



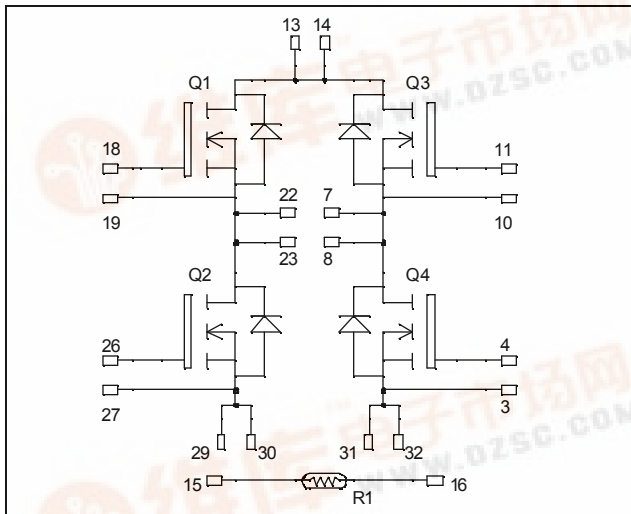
APTC80H29T3G

Full - Bridge Super Junction MOSFET Power Module

$$V_{DSS} = 800V$$

$$R_{DSon} = 290m\Omega \text{ max @ } T_j = 25^\circ C$$

$$I_D = 15A \text{ @ } T_c = 25^\circ C$$

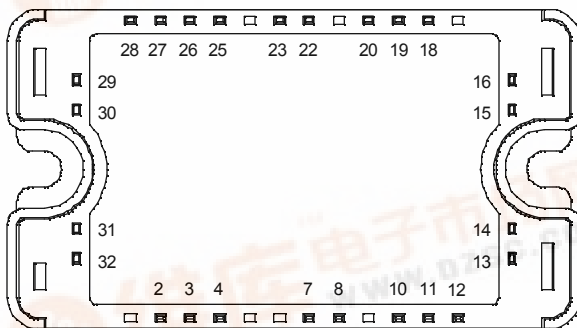


Application

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

Features

- **COOLMOS** Power Semiconductors
 - Ultra low R_{DSon}
 - Low Miller capacitance
 - Ultra 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 phase leg 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		800	V
I _D	Continuous Drain Current	T _c = 25°C	15	A
		T _c = 80°C	11	
I _{DM}	Pulsed Drain current		60	
V _{GS}	Gate - Source Voltage		±30	V
R _{DSon}	Drain - Source ON Resistance		290	mΩ
P _D	Maximum Power Dissipation	T _c = 25°C	156	W
I _{AR}	Avalanche current (repetitive and non repetitive)		17	A
E _{AR}	Repetitive Avalanche Energy		0.5	mJ
E _{AS}	Single Pulse Avalanche Energy		670	

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	$V_{GS} = 0V, V_{DS} = 800V, T_j = 25^\circ\text{C}$			25	μA
		$V_{GS} = 0V, V_{DS} = 800V, T_j = 125^\circ\text{C}$			250	
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10V, I_D = 7.5A$			290	$\text{m}\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 1\text{mA}$	2.1	3	3.9	V
I_{GSS}	Gate – Source Leakage Current	$V_{GS} = \pm 20V, V_{DS} = 0V$			± 100	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{iss}	Input Capacitance	$V_{GS} = 0V$		2254		pF
C_{oss}	Output Capacitance	$V_{DS} = 25V$		1046		
C_{rss}	Reverse Transfer Capacitance	$f = 1\text{MHz}$		54		
Q_g	Total gate Charge	$V_{GS} = 10V$		90		nC
Q_{gs}	Gate – Source Charge	$V_{Bus} = 400V$		11		
Q_{gd}	Gate – Drain Charge	$I_D = 15A$		45		
$T_{d(on)}$	Turn-on Delay Time	Inductive switching @ 125°C $V_{GS} = 15V$ $V_{Bus} = 533V$ $I_D = 15A$ $R_G = 5\Omega$		10		ns
T_r	Rise Time			13		
$T_{d(off)}$	Turn-off Delay Time			83		
T_f	Fall Time			35		
E_{on}	Turn-on Switching Energy	Inductive switching @ 25°C $V_{GS} = 15V, V_{Bus} = 533V$ $I_D = 15A, R_G = 5\Omega$		243		μJ
E_{off}	Turn-off Switching Energy			139		
E_{on}	Turn-on Switching Energy	Inductive switching @ 125°C $V_{GS} = 15V, V_{Bus} = 533V$ $I_D = 15A, R_G = 5\Omega$		425		μJ
E_{off}	Turn-off Switching Energy			171		

