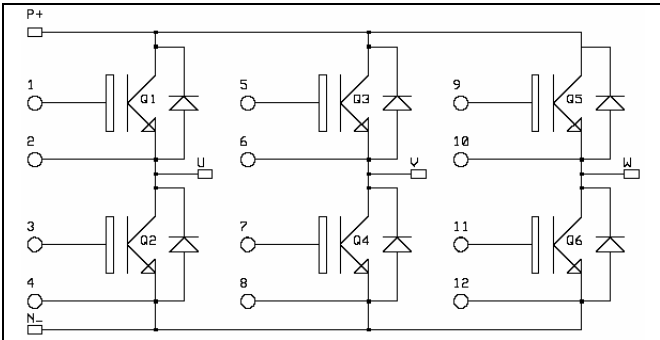


## 3 Phase bridge NPT IGBT Power Module

$V_{CES} = 1200V$   
 $I_C = 15A @ T_c = 80^\circ C$



### Application

- AC Motor control

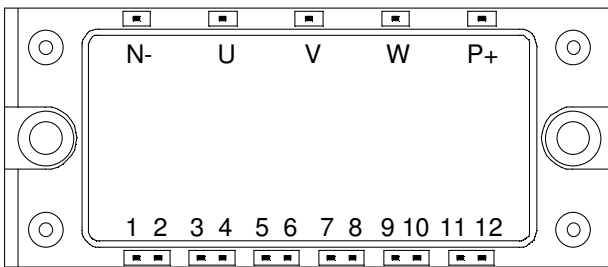
### Features

- 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

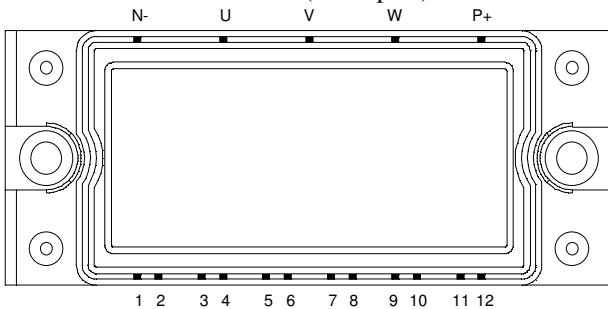
### Benefits

- 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

Pin out: APTGF15X120E2 (Long pins)




Pin out: APTGF15X120P2 (Short pins)



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

### Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
$V_{CES}$	Collector - Emitter Breakdown Voltage	1200	V
$I_C$	Continuous Collector Current	$T_C = 25^\circ C$	25
		$T_C = 80^\circ C$	15
$I_{CM}$	Pulsed Collector Current	$T_C = 25^\circ C$	50
$V_{GE}$	Gate - Emitter Voltage	$\pm 20$	V
$P_D$	Maximum Power Dissipation	$T_C = 25^\circ C$	145
SCSOA	Short Circuit Safe Operating Area	$T_j = 125^\circ C$	150A@1200V

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

**Electrical Characteristics**

<i>Symbol</i>	<i>Characteristic</i>	<i>Test Conditions</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
$BV_{CES}$	Collector - Emitter Breakdown Voltage	$V_{GE} = 0V, I_C = 500\mu A$	1200			V
$I_{CES}$	Zero Gate Voltage Collector Current	$V_{GE} = 0V$ $V_{CE} = 1200V$	$T_j = 25^\circ C$	300	500	$\mu A$
			$T_j = 125^\circ C$	1200		
$V_{CE(on)}$	Collector Emitter on Voltage	$V_{GE} = 15V$ $I_C = 15A$	$T_j = 25^\circ C$	2.5	3.0	V
			$T_j = 125^\circ C$	3.1	3.7	
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 0.6 mA$	4.5	5.5	6.5	V
$I_{GES}$	Gate - Emitter Leakage Current	$V_{GE} = 20V, V_{CE} = 0V$			150	nA

**Dynamic Characteristics**

<i>Symbol</i>	<i>Characteristic</i>	<i>Test Conditions</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
$C_{ies}$	Input Capacitance	$V_{GE} = 0V$ $V_{CE} = 25V$ $f = 1MHz$		1000		$\mu F$
$C_{oes}$	Output Capacitance			150		
$C_{res}$	Reverse Transfer Capacitance			70		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching ( $125^\circ C$ ) $V_{GE} = \pm 15V$ $V_{Bus} = 600V$ $I_C = 15A$ $R_G = 82\Omega$		55	110	ns
$T_r$	Rise Time			45	90	
$T_{d(off)}$	Turn-off Delay Time			400	600	
$T_f$	Fall Time			70	100	

**Reverse diode ratings and characteristics**

<i>Symbol</i>	<i>Characteristic</i>	<i>Test Conditions</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
$V_F$	Diode Forward Voltage	$I_F = 15A$ $V_{GE} = 0V$	$T_j = 25^\circ C$	2.4	2.9	V
			$T_j = 125^\circ C$	1.9		
$t_{rr}$	Reverse Recovery Time	$I_F = 15A$ $V_R = 600V$ $di/dt = 800A/\mu s$		0.1		$\mu s$
$Q_{rr}$	Reverse Recovery Charge	$I_F = 15A$ $V_R = 600V$ $di/dt = 800A/\mu s$	$T_j = 25^\circ C$	1		$\mu C$
			$T_j = 125^\circ C$	3		

