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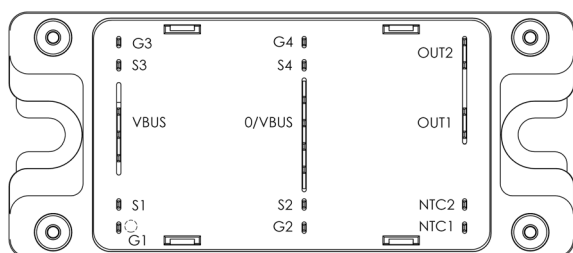
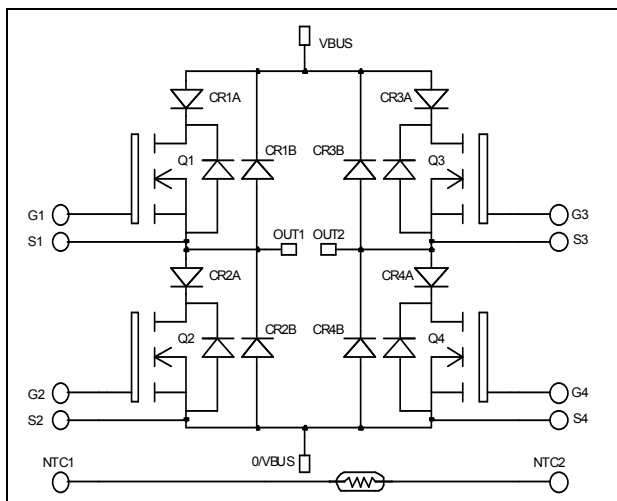


**Full – Bridge Series & SiC parallel diodes
Super Junction MOSFET Power Module**

$V_{DSS} = 900V$

$R_{DSon} = 120m\Omega \text{ max @ } T_j = 25^\circ C$

$I_D = 30A \text{ @ } T_c = 25^\circ C$



Application

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

Features

- **CoolMOST™**
 - Ultra low R_{DSon}
 - Low Miller capacitance
 - Ultra low gate charge
 - Avalanche energy rated
- **Parallel SiC Schottky Diode**
 - Zero reverse recovery
 - Zero forward recovery
 - Temperature Independent switching behavior
 - Positive temperature coefficient on VF
- Kelvin source for easy drive
- Very low stray inductance
 - Symmetrical design
 - Lead frames for power connections
- 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

All ratings @ $T_j = 25^\circ C$ unless otherwise specified

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

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°C			100	μA
		V _{GS} = 0V, V _{DS} = 900V, T _j = 125°C		500		
R _{DS(on)}	Drain – Source on Resistance	V _{GS} = 10V, I _D = 26A		100	120	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} = V _{DS} , I _D = 3mA	2.5	3	3.5	V
I _{GSS}	Gate – Source Leakage Current	V _{GS} = ±20 V, 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 = 1MHz		6800		pF
C _{oss}	Output Capacitance			330		
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 = 7.5Ω		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 = 7.5Ω		900		μJ
E _{off}	Turn-off Switching Energy			750		
E _{on}	Turn-on Switching Energy	Inductive switching @ 125°C V _{GS} = 10V ; V _{Bus} = 600V I _D = 26A ; R _G = 7.5Ω		1278		μJ
E _{off}	Turn-off Switching Energy			867		
R _{thJC}	Junction to Case Thermal Resistance				0.5	°C/W

Series diode ratings and characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
V _{RRM}	Maximum Peak Repetitive Reverse Voltage			1000			V
I _{RM}	Maximum Reverse Leakage Current	V _R = 1000V				250	μA
I _F	DC Forward Current		T _c = 80°C		30		A
V _F	Diode Forward Voltage	I _F = 30A			1.9	2.3	V
		I _F = 60A			2.2		
		I _F = 30A	T _j = 125°C		1.7		
t _{rr}	Reverse Recovery Time	I _F = 30A V _R = 667V di/dt = 200A/μs	T _j = 25°C		290		ns
			T _j = 125°C		390		
Q _{rr}	Reverse Recovery Charge		T _j = 25°C		670		nC
			T _j = 125°C		2350		
R _{thJC}	Junction to Case Thermal Resistance					1.2	°C/W

Parallel 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°C T _j = 175°C	32 56	200 1000	μA
I _F	DC Forward Current		T _c = 100°C	10		A
V _F	Diode Forward Voltage	I _F = 10A	T _j = 25°C T _j = 175°C	1.6 2.3	1.8 3	V
Q _C	Total Capacitive Charge	I _F = 10A, V _R = 1200V di/dt = 500A/μs		80		nC
Q	Total Capacitance	f = 1MHz, V _R = 200V f = 1MHz, V _R = 400V		96 69		pF
R _{thJC}	Junction to Case Thermal Resistance				1.8	°C/W

