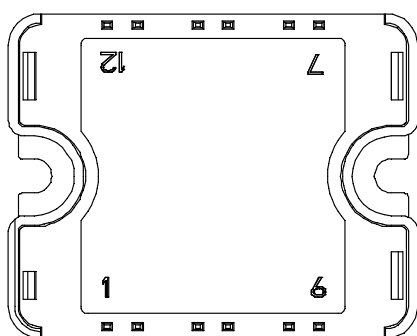
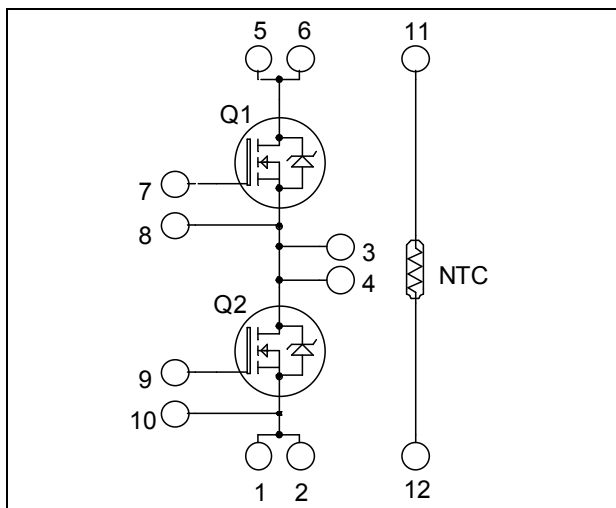


Phase leg Super Junction MOSFET Power Module

$$V_{DSS} = 900V$$

$$R_{DSon} = 60m\Omega \text{ max @ } T_j = 25^\circ C$$

$$I_D = 59A \text{ @ } T_c = 25^\circ C$$



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

Application

- Welding converters
- Switched Mode Power Supplies
- Uninterruptible Power Supplies
- Motor control

Features

- **COOLMOS**
Power Semiconductors
 - Ultra low R_{DSon}
 - Low Miller capacitance
 - Ultra low gate charge
 - Avalanche energy rated
 - Very rugged
- Kelvin source for easy drive
- 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
- RoHS Compliant

Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{DSS}	Drain - Source Breakdown Voltage	900	V
I_D	Continuous Drain Current	$T_c = 25^\circ C$	A
		$T_c = 80^\circ C$	
I_{DM}	Pulsed Drain current	150	
V_{GS}	Gate - Source Voltage	± 20	V
R_{DSon}	Drain - Source ON Resistance	60	m Ω
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	462 W
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	$V_{GS} = 0V, V_{DS} = 900V$ $T_j = 25^\circ\text{C}$			200	μA
		$V_{GS} = 0V, V_{DS} = 900V$ $T_j = 125^\circ\text{C}$		1000		
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10V, I_D = 52A$		50	60	$\text{m}\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 6\text{mA}$	2.5	3	3.5	V
I_{GSS}	Gate – Source Leakage Current	$V_{GS} = \pm 20V, V_{DS} = 0V$			200	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{iss}	Input Capacitance	$V_{GS} = 0V ; V_{DS} = 100V$ $f = 1\text{MHz}$		13.6		nF
C_{oss}	Output Capacitance			0.66		
Q_g	Total gate Charge	$V_{GS} = 10V$ $V_{Bus} = 400V$ $I_D = 52A$		540		nC
Q_{gs}	Gate – Source Charge			64		
Q_{gd}	Gate – Drain Charge			230		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (125°C) $V_{GS} = 10V$ $V_{Bus} = 600V$ $I_D = 52A$ $R_G = 3.8\Omega$		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 $V_{GS} = 10V ; V_{Bus} = 600V$ $I_D = 52A ; R_G = 3.8\Omega$		3		mJ
E_{off}	Turn-off Switching Energy			1.5		
E_{on}	Turn-on Switching Energy	Inductive switching @ 125°C $V_{GS} = 10V ; V_{Bus} = 600V$ $I_D = 52A ; R_G = 3.8\Omega$		4.2		mJ
E_{off}	Turn-off Switching Energy			1.7		

