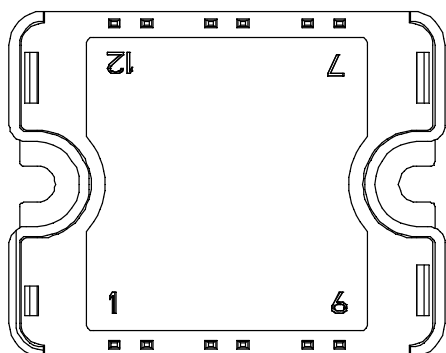
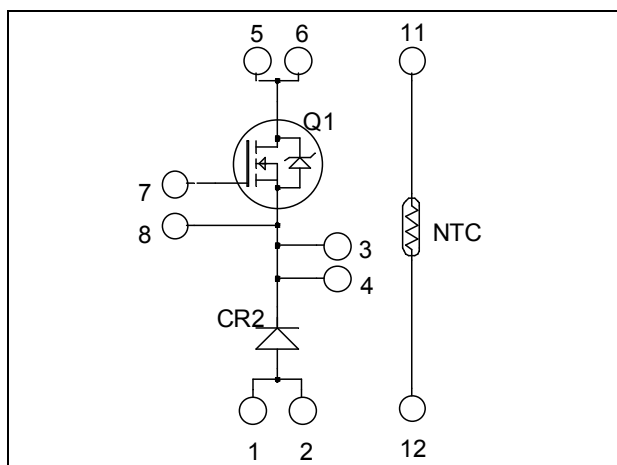


Buck chopper MOSFET Power Module

$V_{DSS} = 1000V$
 $R_{DSon} = 330m\Omega$ typ @ $T_j = 25^\circ C$
 $I_D = 23A$ @ $T_c = 25^\circ C$



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

Application

- AC and DC motor control
- Switched Mode Power Supplies

Features

- Power MOS 8™ 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	1000	V
I_D	Continuous Drain Current	$T_c = 25^\circ C$	23
		$T_c = 80^\circ C$	17
I_{DM}	Pulsed Drain current	140	A
V_{GS}	Gate - Source Voltage	± 30	V
R_{DSon}	Drain - Source ON Resistance	396	m Ω
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	390
I_{AR}	Avalanche current (repetitive and non repetitive)	18	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	$V_{DS} = 1000\text{V}$ $V_{GS} = 0\text{V}$			100	μA
		$T_j = 125^\circ\text{C}$			500	
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10\text{V}$, $I_D = 18\text{A}$		330	396	$\text{m}\Omega$
$V_{GS(th)}$	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	$V_{GS} = 0\text{V}$		7868		pF
C_{oss}	Output Capacitance	$V_{DS} = 25\text{V}$		825		
C_{rss}	Reverse Transfer Capacitance	$f = 1\text{MHz}$		104		
Q_g	Total gate Charge	$V_{GS} = 10\text{V}$		305		nC
Q_{gs}	Gate – Source Charge	$V_{Bus} = 500\text{V}$		55		
Q_{gd}	Gate – Drain Charge	$I_D = 18\text{A}$		145		
$T_{d(on)}$	Turn-on Delay Time	Resistive switching @ 25°C $V_{GS} = 15\text{V}$ $V_{Bus} = 667\text{V}$ $I_D = 18\text{A}$ $R_G = 2.2\Omega$		44		ns
T_r	Rise Time			40		
$T_{d(off)}$	Turn-off Delay Time			150		
T_f	Fall Time			38		

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	$V_R = 1200\text{V}$			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	$I_F = 30\text{A}$, $T_j = 25^\circ\text{C}$		300		ns
		$T_j = 125^\circ\text{C}$		380		
Q_{rr}	Reverse Recovery Charge	$V_R = 800\text{V}$, $di/dt = 200\text{A}/\mu\text{s}$, $T_j = 25^\circ\text{C}$		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			0.32	°C/W
			Diode			1.2	
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	M4	2		3	N.m
Wt	Package Weight					80	g

