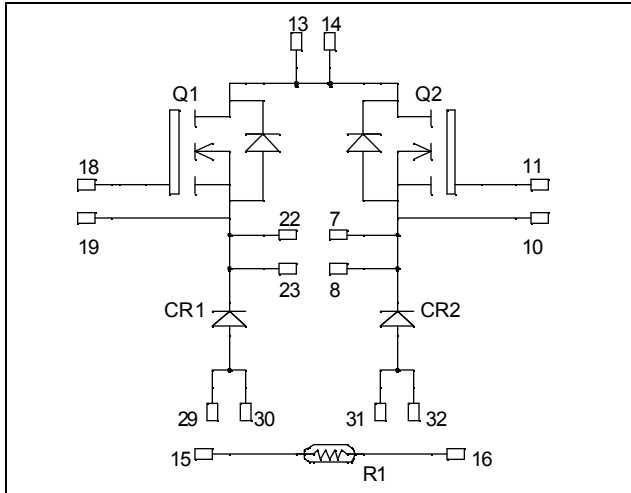


Dual Buck chopper MOSFET Power Module

$$V_{DSS} = 500V$$

$$R_{DSon} = 65m\Omega \text{ typ @ } T_j = 25^\circ C$$

$$I_D = 51A \text{ @ } T_c = 25^\circ C$$

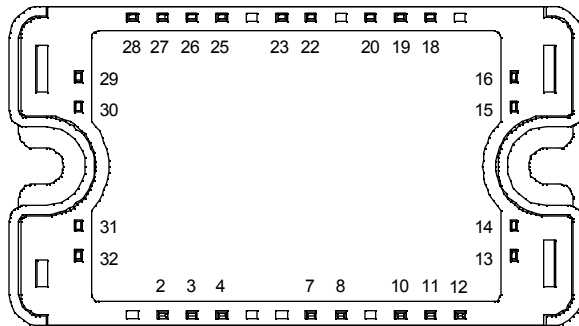


Application

- 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	500	V
I_D	Continuous Drain Current	$T_c = 25^\circ C$	51
		$T_c = 80^\circ C$	38
I_{DM}	Pulsed Drain current	204	
V_{GS}	Gate - Source Voltage	± 30	V
R_{DSon}	Drain - Source ON Resistance	78	$m\Omega$
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	390
I_{AR}	Avalanche current (repetitive and non repetitive)	51	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

<i>Symbol</i>	<i>Characteristic</i>	<i>Test Conditions</i>		<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
I_{DSS}	Zero Gate Voltage Drain Current	$V_{GS} = 0\text{V}, V_{DS} = 500\text{V}$	$T_j = 25^\circ\text{C}$			100	μA
		$V_{GS} = 0\text{V}, V_{DS} = 400\text{V}$	$T_j = 125^\circ\text{C}$			500	
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10\text{V}, I_D = 25.5\text{A}$			65	78	$\text{m}\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 2.5\text{mA}$		3		5	V
I_{GSS}	Gate – Source Leakage Current	$V_{GS} = \pm 30\text{V}, V_{DS} = 0\text{V}$				± 100	nA

