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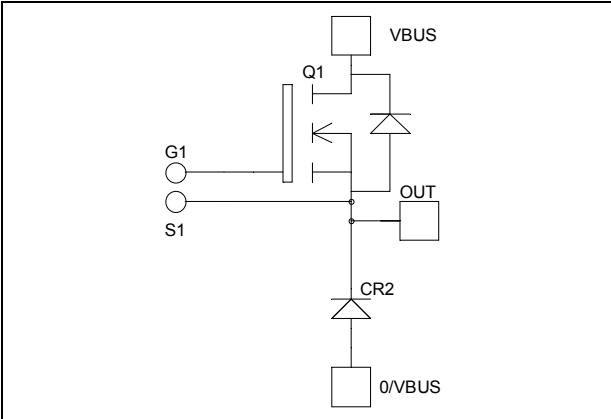
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Buck chopper MOSFET Power Module

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

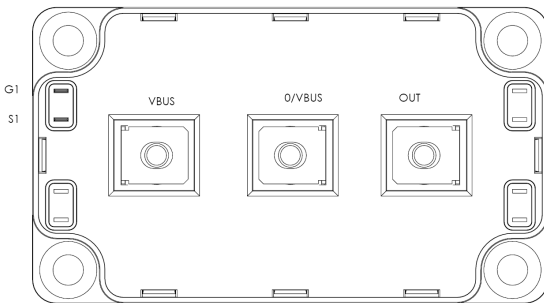


Application

- AC and DC motor control
- Switched Mode Power Supplies

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	A
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} = 0V, V _{DS} = 500V			200	μA
		T _j = 25°C				
		V _{GS} = 0V, V _{DS} = 400V			1000	
R _{DS(on)}	Drain – Source on Resistance	V _{GS} = 10V, I _D = 81.5A		19	22.5	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

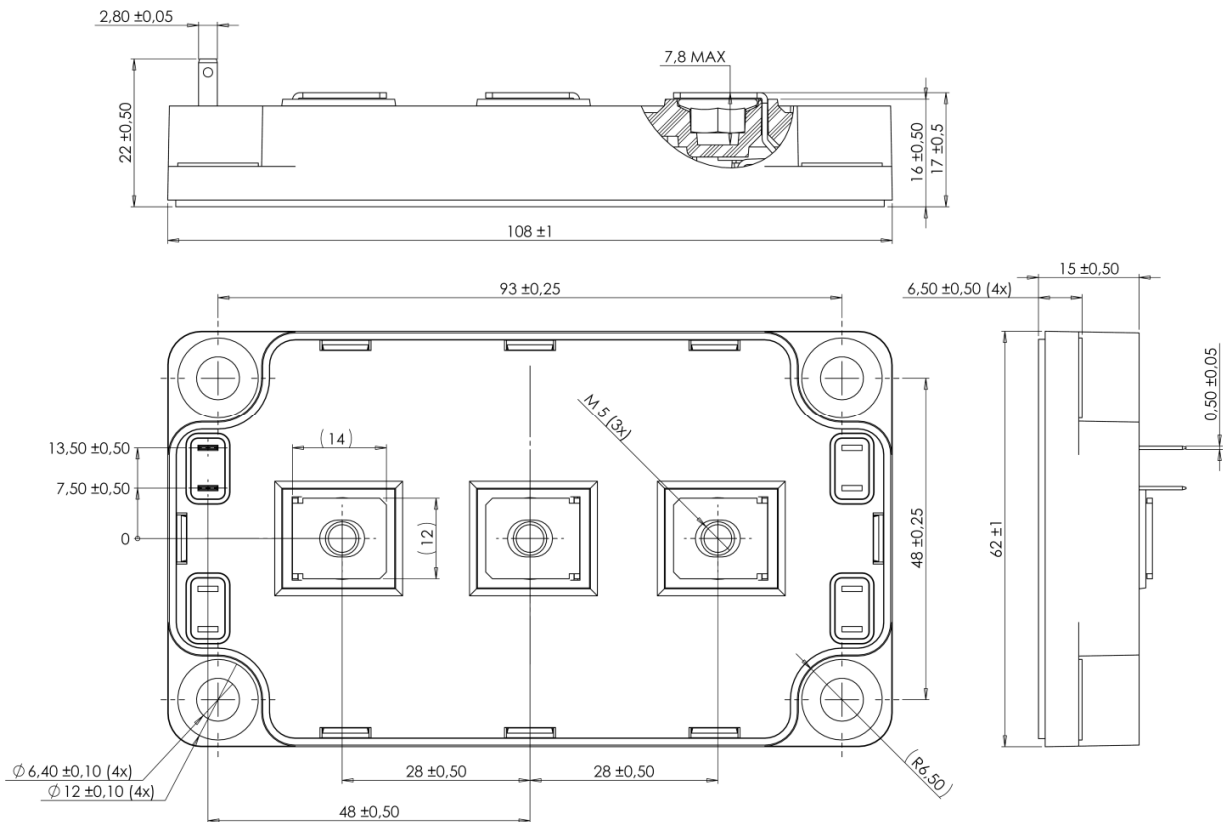
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C _{iss}	Input Capacitance	V _{GS} = 0V		22.4		nF
C _{oss}	Output Capacitance	V _{DS} = 25V		4.8		
C _{rss}	Reverse Transfer Capacitance	f = 1MHz		0.36		
Q _g	Total gate Charge	V _{GS} = 10V		492		nC
Q _{gs}	Gate – Source Charge	V _{Bus} = 250V		132		
Q _{gd}	Gate – Drain Charge	I _D = 163A		260		
T _{d(on)}	Turn-on Delay Time	Inductive switching @ 125°C V _{GS} = 15V V _{Bus} = 333V I _D = 163A R _G = 1Ω		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} = 15V, V _{Bus} = 333V I _D = 163A, R _G = 1Ω		3020		μJ
E _{off}	Turn-off Switching Energy			2904		
E _{on}	Turn-on Switching Energy	Inductive switching @ 125°C V _{GS} = 15V, V _{Bus} = 333V I _D = 163A, R _G = 1Ω		4964		μJ
E _{off}	Turn-off Switching Energy			3384		