Source - Drain diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
I_S	Continuous Source current (Body diode)	$T_c = 25^\circ\text{C}$			59	A
		$T_c = 80^\circ\text{C}$			44	
V_{SD}	Diode Forward Voltage	$V_{GS} = 0V, I_S = -52A$		0.8	1.2	V
t_{rr}	Reverse Recovery Time	$I_S = -52A$ $V_R = 400V$	$T_j = 25^\circ\text{C}$	920		ns
Q_{rr}	Reverse Recovery Charge	$di_s/dt = 200A/\mu\text{s}$	$T_j = 25^\circ\text{C}$	60		μC

Thermal and package characteristics

Symbol				Characteristic	Min	Typ	Max	Unit
R _{thJC}		Junction to Case Thermal Resistance					0.27	°C/W
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

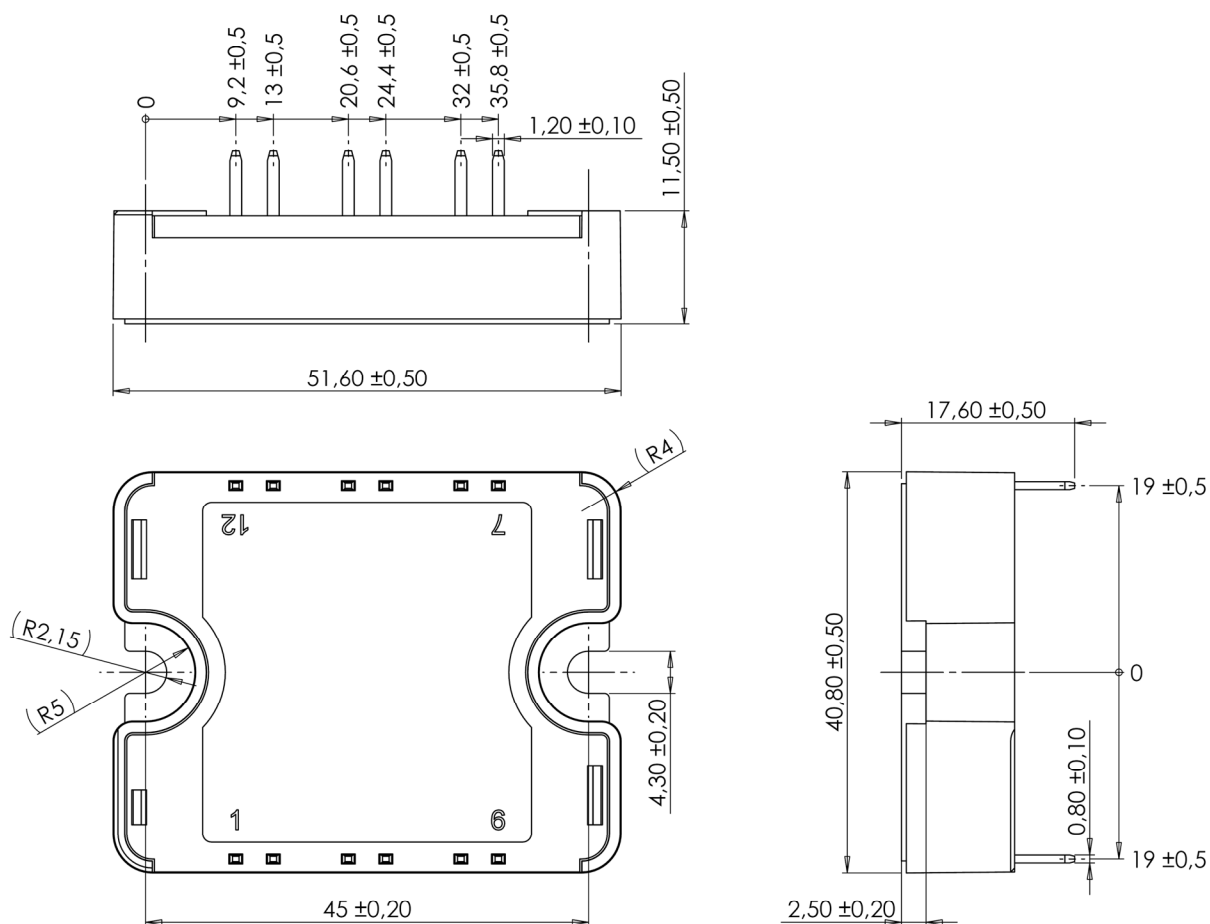
Temperature sensor NTC (see application note APT0406 on www.microsemi.com for more information).

