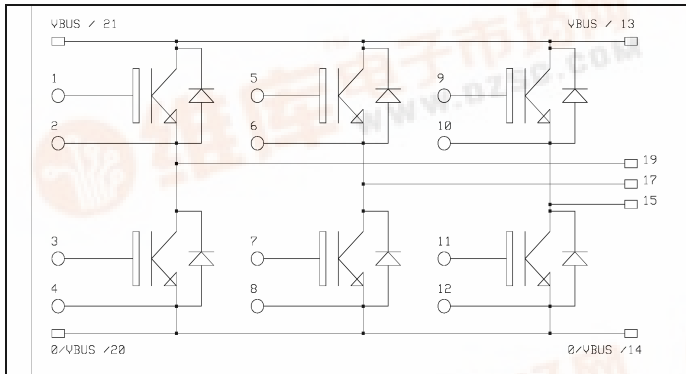




APTGF90X60E3

3 Phase bridge NPT IGBT Power Module

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



Application

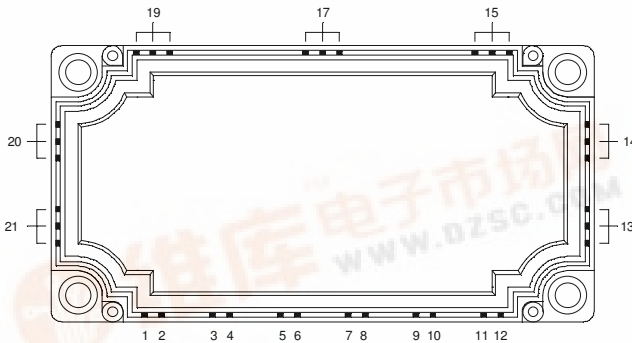
- AC Motor control

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

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



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
			$T_j = 125^\circ\text{C}$	2.2		V
$V_{GE(th)}$	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	$V_{GE} = 0V, V_{CE} = 25V$		4300		pF
C_{res}	Reverse Transfer Capacitance	$f = 1MHz$		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	$I_F = 100A$ $V_R = 300V$ $di/dt = 800A/\mu s$	$T_j = 125^\circ\text{C}$	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		

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

Technical drawing of a rectangular electronic component, showing dimensions and pin locations. The drawing includes a top view and a side view.

Top View Dimensions:

- Overall width: $62 \pm 0,3$
- Overall height: $110 \pm 0,3$
- Pin pitch (horizontal): $1,2 \times 0,8$
- Pin pitch (vertical): $0,8 \times 1,2$
- Distance from top edge to first pin row: $15,7^{+0,8}_{+0}$
- Distance from bottom edge to last pin row: $11,5 \pm 0,4$
- Distance from left edge to first pin column: $11,5 \pm 0,4$
- Distance from right edge to last pin column: $11,5 \pm 0,4$
- Distance from top edge to first pin row (alternative): $20,5 \pm 1$
- Distance from top edge to first pin row (alternative): $17 \pm 0,5$
- Distance from bottom edge to last pin row (alternative): $7 \pm 0,3$
- Distance from left edge to first pin column (alternative): $50 \pm 0,3$
- Distance from left edge to first pin column (alternative): $62 \pm 0,3$

Pin Locations (Top View):

- Pin 1: $\varnothing 2,1-6$
- Pin 21: $\varnothing 4,5$
- Pin 1: $\varnothing 5,6 \pm 0,2$
- Pin 21: $\varnothing 5,6 \pm 0,2$

Side View Dimensions:

- Overall width: $57,5 \pm 0,3$
- Overall height: $114,05^*$
- Distance from top edge to first pin row: $39 \pm 0,4$
- Distance from bottom edge to last pin row: $39 \pm 0,4$
- Distance from left edge to first pin column: $39 \pm 0,4$
- Distance from right edge to last pin column: $39 \pm 0,4$

Pin Locations (Side View):

- Pin 1: $\varnothing 2,1-6$
- Pin 21: $\varnothing 4,5$
- Pin 1: $\varnothing 5,6 \pm 0,2$
- Pin 21: $\varnothing 5,6 \pm 0,2$

Other Dimensions:

- Distance from top edge to first pin row: $15,7^{+0,8}_{+0}$
- Distance from bottom edge to last pin row: $11,5 \pm 0,4$
- Distance from left edge to first pin column: $11,5 \pm 0,4$
- Distance from right edge to last pin column: $11,5 \pm 0,4$
- Distance from top edge to first pin row (alternative): $20,5 \pm 1$
- Distance from top edge to first pin row (alternative): $17 \pm 0,5$
- Distance from bottom edge to last pin row (alternative): $7 \pm 0,3$
- Distance from left edge to first pin column (alternative): $50 \pm 0,3$
- Distance from left edge to first pin column (alternative): $62 \pm 0,3$

Notes:

- CONVEX $\square 0,25$
- PIN 1
- PIN 21

APT's products are covered by one or more of U.S. patents 4,895,810 5,045,903 5,089,434 5,182,234 5,019,522 5,262,336 6,503,786 5,256,583 4,748,103 5,283,202 5,231,474 5,434,095 5,528,058 and foreign patents. U.S. and Foreign patents pending. All Rights Reserved.