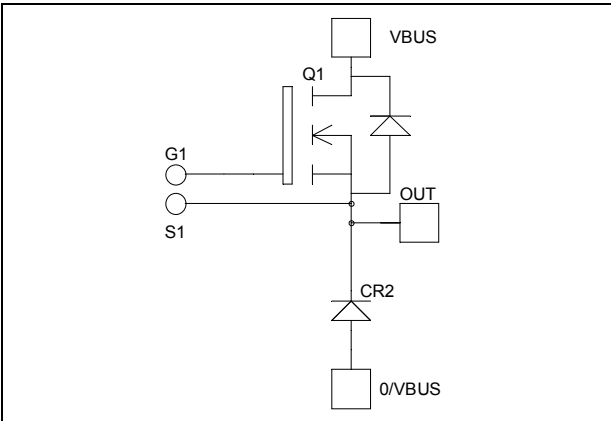


Buck chopper MOSFET Power Module

$V_{DSS} = 500V$
 $R_{DSon} = 17m\Omega \text{ typ @ } T_j = 25^\circ C$
 $I_D = 180A \text{ @ } T_c = 25^\circ C$

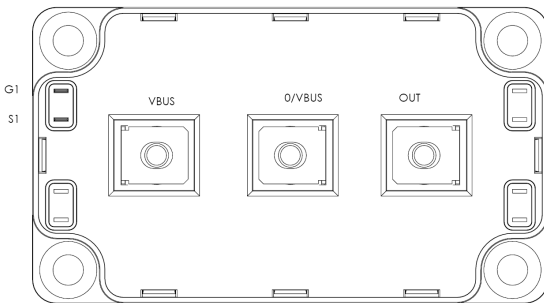


Application

- 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
 - 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	$T_c = 25^\circ C$	180
		$T_c = 80^\circ C$	135
I_{DM}	Pulsed Drain current	720	A
V_{GS}	Gate - Source Voltage	± 30	V
R_{DSon}	Drain - Source ON Resistance	20	$m\Omega$
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	1250
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

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} = 0V, V _{DS} = 500V			400	μA
		T _j = 25°C				
		V _{GS} = 0V, V _{DS} = 400V			2000	
R _{DS(on)}	Drain – Source on Resistance	V _{GS} = 10V, I _D = 90A		17	20	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} = V _{DS} , I _D = 10mA	3		5	V
I _{GSS}	Gate – Source Leakage Current	V _{GS} = ±30 V, V _{DS} = 0V			±200	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C _{iss}	Input Capacitance	V _{GS} = 0V		28		nF
C _{oss}	Output Capacitance	V _{DS} = 25V		5.6		
C _{rss}	Reverse Transfer Capacitance	f = 1MHz		0.36		
Q _g	Total gate Charge	V _{GS} = 10V		560		nC
Q _{gs}	Gate – Source Charge	V _{Bus} = 250V		160		
Q _{gd}	Gate – Drain Charge	I _D = 180A		280		
T _{d(on)}	Turn-on Delay Time	Inductive switching @ 125°C V _{GS} = 15V V _{Bus} = 333V I _D = 180A R _G = 0.5Ω		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} = 15V, V _{Bus} = 333V I _D = 180A, R _G = 0.5Ω		4140		μJ
E _{off}	Turn-off Switching Energy			3380		
E _{on}	Turn-on Switching Energy	Inductive switching @ 125°C V _{GS} = 15V, V _{Bus} = 333V I _D = 180A, R _G = 0.5Ω		6224		μJ
E _{off}	Turn-off Switching Energy			4052		

