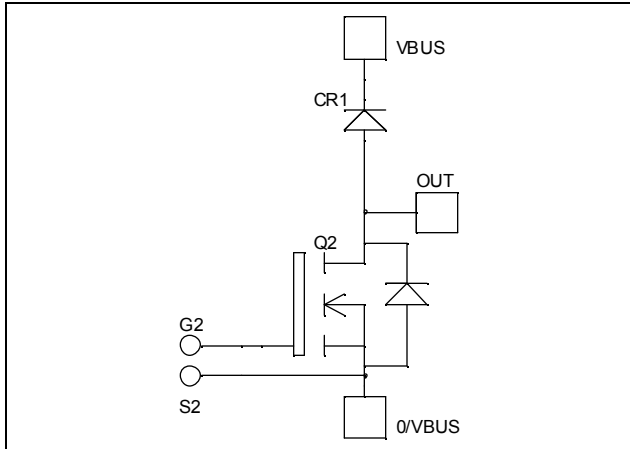


Boost chopper MOSFET Power Module

$V_{DSS} = 500V$
 $R_{DSon} = 19m\Omega \text{ typ @ } T_j = 25^\circ C$
 $I_D = 163A \text{ @ } T_c = 25^\circ C$



Application

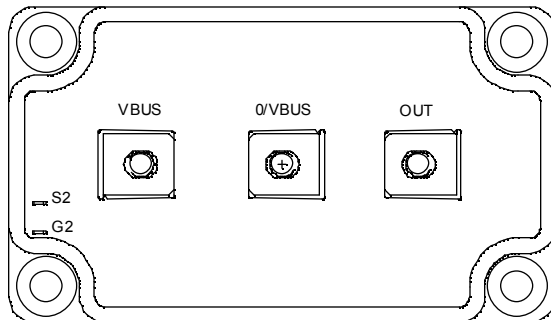
- AC and DC motor control
- Switched Mode Power Supplies
- Power Factor Correction

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
 - M5 power connectors
- High level of integration


Benefits

- Outstanding performance at high frequency operation
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Low profile
- RoHS Compliant



Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{DSS}	Drain - Source Breakdown Voltage	500	V
I_D	Continuous Drain Current	$T_c = 25^\circ C$	163
		$T_c = 80^\circ C$	122
I_{DM}	Pulsed Drain current	652	
V_{GS}	Gate - Source Voltage	± 30	V
R_{DSon}	Drain - Source ON Resistance	22.5	$m\Omega$
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	1136
I_{AR}	Avalanche current (repetitive and non repetitive)	46	A
E_{AR}	Repetitive Avalanche Energy	50	mJ
E_{AS}	Single Pulse Avalanche Energy	2500	


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	$V_{GS} = 0\text{V}, V_{DS} = 500\text{V}$			200	μA
		$V_{GS} = 0\text{V}, V_{DS} = 400\text{V}$			1000	
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10\text{V}, I_D = 81.5\text{A}$		19	22.5	$\text{m}\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 10\text{mA}$	3		5	V
I_{GSS}	Gate – Source Leakage Current	$V_{GS} = \pm 30\text{V}, V_{DS} = 0\text{V}$			± 200	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{iss}	Input Capacitance	$V_{GS} = 0\text{V}$		22.4		nF
C_{oss}	Output Capacitance	$V_{DS} = 25\text{V}$		4.8		
C_{rss}	Reverse Transfer Capacitance	$f = 1\text{MHz}$		0.36		
Q_g	Total gate Charge	$V_{GS} = 10\text{V}$		492		nC
Q_{gs}	Gate – Source Charge	$V_{Bus} = 250\text{V}$		132		
Q_{gd}	Gate – Drain Charge	$I_D = 163\text{A}$		260		
$T_{d(on)}$	Turn-on Delay Time	Inductive switching @ 125°C $V_{GS} = 15\text{V}$ $V_{Bus} = 333\text{V}$ $I_D = 163\text{A}$ $R_G = 1\Omega$		18		ns
T_r	Rise Time			35		
$T_{d(off)}$	Turn-off Delay Time			87		
T_f	Fall Time			77		
E_{on}	Turn-on Switching Energy	Inductive switching @ 25°C $V_{GS} = 15\text{V}, V_{Bus} = 333\text{V}$ $I_D = 163\text{A}, R_G = 1\Omega$		3020		μJ
E_{off}	Turn-off Switching Energy			2904		
E_{on}	Turn-on Switching Energy	Inductive switching @ 125°C $V_{GS} = 15\text{V}, V_{Bus} = 333\text{V}$ $I_D = 163\text{A}, R_G = 1\Omega$		4964		μJ
E_{off}	Turn-off Switching Energy			3384		

