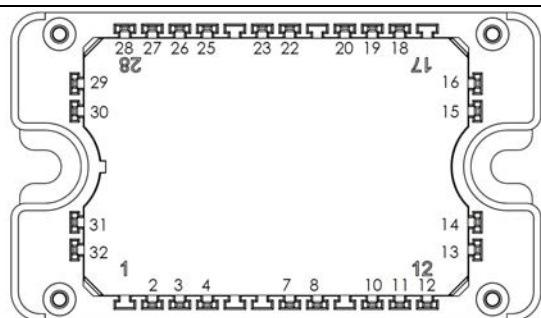
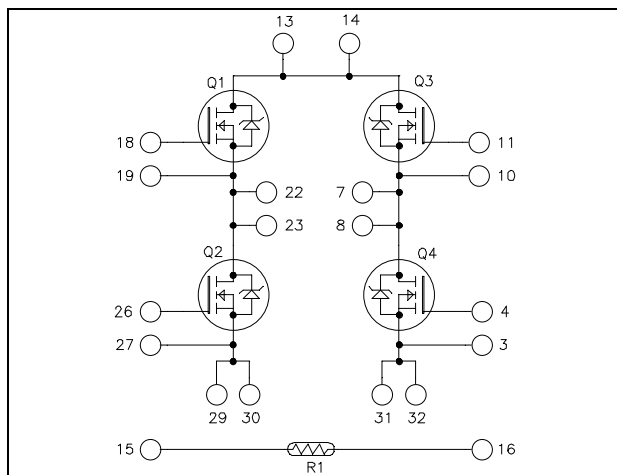


Full - Bridge MOSFET Power Module

$V_{DSS} = 100V$
 $R_{DSon} = 9m\Omega$ 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® 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	430	
V_{GS}	Gate - Source Voltage	± 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	μA
$R_{DS(on)}$	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	$V_{GS} = \pm 30V, V_{DS} = 0V$			± 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	Inductive switching @ 125°C $V_{GS} = 15V$ $V_{Bus} = 66V$ $I_D = 139A$ $R_G = 5\Omega$		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	Inductive switching @ 25°C $V_{GS} = 15V, V_{Bus} = 66V$ $I_D = 139A, R_G = 5\Omega$		552		μJ
E_{off}	Turn-off Switching Energy			604		
E_{on}	Turn-on Switching Energy	Inductive switching @ 125°C $V_{GS} = 15V, V_{Bus} = 66V$ $I_D = 139A, R_G = 5\Omega$		608		μJ
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°C			139	A
			T _C = 80°C			100	
V _{SD}	Diode Forward Voltage	V _{GS} = 0V, I _S = - 139A				1.3	V
dv/dt	Peak Diode Recovery ❶					8	V/ns
t _{rr}	Reverse Recovery Time	I _S = - 139A V _R = 66V di _S /dt = 100A/μs	T _J = 25°C			190	ns
			T _J = 125°C			370	
Q _{rr}	Reverse Recovery Charge		T _J = 25°C		0.4		μC
			T _J = 125°C		1.7		

