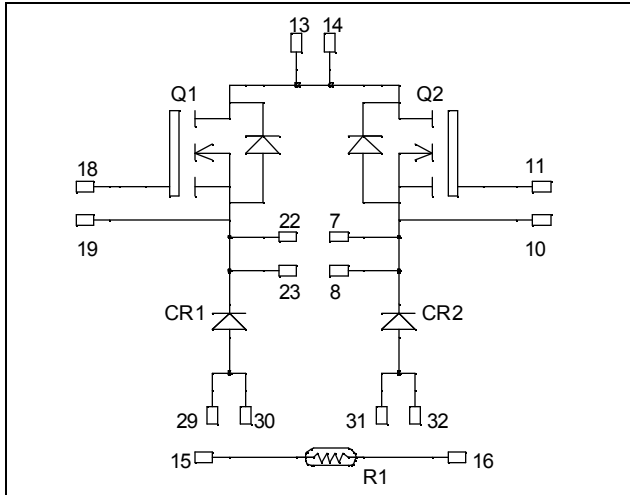


Dual Buck chopper Super Junction MOSFET Power Module

$V_{DSS} = 800V$

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

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

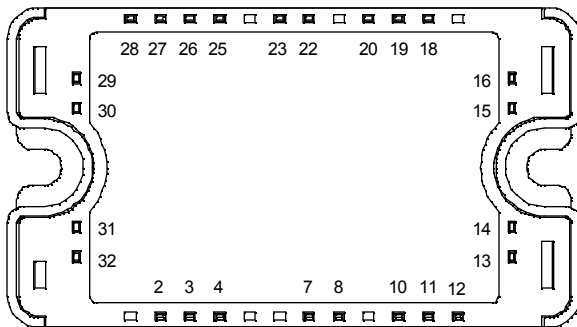


Application

- AC and DC motor control
- Switched Mode 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 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	800	V
I_D	Continuous Drain Current	$T_c = 25^\circ C$ 15	A
		$T_c = 80^\circ C$ 11	
I_{DM}	Pulsed Drain current	60	
V_{GS}	Gate - Source Voltage	± 30	V
R_{DSon}	Drain - Source ON Resistance	290	$m\Omega$
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$ 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	$V_{\text{GS}} = 0\text{V}, V_{\text{DS}} = 800\text{V}, T_j = 25^\circ\text{C}$			25	μA
		$V_{\text{GS}} = 0\text{V}, V_{\text{DS}} = 800\text{V}, T_j = 125^\circ\text{C}$			250	
$R_{\text{DS(on)}}$	Drain – Source on Resistance	$V_{\text{GS}} = 10\text{V}, I_{\text{D}} = 7.5\text{A}$			290	$\text{m}\Omega$
$V_{\text{GS(th)}}$	Gate Threshold Voltage	$V_{\text{GS}} = V_{\text{DS}}, I_{\text{D}} = 1\text{mA}$	2.1	3	3.9	V
I_{GSS}	Gate – Source Leakage Current	$V_{\text{GS}} = \pm 20\text{V}, V_{\text{DS}} = 0\text{V}$			± 100	nA

Dynamic Characteristics

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

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	$V_{\text{R}} = 1000\text{V}$			250	μA
		$T_j = 125^\circ\text{C}$			500	
I_{F}	DC Forward Current	$T_c = 65^\circ\text{C}$		30		A
V_{F}	Diode Forward Voltage	$I_{\text{F}} = 30\text{A}$		1.9	2.3	V
		$I_{\text{F}} = 60\text{A}$		2.2		
		$I_{\text{F}} = 30\text{A}, T_j = 125^\circ\text{C}$		1.7		
t_{rr}	Reverse Recovery Time	$I_{\text{F}} = 30\text{A}, T_j = 25^\circ\text{C}$		290		ns
		$T_j = 125^\circ\text{C}$		390		
Q_{rr}	Reverse Recovery Charge	$I_{\text{F}} = 30\text{A}, V_{\text{R}} = 667\text{V}, di/dt = 200\text{A}/\mu\text{s}, T_j = 25^\circ\text{C}$		670		nC
		$T_j = 125^\circ\text{C}$		2350		

Thermal and package characteristics

Symbol	Characteristic			Min	Typ	Max	Unit
R _{thJC}	Junction to Case Thermal Resistance			Transistor		0.8	°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