Dynamic Characteristics

<i>Symbol</i>	<i>Characteristic</i>	<i>Test Conditions</i>		<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
C_{iss}	Input Capacitance	$V_{GS} = 0\text{V}$			7000		pF
C_{oss}	Output Capacitance	$V_{DS} = 25\text{V}$			1400		
C_{rss}	Reverse Transfer Capacitance	$f = 1\text{MHz}$			90		
Q_g	Total gate Charge	$V_{GS} = 10\text{V}$			140		nC
Q_{gs}	Gate – Source Charge	$V_{Bus} = 250\text{V}$			40		
Q_{gd}	Gate – Drain Charge	$I_D = 51\text{A}$			70		
$T_{d(on)}$	Turn-on Delay Time	Inductive switching @ 125°C $V_{GS} = 15\text{V}$ $V_{Bus} = 333\text{V}$ $I_D = 51\text{A}$ $R_G = 3\Omega$			21		ns
T_r	Rise Time				38		
$T_{d(off)}$	Turn-off Delay Time				75		
T_f	Fall Time				93		
E_{on}	Turn-on Switching Energy	Inductive switching @ 25°C $V_{GS} = 15\text{V}, V_{Bus} = 333\text{V}$ $I_D = 51\text{A}, R_G = 3\Omega$			1035		μJ
E_{off}	Turn-off Switching Energy				845		
E_{on}	Turn-on Switching Energy	Inductive switching @ 125°C $V_{GS} = 15\text{V}, V_{Bus} = 333\text{V}$ $I_D = 51\text{A}, R_G = 3\Omega$			1556		μJ
