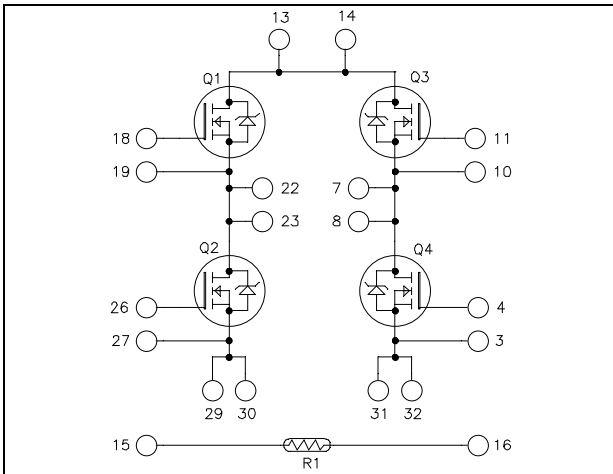


**Full - Bridge
MOSFET Power Module**

$V_{DSS} = 500V$
 $R_{DSon} = 65m\Omega$ typ @ $T_j = 25^\circ C$
 $I_D = 51A$ @ $T_c = 25^\circ C$

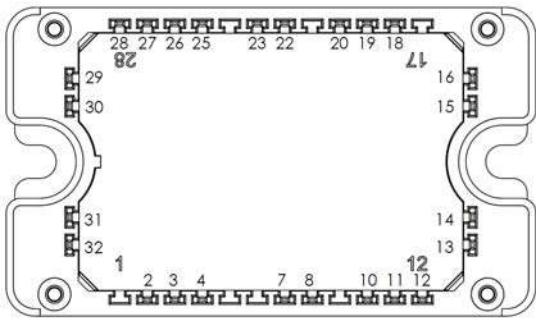


Application

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

Features

- **Power MOS 7® FREDFETs**
 - Low R_{DSon}
 - Low input and Miller capacitance
 - Low gate charge
 - Fast intrinsic reverse 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 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	500	V
I_D	Continuous Drain Current	$T_c = 25^\circ C$	51
		$T_c = 80^\circ C$	38
I_{DM}	Pulsed Drain current	204	A
V_{GS}	Gate - Source Voltage	± 30	V
R_{DSon}	Drain - Source ON Resistance	78	$m\Omega$
P_D	Power Dissipation	$T_c = 25^\circ C$	390
I_{AR}	Avalanche current (repetitive and non repetitive)	51	A
E_{AR}	Repetitive Avalanche Energy	50	mJ
E_{AS}	Single Pulse Avalanche Energy	3000	

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

Electrical Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} = 0V, V _{DS} = 500V			100	μA
R _{DS(on)}	Drain – Source on Resistance	V _{GS} = 10V, I _D = 25.5A		65	78	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} = V _{DS} , I _D = 2.5mA	3		5	V
I _{GSS}	Gate – Source Leakage Current	V _{GS} = ±30 V, V _{DS} = 0V			±150	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C _{iss}	Input Capacitance	V _{GS} = 0V		7000		pF
C _{oss}	Output Capacitance	V _{DS} = 25V		1400		
C _{rss}	Reverse Transfer Capacitance	f = 1MHz		90		
Q _g	Total gate Charge	V _{GS} = 10V		140		nC
Q _{gs}	Gate – Source Charge	V _{Bus} = 250V		40		
Q _{gd}	Gate – Drain Charge	I _D = 51A		70		
T _{d(on)}	Turn-on Delay Time	Inductive switching @ 125°C V _{GS} = 15V V _{Bus} = 333V I _D = 51A R _G = 3Ω		21		ns
T _r	Rise Time			38		
T _{d(off)}	Turn-off Delay Time			75		
T _f	Fall Time			93		
E _{on}	Turn-on Switching Energy	Inductive switching @ 25°C V _{GS} = 15V, V _{Bus} = 333V I _D = 51A, R _G = 3Ω		1035		μJ
E _{off}	Turn-off Switching Energy			845		
E _{on}	Turn-on Switching Energy	Inductive switching @ 125°C V _{GS} = 15V, V _{Bus} = 333V I _D = 51A, R _G = 3Ω		1556		μJ
E _{off}	Turn-off Switching Energy			1013		
R _{thJC}	Junction to Case Thermal Resistance				0.32	°C/W

