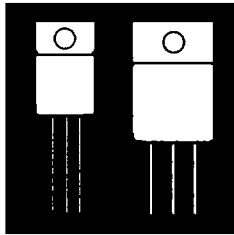


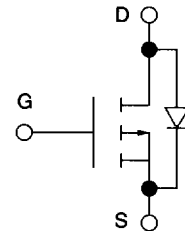
POWER MOSFET IN HERMETIC ISOLATED JEDEC PACKAGE, P-CHANNEL



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.

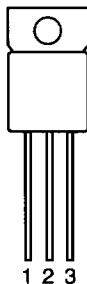
MAXIMUM RATINGS (T_J = 25°C unless otherwise noted.)

BASIC PART NUMBER	V _{DS} (V)	R _{DS(on)} (Ω)		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

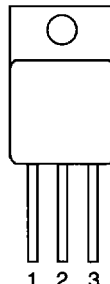
PIN CONNECTION

TO-257AA



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

TO-254AA



ORDERING INFORMATION

Example:
OM20P10 ST M
Basic Part Case Screening
Number Style 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: ($T_C = 25^\circ\text{C}$ unless otherwise noted)
STATIC P/N OM23P06ST/OM23P06SA (60V)

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

DYNAMIC

g_m Forward Transconductance ¹	5.0	S/(V)	$V_{DS} \geq 2 V_{DS(on)}$, $I_D = 11.5\ \text{A}$
C_{iss} Input Capacitance	1700	pF	$V_{GS} = 0$
C_{oss} Output Capacitance	900	pF	$V_{DS} = 25\ \text{V}$
C_{res} Reverse Transfer Capacitance	400	pF	$f = 1\ \text{MHz}$
$t_{d(on)}$ Turn-On Delay Time	30	ns	
t_r Rise Time	170	ns	$V_{DS} = 25\ \text{V}$, $I_D = 23\ \text{A}$
$t_{d(off)}$ Turn-Off Delay Time	140	ns	$R_G = 13\ \Omega$
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	$I_S = 23\ \text{A}$, $V_{GS} = 0$
t_r Reverse Recovery Time	200	ns	$I_S = 23\ \text{A}$, $dI/dt = 100\ \text{A}/\mu\text{s}$

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

ELECTRICAL CHARACTERISTICS: ($T_C = 25^\circ\text{C}$ unless otherwise noted)
STATIC P/N OM20P10ST/OM20P10SA (100V)

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

DYNAMIC

g_m Forward Transconductance ¹	5.0	S/(V)	$V_{DS} \geq 2 V_{DS(on)}$, $I_D = 10\ \text{A}$
C_{iss} Input Capacitance	2000	pF	$V_{GS} = 0$
C_{oss} Output Capacitance	950	pF	$V_{DS} = 25\ \text{V}$
C_{res} Reverse Transfer Capacitance	400	pF	$f = 1\ \text{MHz}$
$t_{d(on)}$ Turn-On Delay Time	45	ns	
t_r Rise Time	200	ns	$V_{DS} = 25\ \text{V}$, $I_D = 10\ \text{A}$
$t_{d(off)}$ Turn-Off Delay Time	150	ns	$R_G = 50\ \Omega$
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	$I_S = 20\ \text{A}$, $V_{GS} = 0$
t_r Reverse Recovery Time	475	ns	$I_S = 20\ \text{A}$, $dI/dt = 100\ \text{A}/\mu\text{s}$

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

ELECTRICAL CHARACTERISTICS: ($T_C = 25^\circ\text{C}$ unless otherwise noted)
STATIC P/N OM12P10ST/OM12P10SA (100V)

