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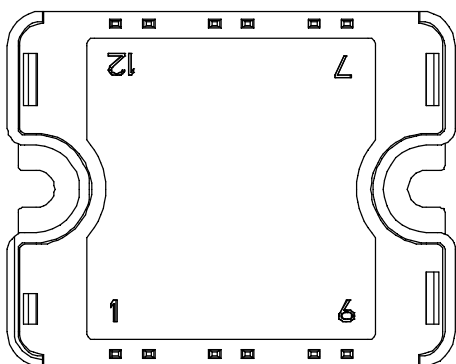
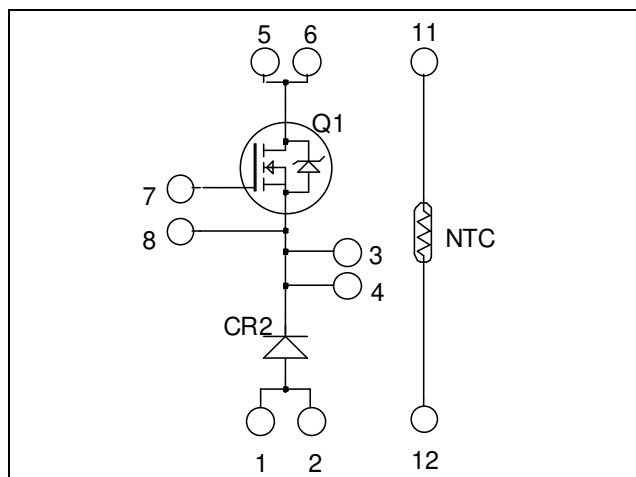


Buck chopper MOSFET Power Module

$V_{DSS} = 1200V$

$R_{DSon} = 680m\Omega$ typ @ $T_j = 25^\circ C$

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



Pins 1/2 ; 3/4 ; 5/6 must be shorted together

Application

- AC and DC motor control
- Switched Mode Power Supplies

Features

- Power MOS 8TM MOSFETs
 - Low R_{DSon}
 - Low input and Miller capacitance
 - Low gate charge
 - Avalanche energy rated
 - Very rugged
- Very low stray inductance
- 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
- RoHS Compliant

Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{DSS}	Drain - Source Breakdown Voltage	1200	V
I_D	Continuous Drain Current	$T_c = 25^\circ C$	15
		$T_c = 80^\circ C$	11
I_{DM}	Pulsed Drain current	90	A
V_{GS}	Gate - Source Voltage	± 30	V
R_{DSon}	Drain - Source ON Resistance	816	m Ω
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	357
I_{AR}	Avalanche current (repetitive and non repetitive)	12	A



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	$V_{DS} = 1200\text{V}$ $V_{GS} = 0\text{V}$	$T_j = 25^\circ\text{C}$		100	μA
			$T_j = 125^\circ\text{C}$		500	
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10\text{V}, I_D = 12\text{A}$		680	816	$\text{m}\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 2.5\text{mA}$	3	4	5	V
I_{GSS}	Gate – Source Leakage Current	$V_{GS} = \pm 30\text{V}$			± 100	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{iss}	Input Capacitance	$V_{GS} = 0\text{V}$		6696		pF
C_{oss}	Output Capacitance	$V_{DS} = 25\text{V}$		615		
C_{rss}	Reverse Transfer Capacitance	$f = 1\text{MHz}$		80		
Q_g	Total gate Charge	$V_{GS} = 10\text{V}$		260		nC
Q_{gs}	Gate – Source Charge	$V_{Bus} = 600\text{V}$		42		
Q_{gd}	Gate – Drain Charge	$I_D = 12\text{A}$		120		
$T_{d(on)}$	Turn-on Delay Time	Resistive switching @ 25°C $V_{GS} = 15\text{V}$ $V_{Bus} = 800\text{V}$ $I_D = 12\text{A}$ $R_G = 2.2\Omega$		45		ns
T_r	Rise Time			27		
$T_{d(off)}$	Turn-off Delay Time			145		
T_f	Fall Time			42		

Chopper diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Maximum Peak Repetitive Reverse Voltage		1200			V
I_{RM}	Maximum Reverse Leakage Current	$V_R = 1200\text{V}$	$T_j = 25^\circ\text{C}$		100	μA
			$T_j = 125^\circ\text{C}$		500	
I_F	DC Forward Current	$T_c = 80^\circ\text{C}$		30		A
V_F	Diode Forward Voltage	$I_F = 30\text{A}$		2.6	3.1	V
		$I_F = 60\text{A}$		3.2		
		$I_F = 30\text{A}, T_j = 125^\circ\text{C}$		1.8		
t_{rr}	Reverse Recovery Time	$I_F = 30\text{A}$ $V_R = 800\text{V}$ $di/dt = 200\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$	300		ns
			$T_j = 125^\circ\text{C}$	380		
Q_{rr}	Reverse Recovery Charge		$T_j = 25^\circ\text{C}$	360		nC
			$T_j = 125^\circ\text{C}$	1700		

