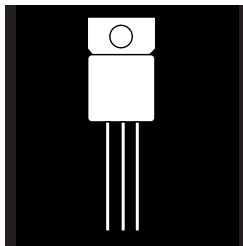


OM6001ST OM6003ST OM6101ST OM6103ST  
 OM6002ST OM6004ST OM6102ST OM6104ST

# 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.

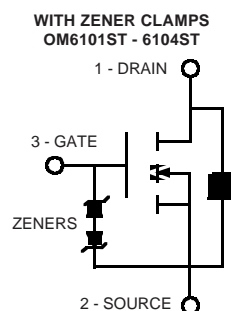
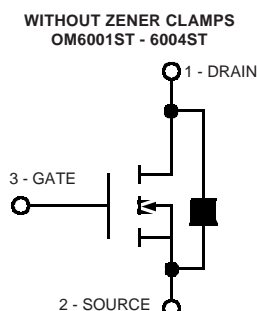
## MAXIMUM RATINGS

PART NUMBER	$V_{DS}$	$R_{DS(on)}$	$I_D$
OM6001ST/OM6101ST	100 V	.20	14 A
OM6002ST/OM6102ST	200 V	.44	9 A
OM6003ST/OM6103ST	400 V	1.05	5.5 A
OM6004ST/OM6104ST	500 V	1.60	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<sub>C</sub> = 25°C unless otherwise noted)  
STATIC P/N OM6101ST / OM6001ST (100V)**

Parameter	Min.	Typ.	Max.	Units	Test Conditions
BV <sub>DSS</sub> Drain-Source Breakdown Voltage	100			V	V <sub>GS</sub> = 0, I <sub>D</sub> = 250 mA
V <sub>GS(th)</sub> Gate-Threshold Voltage	2.0	4.0		V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 mA
I <sub>DSS</sub> Gate-Body Leakage (OM6101)		± 500		nA	V <sub>GS</sub> = ± 12.8 V
I <sub>DSS</sub> Gate-Body Leakage (OM6001)		± 100		nA	V <sub>GS</sub> = ± 20 V
I <sub>DSS</sub> Zero Gate Voltage Drain Current		0.1	0.25	mA	V <sub>DS</sub> = Max. Rat., V <sub>GS</sub> = 0
I <sub>DSS</sub> Current		0.2	1.0	mA	V <sub>DS</sub> = 0.8 Max. Rat., V <sub>GS</sub> = 0, T <sub>C</sub> = 125°C
I <sub>D(on)</sub> On-State Drain Current <sup>1</sup>	14			A	V <sub>DS</sub> = 2 V <sub>DSS(on)</sub> , V <sub>GS</sub> = 10 V
V <sub>DS(on)</sub> Static Drain-Source On-State Voltage <sup>1</sup>		1.2	1.60	V	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 8 A
R <sub>DSS(on)</sub> Static Drain-Source On-State Resistance <sup>1</sup>			0.20		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 8 A
R <sub>DS(on)</sub> Static Drain-Source On-State Resistance <sup>1</sup>			0.40		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 8 A, T <sub>C</sub> = 125°C

**DYNAMIC**

Parameter	Min.	Typ.	Max.	Units	Test Conditions
g <sub>fs</sub> Forward Transconductance <sup>1</sup>	4.0			S (M)	V <sub>DS</sub> = 2 V <sub>DSS(on)</sub> , I <sub>D</sub> = 8 A
C <sub>iss</sub> Input Capacitance		750		pF	V <sub>GS</sub> = 0
C <sub>oss</sub> Output Capacitance		250		pF	V <sub>DS</sub> = 25 V
C <sub>rss</sub> Reverse Transfer Capacitance		100		pF	f = 1 MHz
t <sub>d(on)</sub> Turn-On Delay Time		15		ns	V <sub>DD</sub> = 30 V, I <sub>D</sub> @ 8 A
t <sub>r</sub> Rise Time		35		ns	
t <sub>d(off)</sub> Turn-Off Delay Time		38		ns	R <sub>g</sub> = 7.5 Ω, V <sub>DS</sub> = 10 V
t <sub>f</sub> Fall Time		23		ns	

**BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS**

Parameter	Min.	Typ.	Max.	Units	Test Conditions
I <sub>S</sub> Continuous Source Current (Body Diode)			-14	A	Modified MOSPOWER symbol showing the integral P-N Junction rectifier.
I <sub>SM</sub> Source Current <sup>1</sup> (Body Diode)			-56	A	T <sub>C</sub> = 25°C, I <sub>S</sub> = -14 A, V <sub>GS</sub> = 0
V <sub>SD</sub> Diode Forward Voltage <sup>1</sup>			-2.5	V	T <sub>C</sub> = 25°C, I <sub>S</sub> = -12 A, V <sub>GS</sub> = 0
t <sub>rr</sub> Reverse Recovery Time		100		ns	T <sub>J</sub> = 150°C, I <sub>F</sub> = I <sub>S</sub> , dI <sub>F</sub> /ds = 100 A/ms

