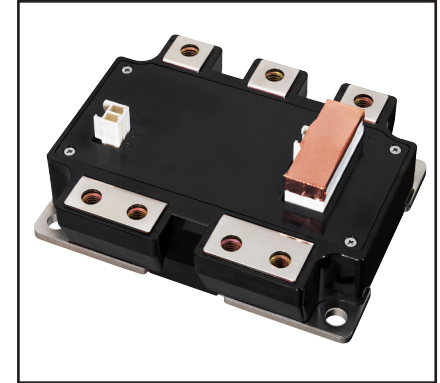
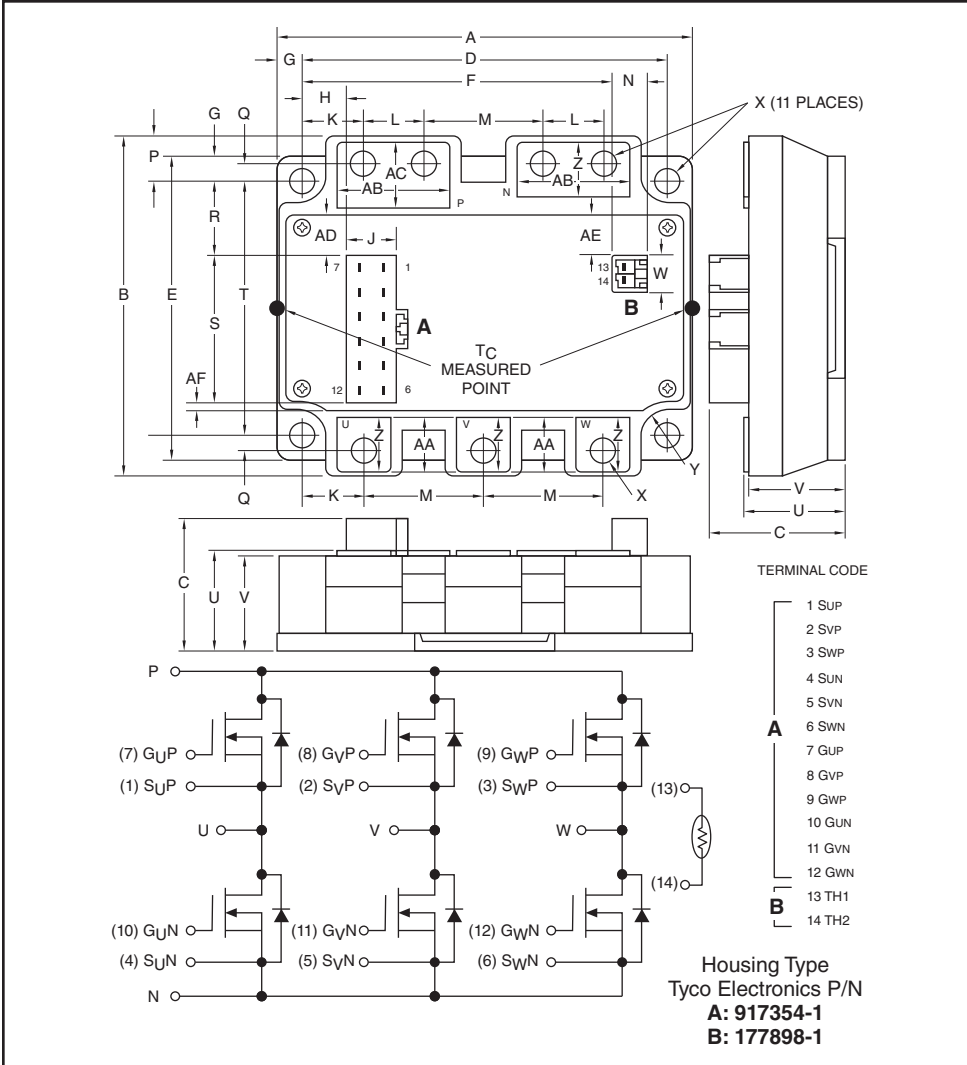


**6-PACK High Power MOSFET Module**  
**300 Amperes/150 Volts**



**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. FM600TU-3A is a 150V ( $V_{DSS}$ ), 300 Ampere 6-Pack High Power MOSFET Module.

