



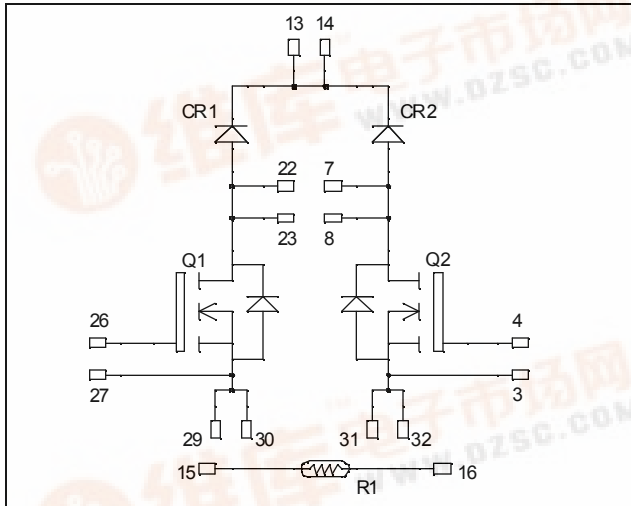
APTC80DDA15T3G

Dual Boost chopper Super Junction MOSFET Power Module

$$V_{DSS} = 800V$$

$$R_{DSon} = 150m\Omega \text{ max @ } T_j = 25^\circ C$$

$$I_D = 28A \text{ @ } T_c = 25^\circ C$$

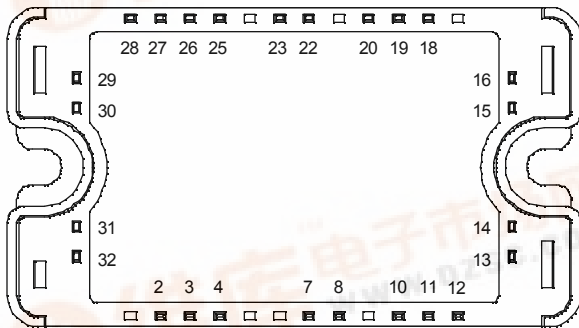


Application

- AC and DC motor control
- Switched Mode Power Supplies
- Power Factor Correction

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 single boost 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	$T_c = 25^\circ C$	A
		$T_c = 80^\circ C$	
I_{DM}	Pulsed Drain current	110	
V_{GS}	Gate - Source Voltage	± 30	V
R_{DSon}	Drain - Source ON Resistance	150	m Ω
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	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	$V_{GS} = 0V, V_{DS} = 800V$ $T_j = 25^\circ\text{C}$			50	μA
		$V_{GS} = 0V, V_{DS} = 800V$ $T_j = 125^\circ\text{C}$			375	
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10V, I_D = 14A$			150	$\text{m}\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 2\text{mA}$	2.1	3	3.9	V
I_{GSS}	Gate – Source Leakage Current	$V_{GS} = \pm 20V, V_{DS} = 0V$			± 150	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{iss}	Input Capacitance	$V_{GS} = 0V$		4507		pF
C_{oss}	Output Capacitance	$V_{DS} = 25V$		2092		
C_{rss}	Reverse Transfer Capacitance	$f = 1\text{MHz}$		108		
Q_g	Total gate Charge	$V_{GS} = 10V$		180		nC
Q_{gs}	Gate – Source Charge	$V_{Bus} = 400V$		22		
Q_{gd}	Gate – Drain Charge	$I_D = 28A$		90		
$T_{d(on)}$	Turn-on Delay Time	Inductive switching @ 125°C $V_{GS} = 15V$ $V_{Bus} = 533V$ $I_D = 28A$ $R_G = 2.5\Omega$		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 $V_{GS} = 15V, V_{Bus} = 533V$ $I_D = 28A, R_G = 2.5\Omega$		486		μJ
E_{off}	Turn-off Switching Energy			278		
E_{on}	Turn-on Switching Energy	Inductive switching @ 125°C $V_{GS} = 15V, V_{Bus} = 533V$ $I_D = 28A, R_G = 2.5\Omega$		850		μJ
E_{off}	Turn-off Switching Energy			342		

Chopper 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 = 100°C		60		A	
V _F	Diode Forward Voltage	I _F = 60A			1.9	2.5	V	
		I _F = 120A			2.2			
		I _F = 60A	T _j = 125°C		1.7			
t _{rr}	Reverse Recovery Time	I _F = 60A V _R = 667V di/dt=200A/μs	T _j = 25°C		280		ns	
			T _j = 125°C		350			
Q _{rr}	Reverse Recovery Charge			T _j = 25°C		760		nC
				T _j = 125°C		3600		