Chopper diode ratings and characteristics

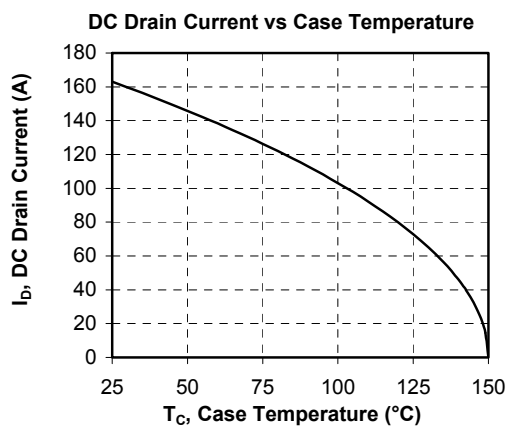
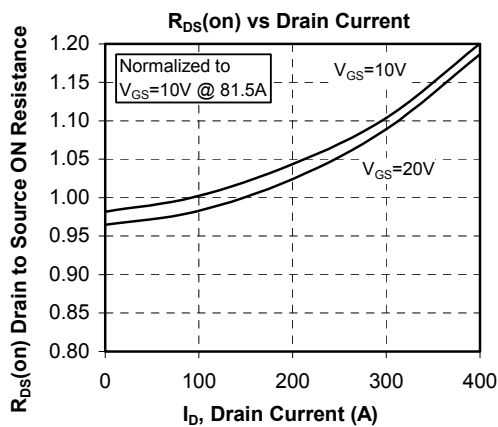
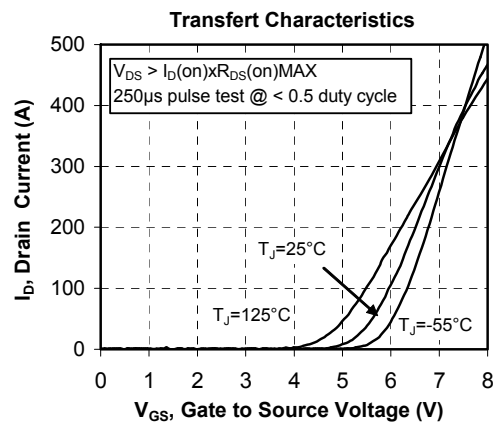
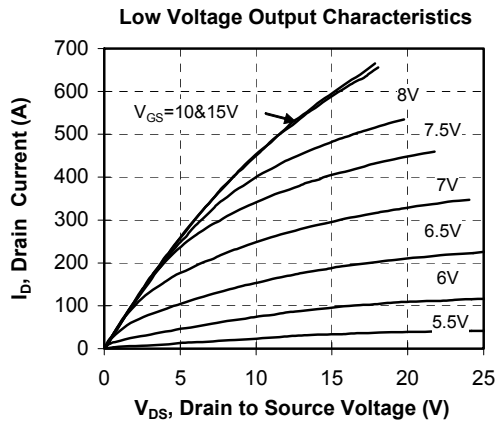
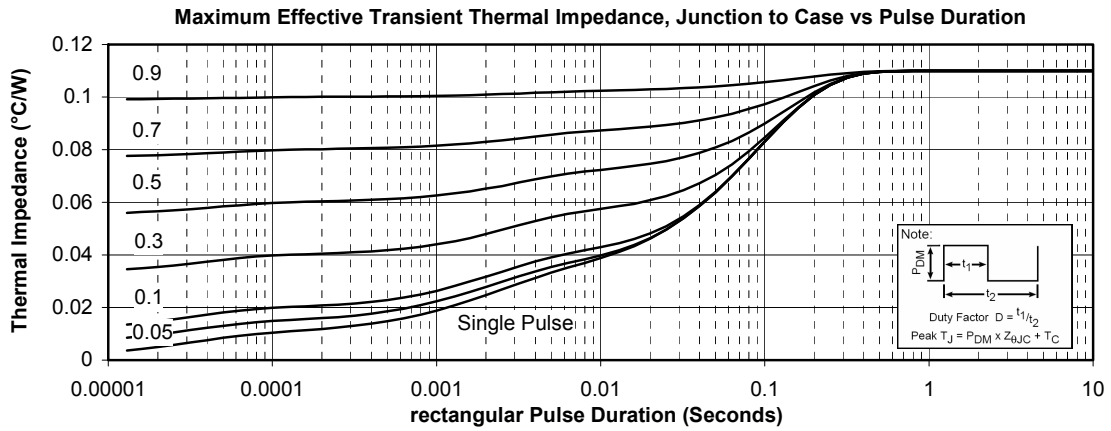
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V _{RRM}	Maximum Peak Repetitive Reverse Voltage		600			V
I _{RM}	Maximum Reverse Leakage Current	V _R = 600V	T _j = 25°C		350	μA
			T _j = 125°C		600	
I _F	DC Forward Current	T _c = 70°C		120		A
V _F	Diode Forward Voltage	I _F = 120A		1.6	1.8	V
		I _F = 240A		1.9		
		I _F = 120A	T _j = 125°C		1.4	
t _{rr}	Reverse Recovery Time	I _F = 120A V _R = 400V di/dt = 400A/μs	T _j = 25°C		130	ns
			T _j = 125°C		170	
Q _{rr}	Reverse Recovery Charge	I _F = 120A V _R = 400V di/dt = 400A/μs	T _j = 25°C		440	nC
			T _j = 125°C		1840	