Type	Current Rating Amperes	$V_{DSS}$ Volts
FM	300	150

**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



Powerex, Inc., 173 Pavilion Lane, Youngwood, Pennsylvania 15697 (724) 925-7272 [www.pwr.com](http://www.pwr.com)

**FM600TU-3A**  
**6-Pack High Power MOSFET Module**  
300 Amperes/150 Volts

**Absolute Maximum Ratings,  $T_j = 25^\circ\text{C}$  unless otherwise specified**

Ratings	Symbol	FM600TU-3A	Units
Channel Temperature	$T_j$	-40 to 150	$^\circ\text{C}$
Storage Temperature	$T_{\text{stg}}$	-40 to 125	$^\circ\text{C}$
Drain-Source Voltage (G-S Short)	$V_{\text{DSS}}$	150	Volts
Gate-Source Voltage (D-E Short)	$V_{\text{GSS}}$	$\pm 20$	Volts
Drain Current ( $T_C = 25^\circ\text{C}$ )	$I_{\text{D(rms)}}$	300	$A_{\text{rms}}$
Peak Drain Current (Pulse)	$I_{\text{DM}}$	600*	Amperes
Avalanche Current ( $L = 10\mu\text{H}$ , Pulse)	$I_{\text{DA}}$	300*	Amperes
Source Current ( $T_C = 25^\circ\text{C}$ )**	$I_{\text{S(rms)}}$	300	$A_{\text{rms}}$
Peak Source Current (Pulse)**	$I_{\text{SM}}$	600*	Amperes
Maximum Power Dissipation ( $T_C = 25^\circ\text{C}$ , $T_j < 150^\circ\text{C}$ )***	$P_{\text{D}}$	960	Watts
Maximum Peak Power Dissipation ( $T_C = 25^\circ\text{C}$ , $T_j < 150^\circ\text{C}$ )***	$P_{\text{D}}$	1300	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.)	$V_{\text{ISO}}$	2500	Volts

\* Pulse width and repetition rate should be such that device channel temperature ( $T_j$ ) does not exceed  $T_{j(\text{max})}$  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,  $R_{\text{th(f-a)}}$  should be measured just under the chips.

**FM600TU-3A**  
**6-Pack High Power MOSFET Module**  
 300 Amperes/150 Volts

**Electrical Characteristics,  $T_j = 25^\circ\text{C}$  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	$V_{GS(th)}$	$I_D = 30mA, V_{DS} = 10V$	4.7	6.0	7.3	Volts
Gate Leakage Current	$I_{GSS}$	$V_{GS} = V_{GSS}, V_{DS} = 0V$	—	—	1.5	$\mu\text{A}$
Static Drain-Source On-State Resistance (Chip)	$r_{DS(on)}$	$I_D = 300A, V_{GS} = 15V, T_j = 25^\circ\text{C}$	—	1.6	2.2	$\text{m}\Omega$
		$I_D = 300A, V_{GS} = 15V, T_j = 125^\circ\text{C}$	—	3.0	—	$\text{m}\Omega$
Static Drain-Source On-State Voltage (Chip)	$V_{DS(on)}$	$I_D = 300A, V_{GS} = 15V, T_j = 25^\circ\text{C}$	—	0.48	0.66	Volts
		$I_D = 300A, V_{GS} = 15V, T_j = 125^\circ\text{C}$	—	0.91	—	Volts
Lead Resistance	$R_{lead}$	$I_D = 300A, \text{Terminal-Chip}, T_j = 25^\circ\text{C}$	—	0.7	—	$\text{m}\Omega$
		$I_D = 300A, \text{Terminal-Chip}, T_j = 125^\circ\text{C}$	—	1.0	—	$\text{m}\Omega$
Input Capacitance	$C_{iss}$	$V_{DS} = 10V, V_{GS} = 0V$	—	—	110	nF
Output Capacitance	$C_{oss}$		—	—	15	nF
Reverse Transfer Capacitance	$C_{rss}$		—	—	10	nF
Total Gate Charge	$Q_G$	$V_{DD} = 48V, I_D = 300A, V_{GS} = 15V$	—	1950	—	nC
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 48V, I_D = 300A,$ $V_{GS1} = V_{GS2} = 15V, R_G = 4.2\Omega,$ Inductive Load Switching Operation,	—	—	400	ns
Rise Time	$t_r$		—	—	400	ns
Turn-off Delay Time	$t_{d(off)}$		—	—	500	ns
Fall Time	$t_f$		—	—	200	ns
Diode Reverse Recovery Time**	$t_{rr}$	$I_S = 300A$	—	—	200	ns
Diode Reverse Recovery Charge**	$Q_{rr}$		—	8.0	—	$\mu\text{C}$
Source-Drain Voltage	$V_{SD}$	$I_S = 300A, V_{GS} = 0V$	—	—	1.3	Volts

\*\*Represents characteristics of the anti-parallel, source-to-drain free-wheel diode (FWDi).