Source - Drain diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
I_S	Continuous Source current (Body diode)	$T_c = 25^\circ\text{C}$		15		A
		$T_c = 80^\circ\text{C}$		11		
V_{SD}	Diode Forward Voltage	$V_{GS} = 0V, I_S = -15A$			1.2	V
dv/dt	Peak Diode Recovery ❶				6	V/ns
t_{rr}	Reverse Recovery Time	$I_S = -15A$ $V_R = 400V$ $di/dt = 100A/\mu\text{s}$	$T_j = 25^\circ\text{C}$	550		ns
Q_{rr}	Reverse Recovery Charge	$di/dt = 100A/\mu\text{s}$	$T_j = 25^\circ\text{C}$	15		μC

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

$I_S \leq -15A$ $di/dt \leq 100A/\mu\text{s}$ $V_R \leq V_{DSS}$ $T_j \leq 150^\circ\text{C}$

Thermal and package characteristics

Symbol	Characteristic			Min	Typ	Max	Unit
R _{thJC}	Junction to Case Thermal Resistance					0.80	°C/W
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

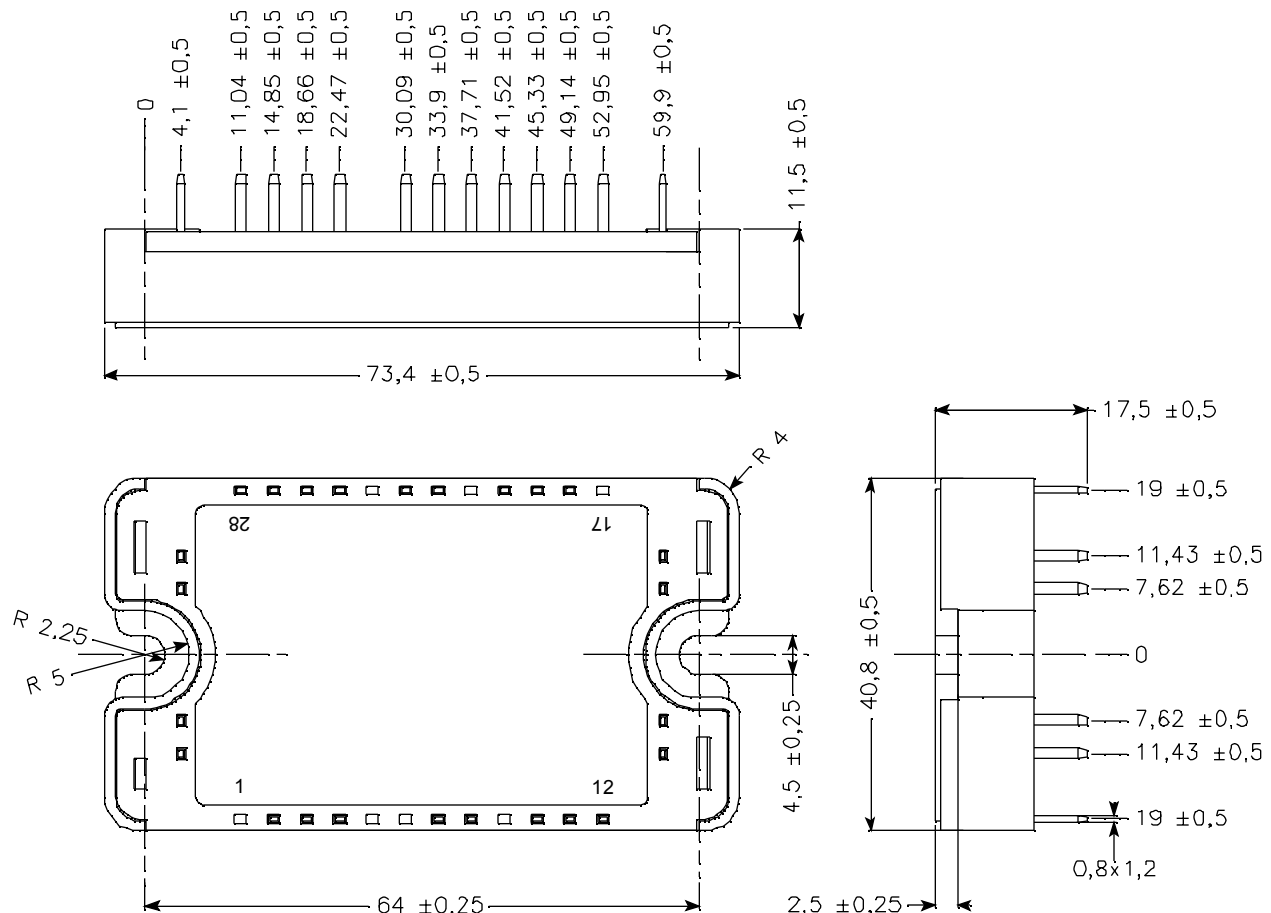
Temperature sensor NTC (see application note APT0406 on www.microsemi.com for more information).

