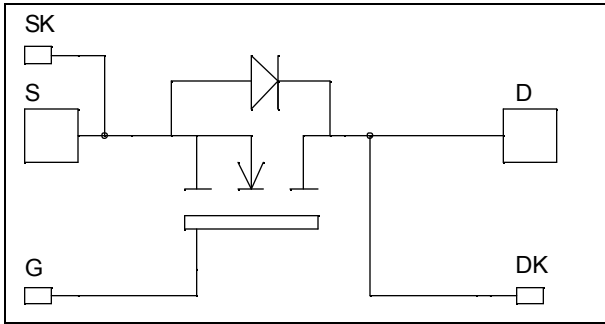


**Single Switch  
MOSFET Power Module**

**$V_{DSS} = 1000V$   
 $R_{DSon} = 45m\Omega$  typ @  $T_j = 25^\circ C$   
 $I_D = 215A$  @  $T_c = 25^\circ C$**

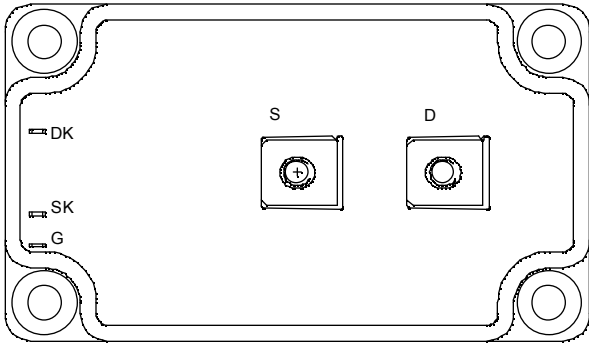


**Application**

- Welding converters
- Switched Mode Power Supplies
- Uninterruptible Power Supplies
- Motor control

**Features**

- Power MOS 7<sup>®</sup> FREDFETs
  - Low  $R_{DSon}$
  - Low input and Miller capacitance
  - Low gate charge
  - Fast intrinsic reverse diode
  - Avalanche energy rated
  - Very rugged
- Kelvin source for easy drive
- Very low stray inductance
  - Symmetrical design
  - M5 power connectors
- High level of integration
- AlN substrate for improved thermal performance



**Benefits**

- Outstanding performance at high frequency operation
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Low profile

**Absolute maximum ratings**

Symbol	Parameter	Max ratings	Unit
$V_{DSS}$	Drain - Source Breakdown Voltage	1000	V
$I_D$	Continuous Drain Current	$T_c = 25^\circ C$	215
		$T_c = 80^\circ C$	160
$I_{DM}$	Pulsed Drain current	860	A
$V_{GS}$	Gate - Source Voltage	$\pm 30$	V
$R_{DSon}$	Drain - Source ON Resistance	55	$m\Omega$
$P_D$	Maximum Power Dissipation	$T_c = 25^\circ C$	5000
$I_{AR}$	Avalanche current (repetitive and non repetitive)	30	A
$E_{AR}$	Repetitive Avalanche Energy	50	mJ
$E_{AS}$	Single Pulse Avalanche Energy	3200	

**CAUTION:** These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed.

All ratings @  $T_j = 25^\circ\text{C}$  unless otherwise specified

## Electrical Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{GS} = 0V, V_{DS} = 1000V$   $T_j = 25^\circ\text{C}$			600	$\mu\text{A}$
		$V_{GS} = 0V, V_{DS} = 800V$   $T_j = 125^\circ\text{C}$			3	$\text{mA}$
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10V, I_D = 107.5A$		45	55	$\text{m}\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 30\text{mA}$	3		5	V
$I_{GSS}$	Gate – Source Leakage Current	$V_{GS} = \pm 30V, V_{DS} = 0V$			$\pm 600$	$\text{nA}$

## Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$C_{iss}$	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1\text{MHz}$		42.7		$\text{nF}$
$C_{oss}$	Output Capacitance			7.6		
$C_{rss}$	Reverse Transfer Capacitance			1.3		
$Q_g$	Total gate Charge	$V_{GS} = 10V$ $V_{Bus} = 500V$ $I_D = 215A$		1602		$\text{nC}$
$Q_{gs}$	Gate – Source Charge			204		
$Q_{gd}$	Gate – Drain Charge			1038		
$T_{d(on)}$	Turn-on Delay Time	<b>Inductive switching @ <math>125^\circ\text{C}</math></b> $V_{GS} = 15V$ $V_{Bus} = 670V$ $I_D = 215A$ $R_G = 0.5\Omega$		18		$\text{ns}$
$T_r$	Rise Time			14		
$T_{d(off)}$	Turn-off Delay Time			140		
$T_f$	Fall Time			55		
$E_{on}$	Turn-on Switching Energy	<b>Inductive switching @ <math>25^\circ\text{C}</math></b> $V_{GS} = 15V, V_{Bus} = 670V$ $I_D = 215A, R_G = 0.5\Omega$		7.2		$\text{mJ}$
$E_{off}$	Turn-off Switching Energy			4.3		
$E_{on}$	Turn-on Switching Energy	<b>Inductive switching @ <math>125^\circ\text{C}</math></b> $V_{GS} = 15V, V_{Bus} = 670V$ $I_D = 215A, R_G = 0.5\Omega$		12		$\text{mJ}$
$E_{off}$	Turn-off Switching Energy			5.8		

## Source - Drain diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit	
$I_S$	Continuous Source current (Body diode)	$T_c = 25^\circ\text{C}$			215	A	
		$T_c = 80^\circ\text{C}$			160		
$V_{SD}$	Diode Forward Voltage	$V_{GS} = 0V, I_S = -215A$			1.3	V	
$dv/dt$	Peak Diode Recovery ①				18	V/ns	
$t_{rr}$	Reverse Recovery Time	$I_S = -215A$ $V_R = 500V$ $di/dt = 600A/\mu\text{s}$	$T_j = 25^\circ\text{C}$			310	$\text{ns}$
			$T_j = 125^\circ\text{C}$			625	
$Q_{rr}$	Reverse Recovery Charge		$T_j = 25^\circ\text{C}$		12		$\mu\text{C}$
			$T_j = 125^\circ\text{C}$		36		

①  $dv/dt$  numbers reflect the limitations of the circuit rather than the device itself.