**FM600TU-3A**  
**6-Pack High Power MOSFET Module**  
300 Amperes/150 Volts

**Thermal and Mechanical Characteristics,  $T_j = 25^\circ\text{C}$  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) $T_C$ Reference Point per Outline Drawing	—	—	0.13	$^\circ\text{C/W}$
Thermal Resistance, Channel to Case	$R_{th(j-c')}$	MOSFET part (1/6 Module) Measured Point is Just Under the Chips.	—	—	0.096	$^\circ\text{C/W}$
Contact Thermal Resistance	$R_{th(c-f)}$	Per 1/6 Module, Thermal Grease Applied	—	0.1	—	$^\circ\text{C/W}$

**Thermistors Part**

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Resistance*	$R_{th}$	$T_C = 25^\circ\text{C}$	—	100	—	$\text{k}\Omega$
B Constant*	B	Resistance at $25^\circ\text{C}$ , $50^\circ\text{C}$	—	4000	—	K

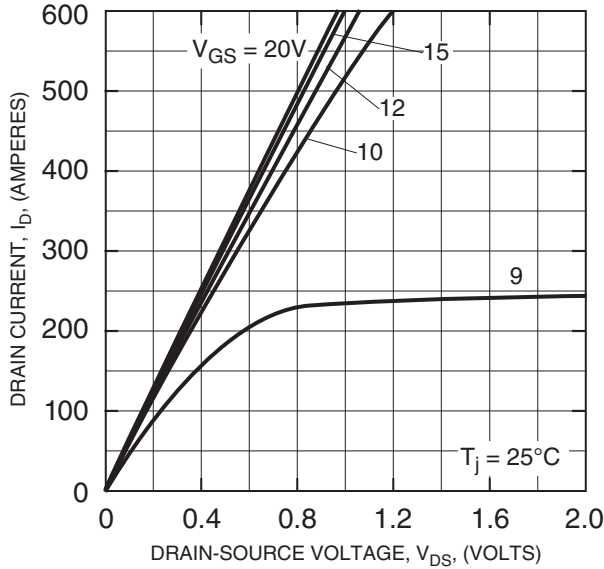
\* $B = (\ln R_1 - \ln R_2) / (1/T_1 - 1/T_2)$

