

TECHNICAL DATA  
DATASHEET 5384, Rev. B

**600 VOLT, 40 AMP LOW LOSS ULTRAFAST IGBT THREE PHASE BRIDGE MODULE**

**Features**

- Trench stop third generation IGBT
- Soft, fast recovery diode for minimal EMI
- Isolated base plate
- Aluminum nitride substrate
- Light weight low profile standard package
- High temperature engineering plastic shell construction



**ELECTRICAL CHARACTERISTICS PER IGBT LEG**

(T<sub>j</sub>=25°C UNLESS OTHERWISE SPECIFIED)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
<b>IGBT SPECIFICATIONS</b>					
Collector to Emitter Breakdown Voltage I <sub>C</sub> = 2 mA, V <sub>GE</sub> = 0V	BV <sub>CES</sub>	600	-	-	V
Continuous Collector Current T <sub>C</sub> = 25 °C T <sub>C</sub> = 100 °C	I <sub>C</sub>	-	-	60 30	A
Pulsed Collector Current, 1ms	I <sub>CM</sub>	-	-	160	A
Gate to Emitter Voltage	V <sub>GE</sub>	-	-	+/-20	V
Gate-Emitter Leakage Current , V <sub>GE</sub> = +/-20V	I <sub>GES</sub>	-	-	+/- 100	nA
Gate Threshold Voltage, I <sub>C</sub> = 0.58 mA	V <sub>GE(TH)</sub>	4.1	-	5.7	V
Zero Gate Voltage Collector Current V <sub>CE</sub> = 600 V, V <sub>GE</sub> =0V T <sub>i</sub> =25°C V <sub>CE</sub> = 480 V, V <sub>GE</sub> =0V T <sub>i</sub> =125°C	I <sub>CES</sub>	-	-	0.1 1.5	mA
Collector to Emitter Saturation Voltage T <sub>C</sub> = 25 °C I <sub>C</sub> = 20A, V <sub>GE</sub> = 15V T <sub>C</sub> = 125 °C I <sub>C</sub> = 20A, V <sub>GE</sub> = 15V	V <sub>CE(SAT)</sub>	-	1.95 2.30	2.40 -	V
Input Capacitance Output Capacitance V <sub>CE</sub> = 25 V, V <sub>GE</sub> = 0 V, f = 1 MHz	C <sub>ies</sub> C <sub>oes</sub>	-	2190 112	-	pF
Turn On Delay Time Rise Time Turn Off Delay Time Fall Time (T <sub>i</sub> = 25°C, I <sub>C</sub> = 20A, V <sub>GE</sub> = 15V, V <sub>CE</sub> = 400 V, R <sub>G</sub> = 8 Ω)	t <sub>d(on)</sub> t <sub>r</sub> t <sub>d(off)</sub> t <sub>f</sub>	-	24 40 240 26	-	ns
Turn on Energy Loss Turn off Energy Loss (T <sub>i</sub> = 25°C, I <sub>C</sub> = 20A, V <sub>GE</sub> = 15V, V <sub>CE</sub> = 400 V, R <sub>G</sub> = 8 Ω)	E <sub>on</sub> E <sub>off</sub>	-	1.10 0.58	-	mJ

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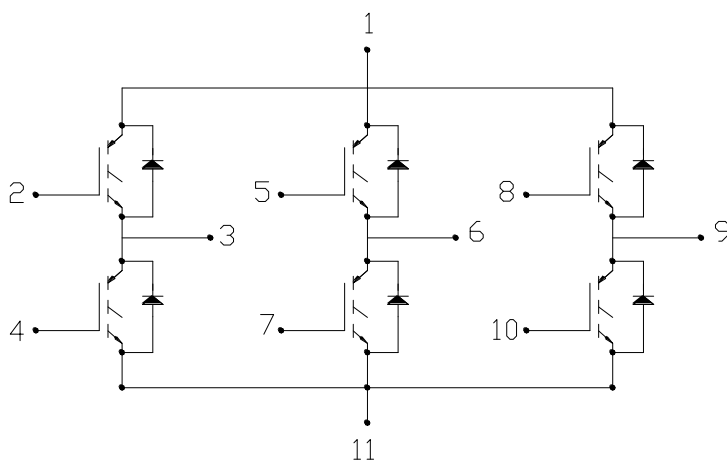
**DIODE RATING AND CHARACTERISTICS PER LEG**

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Diode Peak Inverse Voltage	PIV	600	-	-	V
Continuous Forward Current, $T_C = 25^\circ\text{C}$ $T_C = 100^\circ\text{C}$	$I_F$	-	-	30 15	A
Forward Surge Current, $t_p = 1\text{ms}$	$I_{FSM}$	-	-	160	A
Diode Forward Voltage, $I_F = 20\text{A } T_C = 25^\circ\text{C}$ $I_F = 20\text{A } T_C = 125^\circ\text{C}$	$V_F$	-	1.70 1.75	2.1 -	V
Diode Reverse Recovery Time $T_j = 25^\circ\text{C}, I_F = 20\text{A}, V_{CE} = 400\text{V}, di/dt = 100\text{A}/\mu\text{s}$	$t_{RR}$	-	160	-	ns

