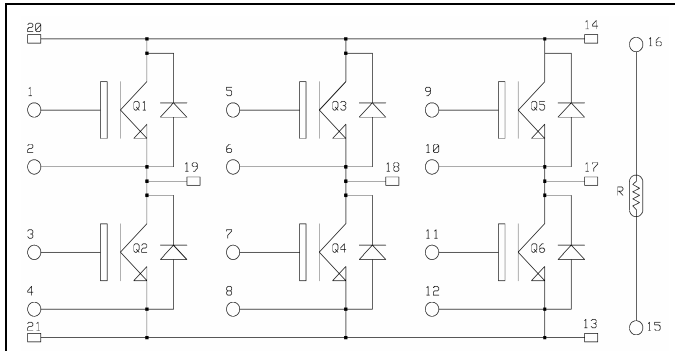


## 3 Phase bridge NPT IGBT Power Module

$V_{CES} = 1200V$   
 $I_C = 50A @ T_c = 80^\circ C$

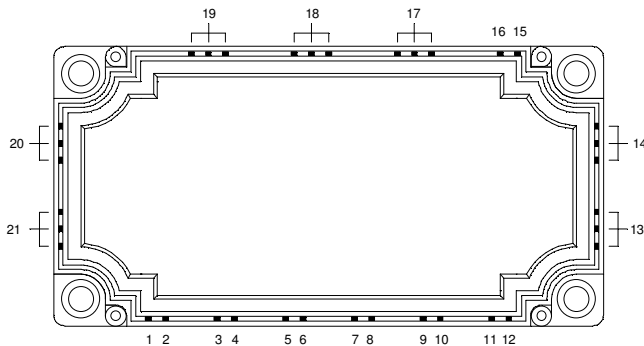


### Application

- AC Motor control

### Features

- Non Punch Through (NPT) 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	1200	V
$I_C$	Continuous Collector Current	$T_C = 25^\circ C$	78
		$T_C = 80^\circ C$	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	$T_C = 25^\circ C$	400
SCSOA	Short Circuit Safe Operating Area	$T_j = 125^\circ C$	500A@1200V

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

## Electrical Characteristics

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

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit	
$BV_{CES}$	Collector - Emitter Breakdown Voltage	$V_{GE} = 0V, I_C = 3mA$	1200			V	
$I_{CES}$	Zero Gate Voltage Collector Current	$V_{GE} = 0V$ $V_{CE} = 1200V$	$T_j = 25^\circ\text{C}$	0.8	1	mA	
			$T_j = 125^\circ\text{C}$	4			
$V_{CE(on)}$	Collector Emitter on Voltage	$V_{GE} = 15V$ $I_C = 50A$	$T_j = 25^\circ\text{C}$	2.0	2.5	3.0	V
			$T_j = 125^\circ\text{C}$		3.1	3.7	
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 2mA$	4.5		6.5	V	
$I_{GES}$	Gate - Emitter Leakage Current	$V_{GE} = 20V, V_{CE} = 0V$			200	nA	

## Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$C_{ies}$	Input Capacitance	$V_{GE} = 0V$ $V_{CE} = 25V$ $f = 1MHz$		3300		pF
$C_{oes}$	Output Capacitance			500		
$C_{res}$	Reverse Transfer Capacitance			220		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching ( $125^\circ\text{C}$ ) $V_{GE} = \pm 15V$ $V_{Bus} = 600V$ $I_C = 50A$ $R_G = 22\Omega$		44		ns
$T_r$	Rise Time			56		
$T_{d(off)}$	Turn-off Delay Time			380		
$T_f$	Fall Time			70		

## Reverse diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit	
$V_F$	Diode Forward Voltage	$I_F = 50A$ $V_{GE} = 0V$	$T_j = 25^\circ\text{C}$		2.3	2.8	V
			$T_j = 125^\circ\text{C}$		1.8		
$t_{rr}$	Reverse Recovery Time	$I_F = 50A$ $V_R = 600V$ $di/dt = 800A/\mu s$		200		ns	
$Q_{rr}$	Reverse Recovery Charge	$I_F = 50A$ $V_R = 600V$ $di/dt = 800A/\mu s$	$T_j = 25^\circ\text{C}$		2.8		$\mu C$
			$T_j = 125^\circ\text{C}$		8		

