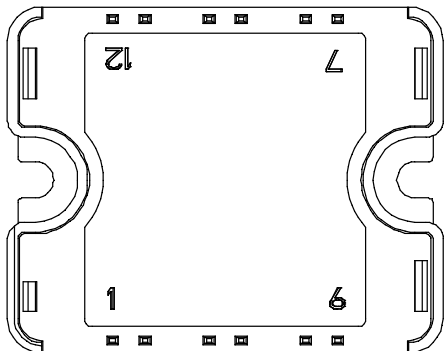
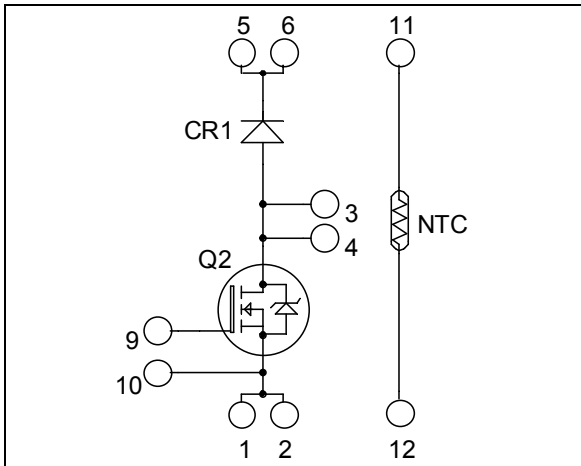


Boost chopper Super Junction MOSFET Power Module

$$V_{DSS} = 600V$$

$$R_{DSon} = 35m\Omega \text{ max @ } T_j = 25^\circ C$$

$$I_D = 72A \text{ @ } T_c = 25^\circ C$$



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

Application

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

Features

- **COOLMOS** Power Semiconductors
 - Ultra low R_{DSon}
 - Low Miller capacitance
 - Ultra 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	600	V
I_D	Continuous Drain Current	$T_c = 25^\circ C$	72
		$T_c = 80^\circ C$	54
I_{DM}	Pulsed Drain current	200	A
V_{GS}	Gate - Source Voltage	± 20	V
R_{DSon}	Drain - Source ON Resistance	35	$m\Omega$
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	416
I_{AR}	Avalanche current (repetitive and non repetitive)	20	A
E_{AR}	Repetitive Avalanche Energy	1	mJ
E_{AS}	Single Pulse Avalanche Energy	1800	

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} = 600V	T _j = 25°C			40	μA
		V _{GS} = 0V, V _{DS} = 600V	T _j = 125°C			375	
R _{DS(on)}	Drain – Source on Resistance	V _{GS} = 10V, I _D = 72A				35	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} = V _{DS} , I _D = 5.4mA		2.1	3	3.9	V
I _{GSS}	Gate – Source Leakage Current	V _{GS} = ±20 V, V _{DS} = 0V				±150	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C _{iss}	Input Capacitance	V _{GS} = 0V V _{DS} = 25V f = 1MHz		14		nF
C _{oss}	Output Capacitance			5.13		
C _{rss}	Reverse Transfer Capacitance			0.42		
Q _g	Total gate Charge	V _{GS} = 10V V _{Bus} = 300V I _D = 72A		518		nC
Q _{gs}	Gate – Source Charge			58		
Q _{gd}	Gate – Drain Charge			222		
T _{d(on)}	Turn-on Delay Time	Inductive Switching @ 125°C V _{GS} = 15V V _{Bus} = 400V I _D = 72A R _G = 2.5Ω		21		ns
T _r	Rise Time			30		
T _{d(off)}	Turn-off Delay Time			283		
T _f	Fall Time			84		
E _{on}	Turn-on Switching Energy	Inductive switching @ 25°C V _{GS} = 15V, V _{Bus} = 400V I _D = 72A, R _G = 2.5Ω		1340		μJ
E _{off}	Turn-off Switching Energy			1960		
E _{on}	Turn-on Switching Energy	Inductive switching @ 125°C V _{GS} = 15V, V _{Bus} = 400V I _D = 72A, R _G = 2.5Ω		2192		μJ
E _{off}	Turn-off Switching Energy			2412		

