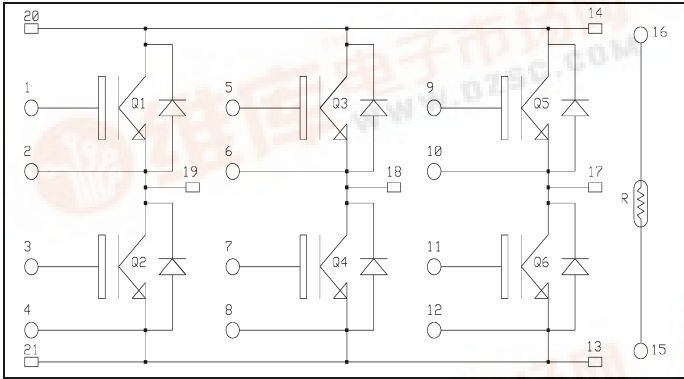


APTGF90X60TE3

3 Phase bridge NPT IGBT Power Module

$V_{CES} = 600V$
 $I_C = 90A @ T_c = 80^\circ C$



Application

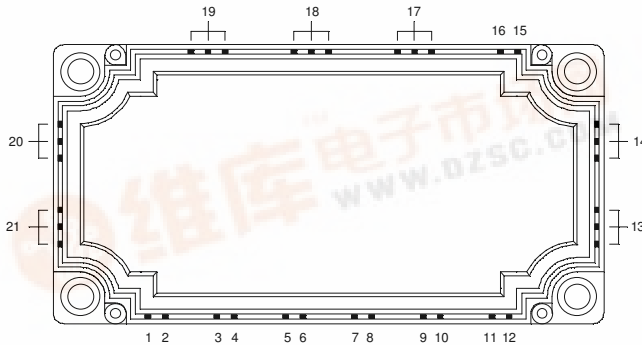
- AC Motor control

Features

- Non Punch Through (NPT) Fast IGBT®
 - Low voltage drop
 - Low tail current
 - Switching frequency up to 50 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

- Outstanding performance at high frequency operation
- 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	600	V
I_C	Continuous Collector Current	$T_C = 25^\circ C$	130
		$T_C = 80^\circ C$	90
I_{CM}	Pulsed Collector Current	$T_C = 25^\circ C$	230
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_C = 25^\circ C$	430
RBSOA	Reverse Bias Safe Operating Area	$T_j = 125^\circ C$	200A@520V

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	$V_{GE} = 0V, I_C = 500\mu A$	600			V	
I_{CES}	Zero Gate Voltage Collector Current	$V_{GE} = 0V$ $V_{CE} = 600V$	$T_j = 25^\circ\text{C}$	1	500	μA	
			$T_j = 125^\circ\text{C}$	1		mA	
$V_{CE(on)}$	Collector Emitter on Voltage	$V_{GE} = 15V$ $I_C = 100A$	$T_j = 25^\circ\text{C}$	1.7	2.0	2.45	V
			$T_j = 125^\circ\text{C}$		2.2		
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 1.5mA$	4.5		6.5	V	
I_{GES}	Gate - Emitter Leakage Current	$V_{GE} = 20V, V_{CE} = 0V$			400	nA	

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0V, V_{CE} = 25V$ $f = 1MHz$		4300		pF
C_{res}	Reverse Transfer Capacitance			400		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = \pm 15V$ $V_{Bus} = 300V$ $I_C = 100A$ $R_G = 2.2\Omega$		25		ns
T_r	Rise Time			10		
$T_{d(off)}$	Turn-off Delay Time			130		
T_f	Fall Time			20		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (125°C) $V_{GE} = \pm 15V$ $V_{Bus} = 300V$ $I_C = 100A$ $R_G = 2.2\Omega$		25		ns
T_r	Rise Time			11		
$T_{d(off)}$	Turn-off Delay Time			150		
T_f	Fall Time			30		
E_{off}	Turn off Energy			2.9		mJ

