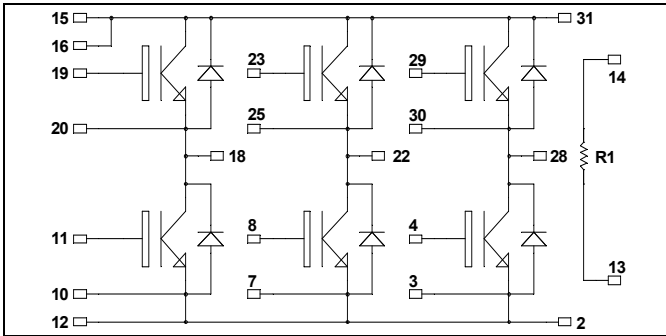
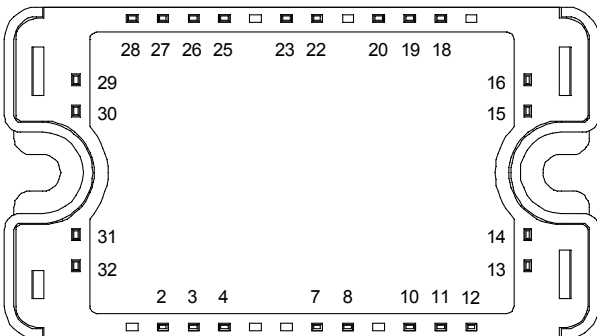


**3 Phase bridge
Trench + Field Stop IGBT3
Power Module**

**$V_{CES} = 1200V$
 $I_C = 25A @ T_c = 80^\circ C$**



It is recommended to connect a decoupling capacitor between pins 31 & 2 to reduce switching overvoltages, if DC Power is connected between pins 15, 16 & 12. Pins 15 & 16 must be shorted together.



Application

- Motor control

Features

- Trench + Field Stop IGBT3 Technology
 - Low voltage drop
 - Low tail current
 - Switching frequency up to 20 kHz
 - Soft recovery parallel diodes
 - Low diode VF
 - 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

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
- RoHS compliant

Absolute maximum ratings

Symbol	Parameter		Max ratings	Unit
V_{CES}	Collector - Emitter Breakdown Voltage		1200	V
I_C	Continuous Collector Current	$T_c = 25^\circ C$	40	A
		$T_c = 80^\circ C$	25	
I_{CM}	Pulsed Collector Current	$T_c = 25^\circ C$	50	
V_{GE}	Gate - Emitter Voltage		± 20	V
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	156	W
RBSOA	Reverse Bias Safe Operation Area	$T_j = 125^\circ C$	50A @ 1150V	

CAUTION: These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed. See application note APT0502 on www.microsemi.com

All ratings @ $T_j = 25^\circ\text{C}$ unless otherwise specified

Electrical Characteristics

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	$V_{GE} = 15V$ $I_C = 25A$		$T_j = 25^\circ\text{C}$ 1.7 $T_j = 125^\circ\text{C}$ 2.0	2.1	V
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 1mA$	5.0	5.8	6.5	V
I_{GES}	Gate – Emitter Leakage Current	$V_{GE} = 20V, V_{CE} = 0V$			400	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0V, V_{CE} = 25V$		1800		pF
C_{res}	Reverse Transfer Capacitance	$f = 1MHz$		82		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = \pm 15V$ $V_{Bus} = 600V$ $I_C = 25A$ $R_G = 27\Omega$		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°C) $V_{GE} = \pm 15V$ $V_{Bus} = 600V$ $I_C = 25A$ $R_G = 27\Omega$		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	$V_{GE} = \pm 15V$ $V_{Bus} = 600V$ $I_C = 25A$		$T_j = 25^\circ\text{C}$ 1.9 $T_j = 125^\circ\text{C}$ 2.5		mJ
E_{off}	Turn-off Switching Energy	$R_G = 27\Omega$		$T_j = 25^\circ\text{C}$ 1.9 $T_j = 125^\circ\text{C}$ 2.9		