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

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

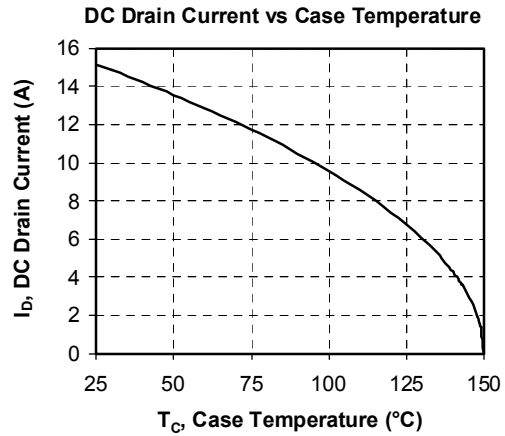
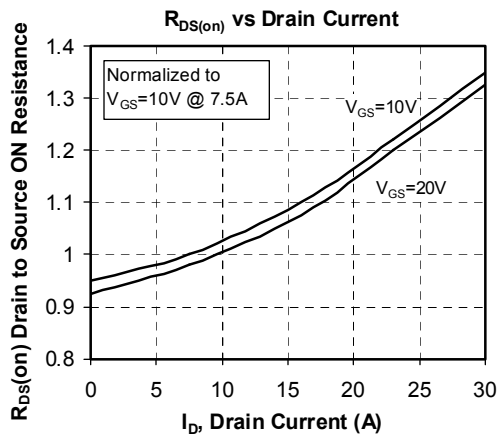
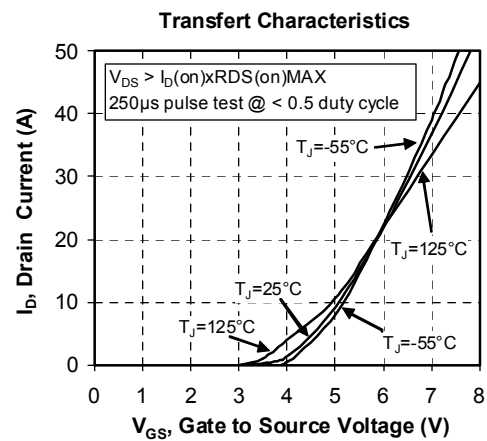
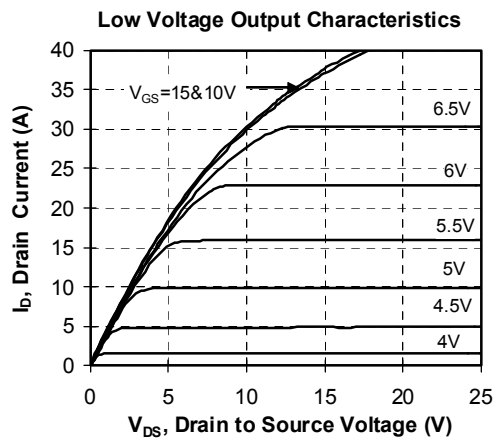
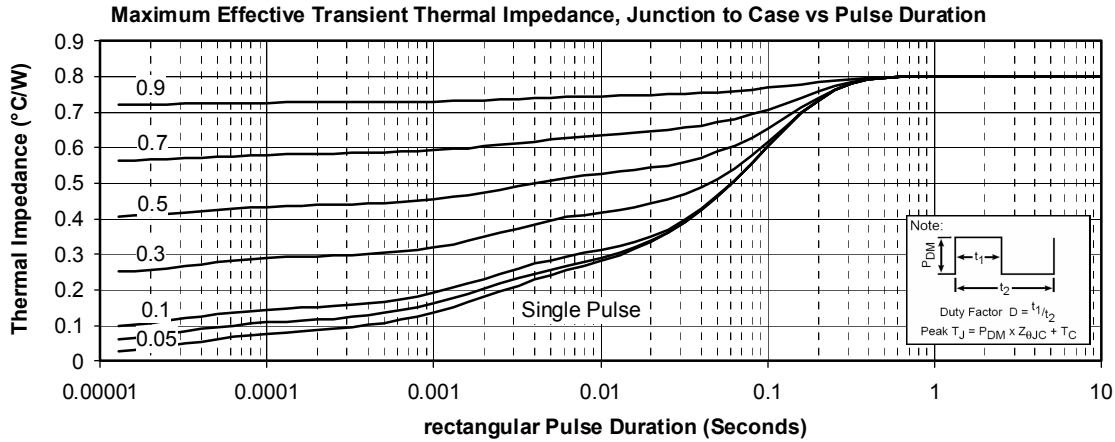
T: Thermistor temperature
 R_T: Thermistor value at T

