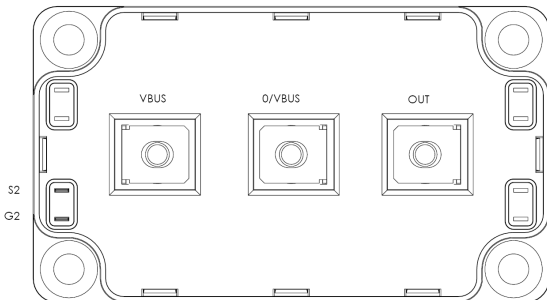
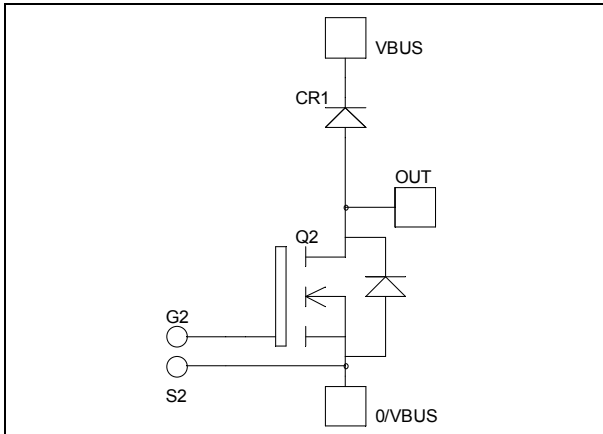


Boost chopper MOSFET Power Module

$V_{DSS} = 100V$
 $R_{DSon} = 2.25m\Omega \text{ typ @ } T_j = 25^\circ C$
 $I_D = 495A \text{ @ } T_c = 25^\circ C$



Application

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

Features


- Power MOS V[®] 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	100	V
I_D	Continuous Drain Current	$T_c = 25^\circ C$	495
		$T_c = 80^\circ C$	370
I_{DM}	Pulsed Drain current	1900	A
V_{GS}	Gate - Source Voltage	± 30	V
R_{DSon}	Drain - Source ON Resistance	2.5	$m\Omega$
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	1250
I_{AR}	Avalanche current (repetitive and non repetitive)	100	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	$V_{GS} = 0V, V_{DS} = 100V$			400	μA
		$V_{GS} = 0V, V_{DS} = 80V$	$T_j = 25^\circ\text{C}$		2000	
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10V, I_D = 200A$		2.25	2.5	$\text{m}\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 10\text{mA}$	2		4	V
I_{GSS}	Gate – Source Leakage Current	$V_{GS} = \pm 30V, V_{DS} = 0V$			± 400	nA

