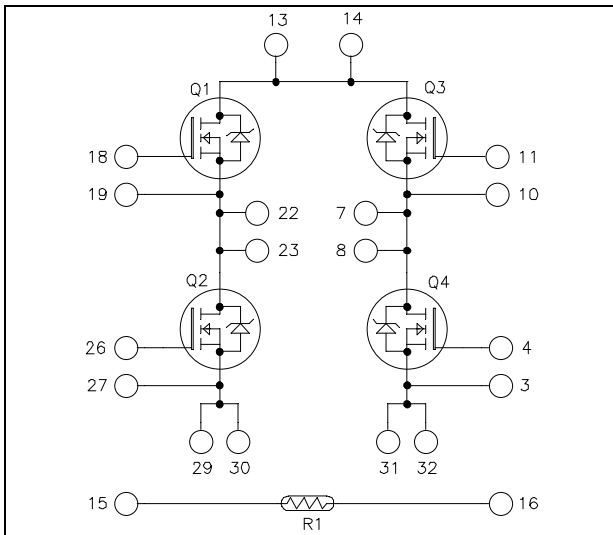


Full bridge MOSFET Power Module

$V_{DSS} = 1000V$
 $R_{DSon} = 460m\Omega$ typ @ $T_j = 25^\circ C$
 $I_D = 19A$ @ $T_c = 25^\circ C$

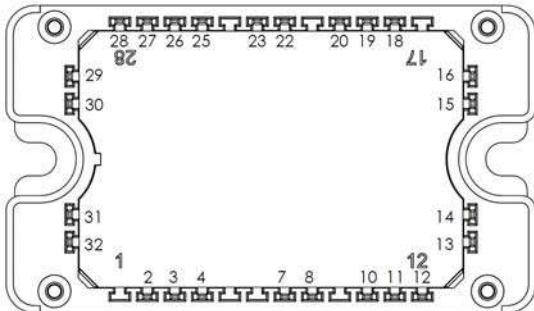


Application

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

Features

- **Power MOS 8™ Fast FREDFETs**
 - Low R_{DSon}
 - Low input and Miller capacitance
 - Low gate charge
 - Fast intrinsic reverse diode
 - Avalanche energy rated
 - Very rugged
- Very low stray inductance
- Kelvin source for easy drive
- Internal thermistor for temperature monitoring



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 phase leg of twice the current capability
- RoHS Compliant

All multiple inputs and outputs must be shorted together
 Example: 13/14 ; 29/30 ; 22/23 ...

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

Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{DSS}	Drain - Source Voltage	1000	V
I_D	Continuous Drain Current	$T_c = 25^\circ C$	19
		$T_c = 80^\circ C$	14
I_{DM}	Pulsed Drain current	120	A
V_{GS}	Gate - Source Voltage	± 30	V
R_{DSon}	Drain - Source ON Resistance	552	$m\Omega$
P_D	Power Dissipation	$T_c = 25^\circ C$	357
I_{AR}	Avalanche current (repetitive and non repetitive)	16	A

CAUTION: These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed.

Electrical Characteristics

<i>Symbol</i>	<i>Characteristic</i>	<i>Test Conditions</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 1000V ; V _{GS} = 0V			250	μA
R _{DS(on)}	Drain – Source on Resistance	V _{GS} = 10V, I _D = 16A		460	552	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} = V _{DS} , I _D = 2.5mA	3	4	5	V
I _{GSS}	Gate – Source Leakage Current	V _{GS} = ±30 V			±150	nA

Dynamic Characteristics

<i>Symbol</i>	<i>Characteristic</i>	<i>Test Conditions</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
C _{iss}	Input Capacitance	V _{GS} = 0V		6800		pF
C _{oss}	Output Capacitance	V _{DS} = 25V		715		
C _{rss}	Reverse Transfer Capacitance	f = 1MHz		92		
Q _g	Total gate Charge	V _{GS} = 10V		260		nC
Q _{gs}	Gate – Source Charge	V _{Bus} = 500V		46		
Q _{gd}	Gate – Drain Charge	I _D = 16A		125		
T _{d(on)}	Turn-on Delay Time	Resistive switching @ 25°C V _{GS} = 15V V _{Bus} = 667V I _D = 16A R _G = 2.2Ω		36		ns
T _r	Rise Time			37		
T _{d(off)}	Turn-off Delay Time			140		
T _f	Fall Time			35		
R _{thJC}	Junction to Case Thermal Resistance				0.35	°C/W

