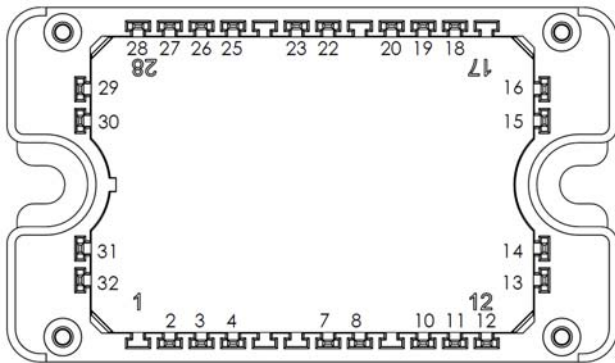
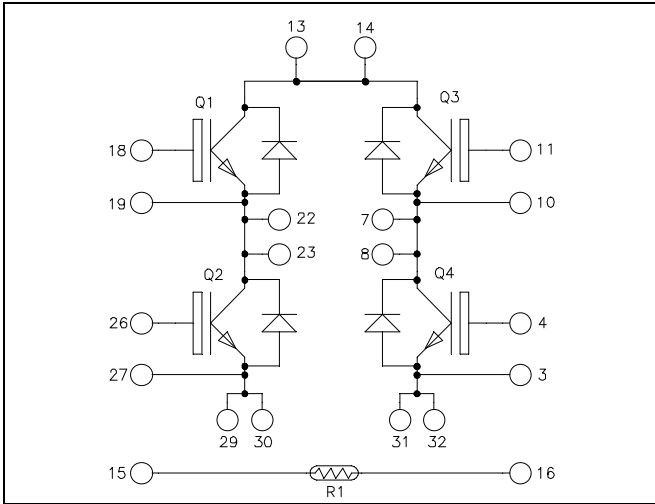


**Full - Bridge  
Trench + Field Stop IGBT3  
Power Module**

**$V_{CES} = 600V$   
 $I_C = 100A^* @ T_c = 80^\circ C$**



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
$V_{CES}$	Collector - Emitter Voltage	600	V
$I_C$	Continuous Collector Current	$T_c = 25^\circ C$	150 *
		$T_c = 80^\circ C$	100 *
$I_{CM}$	Pulsed Collector Current	$T_c = 25^\circ C$	200
$V_{GE}$	Gate - Emitter Voltage	$\pm 20$	V
$P_D$	Power Dissipation	$T_c = 25^\circ C$	340
RBSOA	Reverse Bias Safe Operating Area	$T_j = 150^\circ C$	200A @ 550V

\* Specification of 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.

**Application**

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

**Features**

- **Trench + Field Stop IGBT3**
  - Low voltage drop
  - Low tail current
  - Switching frequency up to 20 kHz
  - Low leakage current
  - RBSOA and SCSOA rated
- Kelvin emitter for easy drive
- Very low stray inductance
- Internal thermistor for temperature monitoring

**Benefits**

- Stable temperature behavior
- Very rugged
- Solderable terminals for easy PCB mounting
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Easy paralleling due to positive TC of  $V_{CESat}$
- Low profile
- Each leg can be easily paralleled to achieve a phase leg of twice the current capability
- RoHS Compliant

**Electrical Characteristics**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
I <sub>CES</sub>	Zero Gate Voltage Collector Current	V <sub>GE</sub> = 0V, V <sub>CE</sub> = 600V			250	μA
V <sub>CE(sat)</sub>	Collector Emitter Saturation Voltage	V <sub>GE</sub> = 15V I <sub>C</sub> = 100A		T <sub>j</sub> = 25°C 1.5 T <sub>j</sub> = 150°C 1.7	1.9	V
V <sub>GE(th)</sub>	Gate Threshold Voltage	V <sub>GE</sub> = V <sub>CE</sub> , I <sub>C</sub> = 1.5 mA	5.0	5.8	6.5	V
I <sub>GES</sub>	Gate – Emitter Leakage Current	V <sub>GE</sub> = 20V, V <sub>CE</sub> = 0V			400	nA