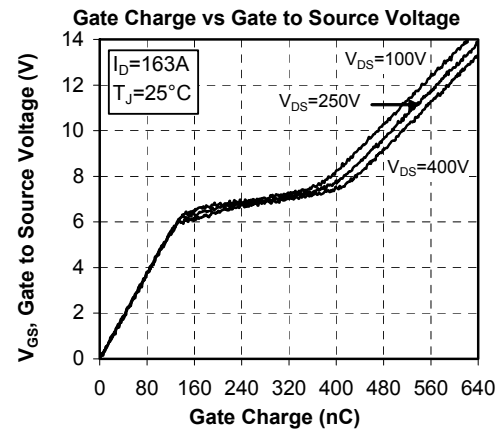
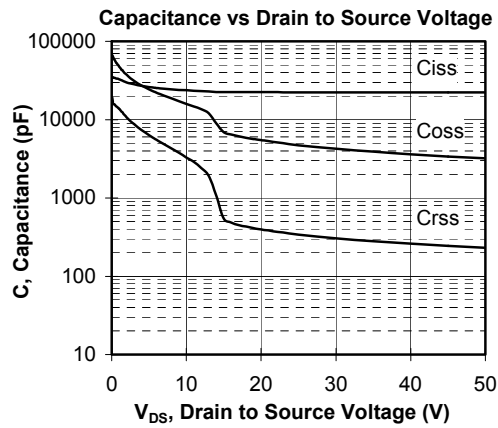
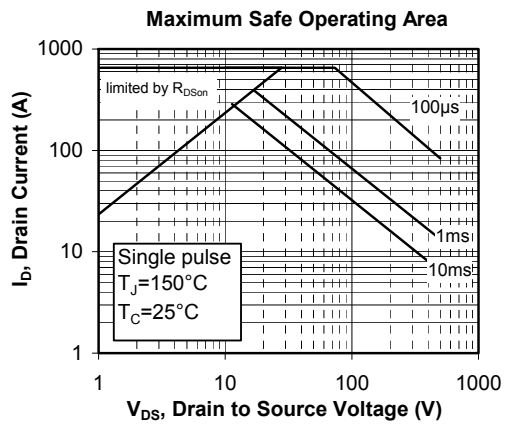
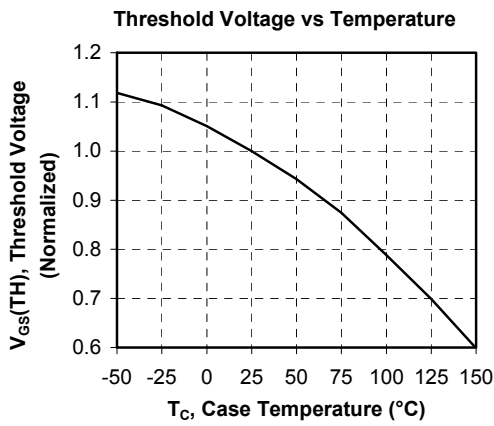
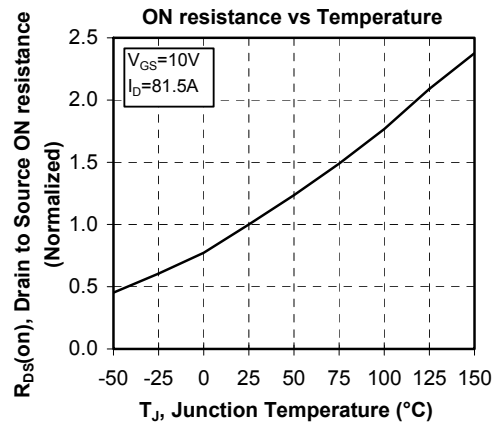
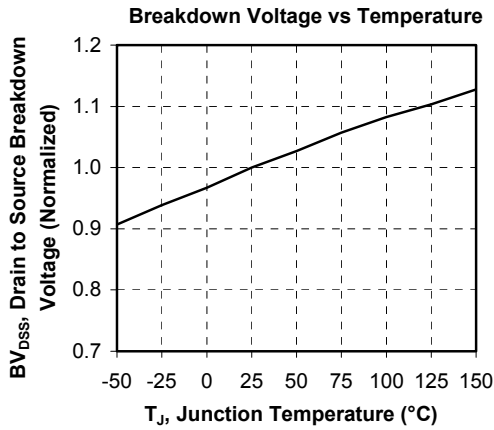
Thermal and package characteristics

