

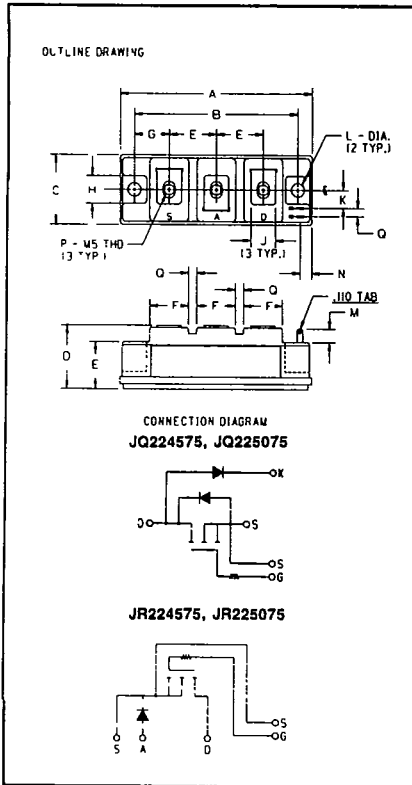


Powerex, Inc., Hillis Street, Youngwood, Pennsylvania 15697 (412) 925-7272
 Powerex Europe, S.A., 428 Avenue G. Durand, BP107, 72003 Le Mans, France (43) 41.14.14

JQ224575/JQ225075
JR224575/JR225075

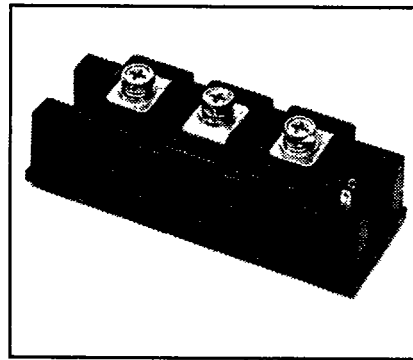
Single Chopper
FETMOD™
Power Modules
75 Amperes/450-500 Volts

T-39-15



**450-500 Volts, JQ224575,
 JQ225075, JR224575, JR225075,
 Outline Drawing**

Dimension	Inches	Millimeters
A	3.70	94
B	3.150 ± .01	80 ± 0.25
C	1.34	34
D	1.18 Max	30 Max.
E	.91	23
F	.75	19
G	.67	17
H	.51	13
J	.47	12
K	.35	9
L	.256 Dia.	6.5 Dia.
M	.25 Min	6.5 Min.
N	.24	6
P	M5 Metric	M5
Q	.16	4



JQ224575, JQ225075
JR224575, JR225075
Single Chopper FETMOD™
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 75 Amperes/450-500 Volts

Description

Powerex Dual FETMOD™ Modules are designed for use in chopper applications requiring Hi-Frequency switching and low loss control. The modules are insulated, consisting of two MOSFET Transistors with each MOSFET having a reverse parallel connected high speed diode.

Features:

- ☐ Isolated Mounting
- ☐ Vertical DMOS Construction
- ☐ Discrete Fast Recovery Feed-back diode
- ☐ Low RDS(on)
- ☐ Low Drive Requirement

Applications:

- ☐ Motor Control
- ☐ UPS Inverters
- ☐ Switch Mode Power Supply
- ☐ Regulator

Ordering Information

Example: Select the complete eight digit module part number you desire from the table — i.e. JR225075 is a 500 Volt, 75 Ampere Single Chopper FETMOD™ Module.

Type	V _{DS} Volts (x10)	Current Rating Amperes (75)
JR22	50	75
	45	



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JQ224575/JQ225075

JR224575/JR225075

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

	Symbol	JQ224575 / JQ225075 JR224575 / JR225075	Units
Junction Temperature	T_J	-40 to 150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-40 to 125	$^\circ\text{C}$
Drain Source Voltage	V_{DSS}	450/500	Volts
Gate-Source Voltage	V_{GSS}	± 20	Volts
Continuous Drain Current (RMS)	I_D	75	Amperes
Continuous Drain Current (DC) (125°C)	I_D	50	Amperes
Pulsed Drain Current Repetitive	I_{DM}		Amperes
Power Dissipation	P_T	500	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 (AC 1 MIN)	V_{RMS}	2500	Volts