**Dynamic Characteristics**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C <sub>ies</sub>	Input Capacitance	V <sub>GE</sub> = 0V		6100		pF
C <sub>oes</sub>	Output Capacitance	V <sub>CE</sub> = 25V		390		
C <sub>res</sub>	Reverse Transfer Capacitance	f = 1MHz		190		
T <sub>d(on)</sub>	Turn-on Delay Time	Inductive Switching (25°C) V <sub>GE</sub> = ±15V V <sub>Bus</sub> = 300V I <sub>C</sub> = 100A R <sub>G</sub> = 3.3Ω		115		ns
T <sub>r</sub>	Rise Time			45		
T <sub>d(off)</sub>	Turn-off Delay Time			225		
T <sub>f</sub>	Fall Time			55		
T <sub>d(on)</sub>	Turn-on Delay Time	Inductive Switching (150°C) V <sub>GE</sub> = ±15V V <sub>Bus</sub> = 300V I <sub>C</sub> = 100A R <sub>G</sub> = 3.3Ω		130		ns
T <sub>r</sub>	Rise Time			50		
T <sub>d(off)</sub>	Turn-off Delay Time			300		
T <sub>f</sub>	Fall Time			70		
E <sub>on</sub>	Turn on Energy	V <sub>GE</sub> = ±15V V <sub>Bus</sub> = 300V I <sub>C</sub> = 100A R <sub>G</sub> = 3.3Ω		T <sub>j</sub> = 150°C 0.875		mJ
E <sub>off</sub>	Turn off Energy			T <sub>j</sub> = 150°C 3.5		mJ
R <sub>thJC</sub>	Junction to Case Thermal Resistance				0.44	°C/W

**Reverse diode ratings and characteristics**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit	
V <sub>RRM</sub>	Peak Repetitive Reverse Voltage				600	V	
I <sub>RM</sub>	Reverse Leakage Current	V <sub>R</sub> = 600V			250	μA	
I <sub>F</sub>	DC Forward Current	T <sub>c</sub> = 80°C		100		A	
V <sub>F</sub>	Diode Forward Voltage	I <sub>F</sub> = 100A V <sub>GE</sub> = 0V		T <sub>j</sub> = 25°C 1.6 T <sub>j</sub> = 150°C 1.5	2	V	
t <sub>rr</sub>	Reverse Recovery Time	I <sub>F</sub> = 100A V <sub>R</sub> = 300V di/dt = 2000A/μs		T <sub>j</sub> = 25°C 125 T <sub>j</sub> = 150°C 220		ns	
Q <sub>rr</sub>	Reverse Recovery Charge				T <sub>j</sub> = 25°C 4.7 T <sub>j</sub> = 150°C 9.9		μC
E <sub>r</sub>	Reverse Recovery Energy				T <sub>j</sub> = 25°C 1.1 T <sub>j</sub> = 150°C 2.4		mJ
R <sub>thJC</sub>	Junction to Case Thermal Resistance					0.77	°C/W

**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		%

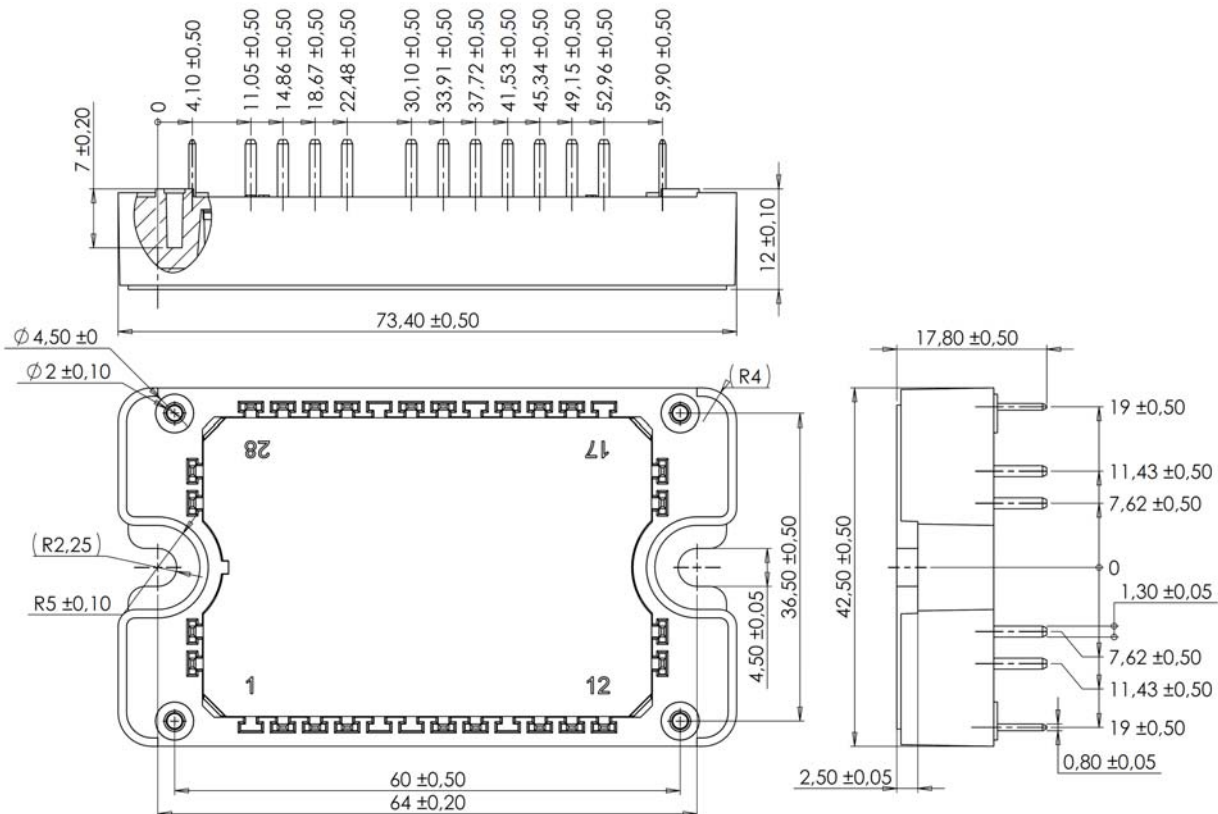
$$R_T = \frac{R_{25}}{\exp \left[ B_{25/85} \left( \frac{1}{T_{25}} - \frac{1}{T} \right) \right]}$$