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

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

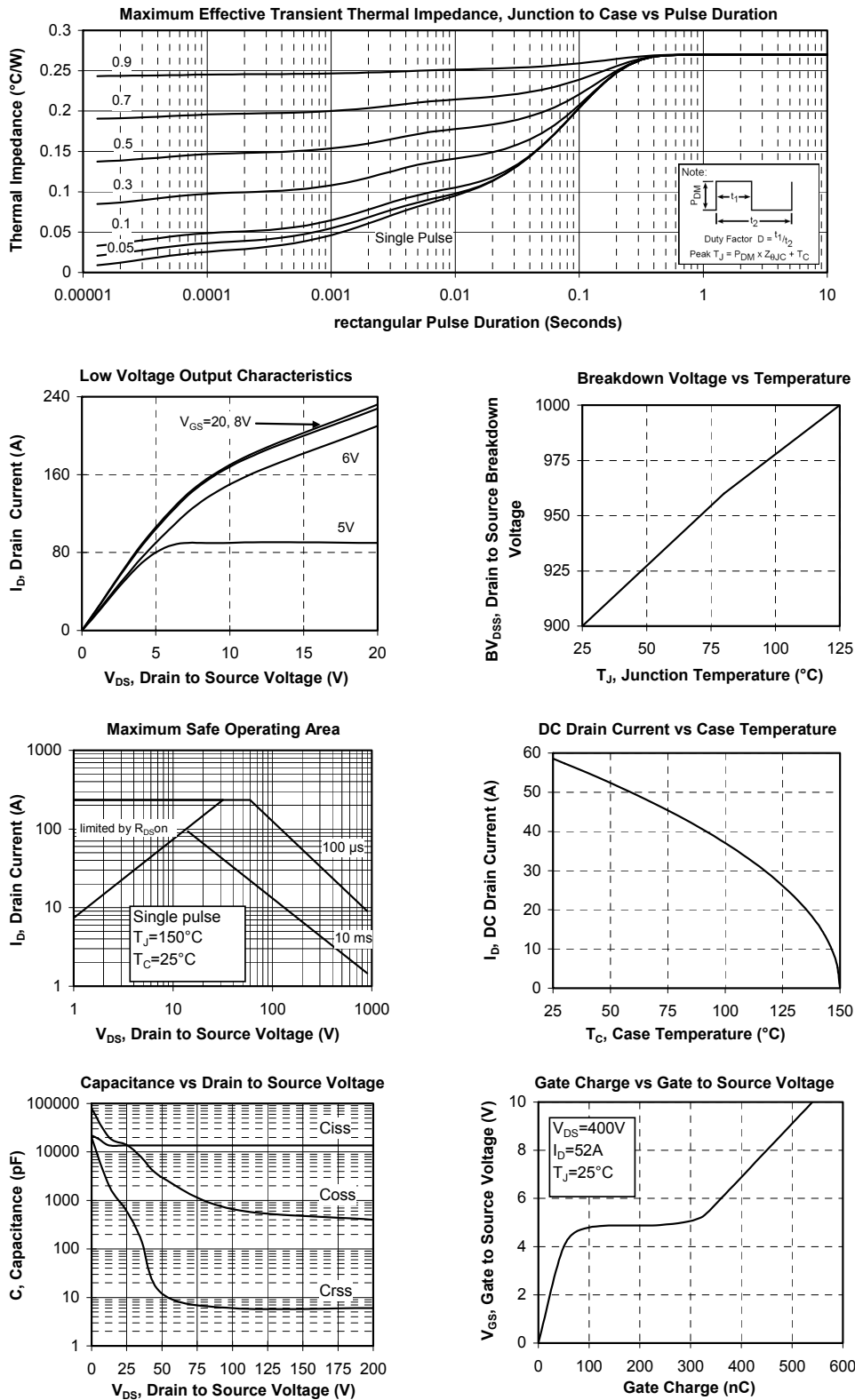
T: Thermistor temperature
 R_T: Thermistor value at T

