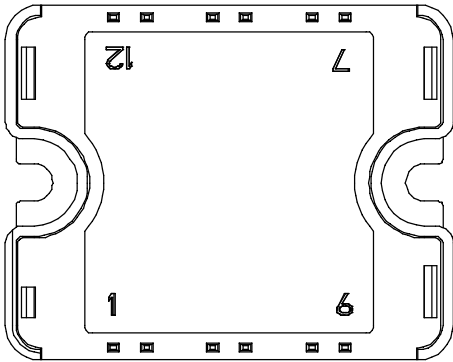
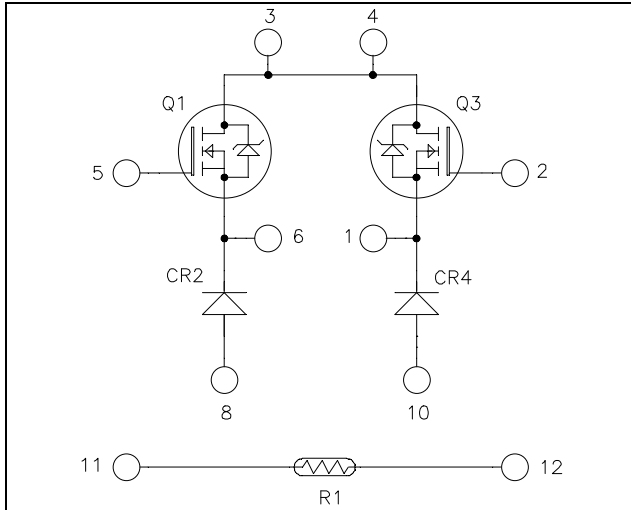


Dual Buck chopper Super Junction MOSFET Power Module

$V_{DSS} = 900V$
 $R_{DSon} = 120m\Omega \text{ max @ } T_j = 25^\circ C$
 $I_D = 30A \text{ @ } T_c = 25^\circ C$



Pins 3/4 must be shorted together

Application

- AC and DC motor control
- Switched Mode Power Supplies

Features

- **COOLMOS** Power Semiconductors
 - Ultra low R_{DSon}
 - Low Miller capacitance
 - Ultra low gate charge
 - Avalanche energy rated
 - Very rugged
- Very low stray inductance
 - Symmetrical design
- 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
- Each leg can be easily paralleled to achieve a single buck of twice the current capability
- RoHS Compliant

Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{DSS}	Drain - Source Breakdown Voltage	900	V
I_D	Continuous Drain Current	$T_c = 25^\circ C$	30
		$T_c = 80^\circ C$	23
I_{DM}	Pulsed Drain current	75	A
V_{GS}	Gate - Source Voltage	± 20	V
R_{DSon}	Drain - Source ON Resistance	120	$m\Omega$
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	250
I_{AR}	Avalanche current (repetitive and non repetitive)	8.8	A
E_{AR}	Repetitive Avalanche Energy	2.9	mJ
E_{AS}	Single Pulse Avalanche Energy	1940	

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	$V_{GS} = 0V, V_{DS} = 900V$	$T_j = 25^\circ\text{C}$			100	μA
		$V_{GS} = 0V, V_{DS} = 900V$	$T_j = 125^\circ\text{C}$		500		
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10V, I_D = 26A$		100	120	$\text{m}\Omega$	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 3\text{mA}$	2.5	3	3.5	V	
I_{GSS}	Gate – Source Leakage Current	$V_{GS} = \pm 20V, V_{DS} = 0V$			100	nA	

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{iss}	Input Capacitance	$V_{GS} = 0V; V_{DS} = 100V$ $f = 1\text{MHz}$		6.8		nF
C_{oss}	Output Capacitance			0.33		
Q_g	Total gate Charge	$V_{GS} = 10V$ $V_{Bus} = 400V$ $I_D = 26A$		270		nC
Q_{gs}	Gate – Source Charge			32		
Q_{gd}	Gate – Drain Charge			115		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (125°C) $V_{GS} = 10V$ $V_{Bus} = 600V$ $I_D = 26A$ $R_G = 7.5\Omega$		70		ns
T_r	Rise Time			20		
$T_{d(off)}$	Turn-off Delay Time			400		
T_f	Fall Time			25		
E_{on}	Turn-on Switching Energy	Inductive switching @ 25°C $V_{GS} = 10V; V_{Bus} = 600V$ $I_D = 26A; R_G = 7.5\Omega$		1.5		mJ
E_{off}	Turn-off Switching Energy			0.75		
E_{on}	Turn-on Switching Energy	Inductive switching @ 125°C $V_{GS} = 10V; V_{Bus} = 600V$ $I_D = 26A; R_G = 7.5\Omega$		2.1		mJ
E_{off}	Turn-off Switching Energy			0.85		

