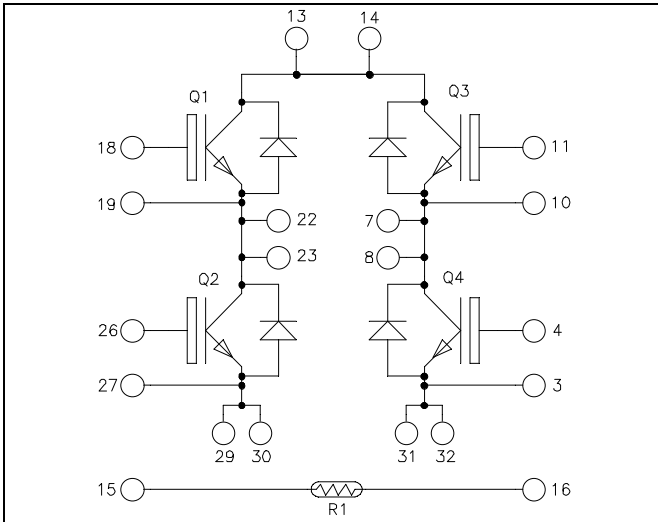


**Full - Bridge  
Trench + Field Stop IGBT3  
Power Module**

**$V_{CES} = 600V$   
 $I_C = 75A @ T_c = 80^\circ C$**

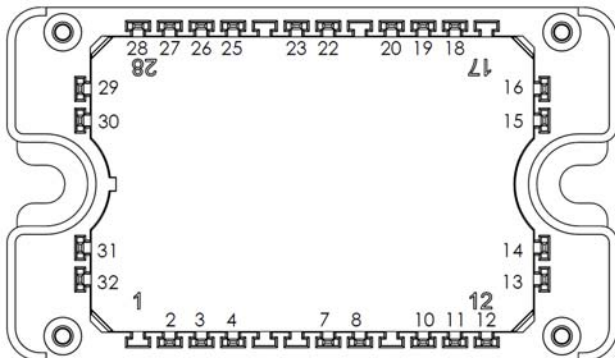


**Application**

- 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
- High level of integration
- Internal thermistor for temperature monitoring



All multiple inputs and outputs must be shorted together  
 Example: 13/14 ; 29/30 ; 22/23 ...

**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

**All ratings @  $T_j = 25^\circ C$  unless otherwise specified**

**Absolute maximum ratings (per IGBT)**

Symbol	Parameter	Max ratings	Unit
$V_{CES}$	Collector - Emitter Voltage	600	V
$I_C$	Continuous Collector Current	$T_C = 25^\circ C$	100
		$T_C = 80^\circ C$	75
$I_{CM}$	Pulsed Collector Current	$T_C = 25^\circ C$	140
$V_{GE}$	Gate - Emitter Voltage	$\pm 20$	V
$P_D$	Power Dissipation	$T_C = 25^\circ C$	250
RBSOA	Reverse Bias Safe Operating Area	$T_j = 150^\circ C$	150A @ 550V

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

**Electrical Characteristics (per IGBT)**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$I_{CES}$	Zero Gate Voltage Collector Current	$V_{GE} = 0V, V_{CE} = 600V$			250	$\mu A$
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	$V_{GE} = 15V$ $I_C = 75A$		1.5 1.7	1.9	V
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 600\mu A$	5.0	5.8	6.5	V
$I_{GES}$	Gate – Emitter Leakage Current	$V_{GE} = 20V, V_{CE} = 0V$			600	nA

**Dynamic Characteristics (per IGBT)**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$C_{ies}$	Input Capacitance	$V_{GE} = 0V$		4620		pF
$C_{oes}$	Output Capacitance	$V_{CE} = 25V$		300		
$C_{res}$	Reverse Transfer Capacitance	$f = 1MHz$		140		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = \pm 15V$ $V_{Bus} = 300V$ $I_C = 75A$ $R_G = 4.7\Omega$		110		ns
$T_r$	Rise Time			45		
$T_{d(off)}$	Turn-off Delay Time			200		
$T_f$	Fall Time			40		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (150°C) $V_{GE} = \pm 15V$ $V_{Bus} = 300V$ $I_C = 75A$ $R_G = 4.7\Omega$		120		ns
$T_r$	Rise Time			50		
$T_{d(off)}$	Turn-off Delay Time			250		
$T_f$	Fall Time			60		
$E_{on}$	Turn-on Switching Energy	$V_{GE} = \pm 15V$ $V_{Bus} = 300V$ $I_C = 75A$	$T_j = 25^\circ C$	0.35		mJ
$E_{off}$	Turn-off Switching Energy		$T_j = 150^\circ C$	0.6		
		$R_G = 4.7\Omega$	$T_j = 25^\circ C$	2.2		mJ
			$T_j = 150^\circ C$	2.6		
$R_{thJC}$	Junction to Case Thermal Resistance				0.6	$^\circ C/W$