Source - Drain diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit	
I _S	Continuous Source current (Body diode)	T _c = 25°C			51	A	
		T _c = 80°C			38		
V _{SD}	Diode Forward Voltage	V _{GS} = 0V, I _S = - 51A			1.3	V	
dv/dt	Peak Diode Recovery ❶				15	V/ns	
t _{rr}	Reverse Recovery Time	I _S = - 51A V _R = 333V di/dt = 100A/μs	T _j = 25°C			270	ns
			T _j = 125°C			540	
Q _{rr}	Reverse Recovery Charge	I _S = - 51A V _R = 333V di/dt = 100A/μs	T _j = 25°C		2.6	μC	
			T _j = 125°C		9.6		

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

$$I_S \leq - 51A \quad di/dt \leq 700A/\mu s \quad V_R \leq V_{DSS} \quad T_j \leq 150^\circ C$$

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	2	3	N.m
Wt	Package Weight				110	g

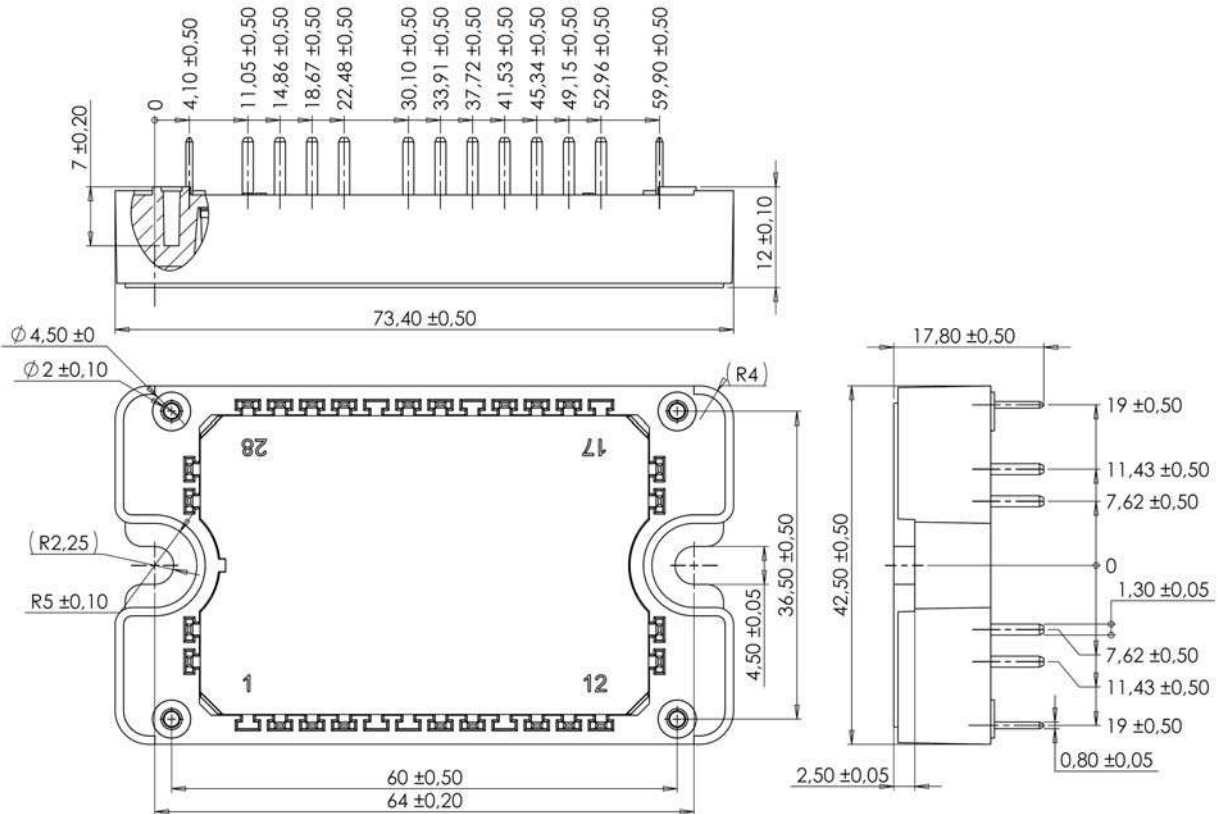
Temperature sensor NTC (see application note APT0406 on www.microsemi.com for more information).