Thermal and package characteristics

Symbol	Characteristic				Min	Typ	Max	Unit
R _{thJC}	Junction to Case Thermal Resistance			Transistor			0.45	°C/W
				Diode			0.9	
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

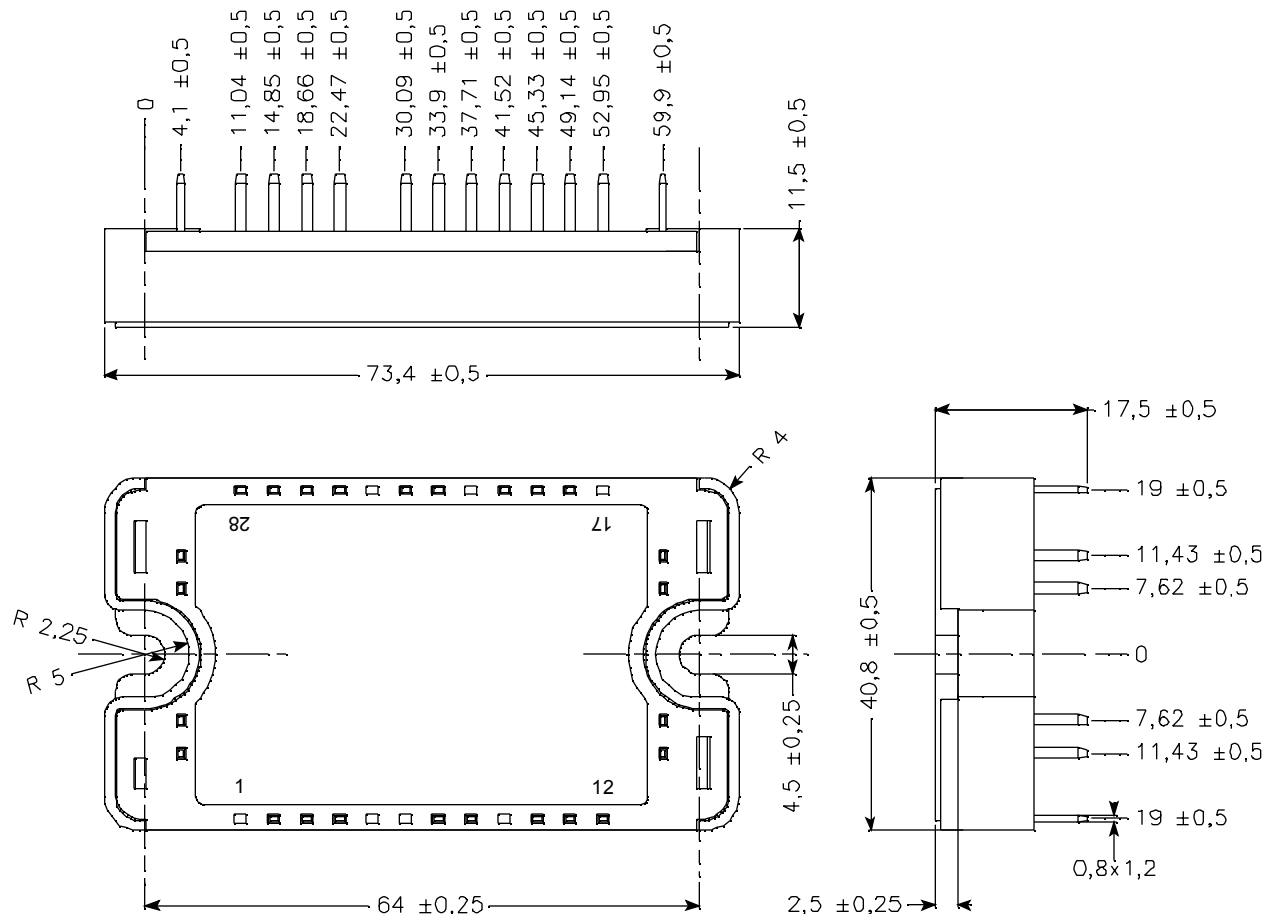
Temperature sensor NTC (see application note APT0406 on www.microsemi.com for more information).