**Reverse diode ratings and characteristics (per diode)**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$V_{RRM}$	Peak Repetitive Reverse Voltage				600	V
$I_{RM}$	Reverse Leakage Current	$V_R = 600V$			250	$\mu A$
$I_F$	DC Forward current	$T_c = 40^\circ C$		75		A
$V_F$	Diode Forward Voltage	$I_F = 75A$ $V_{GE} = 0V$	$T_j = 25^\circ C$	1.6	2	V
			$T_j = 150^\circ C$	1.5		
$t_{rr}$	Reverse Recovery Time	$I_F = 75A$ $V_R = 300V$ $di/dt = 2000A/\mu s$	$T_j = 25^\circ C$	100		ns
			$T_j = 150^\circ C$	150		
$Q_{rr}$	Reverse Recovery Charge		$T_j = 25^\circ C$	3.6		$\mu C$
			$T_j = 150^\circ C$	7.6		
$E_r$	Reverse Recovery Energy		$T_j = 25^\circ C$	0.85		mJ
			$T_j = 150^\circ C$	1.8		
$R_{thJC}$	Junction to Case Thermal Resistance				0.98	$^\circ C/W$

**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		%

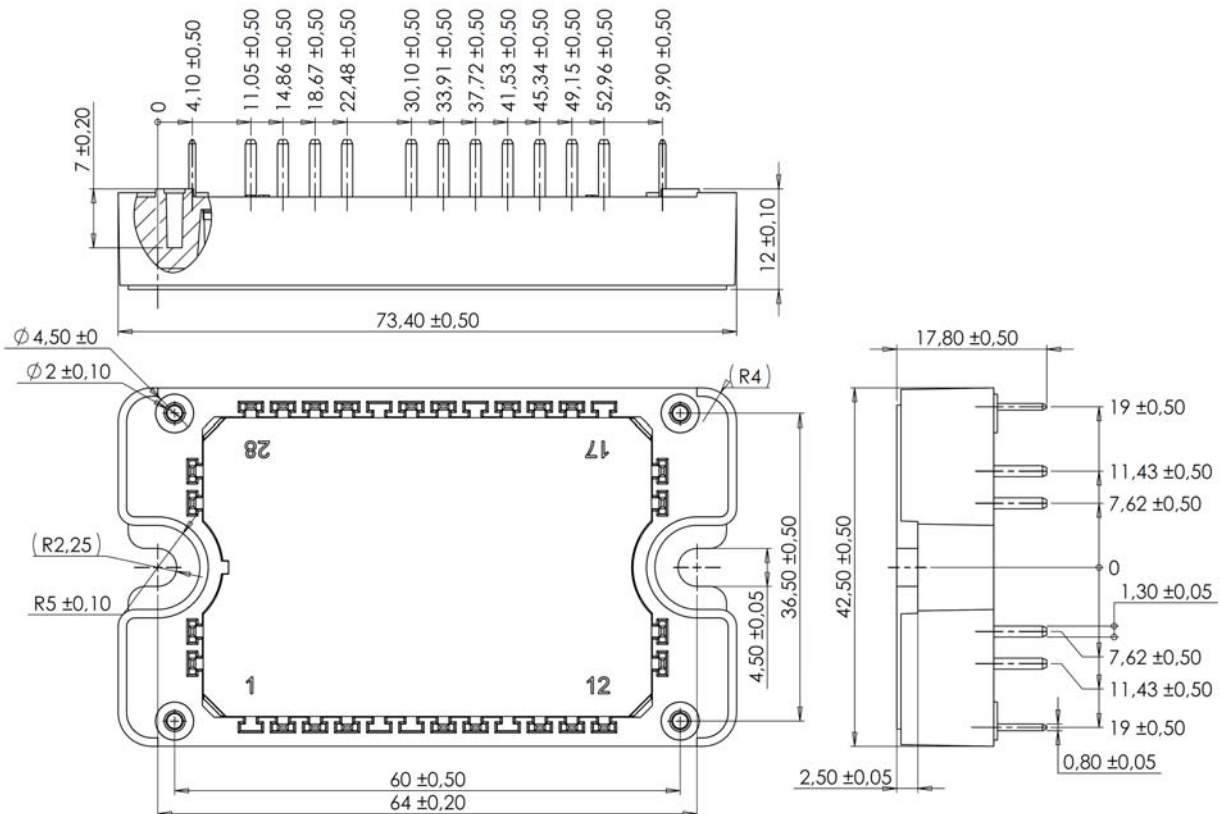
$$R_T = \frac{R_{25}}{\exp \left[ B_{25/85} \left( \frac{1}{T_{25}} - \frac{1}{T} \right) \right]}$$