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		%

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

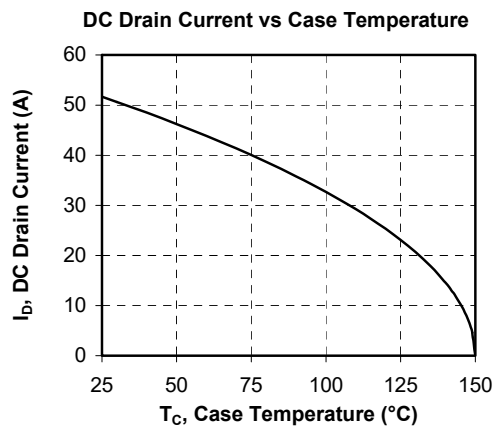
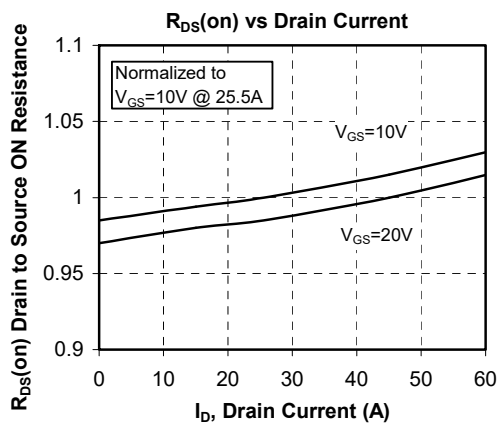
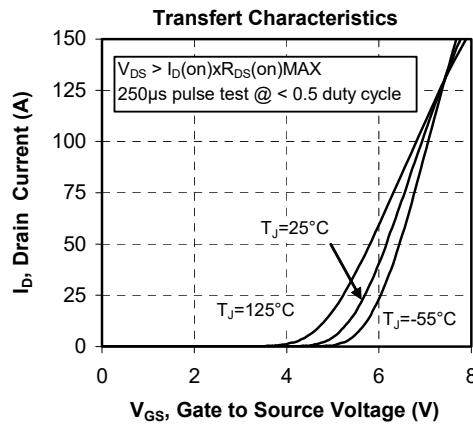
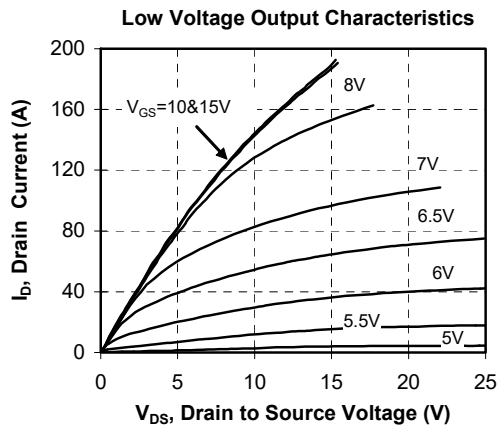
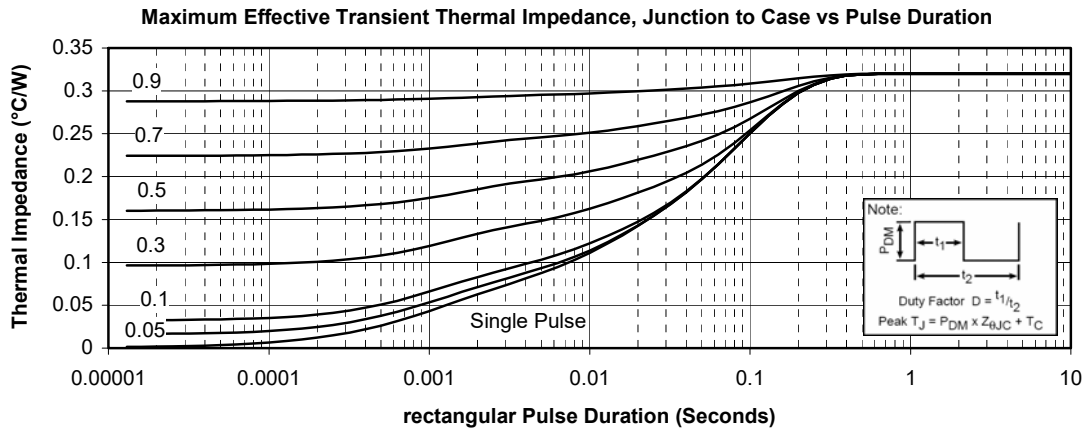
T: Thermistor temperature
R_T: Thermistor value at T