Source - Drain diode ratings and characteristics

<i>Symbol</i>	<i>Characteristic</i>	<i>Test Conditions</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>	
I _S	Continuous Source current (Body diode)	T _c = 25°C			19	A	
		T _c = 80°C			14		
V _{SD}	Diode Forward Voltage	V _{GS} = 0V, I _S = - 16A			1	V	
dv/dt	Peak Diode Recovery ❶				25	V/ns	
t _{rr}	Reverse Recovery Time	I _S = - 16A V _R = 100V di _s /dt = 100A/μs	T _j = 25°C			290	ns
			T _j = 125°C			600	
Q _{rr}	Reverse Recovery Charge		T _j = 25°C		1.3	μC	
			T _j = 125°C		3.5		

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

$$I_S \leq -16A \quad di/dt \leq 1000A/\mu s \quad V_{DD} \leq 667V \quad T_j \leq 125^\circ C$$

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 _{Jmax} - 25			
T _{STG}	Storage Temperature Range	-40	125			
T _C	Operating Case Temperature	-40	125			
Torque	Mounting torque	To heatsink	M4	2	3	N.m
Wt	Package Weight				110	g

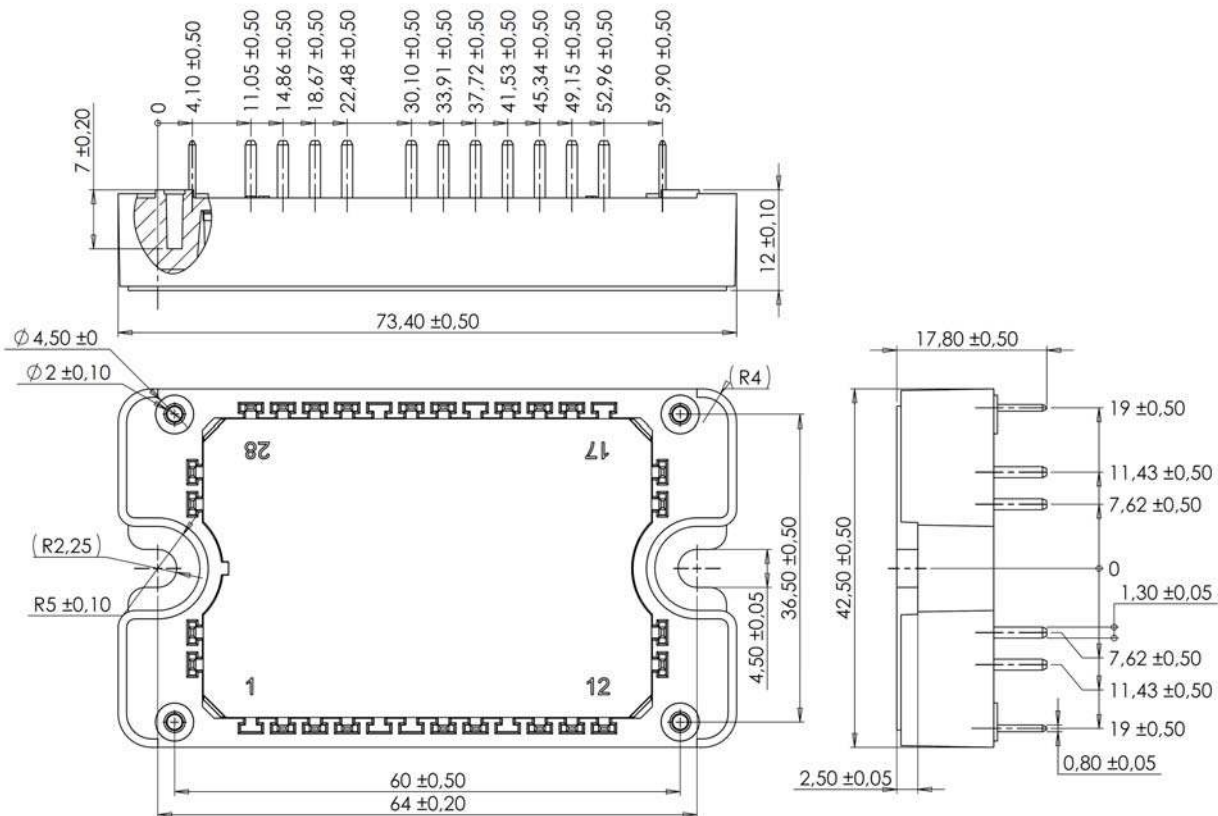
Temperature sensor NTC (see application note APT0406 on www.microsemi.com for more information).