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

### Thermal and package characteristics

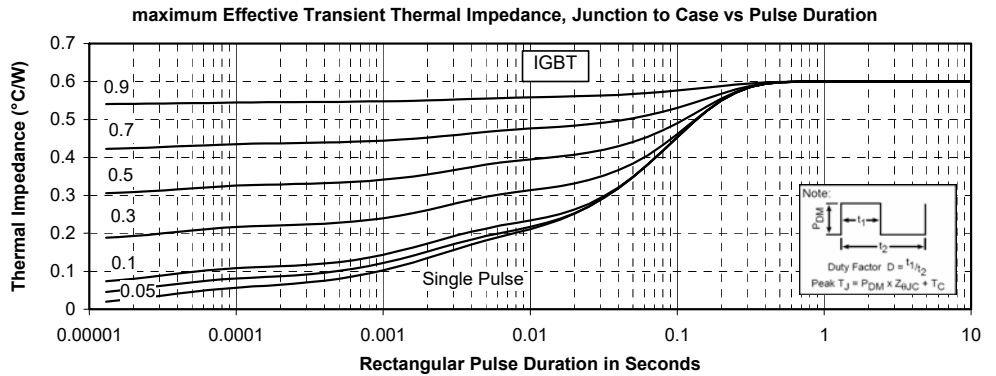
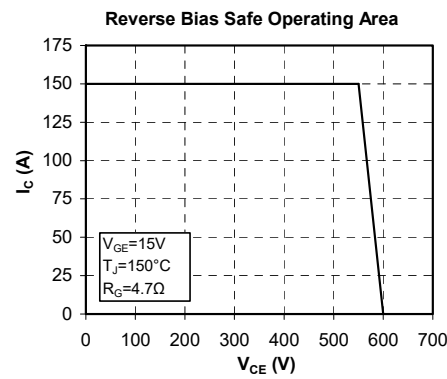
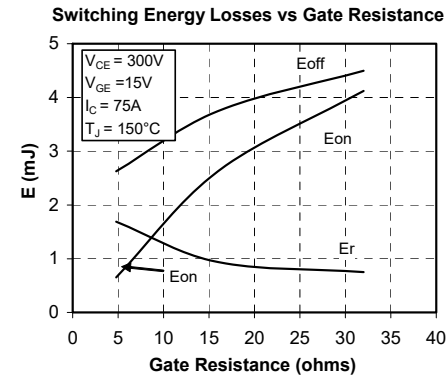
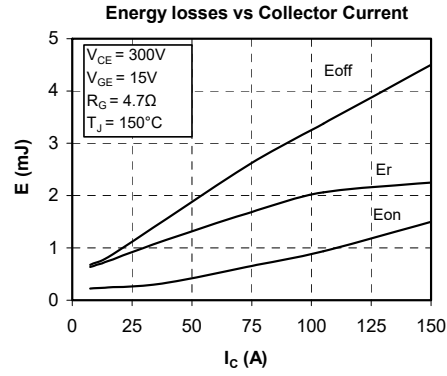
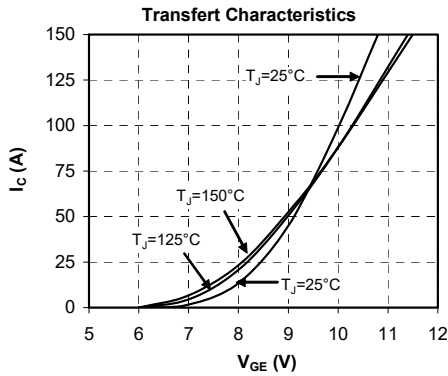
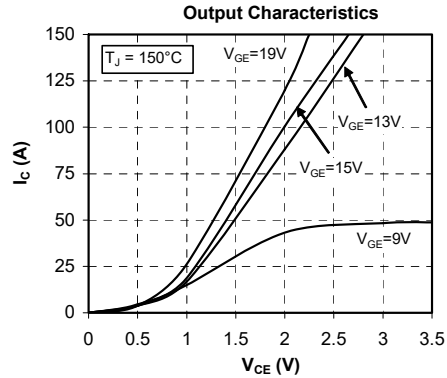
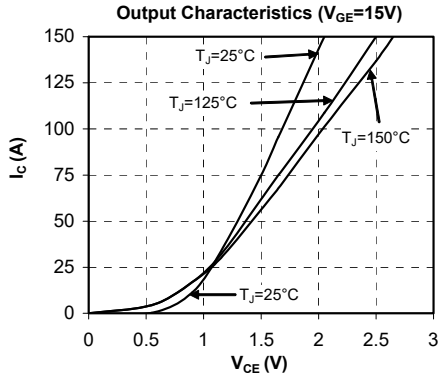
Symbol	Characteristic	Min	Max	Unit		
V <sub>ISOL</sub>	RMS Isolation Voltage, any terminal to case t=1 min, 50/60Hz	4000		V		
T <sub>J</sub>	Operating junction temperature range	-40	175	°C		
T <sub>JOP</sub>	Recommended junction temperature under switching conditions	-40	T <sub>Jmax</sub> -25			
T <sub>STG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