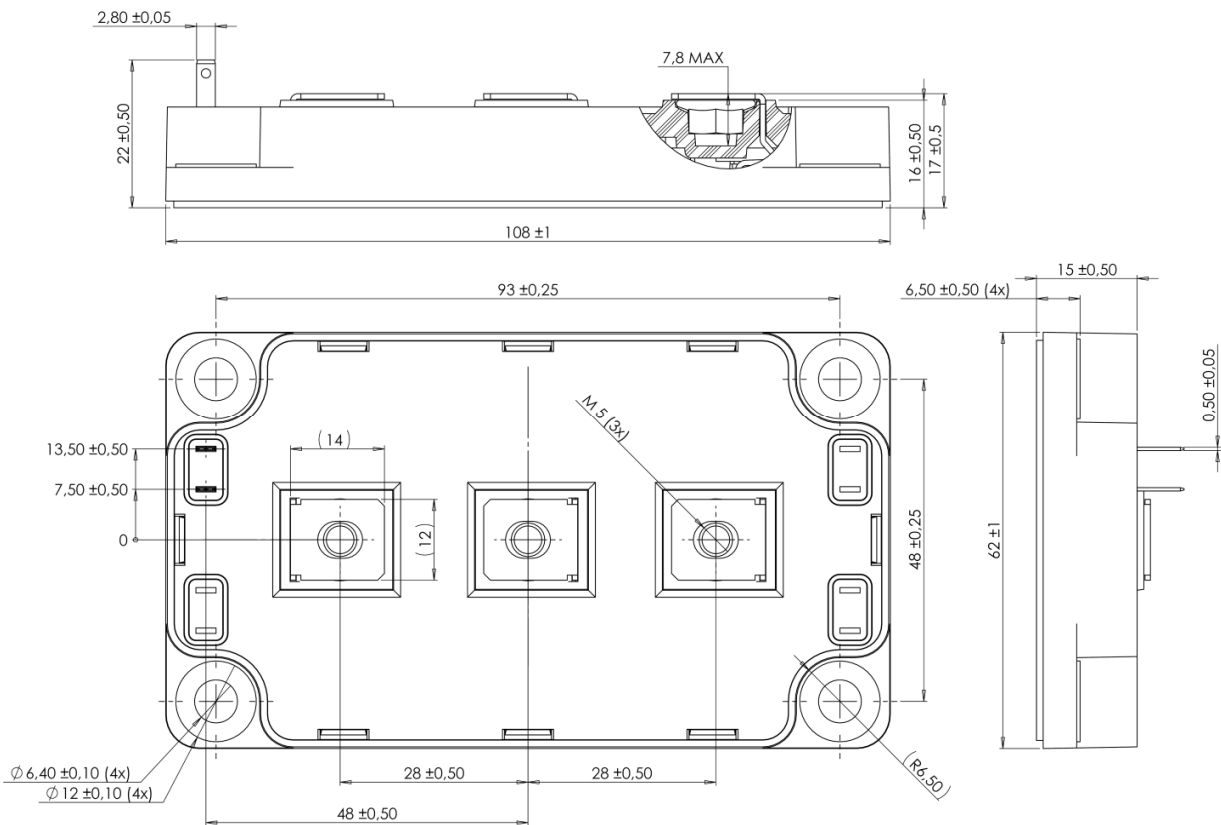
Chopper diode ratings and characteristics

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 = 600V	T _j = 25°C		500	μA
			T _j = 125°C		1000	
I _F	DC Forward Current	T _c = 70°C		180		A
V _F	Diode Forward Voltage	I _F = 180A		1.6	1.8	V
		I _F = 360A		1.9		
		I _F = 180A	T _j = 125°C	1.4		
t _{rr}	Reverse Recovery Time	I _F = 180A V _R = 400V	T _j = 25°C		130	ns
			T _j = 125°C		170	
Q _{rr}	Reverse Recovery Charge	di/dt = 600A/μs	T _j = 25°C		660	nC
			T _j = 125°C		2760	

