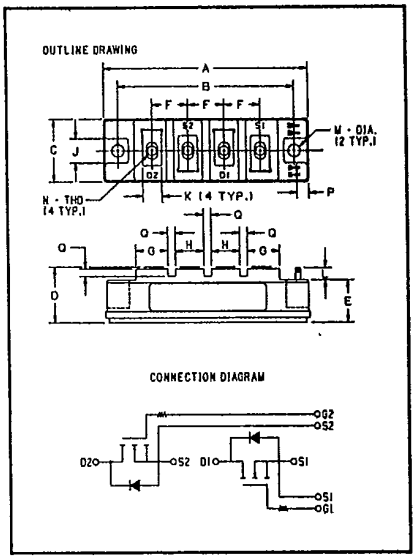
POWEREX

JT224505
JT225005 **Tentative**

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

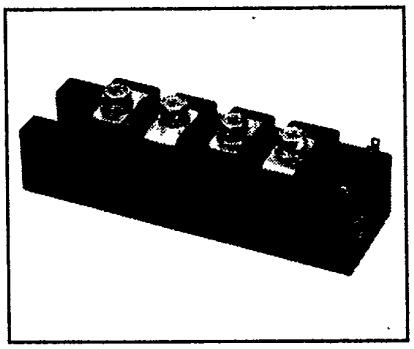
Split-Dual FETMOD™ Power Modules

50 Amperes/450-500 Volts



450-500 Volts JT224505, JT225005 Outline Drawing

Dimension	Inches	Millimeters
A	4.252 Max.	108 Max.
B	3.661 ± .012	93 ± 0.3
C	1.338 Max.	34 Max.
D	1.181 Max.	30 Max.
E	.906	23
F	.748	19
G	.650	16.5
H	.591	15
J	.512	13
K	.394	10
L	.256 Min.	6.5 Min.
M	.256 Dia.	6.5 Dia.
N	M5 Metric	M5
P	.197	5
Q	.157	4



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Split-Dual FETMOD™
Power Modules
50 Amperes/450-500 Volts

Description

Powerex Split-Dual FETMOD™ Power Modules are designed for use in applications requiring high-frequency switching and low loss control. The modules are isolated, consisting of two MOSFETs with internal series gate resistors and independent connections.

Features:

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

Applications:

- ☐ Choppers
- ☐ 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. JT225005 is a 500 Volt, 50 Ampere Split-Dual FETMOD™ Module.

Type	V_{DSS} Volts (×10)	Current Rating Amperes (×10)
JT22	45	05
JT22	50	05

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Maximum Ratings T_J = 25°C unless otherwise specified

	Symbol	JT224505/JT225005	Units
Junction Temperature	T_J	−40 to 150	°C
Storage Temperature	T_{STG}	−40 to 125	°C
Drain Source Voltage	V_{DSS}	450/500	Volts
Gate-Source Voltage	V_{GSS}	±20	Volts
Continuous Drain Current	I_D	40	Amperes
Continuous Source Current	I_S	40	Amperes
Pulsed Drain Current Repetitive	I_{DM}	150	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	—	250	Grams
V isolation	V_{RMS}	2500	Volts

Static Electrical Characteristics T_J = 25°C unless otherwise specified

Characteristics	Symbol	Test Conditions	JT224505/JT225005 Min.	Typ.	Max.	Units
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=V_{DSS}$, $V_{GS}=0V$	—	—	1	mA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=0.8\ V_{DSS}$, $V_{GS}=0V$, $T_J=150°C$	—	—	10	mA
Gate Source Threshold	$V_{GS(th)}$	$I_D=1$ 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*	$R_{DS(on)}$	$V_{GS}=15V$, $I_D=50A$	—	—	0.12	Ω
		$V_{GS}=15V$, $I_D=50A$, $T_J=150°C$	—	—	0.24	Ω
Drain Source On State Voltage*	$V_{DS(on)}$	$V_{GS}=15V$, $I_D=50A$	—	—	6	Volts
		$V_{GS}=15V$, $I_D=50A$, $T_J=150°C$	—	—	12	Volts
Thermal Resistance, Case to Sink Lubricated	$R_{\theta CS}$	—	—	—	—	°C/W
Thermal Resistance, Junction to Case	$R_{\theta JC}$	Per Device	—	—	0.3	°C/W