Dynamic Characteristics

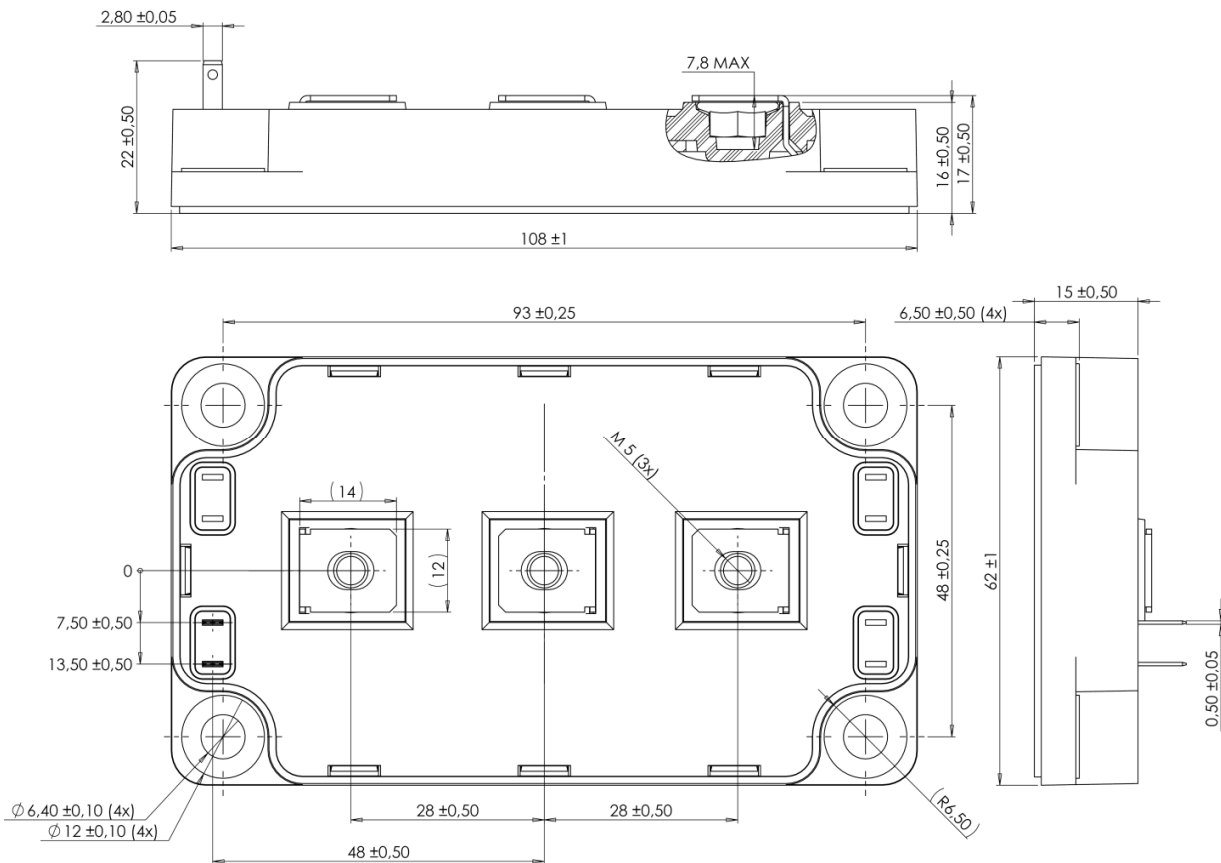
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{iss}	Input Capacitance	$V_{GS} = 0V$		40		nF
C_{oss}	Output Capacitance	$V_{DS} = 25V$		15.7		
C_{rss}	Reverse Transfer Capacitance	$f = 1\text{MHz}$		5.9		
Q_g	Total gate Charge	$V_{GS} = 10V$ $V_{Bus} = 50V$ $I_D = 400A$		1360		nC
Q_{gs}	Gate – Source Charge			240		
Q_{gd}	Gate – Drain Charge			720		
$T_{d(on)}$	Turn-on Delay Time	Inductive switching @ 125°C $V_{GS} = 15V$ $V_{Bus} = 66V$ $I_D = 400A$ $R_G = 1.25\Omega$		160		ns
T_r	Rise Time			240		
$T_{d(off)}$	Turn-off Delay Time			500		
T_f	Fall Time			160		
E_{on}	Turn-on Switching Energy	Inductive switching @ 25°C $V_{GS} = 15V, V_{Bus} = 66V$ $I_D = 400A, R_G = 1.25\Omega$		2.2		mJ
E_{off}	Turn-off Switching Energy			2.41		
E_{on}	Turn-on Switching Energy	Inductive switching @ 125°C $V_{GS} = 15V, V_{Bus} = 66V$ $I_D = 400A, R_G = 1.25\Omega$		2.43		mJ
E_{off}	Turn-off Switching Energy			2.56		

