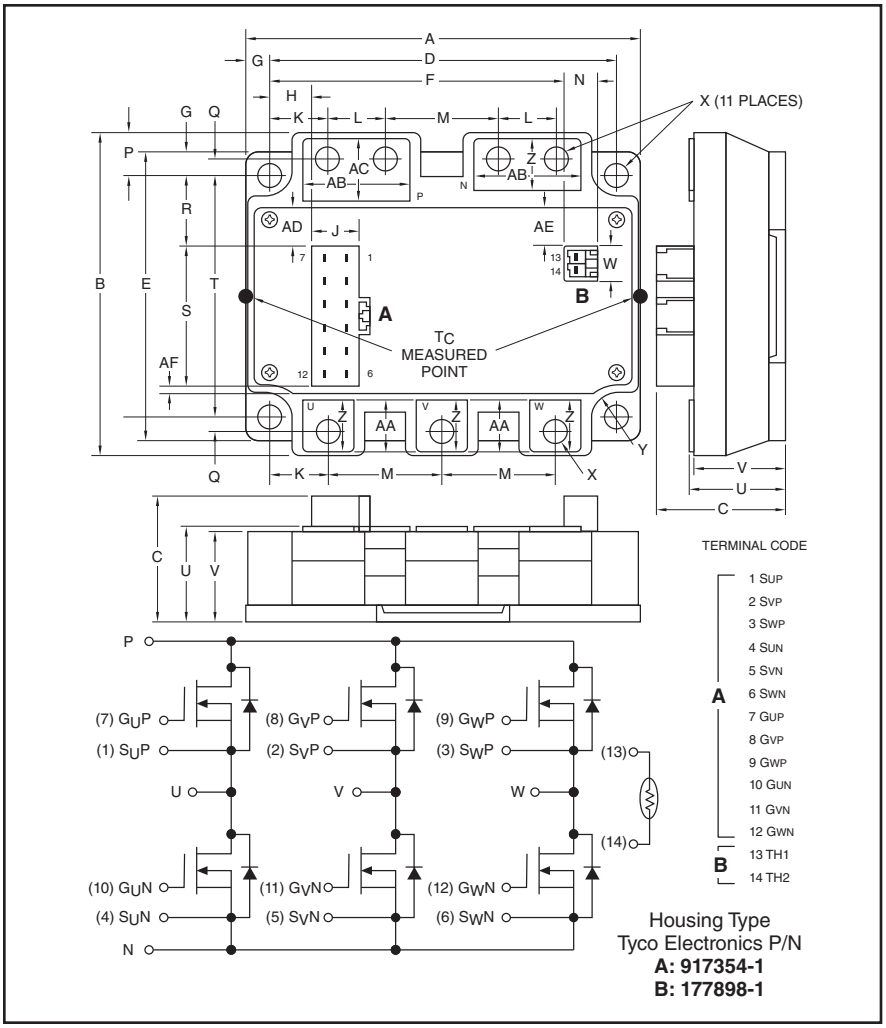
FM200TU-07A

Powerex, Inc., 173 Pavilion Lane, Youngwood, Pennsylvania 15697 (724) 925-7272
www.pwrx.com

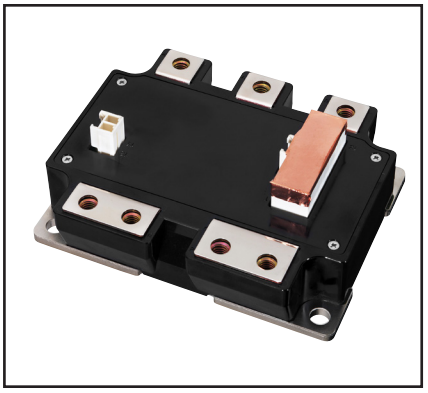
6-Pack High Power MOSFET Module
100 Amperes/75 Volts



Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	4.33	110.0
B	3.54	90.0
C	1.38	35.0
D	3.82	97.0
E	3.15	80.0
F	3.27	83.0
G	0.26	6.5
H	0.48	12.0
J	0.51	12.9
K	0.65	16.5
L	0.63	16.0
M	1.26	32.0
N	0.35	8.8
P	0.45	11.5
Q	0.16	4.0

Dimensions	Inches	Millimeters
R	0.79	20.0
S	1.50	38.0
T	2.64	67.0
U	1.02	26.0
V	0.98	25.0
W	0.36	9.1
X	Dia. 0.25	Dia. 6.5
Y	Rad. 0.25	Rad. 6.5
Z	0.57	14.5
AA	0.55	14.0
AB	1.18	30.0
AC	0.69	17.5
AD	0.47	12.0
AE	0.61	15.5
AF	0.18	4.5



Description:
Powerex MOSFET Modules are designed for use in low voltage switching applications. Each module consists of 6 MOSFET switches with low $R_{ds(on)}$ and a fast recovery body diode to yield low loss. All components and interconnects are isolated from the heat sink baseplate. This offers simplified system assembly and thermal management.

