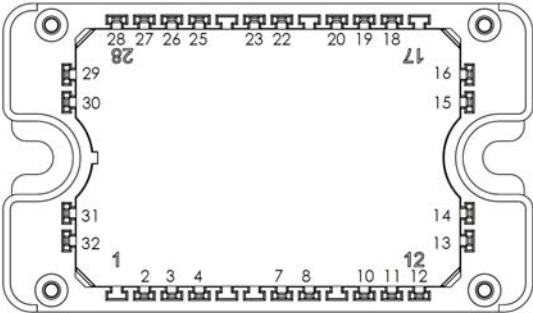
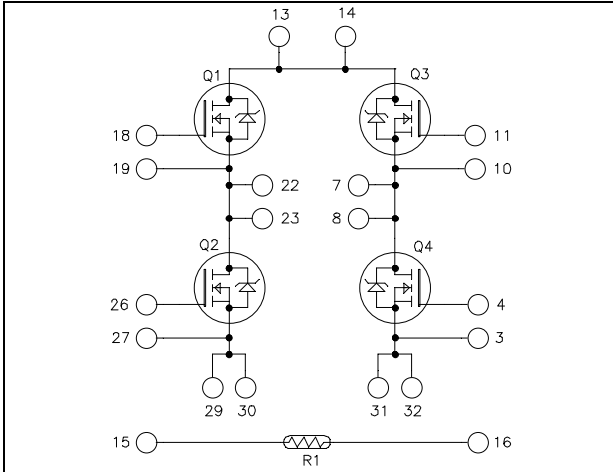


## Full - Bridge MOSFET Power Module

$V_{DSS} = 100V$   
 $R_{DSon} = 9m\Omega$  typ @  $T_j = 25^\circ C$   
 $I_D = 139A$  @  $T_c = 25^\circ C$



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

### Application

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

### Features

- Power MOS V<sup>®</sup> FREDFETs
  - Low  $R_{DSon}$
  - Low input and Miller capacitance
  - Low gate charge
  - Fast intrinsic diode
  - Avalanche energy rated
  - Very rugged
- Kelvin source for easy drive
- Very low stray inductance
- 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 ratings @  $T_j = 25^\circ C$  unless otherwise specified**

### Absolute maximum ratings (per MOSFET)

Symbol	Parameter	Max ratings	Unit
$V_{DSS}$	Drain - Source Voltage	100	V
$I_D$	Continuous Drain Current	$T_c = 25^\circ C$	139
		$T_c = 80^\circ C$	100 *
$I_{DM}$	Pulsed Drain current	430	A
$V_{GS}$	Gate - Source Voltage	$\pm 30$	V
$R_{DSon}$	Drain - Source ON Resistance	10	$m\Omega$
$P_D$	Power Dissipation	$T_c = 25^\circ C$	390
$I_{AR}$	Avalanche current (repetitive and non repetitive)	100	A
$E_{AR}$	Repetitive Avalanche Energy	50	mJ
$E_{AS}$	Single Pulse Avalanche Energy	3000	

\* Specification of MOSFET device but output current must be limited due to size of output pins.

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

**Electrical Characteristics** (per MOSFET)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{GS} = 0V, V_{DS} = 100V$			100	$\mu A$
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10V, I_D = 69.5A$		9	10	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 2.5mA$	2		4	V
$I_{GSS}$	Gate – Source Leakage Current	$V_{GS} = \pm 30V, V_{DS} = 0V$			$\pm 150$	nA