Thermal and package characteristics

Symbol	Characteristic			Min	Max	Unit
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 _{JOP}	Recommended junction temperature under switching conditions			-40	T _J max -25	
T _{STG}	Storage Temperature Range			-40	125	
T _C	Operating Case Temperature			-40	100	
Torque	Mounting torque	To Heatsink	M5	2.5	4.7	N.m
Wt	Package Weight				160	g

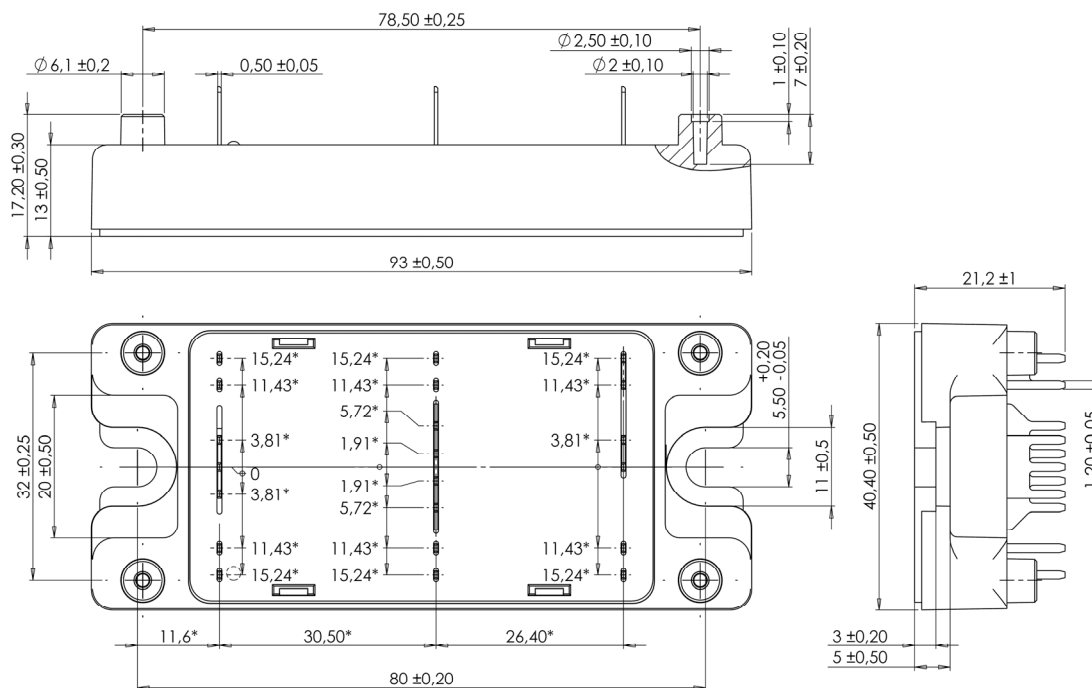
Temperature sensor NTC (see application note APT0406 on www.microsemi.com).

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

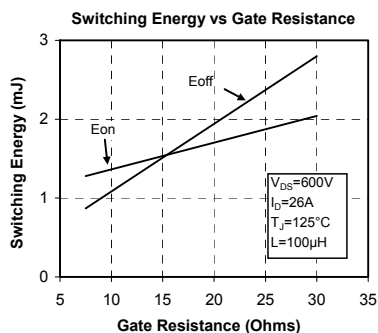
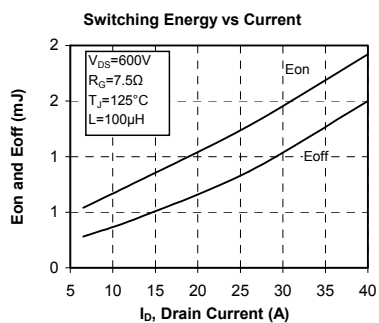
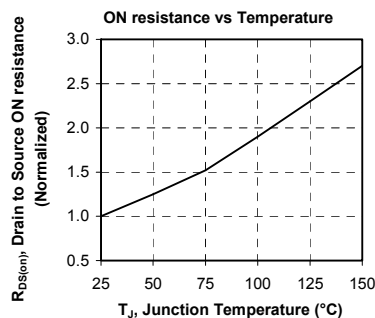
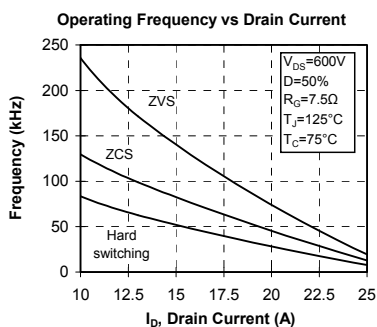
SP4 Package outline (dimensions in mm)