Features:
- ☐ Low $E_{SW(off)}$ and Low $R_{ds(on)}$
- ☐ Super-Fast Recovery Free-Wheel Diode
- ☐ Thermistor for T_C Sensing
- ☐ Parallel Legs to make a Dual Module at 3X the Rating
- ☐ Positive Locking Connectors
- ☐ Easy Bus Bar Layout Due to Flow Through Power Design

Applications:
- ☐ Forklift
- ☐ Off road Electric Vehicle
- ☐ Welder
- ☐ UPS
- ☐ Chopper

Ordering Information:
Example: Select the complete part module number you desire from the table below -i.e. FM200TU-07A is a 75V (V_{DSS}), 100 Ampere 6-Pack High Power MOSFET Module.

Type	Current Rating Amperes	V_{DSS} Volts
FM	100	75

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Absolute Maximum Ratings, T_j = 25°C unless otherwise specified

Ratings	Symbol	FM200TU-07A	Units
Channel Temperature	T_j	–40 to 150	°C
Storage Temperature	T_{stg}	–40 to 125	°C
Drain-Source Voltage (G-S Short)	V_{DSS}	75	Volts
Gate-Source Voltage (D-E Short)	V_{GSS}	±20	Volts
Drain Current (T_C = 25°C)	$I_{D(rms)}$	100	A_{rms}
Peak Drain Current (Pulse)	I_{DM}	200*	Amperes
Avalanche Current (L = 10µH, Pulse)	I_{DA}	100*	Amperes
Source Current (T_C = 25°C)**	$I_{S(rms)}$	100	A_{rms}
Peak Source Current (Pulse)**	I_{SM}	200*	Amperes
Maximum Power Dissipation (T_C = 25°C, T_j < 150°C)***	P_D	410	Watts
Maximum Peak Power Dissipation ($T_{C'}$ = 25°C, T_j < 150°C)***	P_D	560	Watts
Mounting Torque, M6 Main Terminal	—	40	in-lb
Mounting Torque, M6 Mounting	—	40	in-lb
Weight	—	600	Grams
Isolation Voltage (Main Terminal to Baseplate, AC 1 min.)	V_{ISO}	2500	Volts

Electrical Characteristics, T_j = 25°C unless otherwise specified

Characteristics		Symbol	Test Conditions	Min.	Typ.	Max.	Units
Drain-Cutoff Current		I_{DSS}	$V_{DS} = V_{DSS}$, V_{GS} = 0V	—	—	1.0	mA
Gate-Source Threshold Voltage		$V_{GS(th)}$	I_D = 10mA, V_{DS} = 10V	4.7	6.0	7.3	Volts
Gate Leakage Current		I_{GSS}	$V_{GS} = V_{GSS}$, V_{DS} = 0V	—	—	1.5	µA
Static Drain-Source On-State Resistance		$r_{DS(on)}$	I_D = 100A, V_{GS} = 15V, T_j = 25°C	—	1.2	1.65	mΩ
(Chip)			I_D = 100A, V_{GS} = 15V, T_j = 125°C	—	1.92	—	mΩ
Static Drain-Source On-State Voltage		$V_{DS(on)}$	I_D = 100A, V_{GS} = 15V, T_j = 25°C	—	0.12	0.165	Volts
(Chip)			I_D = 100A, V_{GS} = 15V, T_j = 125°C	—	0.192	—	Volts
Lead Resistance		R_{lead}	I_D = 100A, Terminal-Chip, T_j = 25°C	—	1.2	—	mΩ
			I_D = 100A, Terminal-Chip, T_j = 125°C	—	1.68	—	mΩ
Input Capacitance		C_{iss}	V_{DS} = 10V, V_{GS} = 0V	—	—	50	nF
Output Capacitance		C_{oss}		—	—	7	nF
Reverse Transfer Capacitance		C_{rss}		—	—	4	nF
Total Gate Charge		Q_G	V_{DD} = 48V, I_D = 100A, V_{GS} = 15V	—	700	—	nC
Inductive	Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 48V, I_D = 100A, $V_{GS1} = V_{GS2}$ = 15V, R_G = 13Ω, Inductive Load Switching Operation, I_S = 100A	—	—	450	ns
Load	Rise Time	t_r		—	—	400	ns
Switch	Turn-off Delay Time	$t_{d(off)}$		—	—	600	ns
Time	Fall Time	t_f		—	—	400	ns
Diode Reverse Recovery Time**		t_{rr}		—	—	200	ns
Diode Reverse Recovery Charge**		Q_{rr}		—	2.0	—	µC
Source-Drain Voltage		V_{SD}	I_S = 100A, V_{GS} = 0V	—	—	1.3	Volts

* Pulse width and repetition rate should be such that device channel temperature (T_j) does not exceed $T_{j(max)}$ rating.
**Represents characteristics of the anti-parallel, source-to-drain free-wheel diode (FWDi).
***$T_{C'}$ measured point is just under the chips. If you use this value, $R_{th(f-a)}$ should be measured just under the chips.