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

Characteristics	Symbol	Test Conditions	JQ224575 / JQ225075 JR224575 / JR225075			Units
			Min.	Typ.	Max.	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = V_{DSS}$ $V_{GS} = 0V$	—	—	1	mA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 0.8 V_{DSS}$ $V_{GS} = 0V$ $T_J = 125^\circ\text{C}$	—	—	10	mA
Gate Source Threshold	$V_{GS(TH)}$	$I_D = 1\text{mA}$, $V_{DS} = 10V$	2	3	4	Volts
Gate Source Leakage	$\pm I_{GSS}$	$\pm V_{GS} = \pm V_{GSS}$ $V_{DS} = 0V$	—	—	0.5	μA
Drain Source On State Resistance	$R_{DS(ON)}$	$V_{GS} = 15V$ $T_J = 25^\circ\text{C}$	—	—	0.093	Ω
		$I_D = 75A$ $T_J = 150^\circ\text{C}$	—	—	0.22	Ω
		$tw \leq 10\mu\text{s}$	—	—	—	—
Drain Source On State Voltage	$V_{DS(ON)}$	$V_{GS} = 15V$ $T_J = 25^\circ\text{C}$	—	—	7	Volts
		$I_D = 75A$ $T_J = 150^\circ\text{C}$	—	—	16.5	Volts
		$tw \leq 10\mu\text{s}$	—	—	—	—



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

Characteristics	Symbol	Test Conditions	JQ224575 / JQ225075 JR224575 / JR225075			Units
			Min.	Typ.	Max.	
Forward Transconductance	G_{FS}	$I_D = 40\text{A}$, $V_{DS} = 10\text{V}$ $t_w = 300\mu\text{s}$, Duty = 2%	25	—	—	mhos
Input Capacitance	C_{ISS}	$V_{GS} = 0\text{V}$, $V_{DS} = 10\text{V}$	—	—	20000	pf
Output Capacitance	C_{OSS}	$f = 1\text{mhz}$	—	—	4500	pf
Reverse Transfer Capacitance	C_{RSS}		—	—	1800	pf
Total Gate Charge	Q_G	$V_{DD} = 300\text{V}$, $V_{GS} = 15\text{V}$ $I_D = 75\text{A}$	—	—	—	nC
Turn On Time*	t_{on}	$V_{DD} = 300\text{V}$	—	—	600	ns
Turn Off Time*	t_{off}	$I_D = 40\text{A}$, $V_{GS} = 15\text{V}$ $R_{GEN} = R_{GS} = 50\Omega$	—	—	2500	ns
Turn On Time*	t_{on}	$V_{DD} = 300\text{V}$	—	440	—	ns
Turn Off Time*	t_{off}	$I_D = 75\text{A}$, $V_{GS} = \pm 15\text{V}$ $R_{G1} = R_{G2} = 4.7\Omega$	—	290	—	ns

Free Wheel Diode Characteristics, $T_J=25^\circ\text{C}$ unless otherwise specified

Characteristics	Symbol	Test Conditions	JQ224575 / JQ225075 JR224575 / JR225075			Units
			Min.	Typ.	Max.	
Source Current	I_S	$V_{SD} = 2.0\text{V}$, $V_{GS} = 0\text{V}$	—	—	75	Amperes
Source-Drain Voltage	V_{SD}	$I_S = 75\text{A}$, $V_{GS} = 0\text{V}$	—	—	2.0	Volts
Reverse Recovery Time	t_{rr}	$I_S = 75\text{A}$, $di/dt = -150\text{A}/\mu\text{s}$	—	—	180	ns
Reverse Recovery Charge	Q_{rr}	$I_S = 75\text{A}$, $di/dt = -150\text{A}/\mu\text{s}$	—	—	1600	μC
Thermal Resistance Junction To Case	$R_{\theta JC}$	Diode Per Module	—	—	0.33	$^\circ\text{C}/\text{W}$

Body-Drain Diode Characteristics, $T_J=25^\circ\text{C}$ unless otherwise specified

Characteristics	Symbol	Test Conditions	JQ224575 / JQ225075 JR224575 / JR225075			Units
			Min.	Typ.	Max.	
Source Current	I_S	$V_{SD} = 1.2\text{V}$, $V_{GS} = 0\text{V}$	—	—	7.5	Amperes
Source-Drain Voltage	V_{SD}	$I_S = 7.5\text{A}$, $V_{GS} = 0\text{V}$	—	—	1.2	Volts
Thermal Resistance Junction to Case	$R_{\theta JC}$	Diode Per Module	—	—	0.33	$^\circ\text{C}/\text{W}$

FET Thermal Characteristics

Characteristics	Symbol	Test Conditions	JQ224575 / JQ225075 JR224575 / JR225075			Units
			Min.	Typ.	Max.	
Thermal Resistance Junction to Case	$R_{\theta JC}$	FET Per Module	—	—	.25	$^\circ\text{C}/\text{W}$
Thermal Resistance Case to Sink Lubricated	$R_{\theta CS}$		—	—	.15	$^\circ\text{C}/\text{W}$

*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)
Switching times are independent of temperature



