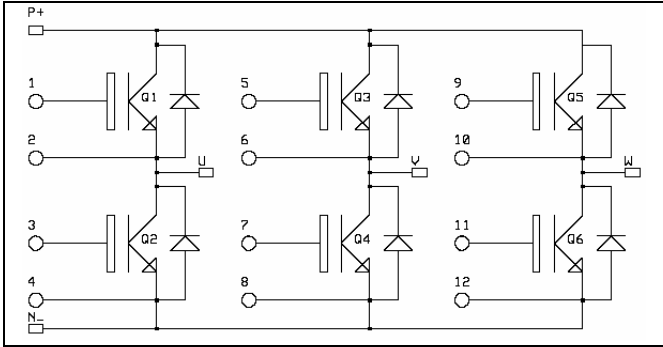


**3 Phase bridge  
NPT IGBT Power Module**

**$V_{CES} = 600V$   
 $I_C = 30A @ T_c = 80^\circ C$**



**Application**

- AC Motor control

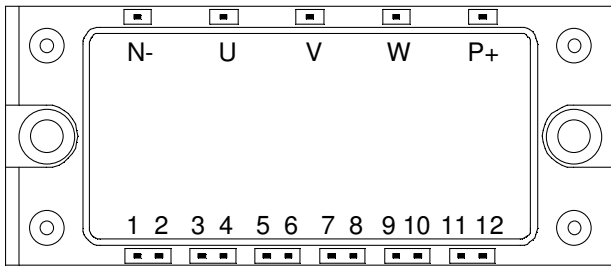
**Features**

- 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

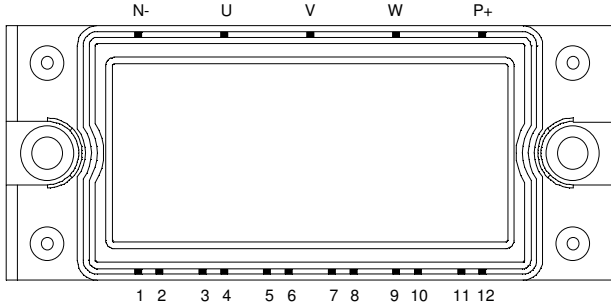
**Benefits**

- 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

**Pin out: APTGF30X60E2 (Long pins)**



**Pin out: APTGF30X60P2 (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	600	V
$I_C$	Continuous Collector Current	$T_c = 25^\circ C$	40
		$T_c = 80^\circ C$	30
$I_{CM}$	Pulsed Collector Current	$T_c = 25^\circ C$	75
$V_{GE}$	Gate - Emitter Voltage	$\pm 20$	V
$P_D$	Maximum Power Dissipation	$T_c = 25^\circ C$	138
SCSOA	Short Circuit Safe Operating Area	$T_j = 125^\circ C$	135A@360V

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

## Electrical Characteristics

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	$V_{GE} = 0V$ $V_{CE} = 600V$	$T_j = 25^\circ C$	1	500	$\mu A$
			$T_j = 125^\circ C$	1		mA
$V_{CE(on)}$	Collector Emitter on Voltage	$V_{GE} = 15V$ $I_C = 30A$	$T_j = 25^\circ C$	1.95	2.45	V
			$T_j = 125^\circ C$	2.2		
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 0.7 mA$	3		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	$V_{GE} = 0V, V_{CE} = 25V$ $f = 1MHz$		1300		pF
$C_{res}$	Reverse Transfer Capacitance			100		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching ( $25^\circ C$ ) $V_{GE} = \pm 15V$ $V_{Bus} = 300V$ $I_C = 30A$ $R_G = 6.8\Omega$		30		ns
$T_r$	Rise Time			6.5		
$T_{d(off)}$	Turn-off Delay Time			75		
$T_f$	Fall Time			12		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching ( $125^\circ C$ ) $V_{GE} = \pm 15V$ $V_{Bus} = 300V$ $I_C = 30A$ $R_G = 6.8\Omega$		32		ns
$T_r$	Rise Time			7		
$T_{d(off)}$	Turn-off Delay Time			85		
$T_f$	Fall Time			18		
$E_{off}$	Turn off Energy			0.8		mJ