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

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

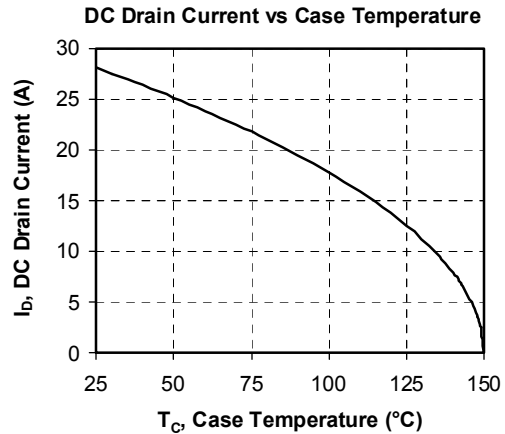
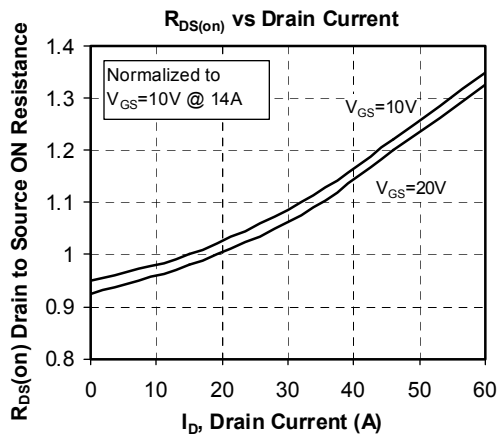
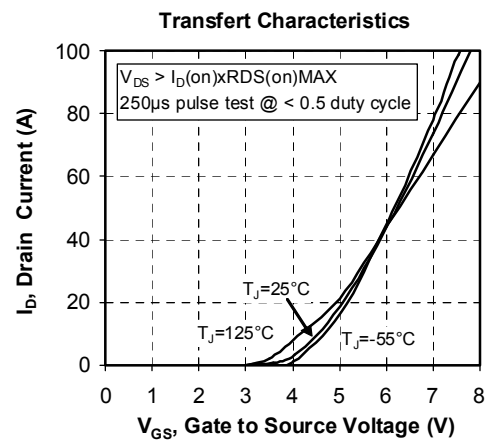
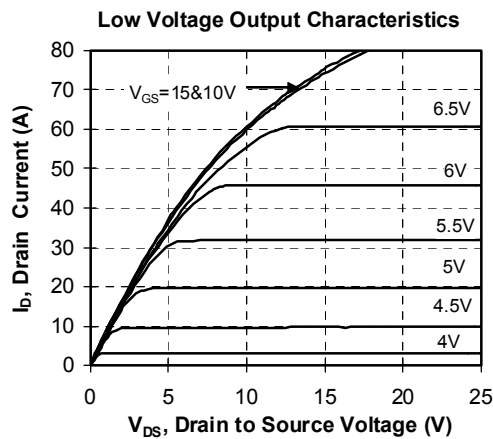
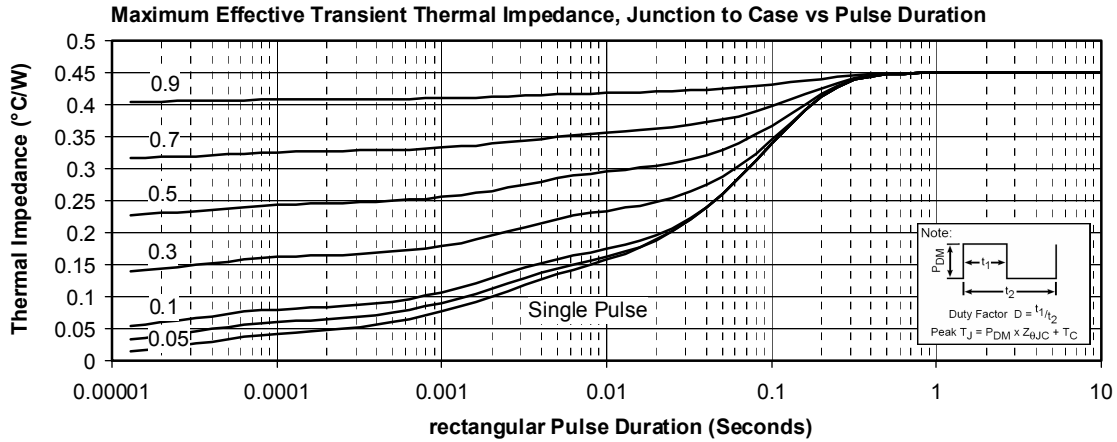
T: Thermistor temperature
 R_T: Thermistor value at T