$R_1$ : Resistance at  $T_1(\text{K})$ ,

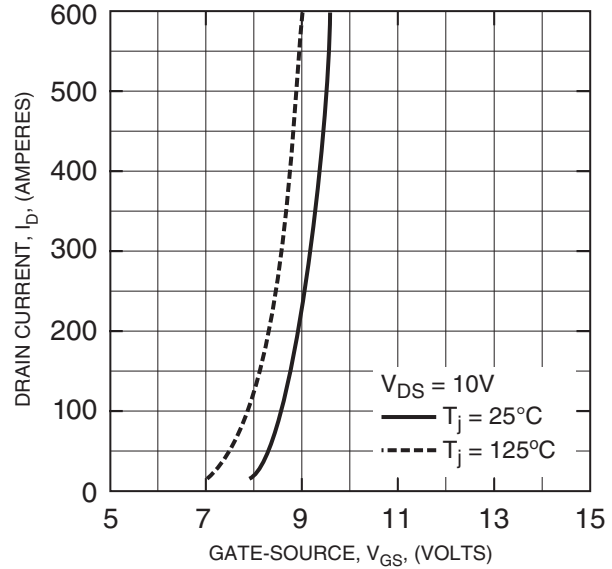
$R_2$ : Resistance at  $T_2(\text{K})$

**FM600TU-3A**  
**6-Pack High Power MOSFET Module**  
 300 Amperes/150 Volts

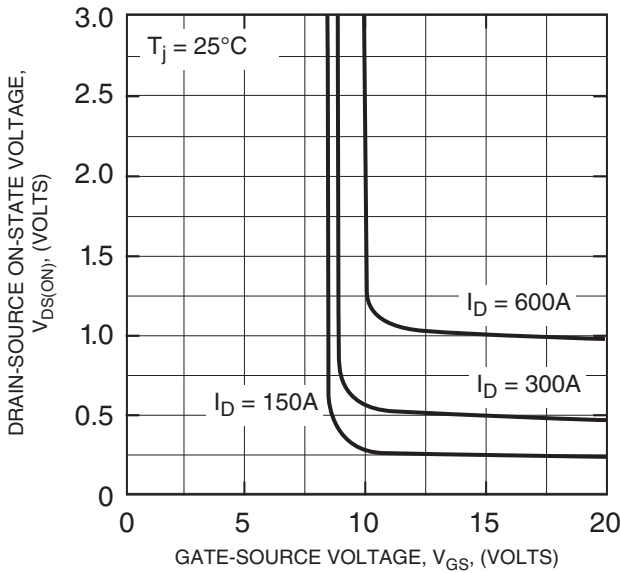
**OUTPUT CHARACTERISTICS (TYPICAL)**



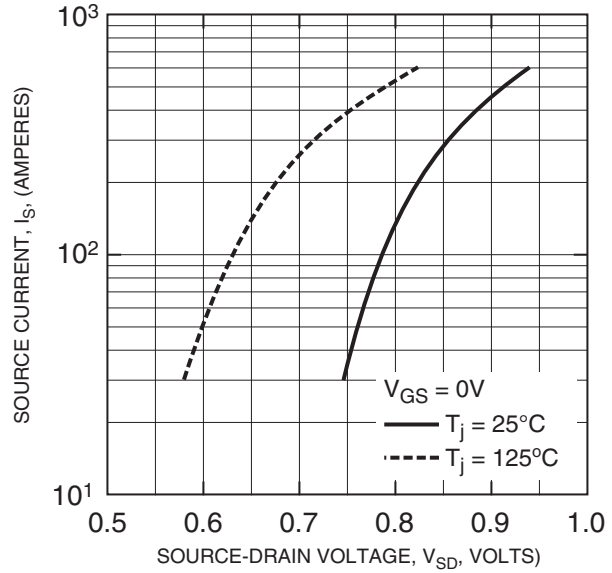
**TRANSFER CHARACTERISTICS (TYPICAL)**



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

