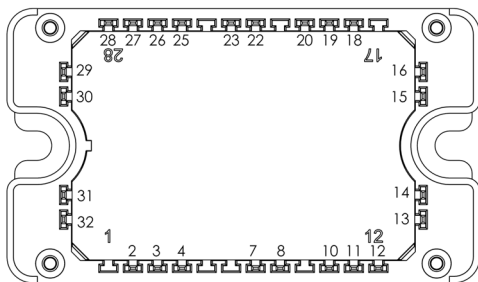
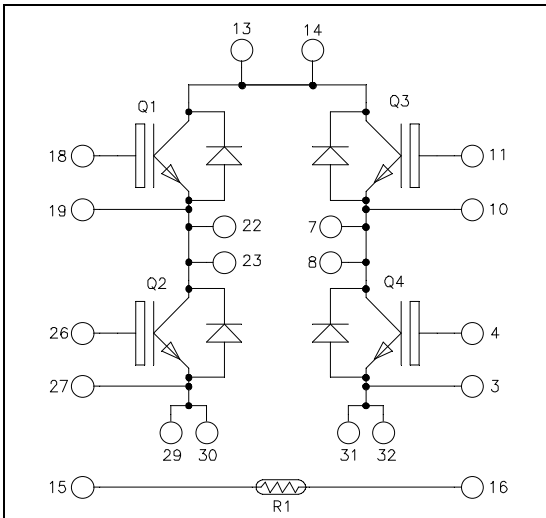


**Full bridge
High speed Trench + Field Stop IGBT4
Power Module**

**$V_{CES} = 650V$
 $I_C = 30A @ T_c = 50^\circ C$**



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

- **High speed Trench + Field Stop IGBT 4 Technology**
 - Low voltage drop
 - Low leakage current
 - Low switching losses
- 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 for both power and signal for easy PCB mounting
- Low profile
- Easy paralleling due to positive TC of VCEsat
- 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	650	V
I_C	Continuous Collector Current	$T_C = 25^\circ C$	40
		$T_C = 50^\circ C$	30
I_{CM}	Pulsed Collector Current	$T_C = 25^\circ C$	80
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Power Dissipation	95	W

 **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	$V_{GE} = 0V, V_{CE} = 650V$			50	μA	
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	$V_{GE} = 15V$ $I_C = 30A$	$T_j = 25^\circ C$ $T_j = 150^\circ C$	1.5 2.3	1.95 2.3	2.3 V	
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 0.43 mA$		4.2	5.1	5.6	V
I_{GES}	Gate – Emitter Leakage Current	$V_{GE} = 20V, V_{CE} = 0V$			300	nA	

Dynamic Characteristics (per IGBT)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0V$		1900		pF
C_{oes}	Output Capacitance	$V_{CE} = 25V$		62		
C_{res}	Reverse Transfer Capacitance	$f = 1MHz$		55		
Q_G	Gate charge	$V_{GE} = 15V, I_C = 30A$ $V_{CE} = 480V$		170		nC
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = \pm 15V$ $V_{Bus} = 400V$ $I_C = 30A$ $R_G = 12\Omega$		19		ns
T_r	Rise Time			33		
$T_{d(off)}$	Turn-off Delay Time			197		
T_f	Fall Time			21		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (150°C) $V_{GE} = \pm 15V$ $V_{Bus} = 400V$ $I_C = 30A$ $R_G = 12\Omega$		19		ns
T_r	Rise Time			29		
$T_{d(off)}$	Turn-off Delay Time			227		
T_f	Fall Time			22		
E_{on}	Turn on Energy	$V_{GE} = \pm 15V$ $V_{Bus} = 400V$ $I_C = 30A$	$T_j = 150^\circ C$	0.74		mJ
E_{off}	Turn off Energy	$R_G = 12\Omega$	$T_j = 150^\circ C$	0.6		
I_{sc}	Short Circuit data	$V_{GE} \leq 15V; V_{Bus} = 400V$ $t_p \leq 5\mu s; T_j = 150^\circ C$		190		A
R_{thJC}	Junction to Case Thermal Resistance				1.59	$^\circ C/W$

