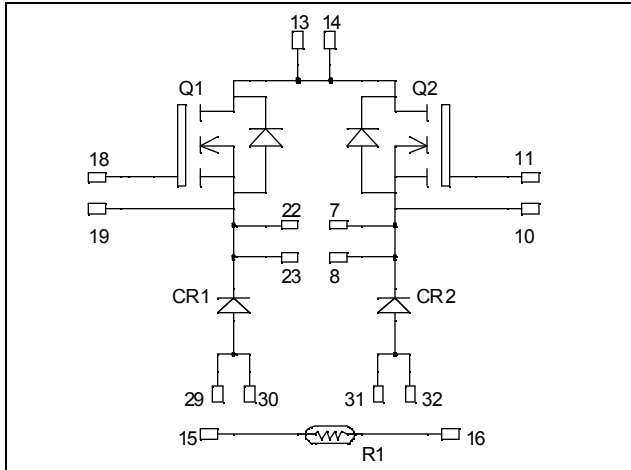


Dual Buck chopper MOSFET Power Module

$V_{DSS} = 1000V$

$R_{DSon} = 350m\Omega$ typ @ $T_j = 25^\circ C$

$I_D = 22A$ @ $T_c = 25^\circ C$

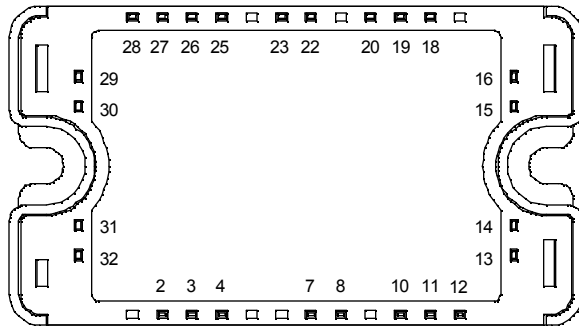


Application

- AC and DC motor control
- Switched Mode Power Supplies

Features

- Power MOS 7[®] MOSFETs
 - Low R_{DSon}
 - Low input and Miller capacitance
 - Low gate charge
 - Avalanche energy rated
 - Very rugged
- Kelvin source for easy drive
- Very low stray inductance
 - Symmetrical design
- Internal thermistor for temperature monitoring
- High level of integration



Benefits

- Outstanding performance at high frequency operation
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Solderable terminals both for power and signal for easy PCB mounting
- Low profile
- Each leg can be easily paralleled to achieve a single buck of twice the current capability
- RoHS Compliant

All multiple inputs and outputs must be shorted together
 Example: 13/14 ; 29/30 ; 22/23 ...

Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{DSS}	Drain - Source Breakdown Voltage	1000	V
I_D	Continuous Drain Current	$T_c = 25^\circ C$	A
		$T_c = 80^\circ C$	
I_{DM}	Pulsed Drain current	88	
V_{GS}	Gate - Source Voltage	± 30	V
R_{DSon}	Drain - Source ON Resistance	420	m Ω
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	390 W
I_{AR}	Avalanche current (repetitive and non repetitive)	25	A
E_{AR}	Repetitive Avalanche Energy	50	mJ
E_{AS}	Single Pulse Avalanche Energy	3000	



CAUTION: These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed. See application note APT0502 on www.microsemi.com