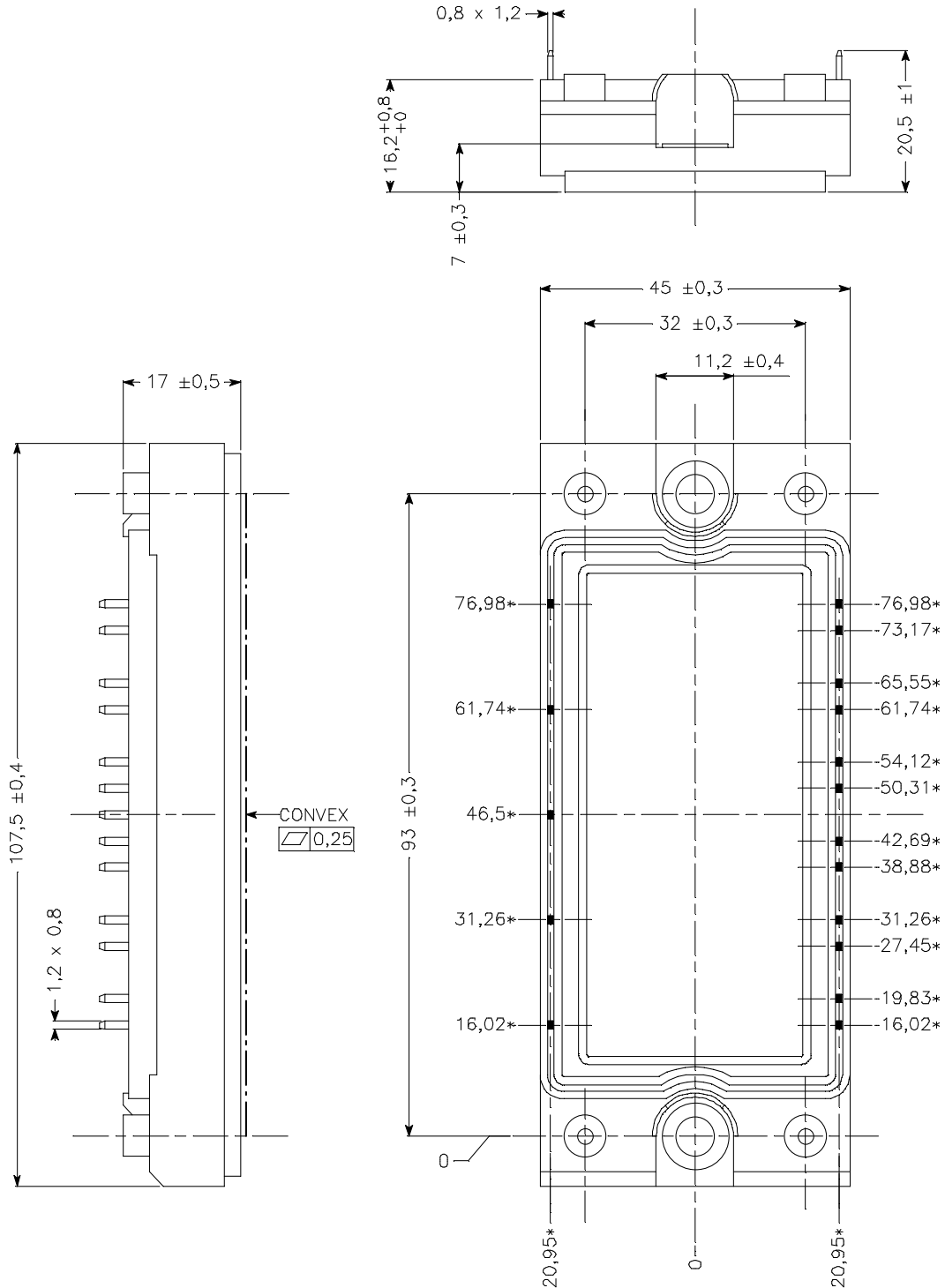
**Thermal and package characteristics**

<i>Symbol</i>	<i>Characteristic</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>	
$R_{thJC}$	Junction to Case	IGBT		0.85	$^\circ C/W$	
		Diode		1.5		
$V_{ISOL}$	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	$^\circ C$	
$T_{STG}$	Storage Temperature Range	-40		125		
$T_C$	Operating Case Temperature	-40		125		
Torque	Mounting torque	To Heatsink	M5	2	3.5	N.m
$Wt$	Package Weight				185	g



**Package outline**

Pin out: APTGF15X120P2 (Short pins)



ALL DIMENSIONS MARKED "\*" ARE TOLERENCED AS :  $\oplus\varnothing 0,4$

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

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.