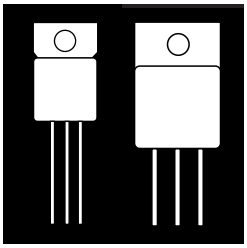
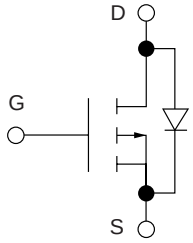
POWER MOSFET IN HERMETIC ISOLATED JEDEC PACKAGE, P-CHANNEL



60V To 500V P-Channel MOSFET In A Hermetic Package

FEATURES

- Isolated Hermetic Metal Package
- P-Channel
- Fast Switching, Low Drive Current
- Ease of Paralleling For Added Power
- Available Screened To MIL-S-19500, TX, TXV And S Level
- 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.

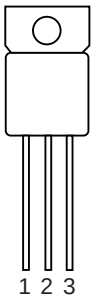
MAXIMUM RATINGS (T_J = 25°C unless otherwise noted.)

BASIC PART NUMBER	V_{DS} (V)	$R_{DS(on)}$ ( )		I_D (A)
		TO-257AA	TO-254AA	
OM23P06	60	.16	.12	23
OM20P10	100	.20	.16	20
OM12P10	100	.34	.30	12
OM8P20	200	.80	.75	8
OM8P25	250	2.08	2.00	8
OM2P50	500	6.10	6.00	2

3.1

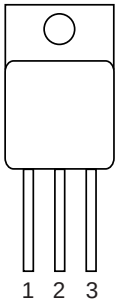
PIN CONNECTION

TO-257AA



Pin 1: Drain
Pin 2: Source
Pin 3: Gate

TO-254AA



ORDERING INFORMATION

Example:

OM20P10	ST	M
Basic Part Number	Case Style	Screening Level

Case Style:
ST = TO-257AA
SA = TO-254AA

Standard Products are supplied with glass feedthroughs. For ceramic feedthroughs, add letter “C” to part number: Example - OM20P10CST.

ELECTRICAL CHARACTERISTICS: (T_C = 25°C unless otherwise noted)

STATIC P/N OM23P06ST/OM23P06SA (60V)

Parameter			Min.	Max.	Units	Test Conditions
BV_{DSS}	Drain-Source Breakdown Voltage		60		V	V_{GS} = 0, I_D = 250 mA
$V_{GS(th)}$	Gate-Threshold Voltage		2	4.5	V	V_{DS} = V_{GS}, I_D = 1.0 mA
I_{GSS}	Gate-Body Leakage			± 100	nA	V_{GS} = ± 20 V
I_{DSS}	Zero Gate Voltage Drain Current			0.1	mA	V_{DS} = Max. Rat., V_{GS} = 0
				1.0	mA	V_{DS} = Max. Rat., V_{GS} = 0, T_C = 125° C
$V_{DS(on)}$	Static Drain-Source On-StateVoltage[1]			3.5	V	V_{GS} = 10 V, I_D = 23 A
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]	OM23P06ST		.16		V_{GS} = 10 V, I_D = 11.5 A
		OM23P06SA		.12		
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]	OM23P06ST		.32		V_{GS} = 10 V, I_D = 11.5 A, T_C = 125 C
		OM23P06SA		.24		

DYNAMIC

g_{fs}	Forward Transductance[1]	5.0		S(M)	V_{DS} 2 $V_{DS(on)}$, I_D = 11.5 A
C_{iss}	Input Capacitance		1700	pF	V_{GS} = 0
C_{oss}	Output Capacitance		900	pF	V_{DS} = 25 V
C_{rss}	Reverse Transfer Capacitance		400	pF	f = 1 MHz
$t_{d(on)}$	Turn-On Delay Time		30	ns	V_{DD} = 25 V, I_D = 23 A R_G = 13 W
t_r	Rise Time		170	ns	
$t_{d(off)}$	Turn-Off Delay Time		140	ns	
t_f	Fall Time		120	ns	

BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS

I_S	Continuous Source Current (Body Diode)		23	A	Modified MOSPOWER symbol showing the integral P-N Junction rectifier.
I_{SM}	Source Current[1] (Body Diode)		75	A	
V_{SD}	Diode Forward Voltage[1]		3.5	V	I_S = 23 A, V_{GS} = 0
t_{rr}	Reverse Recovery Time		200	ns	I_F = 23 A, dI_F/ds = 100 A/ms

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

ELECTRICAL CHARACTERISTICS: (T_C = 25°C unless otherwise noted)

STATIC P/N OM20P10ST/OM20P10SA (100V)

Parameter			Min.	Max.	Units	Test Conditions
BV_{DSS}	Drain-Source Breakdown Voltage		100		V	V_{GS} = 0, I_D = 250 mA
$V_{GS(th)}$	Gate-Threshold Voltage		2	4.5	V	V_{DS} = V_{GS}, I_D = 1.0 mA
I_{GSS}	Gate-Body Leakage			± 100	nA	V_{GS} = ± 20 V
I_{DSS}	Zero Gate Voltage Drain Current			.01	mA	V_{DS} = Max. Rat., V_{GS} = 0
				.10	mA	V_{DS} = Max. Rat., V_{GS} = 0, T_C = 125° C
$V_{DS(on)}$	Static Drain-Source On-State Voltage[1]			4.2	V	V_{GS} = 10 V, I_D = 20 A
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]	OM20P10ST		.20		V_{GS} = 10 V, I_D = 10 A
		OM20P10SA		.16		
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]	OM20P10ST		.40		V_{GS} = 10 V, I_D = 10 A, T_C = 125 C
		OM20P10SA		.32		

DYNAMIC

g_{fs}	Forward Transductance[1]	5.0		S(M)	V_{DS} 2 $V_{DS(on)}$, I_D = 10 A
C_{iss}	Input Capacitance		2000	pF	V_{GS} = 0
C_{oss}	Output Capacitance		950	pF	V_{DS} = 25 V
C_{rss}	Reverse Transfer Capacitance		400	pF	f = 1 MHz
$t_{d(on)}$	Turn-On Delay Time		45	ns	V_{DD} = 25 V, I_D = 10 A R_G = 50 W
t_r	Rise Time		200	ns	
$t_{d(off)}$	Turn-Off Delay Time		150	ns	
t_f	Fall Time		150	ns	

BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS

I_S	Continuous Source Current (Body Diode)		20	A	Modified MOSPOWER symbol showing the integral P-N Junction rectifier.
I_{SM}	Source Current[1] (Body Diode)		80	A	
V_{SD}	Diode Forward Voltage[1]		4.0	V	I_F = 20 A, V_{GS} = 0
t_{rr}	Reverse Recovery Time		475	ns	I_F = 20 A, dI_F/ds = 100 A/ms

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

ELECTRICAL CHARACTERISTICS: (T_C = 25°C unless otherwise noted)
STATIC P/N OM12P10ST/OM12P10SA (100V)

Parameter			Min.	Max.	Units	Test Conditions
BV_{DSS}	Drain-Source Breakdown Voltage		100		V	V_{GS} = 0, I_D = 250 mA
$V_{GS(th)}$	Gate-Threshold Voltage		2	4.5	V	V_{DS} = V_{GS}, I_D = 1.0 mA
I_{GSS}	Gate-Body Leakage			± 100	nA	V_{GS} = ± 20 V
I_{DSS}	Zero Gate Voltage Drain Current			.01	mA	V_{DS} = Max. Rat., V_{GS} = 0
				.10	mA	V_{DS} = Max. Rat., V_{GS} = 0, T_C = 125° C
$V_{DS(on)}$	Static Drain-Source On-StateVoltage[1]			4.2	V	V_{GS} = 10 V, I_D = 12 A
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]	OM12P10ST		.34		V_{GS} = 10 V, I_D = 6 A
		OM12P10SA		.30		
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]	OM12P10ST		.68		V_{GS} = 10 V, I_D = 6 A, T_C = 125 C
		OM12P10SA		.60		