Parameter	Min.	Max.	Units	Test Conditions
BV_{DS} Drain-Source Breakdown Voltage	100		V	$V_{GS} = 0$, $I_D = 250\ \mu\text{A}$
$V_{GS(th)}$ Gate-Threshold Voltage	2	4.5	V	$V_{DS} = V_{GS}$, $I_D = 1.0\ \text{mA}$
I_{DSS} Gate-Body Leakage		± 100	nA	$V_{GS} = \pm 20\ \text{V}$
I_{DSS} Zero Gate Voltage Drain Current		.01	mA	$V_{DS} = \text{Max. Rat.}$, $V_{GS} = 0$
		.10	mA	$T_C = 125^\circ\text{C}$
$V_{DS(on)}$ Static Drain-Source On-State Voltage ¹		4.2	V	$V_{GS} = 10\ \text{V}$, $I_D = 12\ \text{A}$
$R_{DS(on)}$ Static Drain-Source On-State Resistance ¹		.34	Ω	$V_{GS} = 10\ \text{V}$, $I_D = 6\ \text{A}$
$R_{DS(on)}$ Static Drain-Source On-State Resistance ¹		.68	Ω	$V_{GS} = 10\ \text{V}$, $I_D = 6\ \text{A}$, $T_C = 125^\circ\text{C}$

DYNAMIC

g_{fs} Forward Transconductance ¹	2.0	S (r)	$V_{DS} \geq 2 V_{DS(on)}$, $I_D = 6\ \text{A}$
C_{iss} Input Capacitance	920	pF	$V_{GS} = 0$
C_{oss} Output Capacitance	575	pF	$V_{DS} = 25\ \text{V}$
C_{rss} Reverse Transfer Capacitance	200	pF	$f = 1\ \text{MHz}$
t_{don} Turn-On Delay Time	50	ns	
t_r Rise Time	150	ns	$V_{DS} = 25\ \text{V}$, $I_D = 6\ \text{A}$
t_{doff} Turn-Off Delay Time	150	ns	$R_\theta = 50\ \Omega$
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	$I_S = 12\ \text{A}$, $V_{GS} = 0$
t_r Reverse Recovery Time	450	ns	$I_S = 12\ \text{A}$, $dI/dt = 100\ \text{A}/\mu\text{s}$

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

ELECTRICAL CHARACTERISTICS: ($T_C = 25^\circ\text{C}$ unless otherwise noted)
STATIC P/N OM8P20ST/OM8P20SA (200V)

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

DYNAMIC

g_{fs} Forward Transconductance ¹	2.0	S (r)	$V_{DS} \geq 2 V_{DS(on)}$, $I_D = 4\ \text{A}$
C_{iss} Input Capacitance	1600	pF	$V_{GS} = 0$
C_{oss} Output Capacitance	400	pF	$V_{DS} = 25\ \text{V}$
C_{rss} Reverse Transfer Capacitance	120	pF	$f = 1\ \text{MHz}$
t_{don} Turn-On Delay Time	40	ns	
t_r Rise Time	120	ns	$V_{DS} = 100\ \text{V}$, $I_D = 4\ \text{A}$
t_{doff} Turn-Off Delay Time	100	ns	$R_\theta = 50\ \Omega$
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	$I_S = 8\ \text{A}$, $V_{GS} = 0$
t_r Reverse Recovery Time	475	ns	$I_S = 8\ \text{A}$, $dI/dt = 100\ \text{A}/\mu\text{s}$

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

ELECTRICAL CHARACTERISTICS: ($T_C = 25^\circ\text{C}$ unless otherwise noted)
STATIC P/N OM8P25ST/OM8P25SA (250V)

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

DYNAMIC

g_{fs} Forward Transconductance ¹	3.0	$S(\text{ft})$	$V_{DS} \geq 2 V_{DS(on)}$, $I_D = 4 \text{ A}$
C_{iss} Input Capacitance	2200	pF	$V_{GS} = 0$
C_{oss} Output Capacitance	500	pF	$V_{DS} = 25 \text{ V}$
C_{res} Reverse Transfer Capacitance	300	pF	$f = 1 \text{ MHz}$
t_{don} Turn-On Delay Time	40	ns	$V_{GS} = 25 \text{ V}$, $I_D = 4 \text{ A}$
t_r Rise Time	100	ns	$R_G = 50 \Omega$
t_{voff} 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	$I_S = 8 \text{ A}$, $V_{GS} = 0$
t_r Reverse Recovery Time	400	ns	$I_S = 8 \text{ A}$, $dI/dt = 100 \text{ A}/\mu\text{s}$