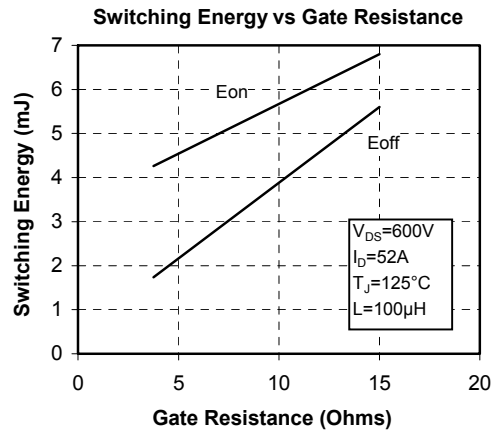
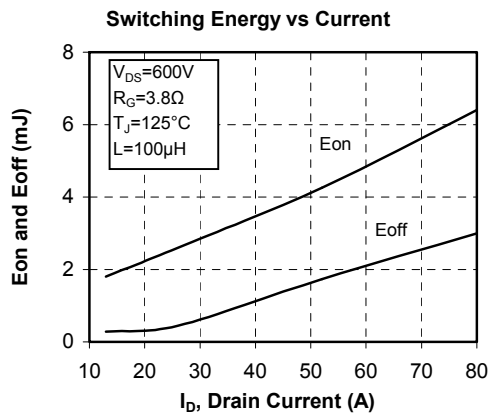
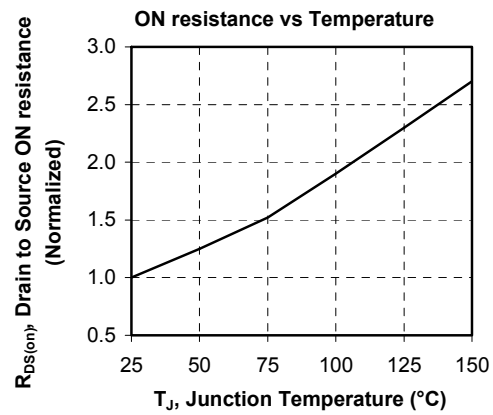
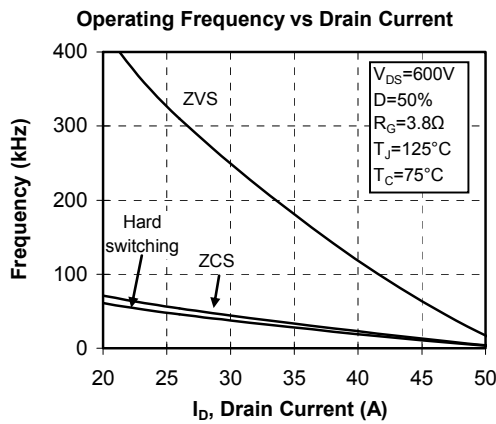
SP1 Package outline (dimensions in mm)



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

Typical CoolMOS Performance Curve





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