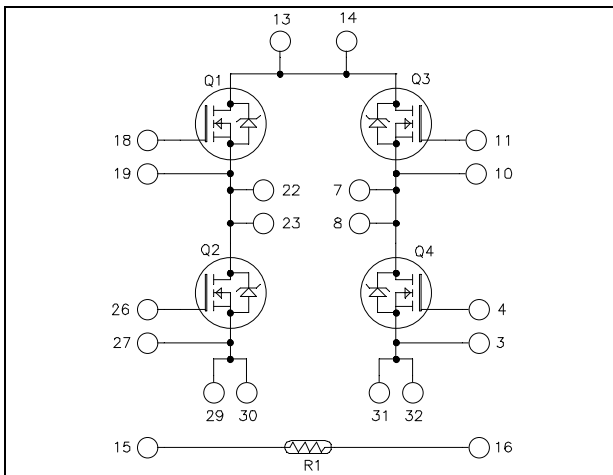


**Full - Bridge  
Super Junction MOSFET  
Power Module**

**$V_{DSS} = 600V$   
 $R_{DSon} = 35m\Omega \text{ max @ } T_j = 25^\circ C$   
 $I_D = 72A \text{ @ } T_c = 25^\circ C$**



### Application

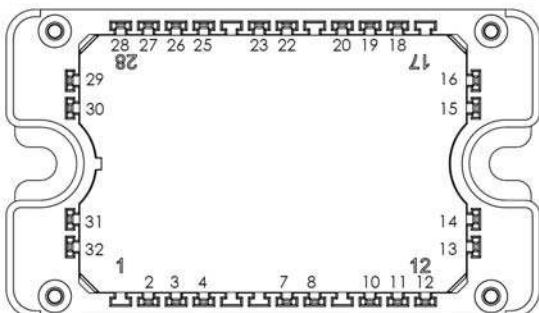
- Welding converters
- Switched Mode Power Supplies
- Uninterruptible Power Supplies

### Features

- **Super junction MOSFET**
  - Ultra low  $R_{DSon}$
  - Low Miller capacitance
  - Ultra low gate charge
  - 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 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 (per super junction MOSFET)

Symbol	Parameter	Max ratings	Unit
$V_{DSS}$	Drain - Source 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	$\pm 20$	V
$R_{DSon}$	Drain - Source ON Resistance	35	$m\Omega$
$P_D$	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.

**Electrical Characteristics** (per super junction MOSFET)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{GS} = 0V, V_{DS} = 600V$			40	$\mu A$
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10V, I_D = 72A$			35	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 5.4mA$	2.1	3	3.9	V
$I_{GSS}$	Gate – Source Leakage Current	$V_{GS} = \pm 20V, V_{DS} = 0V$			$\pm 150$	nA

**Dynamic Characteristics** (per super junction MOSFET)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$C_{iss}$	Input Capacitance	$V_{GS} = 0V$		14		nF
$C_{oss}$	Output Capacitance	$V_{DS} = 25V$		5.13		
$C_{rss}$	Reverse Transfer Capacitance	$f = 1MHz$		0.42		
$Q_g$	Total gate Charge	$V_{GS} = 10V$		518		nC
$Q_{gs}$	Gate – Source Charge	$V_{Bus} = 300V$		58		
$Q_{gd}$	Gate – Drain Charge	$I_D = 72A$		222		
$T_{d(on)}$	Turn-on Delay Time	<b>Inductive Switching @ 125°C</b> $V_{GS} = 15V$ $V_{Bus} = 400V$ $I_D = 72A$ $R_G = 2.5\Omega$		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	<b>Inductive switching @ 25°C</b> $V_{GS} = 15V, V_{Bus} = 400V$ $I_D = 72A, R_G = 2.5\Omega$		1340		$\mu J$
$E_{off}$	Turn-off Switching Energy			1960		
$E_{on}$	Turn-on Switching Energy	<b>Inductive switching @ 125°C</b> $V_{GS} = 15V, V_{Bus} = 400V$ $I_D = 72A, R_G = 2.5\Omega$		2192		$\mu J$
$E_{off}$	Turn-off Switching Energy			2412		
$R_{thJC}$	Junction to Case Thermal Resistance				0.30	$^{\circ}C/W$