## Reverse diode ratings and characteristics

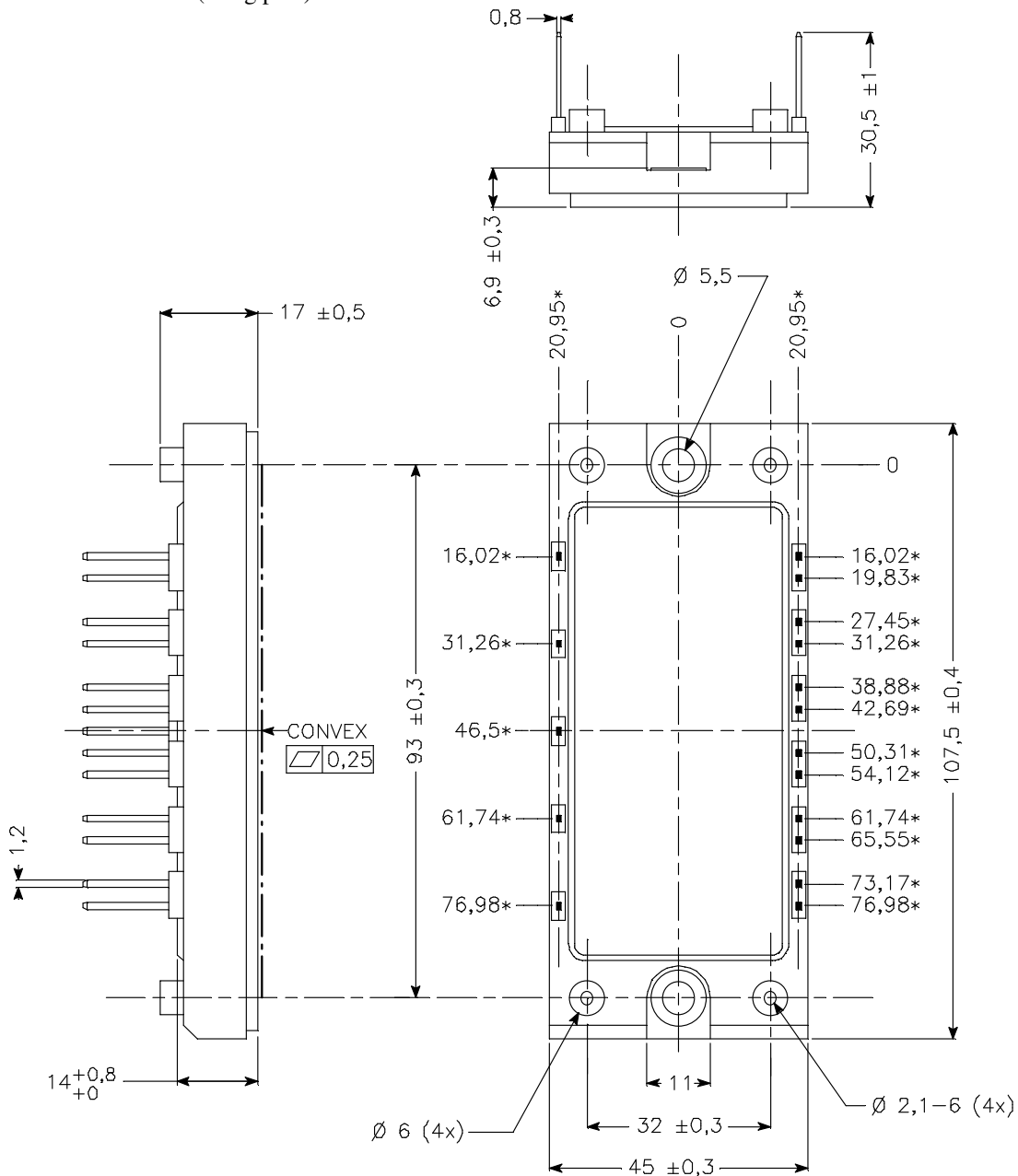
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$V_F$	Diode Forward Voltage	$I_F = 30A$ $V_{GE} = 0V$	$T_j = 25^\circ C$	1.25	1.6	V
			$T_j = 125^\circ C$	1.2		
$E_R$	Reverse Recovery Energy	$I_F = 30A$ $V_R = 300V$ $di/dt = 800A/\mu s$		0.9		mJ
$Q_{rr}$	Reverse Recovery Charge	$I_F = 30A$ $V_R = 300V$ $di/dt = 800A/\mu s$	$T_j = 25^\circ C$	2.1		$\mu C$
			$T_j = 125^\circ C$	3.3		

