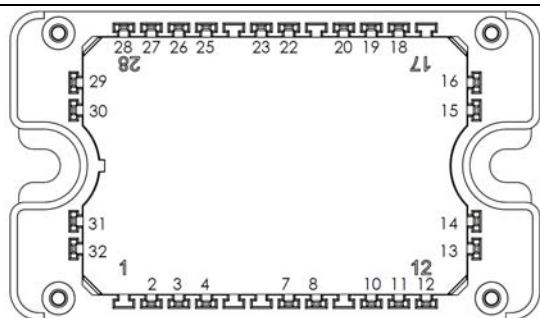
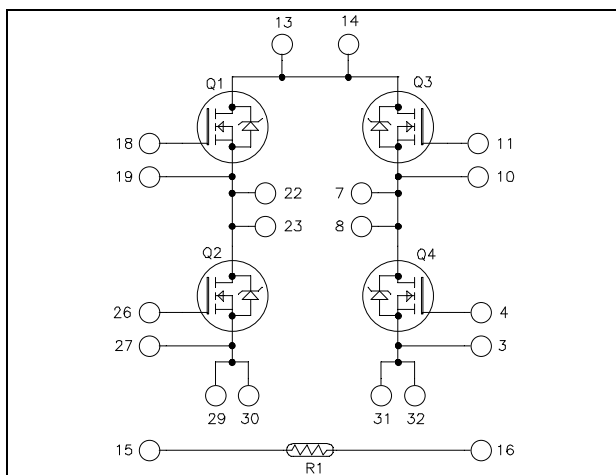


## Full - Bridge MOSFET Power Module

$$V_{DSS} = 100V$$

$$R_{DSon} = 19m\Omega \text{ typ @ } T_j = 25^\circ C$$

$$I_D = 70A \text{ @ } T_c = 25^\circ C$$



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	$T_c = 25^\circ C$	A
		$T_c = 80^\circ C$	
$I_{DM}$	Pulsed Drain current	300	
$V_{GS}$	Gate - Source Voltage	$\pm 30$	V
$R_{DSon}$	Drain - Source ON Resistance	21	m $\Omega$
$P_D$	Power Dissipation	$T_c = 25^\circ C$	W
$I_{AR}$	Avalanche current (repetitive and non repetitive)	75	A
$E_{AR}$	Repetitive Avalanche Energy	30	mJ
$E_{AS}$	Single Pulse Avalanche Energy	1500	

**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	$V_{GS} = 0V, V_{DS} = 100V$			250	$\mu A$
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10V, I_D = 35A$		19	21	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 1mA$	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	$V_{GS} = 0V$		5100		pF
$C_{oss}$	Output Capacitance	$V_{DS} = 25V$		1900		
$C_{rss}$	Reverse Transfer Capacitance	$f = 1MHz$		800		
$Q_g$	Total gate Charge	$V_{GS} = 10V$		200		nC
$Q_{gs}$	Gate – Source Charge	$V_{Bus} = 100V$		40		
$Q_{gd}$	Gate – Drain Charge	$I_D = 70A$		92		
$T_{d(on)}$	Turn-on Delay Time	<b>Inductive switching @ 125°C</b> $V_{GS} = 15V$ $V_{Bus} = 66V$ $I_D = 70A$ $R_G = 5\Omega$		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> $V_{GS} = 15V, V_{Bus} = 66V$ $I_D = 70A, R_G = 5\Omega$		276		$\mu J$
$E_{off}$	Turn-off Switching Energy			302		
$E_{on}$	Turn-on Switching Energy	<b>Inductive switching @ 125°C</b> $V_{GS} = 15V, V_{Bus} = 66V$ $I_D = 70A, R_G = 5\Omega$		304		$\mu J$
$E_{off}$	Turn-off Switching Energy			320		
$R_{thJC}$	Junction to Case Thermal Resistance				0.6	$^{\circ}C/W$

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

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
I <sub>S</sub>	Continuous Source current (Body diode)		T <sub>C</sub> = 25°C			70	A
			T <sub>C</sub> = 80°C			50	
V <sub>SD</sub>	Diode Forward Voltage	V <sub>GS</sub> = 0V, I <sub>S</sub> = - 70A				1.3	V
dv/dt	Peak Diode Recovery ❶					5	V/ns
t <sub>rr</sub>	Reverse Recovery Time	I <sub>S</sub> = -70A V <sub>Bus</sub> = 66V di <sub>S</sub> /dt = 100A/μs	T <sub>j</sub> = 25°C			200	ns
			T <sub>j</sub> = 125°C			350	
Q <sub>rr</sub>	Reverse Recovery Charge		T <sub>j</sub> = 25°C		0.5		μC
			T <sub>j</sub> = 125°C		1		

