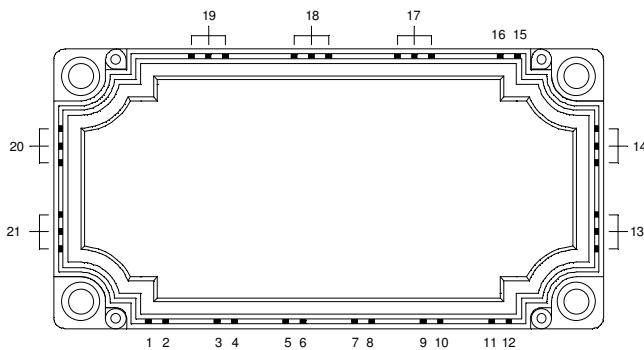
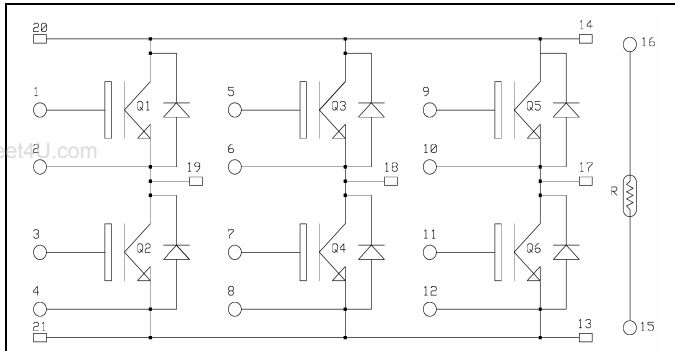


## 3 Phase bridge NPT IGBT Power Module

$V_{CES} = 1700V$   
 $I_C = 50A @ T_c = 80^\circ C$



### Application

- AC Motor control

### Features


- Non Punch Through (NPT) Low Loss IGBT®
  - Low voltage drop
  - Low tail current
  - Switching frequency up to 20 kHz
  - Soft recovery parallel diodes
  - Low diode VF
  - Low leakage current
  - Avalanche energy rated
  - RBSOA and SCSOA rated
- Kelvin emitter for easy drive
- Very low stray inductance
- High level of integration
- Internal thermistor for temperature monitoring

### Benefits

- Stable temperature behavior
- Very rugged
- Solderable terminals for easy PCB mounting
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Easy paralleling due to positive TC of VCEsat
- Low profile

### Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
$V_{CES}$	Collector - Emitter Breakdown Voltage	1700	V
$I_C$	Continuous Collector Current	$T_C = 25^\circ C$	100
		$T_C = 80^\circ C$	50
$I_{CM}$	Pulsed Collector Current	$T_C = 25^\circ C$	150
$V_{GE}$	Gate - Emitter Voltage	$\pm 20$	V
$P_D$	Maximum Power Dissipation	$T_C = 25^\circ C$	480
RBSOA	Reverse Bias Operating Area	$T_j = 125^\circ C$	100A@1600V

 **CAUTION:** These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed.

## Electrical Characteristics

All ratings @ T<sub>j</sub> = 25°C unless otherwise specified

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
BV <sub>CES</sub>	Collector - Emitter Breakdown Voltage	V <sub>GE</sub> = 0V, I <sub>C</sub> = 1mA	1700			V
I <sub>CES</sub>	Zero Gate Voltage Collector Current	V <sub>GE</sub> = 0V V <sub>CE</sub> = 1700V		0.02 1.5	0.1	mA
		T <sub>j</sub> = 25°C T <sub>j</sub> = 125°C				
V <sub>CE(on)</sub>	Collector Emitter on Voltage	V <sub>GE</sub> = 15V I <sub>C</sub> = 50A		2.7 3.2	3.3	V
		T <sub>j</sub> = 25°C T <sub>j</sub> = 125°C				
V <sub>GE(th)</sub>	Gate Threshold Voltage	V <sub>GE</sub> = V <sub>CE</sub> , I <sub>C</sub> = 2.5 mA	4.5		6.5	V
I <sub>GES</sub>	Gate - Emitter Leakage Current	V <sub>GE</sub> = 20V, V <sub>CE</sub> = 0V			100	nA

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## Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C <sub>ies</sub>	Input Capacitance	V <sub>GE</sub> = 0V, V <sub>CE</sub> = 25V f = 1MHz		3500		pF
T <sub>d(on)</sub>	Turn-on Delay Time	Inductive Switching (25°C) V <sub>GE</sub> = ±15V V <sub>Bus</sub> = 900V I <sub>C</sub> = 50A R <sub>G</sub> = 30Ω		100		ns
T <sub>r</sub>	Rise Time			100		
T <sub>d(off)</sub>	Turn-off Delay Time			800		
T <sub>f</sub>	Fall Time			30		
T <sub>d(on)</sub>	Turn-on Delay Time	Inductive Switching (125°C) V <sub>GE</sub> = ±15V V <sub>Bus</sub> = 900V I <sub>C</sub> = 50A R <sub>G</sub> = 30Ω		100		ns
T <sub>r</sub>	Rise Time			100		
T <sub>d(off)</sub>	Turn-off Delay Time			900		
T <sub>f</sub>	Fall Time			30		
E <sub>off</sub>	Turn off Energy			14.5		mJ