Chopper 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	$V_R = 600\text{V}$	$T_j = 25^\circ\text{C}$		350	μA
			$T_j = 125^\circ\text{C}$		600	
I_F	DC Forward Current			120		A
V_F	Diode Forward Voltage	$I_F = 120\text{A}$		1.6	1.8	V
		$I_F = 240\text{A}$		1.9		
		$I_F = 120\text{A}$	$T_j = 125^\circ\text{C}$		1.4	
t_{rr}	Reverse Recovery Time	$I_F = 120\text{A}$ $V_R = 400\text{V}$ $di/dt = 400\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$		130	ns
			$T_j = 125^\circ\text{C}$		170	
Q_{rr}	Reverse Recovery Charge		$T_j = 25^\circ\text{C}$		440	nC
			$T_j = 125^\circ\text{C}$		1840	

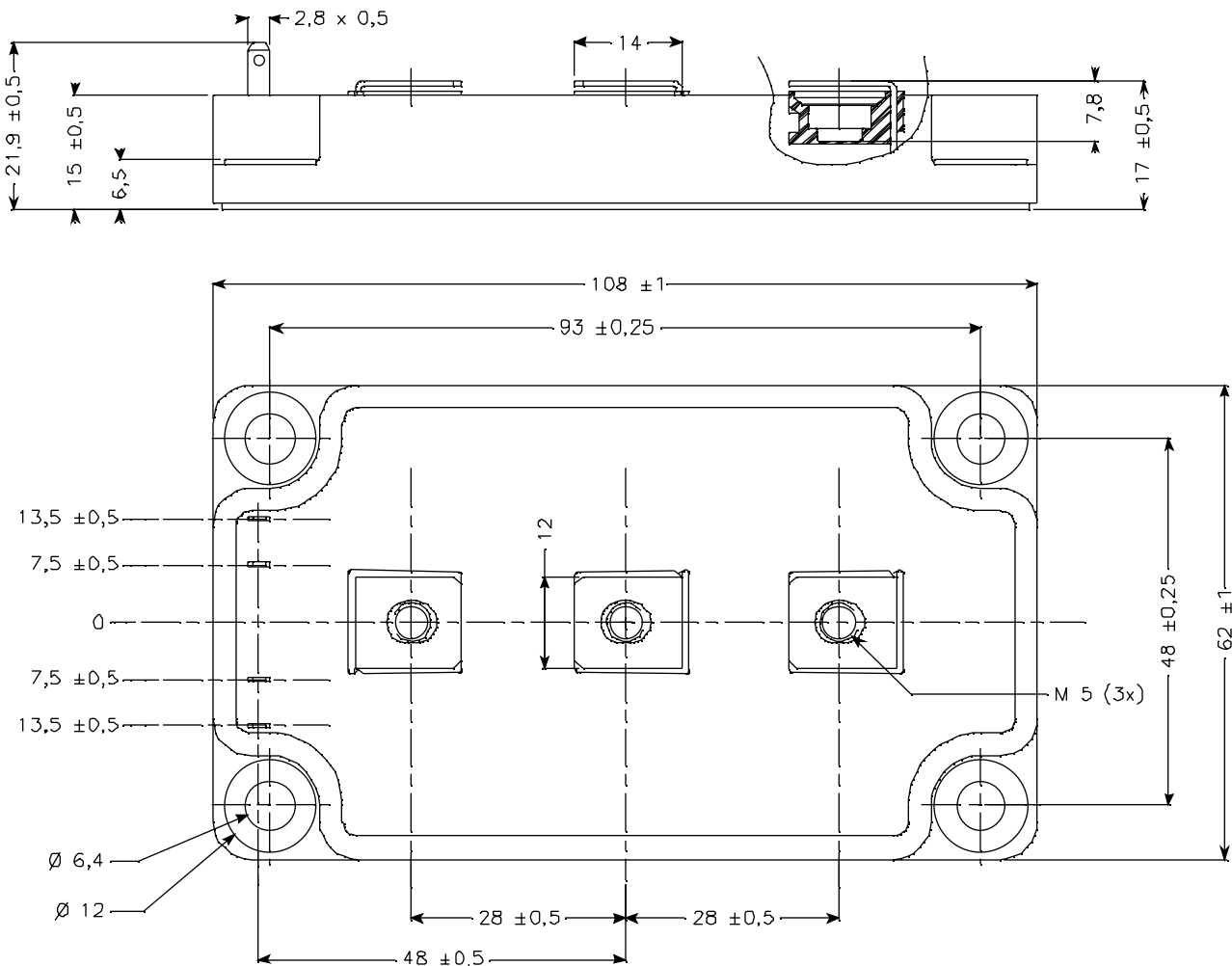
Thermal and package characteristics

Symbol Characteristic

Min Typ Max Unit

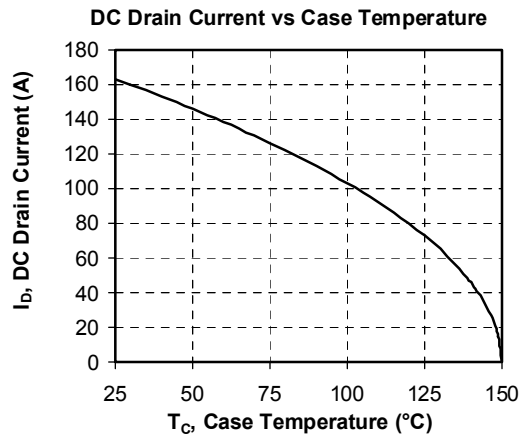
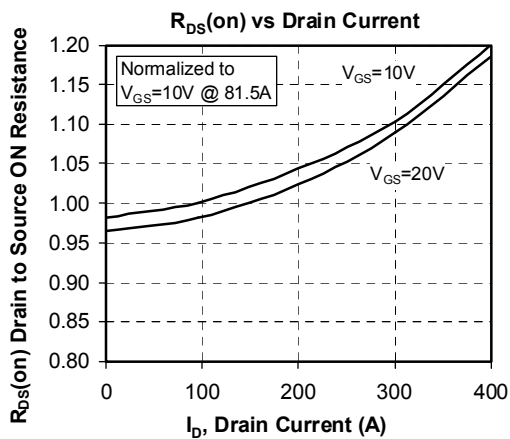
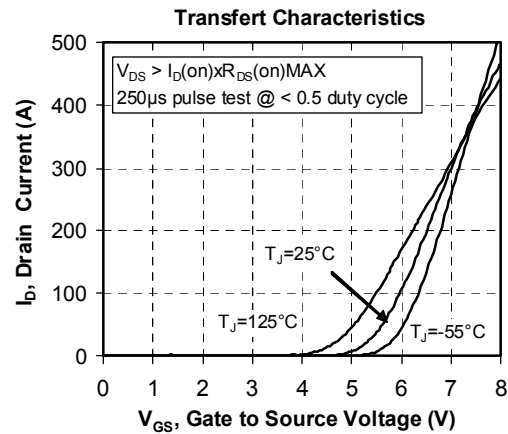
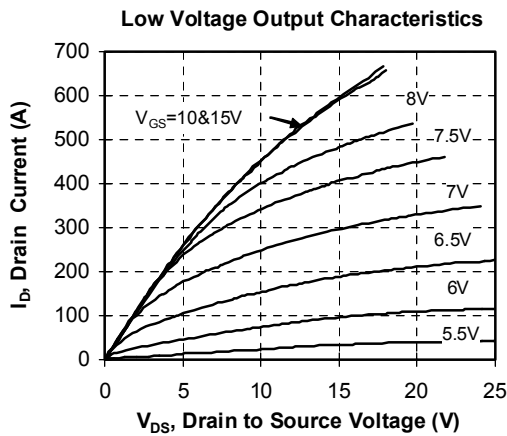
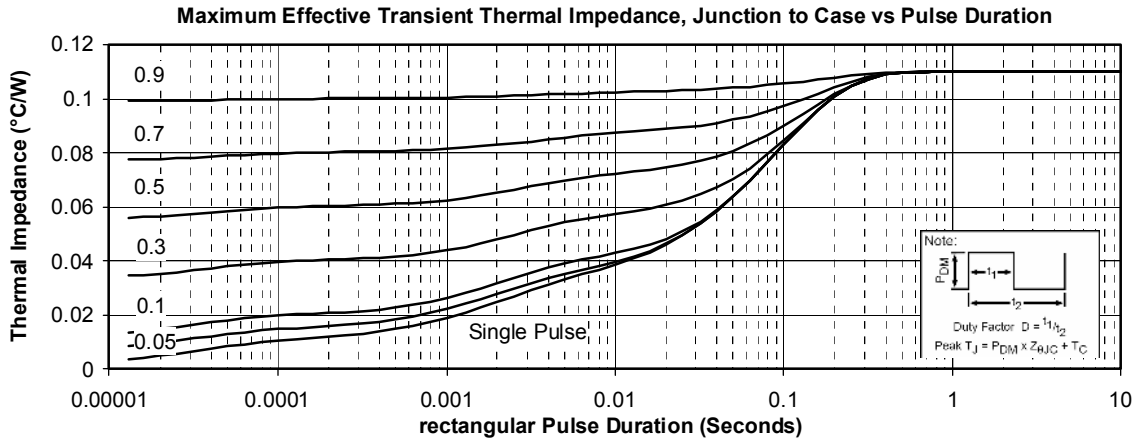
Symbol	Characteristic			Unit		
		Min	Typ			
R _{thJC}	Junction to Case Thermal Resistance	Transistor		0.11	°C/W	
		Diode		0.46		
V _{ISOL}	RMS Isolation Voltage, any terminal to case t=1 min, I _{isol} <1mA, 50/60Hz	2500		V		
T _J	Operating junction temperature range	-40		°C		
T _{STG}	Storage Temperature Range	-40				
T _C	Operating Case Temperature	-40				
Torque	Mounting torque	To heatsink	M6	3	5	N.m
		For terminals	M5	2		
Wt	Package Weight			280	g	