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		%

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

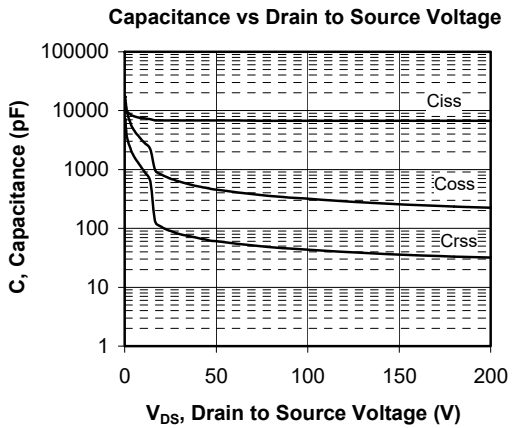
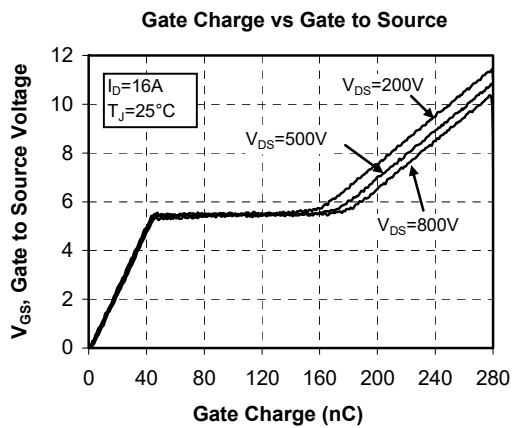
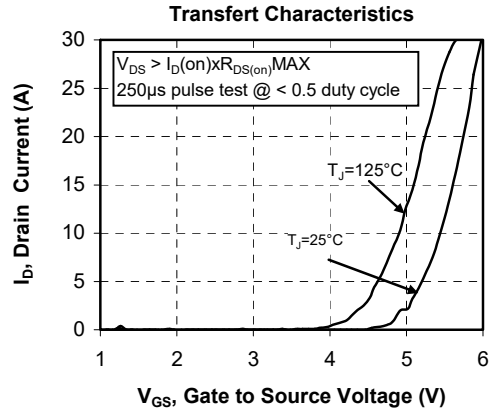
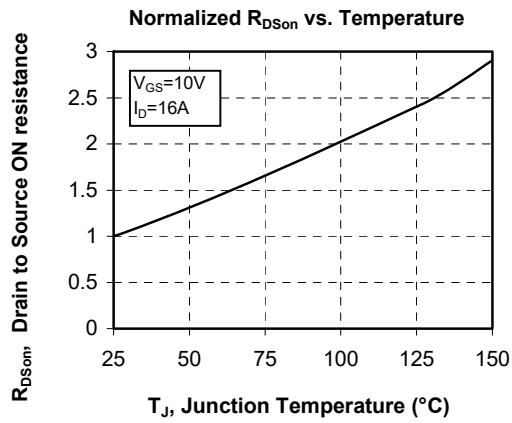
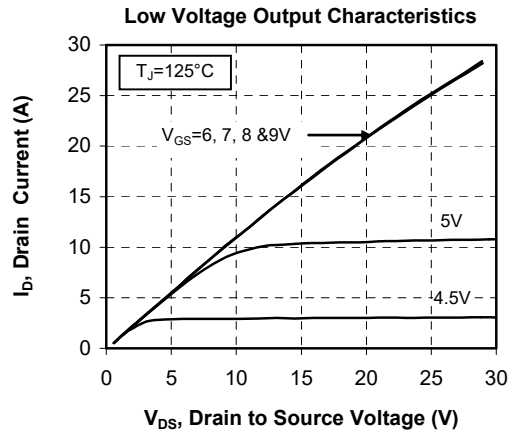
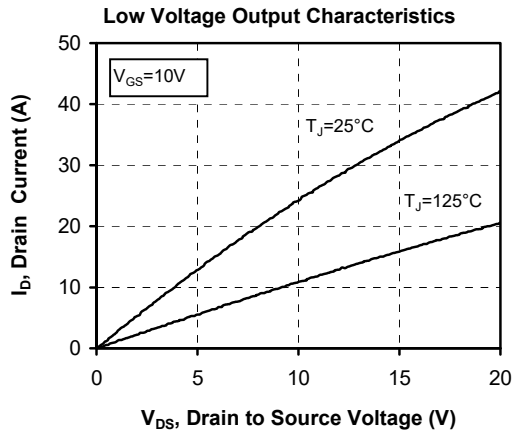
T: Thermistor temperature
R_T: Thermistor value at T