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

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

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

Parameter	Min.	Typ.	Max.	Units	Test Conditions
BV <sub>DSS</sub> Drain-Source Breakdown Voltage	200			V	V <sub>GS</sub> = 0, I <sub>D</sub> = 250 mA
V <sub>GS(th)</sub> Gate-Threshold Voltage	2.0	4.0		V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 mA
I <sub>DSS</sub> Gate-Body Leakage (OM6102)		± 500		nA	V <sub>GS</sub> = ± 12.8 V
I <sub>DSS</sub> Gate-Body Leakage (OM6002)		± 100		nA	V <sub>GS</sub> = ± 20 V
I <sub>DSS</sub> Zero Gate Voltage Drain Current		0.1	0.25	mA	V <sub>DS</sub> = Max. Rat., V <sub>GS</sub> = 0
I <sub>DSS</sub> Current		0.2	1.0	mA	V <sub>DS</sub> = 0.8 Max. Rat., V <sub>GS</sub> = 0, T <sub>C</sub> = 125°C
I <sub>D(on)</sub> On-State Drain Current <sup>1</sup>	9.0			A	V <sub>DS</sub> = 2 V <sub>DSS(on)</sub> , V <sub>GS</sub> = 10 V
V <sub>DS(on)</sub> Static Drain-Source On-State Voltage <sup>1</sup>		1.25	2.2	V	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 5.0 A
R <sub>DSS(on)</sub> Static Drain-Source On-State Resistance <sup>1</sup>			0.44		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 5.0 A
R <sub>DS(on)</sub> Static Drain-Source On-State Resistance <sup>1</sup>			0.88		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 5.0 A, T <sub>C</sub> = 125°C

**DYNAMIC**

Parameter	Min.	Typ.	Max.	Units	Test Conditions
g <sub>fs</sub> Forward Transconductance <sup>1</sup>	3.0	5.8		S (M)	V <sub>DS</sub> = 2 V <sub>DSS(on)</sub> , I <sub>D</sub> = 5.0 A
C <sub>iss</sub> Input Capacitance		780		pF	V <sub>GS</sub> = 0
C <sub>oss</sub> Output Capacitance		150		pF	V <sub>DS</sub> = 25 V
C <sub>rss</sub> Reverse Transfer Capacitance		55		pF	f = 1 MHz
t <sub>d(on)</sub> Turn-On Delay Time		9		ns	V <sub>DD</sub> = 75V, I <sub>D</sub> @ 5.0 A
t <sub>r</sub> Rise Time		18		ns	R <sub>g</sub> = 7.5 Ω, V <sub>GS</sub> = 10 V
t <sub>d(off)</sub> Turn-Off Delay Time		45		ns	
t <sub>f</sub> Fall Time		27		ns	

**BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS**

Parameter	Min.	Typ.	Max.	Units	Test Conditions
I <sub>S</sub> Continuous Source Current (Body Diode)			-9	A	Modified MOSPOWER symbol showing the integral P-N Junction rectifier.
I <sub>SM</sub> Source Current <sup>1</sup> (Body Diode)			-36	A	T <sub>C</sub> = 25°C, I <sub>S</sub> = -9 A, V <sub>GS</sub> = 0
V <sub>SD</sub> Diode Forward Voltage <sup>1</sup>			-2	V	T <sub>C</sub> = 25°C, I <sub>S</sub> = -8 A, V <sub>GS</sub> = 0
t <sub>rr</sub> Reverse Recovery Time		250		ns	T <sub>J</sub> = 150°C, I <sub>F</sub> = I <sub>S</sub> , dI <sub>F</sub> /ds = 100 A/ms

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

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

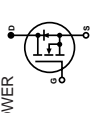
**ELECTRICAL CHARACTERISTICS: (T<sub>C</sub> = 25°C unless otherwise noted)  
STATIC P/N OM6103ST / OM6003ST (400V)**

