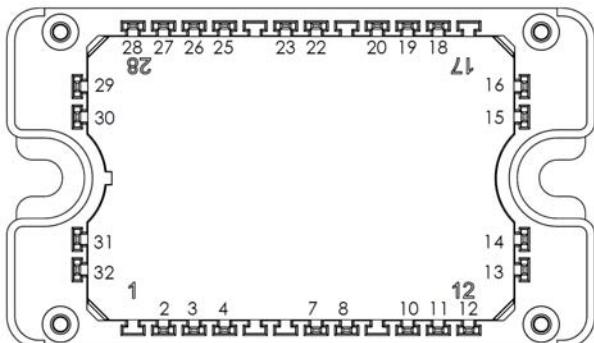
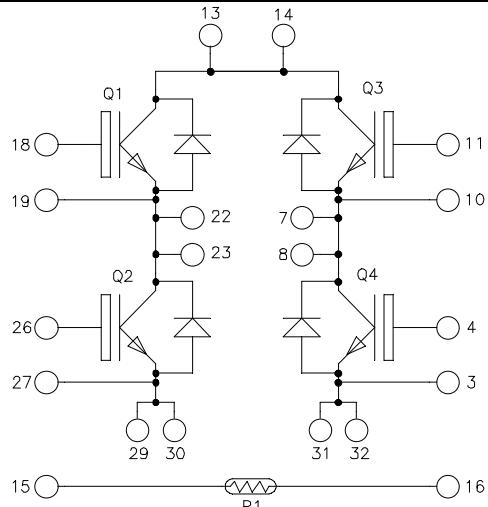


**Full - Bridge
Fast Trench + Field Stop IGBT3
Power Module**
 $V_{CES} = 1200V$
 $I_C = 50A @ T_c = 80^\circ C$


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 (per IGBT)

Symbol	Parameter	Max ratings	Unit
V_{CES}	Collector - Emitter Voltage	1200	V
I_C	Continuous Collector Current	$T_c = 25^\circ C$	A
		$T_c = 80^\circ C$	
I_{CM}	Pulsed Collector Current	$T_c = 25^\circ C$	100
V_{GE}	Gate – Emitter Voltage	± 20	V
P_D	Power Dissipation	$T_c = 25^\circ C$	270
RBSOA	Reverse Bias Safe Operating Area	$T_j = 125^\circ C$	100A @ 1150V

 **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

- **Fast 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
- 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
- Easy paralleling due to positive T_c of V_{CESat}
- Each leg can be easily paralleled to achieve a phase leg of twice the current capability
- RoHS Compliant

Electrical Characteristics (per IGBT)

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
I_{CES}	Zero Gate Voltage Collector Current	$V_{GE} = 0V$; $V_{CE} = 1200V$				250	μA
$V_{CE(sat)}$	Collector Emitter saturation Voltage	$V_{GE} = 15V$	$T_j = 25^\circ C$	1.4	1.7	2.1	V
		$I_C = 50A$	$T_j = 125^\circ C$		2.0		
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}$, $I_C = 2mA$		5.0	5.8	6.5	V
I_{GES}	Gate – Emitter Leakage Current	$V_{GE} = 20V$, $V_{CE} = 0V$				400	nA

Dynamic Characteristics (per IGBT)

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0V$, $V_{CE} = 25V$		3600			pF
C_{rss}	Reverse Transfer Capacitance	$f = 1MHz$		160			
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching ($25^\circ C$) $V_{GE} = \pm 15V$ $V_{Bus} = 600V$ $I_C = 50A$ $R_G = 18\Omega$		90			ns
T_r	Rise Time			30			
$T_{d(off)}$	Turn-off Delay Time			420			
T_f	Fall Time			70			
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching ($125^\circ C$) $V_{GE} = \pm 15V$ $V_{Bus} = 600V$ $I_C = 50A$ $R_G = 18\Omega$		90			ns
T_r	Rise Time			50			
$T_{d(off)}$	Turn-off Delay Time			520			
T_f	Fall Time			90			
E_{on}	Turn-on Switching Energy	$V_{GE} = \pm 15V$ $V_{Bus} = 600V$ $I_C = 50A$ $R_G = 18\Omega$	$T_j = 125^\circ C$	5			mJ
E_{off}	Turn-off Switching Energy		$T_j = 125^\circ C$		5.5		
R_{thJC}	Junction to Case Thermal Resistance					0.45	$^\circ C/W$

