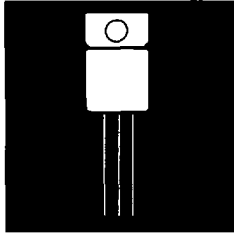


POWER MOSFET IN HERMETIC ISOLATED JEDEC TO-257AA PACKAGE



100V Thru 500V, Up To 14 Amp. N-Channel
 MOSFET With Or Without Zener Gate
 Clamp Protection

FEATURES

- Isolated Hermetic Metal Package
- Bi-Lateral Zener Gate Protection (Optional)
- Fast Switching, Low Drive Current
- Ease Of Paralleling For Added Power
- Low $R_{DS(on)}$
- Available Screened To MIL-S-19500, TX, TXV And S Levels

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 zener clamps in the OM6101ST series.

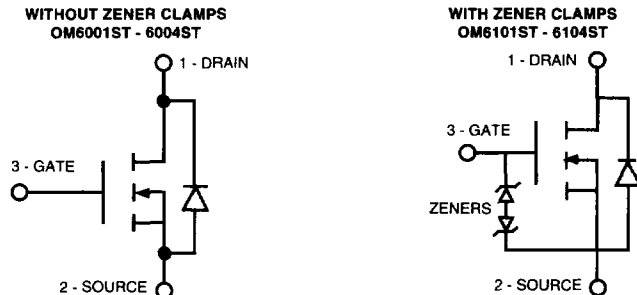
MAXIMUM RATINGS

PART NUMBER	V_{DS}	$R_{DS(on)}$	I_D
OM6001ST/OM6101ST	100 V	.20 Ω	14 A
OM6002ST/OM6102ST	200 V	.44 Ω	9 A
OM6003ST/OM6103ST	400 V	1.05 Ω	5.5 A
OM6004ST/OM6104ST	500 V	1.60 Ω	4.5 A

Note: OM6101ST thru OM6104ST is supplied with zener gate protection.
 OM6001ST thru OM6004ST is supplied without zener gate protection.

3.1

SCHEMATIC



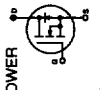
**ELECTRICAL CHARACTERISTICS: (T_C = 25°C unless otherwise noted)
STATIC P/N OM6101ST / OM6001ST (100V)**

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 _{DSS} Gate-Body Leakage		± 500		nA	V _{GS} = ± 12.8 V
I _{DSS} Gate-Body Leakage		± 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 _{ON(ON)} On-State Drain Current ¹	14			A	V _{DS} ≥ 2 V _{DSS(ON)} , V _{GS} = 10 V
V _{DSS(ON)} Static Drain-Source On-State Voltage ¹		1.2	1.60	V	V _{GS} = 10 V, I _b = 8 A
R _{DSON(ON)} Static Drain-Source On-State Resistance ¹			0.20	Ω	V _{GS} = 10 V, I _b = 8 A
R _{DSON(ON)} Static Drain-Source On-State Resistance ¹			0.40	Ω	V _{GS} = 10 V, I _b = 8 A, T _C = 125°C

DYNAMIC

Parameter	Min.	Typ.	Max.	Units	Test Conditions
g _{fs} Forward Transconductance ¹	4.0			S (Ω)	V _{DS} ≥ 2 V _{DSS(ON)} , I _b = 8 A
C _{iss} Input Capacitance		750		pF	V _{GS} = 0
C _{oss} Output Capacitance		250		pF	V _{GS} = 25 V
C _{res} Reverse Transfer Capacitance		100		pF	f = 1 MHz
t _{turn(ON)} Turn-On Delay Time		15		ns	V _{DS} = 30 V, I _b = 8 A
t _r Rise Time		35		ns	R _θ = 7.5 Ω, V _{GS} = 10 V
t _{turn(OFF)} Turn-Off Delay Time		38		ns	
t _f Fall Time		23		ns	

BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS

Parameter	Min.	Typ.	Max.	Units	Test Conditions
I _S Continuous Source Current (Body Diode)			- 14	A	 <p>Modified MOSPOWER symbol showing the integral P-N Junction rectifier.</p>
I _{SM} Source Current ¹ (Body Diode)			- 56	A	
V _{SD} Diode Forward Voltage ¹			- 2.5	V	
t _{rr} Reverse Recovery Time		100		ns	T _C = 25°C, I _S = -14 A, V _{GS} = 0 T _C = 25°C, I _S = -12 A, V _{GS} = 0 T _J = 150°C, I _r = I _S , dI _F /ds = 100 A/μs