Chopper diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V _{RRM}	Maximum Peak Repetitive Reverse Voltage		600			V
I _{RM}	Maximum Reverse Leakage Current	V _R = 600V	T _j = 25°C		25	μA
			T _j = 125°C		500	
I _F	DC Forward Current	T _c = 90°C		60		A
V _F	Diode Forward Voltage	I _F = 60A		1.7	2.3	V
		I _F = 120A		2		
		I _F = 60A	T _j = 125°C	1.4		
t _{rr}	Reverse Recovery Time	I _F = 60A V _R = 400V di/dt = 200A/μs	T _j = 25°C	70		ns
			T _j = 125°C	140		
Q _{rr}	Reverse Recovery Charge	I _F = 60A V _R = 400V di/dt = 200A/μs	T _j = 25°C	100		nC
			T _j = 125°C	690		

Thermal and package characteristics

Symbol	Characteristic	Min	Typ	Max	Unit	
R _{thJC}	Junction to Case Thermal Resistance	Transistor		0.3	°C/W	
		Diode		0.85		
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

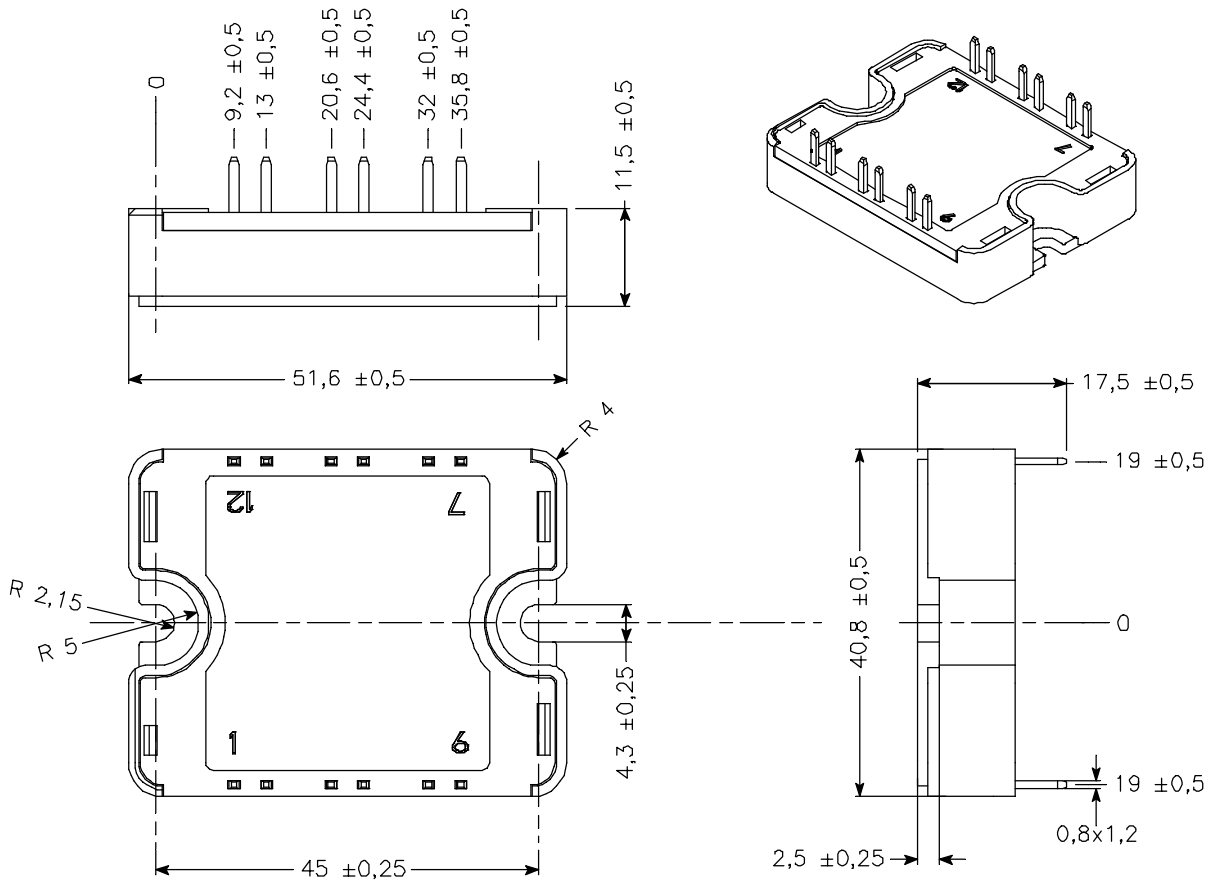
Temperature sensor NTC (see application note APT0406 on www.microsemi.com for more information).