Reverse diode ratings and characteristics (per diode)

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit	
V_{RRM}	Peak Repetitive Reverse Voltage					1200	V	
I_{RM}	Reverse Leakage Current	$V_R = 1200V$				250	μA	
I_F	DC Forward Current				60		A	
V_F	Diode Forward Voltage	$I_F = 60A$			2	2.5	V	
		$I_F = 120A$			2.3			
		$I_F = 60A$	$T_j = 125^\circ C$		1.8			
t_{rr}	Reverse Recovery Time	$I_F = 60A$ $V_R = 800V$ $di/dt = 200A/\mu s$	$T_j = 25^\circ C$		400		ns	
			$T_j = 125^\circ C$		470			
Q_{rr}	Reverse Recovery Charge		$T_j = 25^\circ C$		1200		nC	
			$T_j = 125^\circ C$		4000			
E_r	Reverse Recovery Energy	$I_F = 60A$ $V_R = 800V$ $di/dt = 1000A/\mu s$	$T_j = 125^\circ C$		2.2		mJ	
R_{thJC}	Junction to Case Thermal Resistance					0.9	$^\circ C/W$	

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
$\Delta R_{25}/R_{25}$			5		%
$B_{25/85}$	$T_{25} = 298.15$ K		3952		K
$\Delta B/B$		$T_C = 100$ °C	4		%

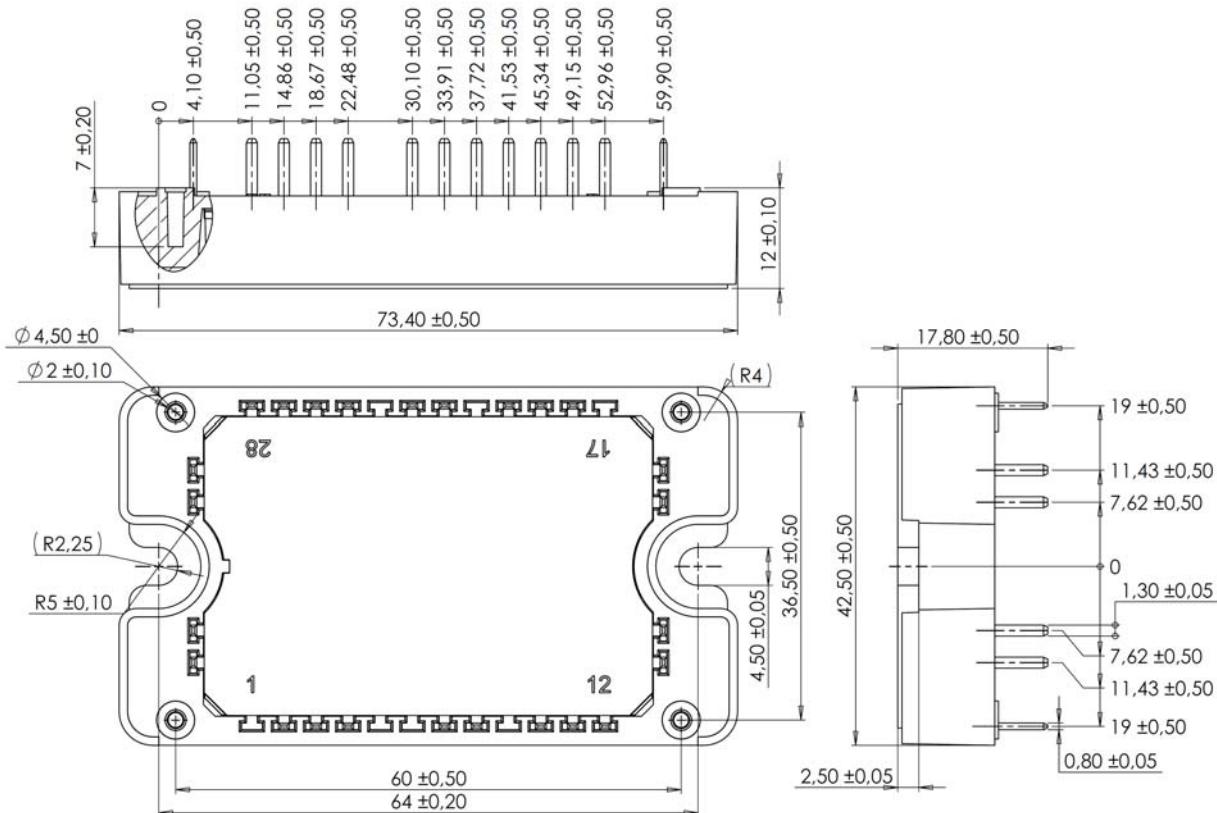
$$R_T = \frac{R_{25}}{\exp\left[B_{25/85}\left(\frac{1}{T_{25}} - \frac{1}{T}\right)\right]}$$