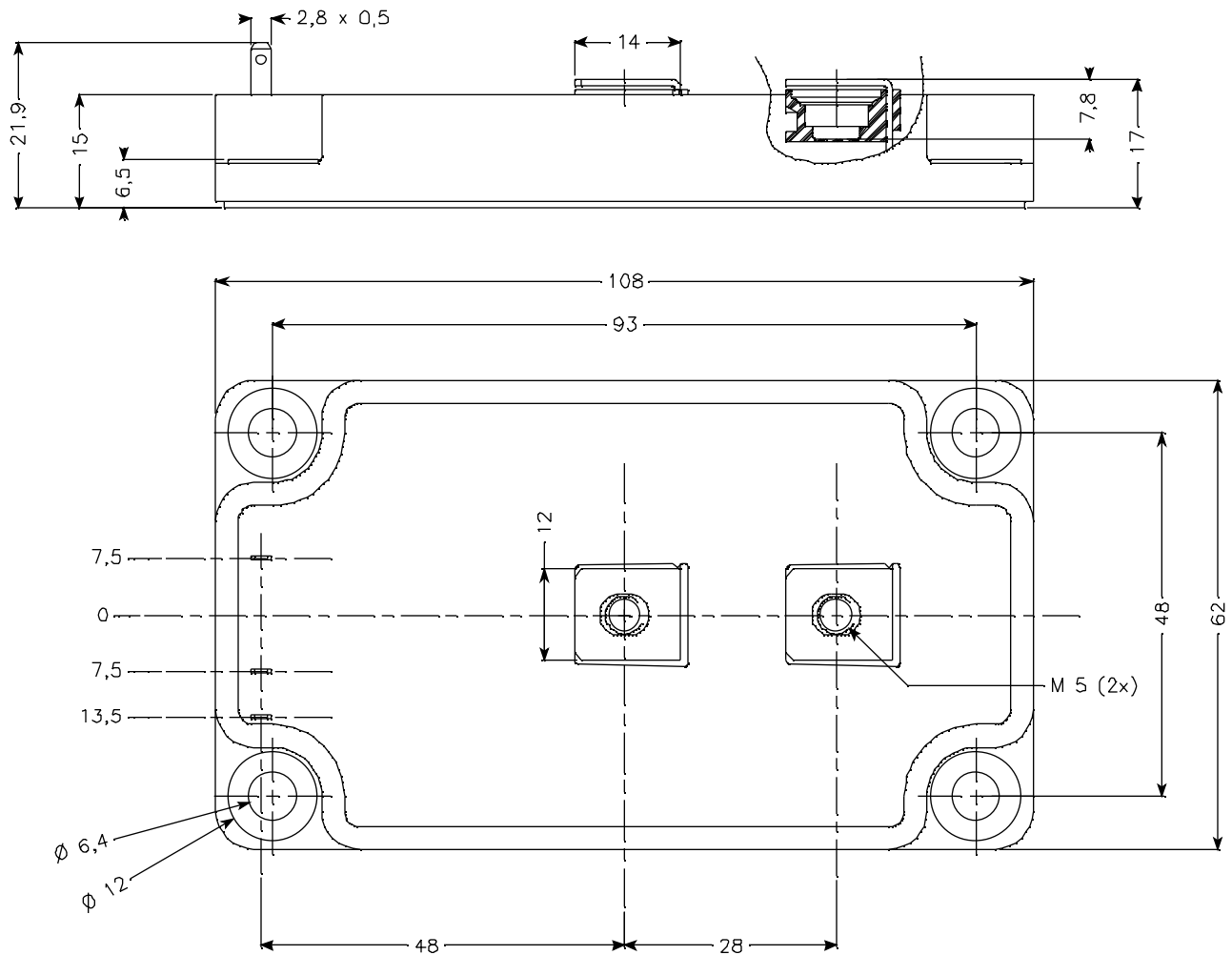
$$I_S \leq -215A \quad di/dt \leq 700A/\mu\text{s} \quad V_R \leq V_{DSS} \quad T_j \leq 150^\circ\text{C}$$

**Thermal and package characteristics**

*Symbol Characteristic*

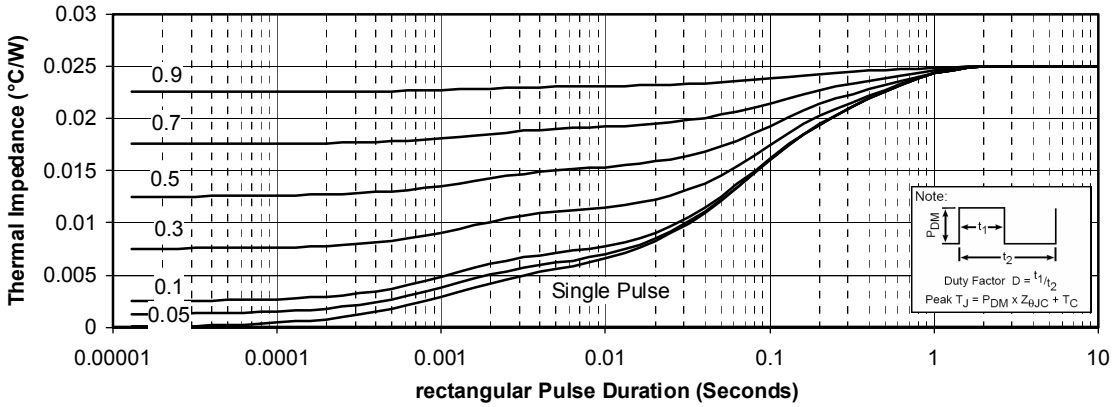
			<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
R <sub>thJC</sub>	Junction to Case	Transistor			0.025	°C/W
V <sub>ISOL</sub>	RMS Isolation Voltage, any terminal to case t = 1 min, I <sub>isol</sub> < 1mA, 50/60Hz		2500			V
T <sub>J</sub>	Operating junction temperature range		-40		150	°C
T <sub>STG</sub>	Storage Temperature Range		-40		125	
T <sub>C</sub>	Operating Case Temperature		-40		100	
Torque	Mounting torque	To Heatsink	M6	3	5	N.m
		For terminals	M5	2	3.5	
Wt	Package Weight				280	g