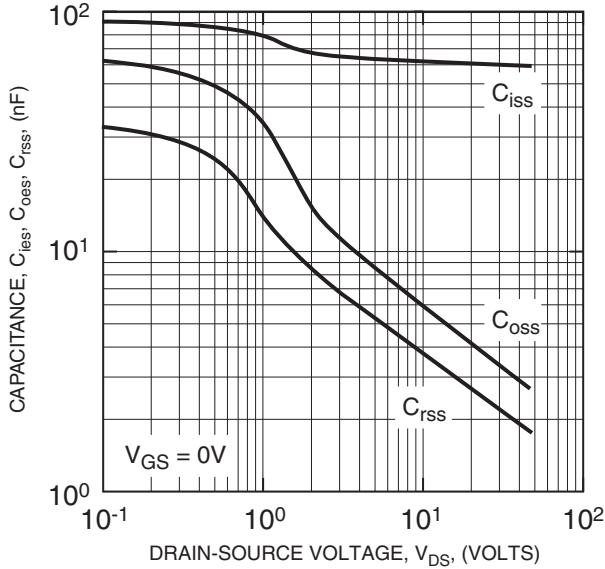


**FREE-WHEEL DIODE FORWARD CHARACTERISTICS (TYPICAL - INVERTER PART)**

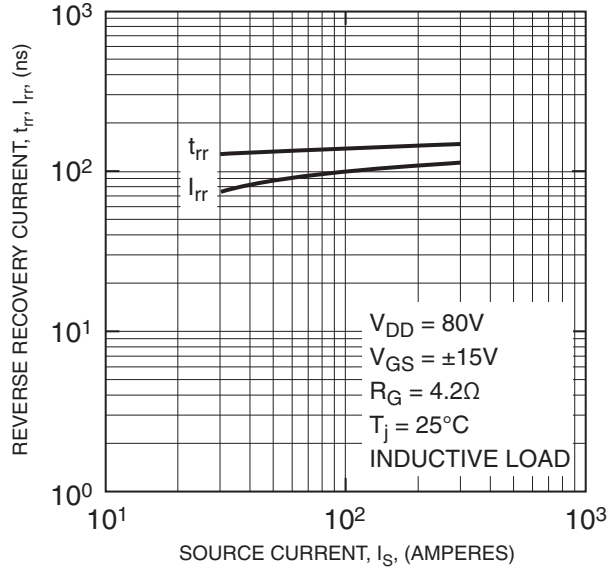


**FM600TU-3A**  
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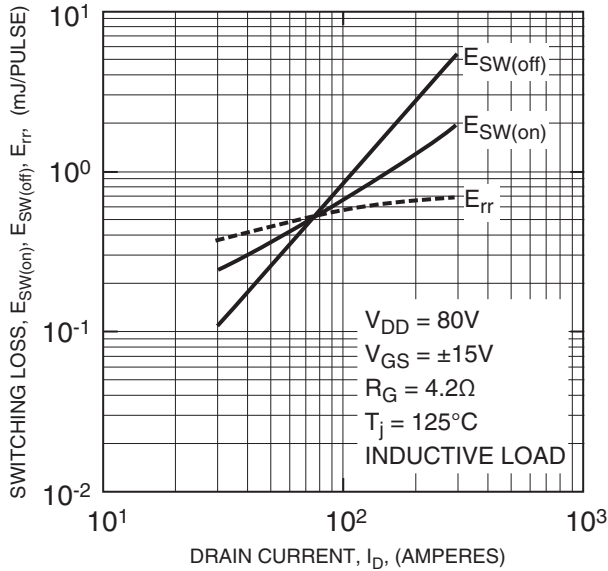
**CAPACITANCE VS. DRAIN-SOURCE VOLTAGE (TYPICAL)**



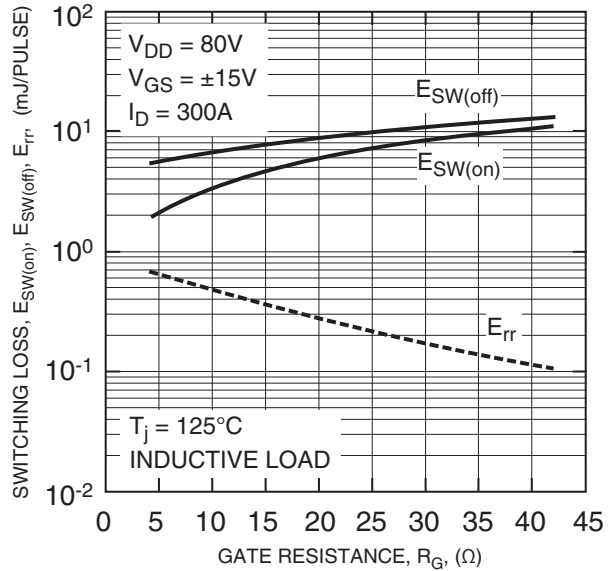
**REVERSE RECOVERY CHARACTERISTICS (TYPICAL)**