E_{off}	Turn-off Switching Energy				1013		

Diode ratings and characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
V _{RRM}	Maximum Peak Repetitive Reverse Voltage			600			V
I _{RM}	Maximum Reverse Leakage Current	V _R =600V	T _j = 25°C			350	μA
			T _j = 125°C			600	
I _F	DC Forward Current		T _c = 70°C		80		A
V _F	Diode Forward Voltage	I _F = 80A	T _j = 25°C		1.45		V
			T _j = 125°C		1.35		
t _{rr}	Reverse Recovery Time	I _F = 80A V _R = 300V di/dt=4500A/μs	T _j = 25°C		95		ns
			T _j = 125°C		115		
Q _{rr}	Reverse Recovery Charge		T _j = 25°C		5.2		μC
			T _j = 125°C		8		

Thermal and package characteristics

Symbol	Characteristic			Min	Typ	Max	Unit
R _{thJC}	Junction to Case Thermal Resistance		Transistor			0.32	°C/W
			Diode			0.8	
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

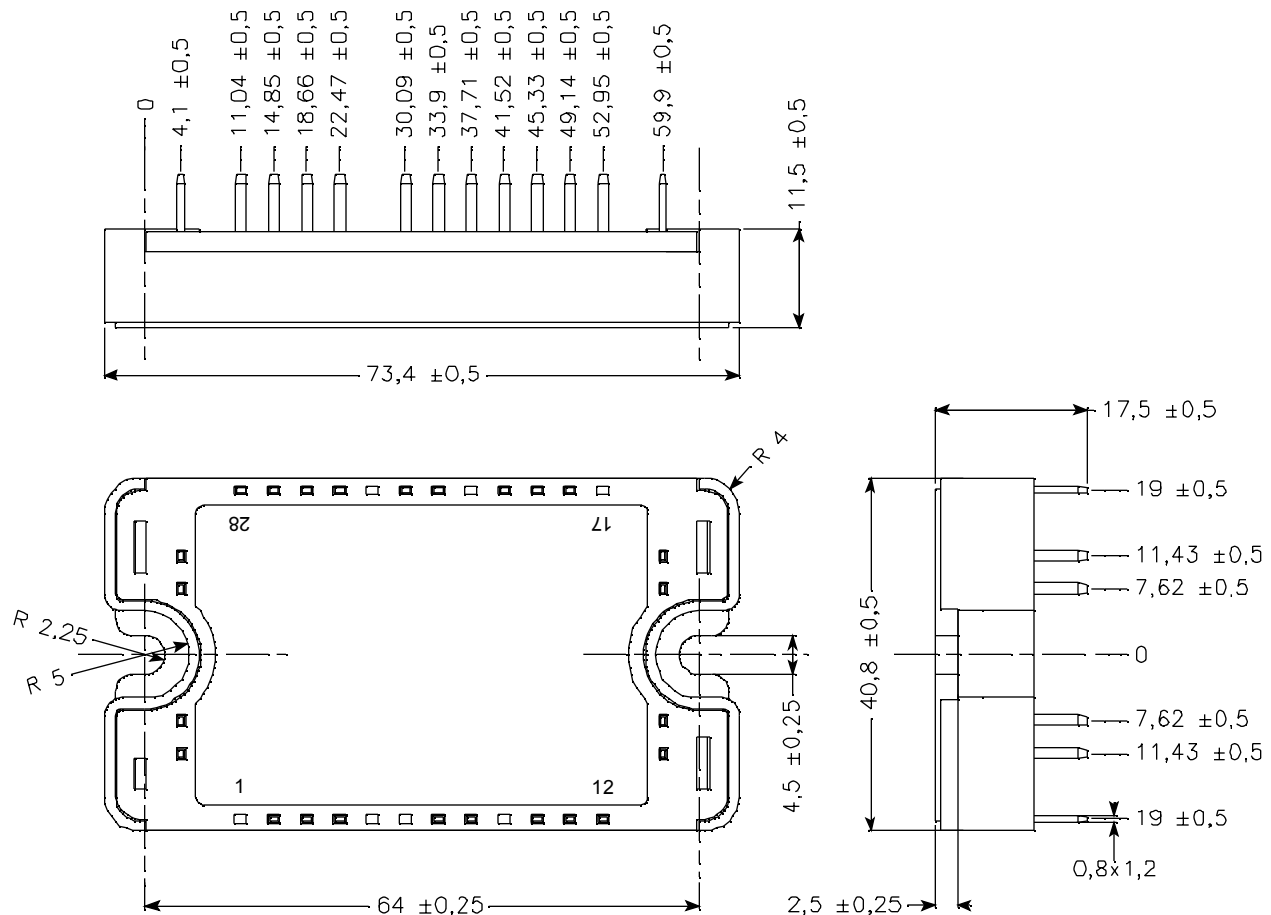
Temperature sensor NTC (see application note APT0406 on www.microsemi.com for more information).

