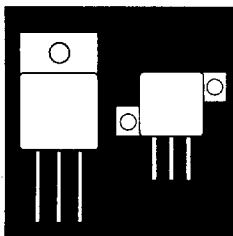


POWER MOSFETS IN HERMETIC ISOLATED TO-254AA PACKAGE



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.

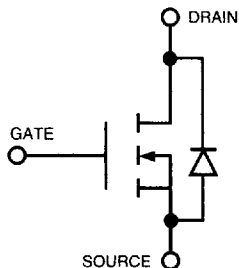
MAXIMUM RATINGS

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

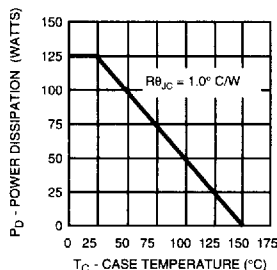
Note: OM61XX Series include gate protection circuitry.

3.1

SCHEMATIC



POWER RATING



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**ELECTRICAL CHARACTERISTICS: T_c = 25° 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 μA
V _{GS(th)} Gate-Threshold Voltage	2.0	4.0		V	V _{DS} = V _{GS} , I _b = 250 μA
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} = ± 12.8 V
I _{DSS} Zero Gate Voltage Drain Current	0.1	0.25		mA	V _{GS} = Max. Rat., V _{GS} = 0
	0.2	1.0		mA	V _{GS} = 0.8 Max. Rat., V _{GS} = 0, T _c = 125° C
I _{D(on)} On-State Drain Current ¹	22			A	V _{DS} ≥ 2 V _{DSS(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 _b = 15 A
R _{DS(on)} Static Drain-Source On-State Resistance ¹	.085	.095		Ω	V _{GS} = 10 V, I _b = 15 A
R _{DS(on)} Static Drain-Source On-State Resistance ¹	.130	.155		Ω	V _{GS} = 10 V, I _b = 15 A, T _c = 125° C

DYNAMIC

Parameter	Min.	Typ.	Max.	Units	Test Conditions
g _{fs} Forward Transconductance ¹	10.0			S (S)	V _{DS} ≥ 2 V _{DSS(on)} , I _b = 15 A
C _{iss} Input Capacitance	1275			pF	V _{GS} = 0
C _{oss} Output Capacitance	550			pF	V _{DS} = 25 V
C _{res} Reverse Transfer Capacitance	160			pF	f = 1 MHz
T _{d(on)} Turn-On Delay Time	16			ns	V _{DS} = 30 V, I _b = 5 A
t _r Rise Time	19			ns	R _θ = 5 Ω, 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

Parameter	Min.	Typ.	Max.	Units	Test Conditions
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° C, I _S = -24 A, V _{GS} = 0
t _r Reverse Recovery Time	200			ns	T _J = 150° C, I _F = I _S , dI _F /ds = 100 A/μs

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

**ELECTRICAL CHARACTERISTICS: T_c = 25° 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 μA
V _{GS(th)} Gate-Threshold Voltage	2.0	4.0		V	V _{DS} = V _{GS} , I _b = 250 μA
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} = ± 12.8 V
I _{DSS} Zero Gate Voltage Drain Current	0.1	0.25		mA	V _{GS} = Max. Rat., V _{GS} = 0
	0.2	1.0		mA	V _{GS} = 0.8 Max. Rat., V _{GS} = 0, T _c = 125° C
I _{D(on)} On-State Drain Current ¹	18			A	V _{DS} ≥ 2 V _{DSS(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 _b = 10 A
R _{DS(on)} Static Drain-Source On-State Resistance ¹	0.14	0.18		Ω	V _{GS} = 10 V, I _b = 10 A
R _{DS(on)} Static Drain-Source On-State Resistance ¹	0.28	0.36		Ω	V _{GS} = 10 V, I _b = 10 A, T _c = 125° C