T: Thermistor temperature
R_T: Thermistor value at T

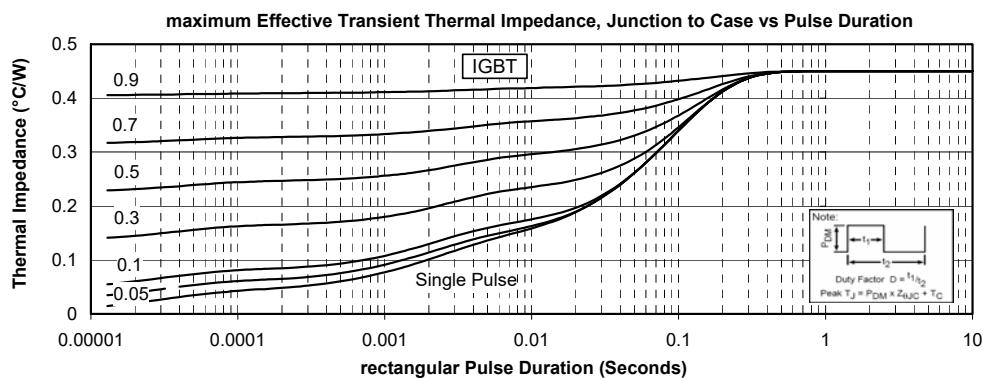
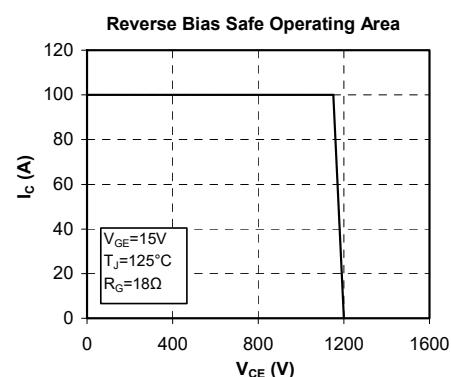
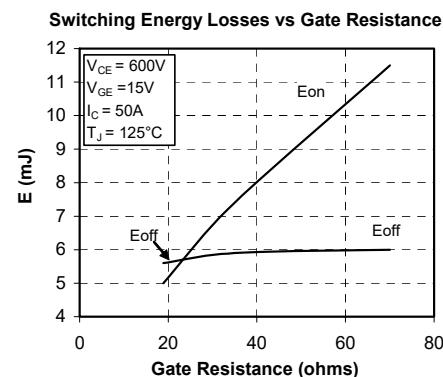
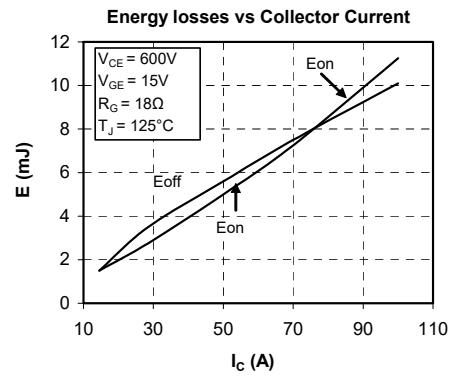
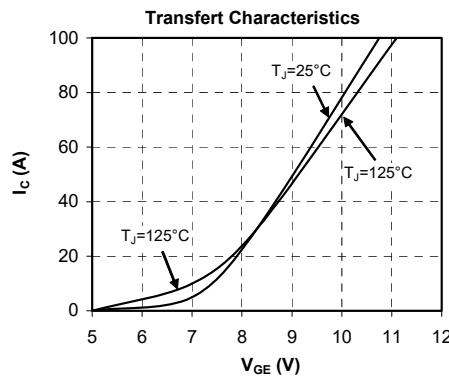
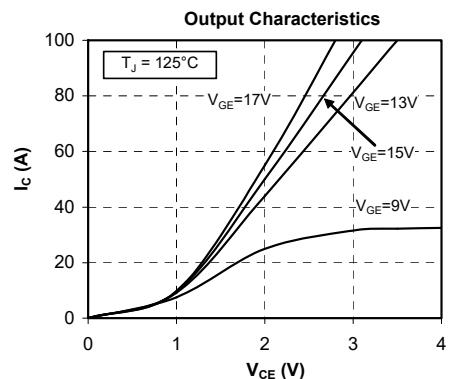
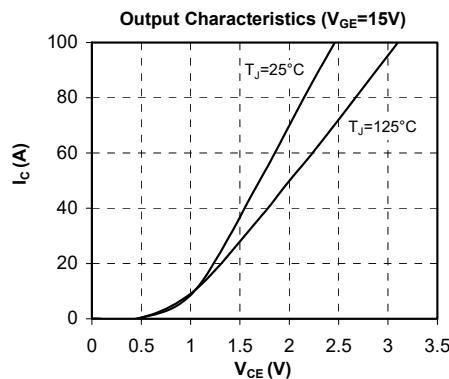
Thermal and package characteristics