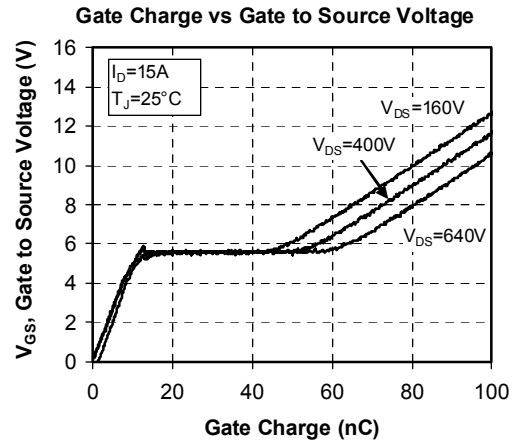
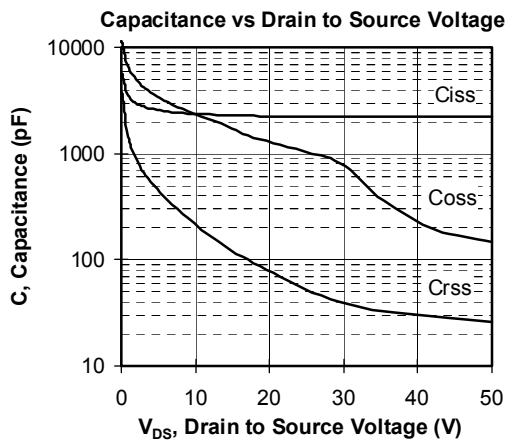
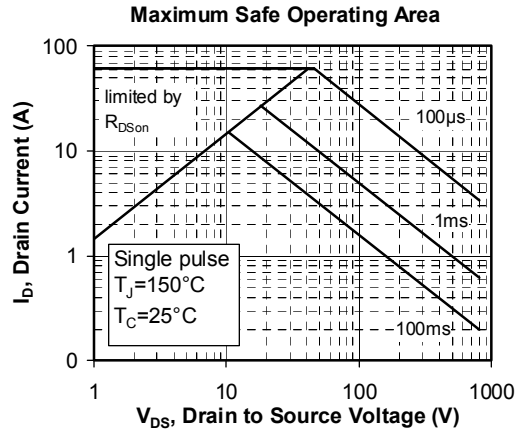
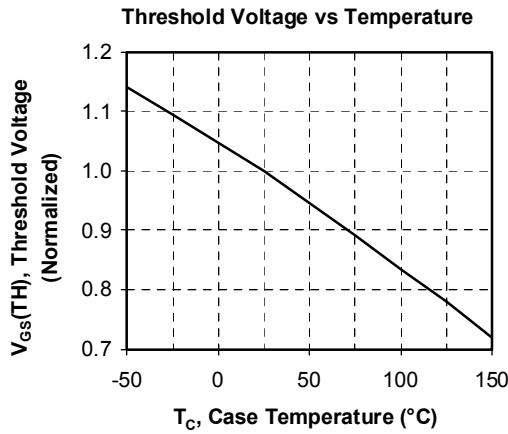
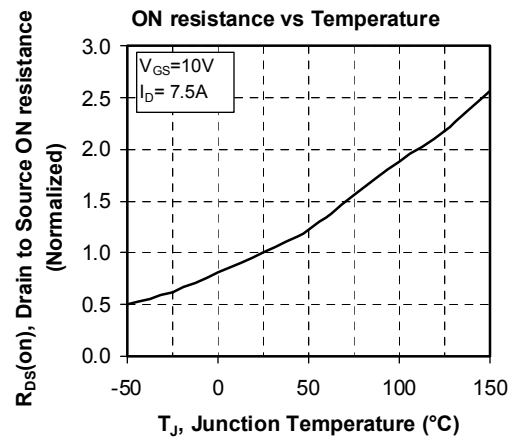
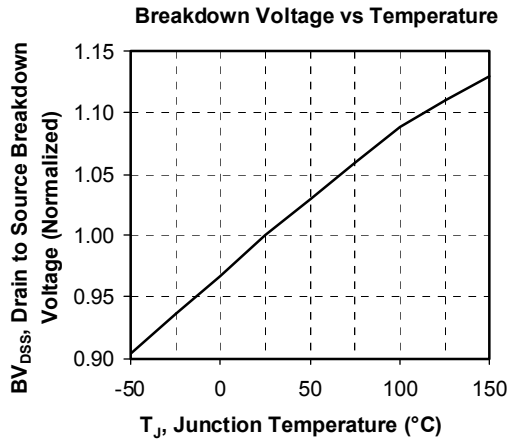
SP3 Package outline (dimensions in mm)