Reverse diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Maximum Peak Repetitive Reverse Voltage		1200			V
I_{RM}	Maximum Reverse Leakage Current	$V_R = 1200V$			$T_j = 25^\circ\text{C}$ 100 $T_j = 150^\circ\text{C}$ 500	μA
I_F	DC Forward Current			$T_c = 80^\circ\text{C}$ 30		A
V_F	Diode Forward Voltage	$I_F = 30A$		2.6	3.1	V
		$I_F = 60A$		3.2		
		$I_F = 30A$ $T_j = 125^\circ\text{C}$		1.8		
t_{rr}	Reverse Recovery Time	$I_F = 30A$		$T_j = 25^\circ\text{C}$ 300 $T_j = 125^\circ\text{C}$ 380		ns
Q_{rr}	Reverse Recovery Charge	$V_R = 800V$ $di/dt = 200A/\mu s$		$T_j = 25^\circ\text{C}$ 360 $T_j = 125^\circ\text{C}$ 1700		

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
B _{25/85}	T ₂₅ = 298.15 K		3952		K

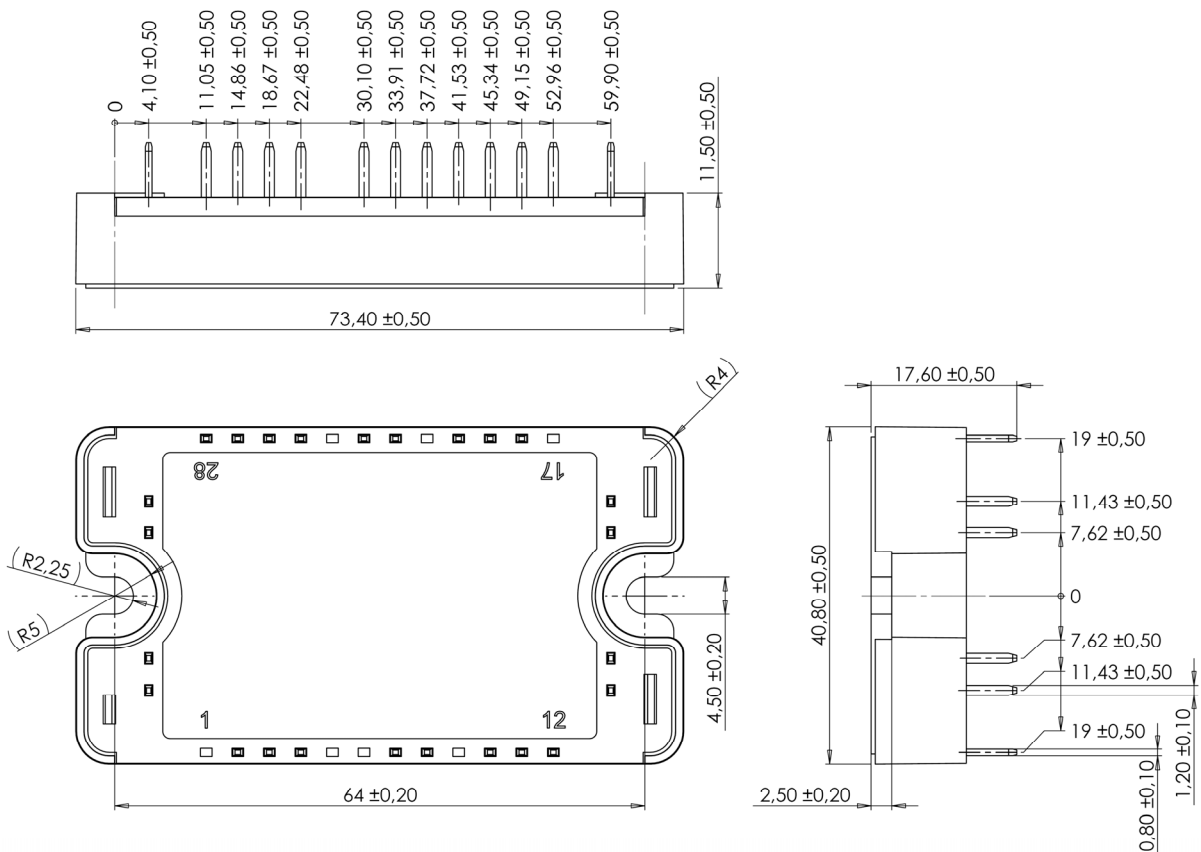
$$R_T = \frac{R_{25}}{\exp\left[B_{25/85}\left(\frac{1}{T_{25}} - \frac{1}{T}\right)\right]}$$