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	$V_{\text{GS}} = 0\text{V}, V_{\text{DS}} = 1000\text{V}$			100	μA
		$V_{\text{GS}} = 0\text{V}, V_{\text{DS}} = 800\text{V}$			500	
$R_{\text{DS(on)}}$	Drain – Source on Resistance	$V_{\text{GS}} = 10\text{V}, I_{\text{D}} = 11\text{A}$		350	420	$\text{m}\Omega$
$V_{\text{GS(th)}}$	Gate Threshold Voltage	$V_{\text{GS}} = V_{\text{DS}}, I_{\text{D}} = 2.5\text{mA}$	3		5	V
I_{GSS}	Gate – Source Leakage Current	$V_{\text{GS}} = \pm 30\text{V}, V_{\text{DS}} = 0\text{V}$			± 100	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{iss}	Input Capacitance	$V_{\text{GS}} = 0\text{V}$		5.2		nF
C_{oss}	Output Capacitance	$V_{\text{DS}} = 25\text{V}$		0.88		
C_{rss}	Reverse Transfer Capacitance	$f = 1\text{MHz}$		0.16		
Q_{g}	Total gate Charge	$V_{\text{GS}} = 10\text{V}$		186		nC
Q_{gs}	Gate – Source Charge	$V_{\text{Bus}} = 500\text{V}$		24		
Q_{gd}	Gate – Drain Charge	$I_{\text{D}} = 22\text{A}$		122		
$T_{\text{d(on)}}$	Turn-on Delay Time	Inductive switching @ 125°C $V_{\text{GS}} = 15\text{V}$ $V_{\text{Bus}} = 670\text{V}$ $I_{\text{D}} = 22\text{A}$ $R_{\text{G}} = 5\Omega$		18		ns
T_{r}	Rise Time			12		
$T_{\text{d(off)}}$	Turn-off Delay Time			155		
T_{f}	Fall Time			40		
E_{on}	Turn-on Switching Energy	Inductive switching @ 25°C $V_{\text{GS}} = 15\text{V}, V_{\text{Bus}} = 670\text{V}$ $I_{\text{D}} = 22\text{A}, R_{\text{G}} = 5\Omega$		900		μJ
E_{off}	Turn-off Switching Energy			623		
E_{on}	Turn-on Switching Energy	Inductive switching @ 125°C $V_{\text{GS}} = 15\text{V}, V_{\text{Bus}} = 670\text{V}$ $I_{\text{D}} = 22\text{A}, R_{\text{G}} = 5\Omega$		1423		μJ
E_{off}	Turn-off Switching Energy			779		

Diode ratings and characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
V _{RRM}	Maximum Peak Repetitive Reverse Voltage			1000			V
I _{RM}	Maximum Reverse Leakage Current	V _R =1000V	T _j = 25°C			250	μA
			T _j = 125°C			500	
I _F	DC Forward Current		T _c = 70°C		30		A
V _F	Diode Forward Voltage	I _F = 30A			1.9	2.3	V
		I _F = 60A			2.2		
		I _F = 30A	T _j = 125°C		1.7		
t _{rr}	Reverse Recovery Time	I _F = 30A V _R = 667V di/dt=200A/μs	T _j = 25°C		290		ns
	T _j = 125°C			390			
Q _{rr}	Reverse Recovery Charge		T _j = 25°C		670		nC
			T _j = 125°C		2350		

Thermal and package characteristics
Symbol Characteristic

			<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
R _{thJC}	Junction to Case Thermal Resistance	transistor			0.32	°C/W
		Diode			1.2	
V _{ISOL}	RMS Isolation Voltage, any terminal to case t = 1 min, I _{isol} < 1mA, 50/60Hz		2500			V
T _J	Operating junction temperature range		-40		150	°C
T _{STG}	Storage Temperature Range		-40		125	
T _C	Operating Case Temperature		-40		100	
Torque	Mounting torque	To heatsink M4	2.5		4.7	N.m
Wt	Package Weight				110	g