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

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

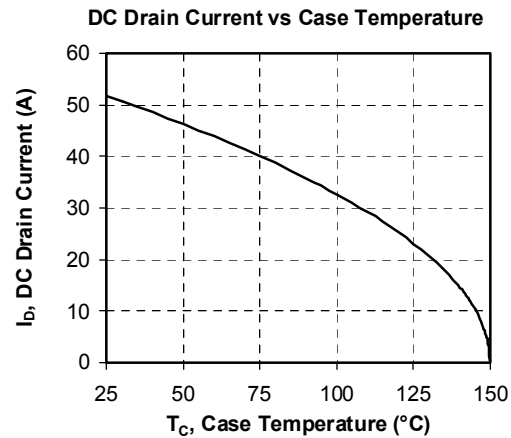
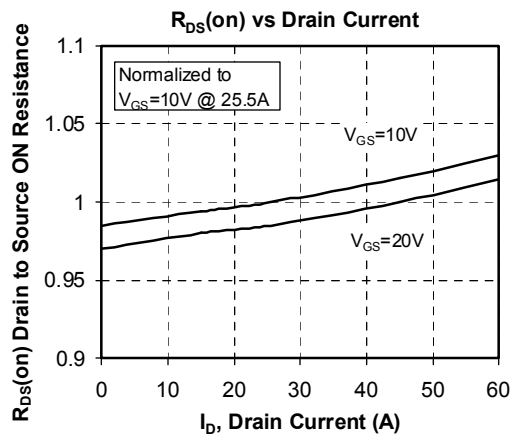
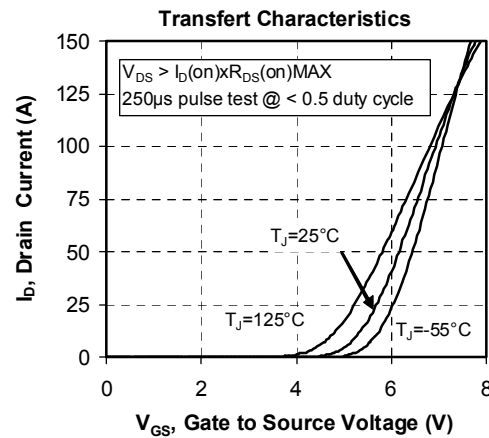
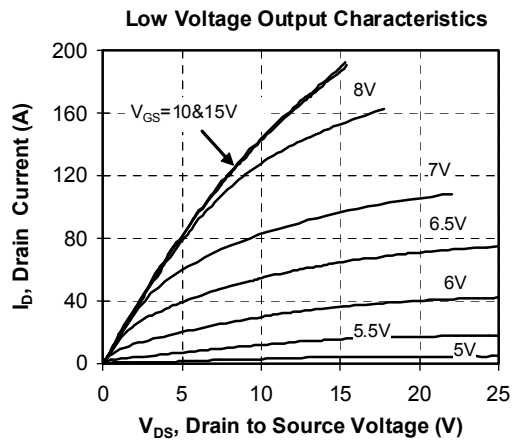
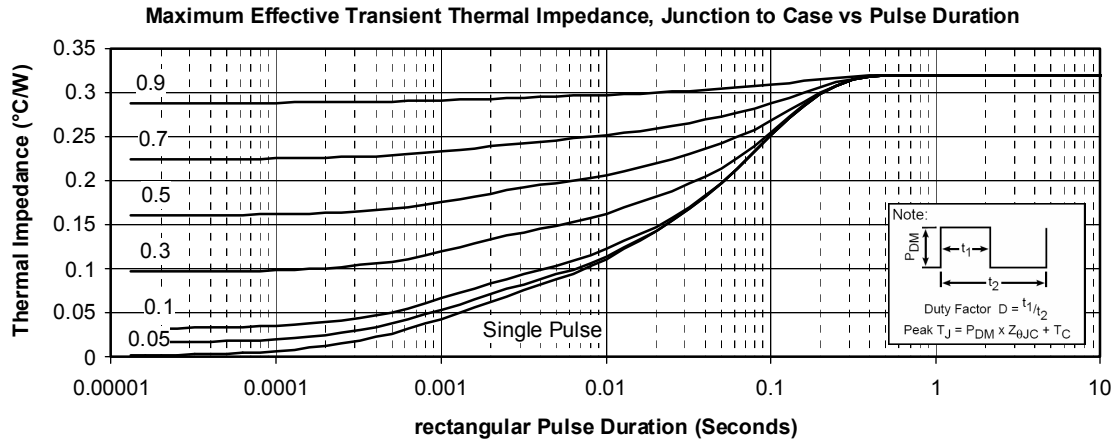
T: Thermistor temperature
 R_T: Thermistor value at T