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

$$I_S \leq -70A \quad di/dt \leq 700A/\mu s \quad V_R \leq V_{DSS} \quad T_j \leq 150^{\circ}C$$

**Thermal and package characteristics**

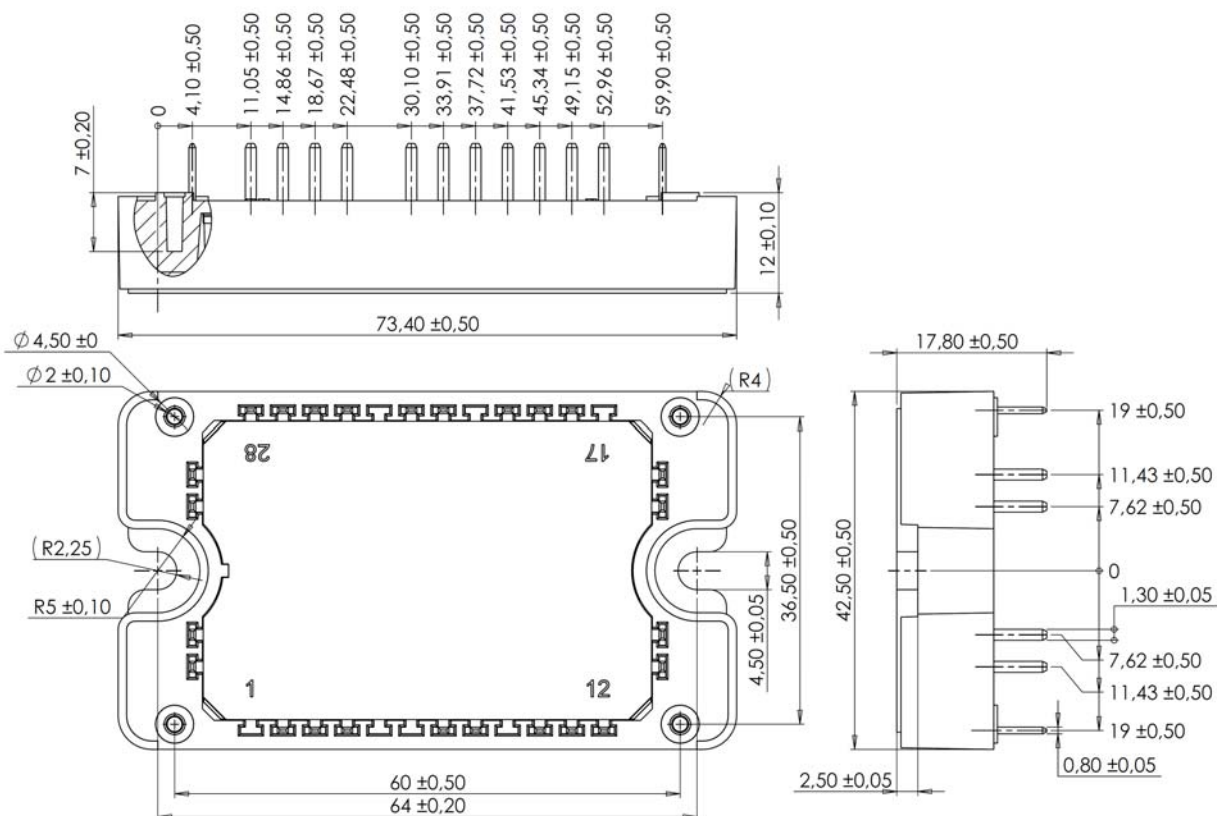
Symbol	Characteristic	Min	Max	Unit
V <sub>ISOL</sub>	RMS Isolation Voltage, any terminal to case t=1 min, 50/60Hz	4000		V
T <sub>J</sub>	Operating junction temperature range	-40	150	°C
T <sub>JOP</sub>	Recommended junction temperature under switching conditions	-40	T <sub>Jmax</sub> - 25	
T <sub>STG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