DYNAMIC

Parameter	Min.	Typ.	Max.	Units	Test Conditions
g _{fs} Forward Transconductance ¹	6.0			S (S)	V _{DS} ≥ 2 V _{DSS(on)} , I _b = 10 A
C _{iss} Input Capacitance	1000			pF	V _{GS} = 0
C _{oss} Output Capacitance	250			pF	V _{DS} = 25 V
C _{res} Reverse Transfer Capacitance	100			pF	f = 1 MHz
T _{d(on)} Turn-On Delay Time	17			ns	V _{DS} = 75 V, I _b = 18 A
t _r Rise Time	52			ns	R _θ = 5 Ω, 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

Parameter	Min.	Typ.	Max.	Units	Test Conditions
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° C, I _S = -18 A, V _{GS} = 0
t _r Reverse Recovery Time	350			ns	T _J = 150° C, I _F = I _S , dI _F /ds = 100 A/μs

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

**ELECTRICAL CHARACTERISTICS: T_c = 25° 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 μA
V _{GS(th)} Gate-Threshold Voltage	2.0	4.0		V	V _{DS} = V _{GS} , I _b = 250 μA
I _{SSFF} Gate-Body Leakage Forward	100	nA		nA	V _{GS} = 20 V
I _{SSFR} Gate-Body Leakage Reverse	-100	nA		nA	V _{GS} = -20 V
I _{SS} Gate-Body Leakage (OM6111)	± 500	nA		nA	V _{GS} = ± 12.8 V
I _{SS} Zero Gate Voltage Drain Current	0.1	0.25		mA	V _{DS} = Max. Rat., V _{GS} = 0, T _c = 125° C
I _{SS} Current	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			A	V _{DS} ≥ 2 V _{DS(on)} , V _{GS} = 10 V
V _{DS(on)} Static Drain-Source On-State Voltage ¹	2.35	2.75		V	V _{GS} = 10 V, I _b = 5 A
R _{D(on)} Static Drain-Source On-State Resistance ¹	0.47	0.55		Ω	V _{GS} = 10 V, I _b = 5 A
R _{DS(on)} Static Drain-Source On-State Resistance ¹	0.93	1.10		Ω	V _{GS} = 10 V, I _b = 5 A, T _c = 125° C

DYNAMIC

Q _b	Forward Transconductance ¹	4.0	S (S)	V _{DS} ≥ 2 V _{DS(on)} , I _b = 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 _{don} Turn-On Delay Time	17		ns	V _{DD} = 175 V, I _b = 5 A
t _r Rise Time	12		ns	R _θ = 5 Ω, 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} <th>Source Current¹ (Body Diode)</th> <td>-40</td> <td>A</td> <td></td>	Source Current ¹ (Body Diode)	-40	A	
V _{SD} <th>Diode Forward Voltage¹</th> <td>-2</td> <td>V</td> <td>T_c = 25°C, I_S = -10 A, V_{GS} = 0</td>	Diode Forward Voltage ¹	-2	V	T _c = 25°C, I _S = -10 A, V _{GS} = 0
t _r <th>Reverse Recovery Time</th> <td>530</td> <td>ns</td> <td>T_J = 150°C, I_r = I_S, dI_r/ds = 100 A/μs</td>	Reverse Recovery Time	530	ns	T _J = 150°C, I _r = I _S , dI _r /ds = 100 A/μs

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

**ELECTRICAL CHARACTERISTICS: T_c = 25° 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 μA
V _{GS(th)} Gate-Threshold Voltage	2.0	4.0		V	V _{DS} = V _{GS} , I _b = 250 μA
I _{SSFF} Gate-Body Leakage Forward	100	nA		nA	V _{GS} = 20 V
I _{SSFR} Gate-Body Leakage Reverse	-100	nA		nA	V _{GS} = -20 V
I _{SS} Gate-Body Leakage (OM6112)	± 500	nA		nA	V _{GS} = ± 12.8 V
I _{SS} Zero Gate Voltage Drain Current	0.1	0.25		mA	V _{DS} = Max. Rat., V _{GS} = 0, T _c = 125° C
I _{SS} Current	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	8.0			A	V _{DS} ≥ 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 _b = 4 A
R _{D(on)} Static Drain-Source On-State Resistance ¹	0.8	0.85		Ω	V _{GS} = 10 V, I _b = 4 A
R _{DS(on)} Static Drain-Source On-State Resistance ¹	1.50	1.65		Ω	V _{GS} = 10 V, I _b = 4 A, T _c = 125° C

