



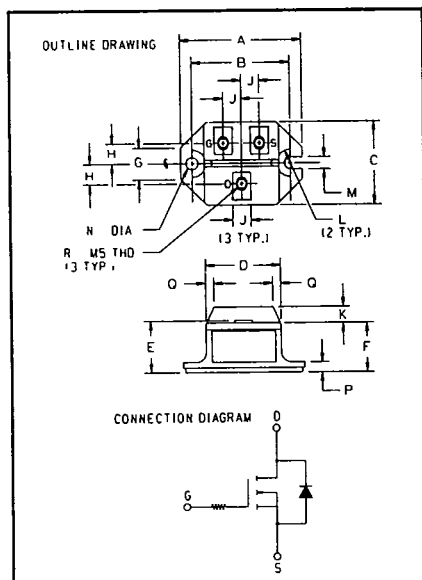
JS524575

JS525075

T-39-15

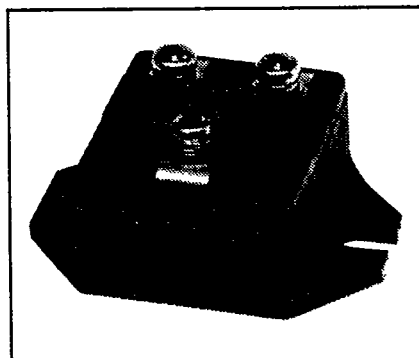
Powerex, Inc., Hillis Street, Youngwood, Pennsylvania 15697 (412) 925-7272

Powerex Europe, S.A., 428 Avenue G. Durand, BP107, 72003 Le Mans, France (43) 41.14.14

Single FETMOD™**Power Modules****75 Amperes/450-500 Volts**

**450-500 Volts JS524575, JS525075
Outline Drawing**

Dimension	Inches	Millimeters
A	2 106	53.5
B	1 705 ± 008	43.3 ± 0.2
C	1 437	36.5
D	1 299	33
E	925	23.5
F	.866	22
G	551	14
H	354	9
J	315	8
K	276	7
L	236 R	6 R
M	209	5.3
N	.209 Dia	5.3 Dia.
P	177	4.5
Q	138	3.5
R	M5 Metric	M5



**JS524575
JS525075
Single FETMOD™
Power Modules
75 Amperes/450-500 Volts**

Description

Powerex Single FETMOD™ Power Modules are designed for use in applications requiring high frequency switching and low loss control. The modules are isolated, consisting of a MOSFET with internal series gate resistors.

Features:

- ☐ Isolated Mounting
- ☐ Vertical DMOS Chips
- ☐ High Speed Body Diode
- ☐ Low $R_{DS(on)}$
- ☐ Low Drive Requirements
- ☐ Internal Series Gate Resistors
- ☐ Fast Switching

Applications:

- ☐ AC Motor Control
- ☐ UPS Inverters
- ☐ Switch Mode Power Supply
- ☐ PWM Regulators
- ☐ Welding Power Supply

Ordering Information

Example: Select the complete eight digit module part number you desire from the table - i.e. JS525075 is a 500 Volt, 75 Ampere Single FETMOD™ Module.

Type	V _{DS} Volts (×10)	Current Rating Amperes (75)
JS52	45	75
	50	



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JS524575

JS525075

Single FETMOD™ Power Modules

75 Amperes/450-500 Volts

Maximum Ratings $T_J = 25^\circ\text{C}$ unless otherwise specified

	Symbol	JS524575/JS525075	Units
Junction Temperature	T_J	-55 to 150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-40 to 150	$^\circ\text{C}$
Drain Source Voltage	V_{DS}	450/500	Volts
Gate-Source Voltage	V_{GS}	± 20	Volts
Continuous Drain Current	I_D	43	Amperes
Continuous Source Current	I_S	43	Amperes
Pulsed Drain Current Repetitive	I_{DM}	225	Amperes
Power Dissipation	P_T	420	Watts
Max. Mounting Torque Terminal Screws (M5)	—	17	in.-lb.
Max. Mounting Torque Mounting Screws (M6)	—	26	in.-lb.
Module Weight	—	90	Grams
V Isolation	V_{RMS}	2500	Volts