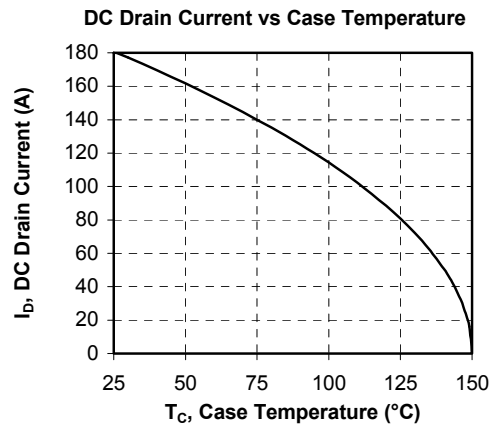
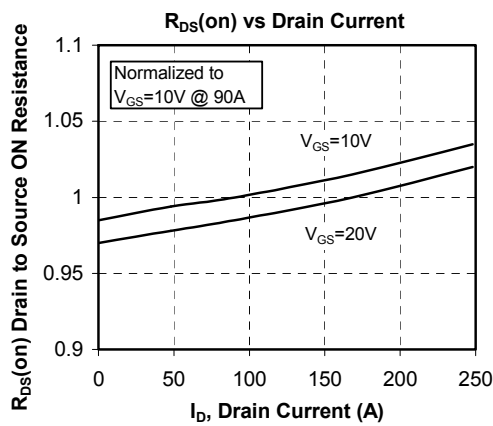
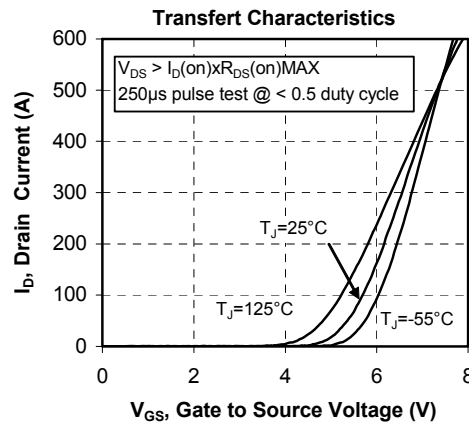
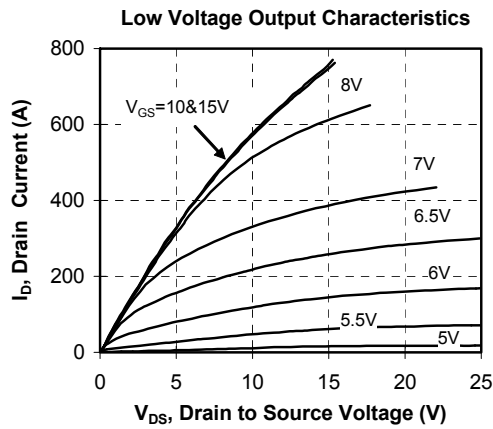
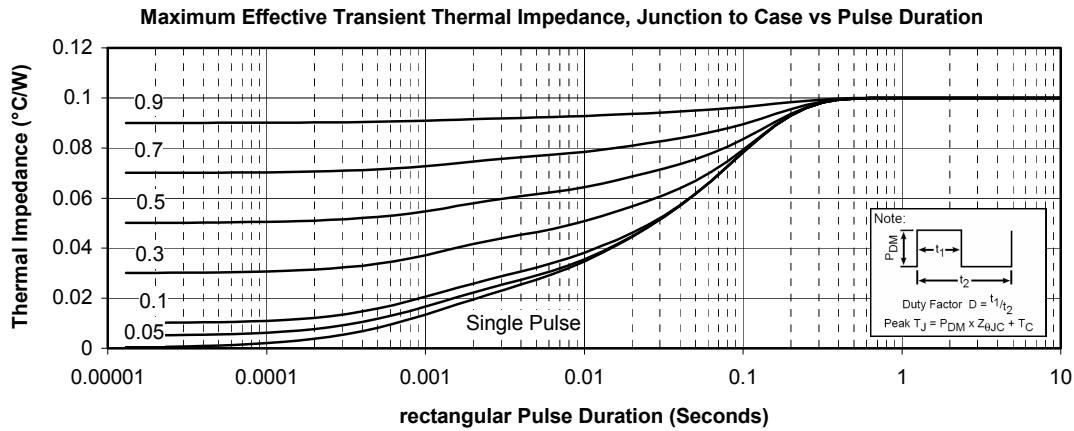
Thermal and package characteristics