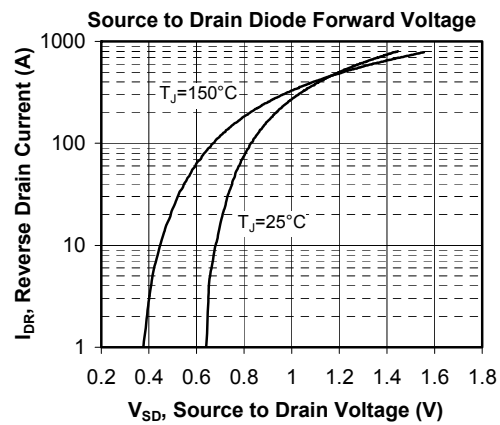
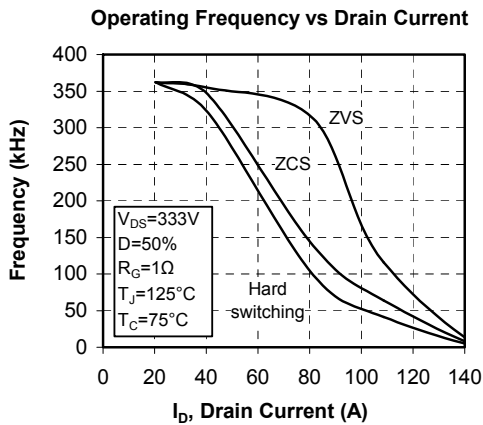
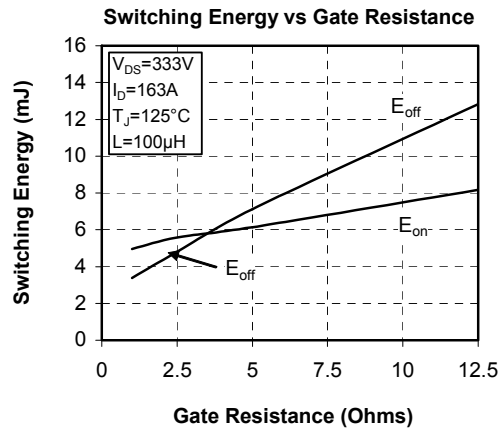
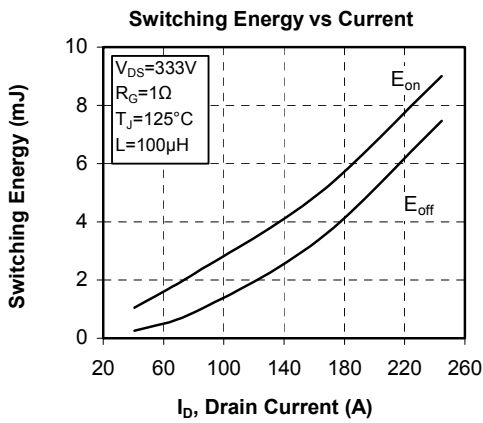
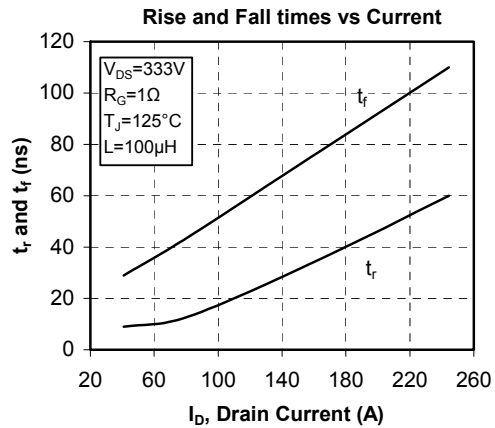
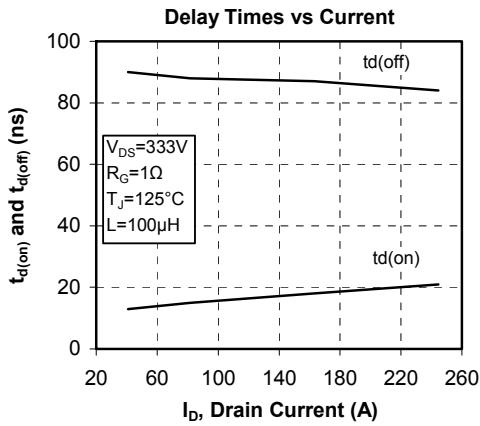
Symbol	Characteristic		Min	Typ	Max	Unit
R _{thJC}	Junction to Case Thermal Resistance	Transistor			0.11	°C/W
		Diode			0.46	
V _{ISOL}	RMS Isolation Voltage, any terminal to case t=1 min, 50/60Hz		4000			V
T _J	Operating junction temperature range		-40		150	°C
T _{STG}	Storage Temperature Range		-40		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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