DYNAMIC

g_{fs}	Forward Transductance[1]	2.0		S(M)	V_{DS} 2 $V_{DS(on)}$, I_D = 6 A
C_{iss}	Input Capacitance		920	pF	V_{GS} = 0
C_{oss}	Output Capacitance		575	pF	V_{DS} = 25 V
C_{rss}	Reverse Transfer Capacitance		200	pF	f = 1 MHz
$t_{d(on)}$	Turn-On Delay Time		50	ns	V_{DD} = 25 V, I_D = 6 A R_G = 50 W
t_r	Rise Time		150	ns	
$t_{d(off)}$	Turn-Off Delay Time		150	ns	
t_f	Fall Time		150	ns	

BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS

I_S	Continuous Source Current (Body Diode)		12	A	Modified MOSPOWER symbol showing the integral P-N Junction rectifier.
I_{SM}	Source Current[1] (Body Diode)		28	A	
V_{SD}	Diode Forward Voltage[1]		5.5	V	I_F = 12 A, V_{GS} = 0
t_{rr}	Reverse Recovery Time		450	ns	I_F = 12 A, dI_F/ds = 100 A/ms

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

ELECTRICAL CHARACTERISTICS: (T_C = 25°C unless otherwise noted)
STATIC P/N OM8P20ST/OM8P20SA (200V)

Parameter			Min.	Max.	Units	Test Conditions
BV_{DSS}	Drain-Source Breakdown Voltage		200		V	V_{GS} = 0, I_D = 250 mA
$V_{GS(th)}$	Gate-Threshold Voltage		2	4.5	V	V_{DS} = V_{GS}, I_D = 1.0 mA
I_{GSS}	Gate-Body Leakage			± 100	nA	V_{GS} = ± 20 V
I_{DSS}	Zero Gate Voltage Drain Current			.2	mA	V_{DS} = Max. Rat., V_{GS} = 0
				1.0	mA	V_{DS} = Max. Rat., V_{GS} = 0, T_C = 125° C
$V_{DS(on)}$	Static Drain-Source On-State Voltage[1]			7.0	V	V_{GS} = 10 V, I_D = 8 A
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]	OM8P20ST		.80		V_{GS} = 10 V, I_D = 4 A
		OM8P20SA		.75		
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]	OM8P20ST		1.60		V_{GS} = 10 V, I_D = 4 A, T_C = 125 C
		OM8P20SA		1.50		

DYNAMIC

g_{fs}	Forward Transductance[1]	2.0		S(M)	V_{DS} 2 $V_{DS(on)}$, I_D = 4 A
C_{iss}	Input Capacitance		1600	pF	V_{GS} = 0
C_{oss}	Output Capacitance		400	pF	V_{DS} = 25 V
C_{rss}	Reverse Transfer Capacitance		120	pF	f = 1 MHz
$t_{d(on)}$	Turn-On Delay Time		40	ns	V_{DD} = 100 V, I_D = 4 A R_G = 50 W
t_r	Rise Time		120	ns	
$t_{d(off)}$	Turn-Off Delay Time		100	ns	
t_f	Fall Time		80	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)		30	A	
V_{SD}	Diode Forward Voltage[1]		3.0	V	I_F = 8 A, V_{GS} = 0
t_{rr}	Reverse Recovery Time		475	ns	I_F = 8 A, dI_F/ds = 100 A/ms

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

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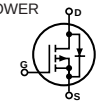
ELECTRICAL CHARACTERISTICS: (T_C = 25°C unless otherwise noted)
STATIC P/N OM8P25ST/OM8P25SA (250V)