1 Pulse Test: Pulse Width $\leq 300 \mu\text{s}$, Duty Cycle $\leq 2\%$.

ELECTRICAL CHARACTERISTICS: ($T_C = 25^\circ\text{C}$ unless otherwise noted)
STATIC P/N OM2P50ST/OM2P50SA (500V)

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

DYNAMIC

g_{fs} Forward Transconductance ¹	.5	$S(\text{ft})$	$V_{DS} \geq 2 V_{DS(on)}$, $I_D = 1.0 \text{ A}$
C_{iss} Input Capacitance	100	pF	$V_{GS} = 0$
C_{oss} Output Capacitance	200	pF	$V_{DS} = 25 \text{ V}$
C_{res} Reverse Transfer Capacitance	80	pF	$f = 1 \text{ MHz}$
t_{don} Turn-On Delay Time	50	ns	$V_{GS} = 125 \text{ V}$, $I_D = 1.0 \text{ A}$
t_r Rise Time	100	ns	$R_G = 50 \Omega$
t_{voff} Turn-Off Delay Time	150	ns	
t_f Fall Time	50	ns	

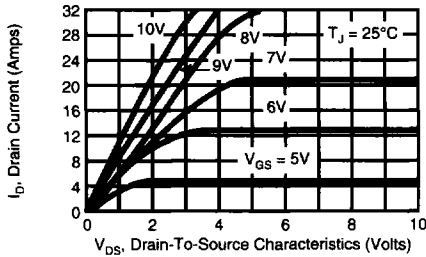
BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS

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	$I_S = 2.0 \text{ A}$, $V_{GS} = 0$
t_r Reverse Recovery Time	125	ns	$I_S = 2.0 \text{ A}$, $dI/dt = 100 \text{ A}/\mu\text{s}$

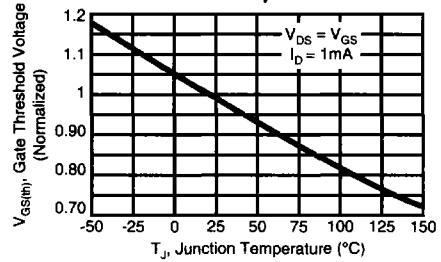
1 Pulse Test: Pulse Width $\leq 300 \mu\text{s}$, Duty Cycle $\leq 2\%$.

TYPICAL ELECTRICAL CHARACTERISTICS, OM23P06

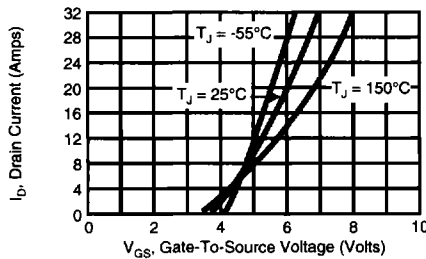
On-Region Characteristics



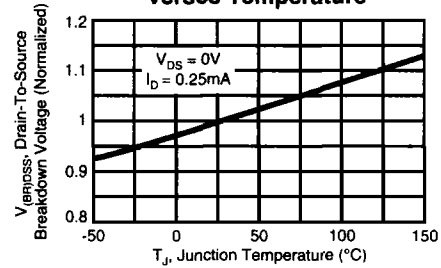
Gate-Threshold Variation With Temperature



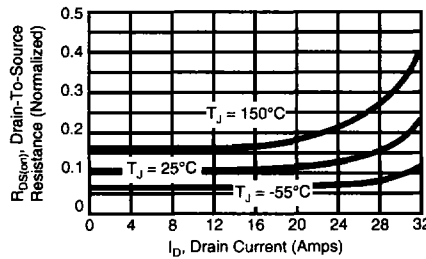
Transfer Characteristics



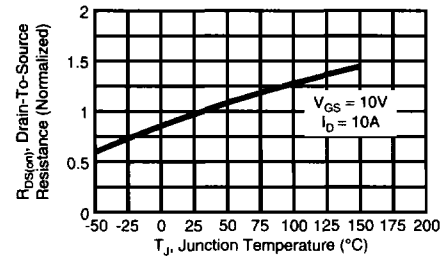
Normalized Breakdown Voltage versus Temperature



