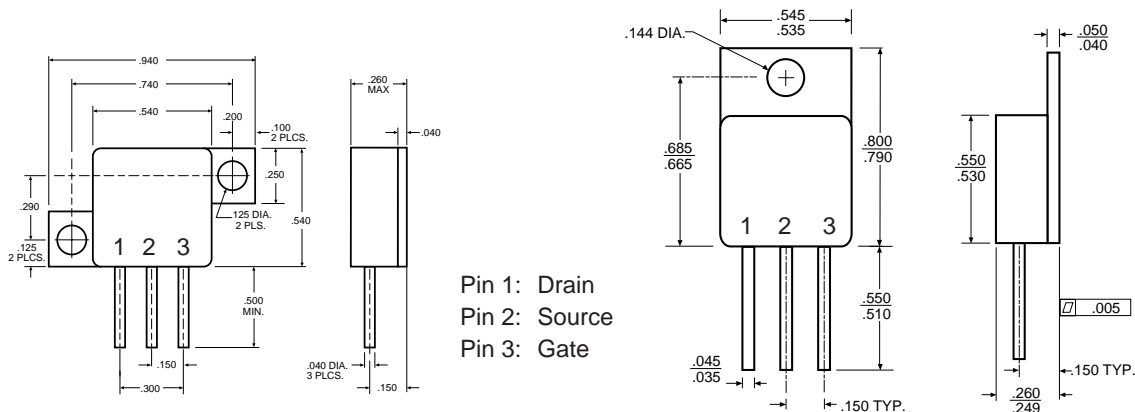
Parameter	OM6009 OM6109	OM6010 OM6110	OM6011 OM6111	OM6012 OM6112	Units
V_{DS}	100	200	400	500	V
V_{DGR}	100	200	400	500	V
$I_D @ T_C = 25^\circ\text{C}$	± 22	± 18	± 10	± 8	A
$I_D @ T_C = 100^\circ\text{C}$	± 17	± 11	± 6	± 5	A
I_{DM}	± 88	± 72	± 40	± 32	A
V_{GS}	± 20	± 20	± 20	± 20	V
$P_D @ T_C = 25^\circ\text{C}$	125	125	125	125	W
$P_D @ T_C = 100^\circ\text{C}$	50	50	50	50	W
Junction To Case	1.0	1.0	1.0	1.0	$W/^\circ\text{C}$
Junction To Ambient	.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	$^\circ\text{C}$
Lead Temperature	(1/16" from case for 10 secs.)	300	300	300	$^\circ\text{C}$

- 1 Pulse Test: Pulse width 300 μsec . Duty Cycle 2%.
- 2 Package Pin Limitation = 25 Amps

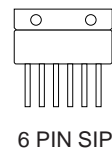
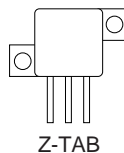
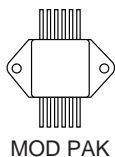
THERMAL RESISTANCE

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.

3.1