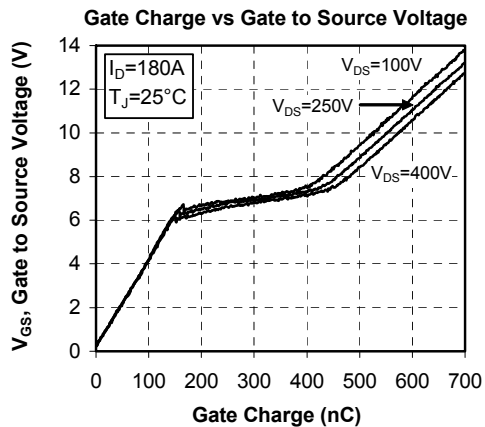
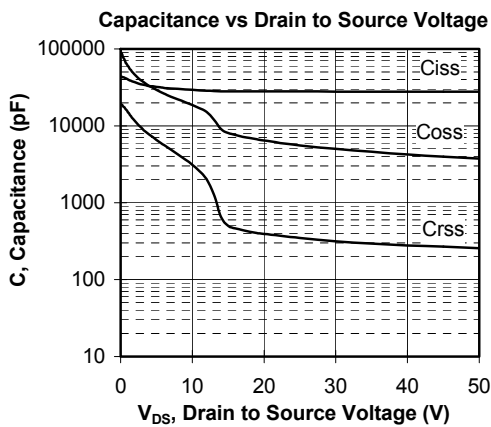
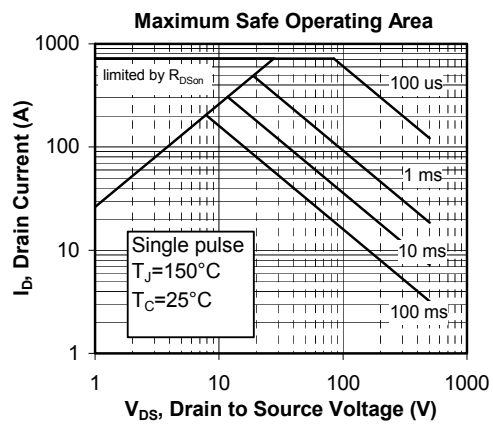
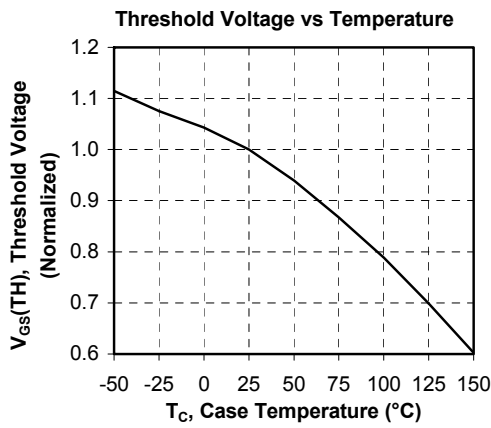
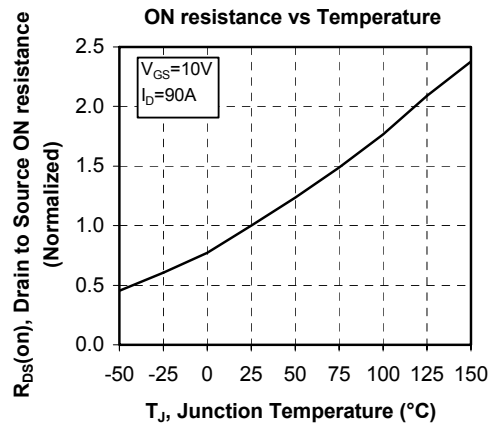
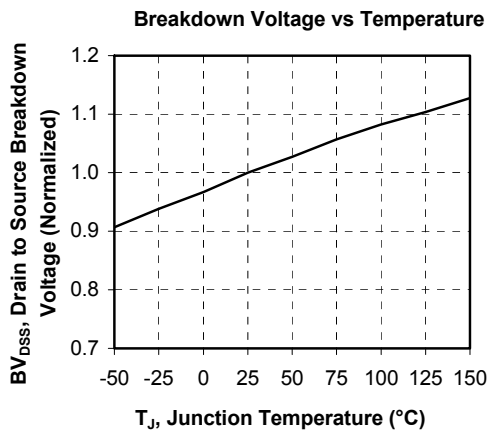
Symbol	Characteristic	Min	Typ	Max	Unit	
R _{thJC}	Junction to Case Thermal Resistance	Transistor		0.1	°C/W	
		Diode		0.32		
V _{ISOL}	RMS Isolation Voltage, any terminal to case t = 1 min, 50/60Hz	4000			V	
T _J	Operating junction temperature range	-40		150	°C	
T _{STG}	Storage Temperature Range	-40		125		
T _C	Operating Case Temperature	-40		100		
Torque	Mounting torque	To heatsink	M6	3	5	N.m
		For terminals	M5	2	3.5	
Wt	Package Weight			300	g	