Thermal and package characteristics

Symbol	Characteristic			Min	Typ	Max	Unit
R _{thJC}	Junction to Case Thermal Resistance		Transistor			0.35	°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					80	g

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

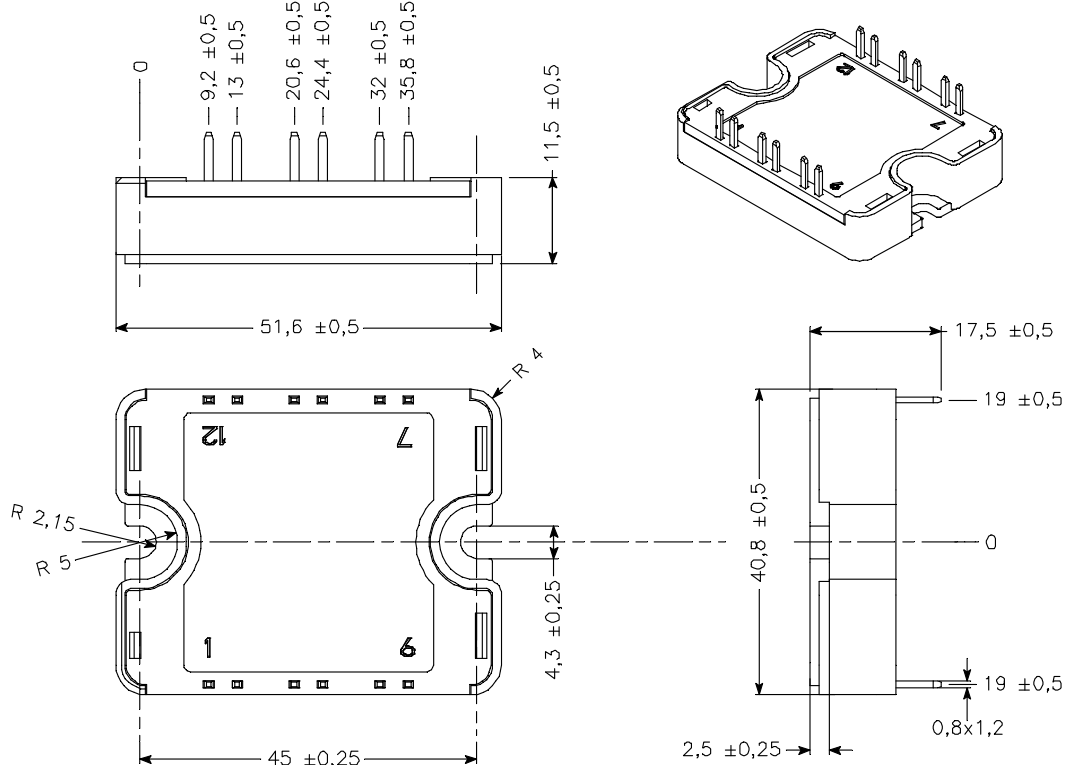
Symbol Characteristic

		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

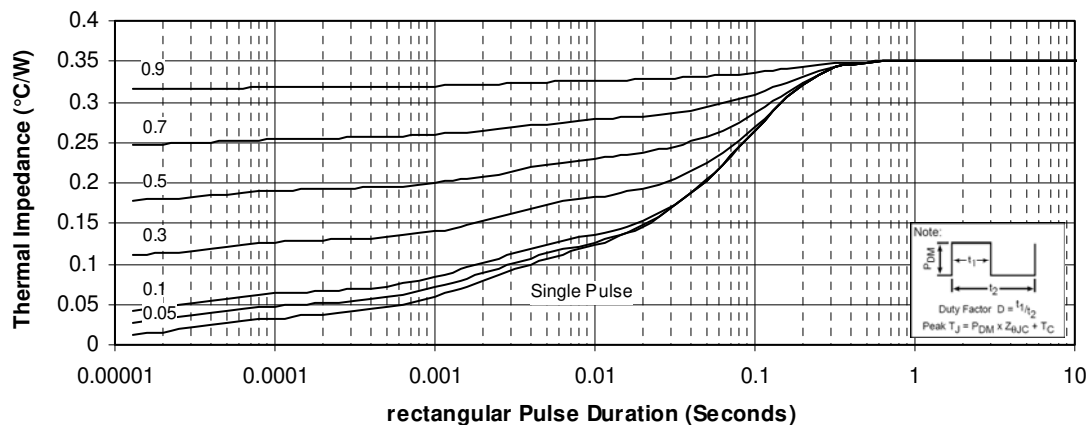
SP1 Package outline (dimensions in mm)