**SWITCHING LOSS VS. DRAIN CURRENT (TYPICAL)**

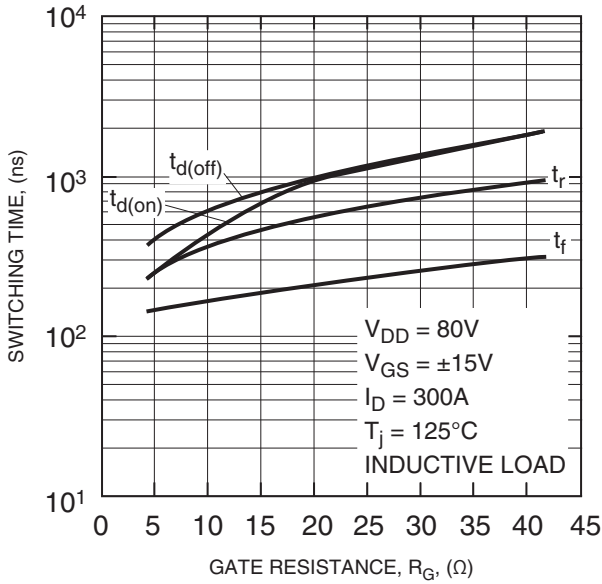


**SWITCHING LOSS VS. GATE RESISTANCE (TYPICAL)**

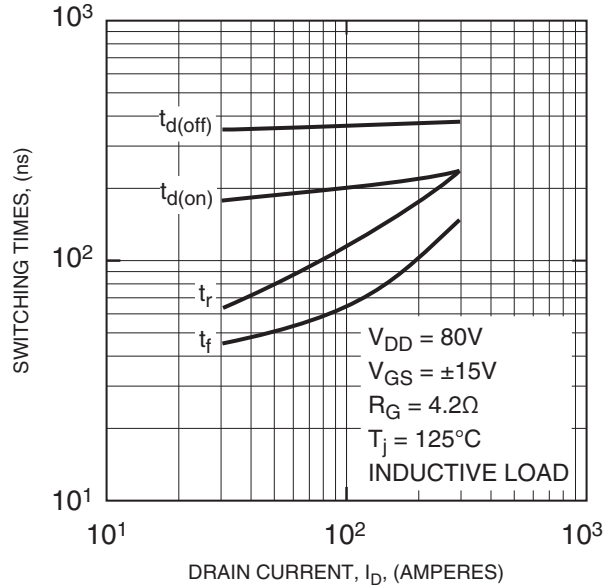


**FM600TU-3A**  
**6-Pack High Power MOSFET Module**  
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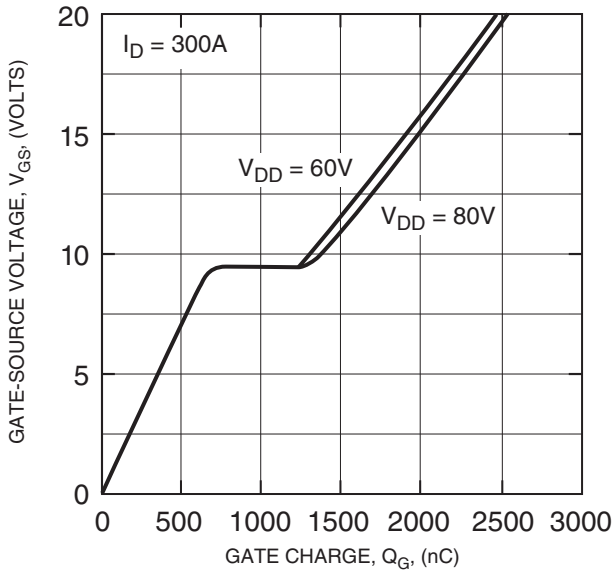
**SWITCHING TIME VS. GATE RESISTANCE (TYPICAL)**



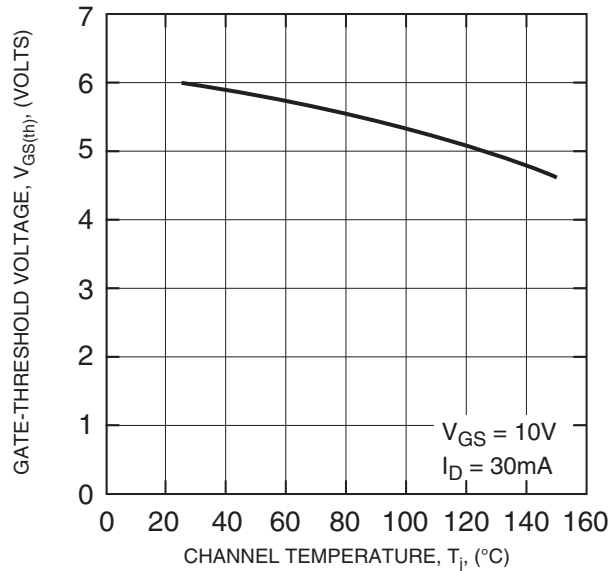
**SWITCHING TIME VS. DRAIN CURRENT (TYPICAL)**



**GATE CHARGE CHARACTERISTICS (TYPICAL)**



**GATE THRESHOLD VOLTAGE VS. TEMPERATURE (TYPICAL)**



**FM600TU-3A**  
**6-Pack High Power MOSFET Module**  
 300 Amperes/150 Volts