**Dynamic Characteristics** (per MOSFET)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$C_{iss}$	Input Capacitance	$V_{GS} = 0V$		9875		pF
$C_{oss}$	Output Capacitance	$V_{DS} = 25V$		3940		
$C_{rss}$	Reverse Transfer Capacitance	$f = 1MHz$		1470		
$Q_g$	Total gate Charge	$V_{GS} = 10V$		350		nC
$Q_{gs}$	Gate – Source Charge	$V_{Bus} = 50V$		60		
$Q_{gd}$	Gate – Drain Charge	$I_D = 139A$		180		
$T_{d(on)}$	Turn-on Delay Time	<b>Inductive switching @ 125°C</b> $V_{GS} = 15V$ $V_{Bus} = 66V$ $I_D = 139A$ $R_G = 5\Omega$		35		ns
$T_r$	Rise Time			70		
$T_{d(off)}$	Turn-off Delay Time			95		
$T_f$	Fall Time			125		
$E_{on}$	Turn-on Switching Energy	<b>Inductive switching @ 25°C</b> $V_{GS} = 15V, V_{Bus} = 66V$ $I_D = 139A, R_G = 5\Omega$		552		$\mu J$
$E_{off}$	Turn-off Switching Energy			604		
$E_{on}$	Turn-on Switching Energy	<b>Inductive switching @ 125°C</b> $V_{GS} = 15V, V_{Bus} = 66V$ $I_D = 139A, R_G = 5\Omega$		608		$\mu J$
$E_{off}$	Turn-off Switching Energy			641		
$R_{thJC}$	Junction to Case Thermal Resistance				0.32	$^{\circ}C/W$

**Source - Drain diode ratings and characteristics** (per MOSFET)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit	
$I_S$	Continuous Source current (Body diode)	$T_c = 25^{\circ}C$			139	A	
		$T_c = 80^{\circ}C$			100		
$V_{SD}$	Diode Forward Voltage	$V_{GS} = 0V, I_S = -139A$			1.3	V	
$dv/dt$	Peak Diode Recovery ①				8	V/ns	
$t_{rr}$	Reverse Recovery Time	$I_S = -139A$ $V_R = 66V$ $di_S/dt = 100A/\mu s$	$T_j = 25^{\circ}C$			190	ns
			$T_j = 125^{\circ}C$			370	
$Q_{rr}$	Reverse Recovery Charge		$T_j = 25^{\circ}C$		0.4		$\mu C$
			$T_j = 125^{\circ}C$		1.7		

①  $dv/dt$  numbers reflect the limitations of the circuit rather than the device itself.

$$I_S \leq -139A \quad di/dt \leq 700A/\mu s \quad V_R \leq V_{DSS} \quad T_j \leq 150^{\circ}C$$

## Thermal and package characteristics

Symbol	Characteristic	Min	Max	Unit		
V <sub>ISOL</sub>	RMS Isolation Voltage, any terminal to case t=1 min, 50/60Hz	4000		V		
T <sub>J</sub>	Operating junction temperature range	-40	150	°C		
T <sub>JOP</sub>	Recommended junction temperature under switching conditions	-40	T <sub>Jmax</sub> - 25			
T <sub>STG</sub>	Storage Temperature Range	-40	125			
T <sub>C</sub>	Operating Case Temperature	-40	125			
Torque	Mounting torque	To heatsink	M4	2	3	N.m
Wt	Package Weight				110	g