Chopper diode ratings and characteristics

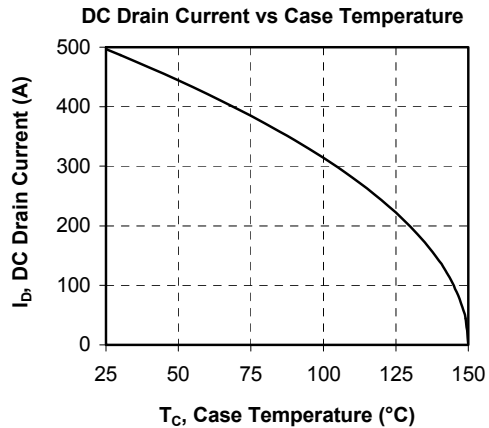
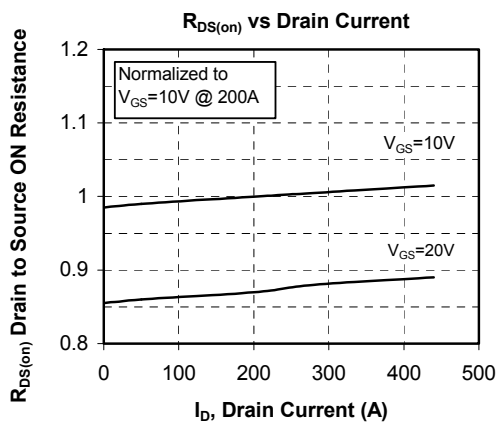
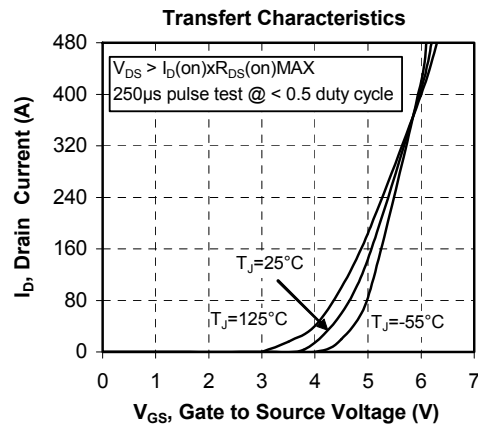
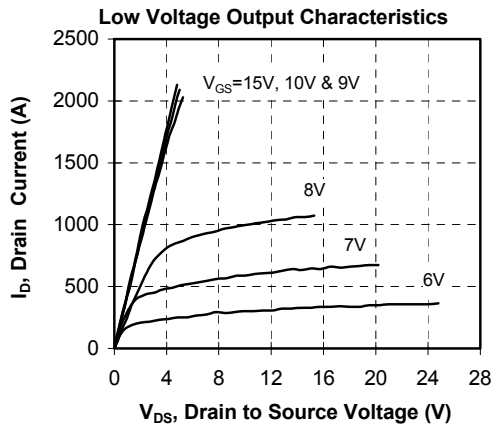
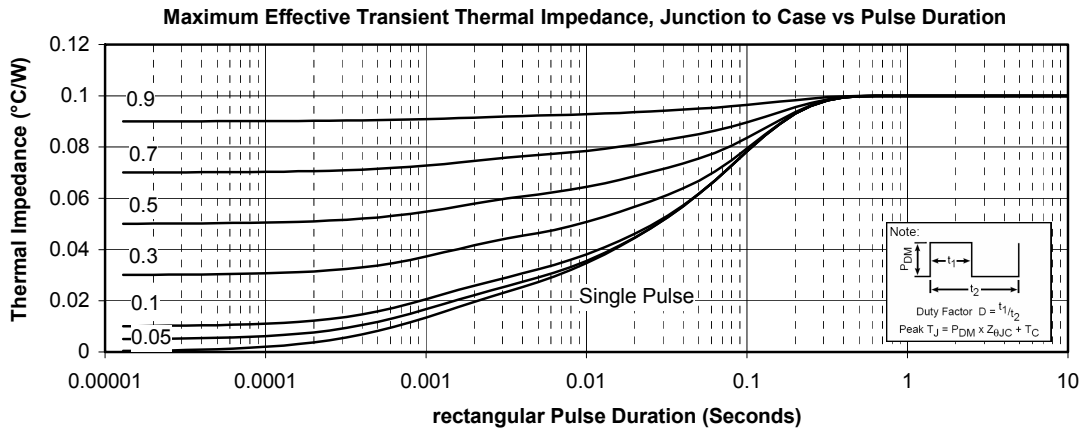
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Maximum Peak Repetitive Reverse Voltage		200			V
I_{RM}	Maximum Reverse Leakage Current	$V_R = 200V$	$T_j = 25^\circ\text{C}$		750	μA
			$T_j = 125^\circ\text{C}$		1000	
I_F	DC Forward Current	$T_c = 80^\circ\text{C}$		400		A
V_F	Diode Forward Voltage	$I_F = 400A$		1		V
		$I_F = 800A$		1.4		
		$I_F = 400A$	$T_j = 125^\circ\text{C}$		0.9	
t_{rr}	Reverse Recovery Time	$I_F = 400A$ $V_R = 133V$ $di/dt = 800A/\mu\text{s}$	$T_j = 25^\circ\text{C}$		60	ns
			$T_j = 125^\circ\text{C}$		110	
Q_{rr}	Reverse Recovery Charge	$I_F = 400A$ $V_R = 133V$ $di/dt = 800A/\mu\text{s}$	$T_j = 25^\circ\text{C}$		800	nC
			$T_j = 125^\circ\text{C}$		3360	