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	$V_R = 1200V$	$T_j = 25^\circ\text{C}$			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	$I_F = 30A$		2.6	3.1	V	
		$I_F = 60A$		3.2			
		$I_F = 30A$	$T_j = 125^\circ\text{C}$	1.8			
t_{rr}	Reverse Recovery Time	$I_F = 30A$ $V_R = 800V$ $di/dt = 200A/\mu\text{s}$	$T_j = 25^\circ\text{C}$	300		ns	
			$T_j = 125^\circ\text{C}$	380			
Q_{rr}	Reverse Recovery Charge	$I_F = 30A$ $V_R = 800V$ $di/dt = 200A/\mu\text{s}$	$T_j = 25^\circ\text{C}$	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	CoolMOS		0.50	°C/W	
		diode		1.2		
V _{ISOL}	RMS Isolation Voltage, any terminal to case t=1 min, I _{isol} <1mA, 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	2.5	4.7	N.m
Wt	Package Weight				80	g

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

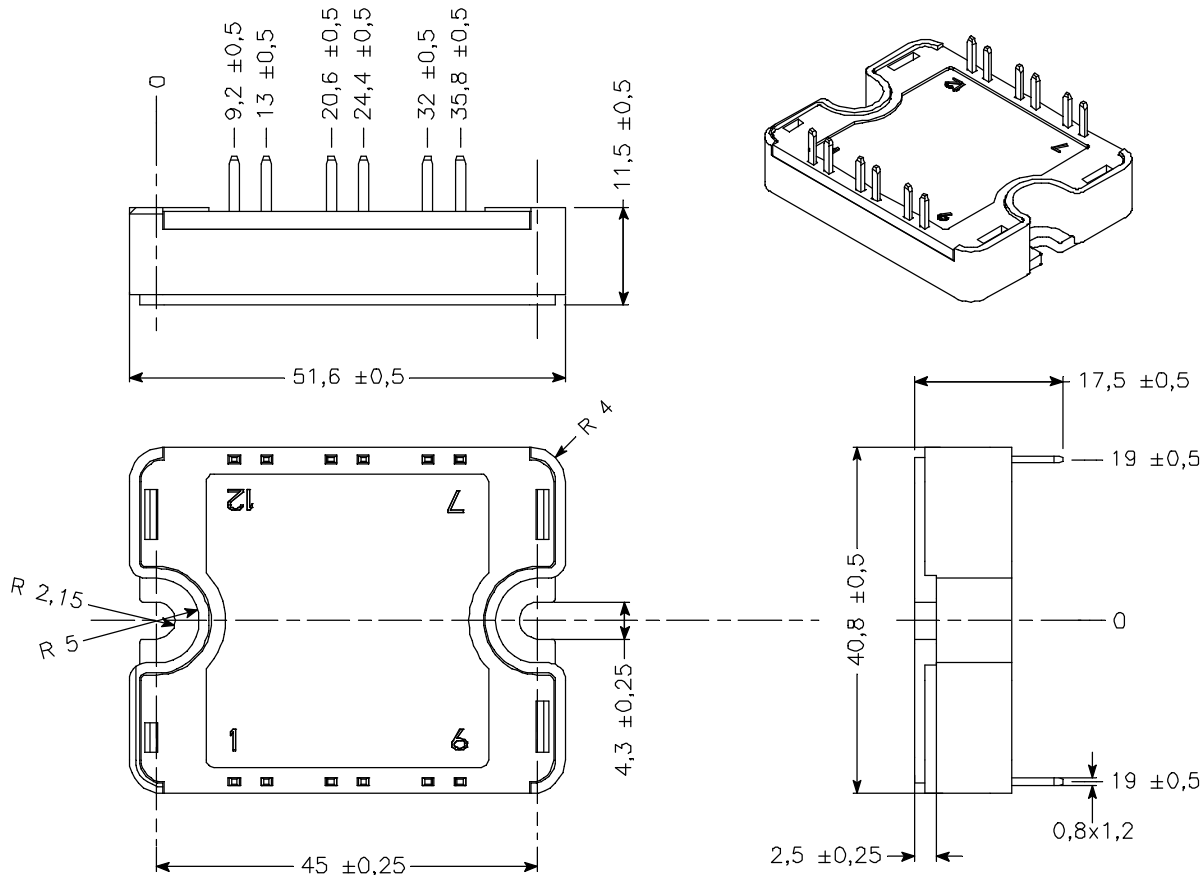
Symbol Characteristic

		Min	Typ	Max	Unit
R ₂₅	Resistance @ 25°C		50		kΩ
ΔR ₂₅ /R ₂₅			5		%
B _{25/85}	T ₂₅ = 298.15 K		3952		K
ΔB/B	T _C = 100°C		4		%

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

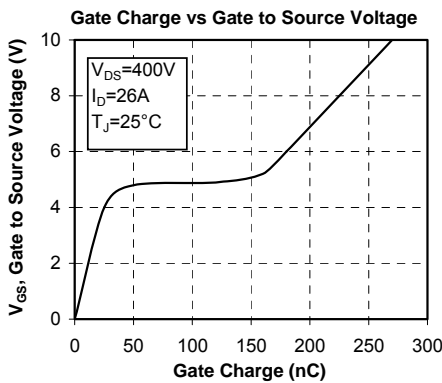
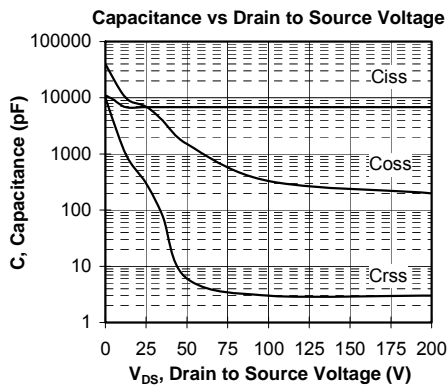
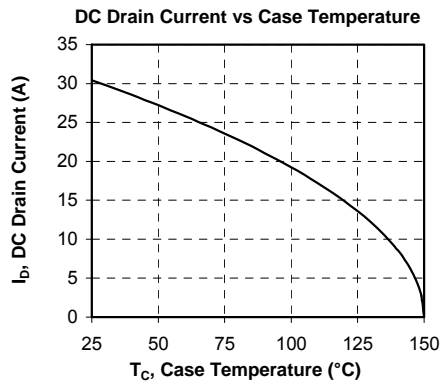
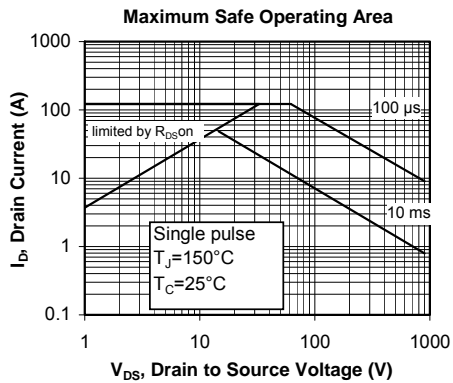
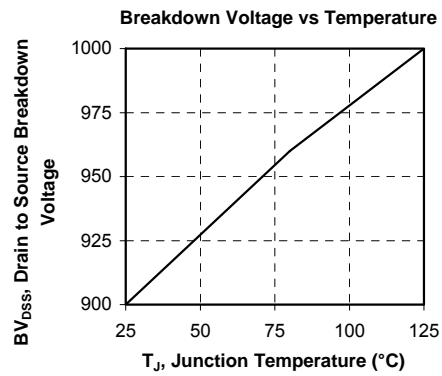
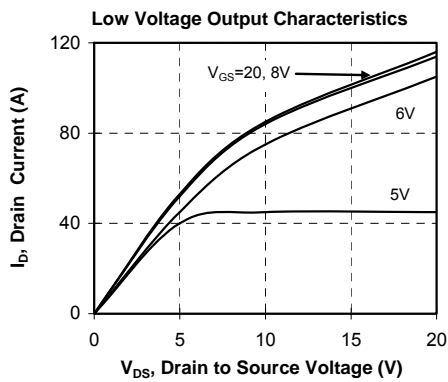
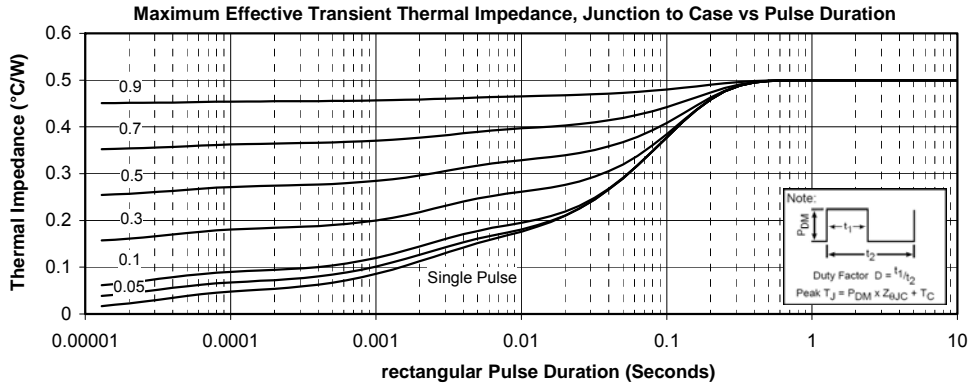
T: Thermistor temperature
 R_T: Thermistor value at T