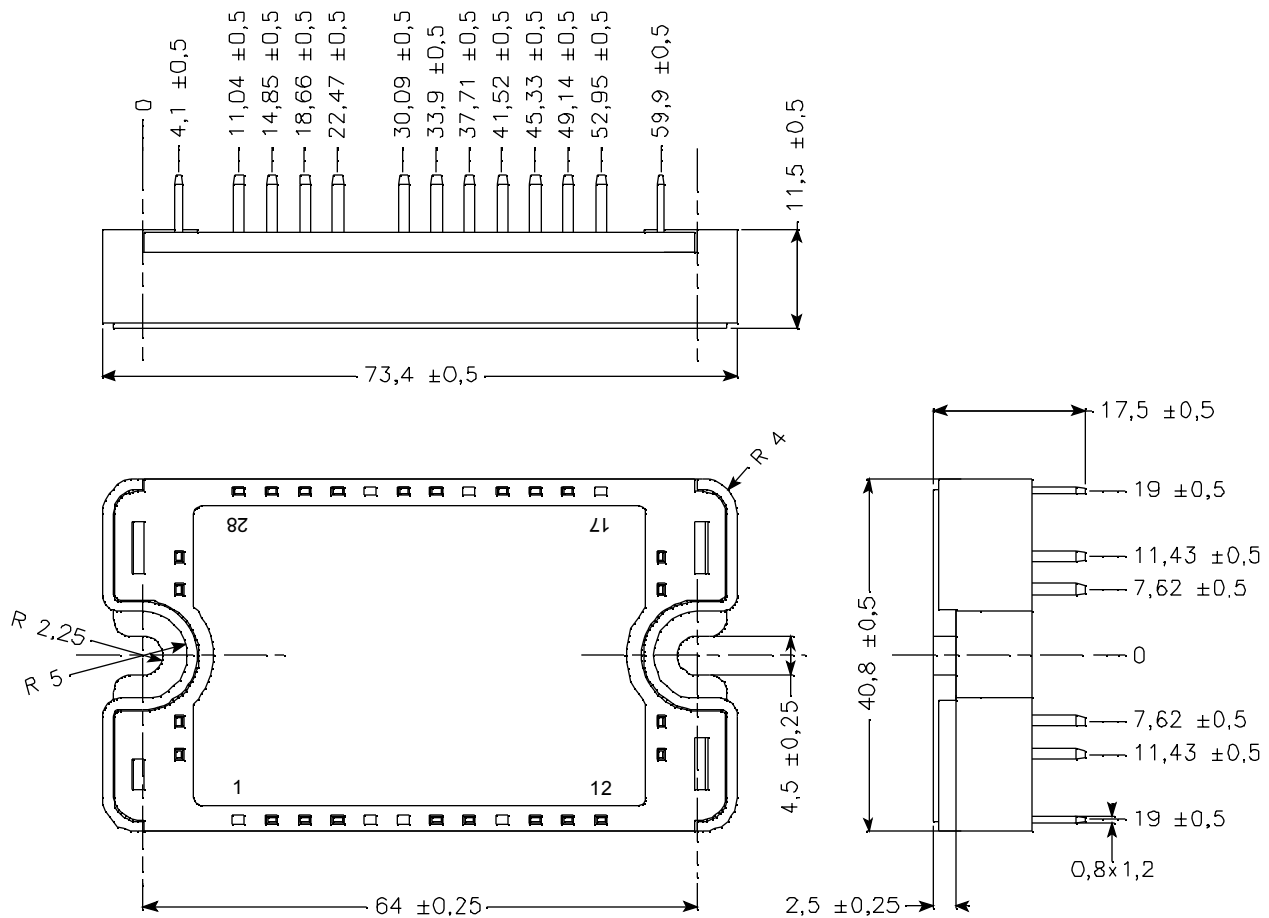
Temperature sensor NTC (see application note APT0406 on www.microsemi.com for more information).