**PACKAGE CHARACTERISTICS**

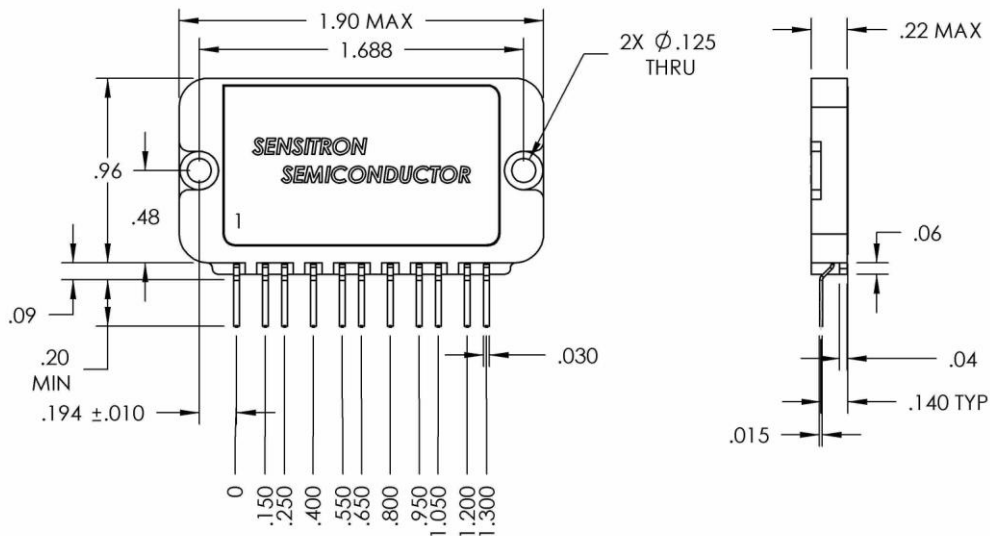
Diode Junction-to-Case Thermal Resistance Per Leg	$R_{\theta JC}$	-	-	2.0	$^\circ\text{C}/\text{W}$
IGBT Junction-to-Case Thermal Resistance Per Leg	$R_{\theta JC}$	-	-	0.7	
Maximum and Storage Junction Temperature	$T_{jmax}$	-55	-	150	$^\circ\text{C}$
Isolation to Base Plate	$V_{iso}$	-	-	2500	V

**Schematic Diagram:**



**Mechanical Outline (inches):**

**SPM1006**

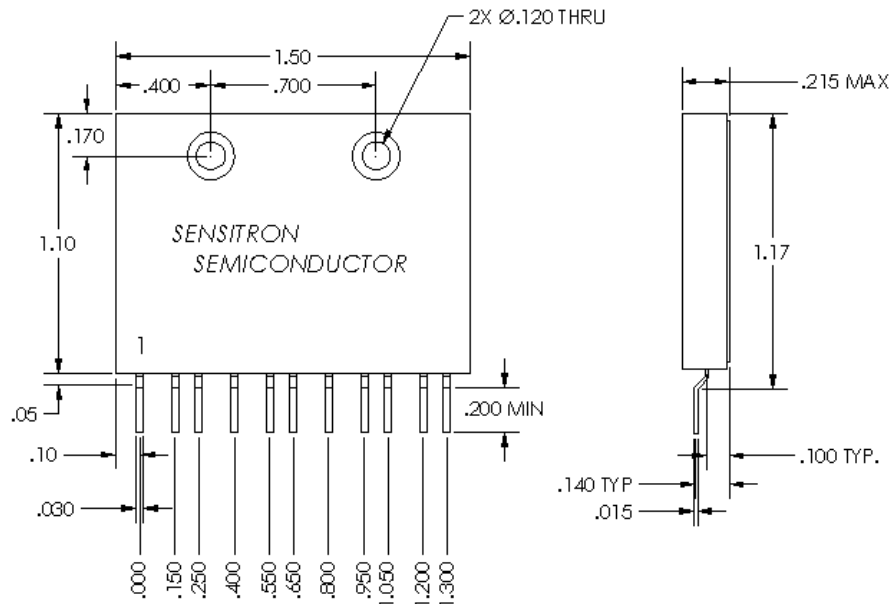


**NOTES:**

**Package: EPAK1**

1. TOLERANCE UNLESS OTHERWISE NOTED:  
    .XX = ±.010  
    .XXX = ±.005
2. MAXIMUM MOUNTING TORQUE = 4 IN-LB
3. PRE-TORQUE BOTH FASTENERS TO 2 IN-LB MAX BEFORE APPLYING FINAL TORQUE.
4. CONTACT FACTORY FOR THERMAL INTERFACE MATERIAL SUGGESTIONS AND COMPATIBILITY.

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**NOTES:**

1. TOLERANCE UNLESS OTHERWISE NOTED:

.XX =  $\pm 0.10$

.XXX =  $\pm 0.005$

2. MAXIMUM MOUNTING TORQUE = 3 IN-LB

3. PRE-TORQUE BOTH FASTENERS TO 1.5 IN-LB MAX BEFORE APPLYING FINAL TORQUE.

4. CONTACT FACTORY FOR THERMAL INTERFACE MATERIAL SUGGESTIONS AND COMPATIBILITY.

**Note:** SPM1006EM units use this legacy package.

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