Parameter			Min.	Max.	Units	Test Conditions
BV_{DSS}	Drain-Source Breakdown Voltage		250		V	V_{GS} = 0, I_D = 250 mA
$V_{GS(th)}$	Gate-Threshold Voltage		2	4.5	V	V_{DS} = V_{GS}, I_D = 250 mA
I_{GSS}	Gate-Body Leakage			± 100	nA	V_{GS} = ± 20 V
I_{DSS}	Zero Gate Voltage Drain Current			.20	mA	V_{DS} = Max. Rat., V_{GS} = 0
				1.0	mA	V_{DS} = 0.8 Max. Rat., V_{GS} = 0, T_C = 125° C
$V_{DS(on)}$	Static Drain-Source On-StateVoltage[1]			18	V	V_{GS} = 10 V, I_D = 8 A
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]	OM8P25ST		2.08		V_{GS} = 10 V, I_D = 4 A
		OM8P25SA		2.00		
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]	OM8P25ST		4.16		V_{GS} = 10 V, I_D = 4 A, T_C = 125 C
		OM8P25SA		4.00		

DYNAMIC

g_{fs}	Forward Transductance[1]	3.0		S (M)	V_{DS} 2 $V_{DS(on)}$, I_D = 4 A
C_{iss}	Input Capacitance		2200	pF	V_{GS} = 0
C_{oss}	Output Capacitance		500	pF	V_{DS} = 25 V
C_{rss}	Reverse Transfer Capacitance		300	pF	f = 1 MHz
$t_{d(on)}$	Turn-On Delay Time		40	ns	V_{DD} = 25 V, I_D = 4 A, R_G = 50 W
t_r	Rise Time		100	ns	
$t_{d(off)}$	Turn-Off Delay Time		160	ns	
t_f	Fall Time		90	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)		24	A	
V_{SD}	Diode Forward Voltage[1]		5	V	I_F = 8 A, V_{GS} = 0
t_{rr}	Reverse Recovery Time		400	ns	I_F = 8 A, dI_F/ds = 100 A/ms

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

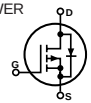
ELECTRICAL CHARACTERISTICS: (T_C = 25°C unless otherwise noted)
STATIC P/N OM2P50ST/OM2P50SA (500V)

Parameter			Min.	Max.	Units	Test Conditions
BV_{DSS}	Drain-Source Breakdown Voltage		500		V	V_{GS} = 0, I_D = 5.0 mA
$V_{GS(th)}$	Gate-Threshold Voltage		2	4.5	V	V_{DS} = V_{GS}, I_D = 1.0 mA
I_{GSS}	Gate-Body Leakage			± 100	nA	V_{GS} = ± 20 V
I_{DSS}	Zero Gate Voltage Drain Current			.25	mA	V_{DS} = 425 V, V_{GS} = 0
				2.5	mA	V_{DS} = 425 V, V_{GS} = 0, T_C = 100° C
$V_{DS(on)}$	Static Drain-Source On-State Voltage[1]			6.1	V	V_{GS} = 10 V, I_D = 1.0 A
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]	OM2P50ST		6.1		V_{GS} = 10 V, I_D = 1.0 A
		OM2P50SA		6.0		
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]	OM2P50ST		12.2		V_{GS} = 10 V, I_D = 1.0 A, T_C = 125 C
		OM2P50SA		12.0		

DYNAMIC

g_{fs}	Forward Transductance[1]	.5		S (M)	V_{DS} 2 $V_{DS(on)}$, I_D = 1.0 A
C_{iss}	Input Capacitance		100	pF	V_{GS} = 0
C_{oss}	Output Capacitance		200	pF	V_{DS} = 25 V
C_{rss}	Reverse Transfer Capacitance		80	pF	f = 1 MHz
$t_{d(on)}$	Turn-On Delay Time		50	ns	V_{DD} = 125 V, I_D = 1.0 A, R_G = 50 W
t_r	Rise Time		100	ns	
$t_{d(off)}$	Turn-Off Delay Time		150	ns	
t_f	Fall Time		50	ns	

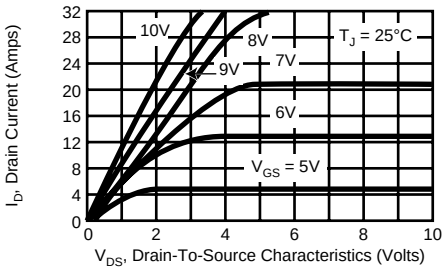
BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS

I_S	Continuous Source Current (Body Diode)		2.0	A	Modified MOSPOWER symbol showing the integral P-N Junction rectifier. 
I_{SM}	Source Current[1] (Body Diode)		8.0	A	
V_{SD}	Diode Forward Voltage[1]		1.8	V	I_S = 2.0 A, V_{GS} = 0
t_{rr}	Reverse Recovery Time		125	ns	I_F = 2.0 A, dI_F/ds = 100 A/ms

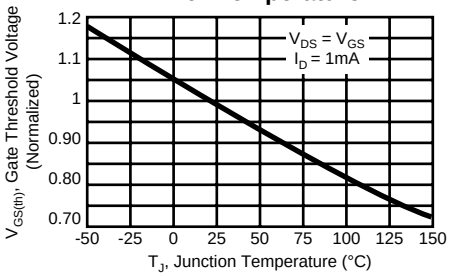
1 Pulse Test: Pulse Width 300msec, Duty Cycle 2%.

TYPICAL ELECTRICAL CHARACTERISTICS, OM23P06

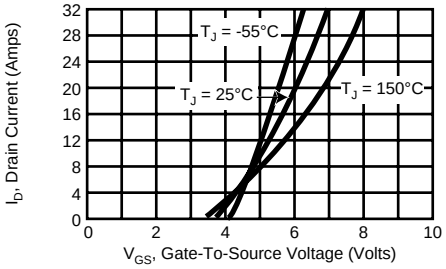
On-Region Characteristics



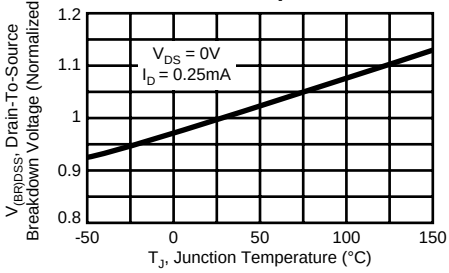
Gate-Threshold Variation With Temperature



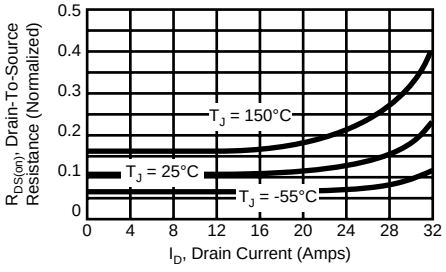
Transfer Characteristics



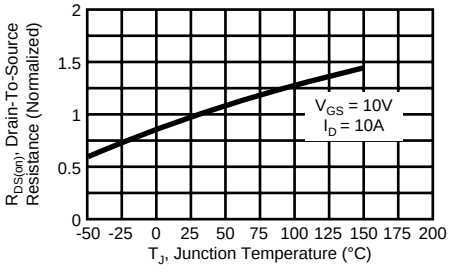
Normalized Breakdown Voltage verses Temperature



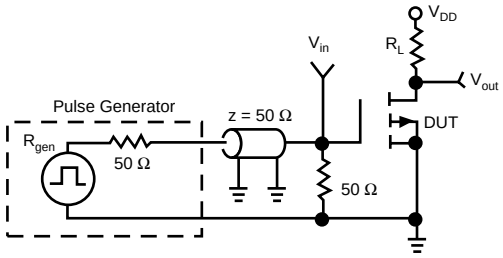
On-Resistance verses Drain Current



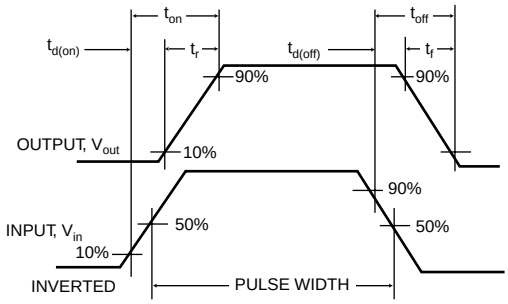
Normalized On-Resistance verses Temperature



SWITCHING TEST CIRCUIT



SWITCHING WAVEFORMS



3.1

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ABSOLUTE MAXIMUM RATINGS (T_C = 25°C unless otherwise noted)