Symbol Characteristic

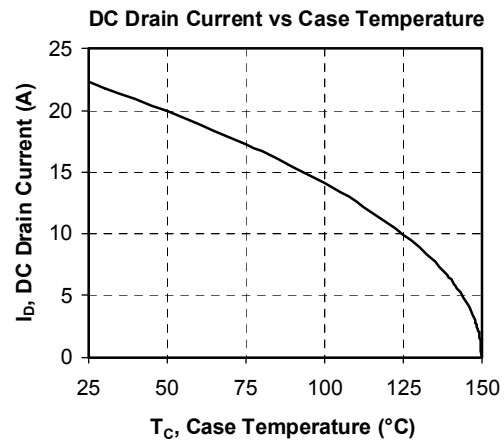
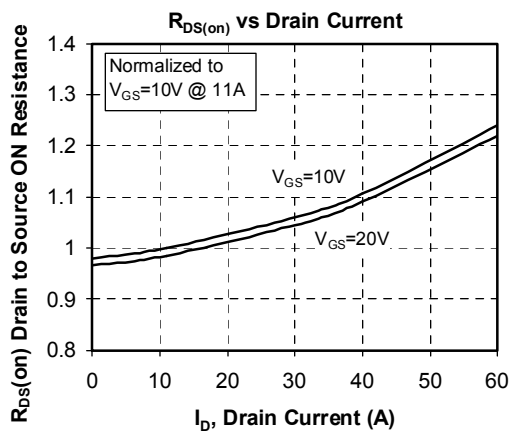
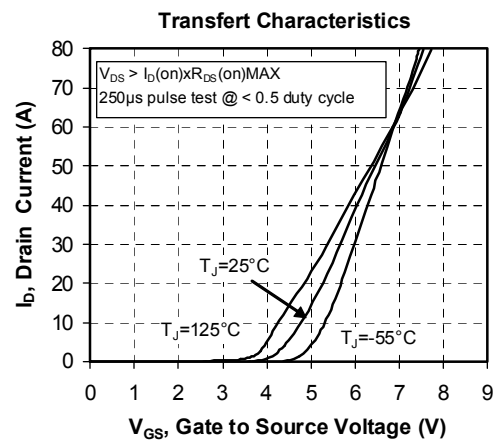
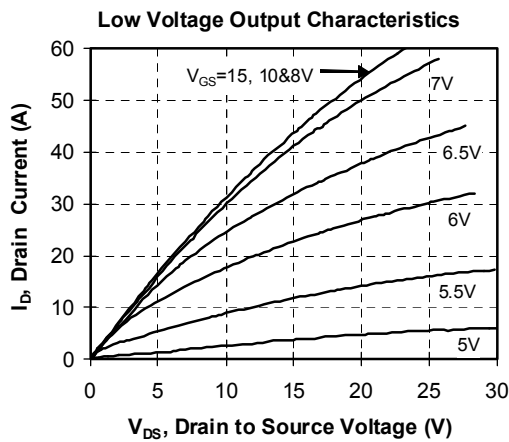
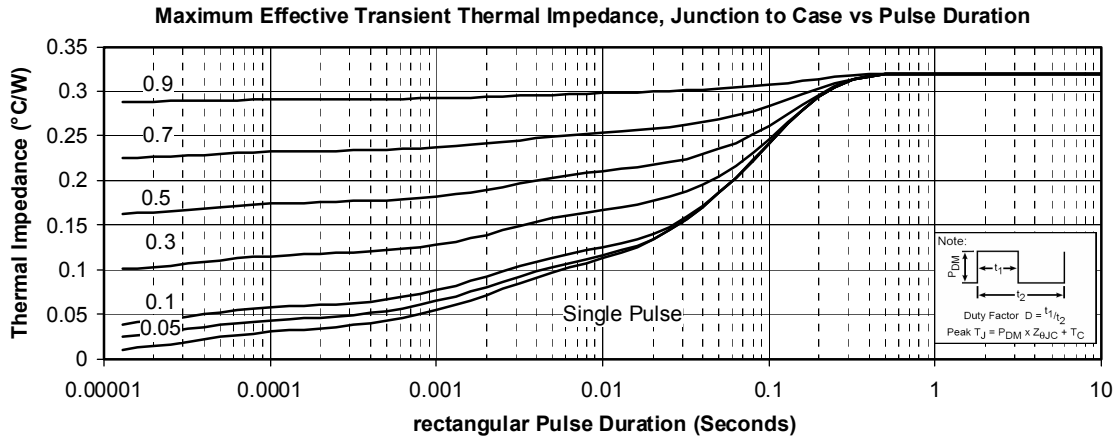
		<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
R ₂₅	Resistance @ 25°C		50		kΩ
B _{25/85}	T ₂₅ = 298.15 K		3952		K