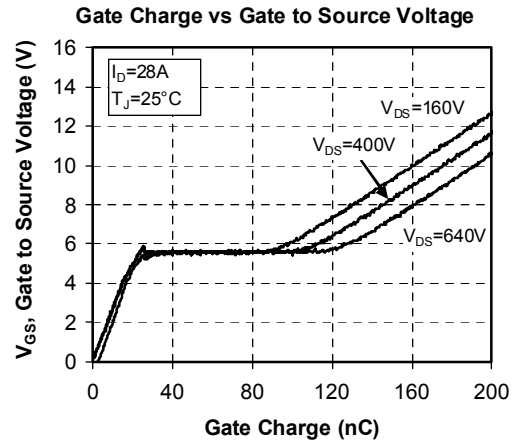
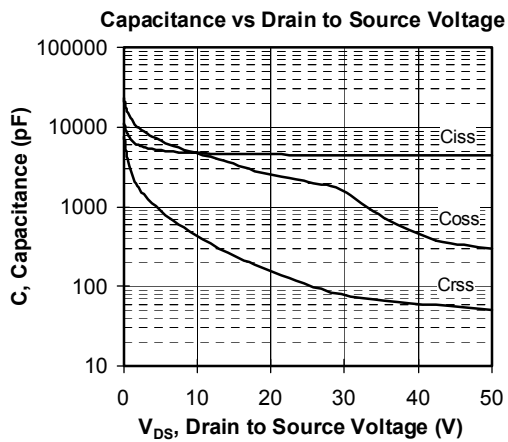
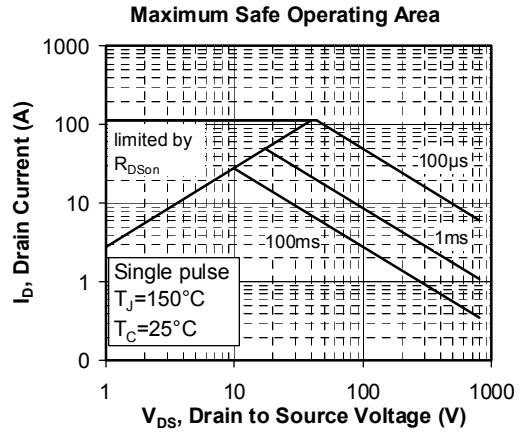
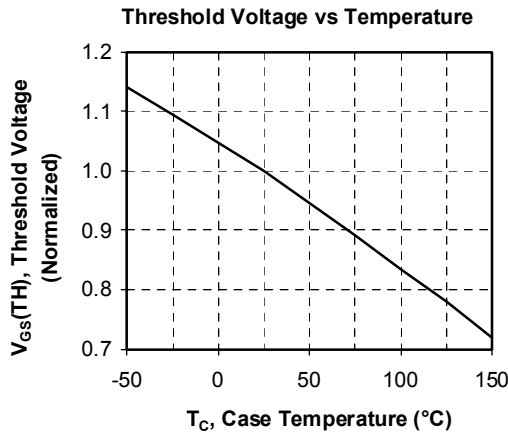
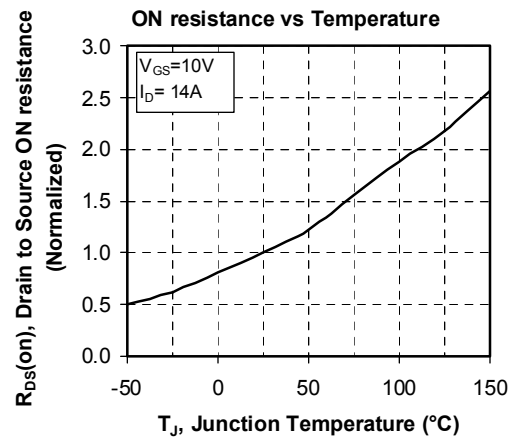
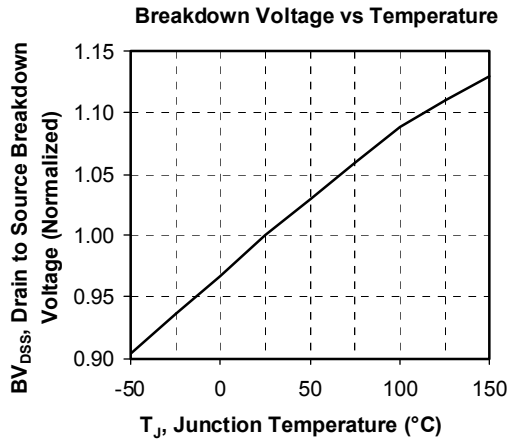
SP3 Package outline (dimensions in mm)