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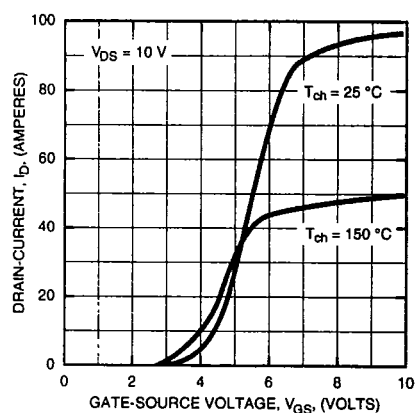
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JR224575/JR225075

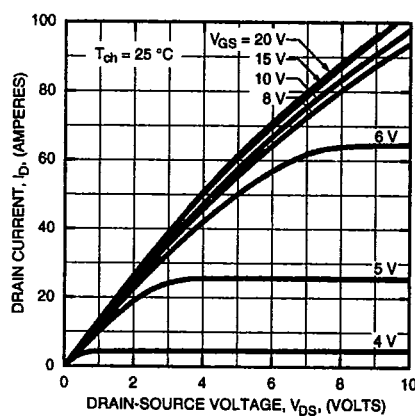
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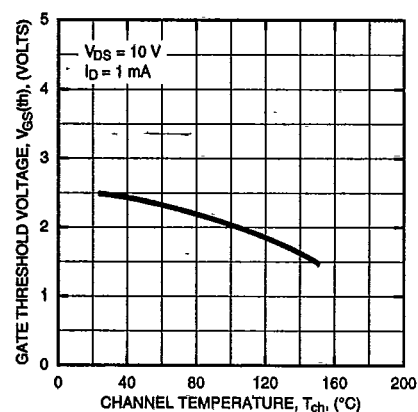
TRANSFER CHARACTERISTICS
(TYPICAL)



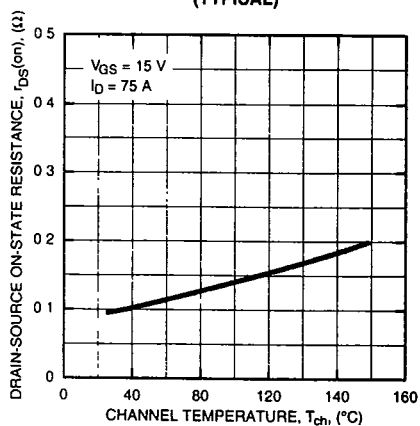
OUTPUT CHARACTERISTICS
(TYPICAL)



GATE THRESHOLD VOLTAGE VS. TEMPERATURE
(TYPICAL)



ON-RESISTANCE VS. TEMPERATURE
(TYPICAL)





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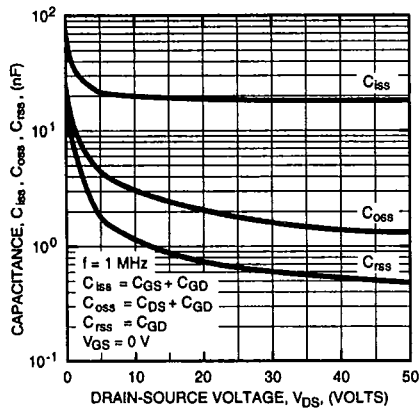
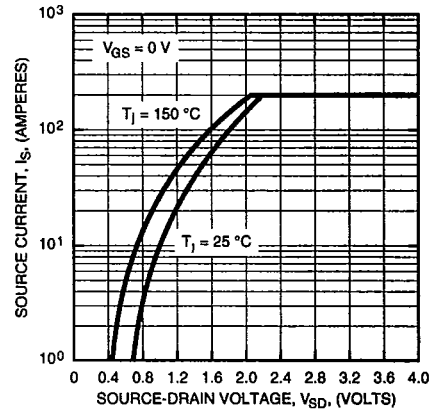
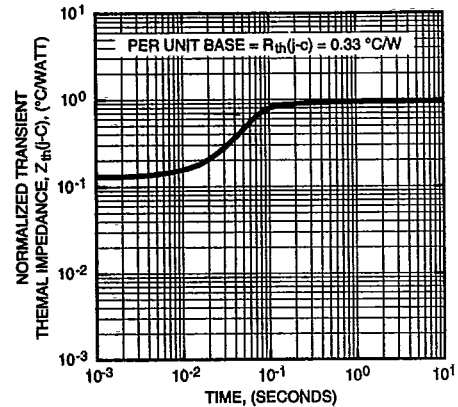
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CAPACITANCE VS. DRAIN-SOURCE VOLTAGE
(TYPICAL)FREE-WHEEL DIODE FORWARD CHARACTERISTICS
(TYPICAL)TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS
(DIODE)TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS
(MOS FET)