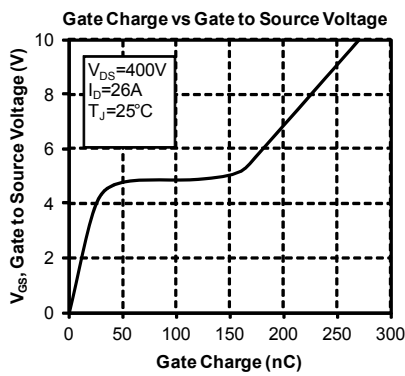
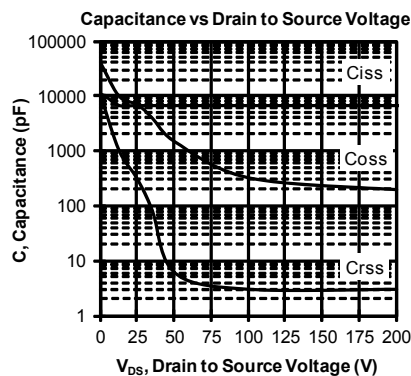
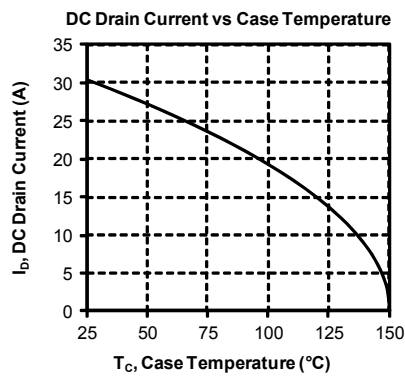
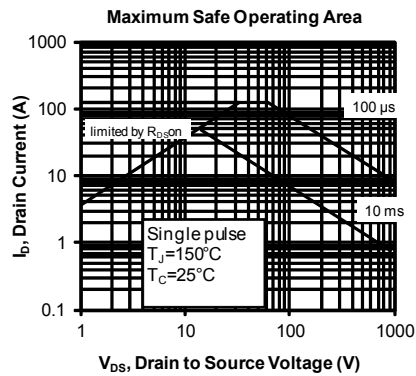
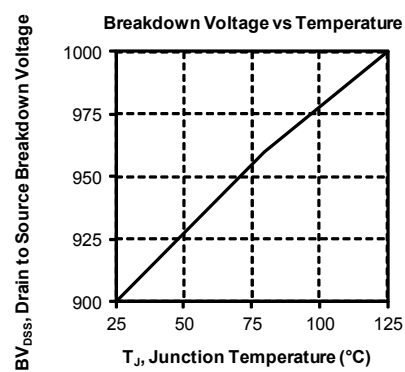
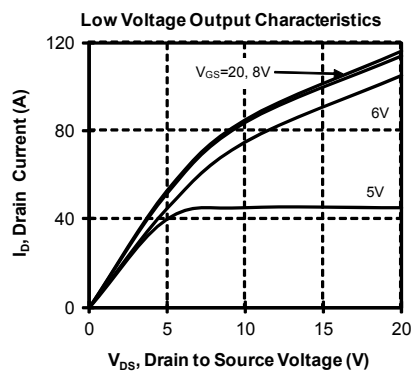
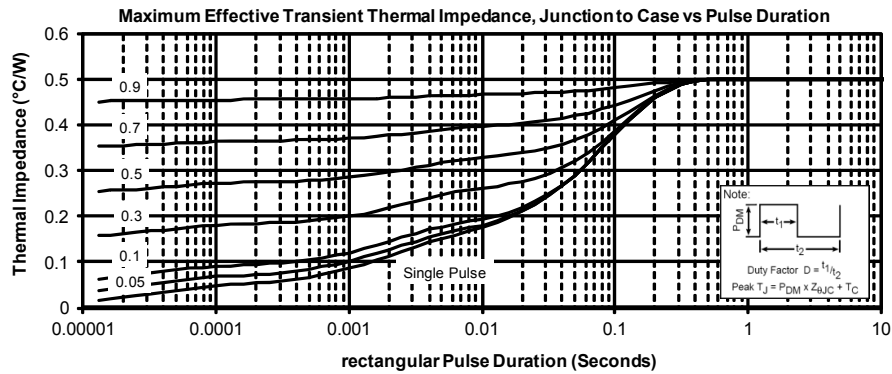