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

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

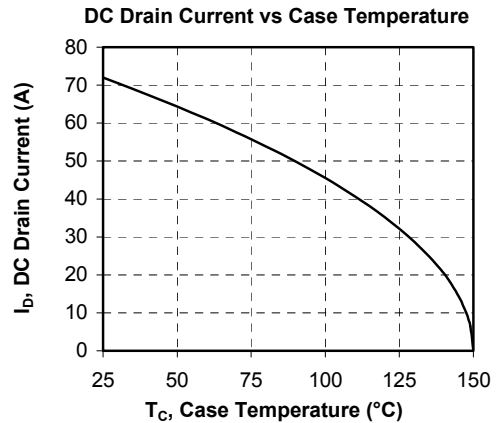
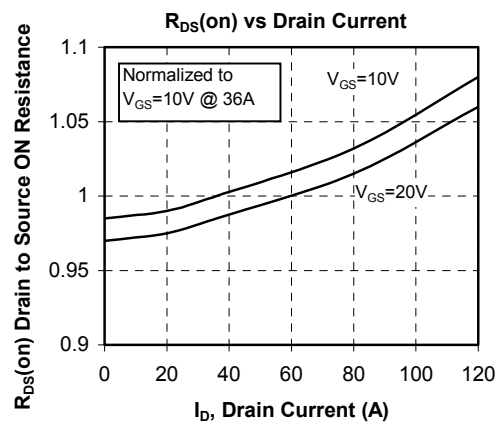
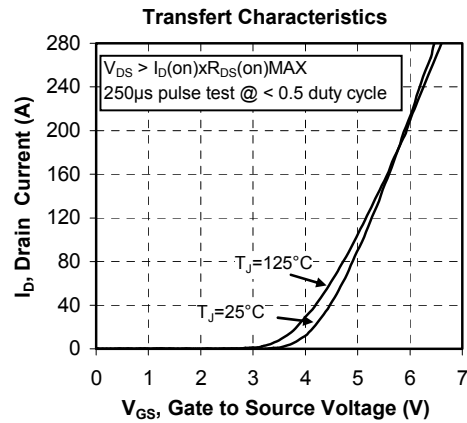
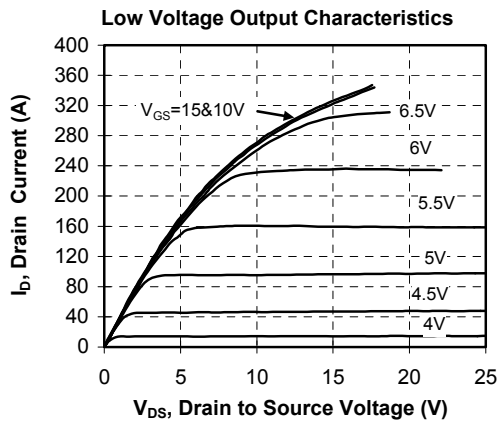
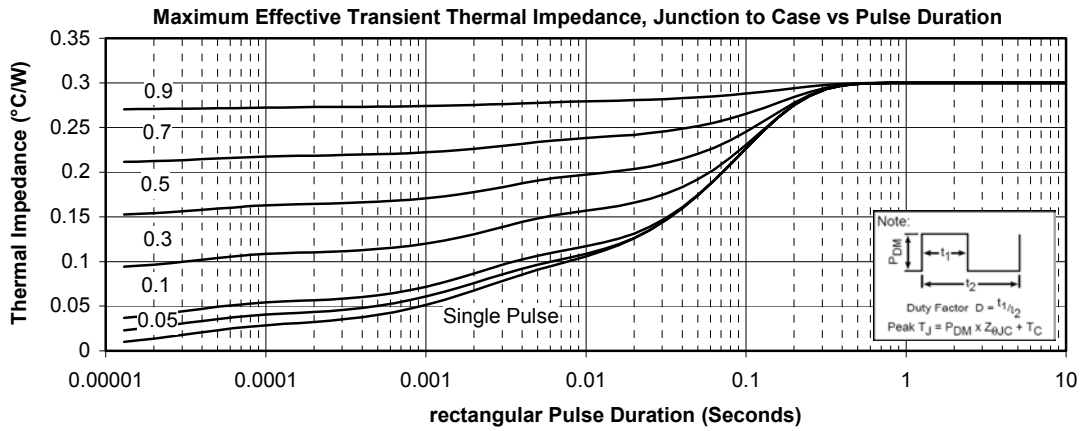
T: Thermistor temperature
 R_T: Thermistor value at T