Electrical Characteristics $T_J = 25^\circ\text{C}$ unless otherwise specified

Characteristics	Symbol	Test Conditions	JS524575/JS525075			Units
			Min.	Typ.	Max.	
Static Electrical Characteristics						
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = V_{DSS}, V_{GS} = 0V$	—	—	1	mA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 0.8 V_{DSS}, V_{GS} = 0V$ $T_J = 150^{\circ}C$	—	—	4	mA
Gate Source Threshold	$V_{GS(th)}$	$I_D = 1 \text{ mA}, V_{DS} = 10V$	2	3	4	Volts
Gate Source Leakage	$\pm I_{GSS}$	$\pm V_{GS} = \pm 20V$ $V_{DS} = 0V$	—	—	0.5	μA
Drain Source On State Resistance*	$R_{DS(on)}$	$V_{GS} = 15V, I_D = 75A$ $V_{GS} = 15V, I_D = 75A, T_J = 150^{\circ}C$	—	—	.11 0.22	Ω Ω
Drain Source On State Voltage*	$V_{DS(on)}$	$V_{GS} = 15V, I_D = 75A$ $V_{GS} = 15V, I_D = 75A, T_J = 150^{\circ}C$	—	—	8.3 16.5	Volts Volts
Thermal Reistance, Case to Sink Lubricated	$R_{\theta CS}$	—	—	—	0.15	$^{\circ}C/W$
Thermal Resistance, Junction to Case	$R_{\theta JC}$	Per FETMOD™ Per Diode	—	—	0.3	$^{\circ}C/W$
Source-Drain Diode Characteristics						
Source-Drain Voltage	V_{SD}	$I_S = 75A, V_{GS} = 0V$	—	—	2.5	Volts
Reverse Recovery Time	t_{rr}	$I_S = 75A, di/dt = 150A/\mu s, V_{GS} = 0V$	—	—	300	ns
Dynamic Electrical Characteristics						
Forward Transconductance	g_{fs}	$I_D = 50A, V_{DS} = 10V$ $tw \leq 300\mu s, \text{Duty} = 2\%$	10	—	—	mhos
Input Capacitance	C_{iss}	$V_{GS} = 0V, V_{DS} = 10V, f = 1 \text{ Mhz}$	—	—	20000	pf
Output Capacitance	C_{oss}		—	—	4500	pf
Reverse Transfer Capacitance	C_{rss}		—	—	1800	pf
Total Gate Charge	Q_G	$V_{DD} = 300V$ $V_{GS} = 15V, I_D = 75A$	—	800	—	nC
Turn-On Time**	t_{on}	$V_{DD} = 300V$ $I_D = 75A, V_{GS} = \pm 10V$	—	520	—	ns
Turn-Off Time**	t_{off}	$R_{G1} = R_{G2} = 4.7\Omega$	—	250	—	ns
Turn-On Time**	t_{on}	$V_{DD} = 300V, I_D = 40A$ $V_{GS} = \pm 15V$	—	—	620	ns
Turn-Off Time**	t_{off}	$R_{GEN} = R_{GS} = 50\Omega$	—	—	2600	ns

* Pulse Test Pulse width $\leq 10 \mu s$

** Turn on Time (t_{on}) = Turn on Delay ($t_{d(on)}$) + Rise Time (t_r)
 Turn-off Time (t_{off}) = Turn off Delay ($t_{d(off)}$) + Fall Time (t_f)