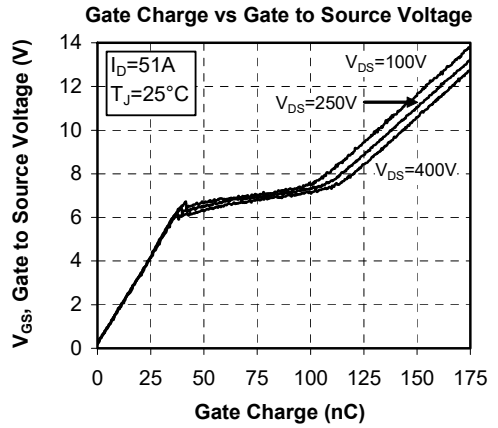
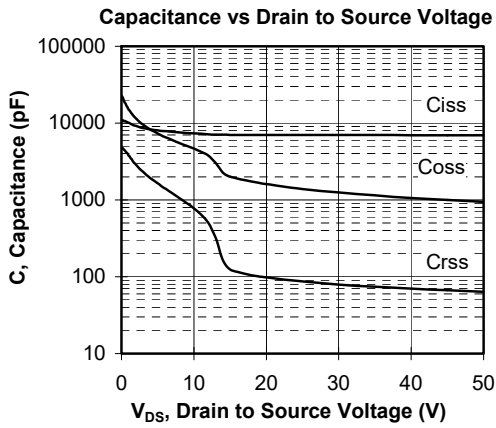
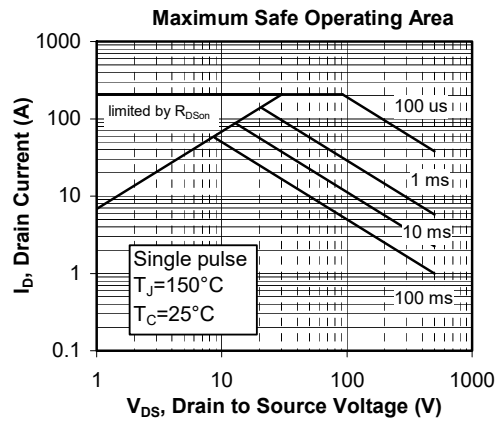
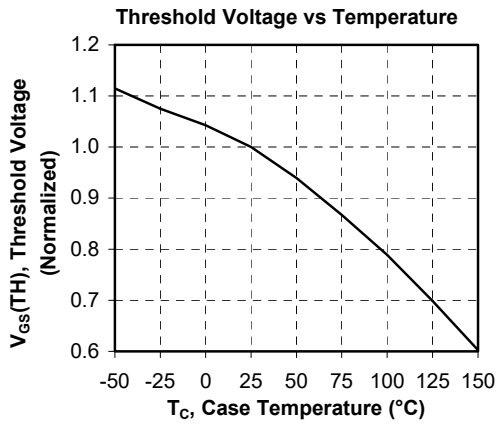
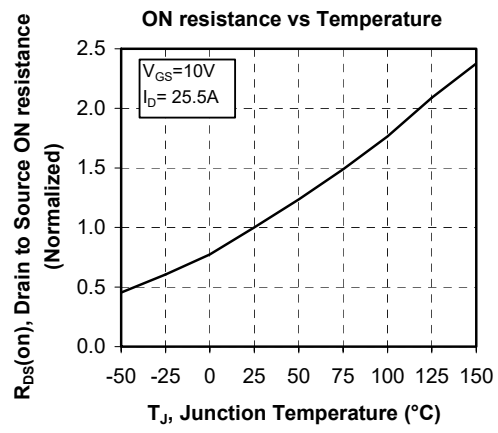
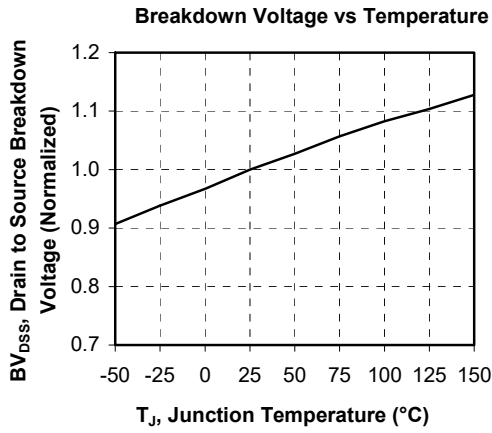
Package outline (dimensions in mm)