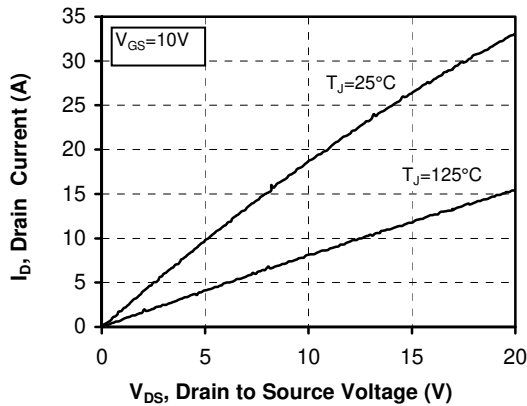
See application note 1904 - Mounting Instructions for SP1 Power Modules on www.microsemi.com

Typical Mosfet Performance Curve

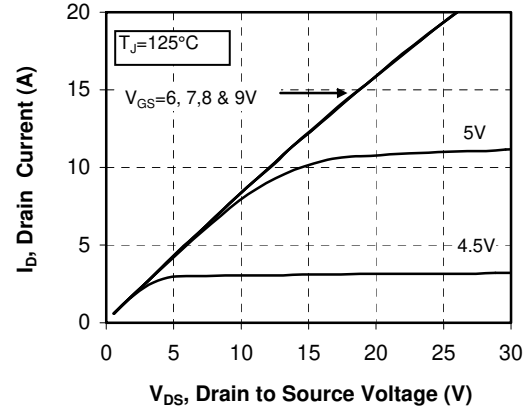
Maximum Effective Transient Thermal Impedance, Junction to Case vs Pulse Duration