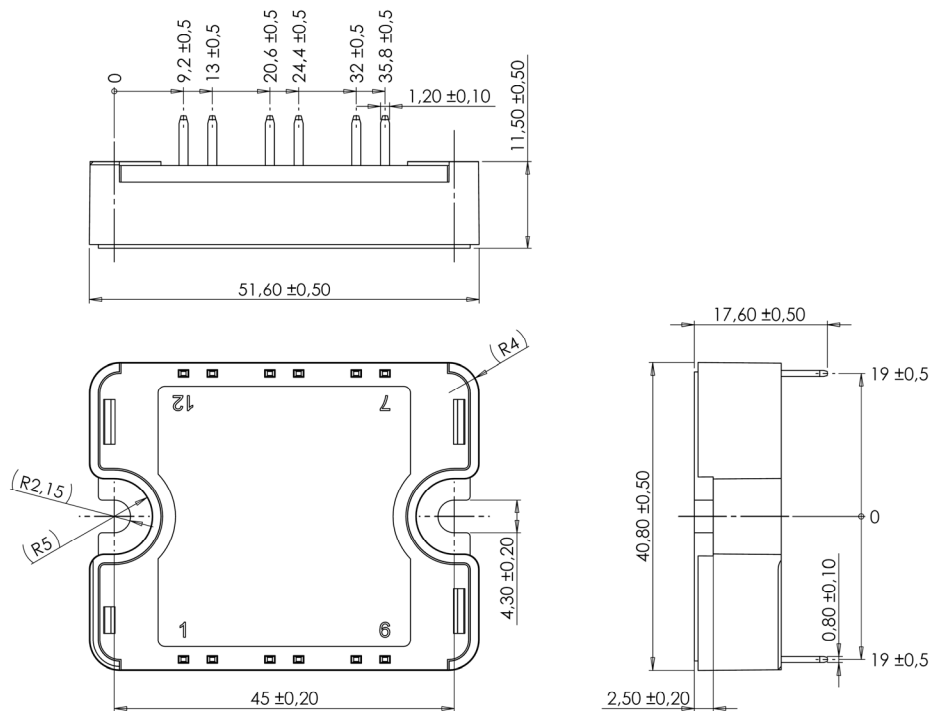
Temperature sensor NTC (see application note APT0406 on www.microsemi.com for more information).

Symbol	Characteristic	Min	Typ	Max	Unit
R ₂₅	Resistance @ 25°C		50		kΩ
B _{25/85}	T ₂₅ = 298.15 K		3952		K

$$R_T = \frac{R_{25}}{\exp \left[B_{25/85} \left(\frac{1}{T_{25}} - \frac{1}{T} \right) \right]}$$

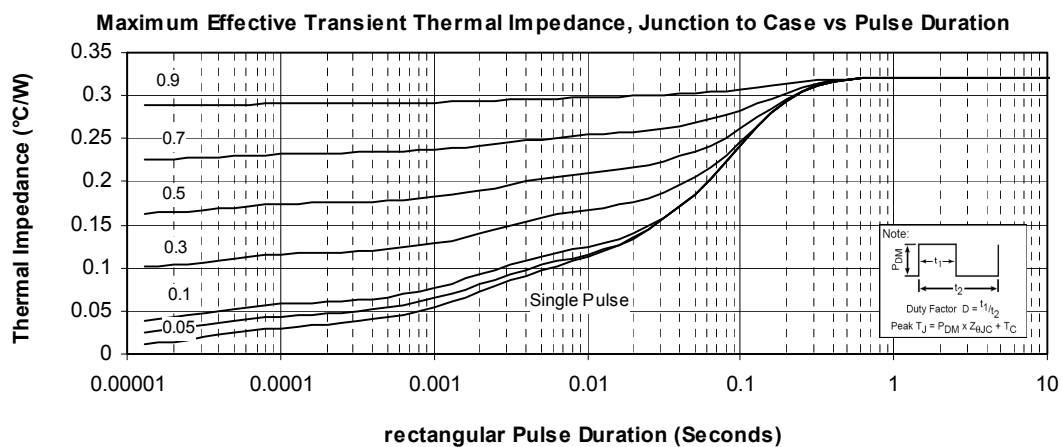
T: Thermistor temperature
 R_T: Thermistor value at T