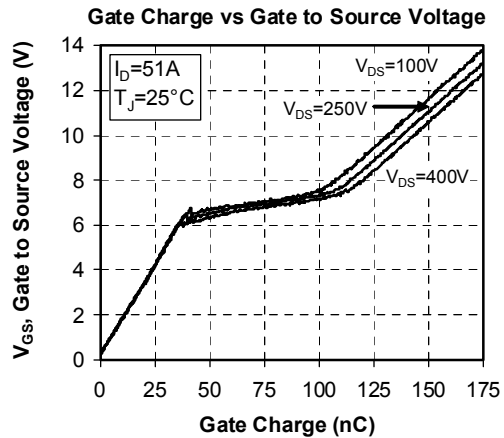
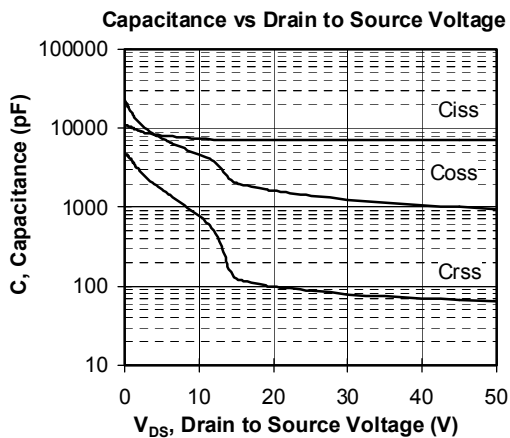
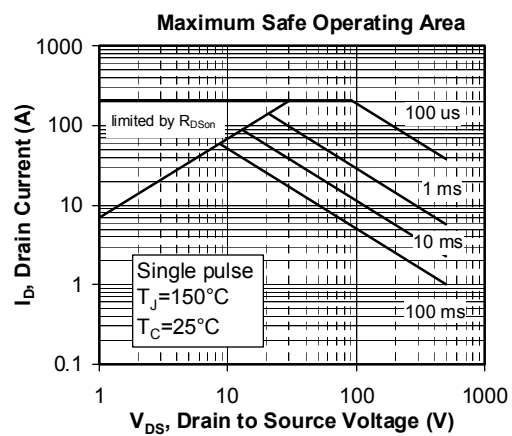
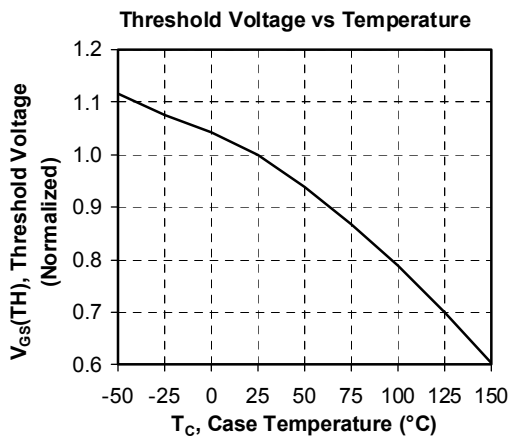
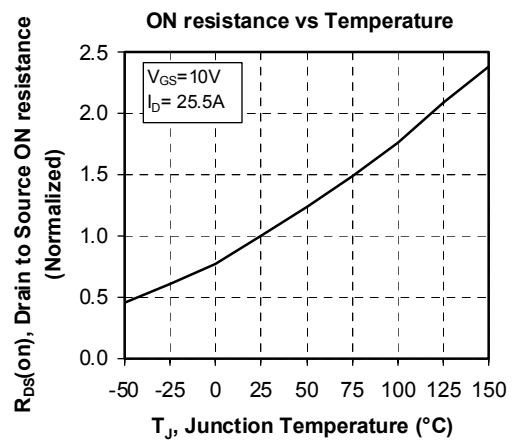
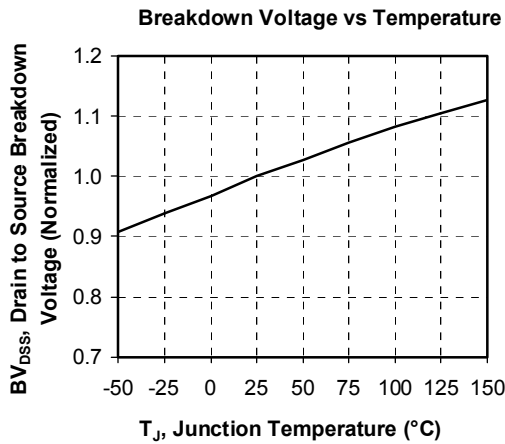
SP3 Package outline (dimensions in mm)