❶ 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

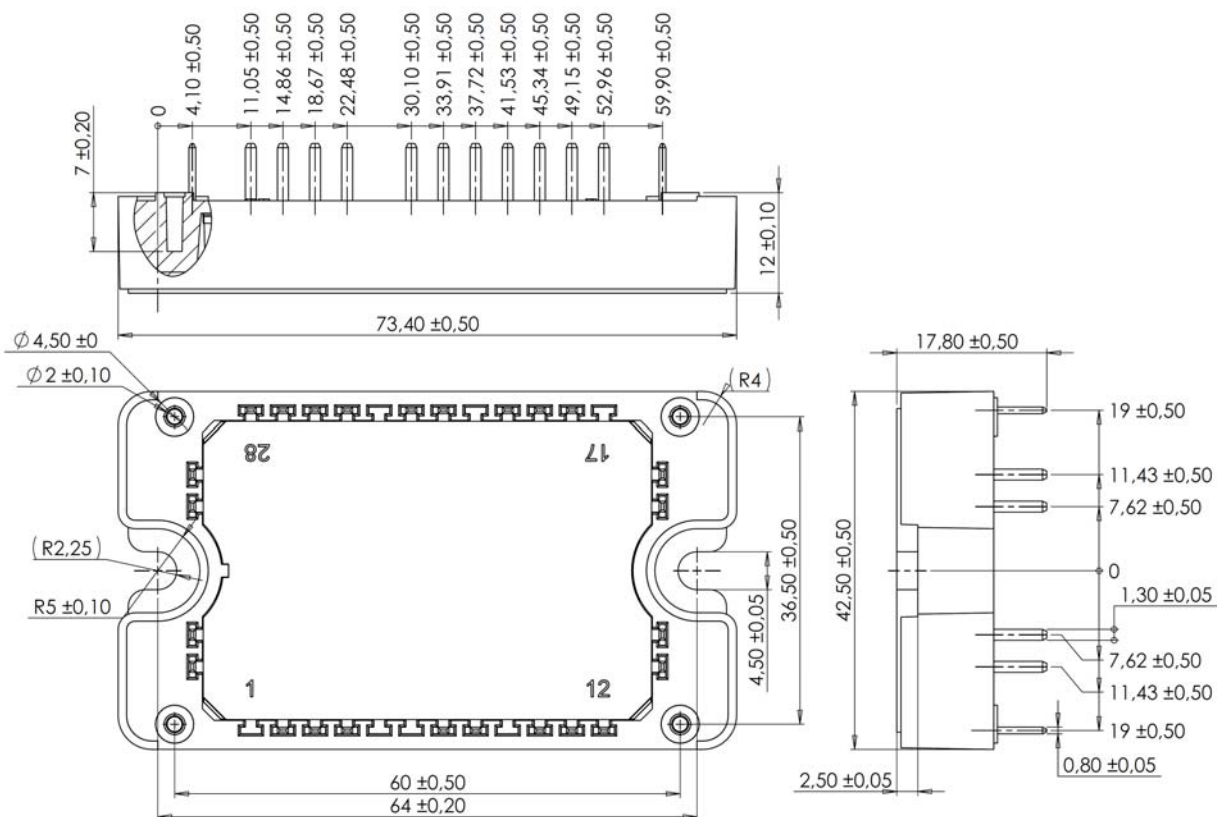
Symbol	Characteristic	Min	Max	Unit
V _{ISOL}	RMS Isolation Voltage, any terminal to case t=1 min, 50/60Hz	4000		V
T _J	Operating junction temperature range	-40	150	°C
T _{JOP}	Recommended junction temperature under switching conditions	-40	T _{Jmax} - 25	
T _{STG}	Storage Temperature Range	-40	125	
T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