ALL DIMENSIONS MARKED "*" ARE TOLERANCED AS : $\begin{array}{|c|c|} \hline \oplus \\ \hline \phi \end{array}$ 1

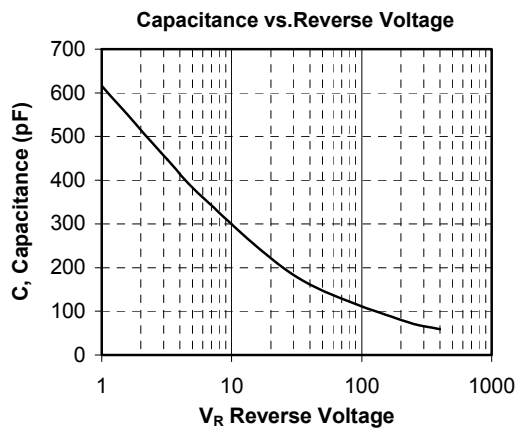
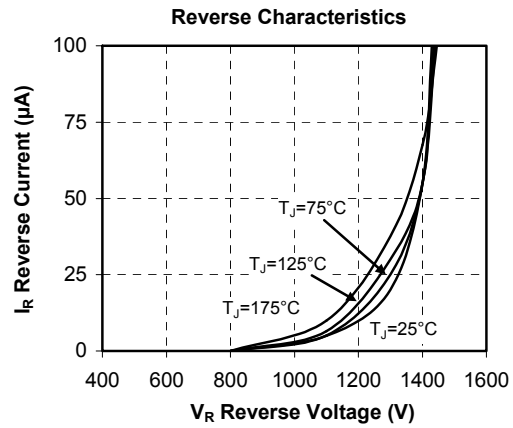
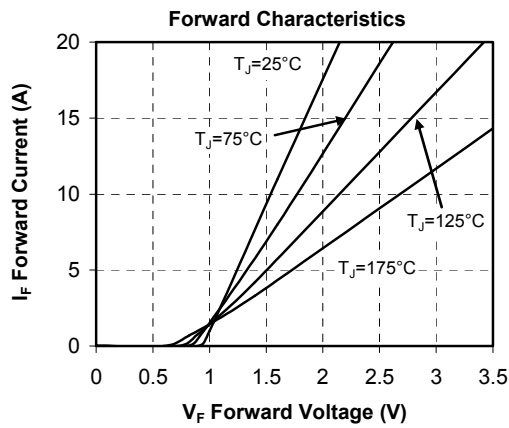
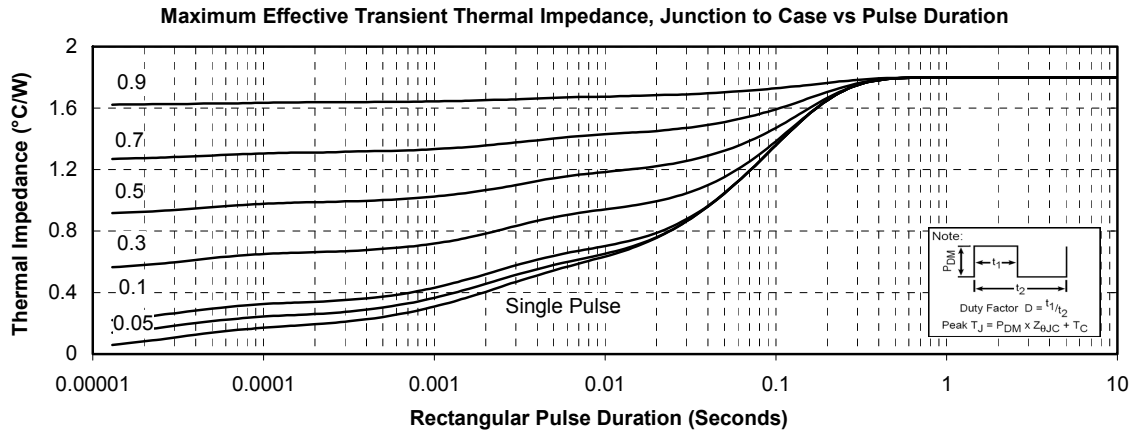
See application note APT0501 - Mounting Instructions for SP4 Power Modules on www.microsemi.com

Typical CoolMOS Performance Curve





Typical SiC Diode Performance Curve



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