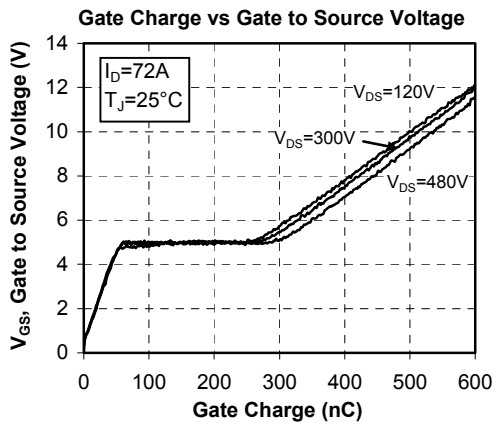
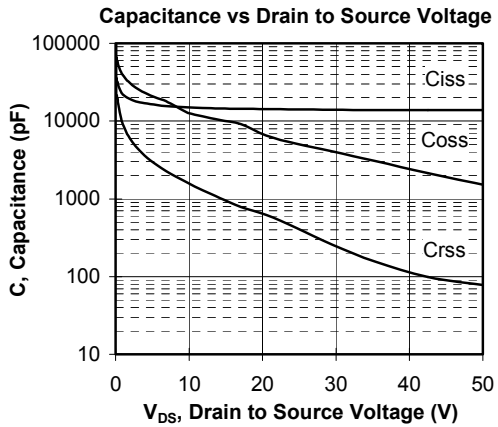
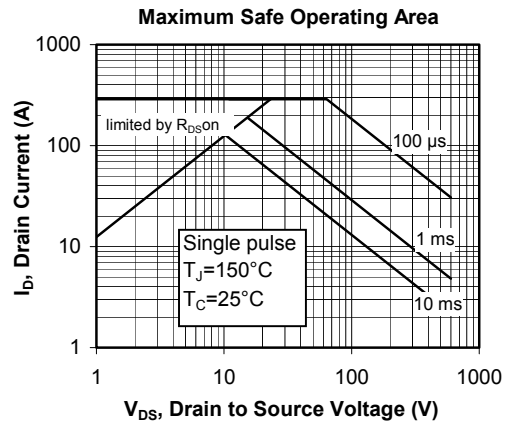
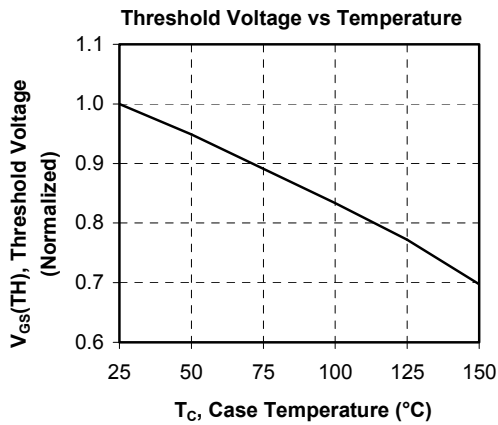
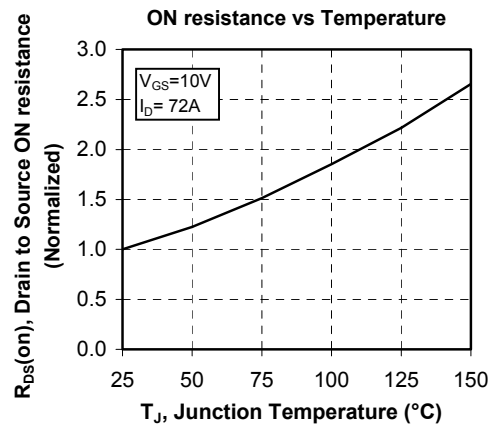
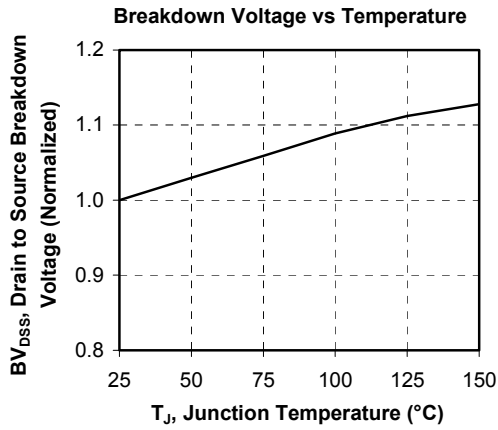
SP1 Package outline (dimensions in mm)