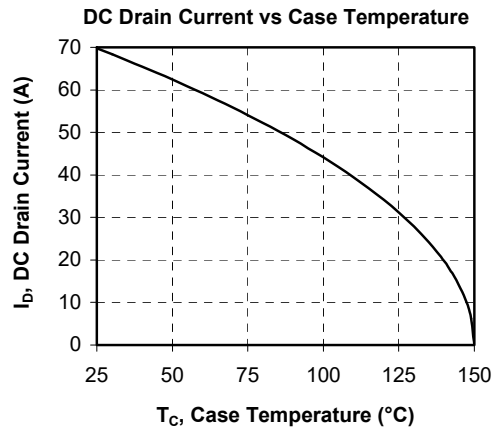
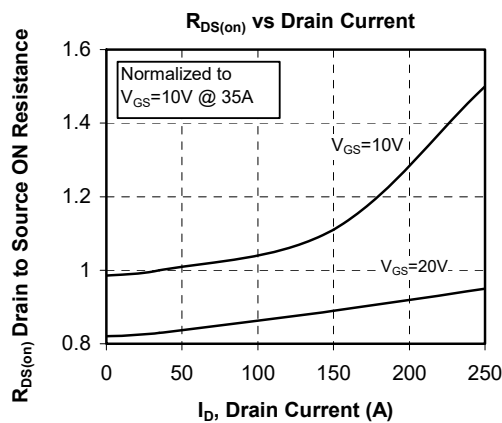
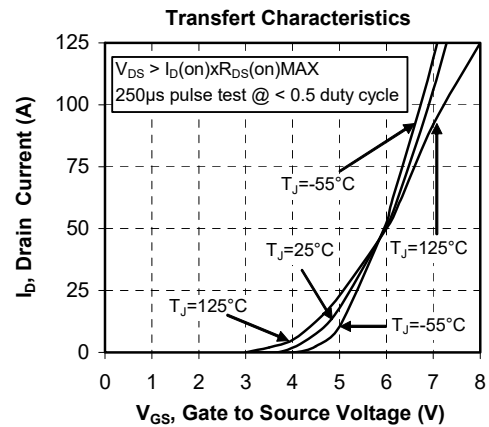
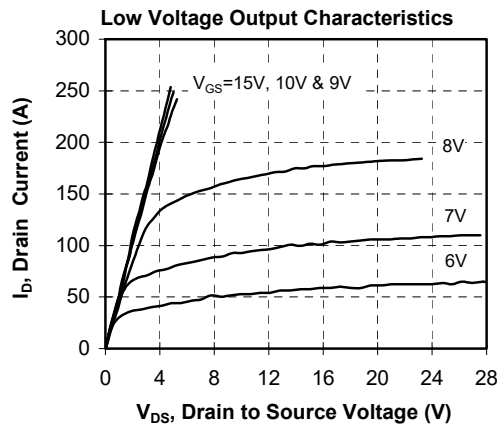
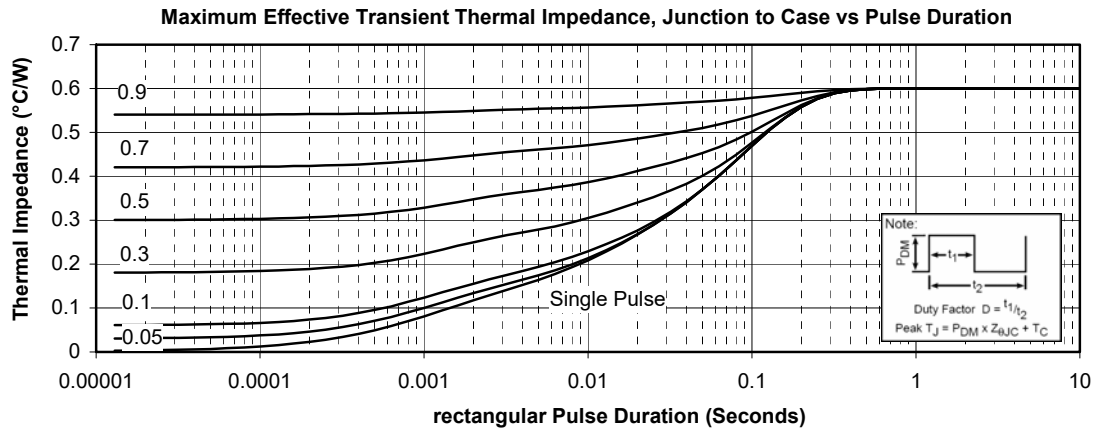
Symbol	Characteristic	Min	Typ	Max	Unit
R <sub>25</sub>	Resistance @ 25°C		50		kΩ
ΔR <sub>25</sub> /R <sub>25</sub>			5		%
B <sub>25/85</sub>	T <sub>25</sub> = 298.15 K		3952		K
ΔB/B	T <sub>C</sub> = 100°C		4		%