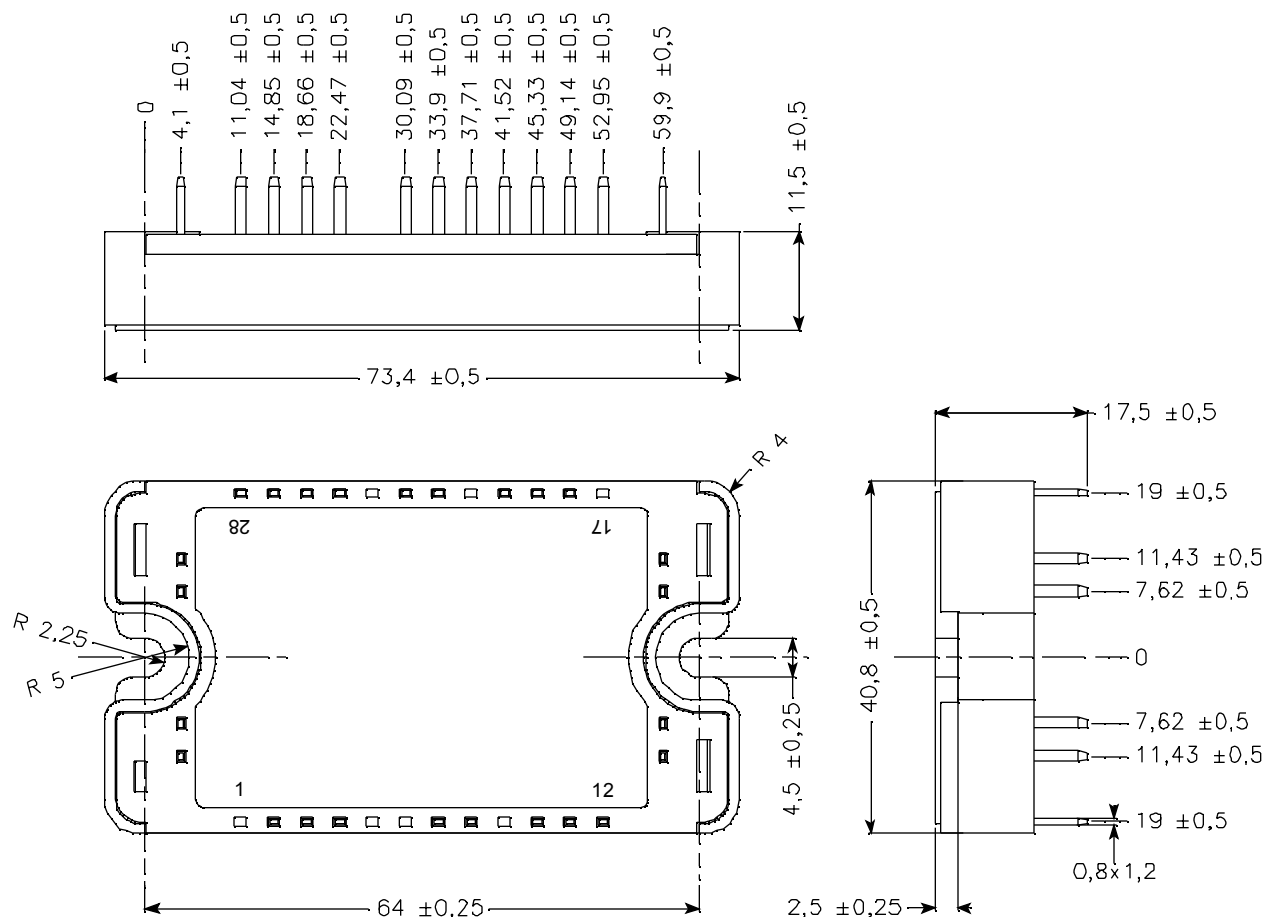
Temperature sensor NTC (see application note APT0406 on www.microsemi.com for more information).