## Reverse diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V <sub>F</sub>	Diode Forward Voltage	I <sub>F</sub> = 50A V <sub>GE</sub> = 0V		2.2 2.0	2.6	V
		T <sub>j</sub> = 25°C T <sub>j</sub> = 125°C				
E <sub>r</sub>	Reverse Recovery Energy	I <sub>F</sub> = 50A V <sub>R</sub> = 900V di/dt = 750A/μs		2 4		mJ
		T <sub>j</sub> = 25°C T <sub>j</sub> = 125°C				
Q <sub>rr</sub>	Reverse Recovery Charge	I <sub>F</sub> = 50A V <sub>R</sub> = 900V di/dt = 750A/μs		6 12		μC
		T <sub>j</sub> = 25°C T <sub>j</sub> = 125°C				

## Temperature sensor NTC

Symbol	Characteristic	Min	Typ	Max	Unit
R <sub>25</sub>	Resistance @ 25°C		5		kΩ
B <sub>25/50</sub>	T <sub>25</sub> = 298.16 K		3375		K

$$R_T = \frac{R_{25}}{\exp \left[ B_{25/50} \left( \frac{1}{T_{25}} - \frac{1}{T} \right) \right]}$$

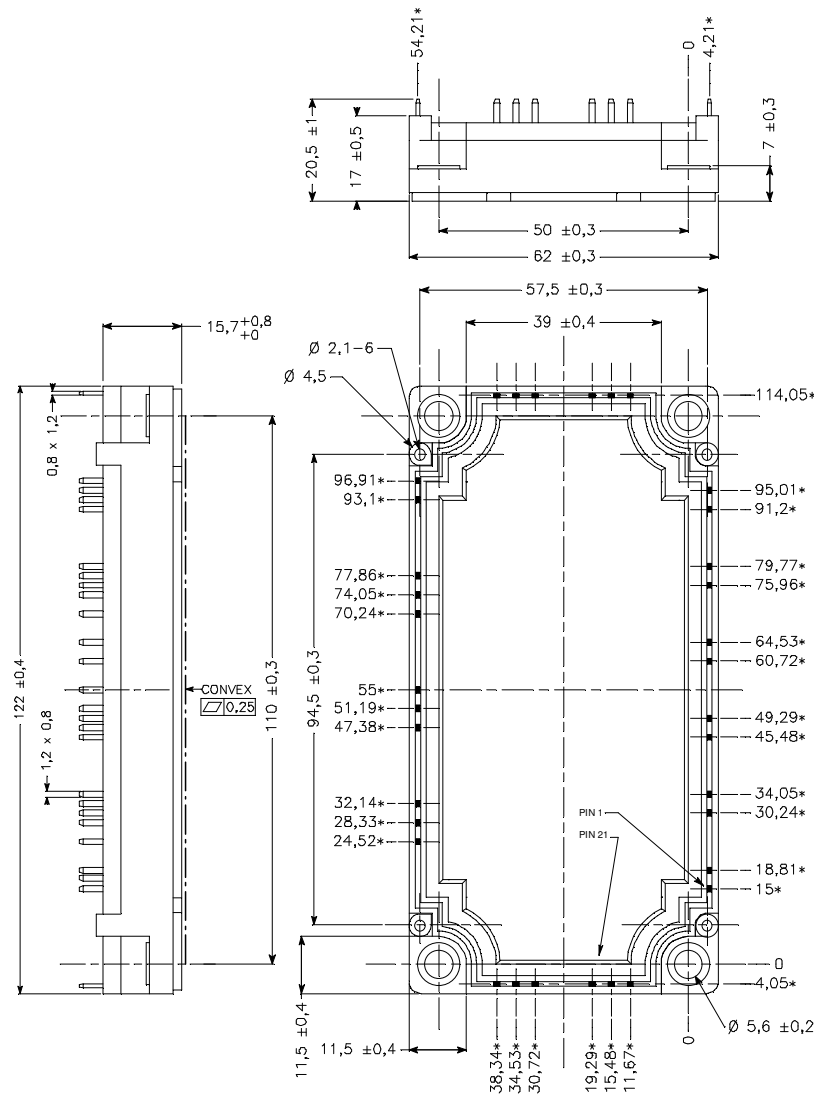
T: Thermistor temperature  
R<sub>T</sub>: Thermistor value at T

**Thermal and package characteristics**

Symbol	Characteristic	Min	Typ	Max	Unit	
R <sub>thJC</sub>	Junction to Case	IGBT		0.26	°C/W	
		Diode		0.56		
V <sub>ISOL</sub>	RMS Isolation Voltage, any terminal to case t =1 min, I <sub>isol</sub> < 1mA, 50/60Hz	2500			V	
T <sub>J</sub>	Operating junction temperature range	-40		150	°C	
T <sub>STG</sub>	Storage Temperature Range	-40		125		
T <sub>C</sub>	Operating Case Temperature	-40		125		
Torque	Mounting torque	To Heatsink	M5	3	4.5	N.m
Wt	Package Weight			300		g

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**Package outline**



ALL DIMENSIONS MARKED \*\*\* ARE TOLERANCED AS:  $\pm 0.4$

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