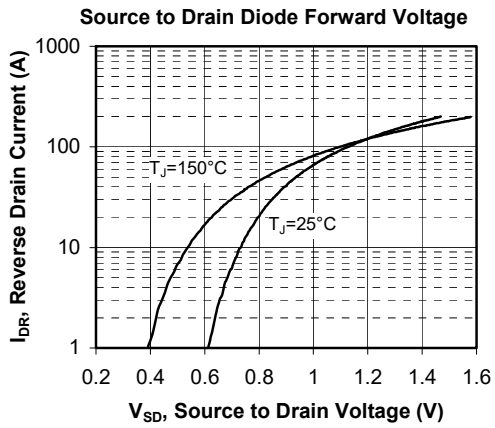
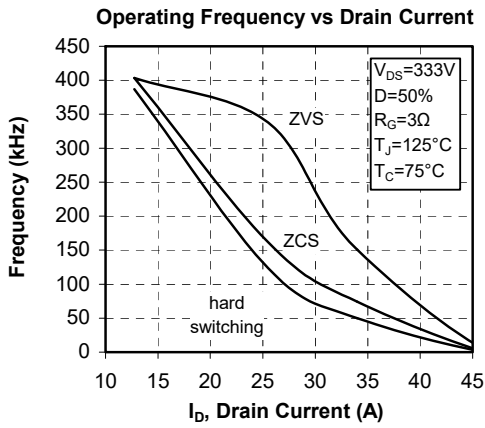
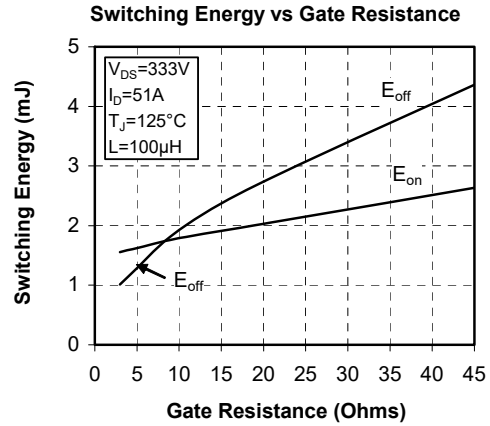
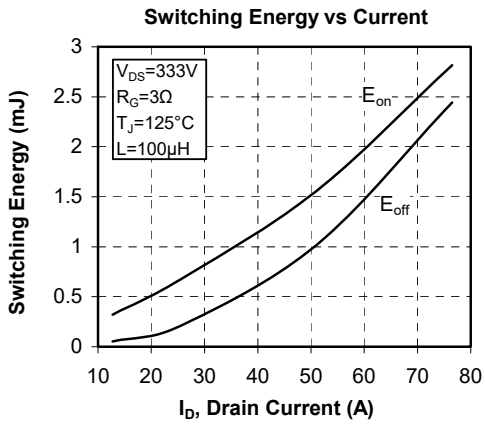
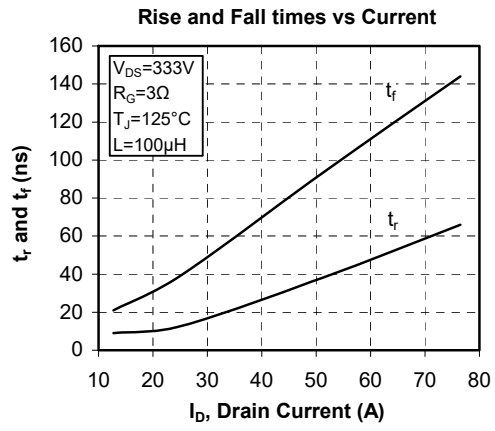
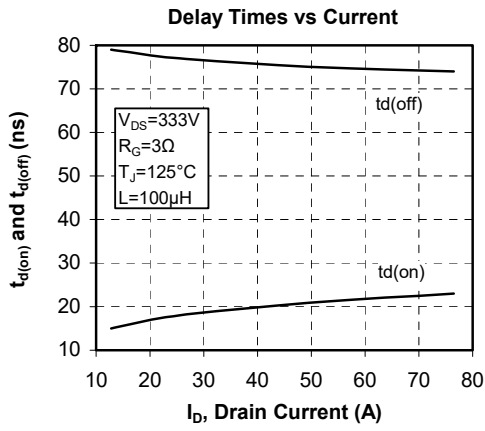


See application note 1906 - Mounting Instructions for SP3F Power Modules on www.microsemi.com

Typical Performance Curve







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