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

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

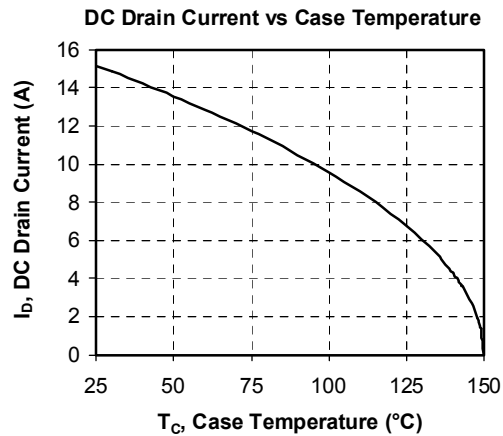
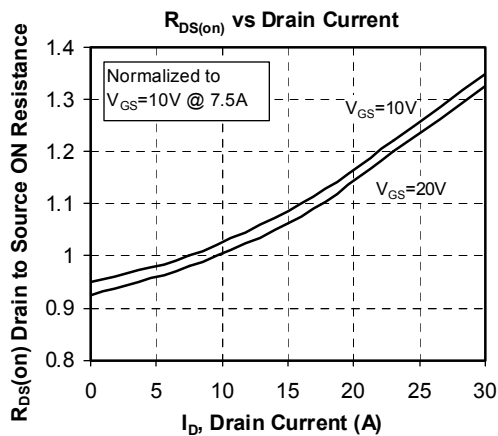
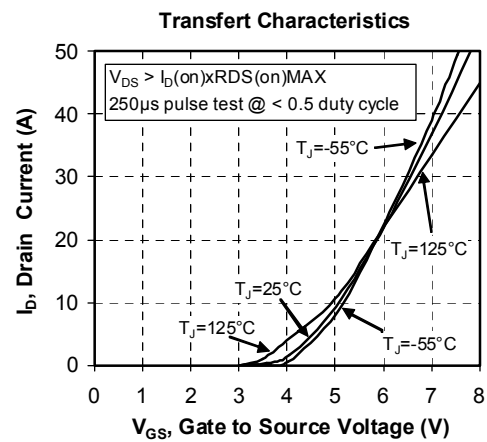
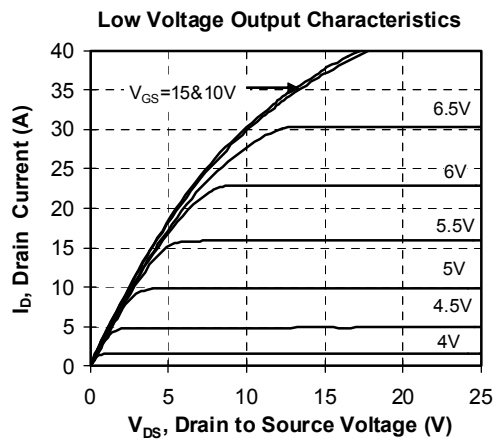
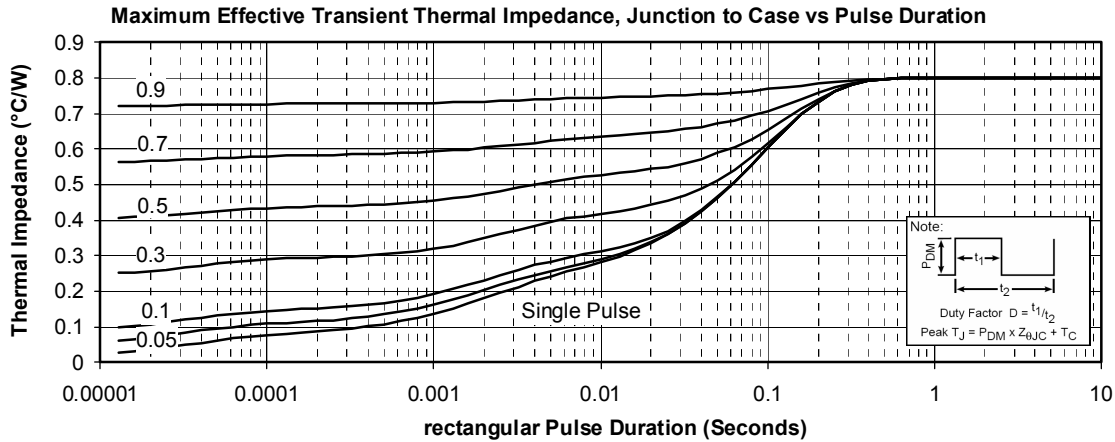
T: Thermistor temperature
R_T: Thermistor value at T

