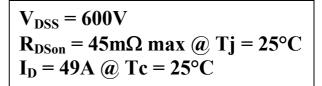
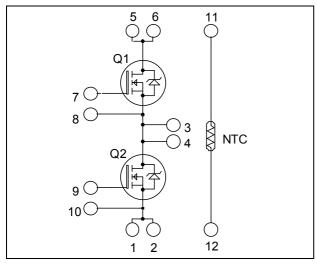
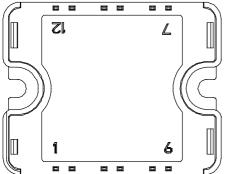


Phase leg Super Junction MOSFET Power Module







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
- 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
$V_{ m DSS}$	Drain - Source Breakdown Voltage		600	V
т	Continuous Drain Current		49	
I_D	Continuous Diani Current	$T_c = 80$ °C	38	Α
I_{DM}	Pulsed Drain current		130	
V_{GS}	Gate - Source Voltage		±20	V
R _{DSon}	Drain - Source ON Resistance		45	mΩ
P_{D}	Maximum Power Dissipation $T_c = 25^{\circ}C$		250	W
I_{AR}	Avalanche current (repetitive and non repetitive)		15	A
E_{AR}	Repetitive Avalanche Energy		3	mJ
E _{AS}	Single Pulse Avalanche Energy		1900	1111

CAUTION: These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed. See application note APT0502 on www.microsemi.com



All ratings @ $T_j = 25$ °C unless otherwise specified

Electrical Characteristics

Symbol	Characteristic	Test Conditions	Min	Тур	Max	Unit
I_{DSS}	Zero Gate Voltage Drain Current	$V_{GS} = 0V, V_{DS} = 600V$ $T_j = 25^{\circ}C$			250	μА
		$V_{GS} = 0V, V_{DS} = 600V$ $T_j = 125^{\circ}C$			500	
R _{DS(on)}	Drain – Source on Resistance	$V_{GS} = 10V, I_D = 24.5A$		40	45	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}$, $I_D = 3mA$	2.1	3	3.9	V
I_{GSS}	Gate – Source Leakage Current	$V_{GS} = \pm 20 \text{ V}, V_{DS} = 0 \text{ V}$			100	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{iss}	Input Capacitance	$V_{GS} = 0V ; V_{DS} = 25V$		7.2		nF
C_{oss}	Output Capacitance	f = 1MHz		8.5		111
Q_{g}	Total gate Charge	$V_{GS} = 10V$		150		
Q_{gs}	Gate – Source Charge	$V_{\text{Bus}} = 300V$		34		nC
Q_{gd}	Gate – Drain Charge	$I_D = 49A$		51		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (125°C)		21		
T_{r}	Rise Time	$V_{GS} = 10V$		30		
$T_{d(off)} \\$	Turn-off Delay Time	$V_{\text{Bus}} = 400V$ $I_{\text{D}} = 49A$		100		ns
T_{f}	Fall Time	$R_G = 5\Omega$		45		
Eon	Turn-on Switching Energy	Inductive switching @ 25°C $V_{GS} = 10V ; V_{Bus} = 400V$		675		μJ
E _{off}	Turn-off Switching Energy	$I_D = 49A ; R_G = 5\Omega$		520		μυ
Eon	Turn-on Switching Energy	Inductive switching @ 125°C		1100		ī
E_{off}	Turn-off Switching Energy	$V_{GS} = 10V ; V_{Bus} = 400V$ $I_D = 49A ; R_G = 5\Omega$		635	·	μJ

Source - Drain diode ratings and characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
I_S	Continuous Source current		$Tc = 25^{\circ}C$		49		Α
	(Body diode)		$Tc = 80^{\circ}C$		38		A
V_{SD}	Diode Forward Voltage	$V_{GS} = 0V, I_S = -49A$				1.2	V
dv/dt	Peak Diode Recovery 1					4	V/ns
t_{rr}	Reverse Recovery Time	$I_S = -49A$	$T_j = 25^{\circ}C$		600		ns
Q_{rr}	Reverse Recovery Charge	$V_R = 350V$ $di_S/dt = 100A/\mu s$	$T_j = 25$ °C		17		μС

• dv/dt numbers reflect the limitations of the circuit rather than the device itself.