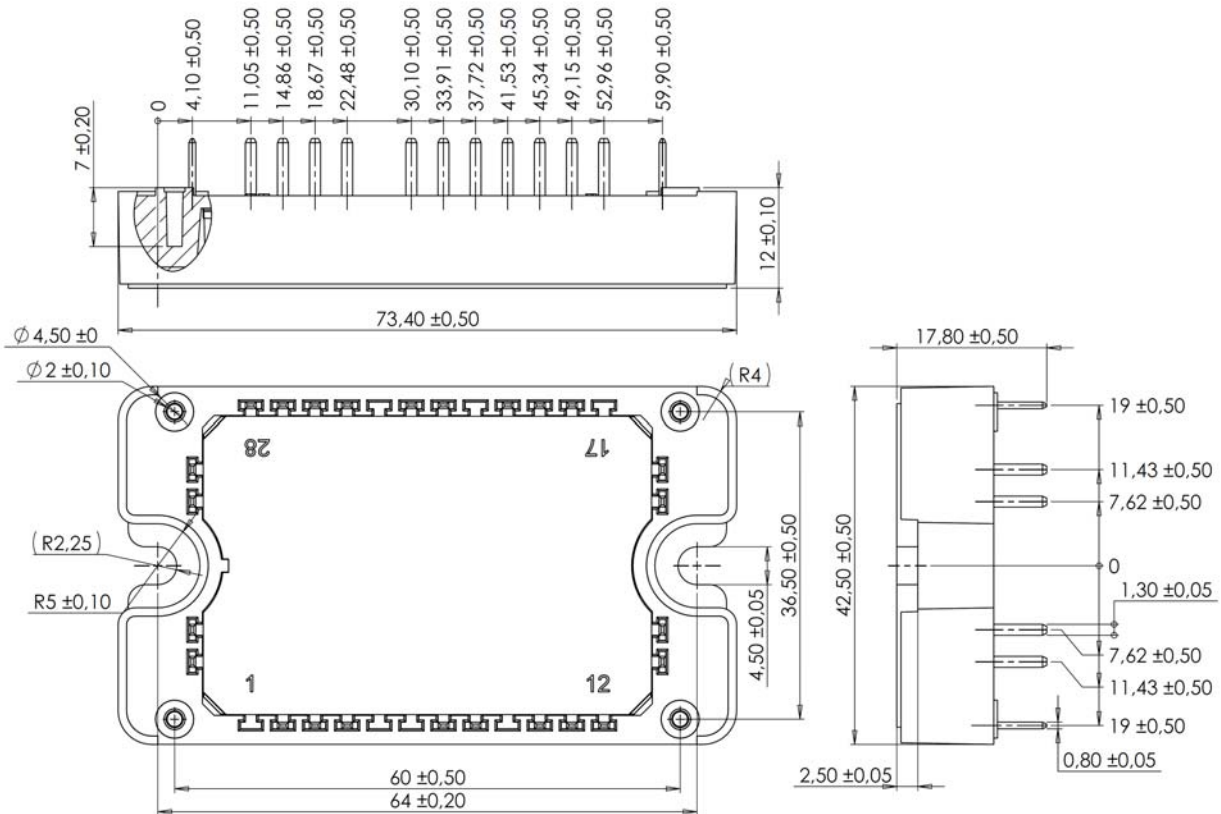
## Temperature sensor NTC (see application note APT0406 on [www.microsemi.com](http://www.microsemi.com) for more information).