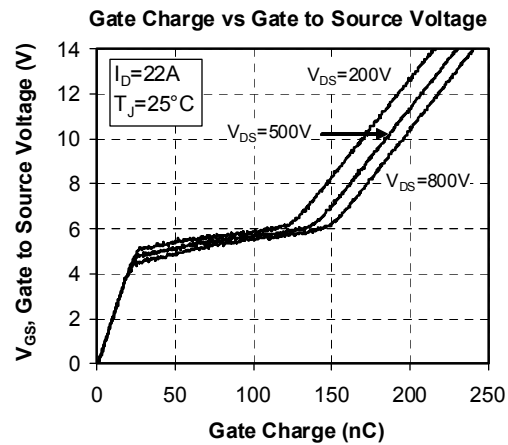
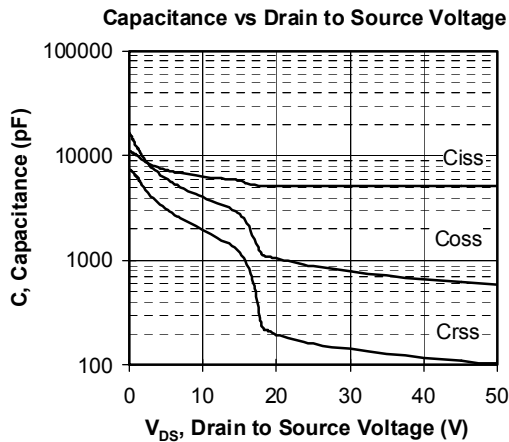
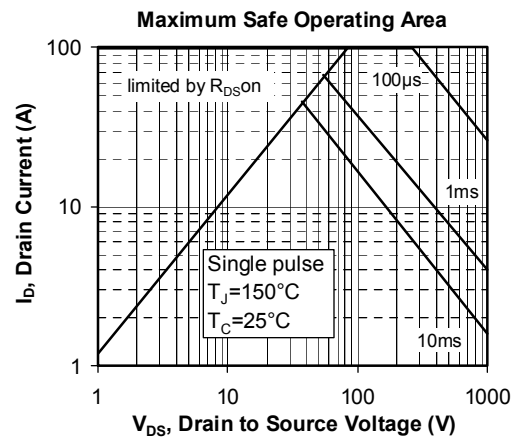
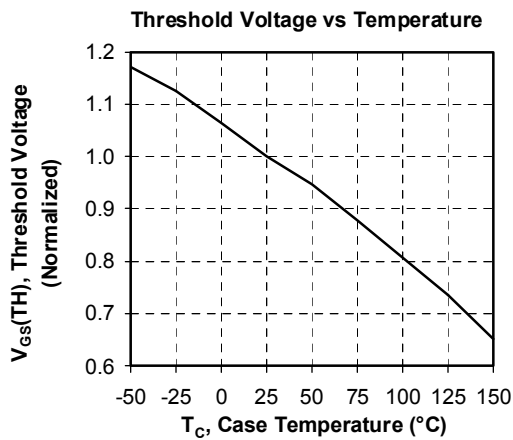
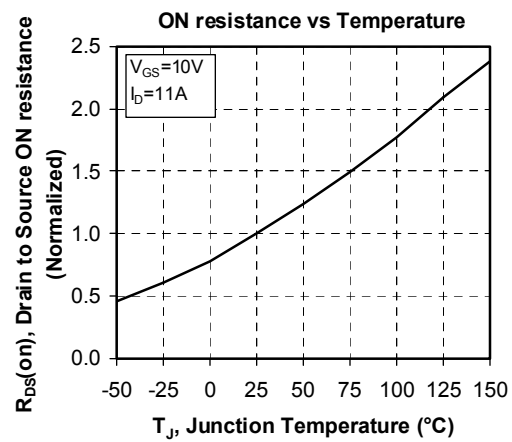
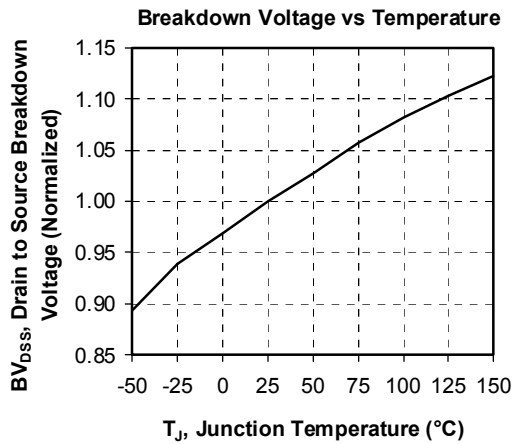
$$R_T = \frac{R_{25}}{\exp \left[B_{25/85} \left(\frac{1}{T_{25}} - \frac{1}{T} \right) \right]}$$