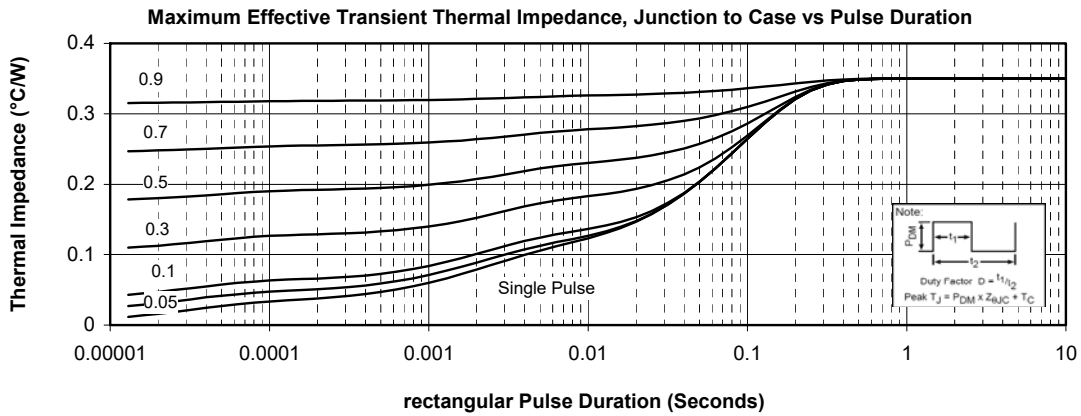
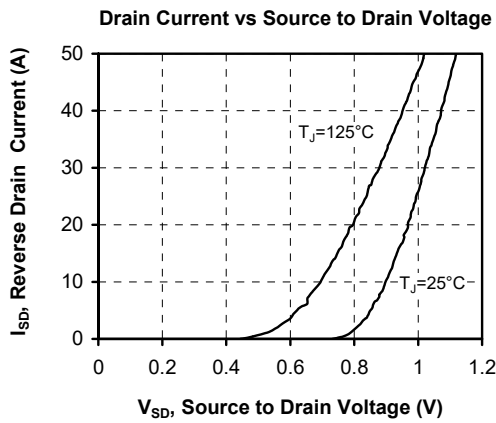
Package outline (dimensions in mm)



See application note 1906 - Mounting Instructions for SP3F Power Modules on www.microsemi.com

Typical Performance Curve





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