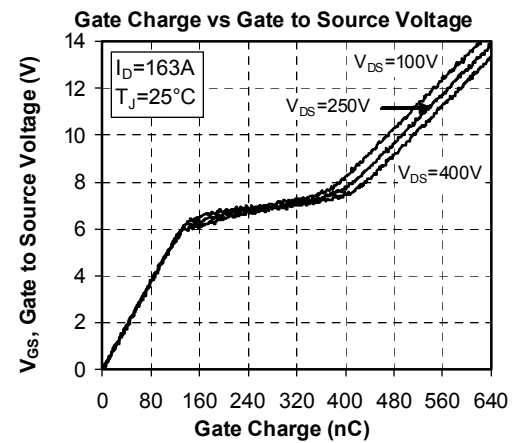
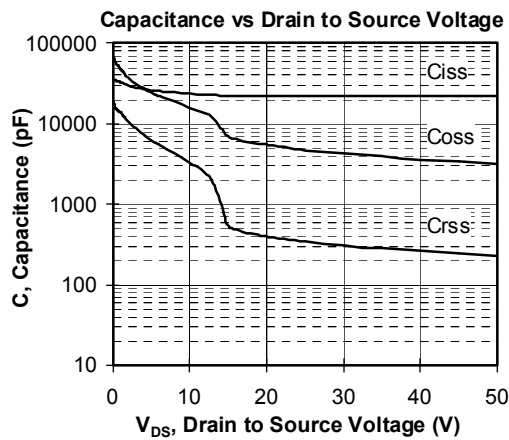
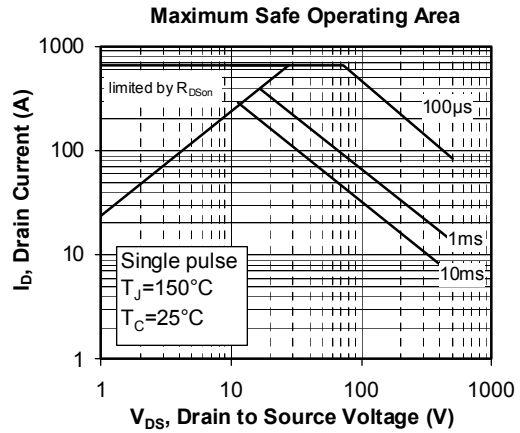
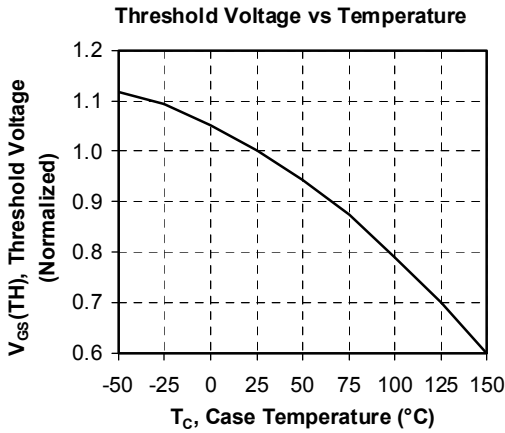
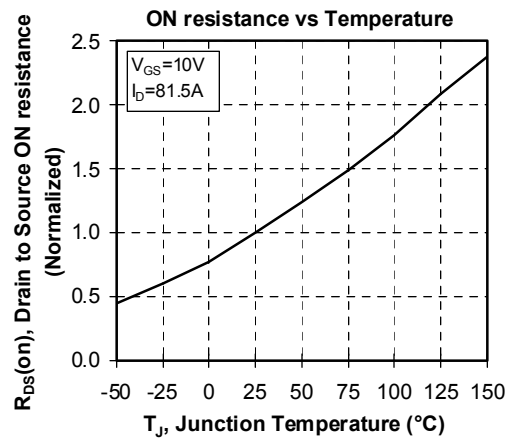
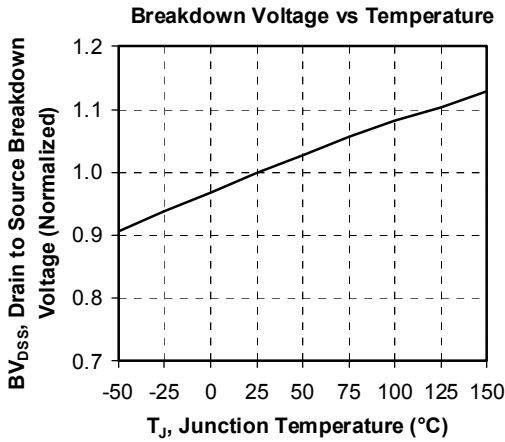
SP6 Package outline (dimensions in mm)