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

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$I_S$	Continuous Source current (Body diode)	$T_c = 25^{\circ}C$		72		A
		$T_c = 80^{\circ}C$		54		
$V_{SD}$	Diode Forward Voltage	$V_{GS} = 0V, I_S = -72A$			1.2	V
$dv/dt$	Peak Diode Recovery ❶				6	V/ns
$t_{rr}$	Reverse Recovery Time	$I_S = -72A$ $V_R = 350V$		580		ns
$Q_{rr}$	Reverse Recovery Charge	$di_S/dt = 200A/\mu s$		46		$\mu C$

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

$$I_S \leq -72A \quad di/dt \leq 200A/\mu s \quad V_R \leq V_{DSS} \quad T_j \leq 150^{\circ}C$$

## 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	100			
Torque	Mounting torque	To heatsink	M4	2.5	4.7	N.m
Wt	Package Weight				110	g

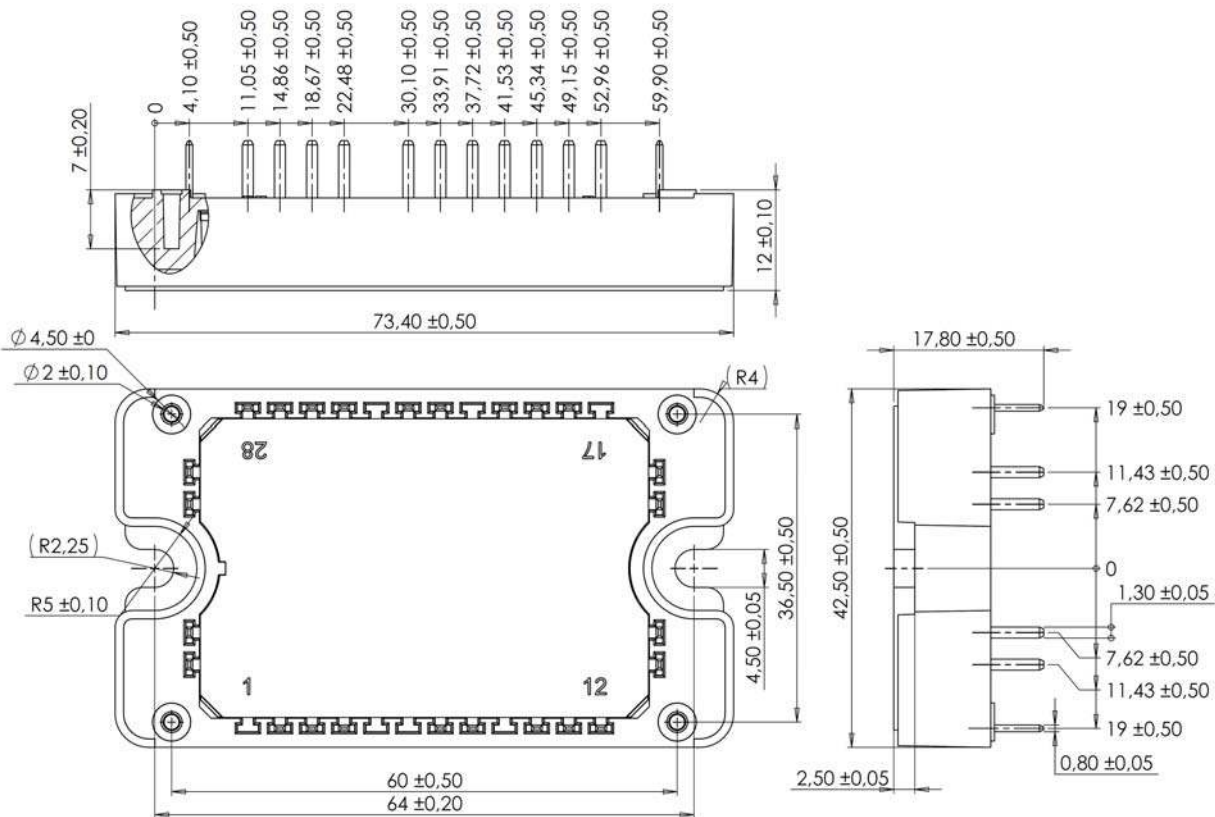
## Temperature sensor NTC (see application note APT0406 on www.microsemi.com for more information).