Diode ratings and characteristics (per diode)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit	
V_{RRM}	Peak Repetitive Reverse Voltage				650	V	
I_{RM}	Reverse Leakage Current	$V_R = 650V$			50	μA	
I_F	DC Forward Current		$T_c = 25^\circ C$	30		A	
V_F	Diode Forward Voltage	$I_F = 30A$ $V_{GE} = 0V$	$T_j = 25^\circ C$ $T_j = 150^\circ C$	1.6 1.5	2	V	
t_{rr}	Reverse Recovery Time	$I_F = 30A$ $V_R = 300V$ $di/dt = 1800A/\mu s$	$T_j = 25^\circ C$ $T_j = 150^\circ C$	100 150		ns	
Q_{rr}	Reverse Recovery Charge		$T_j = 25^\circ C$ $T_j = 150^\circ C$	1.5 3.1		μC	
E_{rr}	Reverse Recovery Energy		$T_j = 25^\circ C$ $T_j = 150^\circ C$	0.34 0.75		mJ	
R_{thJC}	Junction to Case Thermal Resistance					2.45	$^\circ C/W$

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

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		%

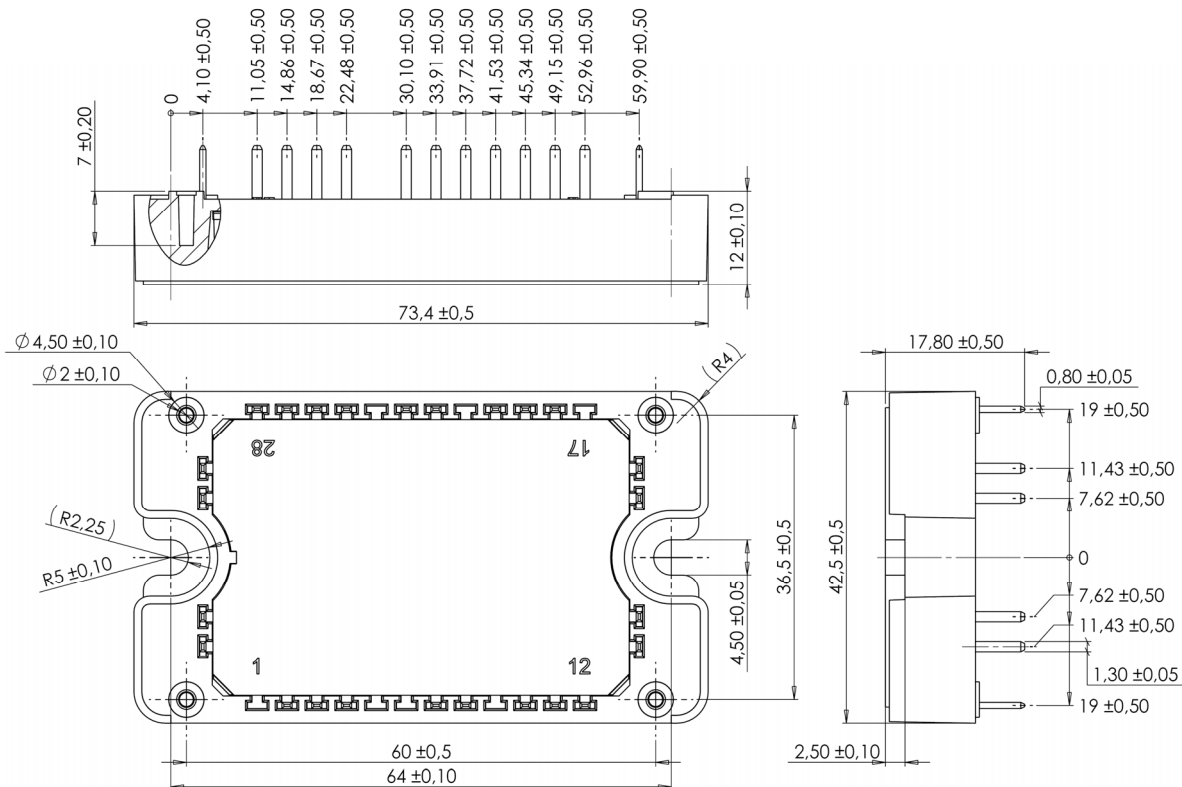
$$R_T = \frac{R_{25}}{\exp\left[B_{25/85}\left(\frac{1}{T_{25}} - \frac{1}{T}\right)\right]}$$