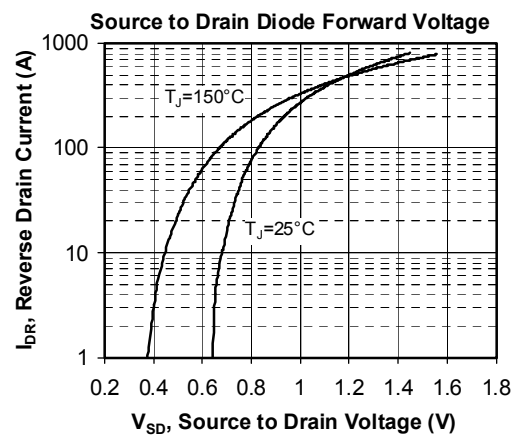
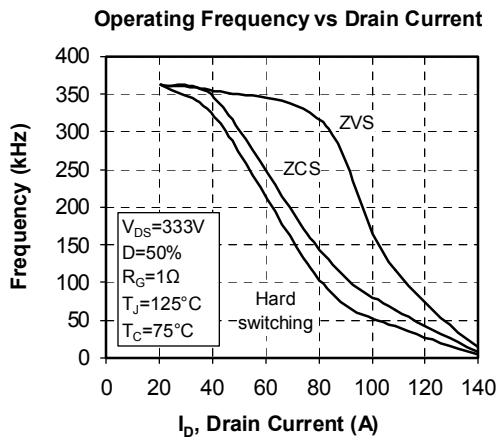
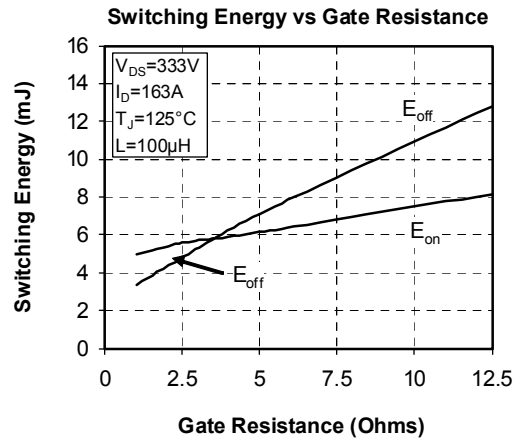
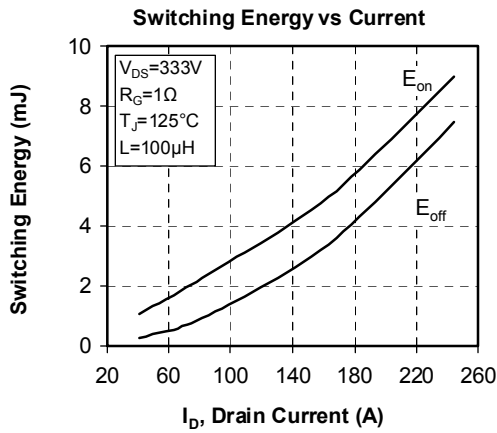
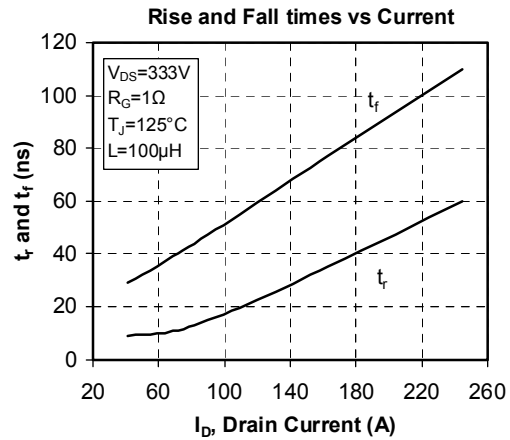
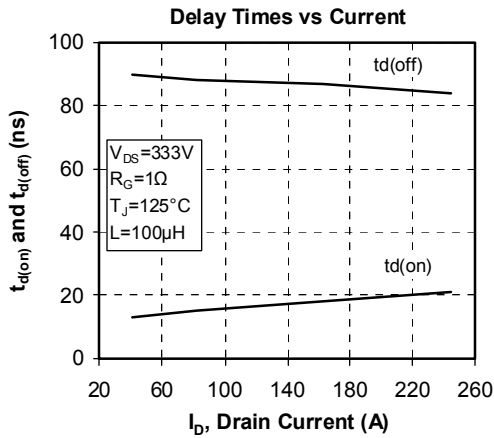


See application note APT0601 - Mounting Instructions for SP6 Power Modules on www.microsemi.com

Typical Performance Curve







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