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

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

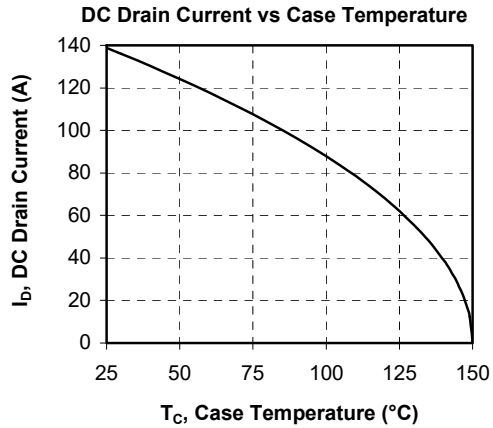
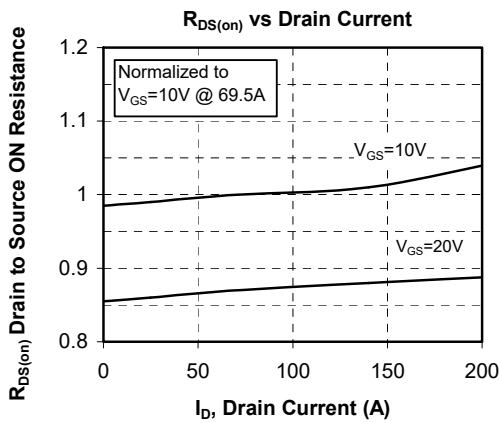
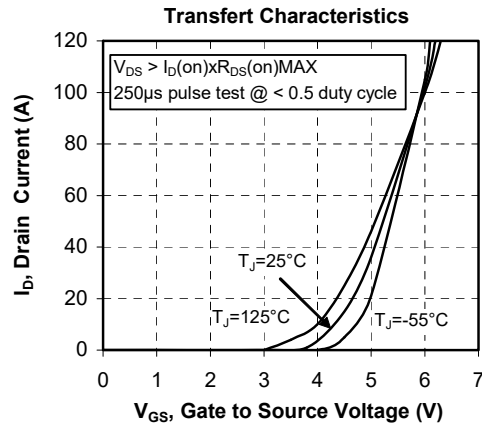
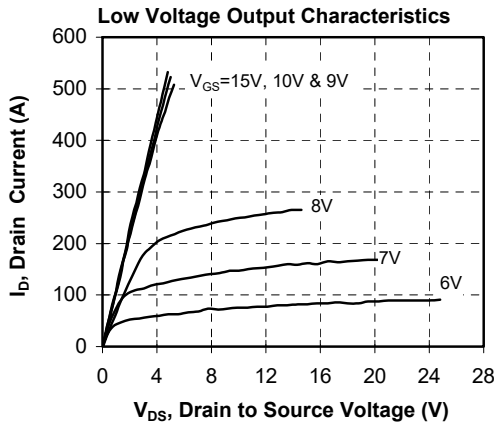
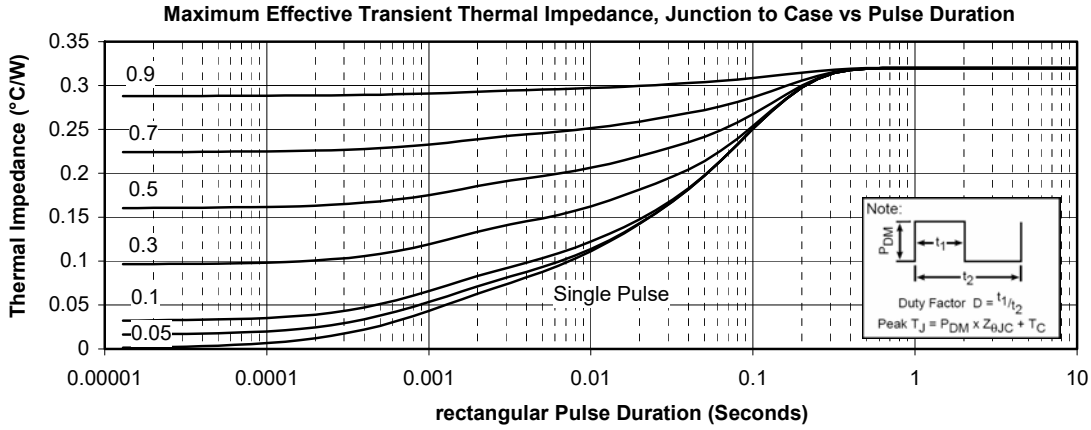
T: Thermistor temperature  
R<sub>T</sub>: Thermistor value at T