T-39-15

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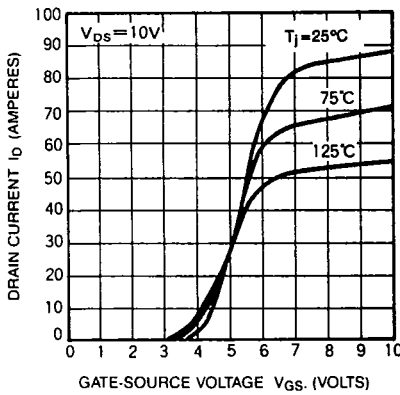
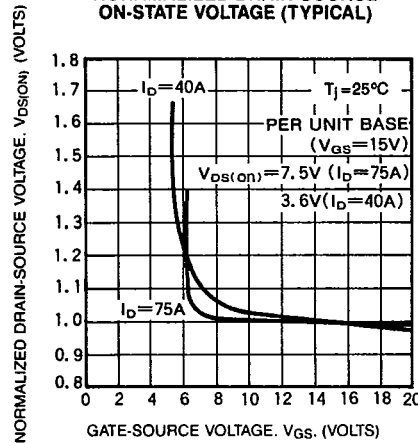
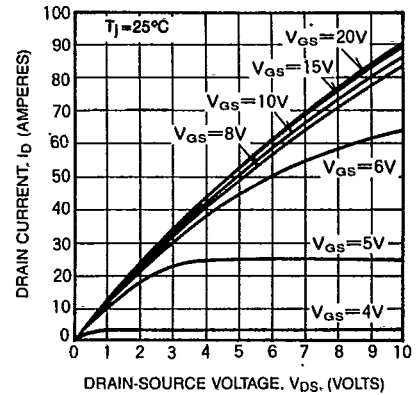
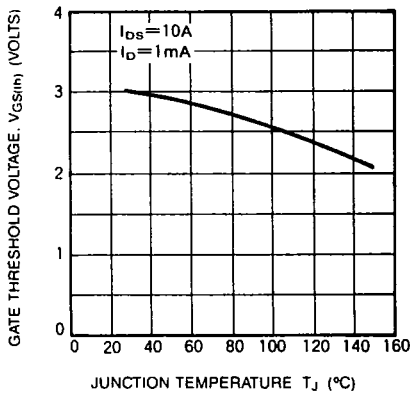
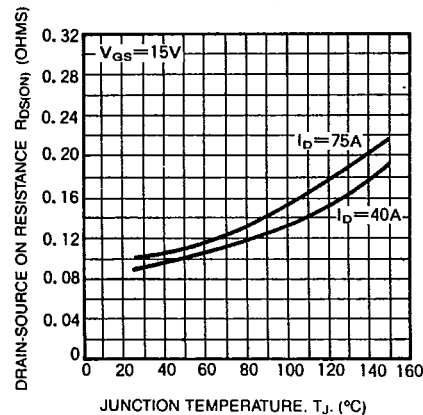
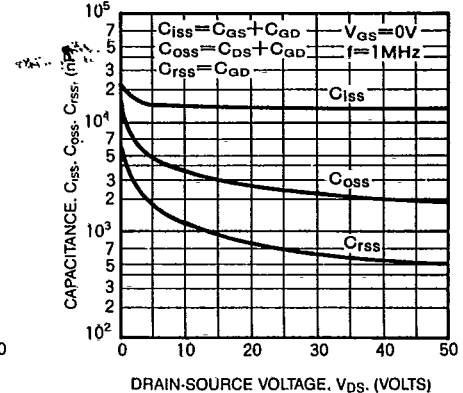
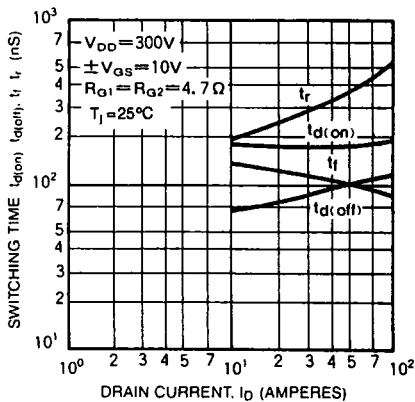
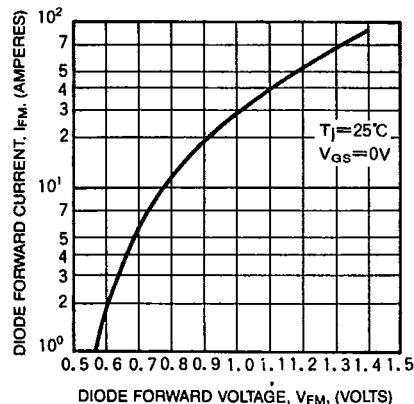
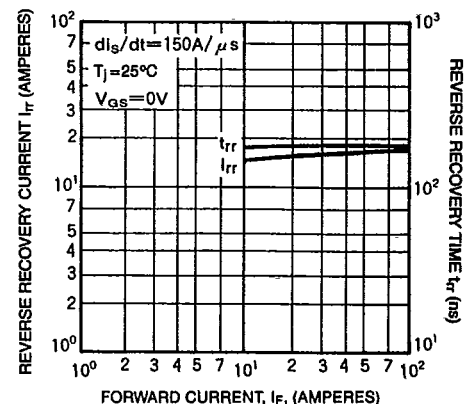
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TRANSFER CHARACTERISTICS
(TYPICAL)NORMALIZED DRAIN-SOURCE
ON-STATE VOLTAGE (TYPICAL)COMMON SOURCE OUTPUT
CHARACTERISTICS (TYPICAL)GATE THRESHOLD
VOLTAGE VS. TEMPERATURE (TYPICAL)ON-RESISTANCE VS. TEMPERATURE
(TYPICAL)CAPACITANCE VS. DRAIN-SOURCE VOLTAGE
(TYPICAL)SWITCHING CHARACTERISTICS
(TYPICAL)DIODE CHARACTERISTICS
(TYPICAL)REVERSE RECOVERY CHARACTERISTICS
OF FREE-WHEEL DIODE (TYPICAL)