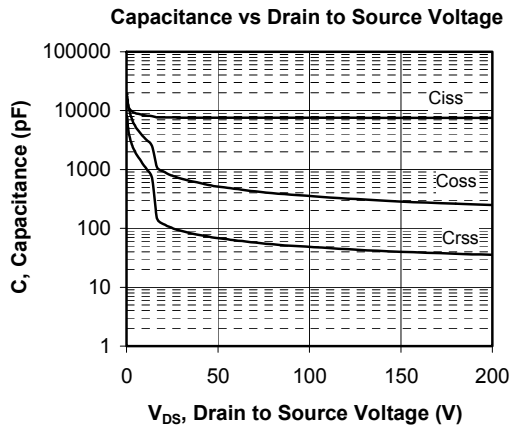
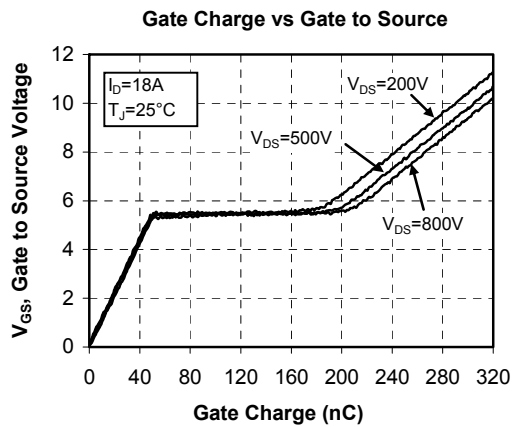
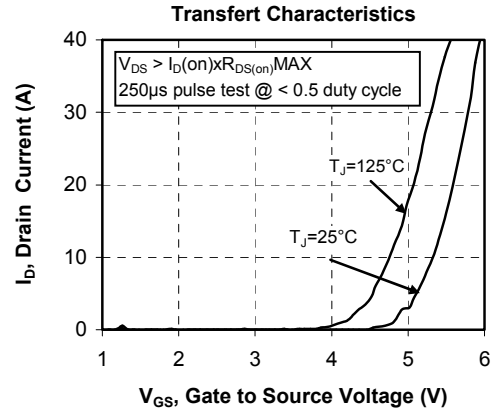
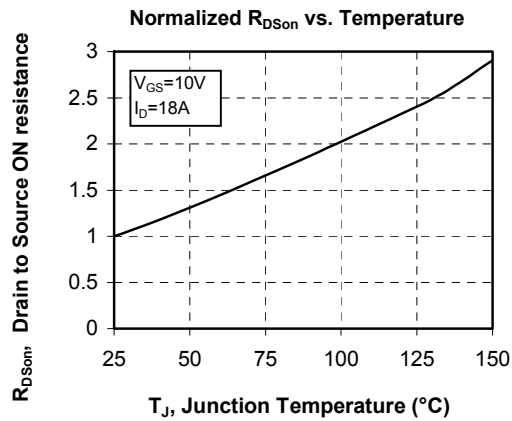
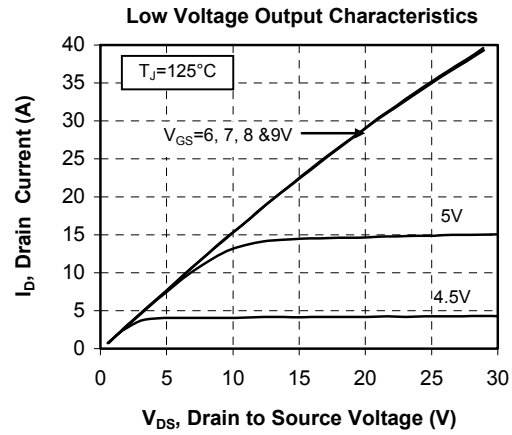
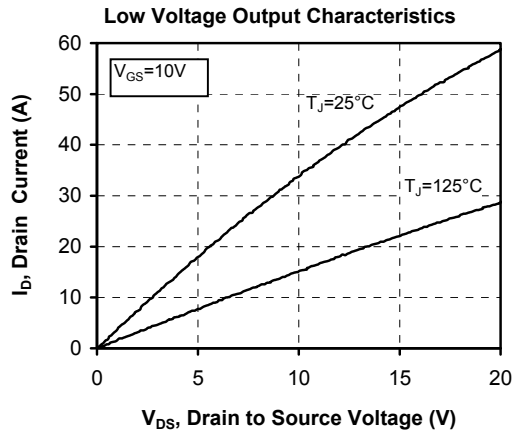
SP1 Package outline (dimensions in mm)