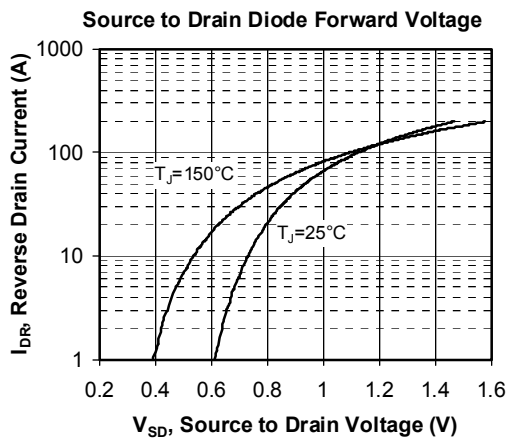
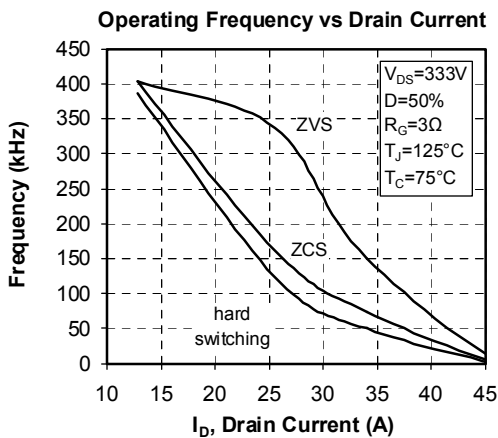
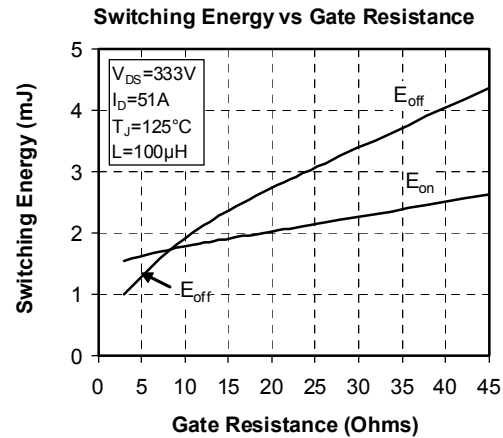
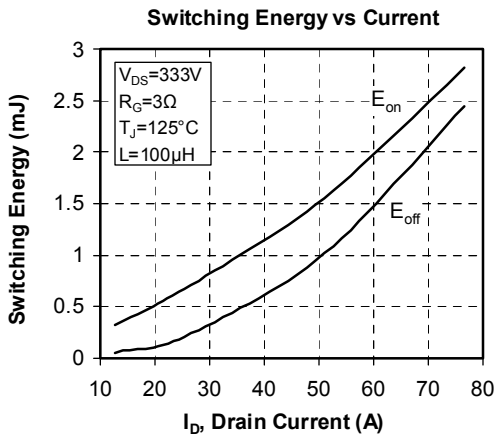
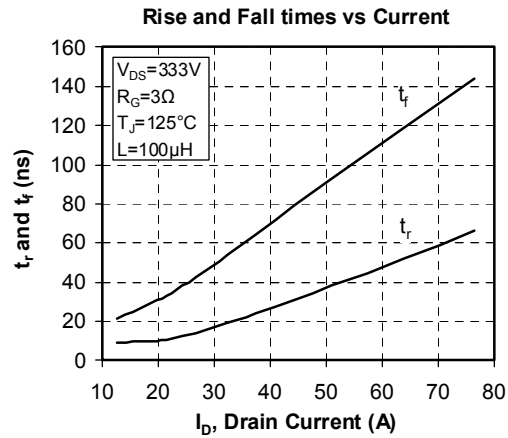
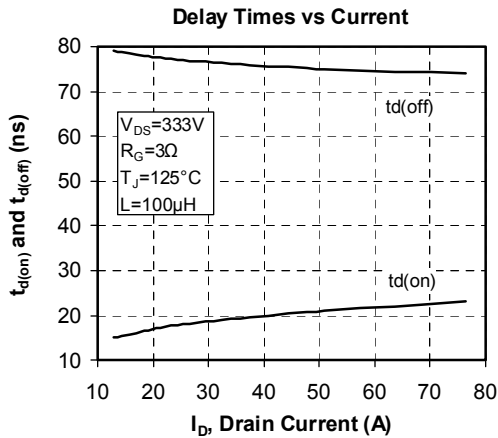


See application note 1901 - Mounting Instructions for SP3 Power Modules on www.microsemi.com

Typical Performance Curve







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