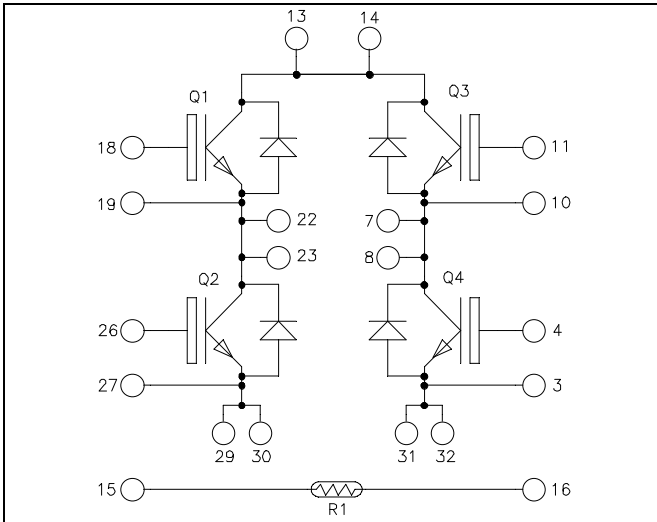


Full - Bridge
Fast Trench + Field Stop IGBT3
Power Module

V_{CES} = 1200V
I_C = 50A @ T_C = 80°C

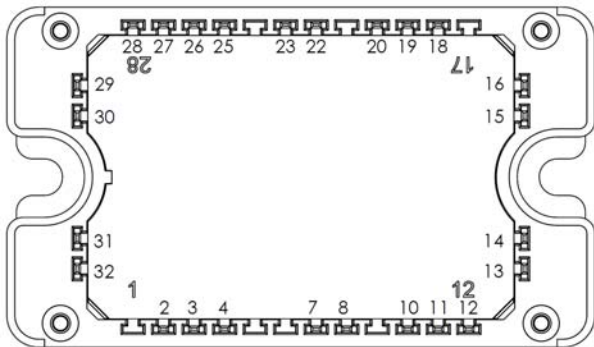


Application

- 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



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

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

All ratings @ T_j = 25°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°C	75
		T _C = 80°C	50
I _{CM}	Pulsed Collector Current	T _C = 25°C	100
V _{GE}	Gate - Emitter Voltage	±20	V
P _D	Power Dissipation	T _C = 25°C	270
RBSOA	Reverse Bias Safe Operating Area	T _J = 125°C	100A @ 1150V

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} = 1200V			250	μA
V _{CE(sat)}	Collector Emitter saturation Voltage	V _{GE} = 15V I _C = 50A	1.4	1.7	2.1	V
		T _j = 25°C T _j = 125°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°C) V _{GE} = ±15V V _{Bus} = 600V I _C = 50A R _G = 18Ω		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°C) V _{GE} = ±15V V _{Bus} = 600V I _C = 50A R _G = 18Ω		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} = ±15V V _{Bus} = 600V I _C = 50A		5		mJ
E _{off}	Turn-off Switching Energy	R _G = 18Ω		5.5		
R _{thJC}	Junction to Case Thermal Resistance				0.45	°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	T _c = 70°C		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°C		1.8		
t _{rr}	Reverse Recovery Time	I _F = 60A V _R = 800V di/dt = 200A/μs	T _j = 25°C	400		ns
			T _j = 125°C	470		
Q _{rr}	Reverse Recovery Charge	di/dt = 200A/μs	T _j = 25°C	1200		nC
			T _j = 125°C	4000		
E _r	Reverse Recovery Energy	I _F = 60A V _R = 800V di/dt = 1000A/μs		2.2		mJ
R _{thJC}	Junction to Case Thermal Resistance				0.9	°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
ΔR ₂₅ /R ₂₅			5		%
B _{25/85}	T ₂₅ = 298.15 K		3952		K
ΔB/B	T _C = 100°C		4		%