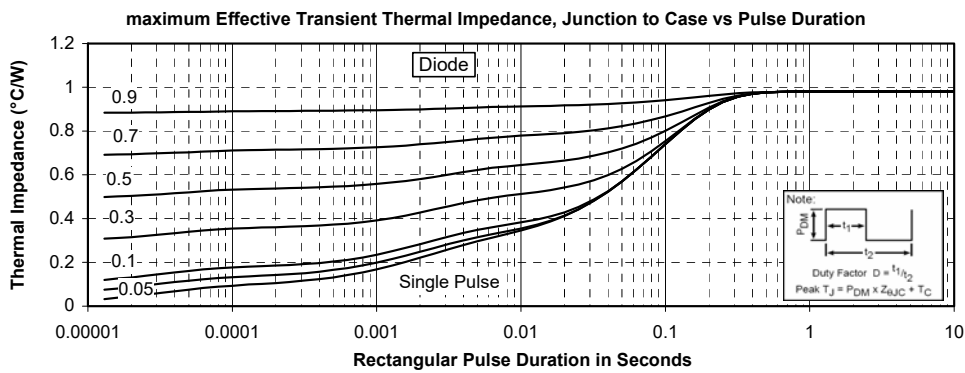
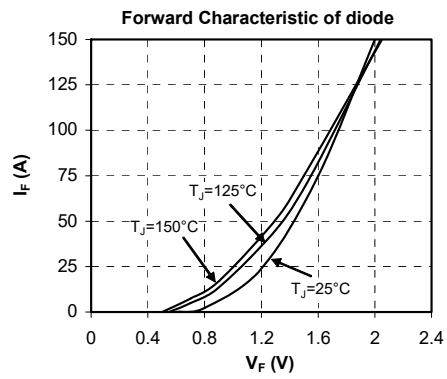
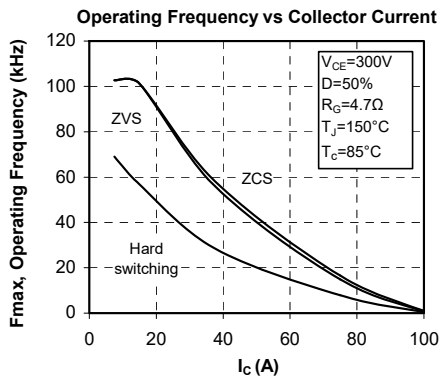
### Package outline (dimensions in mm)



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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Тел: +7 (812) 336 43 04 (многоканальный)

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