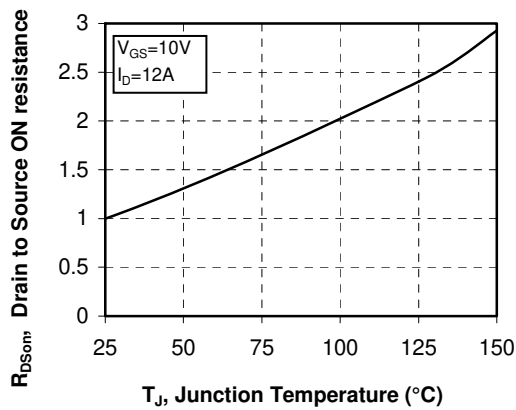
Low Voltage Output Characteristics



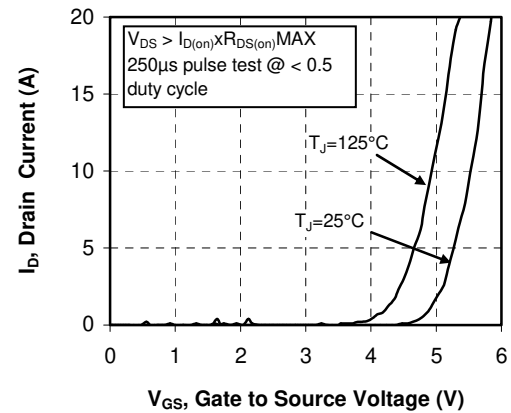
Low Voltage Output Characteristics



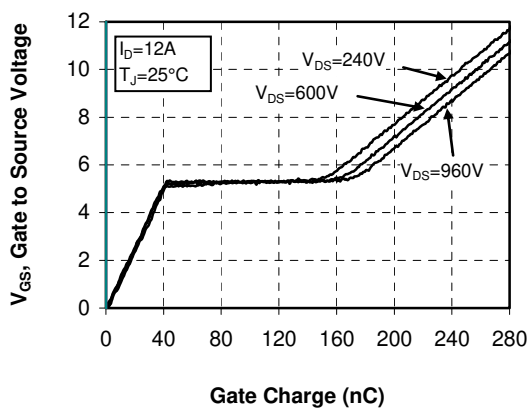
Normalized $R_{DS(on)}$ vs. Temperature



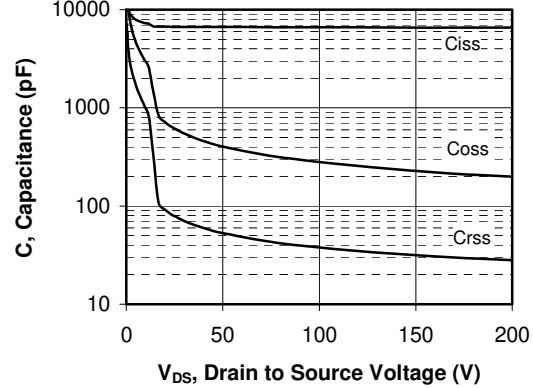
Transfer Characteristics



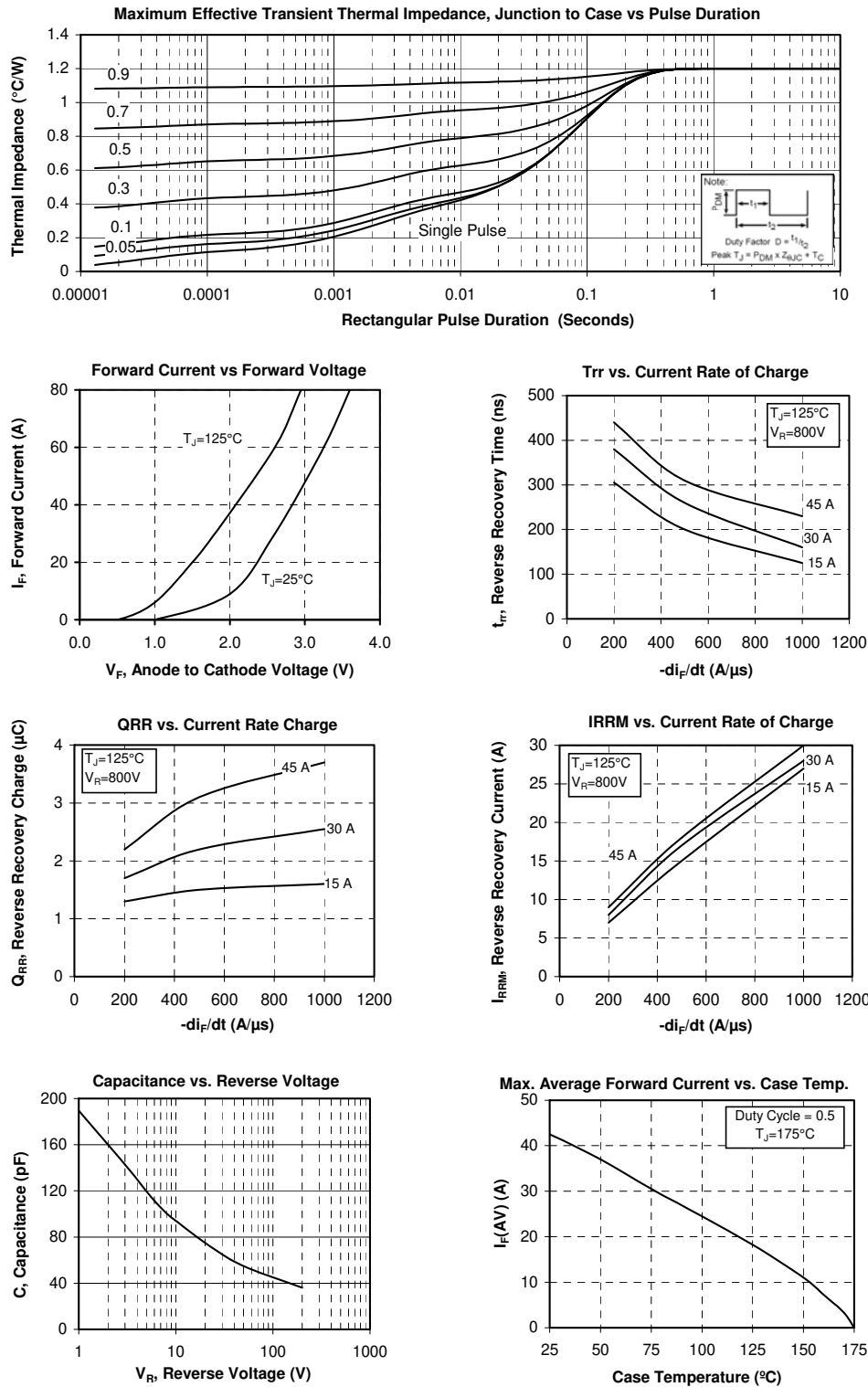
Gate Charge vs Gate to Source



Capacitance vs Drain to Source Voltage



Typical Diode Performance Curve



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Microsemi's products are covered by one or more of U.S. patents 4,895,810 5,045,903 5,089,434 5,182,234 5,019,522 5,262,336 6,503,786 5,256,583 4,748,103 5,283,202 5,231,474 5,434,095 5,528,058 and foreign patents. U.S. and Foreign patents pending. All Rights Reserved.