Symbol	Characteristic	Min	Typ	Max	Unit
R <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		%

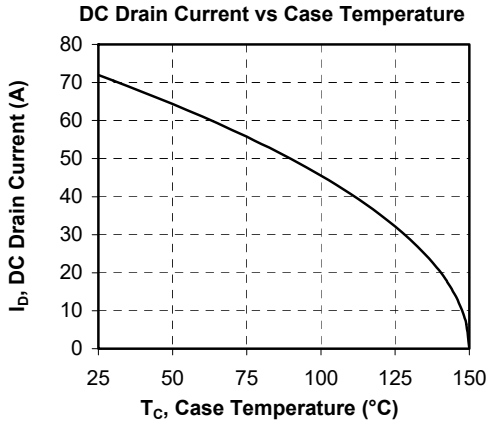
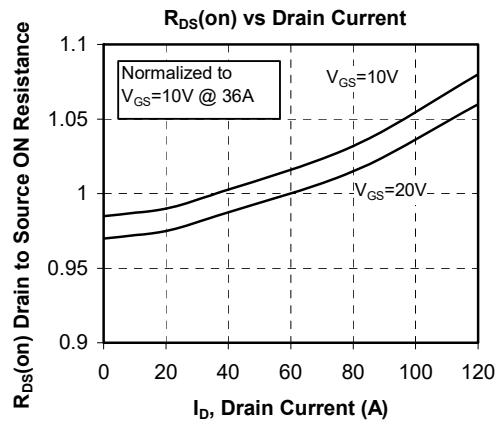
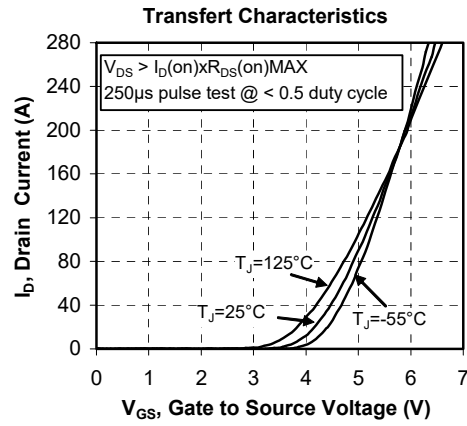
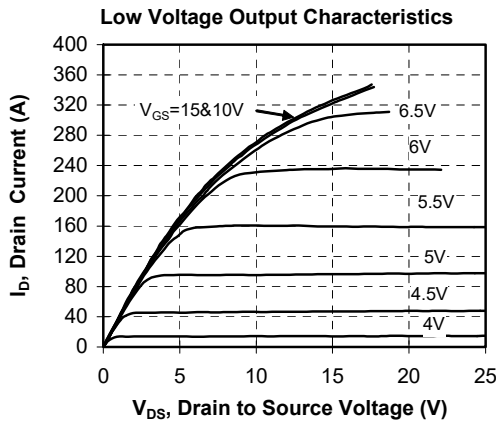
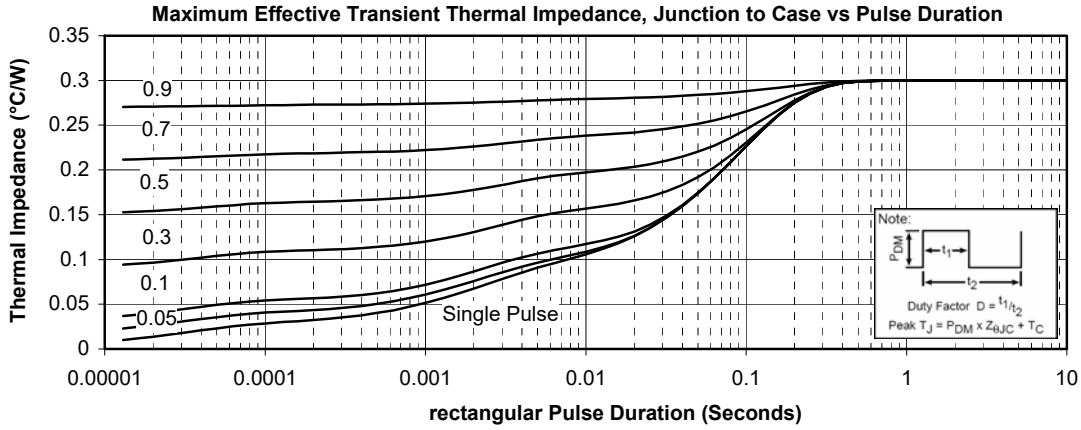
$$R_T = \frac{R_{25}}{\exp\left[B_{25/85}\left(\frac{1}{T_{25}} - \frac{1}{T}\right)\right]}$$