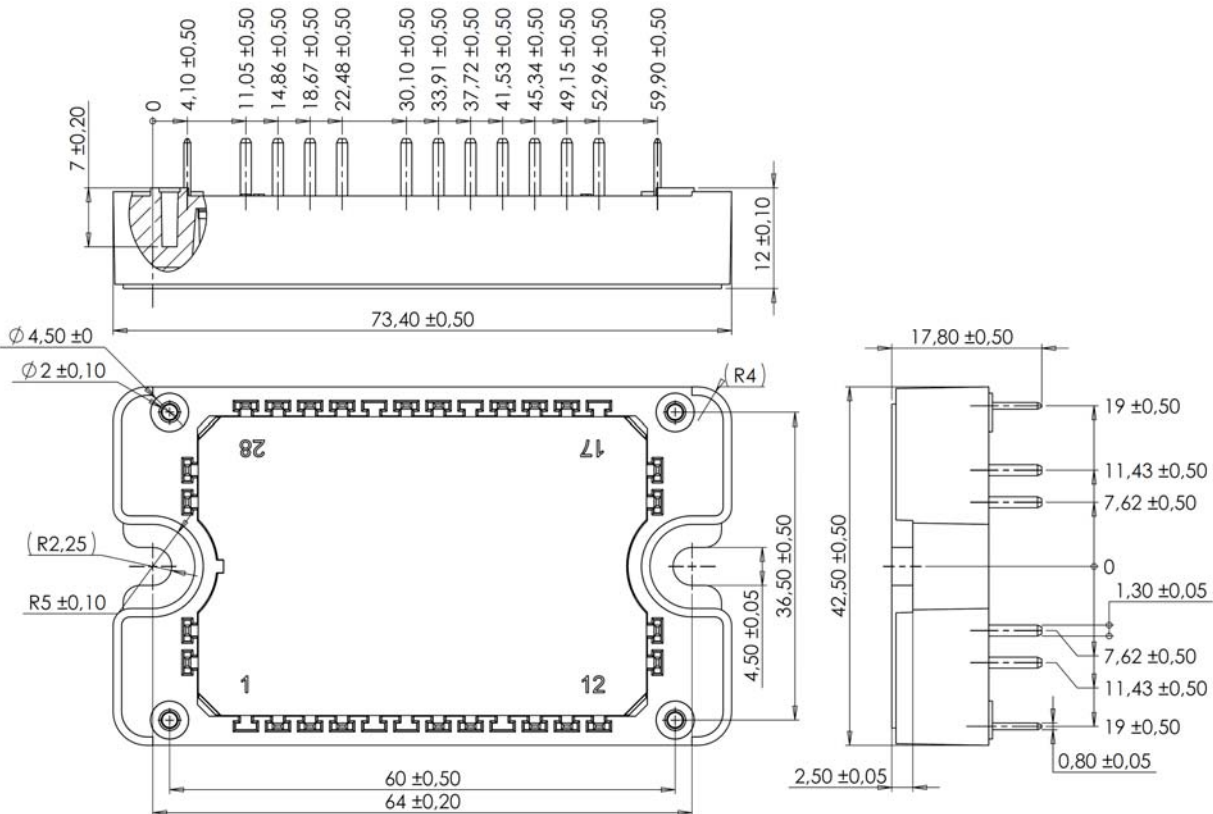
$$R_T = \frac{R_{25}}{\exp\left[B_{25/85}\left(\frac{1}{T_{25}} - \frac{1}{T}\right)\right]}$$

T: Thermistor temperature
R_T: Thermistor value at T

Thermal and package characteristics

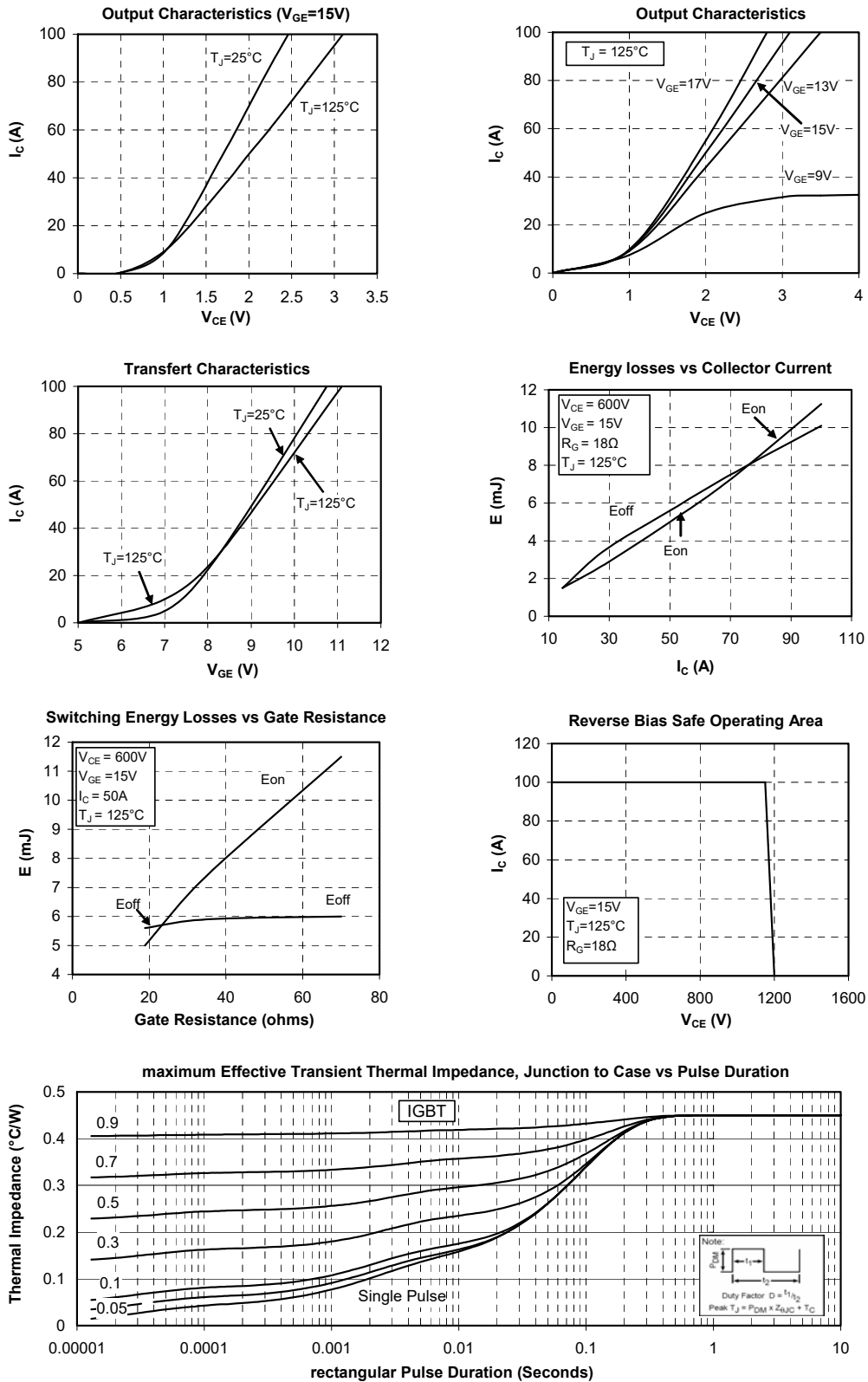
Symbol	Characteristic	Min	Max	Unit		
V _{ISOL}	RMS Isolation Voltage, any terminal to case t = 1 min, 50/60Hz	4000		V		
T _J	Operating junction temperature range	-40	150	°C		
T _{JOP}	Recommended junction temperature under switching conditions	-40	T _{Jmax} -25			
T _{STG}	Storage Temperature Range	-40	125			
T _C	Operating Case Temperature	-40	125			
Torque	Mounting torque	To heatsink	M4	2	3	N.m
Wt	Package Weight				110	g