T: Thermistor temperature
 R_T: Thermistor value at T

Thermal and package characteristics

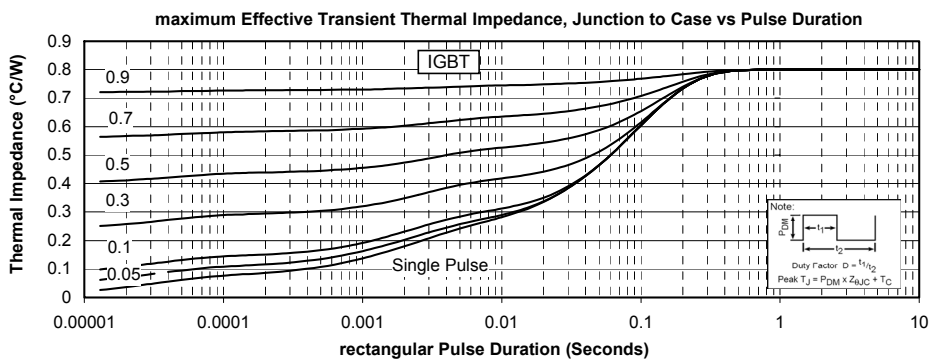
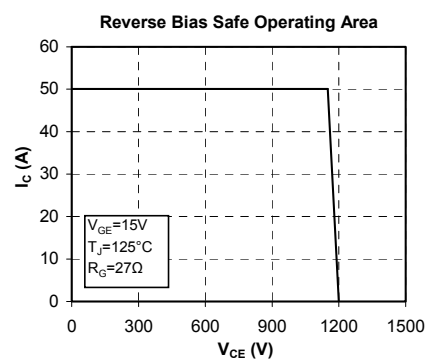
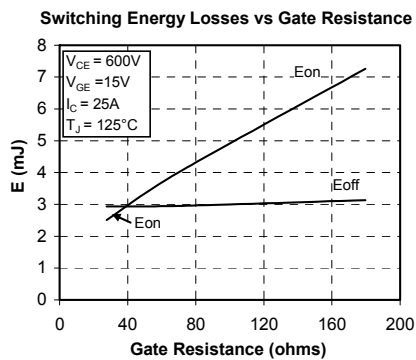
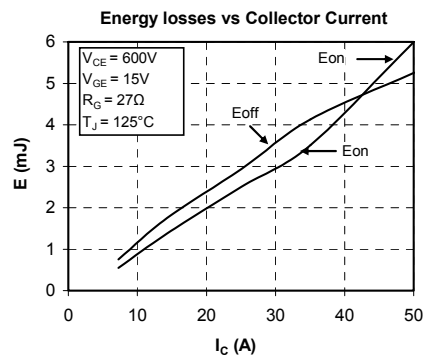
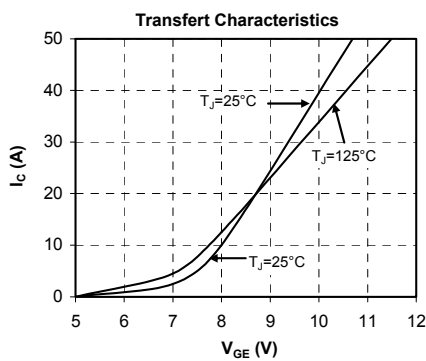
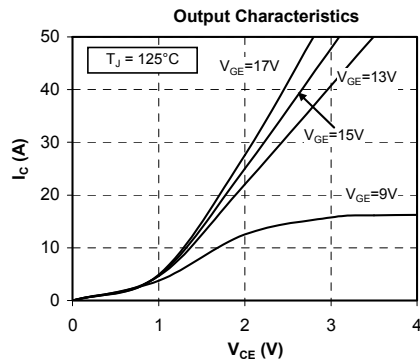
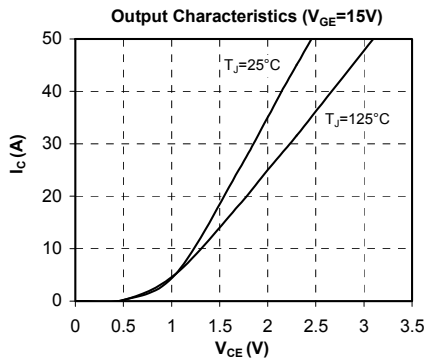
Symbol	Characteristic	Min	Typ	Max	Unit		
R _{thJC}	Junction to Case Thermal Resistance	IGBT		0.8	°C/W		
		Diode		1.2			
V _{ISOL}	RMS Isolation Voltage, any terminal to case t=1 min, 50/60Hz	4000			V		
T _J	Operating junction temperature range	-40		150	°C		
T _{STG}	Storage Temperature Range	-40		125			
T _C	Operating Case Temperature	-40		100			
Torque	Mounting torque		To heatsink	M4	2	3	N.m
Wt	Package Weight					110	g