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

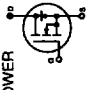
**ELECTRICAL CHARACTERISTICS: (T_C = 25°C unless otherwise noted)
STATIC P/N OM6102ST / OM6002 ST (200V)**

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 _{DSS} Gate-Body Leakage		± 500		nA	V _{GS} = ± 12.8 V
I _{DSS} Gate-Body Leakage		± 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 _{ON(ON)} On-State Drain Current ¹	9.0			A	V _{DS} ≥ 2 V _{DSS(ON)} , V _{GS} = 10 V
V _{DSS(ON)} Static Drain-Source On-State Voltage ¹		1.25	2.2	V	V _{GS} = 10 V, I _b = 5.0 A
R _{DSON(ON)} Static Drain-Source On-State Resistance ¹			0.44	Ω	V _{GS} = 10 V, I _b = 5.0 A
R _{DSON(ON)} Static Drain-Source On-State Resistance ¹			0.88	Ω	V _{GS} = 10 V, I _b = 5.0 A, T _C = 125°C

DYNAMIC

Parameter	Min.	Typ.	Max.	Units	Test Conditions
g _{fs} Forward Transconductance ¹	3.0	5.8		S (Ω)	V _{DS} ≥ 2 V _{DSS(ON)} , I _b = 5.0 A
C _{iss} Input Capacitance		780		pF	V _{GS} = 0
C _{oss} Output Capacitance		150		pF	V _{DS} = 25 V
C _{res} Reverse Transfer Capacitance		55		pF	f = 1 MHz
t _{turn(ON)} Turn-On Delay Time		9		ns	V _{DS} = 75 V, I _b = 5.0 A
t _r Rise Time		18		ns	R _θ = 7.5 Ω, V _{GS} = 10 V
t _{turn(OFF)} Turn-Off Delay Time		45		ns	
t _f Fall Time		27		ns	

BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS

Parameter	Min.	Typ.	Max.	Units	Test Conditions
I _S Continuous Source Current (Body Diode)			- 9	A	 <p>Modified MOSPOWER symbol showing the integral P-N Junction rectifier.</p>
I _{SM} Source Current ¹ (Body Diode)			- 36	A	
V _{SD} Diode Forward Voltage ¹			- 2	V	
t _{rr} Reverse Recovery Time		250		ns	T _C = 25°C, I _S = -9 A, V _{GS} = 0 T _C = 25°C, I _S = -8 A, V _{GS} = 0 T _J = 150°C, I _r = I _S , dI _F /ds = 100 A/μs

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

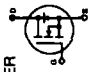
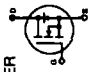
**ELECTRICAL CHARACTERISTICS: (T_C = 25°C unless otherwise noted)
STATIC P/N OM6103ST / OM6003ST (400V)**

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 _{SS} Gate-Body Leakage (OM6103)		± 500		nA	V _{GS} = ± 12.8 V
I _{SS} Gate-Body Leakage (OM6003)		± 100		nA	V _{GS} = ± 20 V
I _{BSS} Zero Gate Voltage Drain Current		0.1	0.25	mA	V _{DS} = Max. Rat., V _{GS} = 0, T _C = 125°C
		0.2	1.0	mA	
I _{D(on)} On-State Drain Current ¹	5.5			A	V _{DS} ≥ 2 V _{DS(on)} , V _{GS} = 10 V
V _{DS(on)} Static Drain-Source On-State Voltage ¹		2.4	3.15	V	V _{GS} = 10 V, I _B = 3.0 A
R _{DS(on)} Static Drain-Source On-State Resistance ¹			1.05	Ω	V _{GS} = 10 V, I _B = 3.0 A
R _{DS(on)} Static Drain-Source On-State Resistance ¹			2.0	Ω	V _{GS} = 10 V, I _B = 3.0 A, T _C = 125°C