## Temperature sensor NTC

Symbol	Characteristic	Min	Typ	Max	Unit
$R_{25}$	Resistance @ $25^\circ\text{C}$		5		k $\Omega$
$B_{25/50}$	$T_{25} = 298.16\text{ K}$		3375		K

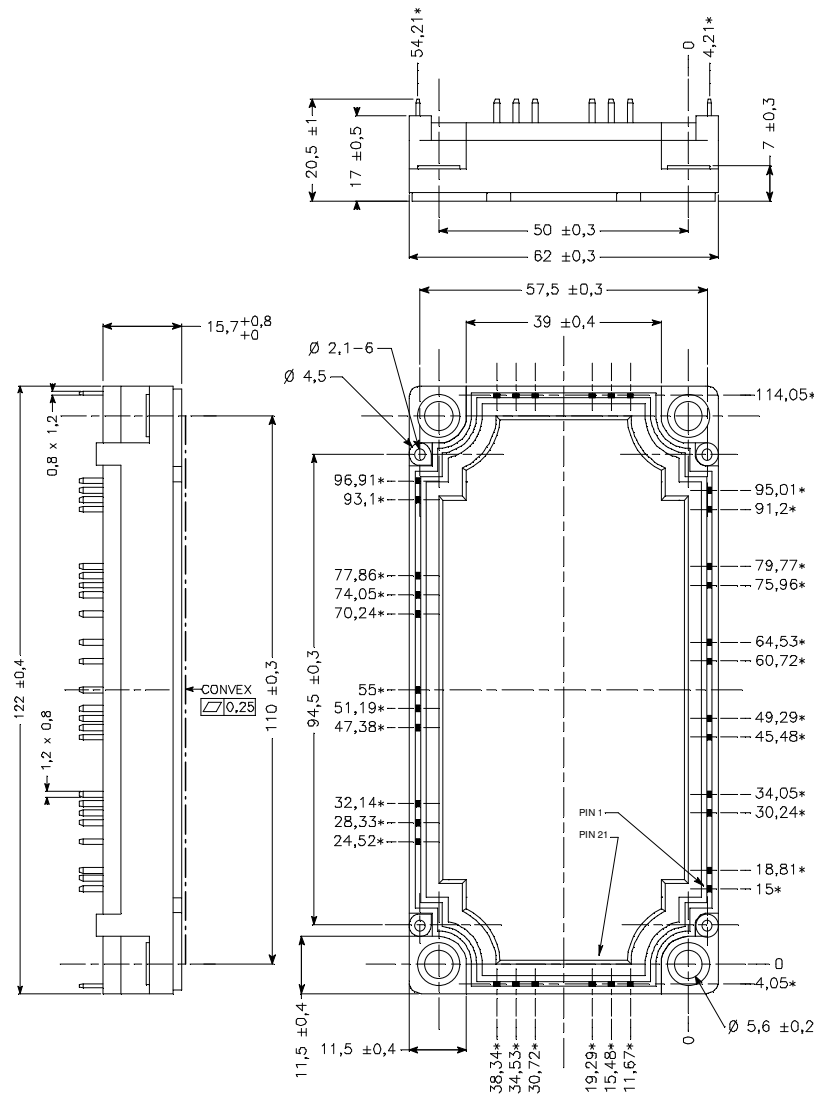
$$R_T = \frac{R_{25}}{\exp\left[B_{25/50}\left(\frac{1}{T_{25}} - \frac{1}{T}\right)\right]}$$

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		0.35	°C/W	
		Diode		0.7		
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

**Package outline**



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

APT reserves the right to change, without notice, the specifications and information contained herein

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