Reverse diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_F	Diode Forward Voltage	$I_F = 100A$ $V_{GE} = 0V$	$T_j = 25^\circ\text{C}$	1.25	1.6	V
			$T_j = 125^\circ\text{C}$		1.2	
E_r	Reverse Recovery Energy	$I_F = 100A$ $V_R = 300V$ $di/dt = 800A/\mu s$		3.2		mJ
Q_{rr}	Reverse Recovery Charge	$I_F = 100A$ $V_R = 300V$ $di/dt = 800A/\mu s$	$T_j = 25^\circ\text{C}$	7		μC
			$T_j = 125^\circ\text{C}$		12	

Temperature sensor NTC

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

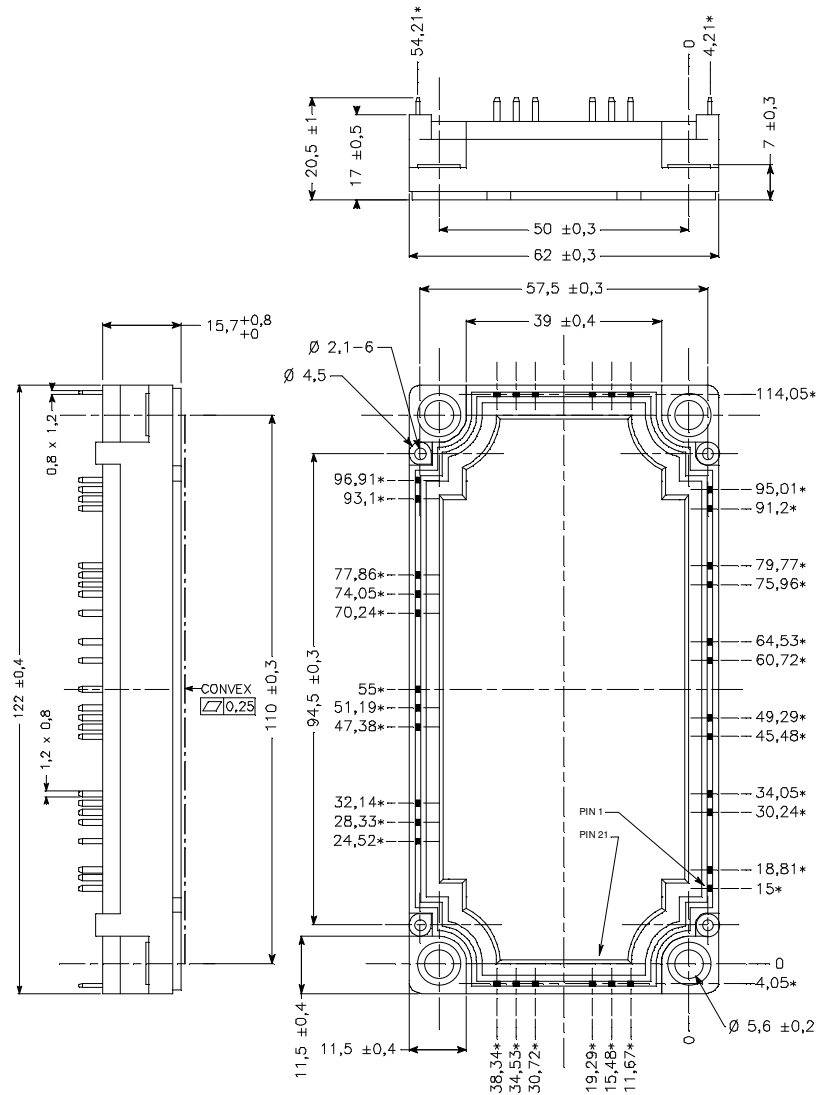
$$R_T = \frac{R_{25}}{\exp\left[B_{25/50}\left(\frac{1}{T_{25}} - \frac{1}{T}\right)\right]}$$

T: Thermistor temperature
R_T: Thermistor value at T

Thermal and package characteristics

Symbol	Characteristic	Min	Typ	Max	Unit	
R _{thJC}	Junction to Case	IGBT		0.29	°C/W	
		Diode		0.55		
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	4.5	N.m
Wt	Package Weight				300	g

Package outline



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

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

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