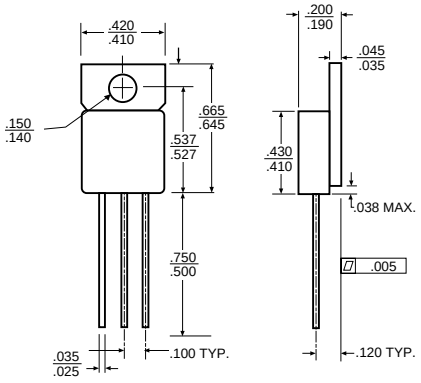
	Parameter	OM23P06	OM20P10	OM12P10	OM8P20	OM8P25	OM2P50	Units
V_{DS}	Drain-Source Voltage	60	100	100	200	250	500	V
V_{DGR}	Drain-Gate Voltage (R_{GS} = 1 M)	60	100	100	200	250	500	V
I_D	Continuous Drain Current[2]	23	20	12	8	8	2	A
I_{DM}	Pulsed Drain Current[1,2]	75	80	28	30	24	8	A
V_{GS}	Gate-Source Voltage	±20	±20	±20	±20	±20	±20	V
P_D	Maximum Power Dissipation	118	110	72	110	72	72	W
R_{qJC}	Junction-To-Case	1.32	1.1	1.76	1.1	1.76	1.76	°C/W
T_J / T_{stg}	Operating and Storage Temperature Range	-55 to 150	-55 to 150	-55 to 150	-55 to 150	-55 to 150	-55 to 150	°C
Linear Derating Factor		.76	.91	.57	.91	.57	.57	W/°C
Lead Temperature	(1/16" from case for 10 secs.)	300	300	300	300	300	300	°C

1 Pulse Test: Pulse width 300 µsec. Duty Cycle 2%.
2 Package Pin Limitations: TO-257AA, 15 Amps; TO-254AA, 25 Amps.

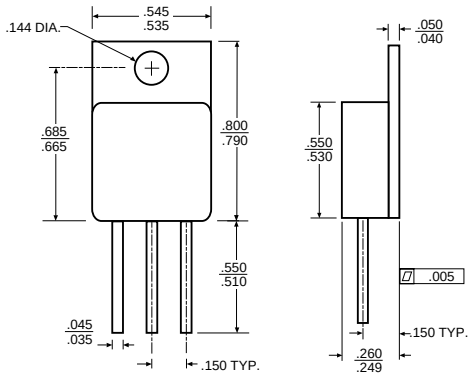
PACKAGE LIMITATIONS

	Parameters	TO-257AA	TO-254AA	Unit
I_D	Continuous Drain Current	15	25	A
	Linear Derating Factor, Junction-to-Ambient	.015	.020	W/°C
R_{thJA}	Thermal Resistance, Junction-to-Ambient (Free Air Operation)	67	50	°C/W

MECHANICAL OUTLINE

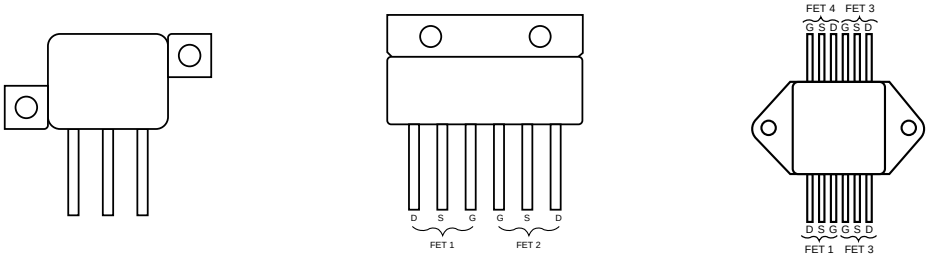


TO-257AA



TO-254AA

PACKAGE OPTIONS



Note: MOSFETs are also available in Z-Pak, dual and quad pak styles. Please call the factory for more information.

Omnirel 205 Crawford Street, Leominster, MA 01453 USA (508) 534-5776 FAX (508) 537-4246