T: Thermistor temperature
 R_T: Thermistor value at T

Thermal and package characteristics

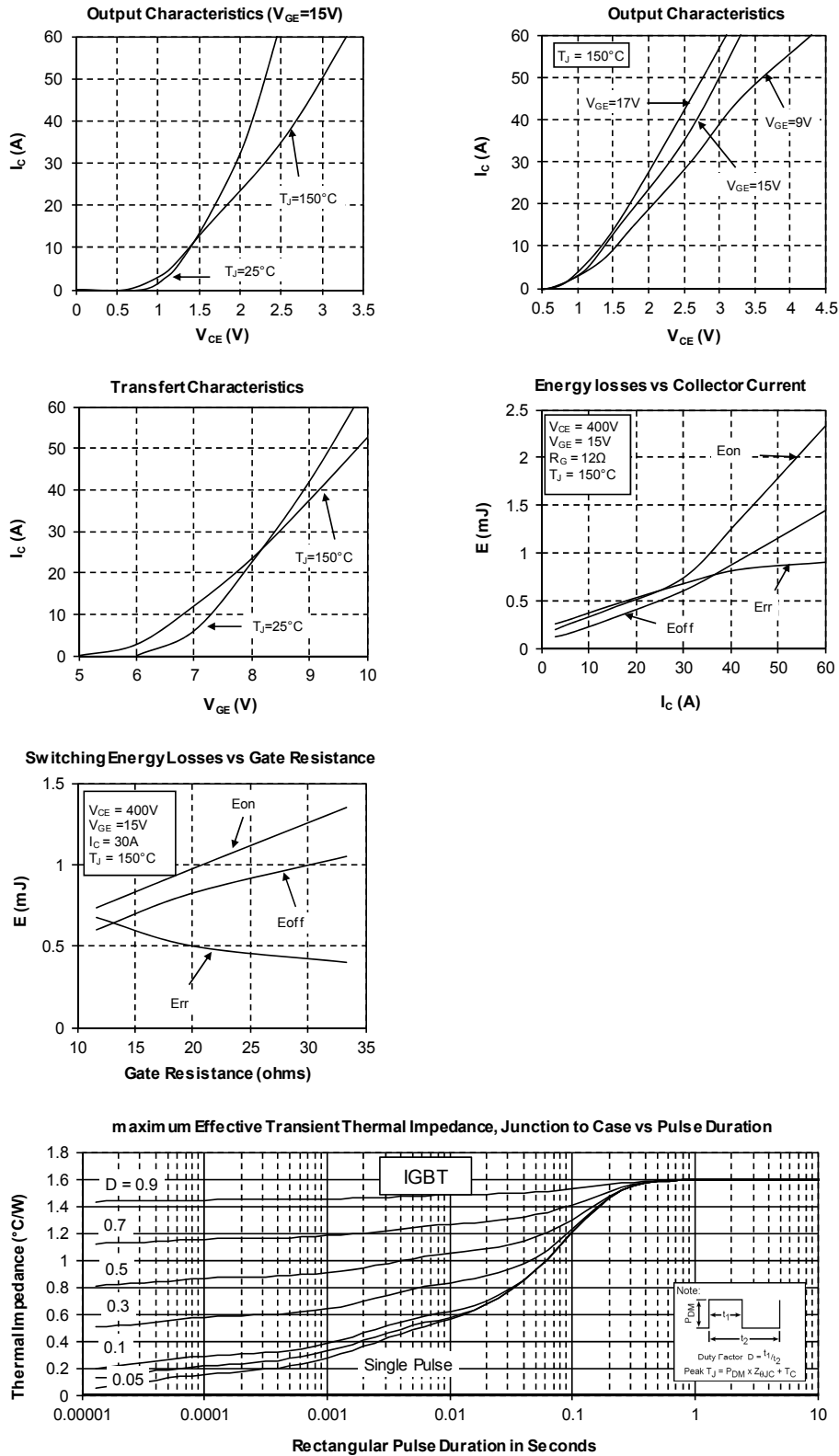
Symbol	Characteristic	Min	Max	Unit		
V _{ISOL}	RMS Isolation Voltage, any terminal to case t = 1 min, 50/60Hz	4000		V		
T _J	Operating junction temperature range	-40	175	°C		
T _{JOP}	Recommended junction temperature under switching conditions	-40	T _{Jmax} -25			
T _{STG}	Storage Temperature Range	-40	125			
T _C	Operating Case Temperature	-40	125			
Torque	Mounting torque	To heatsink	M4	2	3	N.m
Wt	Package Weight				110	g