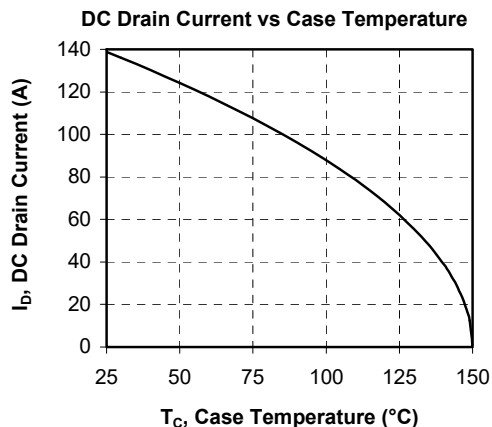
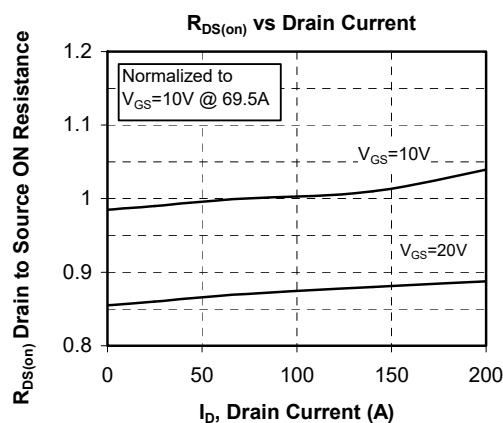
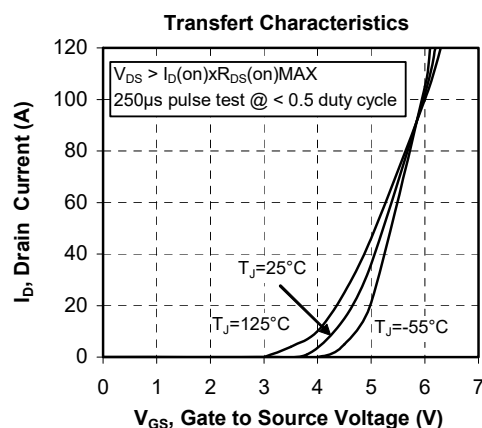
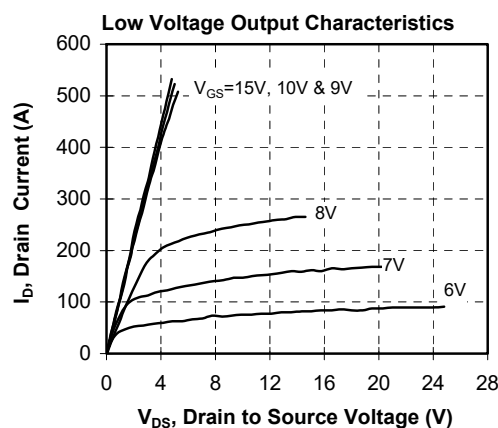
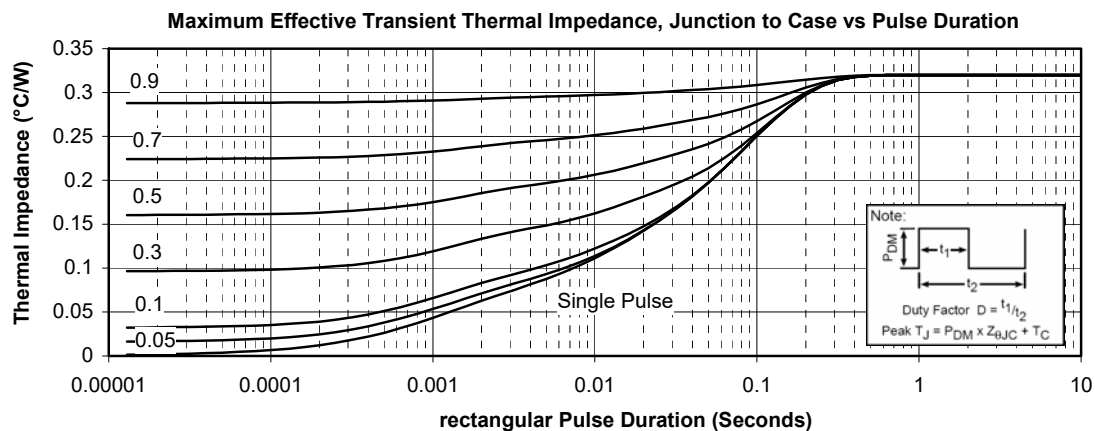
$$R_T = \frac{R_{25}}{\exp \left[B_{25/85} \left(\frac{1}{T_{25}} - \frac{1}{T} \right) \right]}$$