**SP6 Package outline (dimensions in mm)**

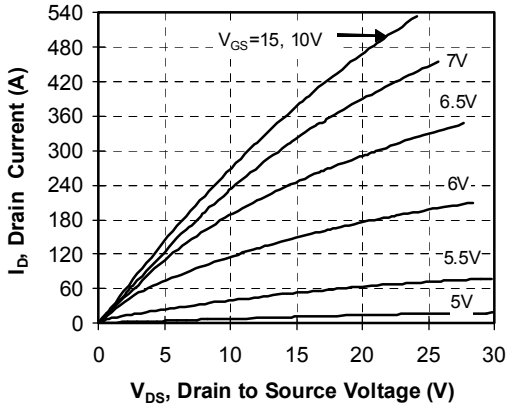


**Typical Performance Curve**

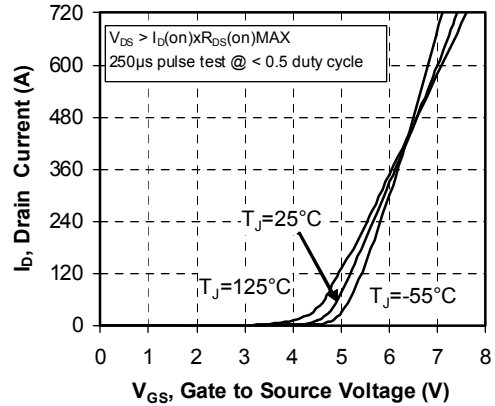
**Maximum Effective Transient Thermal Impedance, Junction to Case vs Pulse Duration**