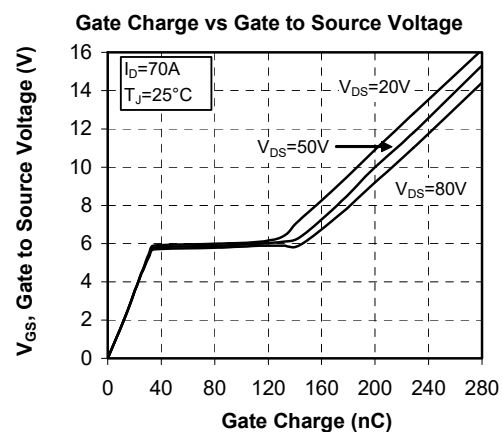
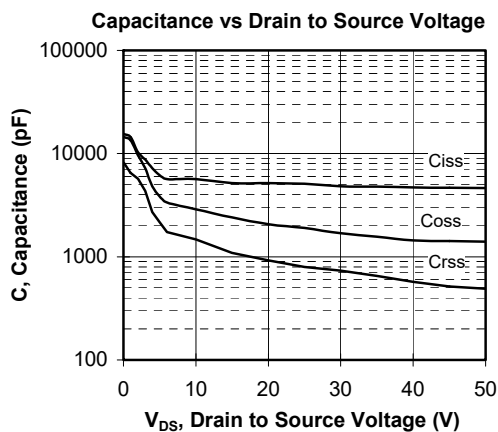
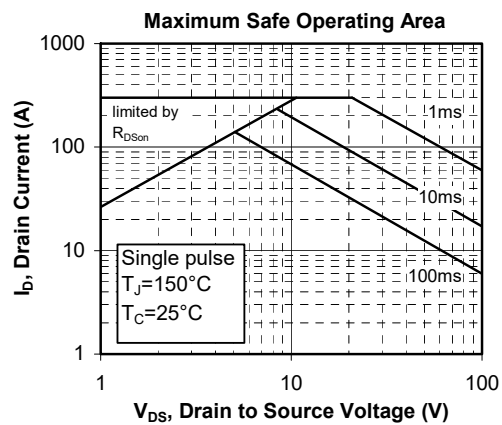
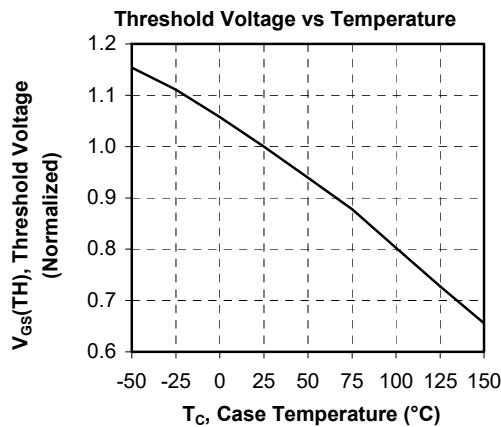
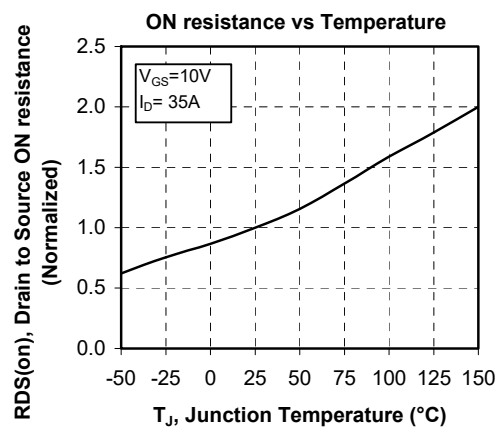
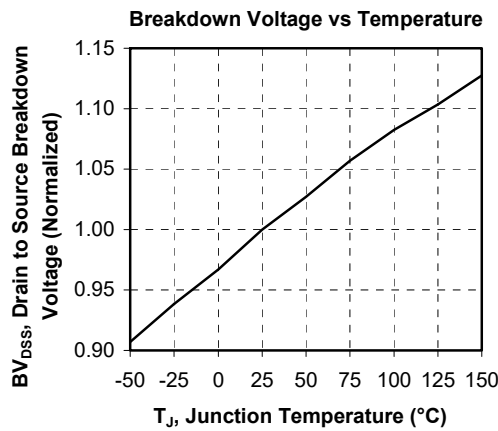
$$R_T = \frac{R_{25}}{\exp \left[ B_{25/85} \left( \frac{1}{T_{25}} - \frac{1}{T} \right) \right]}$$