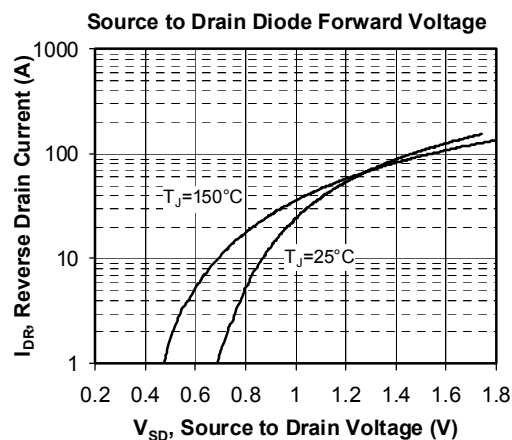
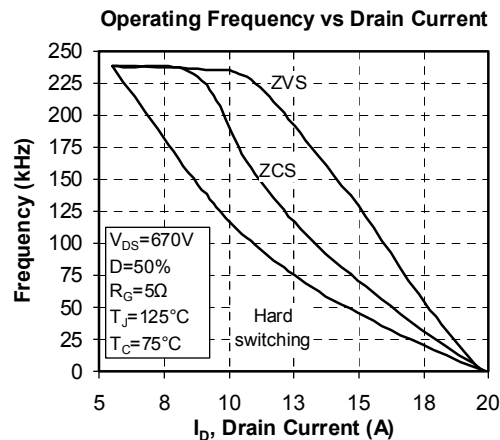
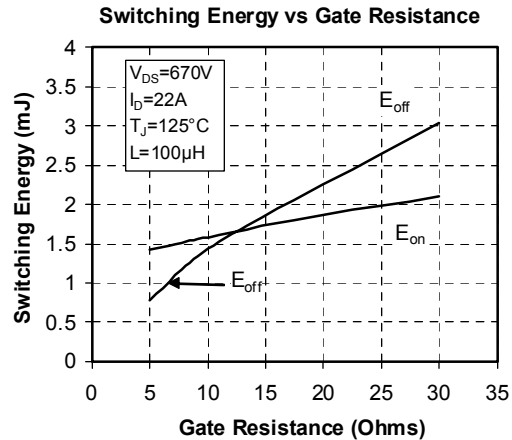
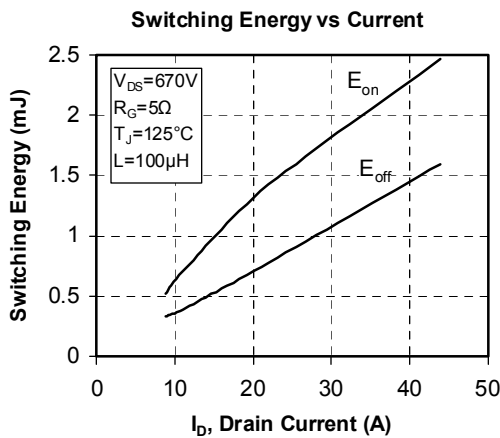
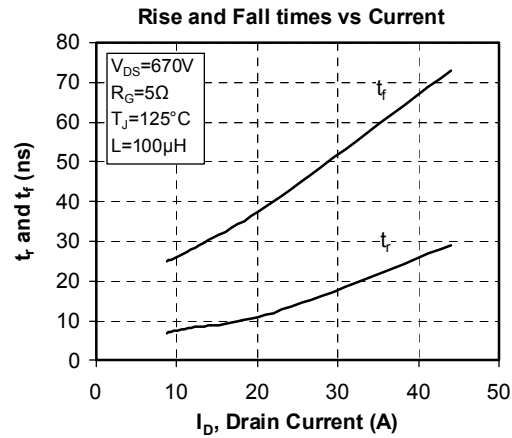
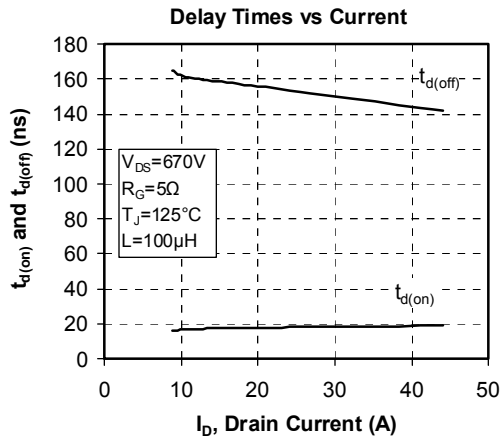
T: Thermistor temperature
R_T: Thermistor value at T

SP3 Package outline (dimensions in mm)

 See application note 1901 - Mounting Instructions for SP3 Power Modules on www.microsemi.com

Typical Performance Curve







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