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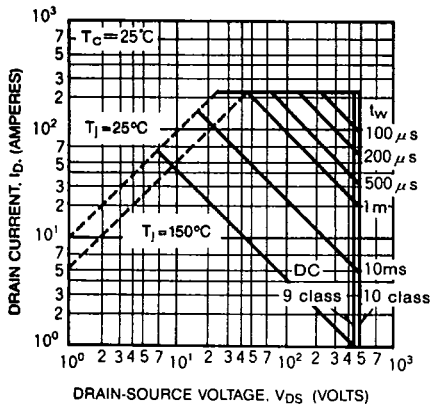
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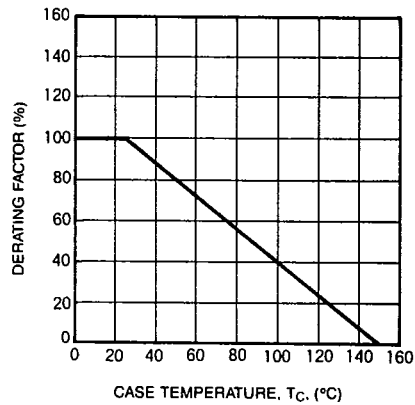
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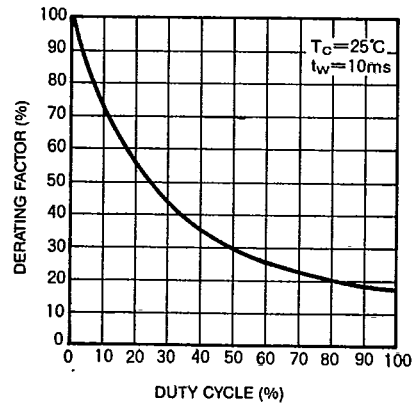
FORWARD BIAS SAFE OPERATING AREA (S.O.A.)



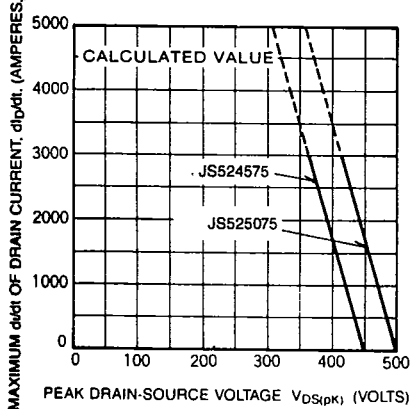
TEMPERATURE DERATING FACTOR OF SAFE OPERATING AREA (S.O.A.)



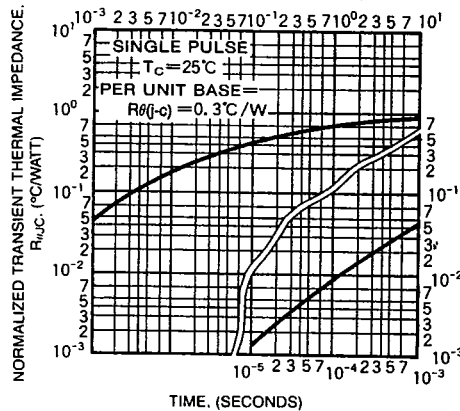
DUTY CYCLE DERATING FACTOR OF SAFE OPERATING AREA (S.O.A.)



MAXIMUM TURN-OFF di/dt VS. PEAK DRAIN-SOURCE VOLTAGE



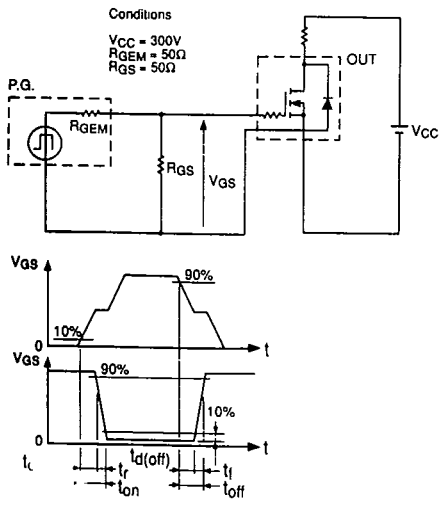
TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (MOSFET)



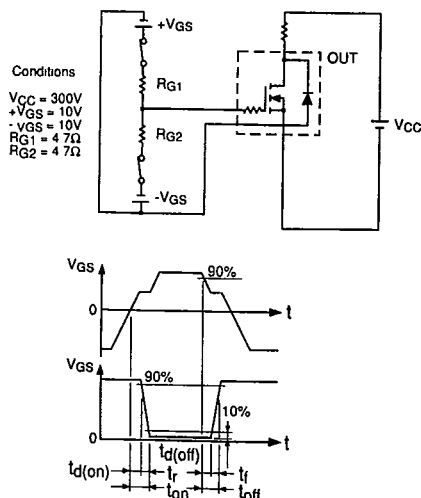
TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (DIODE)

As the free-wheel diode is an integral part of the MOSFET chip (i.e. both having equal chip area) the thermal impedance characteristic of the former is same as that of later. However, while making thermal calculation care should be given to the fact that the same chip becomes the thermal source for both the MOSFET and diode operations.

Switching Time Test Circuit 1



Switching Time Test Circuit 2



Reverse Recovery Test Circuit

