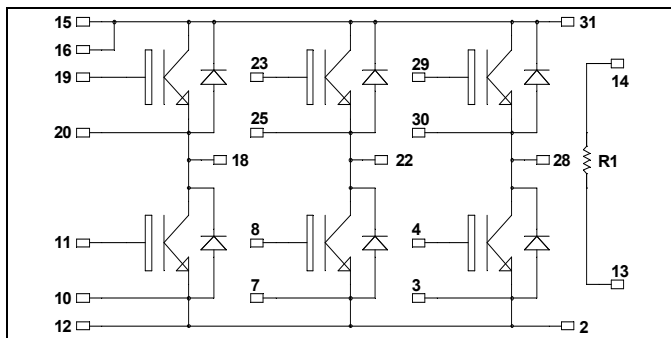


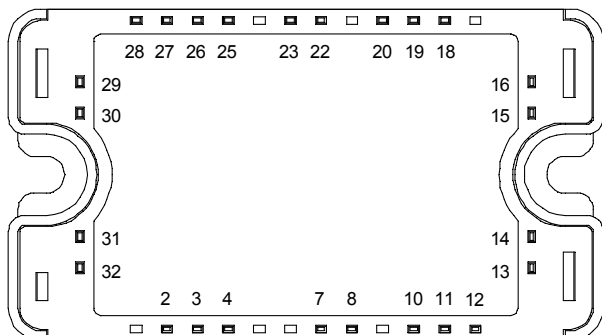
3 Phase bridge Trench + Field Stop IGBT3 Power Module

$$V_{CES} = 1200V$$

$$I_C = 35A @ T_c = 80^{\circ}C$$



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	$T_c = 25^{\circ}C$	A
		$T_c = 80^{\circ}C$	
I_{CM}	Pulsed Collector Current	$T_c = 25^{\circ}C$	
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_c = 25^{\circ}C$	W
RBSOA	Reverse Bias Safe Operating Area	$T_j = 125^{\circ}C$	70A@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	$V_{GE} = 0\text{V}$ $V_{CE} = 1200\text{V}$			250	μA
		$T_j = 125^\circ\text{C}$			500	
$V_{CE(sat)}$	Collector Emitter saturation Voltage	$V_{GE} = 15\text{V}$ $I_C = 35\text{A}$		1.7	2.1	V
		$T_j = 125^\circ\text{C}$		2.0		
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 1.5\text{mA}$	5.0	5.8	6.5	V
I_{GES}	Gate – Emitter Leakage Current	$V_{GE} = 20\text{V}, V_{CE} = 0\text{V}$			400	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0\text{V}, V_{CE} = 25\text{V}$		2.5		nF
C_{res}	Reverse Transfer Capacitance	$f = 1\text{MHz}$		0.15		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C)		90		ns
T_r	Rise Time	$V_{GE} = \pm 15\text{V}$		30		
$T_{d(off)}$	Turn-off Delay Time	$V_{Bus} = 600\text{V}$		420		
T_f	Fall Time	$I_C = 35\text{A}$ $R_G = 27\Omega$		70		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (125°C)		90		ns
T_r	Rise Time	$V_{GE} = \pm 15\text{V}$		50		
$T_{d(off)}$	Turn-off Delay Time	$V_{Bus} = 600\text{V}$		520		
T_f	Fall Time	$I_C = 35\text{A}$ $R_G = 27\Omega$		90		
E_{on}	Turn-on Switching Energy	$V_{GE} = \pm 15\text{V}$ $V_{Bus} = 600\text{V}$		3.5		mJ
E_{off}	Turn-off Switching Energy	$I_C = 35\text{A}$ $R_G = 27\Omega$ $T_j = 125^\circ\text{C}$		4.1		