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Thermal and Mechanical Characteristics, T_j = 25°C unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance, Channel to Case	$R_{th(j-c)}$	MOSFET part (1/6 Module)	—	—	0.30	°C/W
		T_C Reference Point per Outline Drawing				
Thermal Resistance, Channel to Case	$R_{th(j-c')}$	MOSFET part (1/6 Module)	—	—	0.22	°C/W
		Measured Point is Just Under the Chips.				
Contact Thermal Resistance	$R_{th(c-f)}$	Per 1/6 Module, Thermal Grease Applied	—	0.1	—	°C/W

Thermistors Part

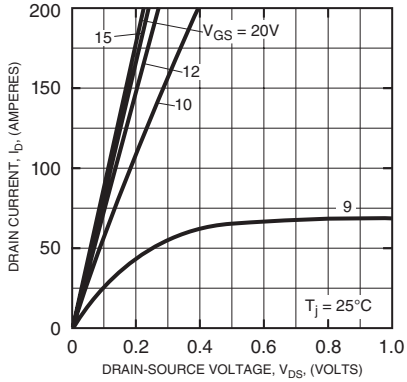
Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Resistance*	R_{th}	T_C = 25°C	—	100	—	kΩ
B Constant*	B	Resistance at 25°C, 50°C	—	4000	—	K

*$B = (\ln R_1 - \ln R_2) / (1/T_1 - 1/T_2)$

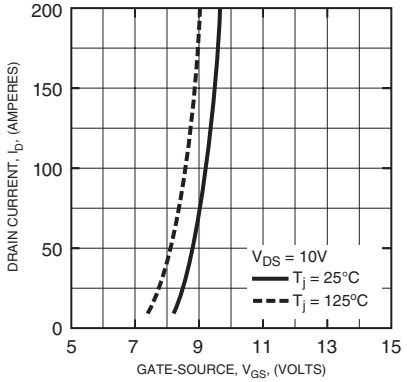
R_1: Resistance at T_1(K),

R_2: Resistance at T_2(K)

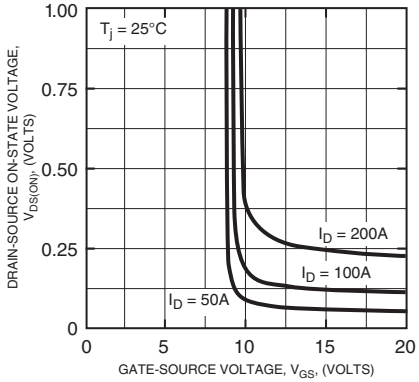
OUTPUT CHARACTERISTICS (TYPICAL)



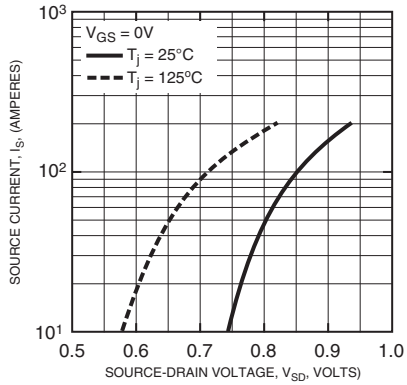
TRANSFER CHARACTERISTICS (TYPICAL)



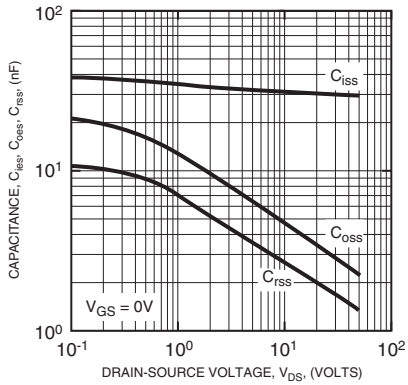
DRAIN-SOURCE ON-STATE VOLTAGE VS. GATE BIAS CHARACTERISTICS (TYPICAL)



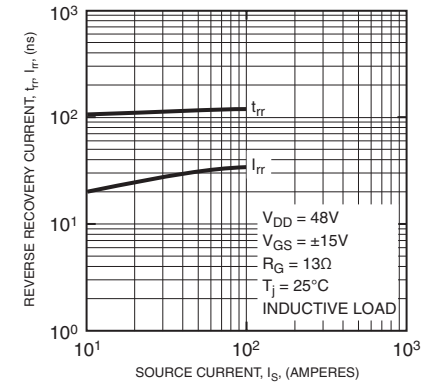
FREE-WHEEL DIODE FORWARD CHARACTERISTICS (TYPICAL - INVERTER PART)