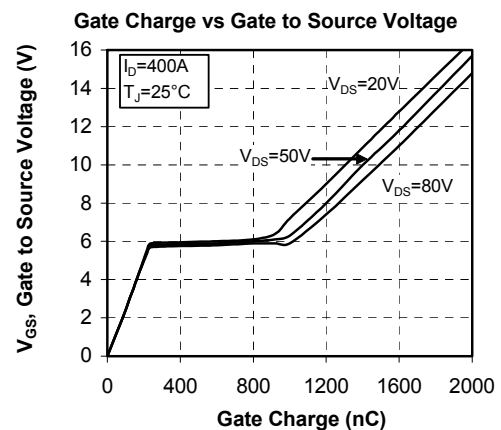
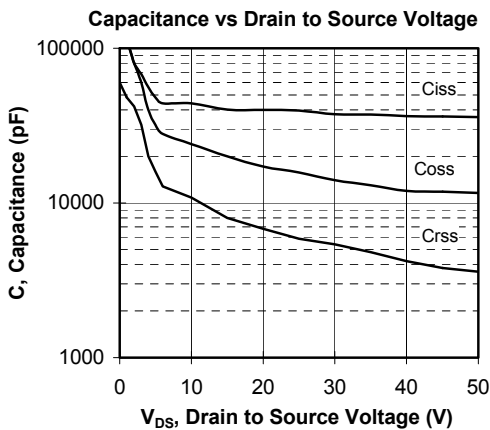
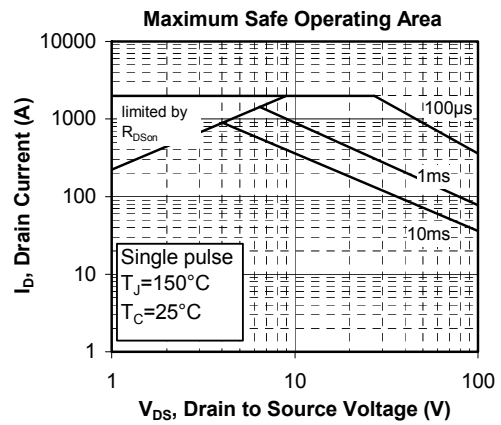
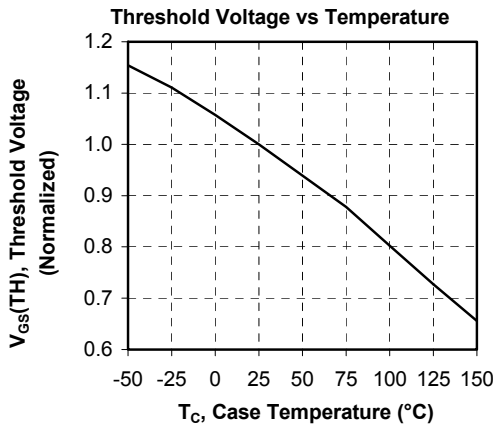
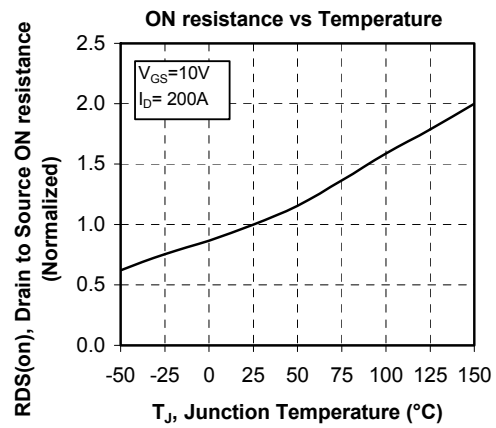
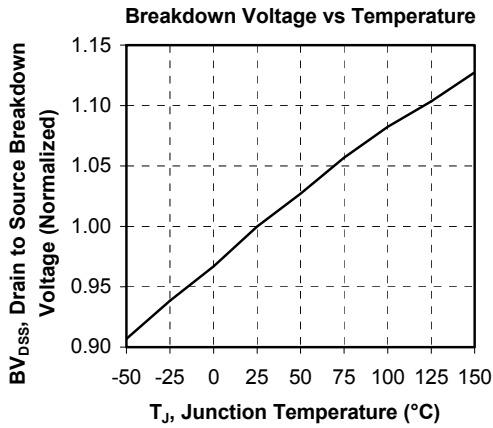
Thermal and package characteristics