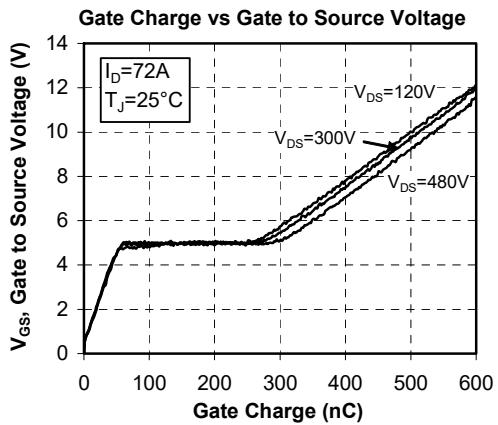
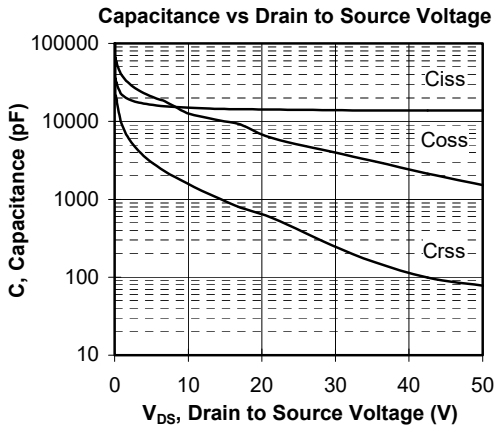
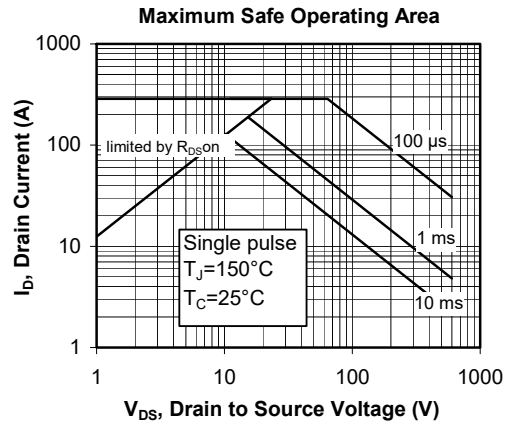
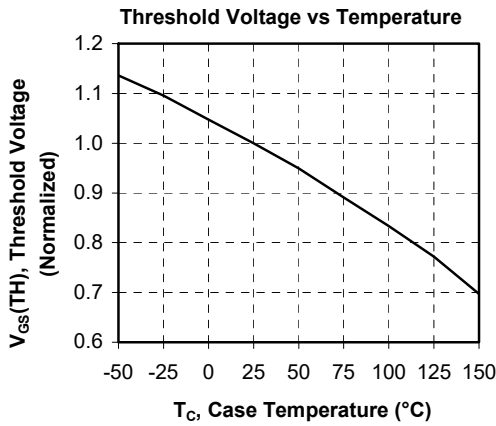
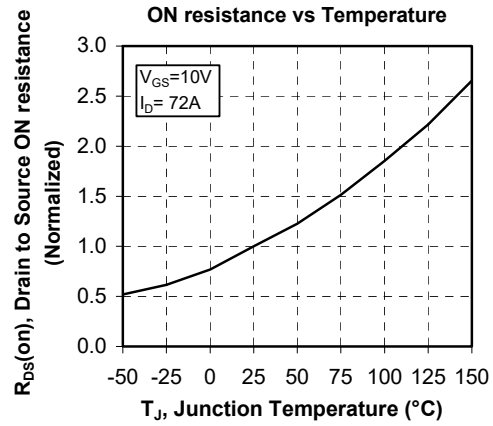
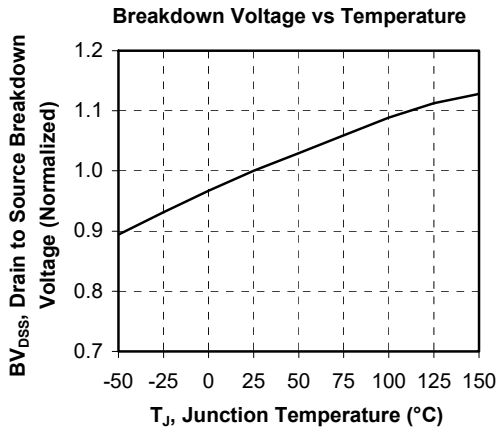
T: Thermistor temperature  
 R<sub>T</sub>: Thermistor value at T