* Pulse Test: Pulse width ≤ 10μs

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Source-Drain Diode Characteristics T_J = 25°C unless otherwise specified

Characteristics	Symbol	Test Conditions	JT224505/JT225005 Min.	Typ.	Max.	Units
Source-Drain Voltage	V_{SD}	I_S = 50A, V_{GS} = 0V	—	—	2.5	Volts
Reverse Recovery Time	t_{rr}	I_S = 50A, dI_S/dt = 100A/μs, V_{GS} = 0V	—	—	200	μs

Dynamic Electrical Characteristics T_J = 25°C unless otherwise specified

Characteristics	Symbol	Test Conditions	JT224505/JT225005 Min.	Typ.	Max.	Units
Forward Transconductance	g_{fs}	I_D = 25A, V_{DS} = 10V, $t_w \leq 300\mu s$, Duty = 2%	10	—	—	mhos
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 10V, f = 1 Mhz	—	5500	9000	pf
Output Capacitance	C_{oss}		—	—	2500	pf
Reverse Transfer Capacitance	C_{rss}		—	—	1000	pf
Total Gate Charge	Q_G	V_{DD} = 0.8 V_{DSS}, V_{GS} = 10V, I_D = 50A	—	600	—	nC
Turn On Time**	t_{on}	V_{DD} = 0.5 V_{DSS}, I_D = 25A, V_{GS} = 15V, R_{GEN} = R_{GS} = 50Ω	—	—	500	ns
Turn Off Time**	t_{off}		—	—	1300	ns

** 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)

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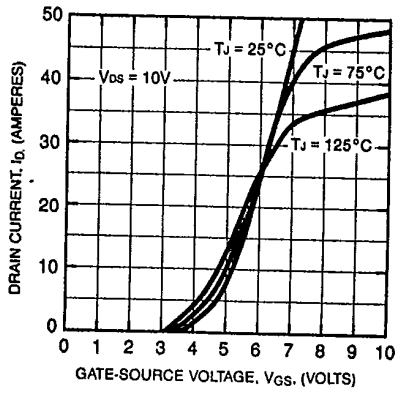
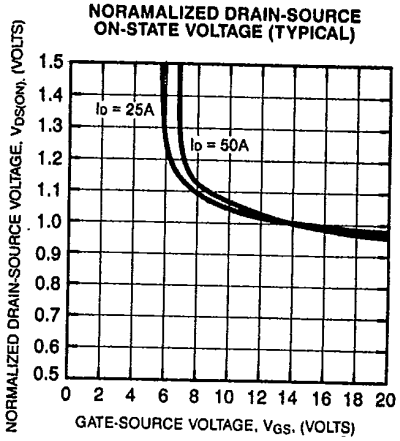
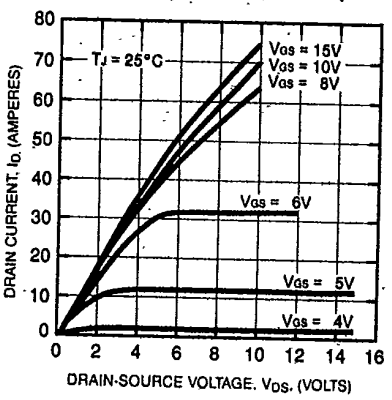
TRANSFER CHARACTERISTICS (TYPICAL)



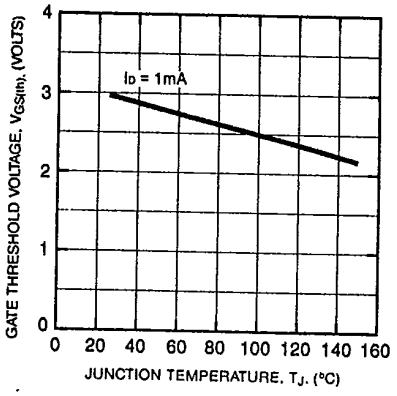
NORAMALIZED DRAIN-SOURCE ON-STATE VOLTAGE (TYPICAL)