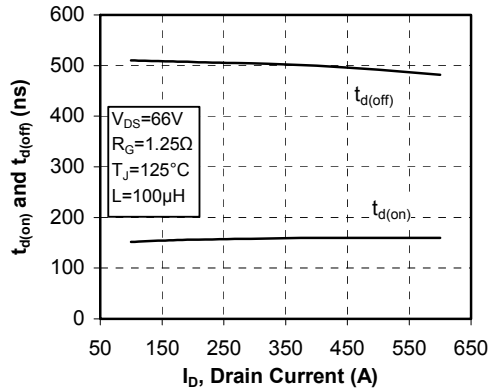
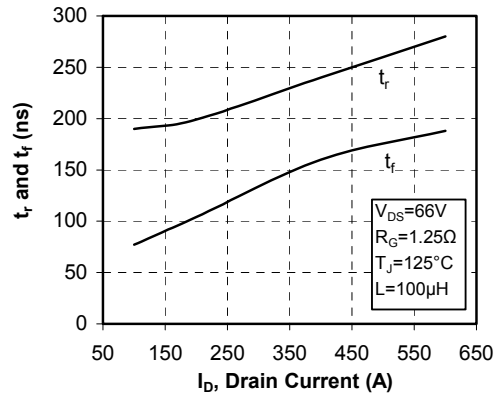
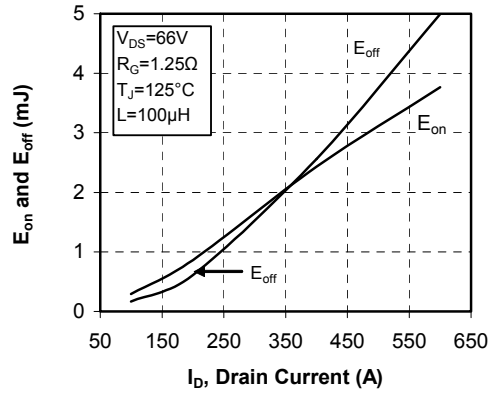
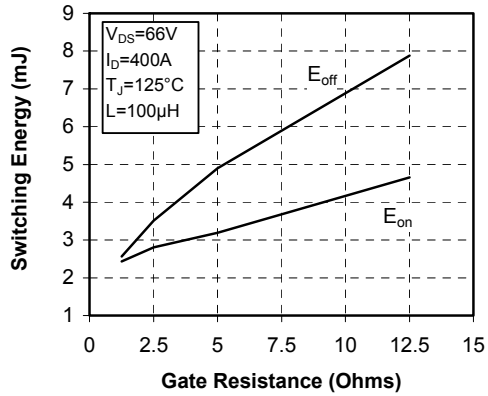
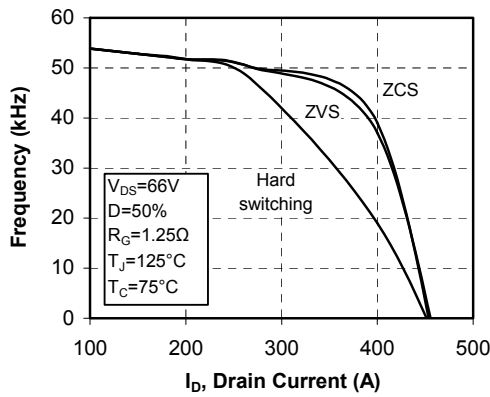
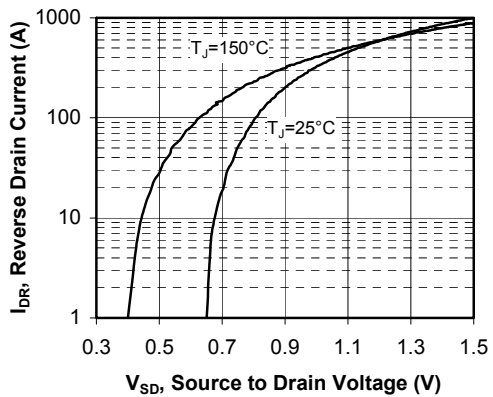
Symbol	Characteristic		Min	Typ	Max	Unit
R _{thJC}	Junction to Case Thermal Resistance	Transistor			0.1	°C/W
		Diode			0.14	
V _{ISOL}	RMS Isolation Voltage, any terminal to case t=1 min, 50/60Hz		4000			V
T _J	Operating junction temperature range		-40		150	°C
T _{STG}	Storage Temperature Range		-40		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




Delay Times vs Current

Rise and Fall times vs Current

Switching Energy vs Current

Switching Energy vs Gate Resistance

Operating Frequency vs Drain Current

Source to Drain Diode Forward Voltage


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