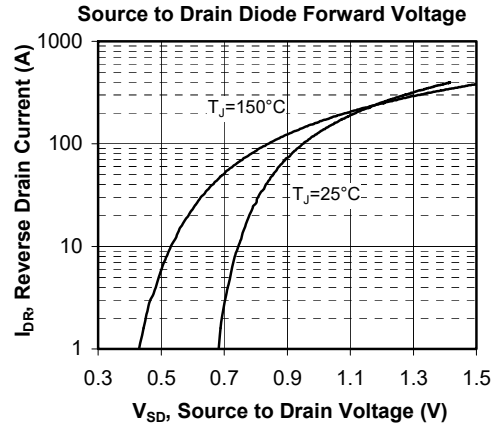
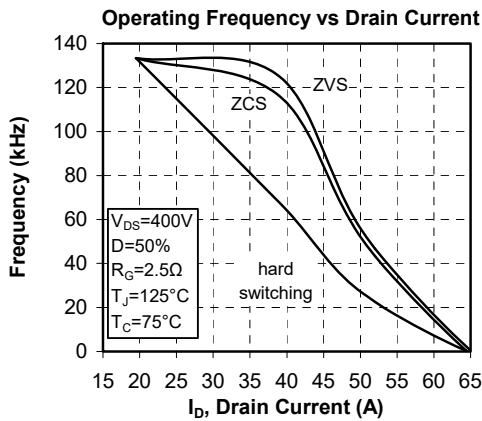
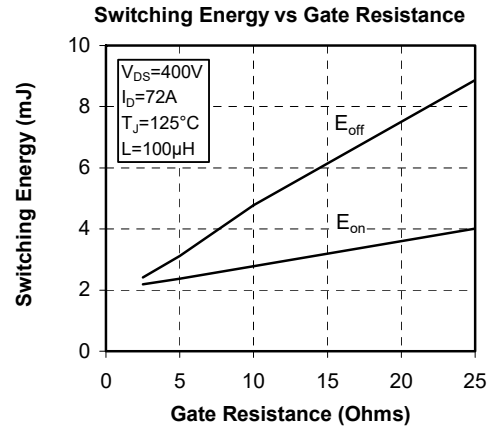
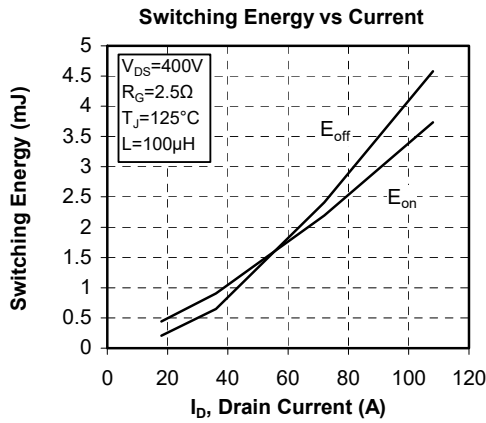
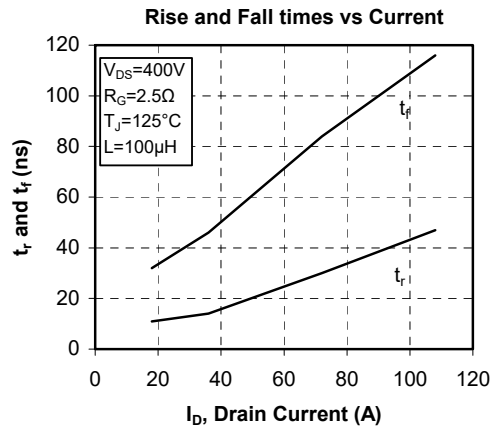
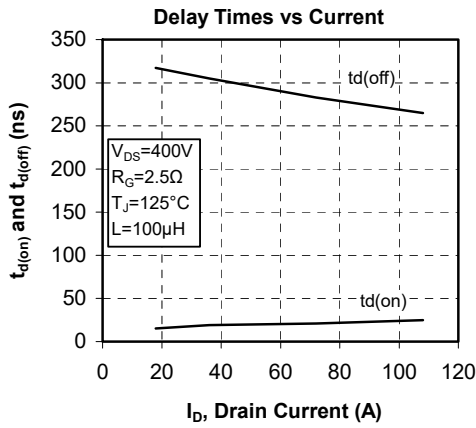
## Package outline (dimensions in mm)



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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