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

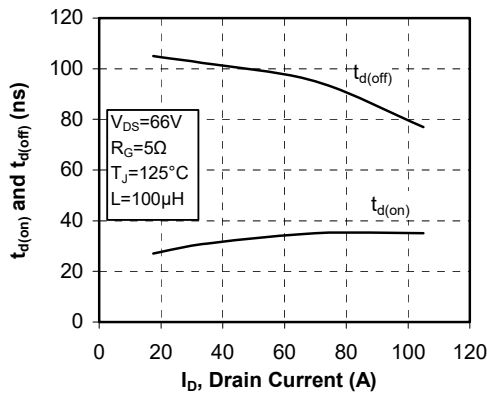
**Package outline** (dimensions in mm)

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

## Typical Performance Curve

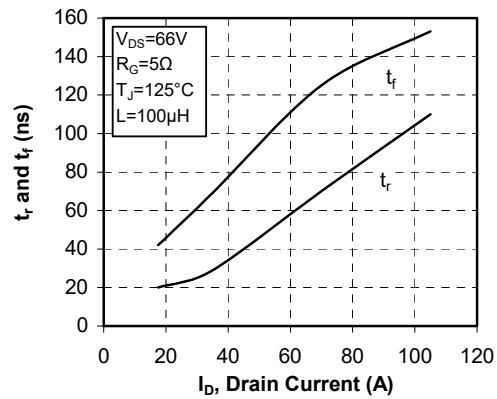




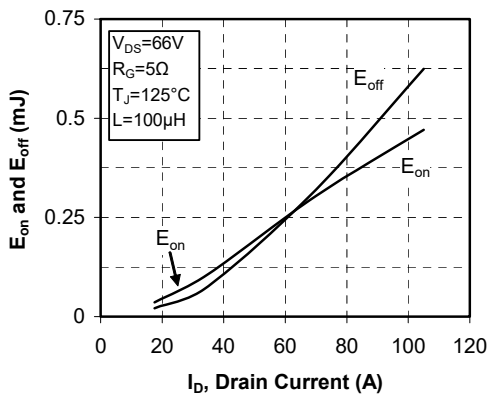
**Delay Times vs Current**



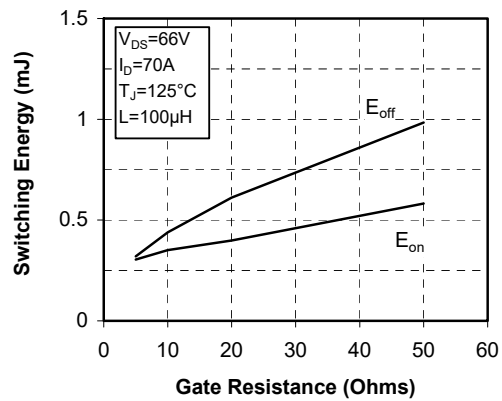
**Rise and Fall times vs Current**



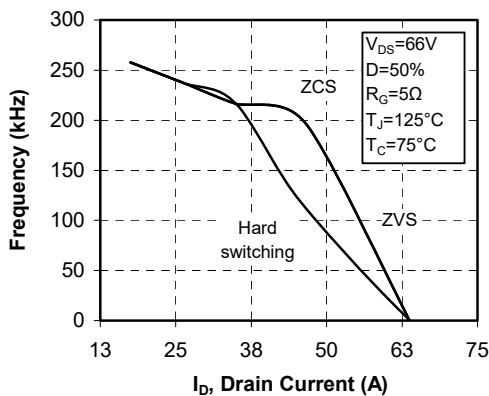
**Switching Energy vs Current**



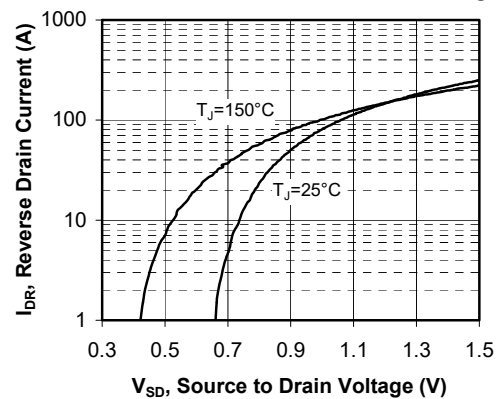
**Switching Energy vs Gate Resistance**



**Operating Frequency vs Drain Current**



**Source to Drain Diode Forward Voltage**



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