Parameter	Min.	Typ.	Max.	Units	Test Conditions
BV <sub>DSS</sub> Drain-Source Breakdown Voltage	400			V	V <sub>GS</sub> = 0, I <sub>b</sub> = 250 mA
V <sub>GS(th)</sub> Gate-Threshold Voltage	2.0	4.0		V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>b</sub> = 250 mA
I <sub>SS</sub> Gate-Body Leakage		± 500		nA	V <sub>GS</sub> = ± 12.8 V
I <sub>SS</sub> Gate-Body Leakage		± 100		nA	V <sub>GS</sub> = ± 20 V
I <sub>DSS</sub> Zero Gate Voltage Drain Current		0.1	0.25	mA	V <sub>DS</sub> = Max. Rat., V <sub>GS</sub> = 0
I <sub>DSS</sub> Current		0.2	1.0	mA	V <sub>DS</sub> = 0.8 Max. Rat., V <sub>GS</sub> = 0, T <sub>C</sub> = 125°C
I <sub>D(on)</sub> On-State Drain Current <sup>1</sup>	5.5			A	V <sub>DS</sub> = 2 V <sub>DS(on)</sub> , V <sub>GS</sub> = 10 V
V <sub>DS(on)</sub> Static Drain-Source On-State Voltage <sup>1</sup>		2.4	3.15	V	V <sub>GS</sub> = 10 V, I <sub>b</sub> = 3.0 A
R <sub>DS(on)</sub> Static Drain-Source On-State Resistance <sup>1</sup>			1.05		V <sub>GS</sub> = 10 V, I <sub>b</sub> = 3.0 A
R <sub>DS(on)</sub> Static Drain-Source On-State Resistance <sup>1</sup>			2.0		V <sub>GS</sub> = 10 V, I <sub>b</sub> = 3.0 A, T <sub>C</sub> = 125°C

**DYNAMIC**

g <sub>fs</sub> Forward Transconductance <sup>1</sup>	3.0	3.6		S (M)	V <sub>DS</sub> = 2 V <sub>DS(on)</sub> , I <sub>b</sub> = 3.0 A
C <sub>iss</sub> Input Capacitance		700		pF	V <sub>GS</sub> = 0
C <sub>oss</sub> Output Capacitance		70		pF	V <sub>DS</sub> = 25 V
C <sub>res</sub> Reverse Transfer Capacitance		20		pF	f = 1 MHz
t <sub>d(on)</sub> Turn-On Delay Time		18		ns	V <sub>DD</sub> = 175 V, I <sub>b</sub> @ 3.0 A
t <sub>r</sub> Rise Time		20		ns	R <sub>g</sub> = 10 n, V <sub>GS</sub> = 10 V
t <sub>d(off)</sub> Turn-Off Delay Time		40		ns	
t <sub>f</sub> Fall Time		25		ns	

**BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS**

I <sub>S</sub> Continuous Source Current (Body Diode)		- 5.5		A	 Modified MOSPOWER symbol showing the integral P-N Junction rectifier.
I <sub>SM</sub> Source Current <sup>1</sup> (Body Diode)		- 22		A	
V <sub>SD</sub> Diode Forward Voltage <sup>1</sup>		- 1.6		V	
t <sub>rr</sub> Reverse Recovery Time		470		ns	

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

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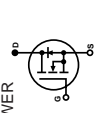
**ELECTRICAL CHARACTERISTICS: (T<sub>C</sub> = 25°C unless otherwise noted)  
STATIC P/N OM6104ST / OM6004ST (500V)**

Parameter	Min.	Typ.	Max.	Units	Test Conditions
BV <sub>DSS</sub> Drain-Source Breakdown Voltage	500			V	V <sub>GS</sub> = 0, I <sub>b</sub> = 250 mA
V <sub>GS(th)</sub> Gate-Threshold Voltage	2.0	4.0		V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>b</sub> = 250 mA
I <sub>SS</sub> Gate-Body Leakage		± 500		nA	V <sub>GS</sub> = ± 12.8 V
I <sub>SS</sub> Gate-Body Leakage		± 100		nA	V <sub>GS</sub> = ± 20 V
I <sub>DSS</sub> Zero Gate Voltage Drain Current		0.1	0.25	mA	V <sub>DS</sub> = Max. Rat., V <sub>GS</sub> = 0
I <sub>DSS</sub> Current		0.2	1.0	mA	V <sub>DS</sub> = 0.8 Max. Rat., V <sub>GS</sub> = 0, T <sub>C</sub> = 125°C
I <sub>D(on)</sub> On-State Drain Current <sup>1</sup>	4.5			A	V <sub>DS</sub> = 2 V <sub>DS(on)</sub> , V <sub>GS</sub> = 10 V
V <sub>DS(on)</sub> Static Drain-Source On-State Voltage <sup>1</sup>		3.25	4.00	V	V <sub>GS</sub> = 10 V, I <sub>b</sub> = 2.5 A
R <sub>DS(on)</sub> Static Drain-Source On-State Resistance <sup>1</sup>			1.6		V <sub>GS</sub> = 10 V, I <sub>b</sub> = 2.5 A
R <sub>DS(on)</sub> Static Drain-Source On-State Resistance <sup>1</sup>			2.9		V <sub>GS</sub> = 10 V, I <sub>b</sub> = 2.5 A, T <sub>C</sub> = 125°C