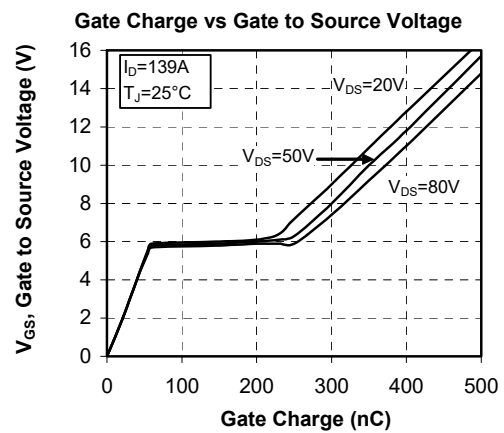
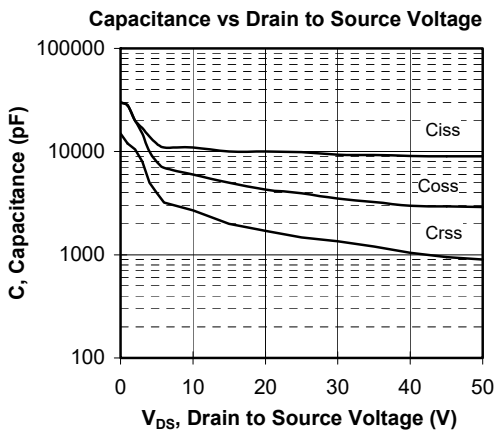
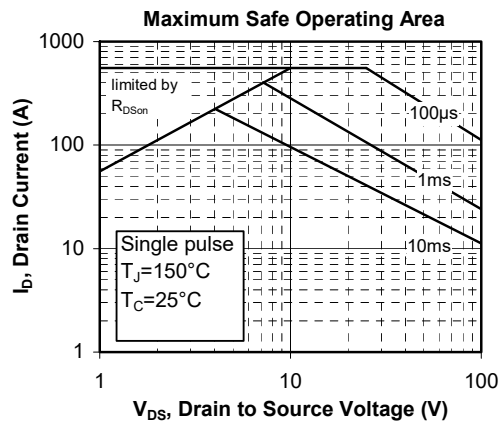
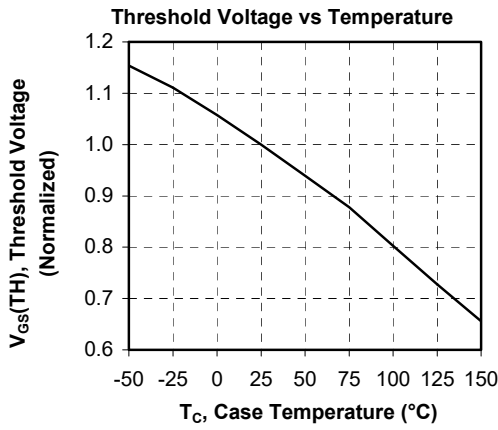
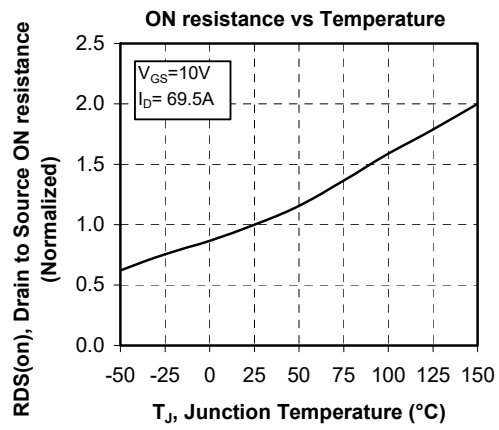
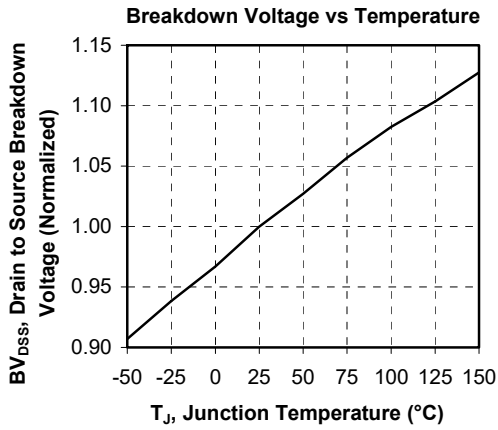
## Package outline (dimensions in mm)