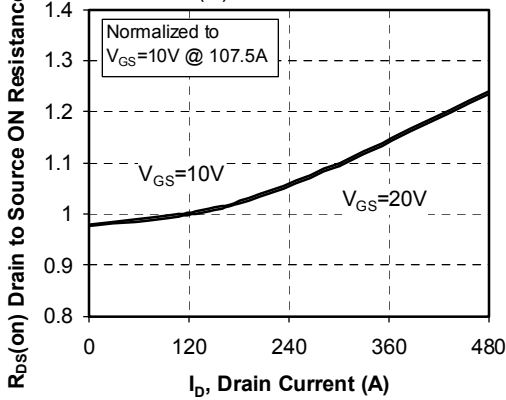
**Low Voltage Output Characteristics**



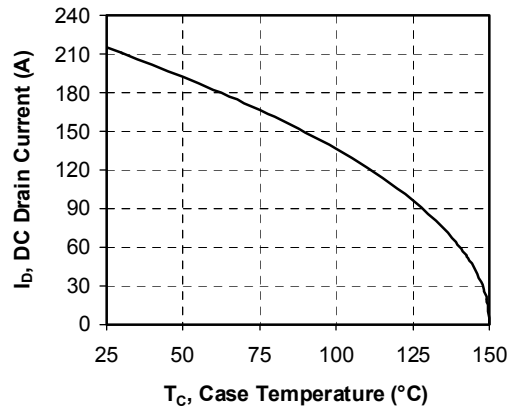
**Transfer Characteristics**

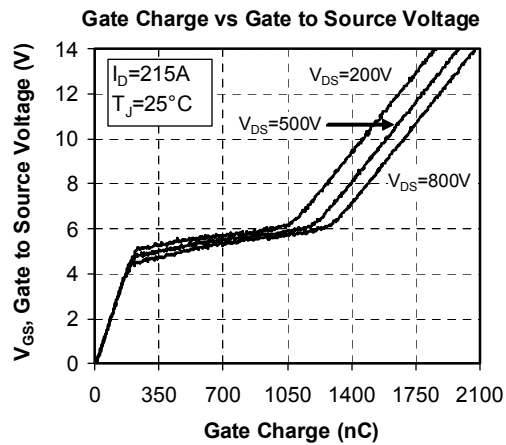
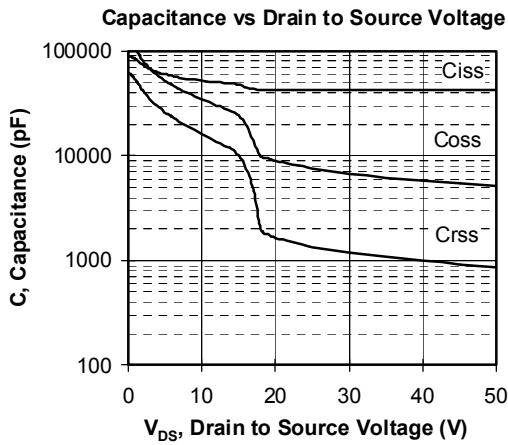
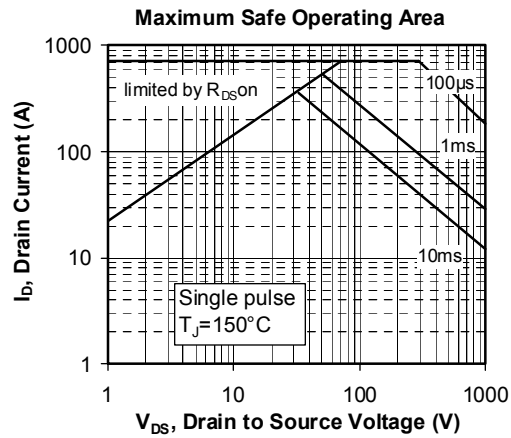
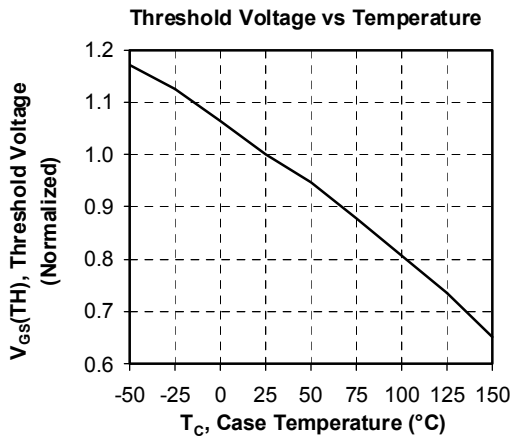
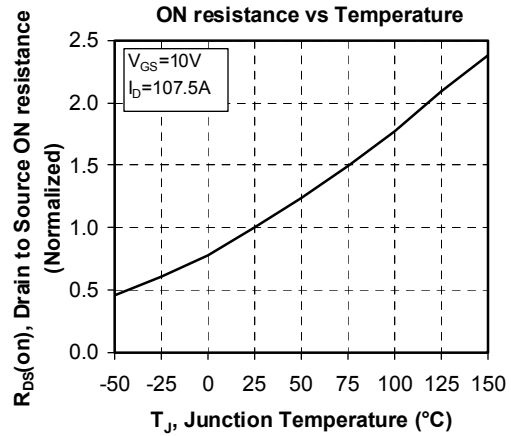
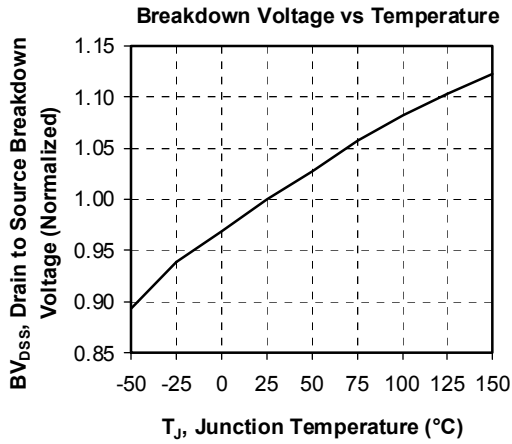