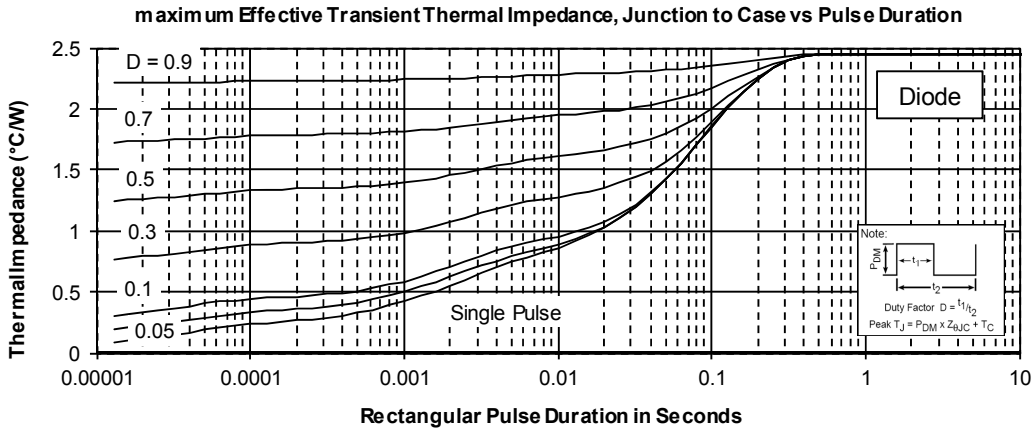
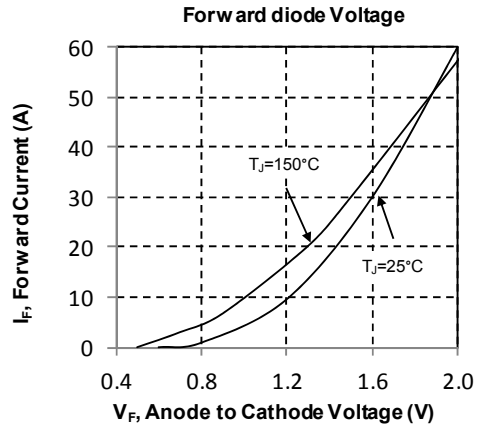
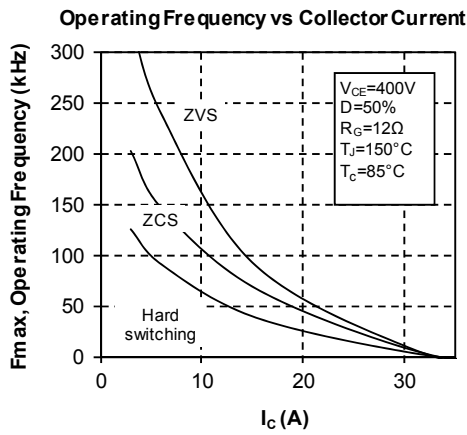
Package outline (dimensions in mm)



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

Typical performance curve





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