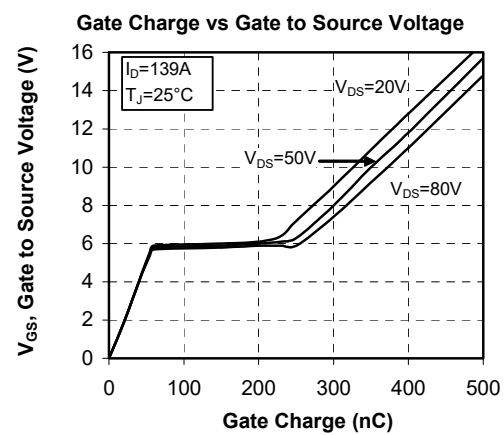
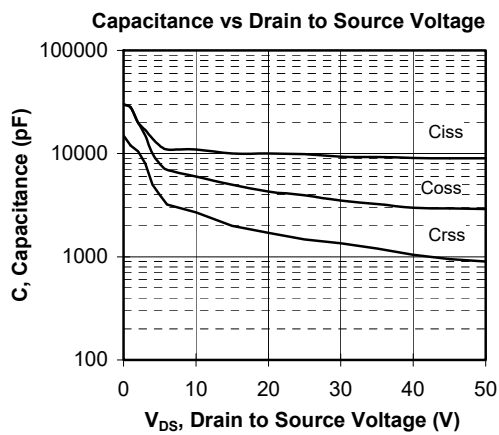
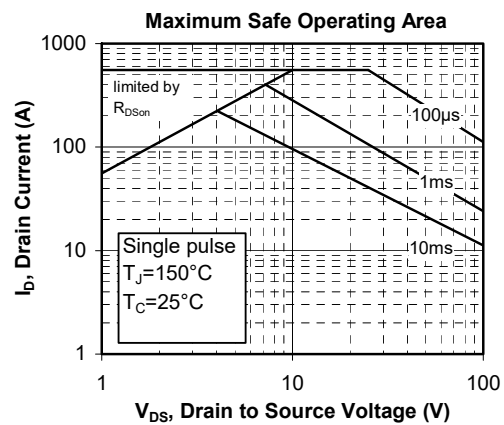
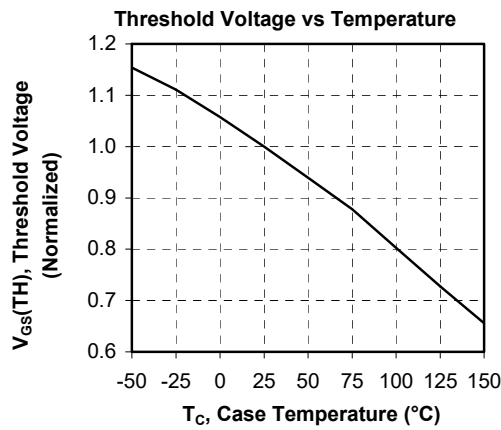
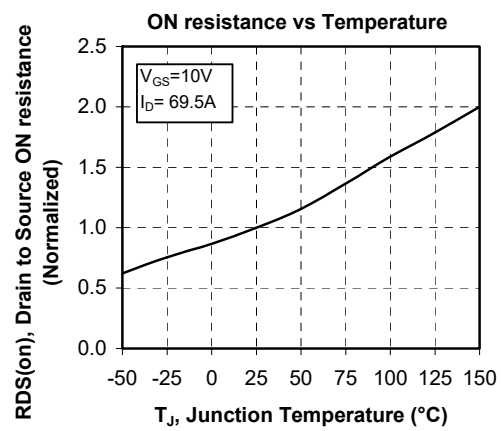
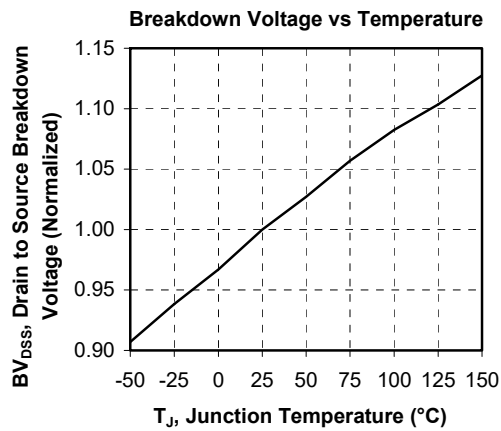
T: Thermistor temperature
 R_T: Thermistor value at T

Package outline (dimensions in mm)