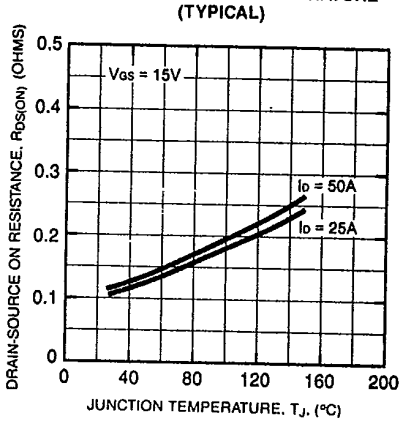
COMMON SOURCE OUTPUT CHARACTERISTICS (TYPICAL)



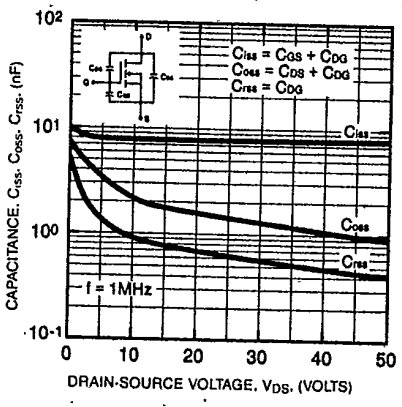
GATE THRESHOLD VOLTAGE VS. TEMPERATURE (TYPICAL)



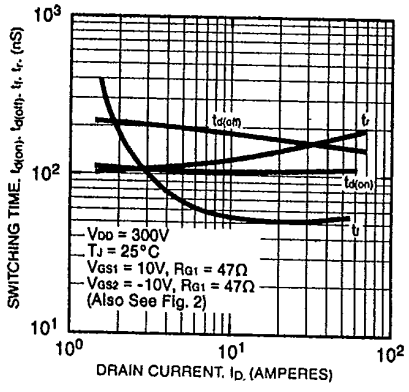
ON-RESISTANCE VS. TEMPERATURE (TYPICAL)



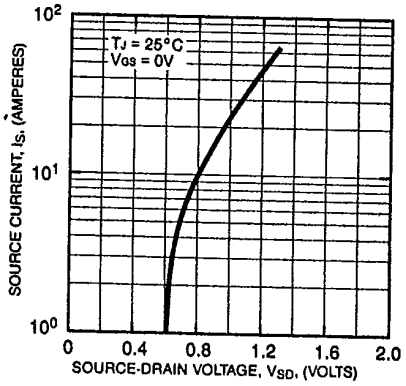
CAPACITANCE VS. DRAIN-SOURCE VOLTAGE (TYPICAL)



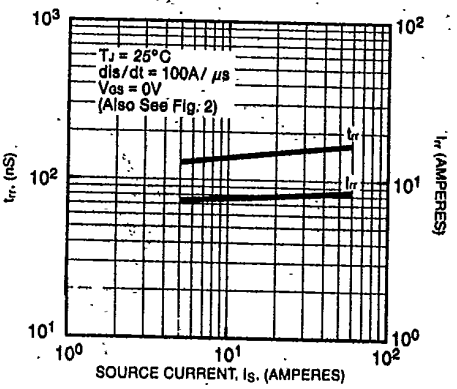
SWITCHING CHARACTERISTICS (TYPICAL)



SOURCE-DRAIN DIODE FORWARD CHARACTERISTICS (TYPICAL)



SOURCE-DRAIN DIODE REVERSE RECOVERY CHARACTERISTICS (TYPICAL)