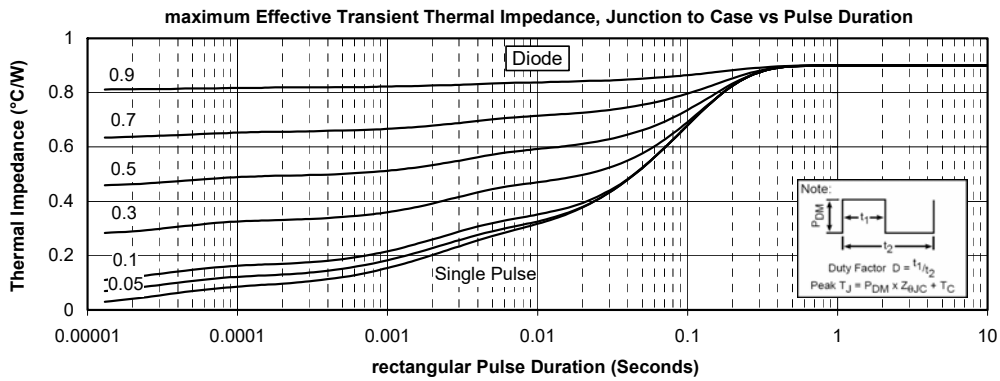
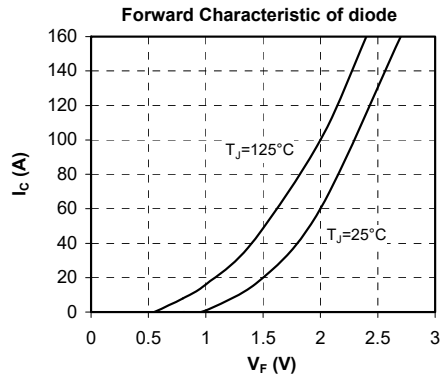
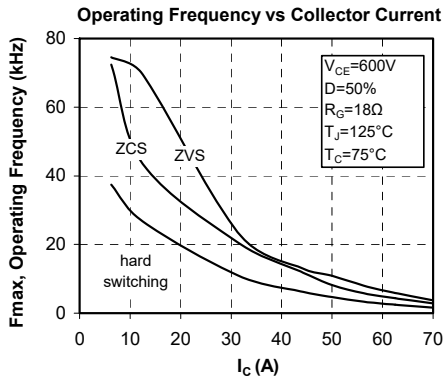
Package outline (dimensions in mm)



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

Typical Performance Curve





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Как с нами связаться

Телефон: 8 (812) 309 58 32 (многоканальный)

Факс: 8 (812) 320-02-42

Электронная почта: org@eplast1.ru

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.