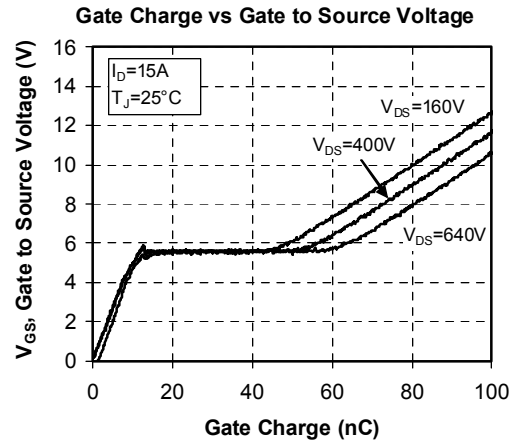
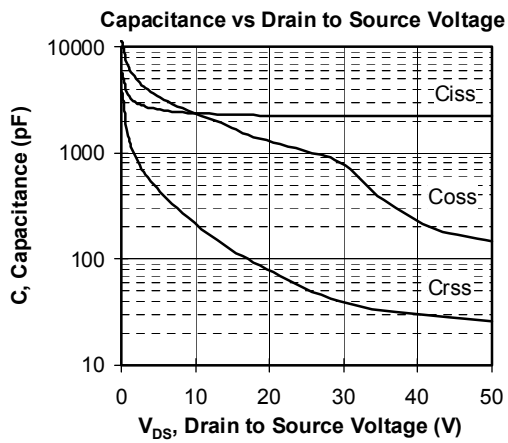
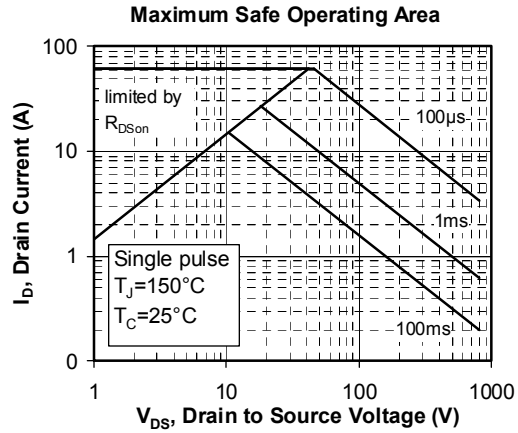
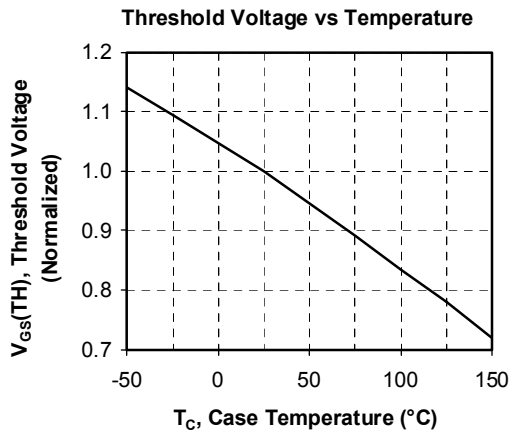
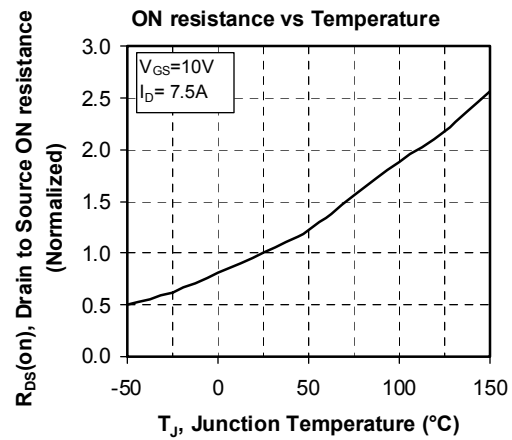
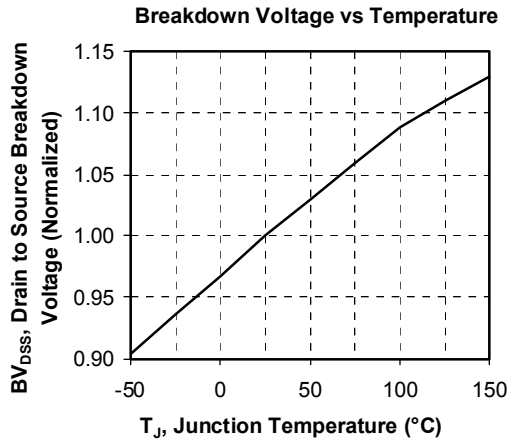
SP3 Package outline (dimensions in mm)