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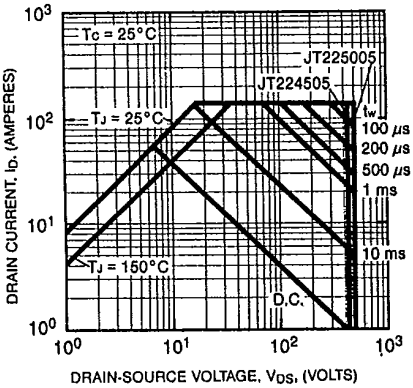
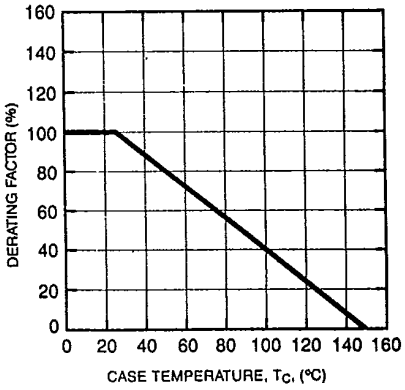
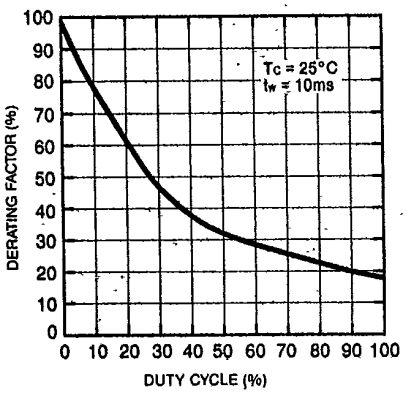
FORWARD BIAS SAFE OPERATING AREA (S.O.A.)



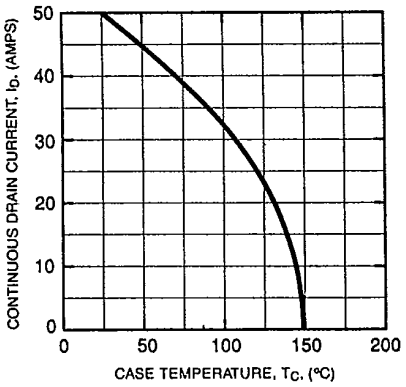
TEMPERATURE DERATING FACTOR OF SAFE OPERATING AREA (S.O.A.)



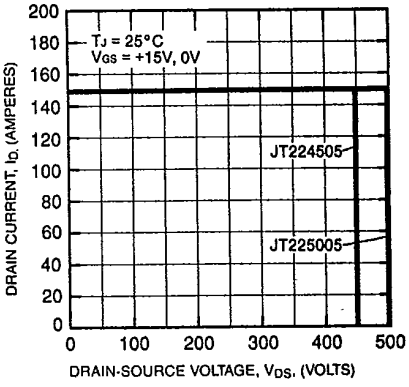
DUTY CYCLE DERATING FACTOR OF SAFE OPERATING AREA (S.O.A.)



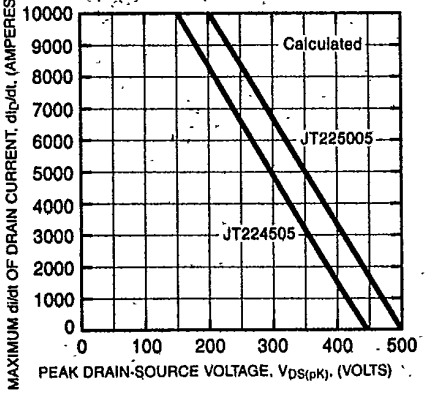
MAXIMUM DRAIN CURRENT VS. CASE TEMPERATURE



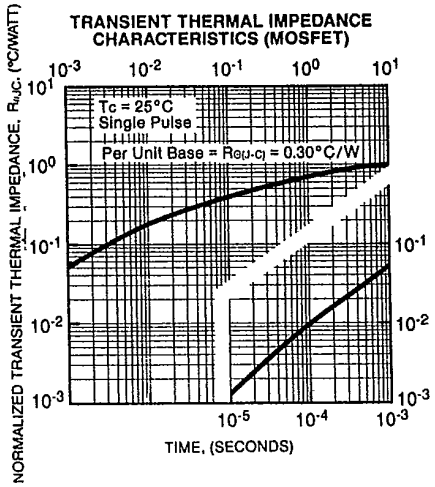
CLAMPED INDUCTIVE LOAD SWITCHING SAFE OPERATING AREA (S.S.O.A.)