DYNAMIC

g _m	Forward Transconductance ¹	3.0	3.6	S(t)	V _{DS} ≥ 2 V _{DS(on)} , I _B = 3.0 A
C _{iss} <td>Input Capacitance</td> <td>700</td> <td></td> <td>pF</td> <td>V_{GS} = 0</td>	Input Capacitance	700		pF	V _{GS} = 0
C _{oss} <td>Output Capacitance</td> <td>70</td> <td></td> <td>pF</td> <td>V_{DS} = 25 V</td>	Output Capacitance	70		pF	V _{DS} = 25 V
C _{res} <td>Reverse Transfer Capacitance</td> <td>20</td> <td></td> <td>pF</td> <td>f = 1 MHz</td>	Reverse Transfer Capacitance	20		pF	f = 1 MHz
t _{turn-on} <td>Turn-On Delay Time</td> <td>18</td> <td></td> <td>ns</td> <td>V_{DS} = 175 V, I_B = 3.0 A</td>	Turn-On Delay Time	18		ns	V _{DS} = 175 V, I _B = 3.0 A
t _r <td>Rise Time</td> <td>20</td> <td></td> <td>ns</td> <td>R_θ = 10 Ω, V_{GS} = 10 V</td>	Rise Time	20		ns	R _θ = 10 Ω, V _{GS} = 10 V
t _{turn-off} <td>Turn-Off Delay Time</td> <td>40</td> <td></td> <td>ns</td> <td></td>	Turn-Off Delay Time	40		ns	
t _f <td>Fall Time</td> <td>25</td> <td></td> <td>ns</td> <td></td>	Fall Time	25		ns	

BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS

I _S	Continuous Source Current (Body Diode)	-5.5	A	Modified MOSPOWER symbol showing the integral P-N Junction rectifier.
I _{SM} <th>Source Current¹ (Body Diode)</th> <td>-22</td> <td>A</td> <td rowspan="3">  </td>	Source Current ¹ (Body Diode)	-22	A	
V _{SD} <th>Diode Forward Voltage¹</th> <td>-1.6</td> <td>V</td>	Diode Forward Voltage ¹	-1.6	V	
t _r <th>Reverse Recovery Time</th> <td>470</td> <td>ns</td>	Reverse Recovery Time	470	ns	

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

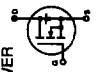
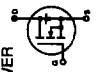
**ELECTRICAL CHARACTERISTICS: (T_C = 25°C unless otherwise noted)
STATIC P/N OM6104ST / OM6004ST (500V)**

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 _{SS} Gate-Body Leakage (OM6104)		± 500		nA	V _{GS} = ± 12.8 V
I _{SS} Gate-Body Leakage (OM6004)		± 100		nA	V _{GS} = ± 20 V
I _{BSS} Zero Gate Voltage Drain Current		0.1	0.25	mA	V _{DS} = Max. Rat., V _{GS} = 0, T _C = 125°C
		0.2	1.0	mA	
I _{D(on)} On-State Drain Current ¹	4.5			A	V _{DS} ≥ 2 V _{DS(on)} , V _{GS} = 10 V
V _{DS(on)} Static Drain-Source On-State Voltage ¹		3.25	4.00	V	V _{GS} = 10 V, I _B = 2.5 A
R _{DS(on)} Static Drain-Source On-State Resistance ¹			1.6	Ω	V _{GS} = 10 V, I _B = 2.5 A
R _{DS(on)} Static Drain-Source On-State Resistance ¹			3.3	Ω	V _{GS} = 10 V, I _B = 2.5 A, T _C = 125°C

DYNAMIC

g _m	Forward Transconductance ¹	2.5	2.8	S(t)	V _{DS} ≥ 2 V _{DS(on)} , I _B = 2.5 A
C _{iss} <td>Input Capacitance</td> <td>700</td> <td></td> <td>pF</td> <td>V_{GS} = 0</td>	Input Capacitance	700		pF	V _{GS} = 0
C _{oss} <td>Output Capacitance</td> <td>90</td> <td></td> <td>pF</td> <td>V_{DS} = 25 V</td>	Output Capacitance	90		pF	V _{DS} = 25 V
C _{res} <td>Reverse Transfer Capacitance</td> <td>30</td> <td></td> <td>pF</td> <td>f = 1 MHz</td>	Reverse Transfer Capacitance	30		pF	f = 1 MHz
t _{turn-on} <td>Turn-On Delay Time</td> <td>18</td> <td></td> <td>ns</td> <td>V_{DS} = 225 V, I_B = 2.5 A</td>	Turn-On Delay Time	18		ns	V _{DS} = 225 V, I _B = 2.5 A
t _r <td>Rise Time</td> <td>20</td> <td></td> <td>ns</td> <td>R_θ = 7.5 Ω, V_{GS} = 10 V</td>	Rise Time	20		ns	R _θ = 7.5 Ω, V _{GS} = 10 V
t _{turn-off} <td>Turn-Off Delay Time</td> <td>42</td> <td></td> <td>ns</td> <td></td>	Turn-Off Delay Time	42		ns	
t _f <td>Fall Time</td> <td>25</td> <td></td> <td>ns</td> <td></td>	Fall Time	25		ns	

BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS

I _S	Continuous Source Current (Body Diode)	-4.5	A	Modified MOSPOWER symbol showing the integral P-N Junction rectifier.
I _{SM} <th>Source Current¹ (Body Diode)</th> <td>-18</td> <td>A</td> <td rowspan="3">  </td>	Source Current ¹ (Body Diode)	-18	A	
V _{SD} <th>Diode Forward Voltage¹</th> <td>-1.4</td> <td>V</td>	Diode Forward Voltage ¹	-1.4	V	
t _r <th>Reverse Recovery Time</th> <td>430</td> <td>ns</td>	Reverse Recovery Time	430	ns	

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

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

Parameter		OM6001ST	OM6002ST	OM6003ST	OM6004ST	Units
		OM6101ST	OM6102ST	OM6103ST	OM6104ST	
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	± 14	± 9	± 5.5	± 4.5	A
$I_D @ T_C = 100^\circ\text{C}$	Continuous Drain Current ²	± 9	± 6	± 3.5	± 3	A
I_{DM}	Pulsed Drain Current ¹	± 56	± 36	± 22	± 18	A
$P_D @ T_C = 25^\circ\text{C}$	Maximum Power Dissipation	50	50	50	50	W
$P_D @ T_C = 100^\circ\text{C}$	Maximum Power Dissipation	20	20	20	20	W
Junction To Case	Linear Derating Factor	0.4	0.4	0.4	0.4	W/ $^\circ\text{C}$
Junction To Ambient	Linear Derating Factor	.015	.015	.015	.015	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	$^\circ\text{C}$

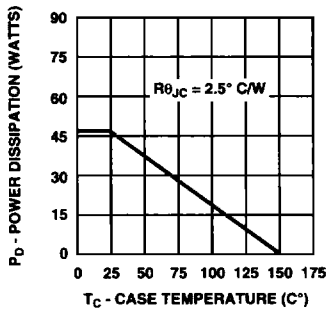
1 Pulse Test: Pulse width $\leq 300\ \mu\text{sec}$. Duty Cycle $\leq 2\%$.

2 Package Pin Limitations = 16 amps

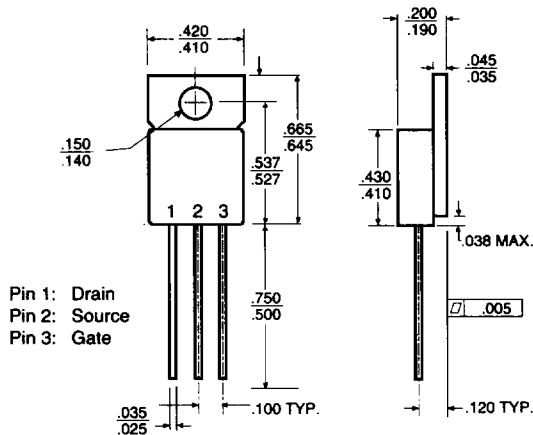
THERMAL RESISTANCE (MAXIMUM) at $T_A = 25^\circ\text{C}$

$R_{\theta JC}$	Junction-to-Case	2.5	$^\circ\text{C/W}$
$R_{\theta JA}$	Junction-to-Ambient	65	$^\circ\text{C/W}$ Free Air Operation

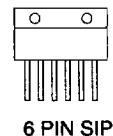
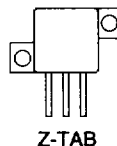
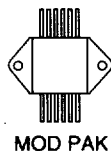
POWER DERATING



MECHANICAL OUTLINE WITH PIN CONNECTION



PACKAGE OPTIONS



Note: MOSFETs are also available in Z-Tab, dual and quad pak styles. Duals and quads available in non-gate versions only. Please call the factory for more information.