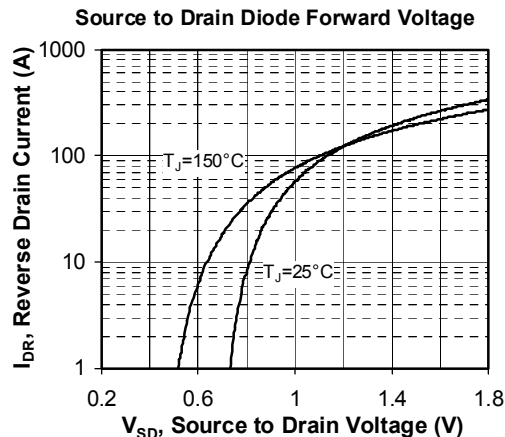
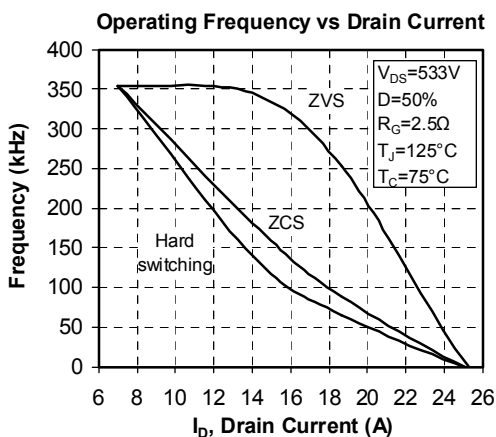
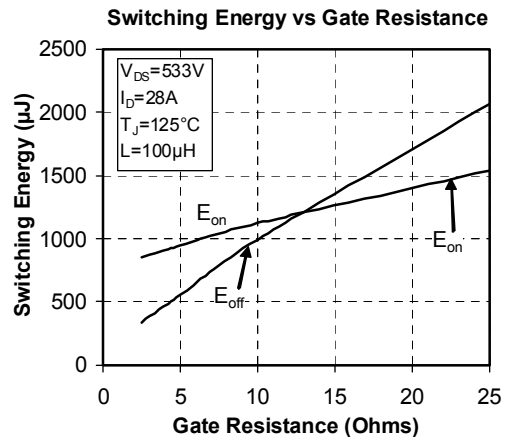
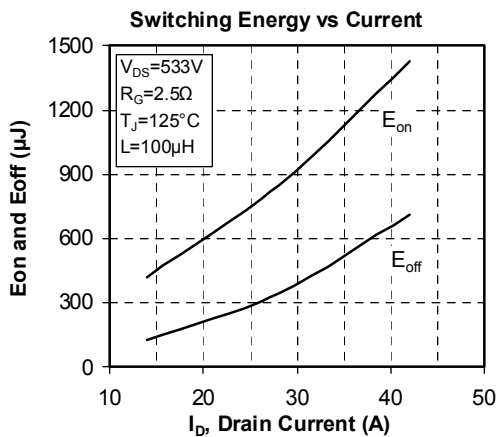
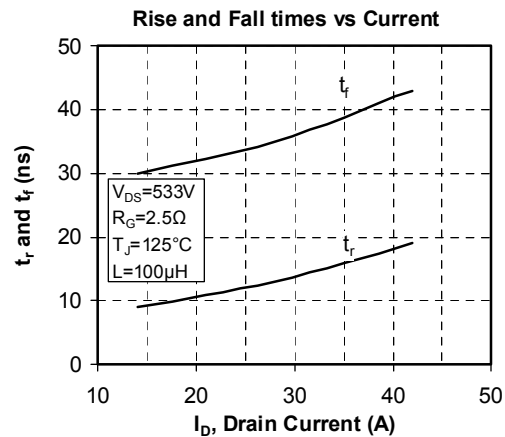
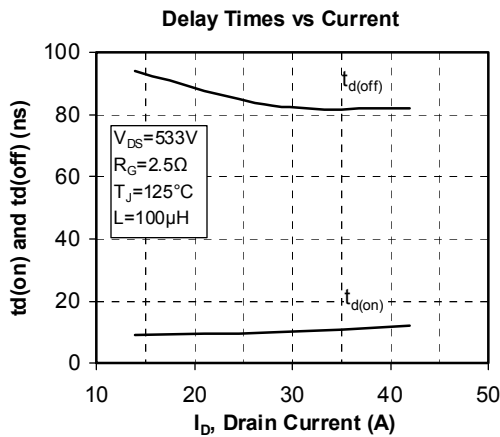


See application note 1901 - Mounting Instructions for SP3 Power Modules on www.microsemi.com

Typical Performance Curve







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