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

### Thermal and package characteristics

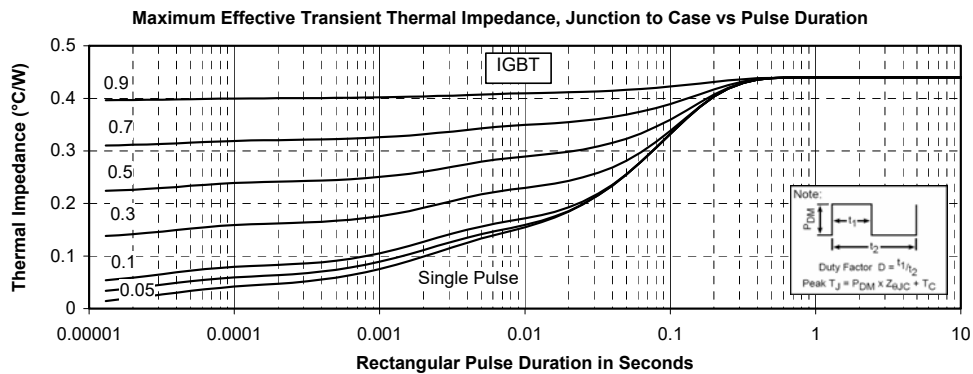
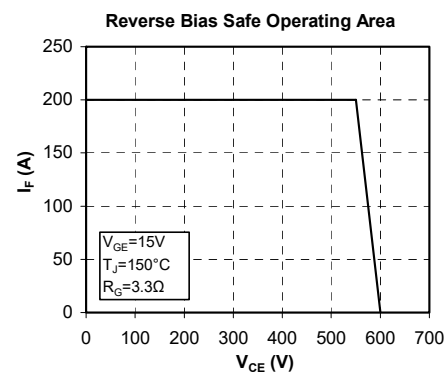
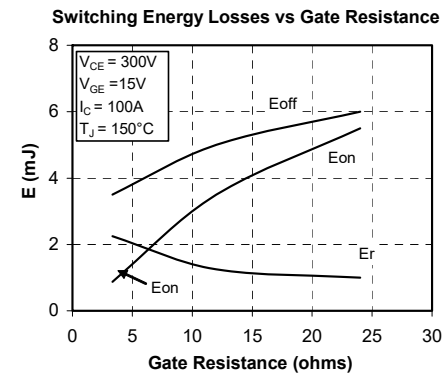
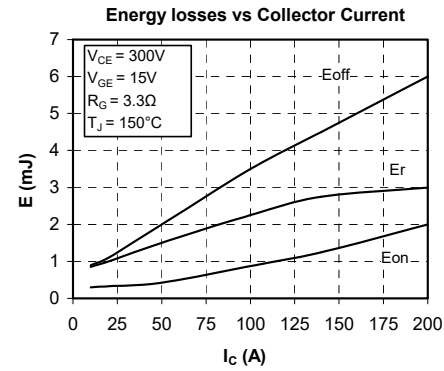
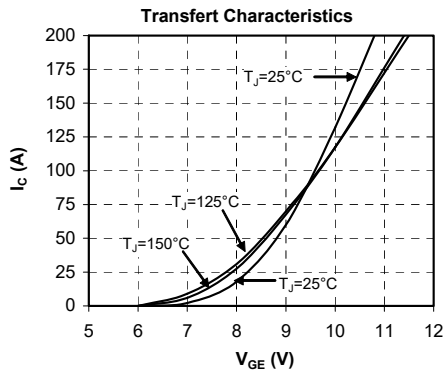
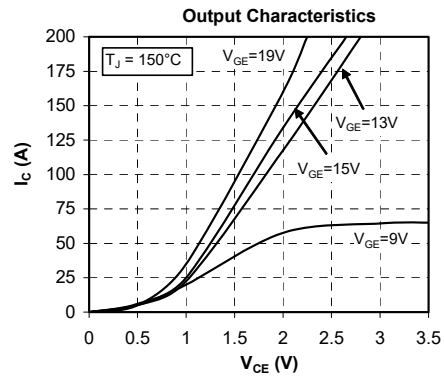
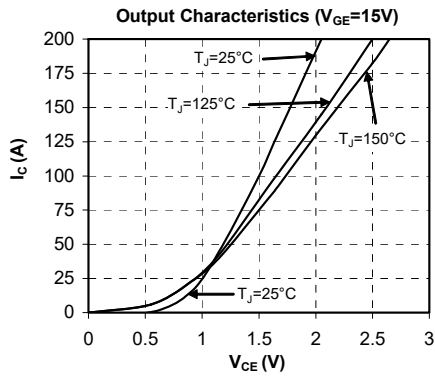
Symbol	Characteristic	Min	Max	Unit		
V <sub>ISOL</sub>	RMS Isolation Voltage, any terminal to case t=1 min, 50/60Hz	4000		V		
T <sub>J</sub>	Operating junction temperature range	-40	175	°C		
T <sub>JOP</sub>	Recommended junction temperature under switching conditions	-40	T <sub>Jmax</sub> -25			
T <sub>STG</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