On-Resistance versus Drain Current

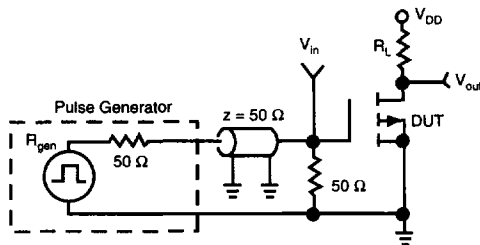


Normalized On-Resistance versus Temperature

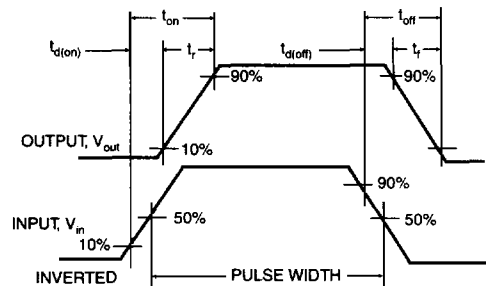


3.1

SWITCHING TEST CIRCUIT



SWITCHING WAVEFORMS



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

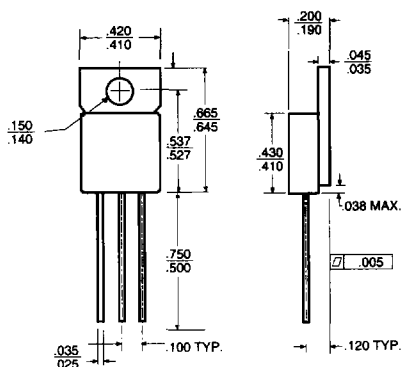
Parameter	OM23P06	OM20P10	OM12P10	OM8P20	OM8P25	OM2P50	Units
V_{DS} Drain-Source Voltage	60	100	100	200	250	500	V
V_{DGR} Drain-Gate Voltage ($R_{GS} = 1\text{ M}\Omega$)	60	100	100	200	250	500	V
I_D Continuous Drain Current ¹	23	20	12	8	8	2	A
I_{DM} Pulsed Drain Current ^{1,2}	75	80	28	30	24	8	A
V_{GS}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

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

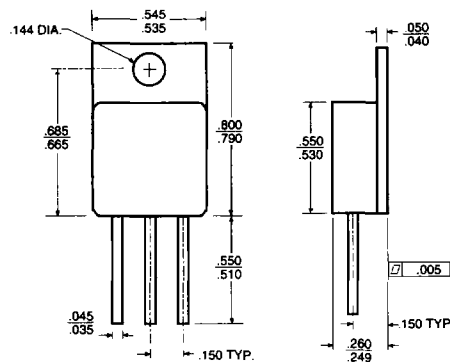
2 **Package Pin Limitations:** TO-257AA, 15 Amps; TO-254AA, 25 Amps.

PACKAGE LIMITATIONS

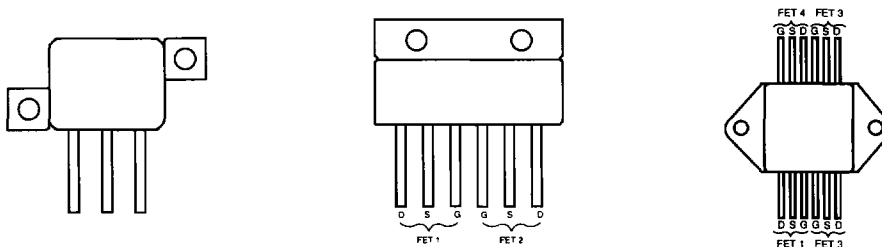
Parameters	TO-257AA	TO-254AA	Unit
I_D Continuous Drain Current	15	25	A
Linear Derating Factor, Junction-to-Ambient	.015	.020	$\text{W}/^\circ\text{C}$
$R_{\theta JA}$ Thermal Resistance, Junction-to-Ambient (Free Air Operation)	67	50	$^\circ\text{C/W}$

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.