**DYNAMIC**

g <sub>fs</sub> Forward Transconductance <sup>1</sup>	2.5	2.8		S (M)	V <sub>DS</sub> = 2 V <sub>DS(on)</sub> , I <sub>b</sub> = 2.5 A
C <sub>iss</sub> Input Capacitance		700		pF	V <sub>GS</sub> = 0
C <sub>oss</sub> Output Capacitance		90		pF	V <sub>DS</sub> = 25 V
C <sub>res</sub> Reverse Transfer Capacitance		30		pF	f = 1 MHz
t <sub>d(on)</sub> Turn-On Delay Time		18		ns	V <sub>DD</sub> = 225 V, I <sub>b</sub> @ 2.5 A
t <sub>r</sub> Rise Time		20		ns	R <sub>g</sub> = 7.5 n, V <sub>GS</sub> = 10 V
t <sub>d(off)</sub> Turn-Off Delay Time		42		ns	
t <sub>f</sub> Fall Time		25		ns	

**BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS**

I <sub>S</sub> Continuous Source Current (Body Diode)		- 4.5		A	 Modified MOSPOWER symbol showing the integral P-N Junction rectifier.
I <sub>SM</sub> Source Current <sup>1</sup> (Body Diode)		- 18		A	
V <sub>SD</sub> Diode Forward Voltage <sup>1</sup>		- 1.4		V	
t <sub>rr</sub> Reverse Recovery Time		430		ns	

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

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

## OM6001ST - OM6104ST

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

Parameter	OM6001ST OM6101ST	OM6002ST OM6102ST	OM6003ST OM6103ST	OM6004ST OM6104ST	Units
$V_{DS}$	100	200	400	500	V
$V_{DGR}$	100	200	400	500	V
$I_D @ T_C = 25^\circ\text{C}$	$\pm 14$	$\pm 9$	$\pm 5.5$	$\pm 4.5$	A
$I_D @ T_C = 100^\circ\text{C}$	$\pm 9$	$\pm 6$	$\pm 3.5$	$\pm 3$	A
$I_{DM}$	$\pm 56$	$\pm 36$	$\pm 22$	$\pm 18$	A
$P_D @ T_C = 25^\circ\text{C}$	50	50	50	50	W
$P_D @ T_C = 100^\circ\text{C}$	20	20	20	20	W
Junction To Case	0.4	0.4	0.4	0.4	$W/^\circ\text{C}$
Junction To Ambient	.015	.015	.015	.015	$W/^\circ\text{C}$
$T_J$	Operating and				
$T_{stg}$	Storage Temperature Range				$^\circ\text{C}$
Lead Temperature	(1/16" from case for 10 secs.)	300	300	300	$^\circ\text{C}$

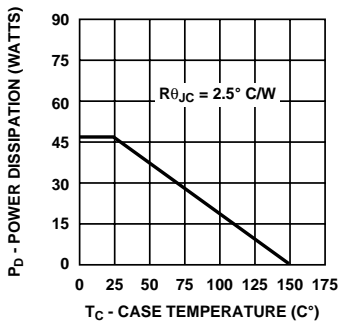
1 Pulse Test: Pulse width 300  $\mu\text{sec}$ . Duty Cycle 2%.

2 Package Pin Limitations = 16 amps

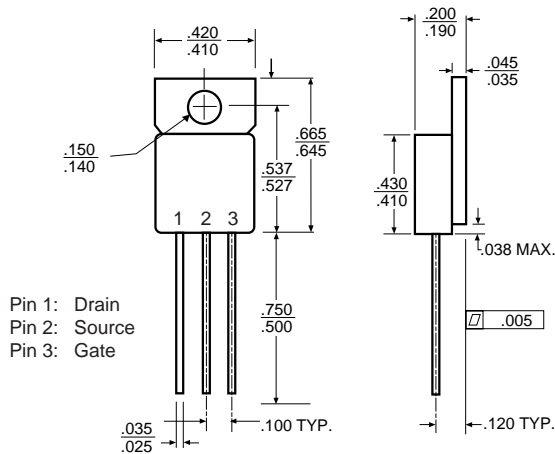
### THERMAL RESISTANCE (MAXIMUM) at $T_A = 25^\circ\text{C}$

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

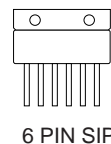
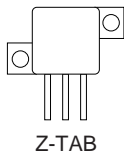
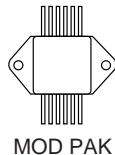
### POWER DERATING



### 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.