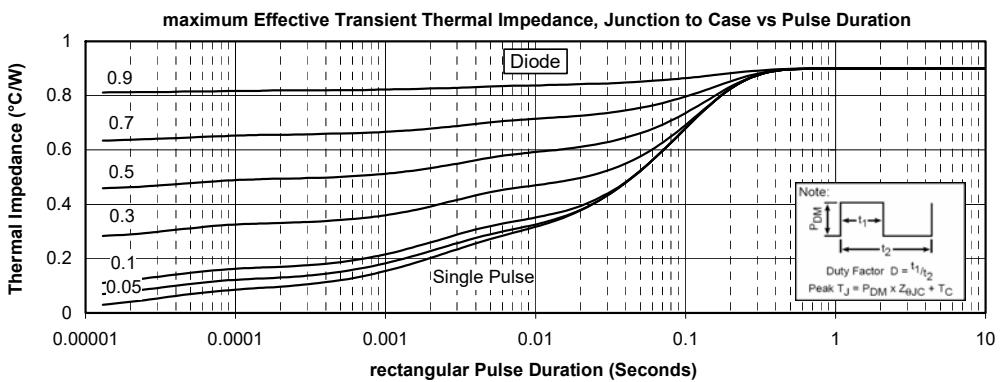
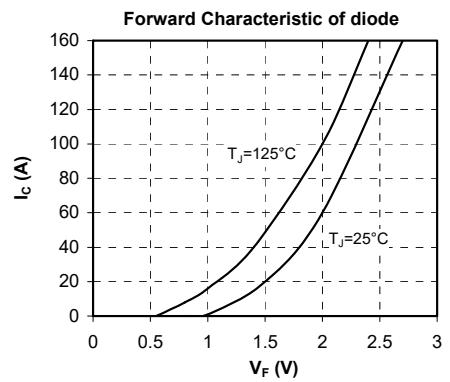
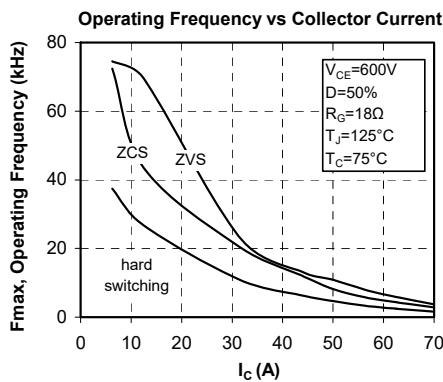
Terminal and package characteristics		Min	Max	Unit		
Symbol	Characteristic					
V_{ISOL}	RMS Isolation Voltage, any terminal to case $t = 1$ min, 50/60Hz	4000		V		
T_J	Operating junction temperature range	-40	150			
T_{JOP}	Recommended junction temperature under switching conditions	-40	$T_Jmax - 25$	$^{\circ}\text{C}$		
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	

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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