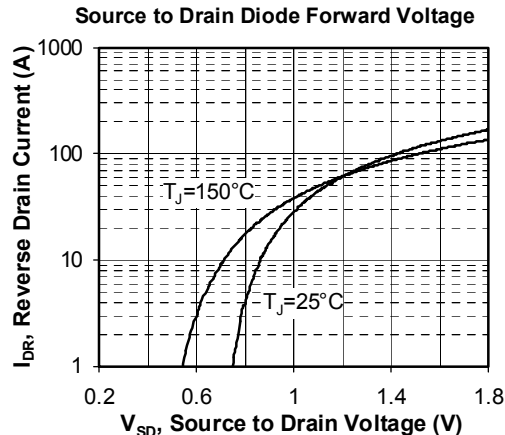
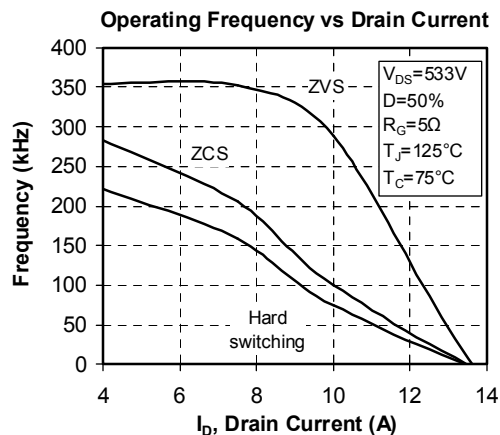
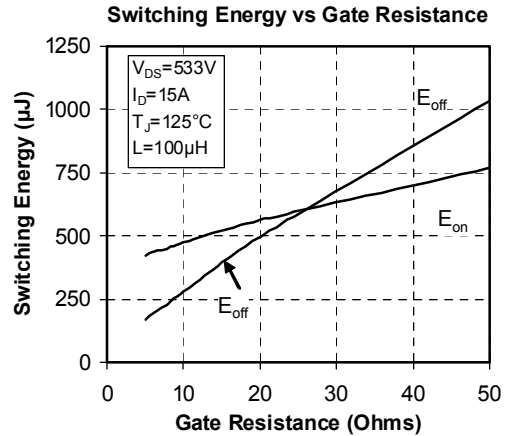
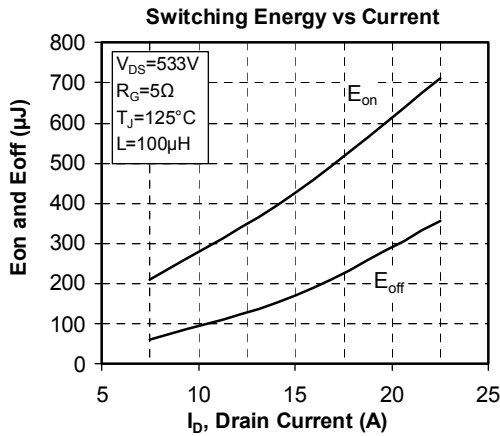
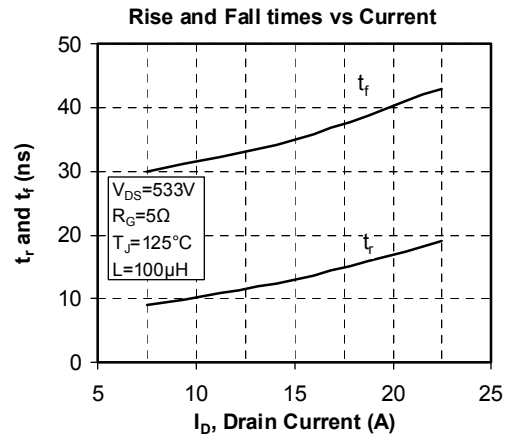
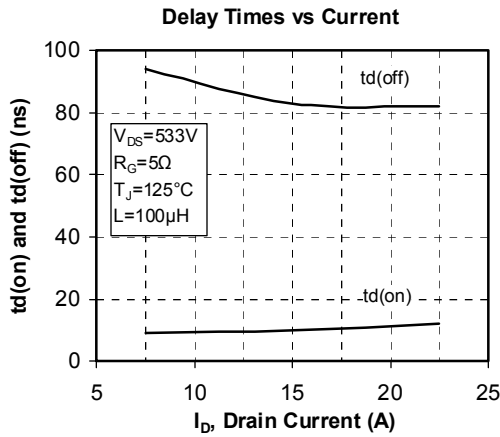


See application note 1901 - Mounting Instructions for SP3 Power Modules on www.microsemi.com

Typical performance Curve







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