DYNAMIC

g _m	Forward Transconductance ¹	4.0	S (S)	V _{DS} ≥ 2 V _{DS(on)} , I _b = 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 _{don} Turn-On Delay Time	17		ns	V _{DD} = 200 V, I _b = 4 A
t _r Rise Time	5		ns	R _θ = 5 Ω, 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} <th>Source Current¹ (Body Diode)</th> <td>-32</td> <td>A</td> <td></td>	Source Current ¹ (Body Diode)	-32	A	
V _{SD} <th>Diode Forward Voltage¹</th> <td>-2</td> <td>V</td> <td>T_c = 25°C, I_S = -18 A, V_{GS} = 0</td>	Diode Forward Voltage ¹	-2	V	T _c = 25°C, I _S = -18 A, V _{GS} = 0
t _r <th>Reverse Recovery Time</th> <td>700</td> <td>ns</td> <td>T_J = 150°C, I_r = I_S, dI_r/ds = 100 A/μs</td>	Reverse Recovery Time	700	ns	T _J = 150°C, I _r = I _S , dI _r /ds = 100 A/μs

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

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

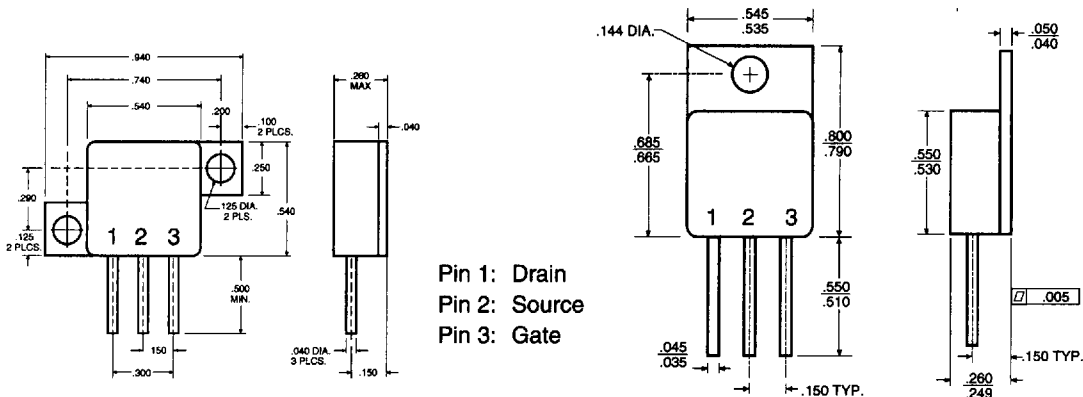
Parameter	OM6009 OM6109	OM6010 OM6110	OM6011 OM6111	OM6012 OM6112	Units
V_{DS} Drain-Source Voltage	100	200	400	500	V
V_{DGR} Drain-Gate Voltage ($R_{GS} = 1\text{ M}\Omega$)	100	200	400	500	V
$I_D @ T_C = 25^\circ\text{C}$ Continuous Drain Current ²	± 22	± 18	± 10	± 8	A
$I_D @ T_C = 100^\circ\text{C}$ 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 $\leq 300\ \mu\text{sec}$. Duty Cycle $\leq 2\%$.
- 2 Package Pin Limitation = 25 Amps

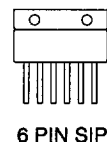
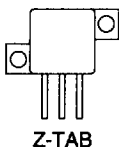
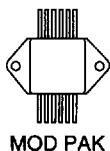
THERMAL RESISTANCE

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