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	$V_R = 1200\text{V}$			100	μA
		$T_j = 25^\circ\text{C}$			500	
		$T_j = 150^\circ\text{C}$				
I_F	DC Forward Current	$T_c = 80^\circ\text{C}$		30		A
V_F	Diode Forward Voltage	$I_F = 30\text{A}$		2.6	3.1	V
		$I_F = 60\text{A}$		3.2		
		$I_F = 30\text{A}, T_j = 125^\circ\text{C}$		1.8		
t_{rr}	Reverse Recovery Time	$I_F = 30\text{A}$		300		ns
		$T_j = 25^\circ\text{C}$		380		
Q_{rr}	Reverse Recovery Charge	$V_R = 800\text{V}$ $di/dt = 200\text{A}/\mu\text{s}$		360		nC
		$T_j = 125^\circ\text{C}$		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

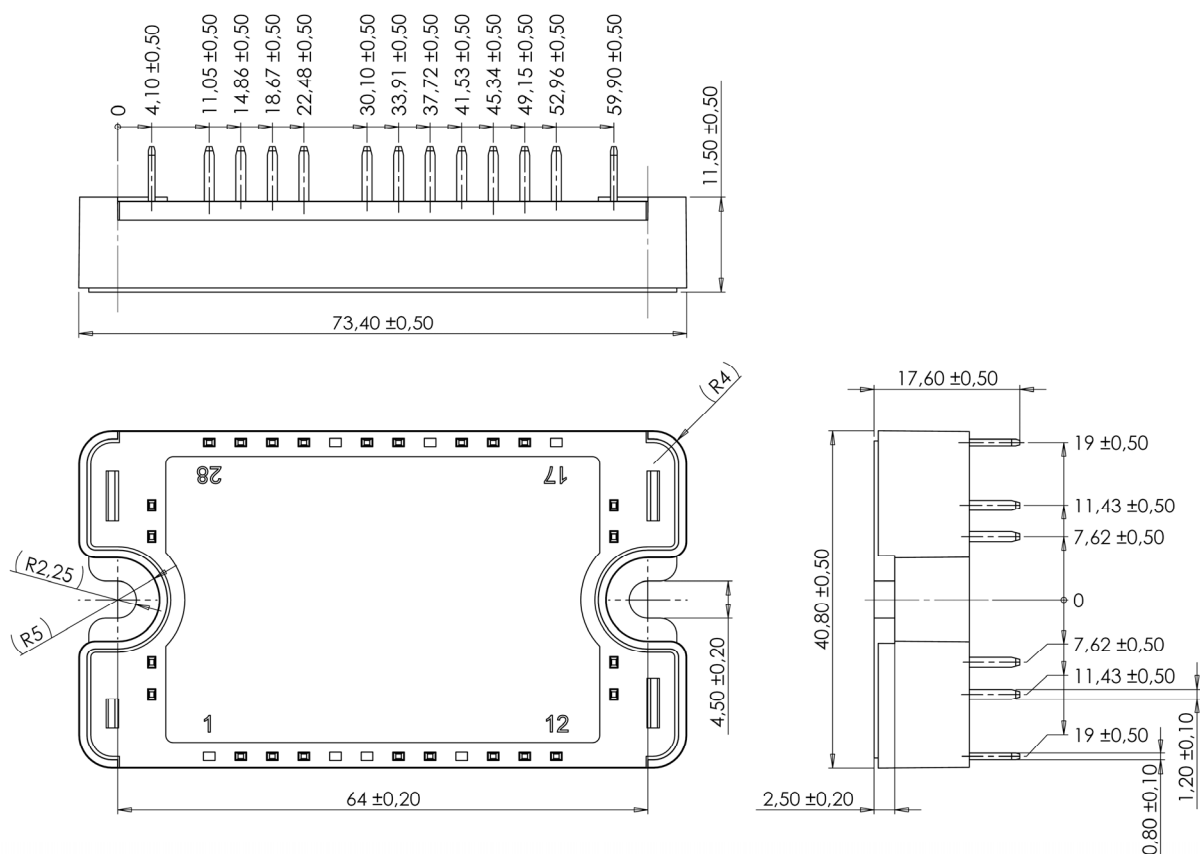
$$R_T = \frac{R_{25}}{\exp \left[B_{25/85} \left(\frac{1}{T_{25}} - \frac{1}{T} \right) \right]}$$