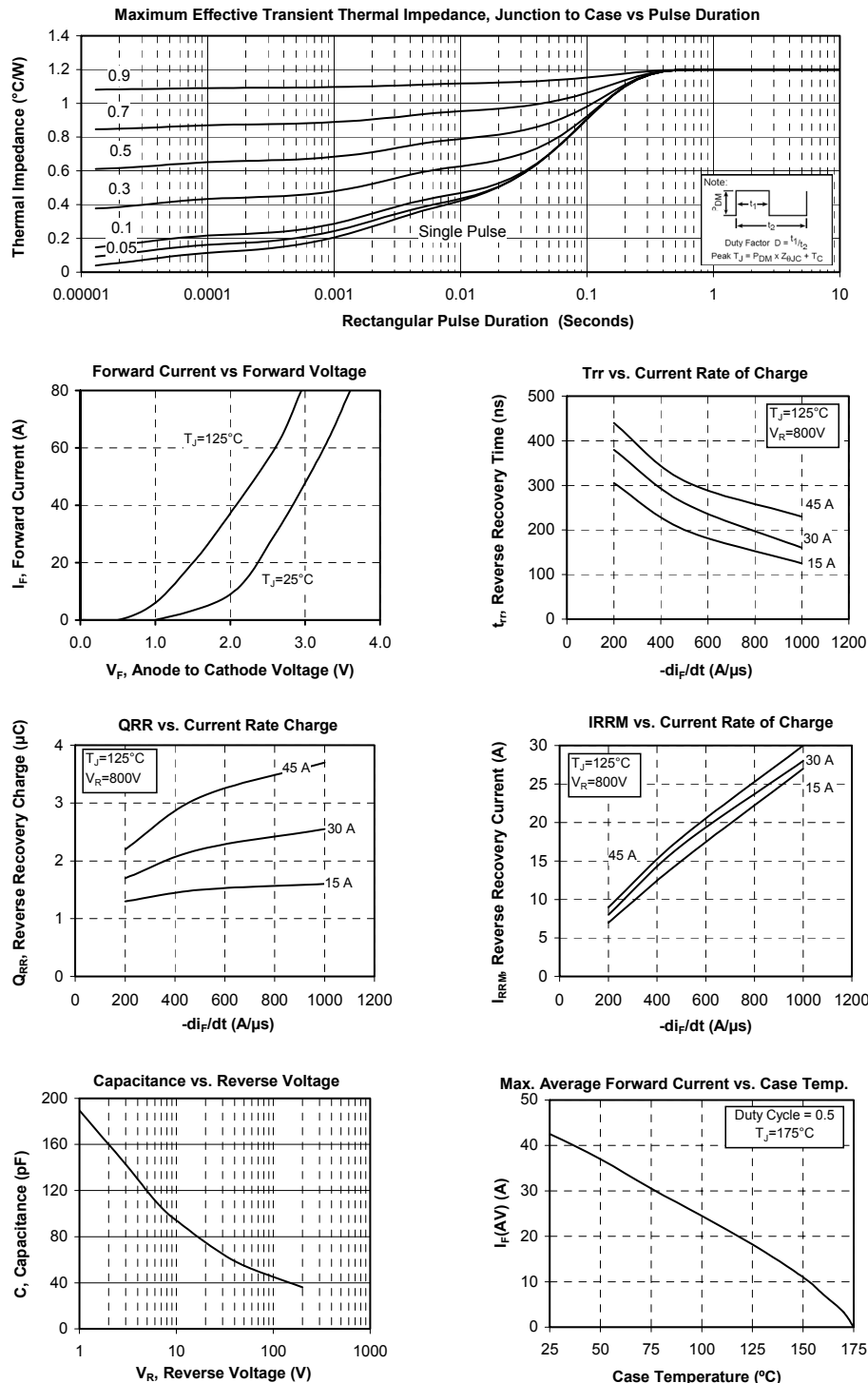
See application note 1904 - Mounting Instructions for SP1 Power Modules on www.microsemi.com

Typical Mosfet Performance Curve





Typical Diode Performance Curve



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