 $I_S \leq \text{- 49A} \qquad di/dt \leq 100 A/\mu s \qquad V_R \leq V_{DSS} \qquad T_j \leq 150 ^{\circ} C$



Thermal and package characteristics

Symbol	Characteristic		Min	Typ	Max	Unit	
R_{thJC}	Junction to Case Thermal Resistance				0.5	°C/W	
V_{ISOL}	RMS Isolation Voltage, any terminal to case t =1 min, 50/60Hz		4000			V	
$T_{\rm J}$	Operating junction temperature range		-40		150		
T_{STG}	Storage Temperature Range			-40		125	°C
$T_{\rm C}$	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	Тур	Max	Unit
R ₂₅	Resistance @ 25°C		50		kΩ
B 25/85	$T_{25} = 298.15 \text{ K}$		3952		K

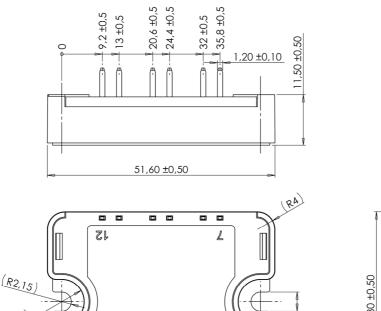
$$R_{T} = \frac{R_{25}}{\exp \left[B_{25/85} \left(\frac{1}{T_{25}} - \frac{1}{T} \right) \right]} \quad \text{T: Thermistor temperature}$$

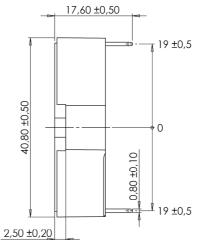
$$R_{T}: \text{ Thermistor value at T}$$

SP1 Package outline (dimensions in mm)

45 ±0,20

П



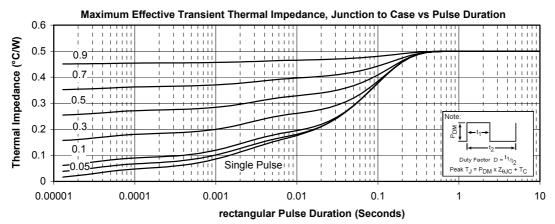


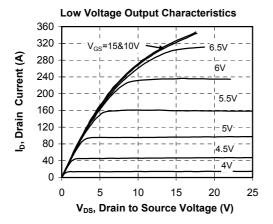
See application note 1904 - Mounting Instructions for SP1 Power Modules on www.microsemi.com

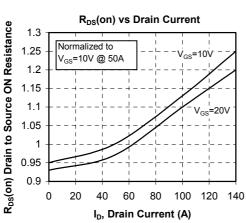
4,30 ±0,20

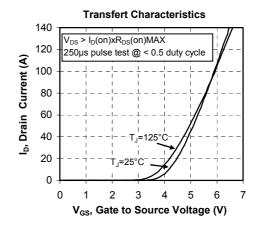


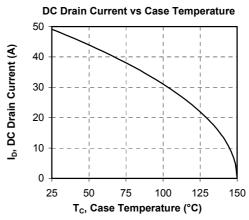
Typical Performance Curve



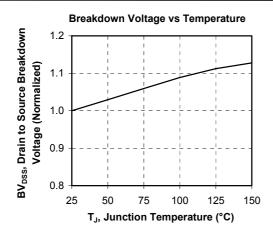


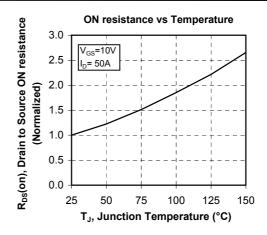


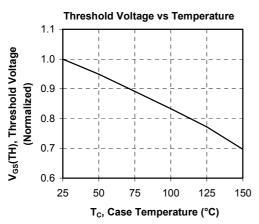


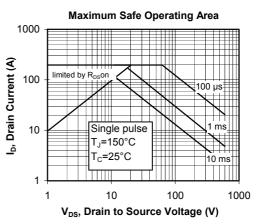


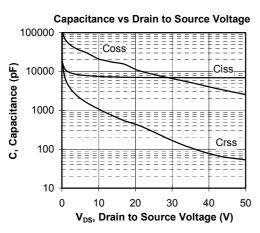


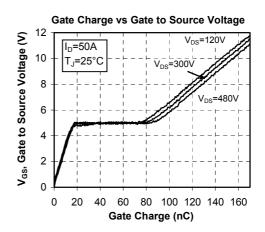




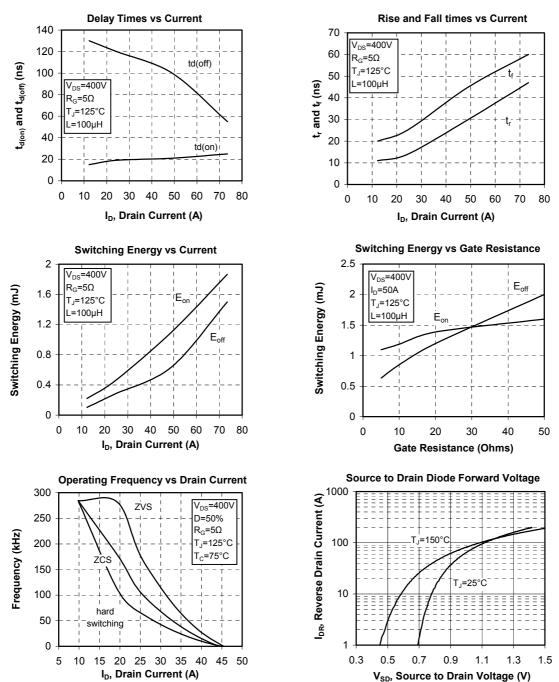












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