CAPACITANCE VS. DRAIN-SOURCE VOLTAGE (TYPICAL)



REVERSE RECOVERY CHARACTERISTICS (TYPICAL)



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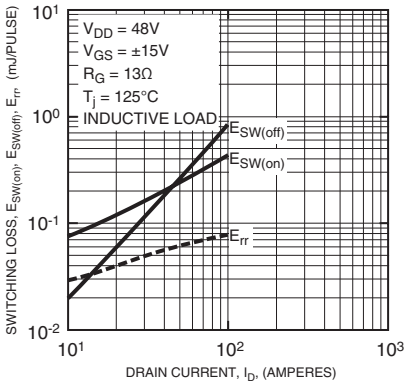
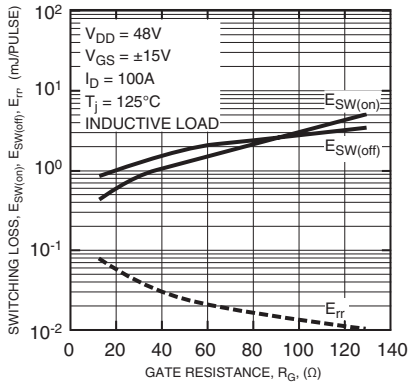
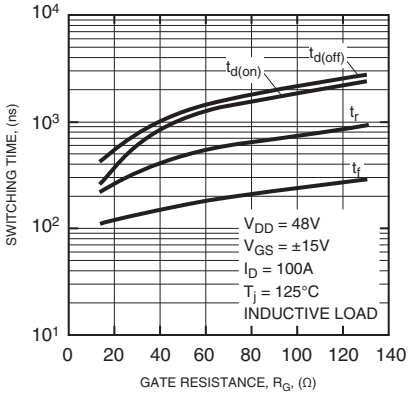
SWITCHING LOSS VS. DRAIN CURRENT (TYPICAL)



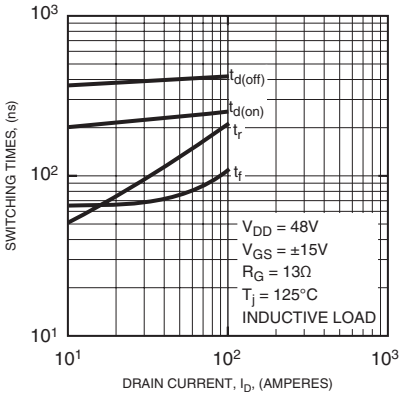
SWITCHING LOSS VS. GATE RESISTANCE (TYPICAL)



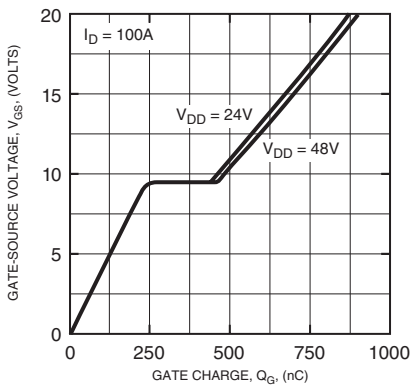
SWITCHING TIME VS. GATE RESISTANCE (TYPICAL)



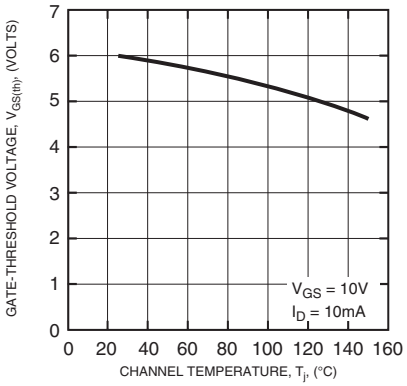
SWITCHING TIME VS. DRAIN CURRENT (TYPICAL)



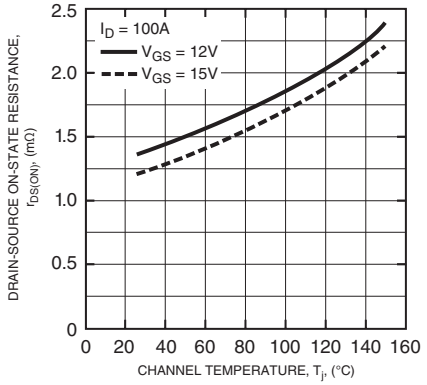
GATE CHARGE CHARACTERISTICS (TYPICAL)



GATE THRESHOLD VOLTAGE VS. TEMPERATURE (TYPICAL)



DRAIN-SOURCE ON-STATE RESISTANCE VS. TEMPERATURE (TYPICAL)



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (TYPICAL)