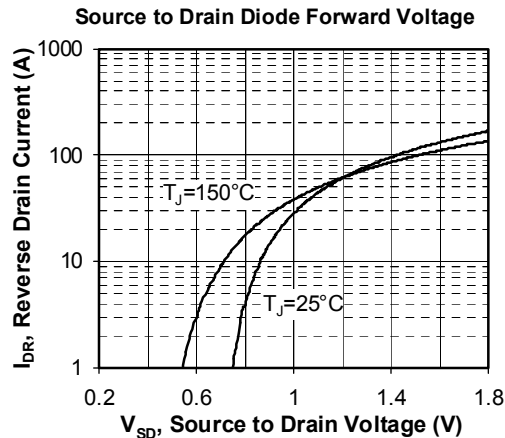
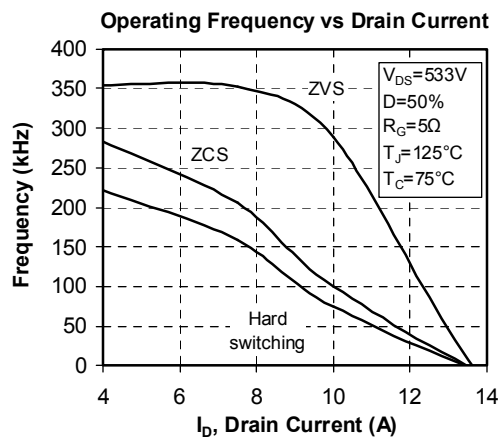
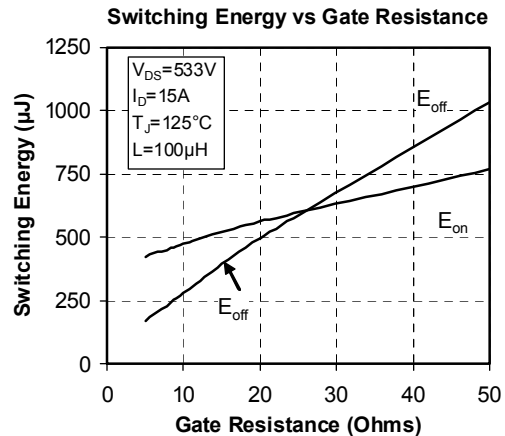
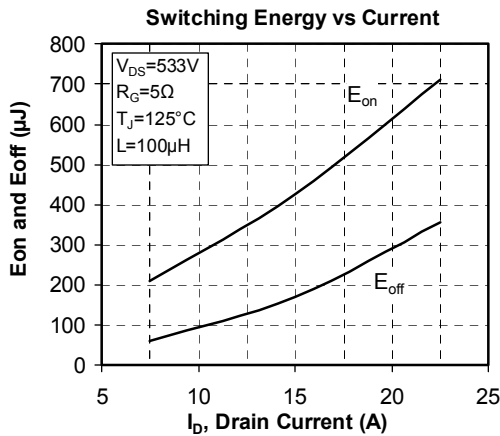
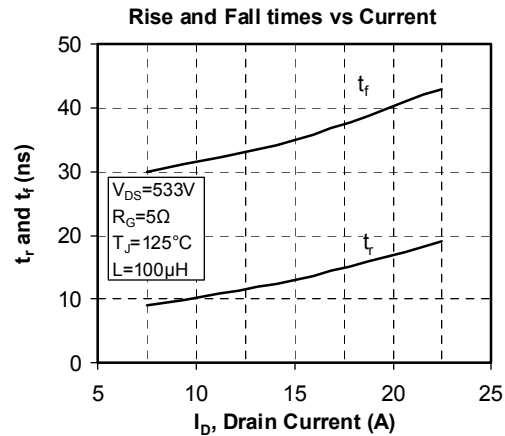
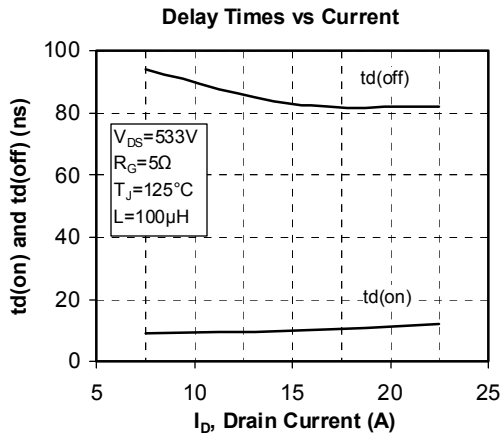


See application note 1901 - Mounting Instructions for SP3 Power Modules on www.microsemi.com

Typical performance Curve







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