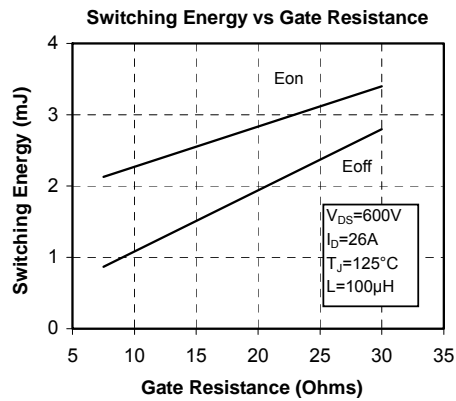
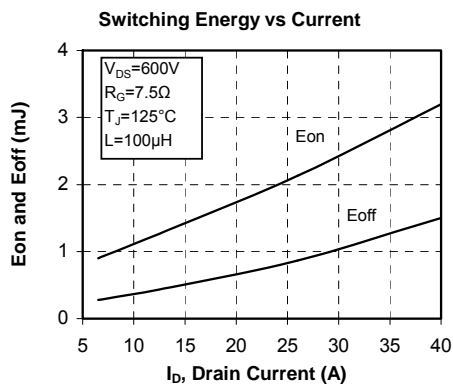
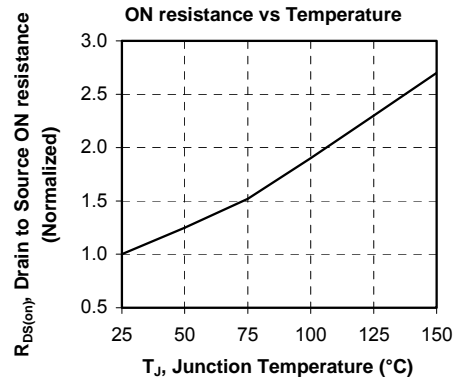
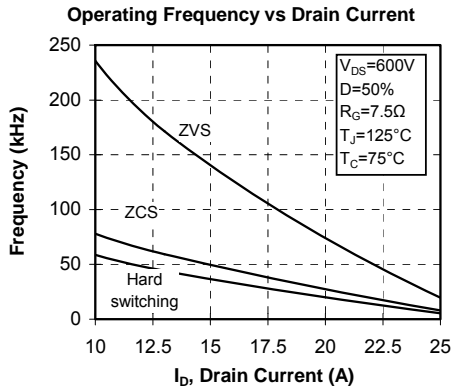
SP1 Package outline (dimensions in mm)