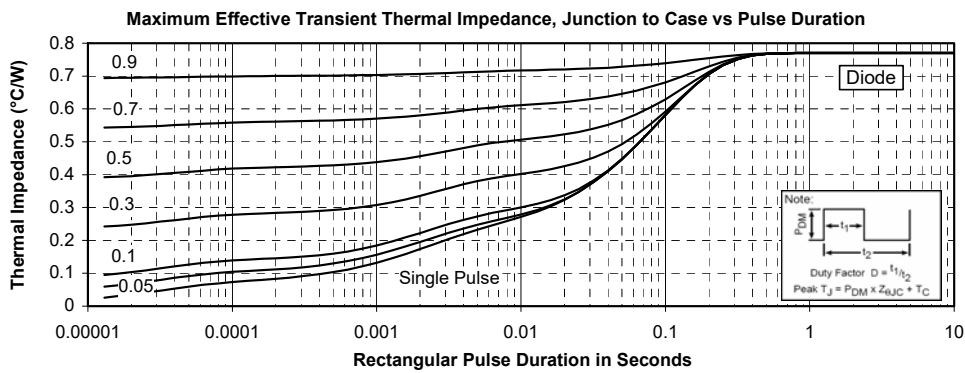
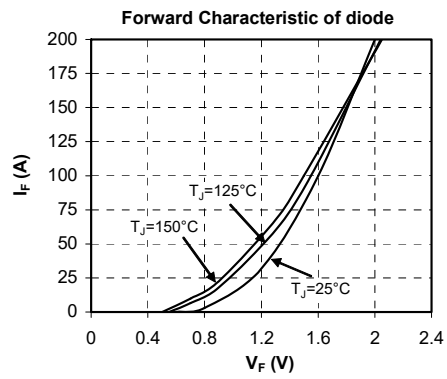
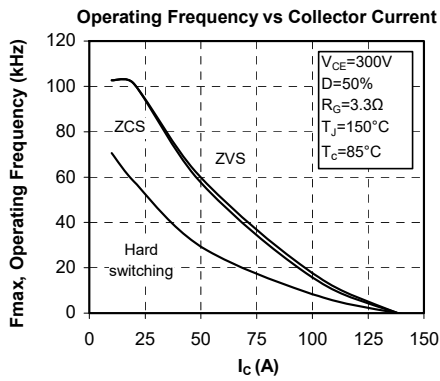
### Package outline (dimensions in mm)



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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