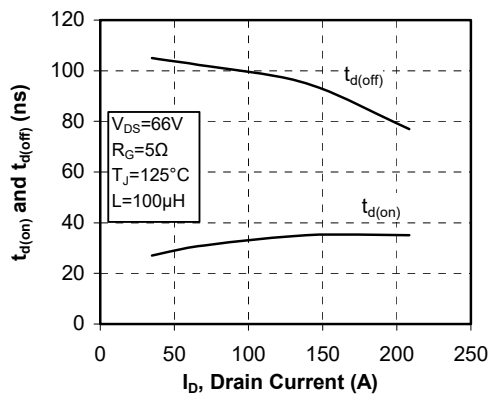
See application note 1906 - Mounting Instructions for SP3F Power Modules on www.microsemi.com

Typical Performance Curve

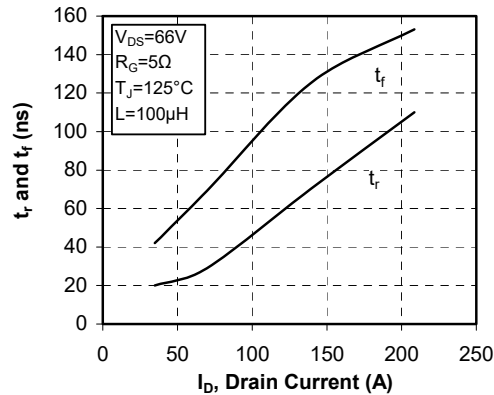




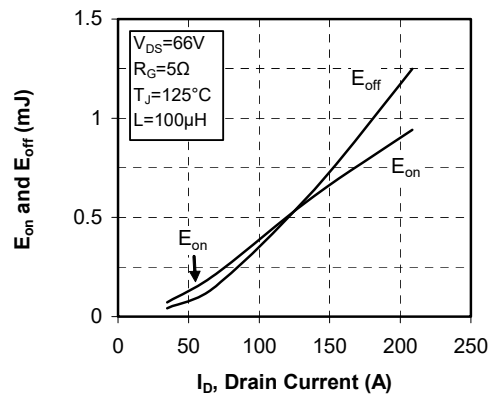
Delay Times vs Current



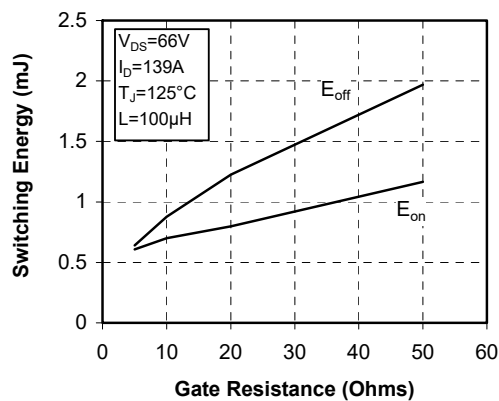
Rise and Fall times vs Current



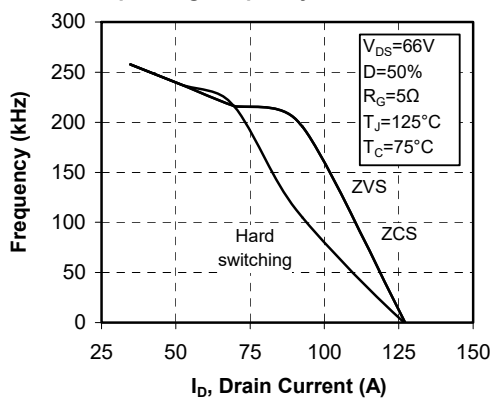
Switching Energy vs Current



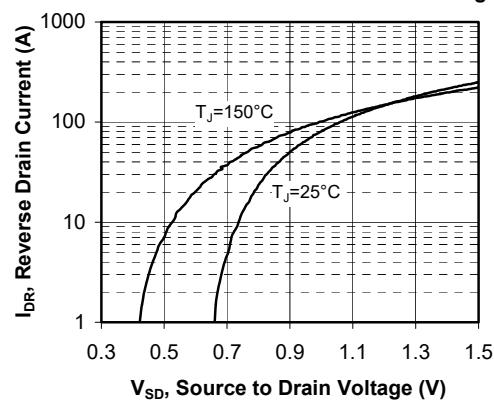
Switching Energy vs Gate Resistance



Operating Frequency vs Drain Current



Source to Drain Diode Forward Voltage



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