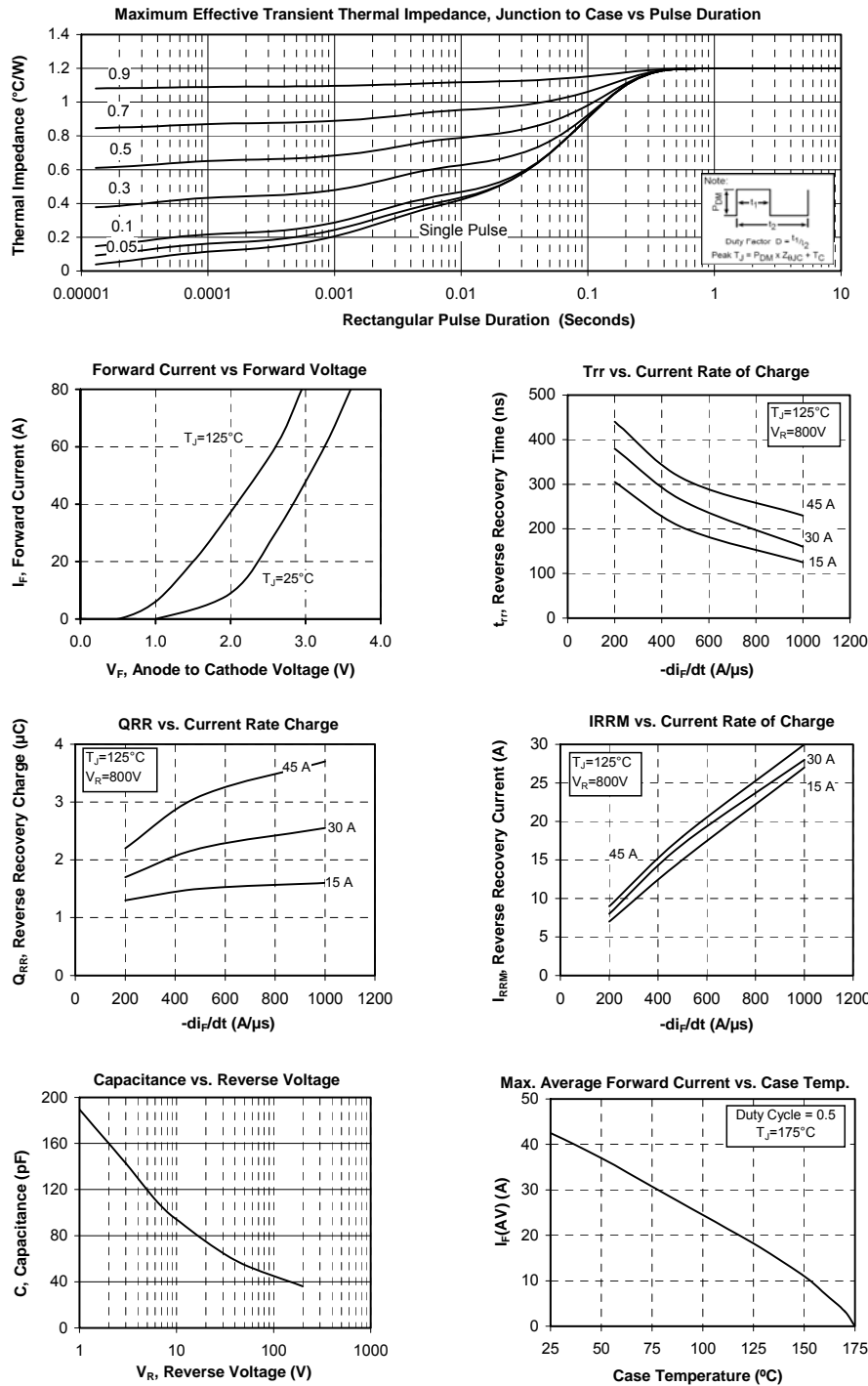
See application note 1904 - Mounting Instructions for SP1 Power Modules on www.microsemi.com

Typical CoolMOS performance Curve





Typical Chopper diode performance Curve



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