T: Thermistor temperature
 R_T: Thermistor value at T

Thermal and package characteristics

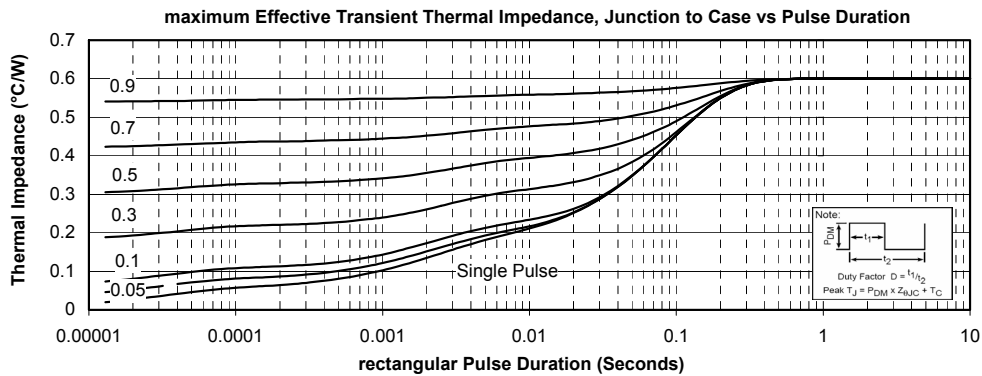
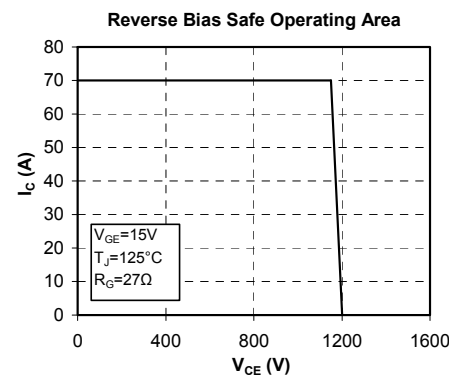
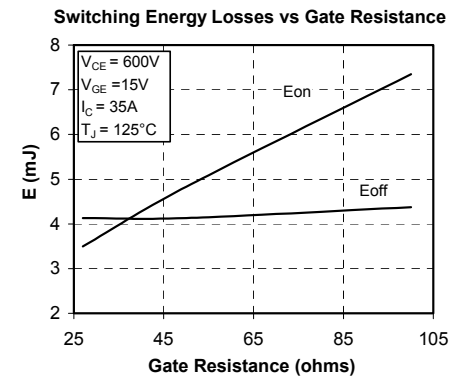
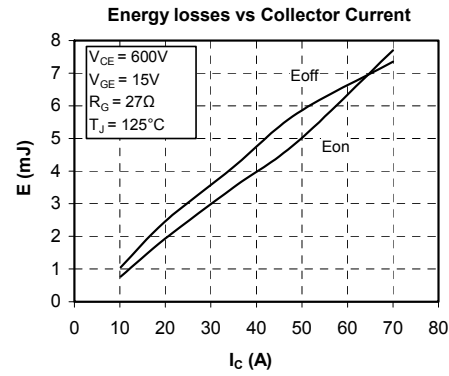
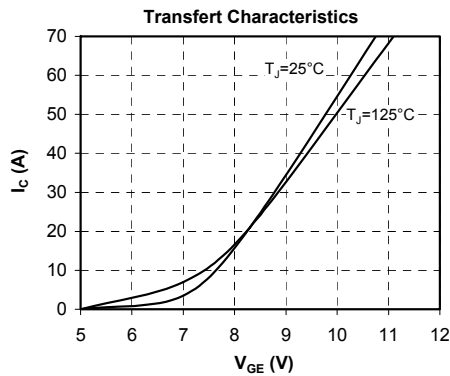
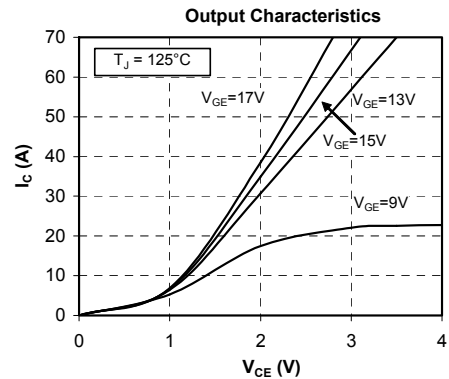
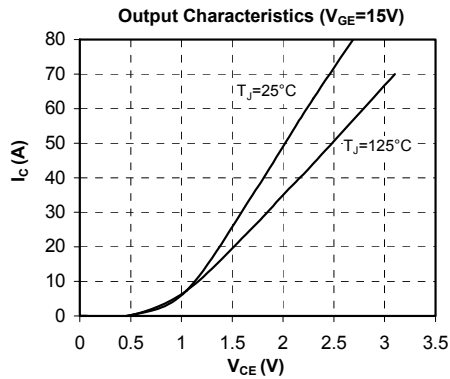
Symbol	Characteristic			Min	Typ	Max	Unit
R _{thJC}	Junction to Case Thermal Resistance			IGBT		0.6	°C/W
				Diode		1.2	
V _{ISOL}	RMS Isolation Voltage, any terminal to case t=1 min, 50/60Hz			4000			V
T _J	Operating junction temperature range			-40		150	°C
T _{STG}	Storage Temperature Range			-40		125	
T _C	Operating Case Temperature			-40		100	
Torque	Mounting torque	To heatsink	M4	2		3	N.m
Wt	Package Weight					110	g