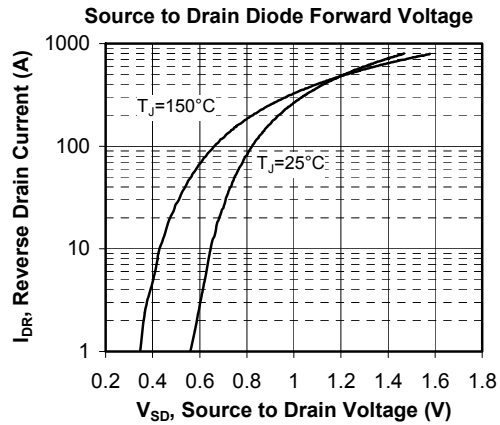
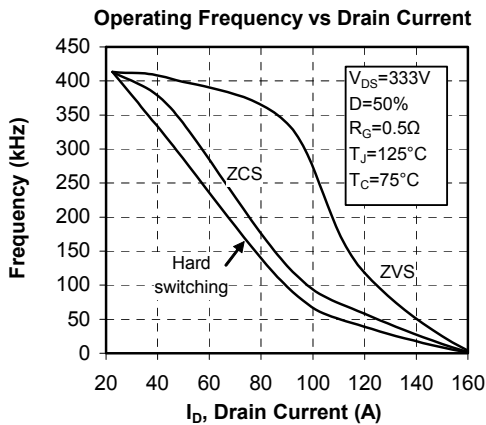
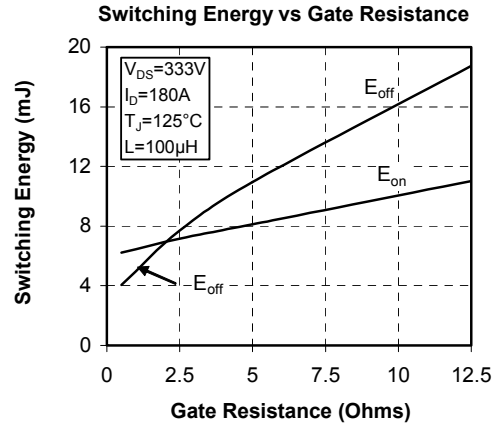
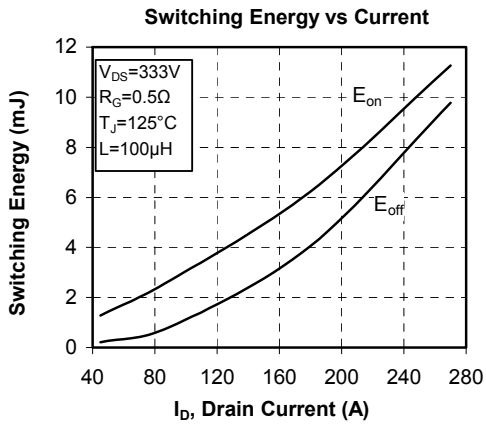
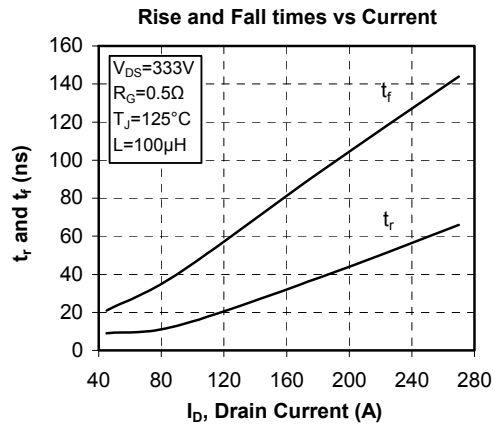
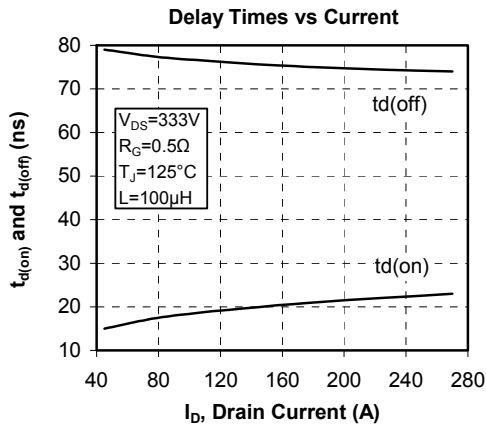
SP6 Package outline (dimensions in mm)



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

Typical Performance Curve






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