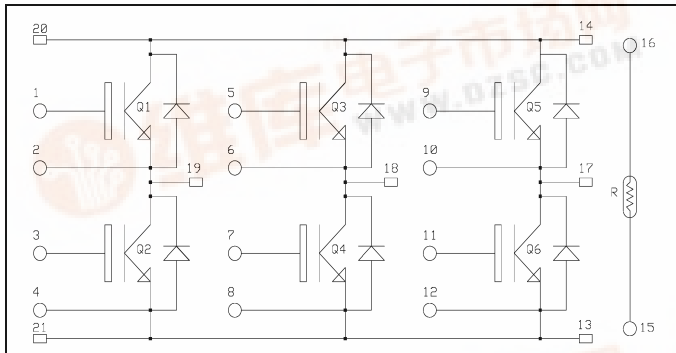




APTGS50X170TE3

3 Phase bridge NPT IGBT Power Module

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



Application

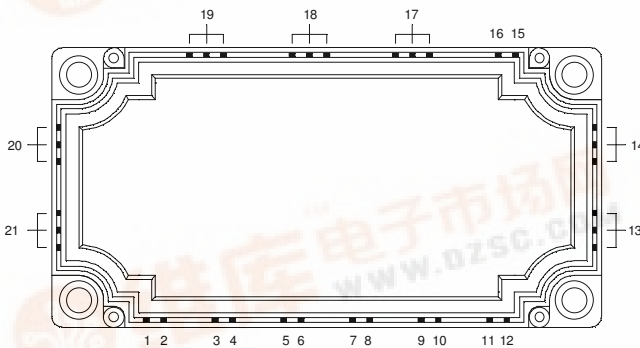
- AC Motor control

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	$T_c = 25^\circ C$	A
		$T_c = 80^\circ C$	
I_{CM}	Pulsed Collector Current	$T_c = 25^\circ C$	150
V_{GE}	Gate - Emitter Voltage	± 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

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	$V_{GE} = 0V, I_C = 1mA$	1700			V
I_{CES}	Zero Gate Voltage Collector Current	$V_{GE} = 0V$ $V_{CE} = 1700V$	$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$	0.02 1.5	0.1	mA
$V_{CE(on)}$	Collector Emitter on Voltage	$V_{GE} = 15V$ $I_C = 50A$	$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$	2.7 3.2	3.3	V
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 2.5mA$	4.5		6.5	V
I_{GES}	Gate - Emitter Leakage Current	$V_{GE} = 20V, V_{CE} = 0V$			100	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0V, V_{CE} = 25V$ $f = 1MHz$		3500		pF
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = \pm 15V$ $V_{Bus} = 900V$ $I_C = 50A$ $R_G = 30\Omega$		100		ns
T_r	Rise Time			100		
$T_{d(off)}$	Turn-off Delay Time			800		
T_f	Fall Time			30		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (125°C) $V_{GE} = \pm 15V$ $V_{Bus} = 900V$ $I_C = 50A$ $R_G = 30\Omega$		100		ns
T_r	Rise Time			100		
$T_{d(off)}$	Turn-off Delay Time			900		
T_f	Fall Time			30		
E_{off}	Turn off Energy			14.5		mJ

Reverse diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_F	Diode Forward Voltage	$I_F = 50A$ $V_{GE} = 0V$	$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$	2.2 2.0	2.6	V
E_r	Reverse Recovery Energy	$I_F = 50A$ $V_R = 900V$ $di/dt = 750A/\mu s$	$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$	2 4		mJ
Q_{rr}	Reverse Recovery Charge	$I_F = 50A$ $V_R = 900V$ $di/dt = 750A/\mu s$	$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$	6 12		μC

Temperature sensor NTC

Symbol	Characteristic	Min	Typ	Max	Unit
R_{25}	Resistance @ 25°C		5		k Ω
$B_{25/50}$	$T_{25} = 298.16K$		3375		K

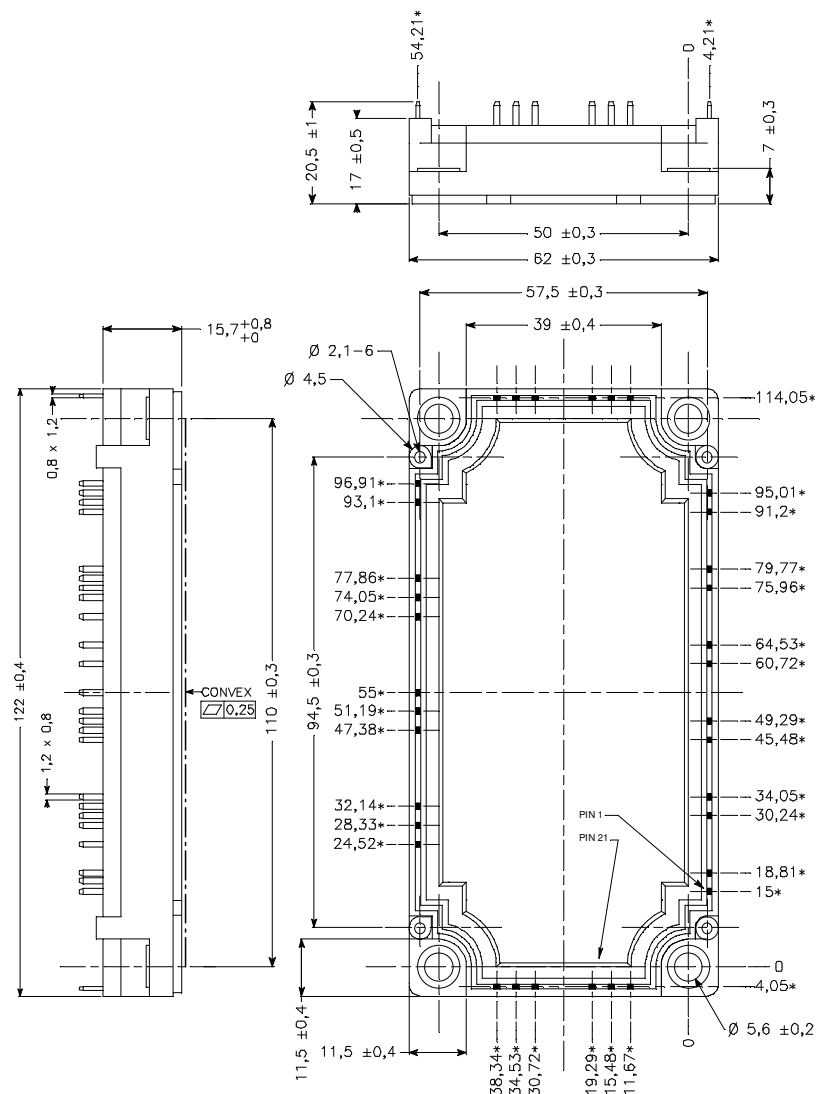
$$R_T = \frac{R_{25}}{\exp\left[B_{25/50}\left(\frac{1}{T_{25}} - \frac{1}{T}\right)\right]}$$

T: Thermistor temperature
R_T: Thermistor value at T

Thermal and package characteristics

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

Package outline



ALL DIMENSIONS MARKED *** ARE TOLERENCED AS: ± 0.4

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