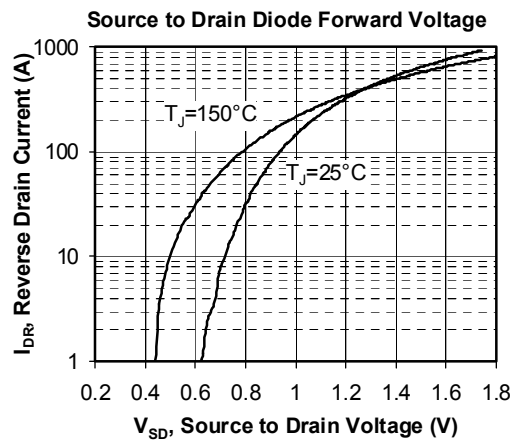
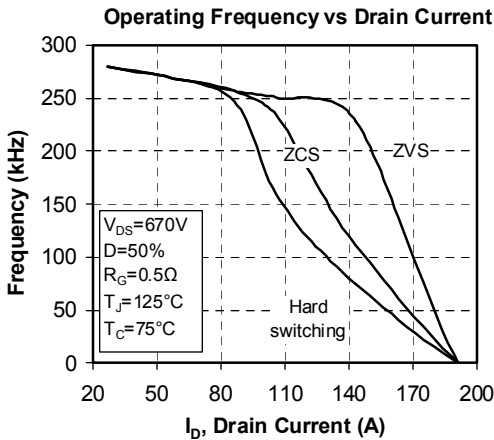
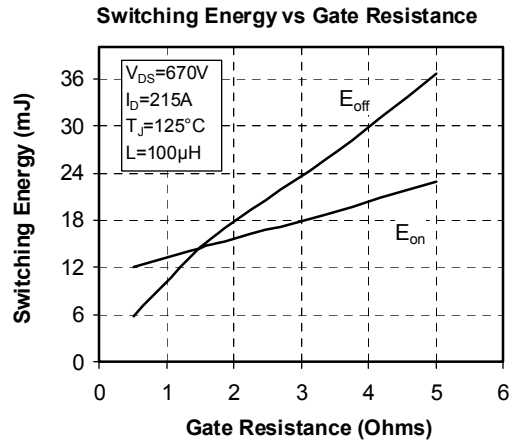
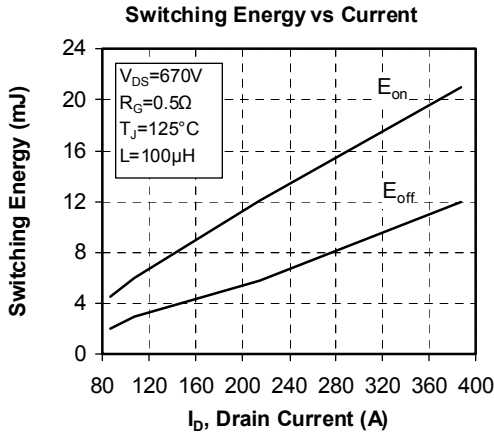
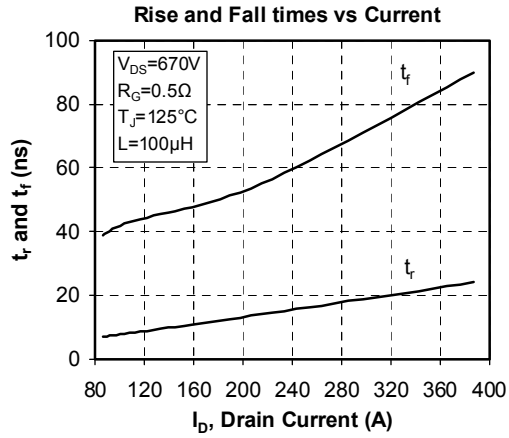
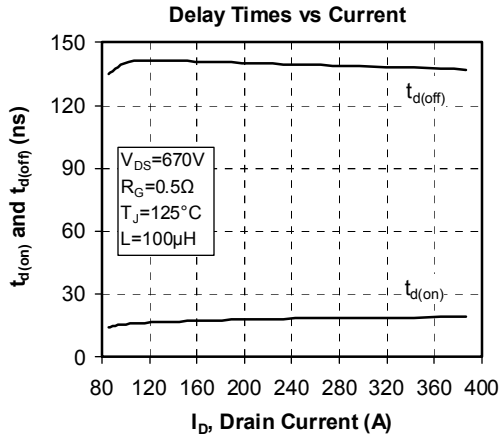
**R\_DS(on) vs Drain Current**



**DC Drain Current vs Case Temperature**







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