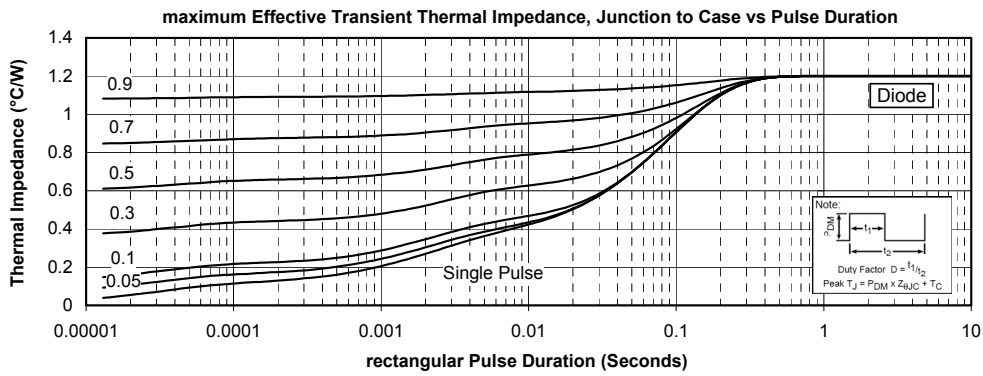
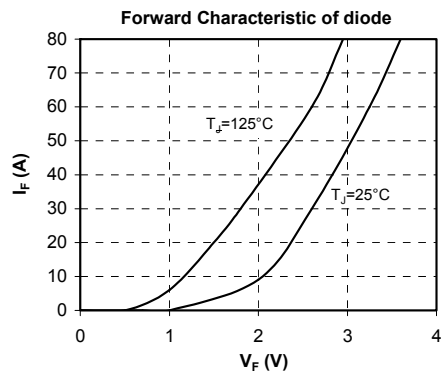
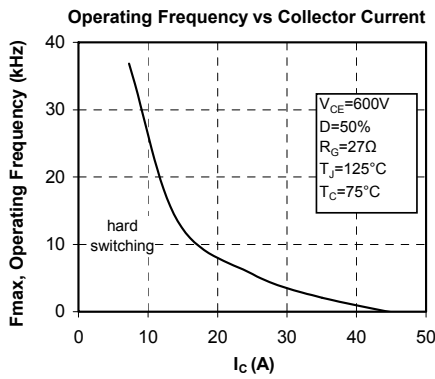
SP3 Package outline (dimensions in mm)



See application note 1901 - Mounting Instructions for SP3 Power Modules on www.microsemi.com

Typical Performance Curve





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