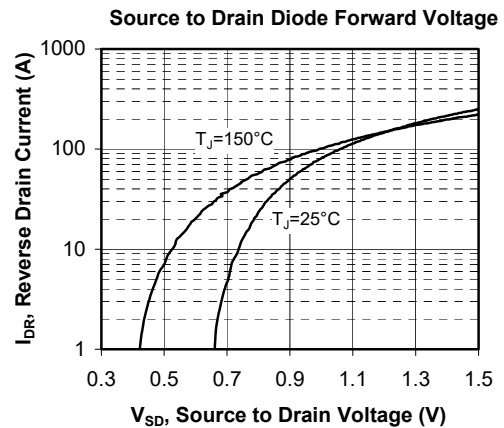
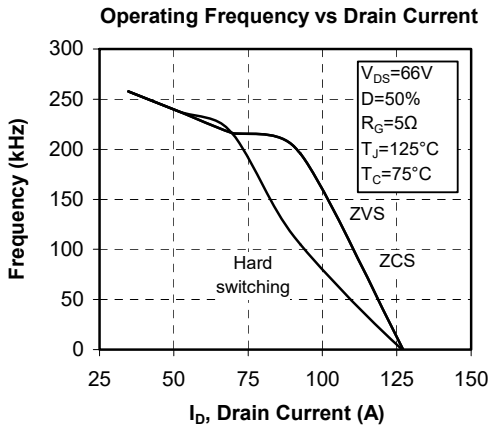
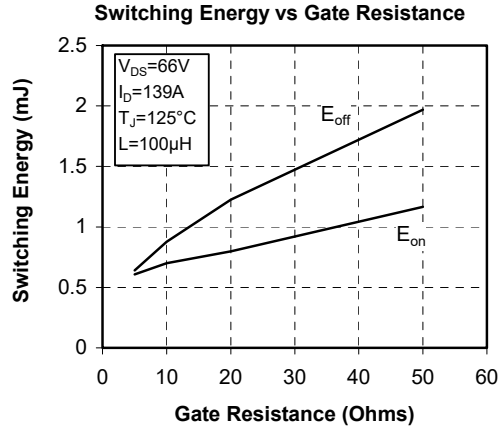
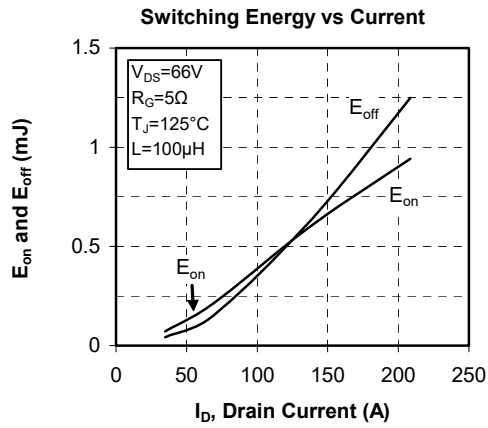
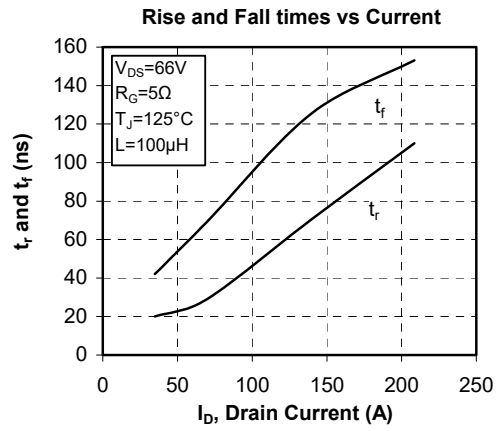
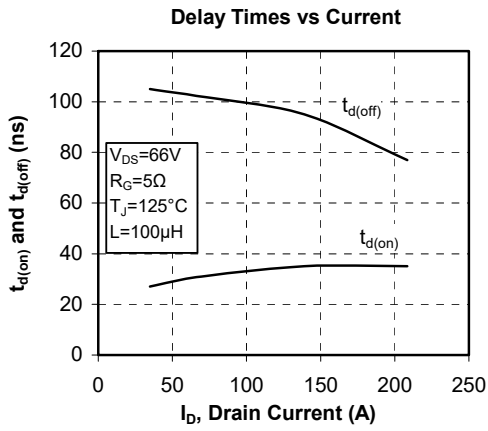


See application note 1906 - Mounting Instructions for SP3F Power Modules on [www.microsemi.com](http://www.microsemi.com)

## Typical Performance Curve







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