## Thermal and package characteristics

Symbol	Characteristic	Min	Typ	Max	Unit	
$R_{thJC}$	Junction to Case	IGBT		0.9	$^\circ C/W$	
		Diode		1.4		
$V_{ISOL}$	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**

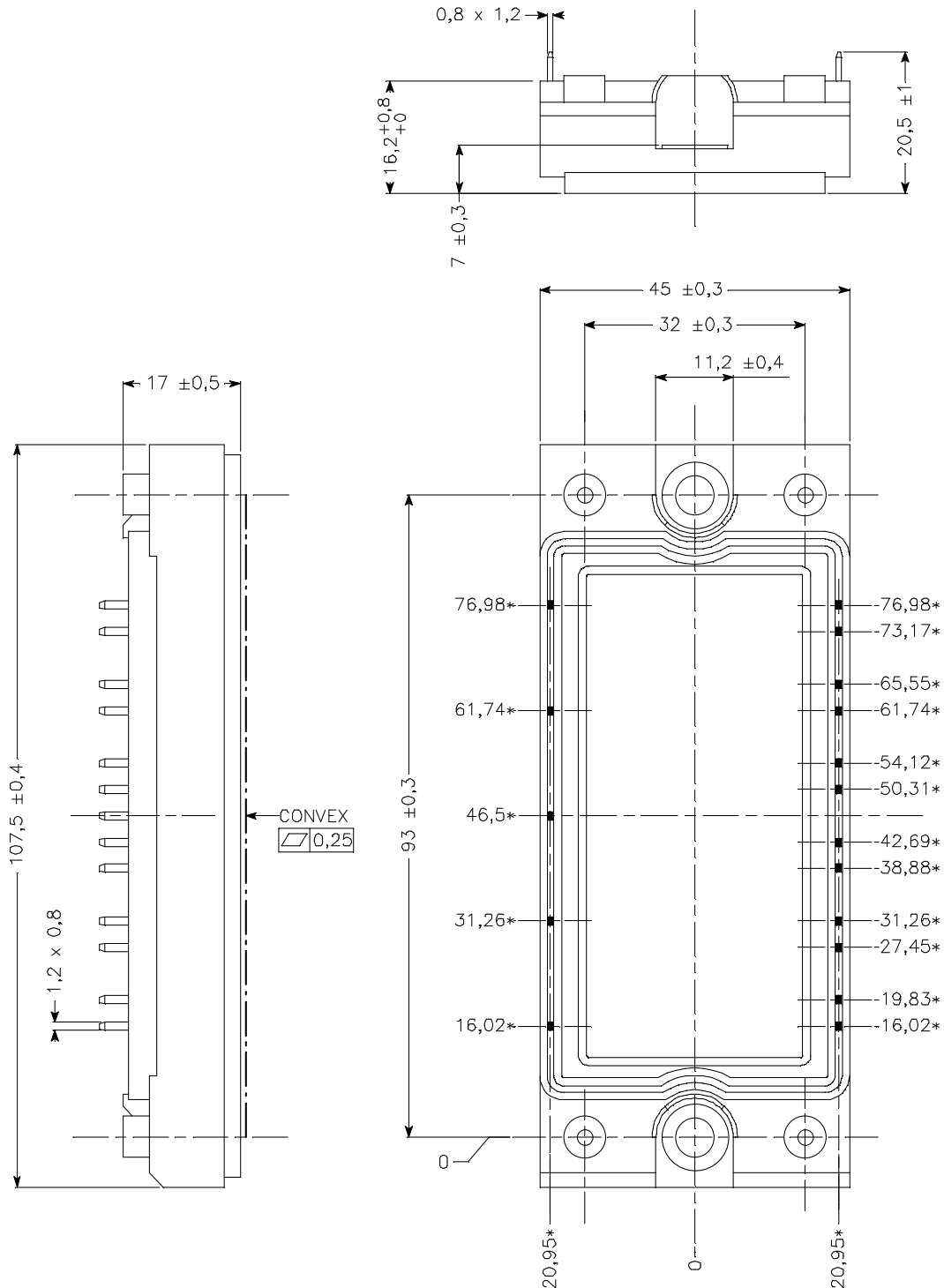
Pin out: APTGF30X60E2 (Long pins)



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

**Package outline**

Pin out: APTGF30X60P2 (Short pins)



**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.