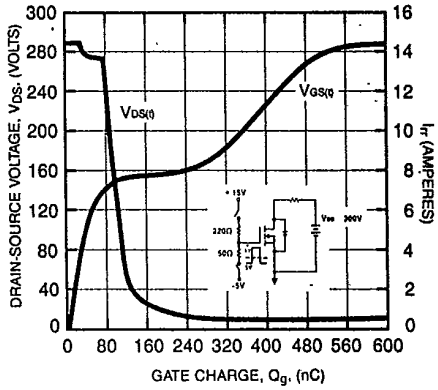
MAXIMUM TURN-OFF di/dt VS. PEAK DRAIN-SOURCE VOLTAGE



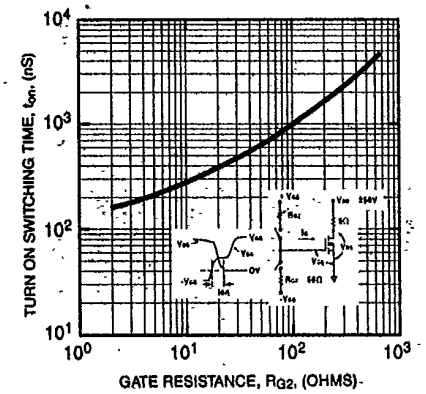
TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (MOSFET)



GATE CHARGE VS. V_{DS} AND V_{GS} (TYPICAL)



TURN-ON SPEED VS. GATE RESISTANCE (TYPICAL)



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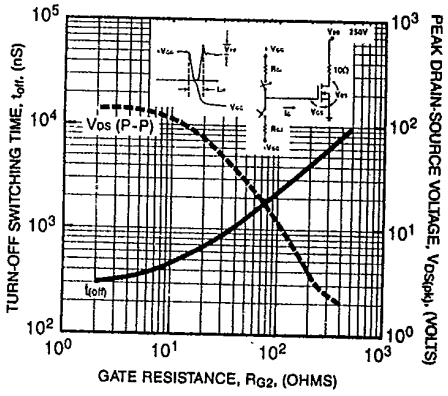
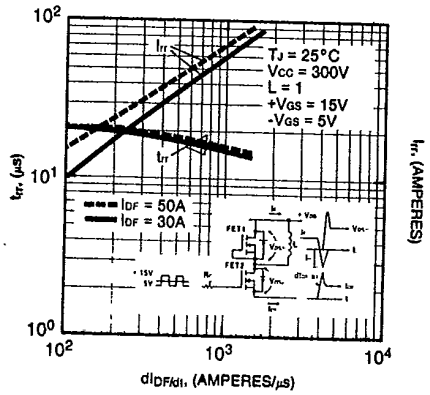
TURN-OFF SPEED AND DRAIN-SOURCE VOLTAGE SPIKE VS. GATE RESISTANCE (TYPICAL)



SOURCE-DRAIN DIODE REVERSE RECOVERY CHARACTERISTICS (TYPICAL FOR HALF BRIDGE OPERATION)



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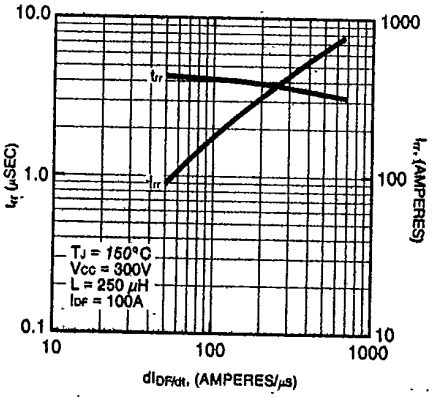

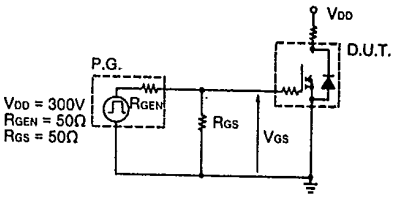

Fig. 1 Switching Time Test Circuit 1

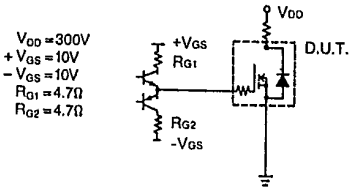

Fig. 2 Switching Time Test Circuit 2