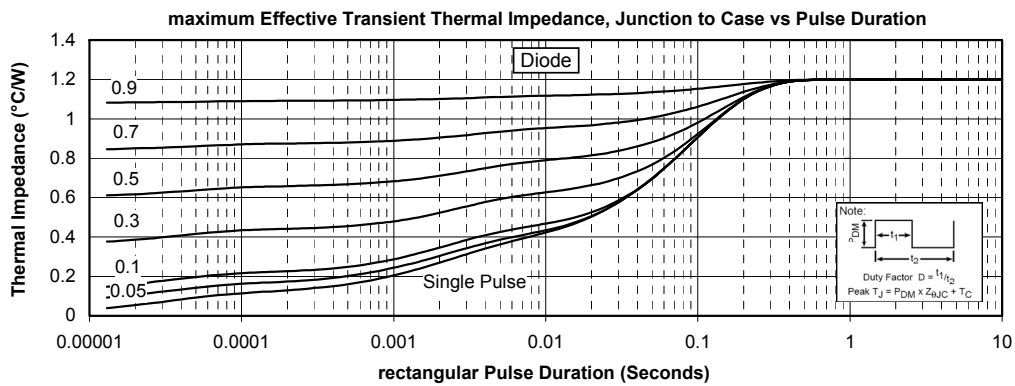
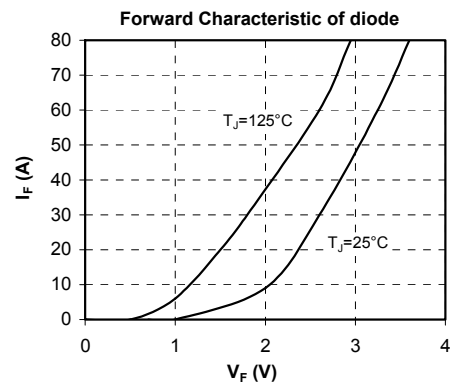
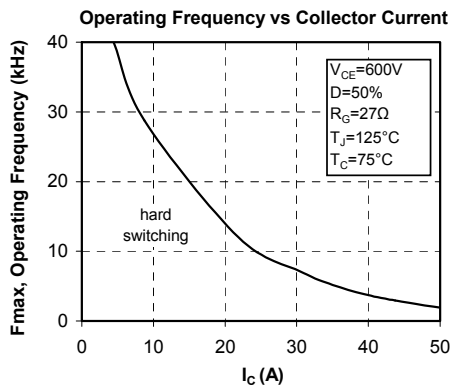
SP3 Package outline (dimensions in mm)



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

Typical Performance Curve





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