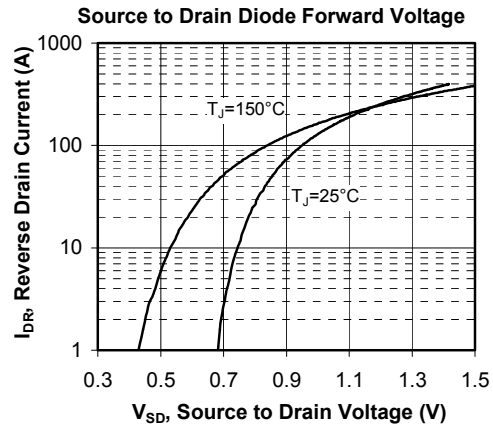
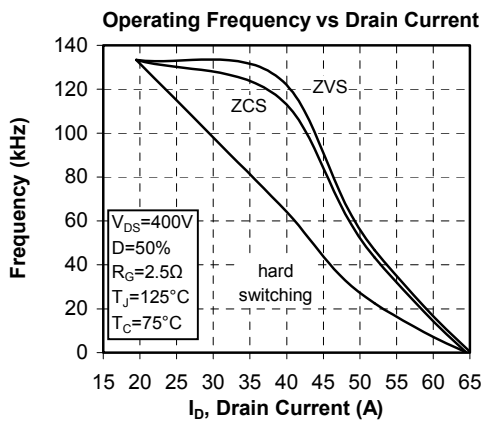
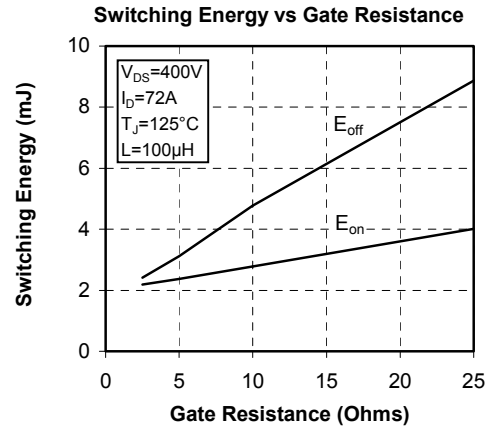
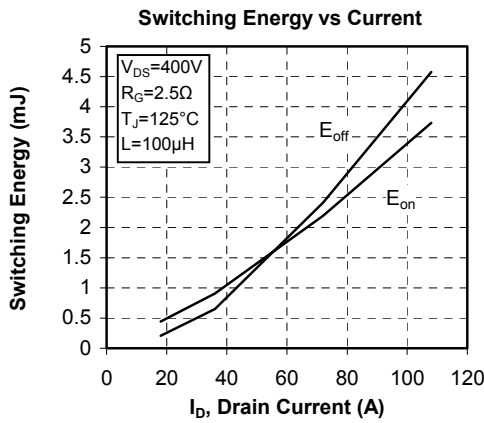
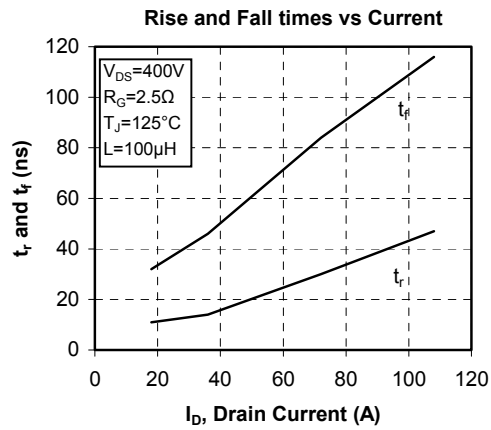
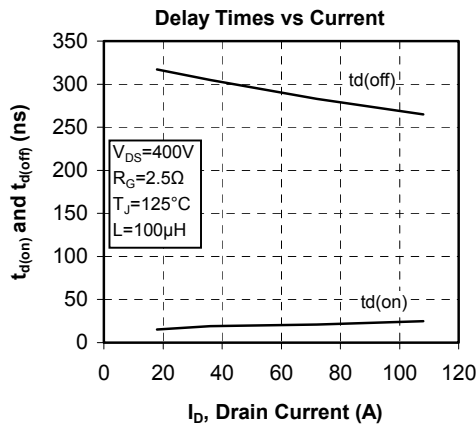


See application note 1904 - Mounting Instructions for SP1 Power Modules on www.microsemi.com

Typical Performance Curve







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