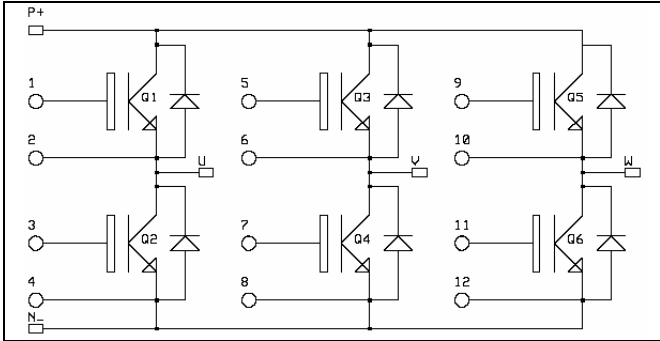


**3 Phase bridge  
NPT IGBT Power Module**

**$V_{CES} = 600V$   
 $I_C = 50A @ T_c = 80^\circ C$**



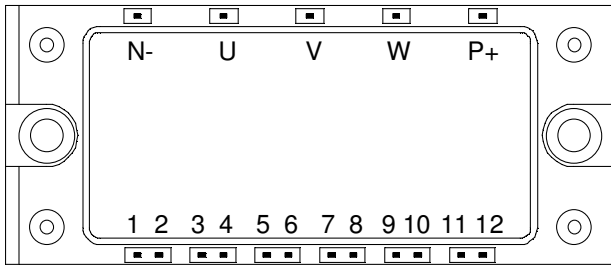
**Application**

- AC Motor control

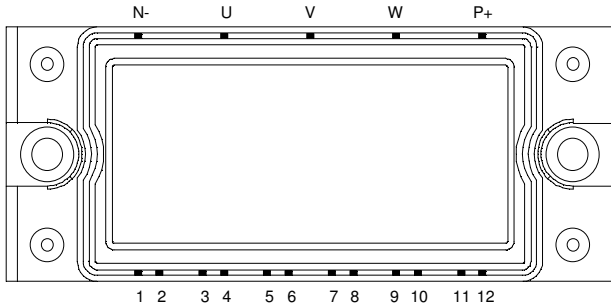
**Features**

- 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

**Pin out: APTGF50X60E2 (Long pins)**



**Pin out: APTGF50X60P2 (Short pins)**



**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

**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	$T_C = 25^\circ C$	70
		$T_C = 80^\circ C$	50
$I_{CM}$	Pulsed Collector Current	$T_C = 25^\circ C$	125
$V_{GE}$	Gate - Emitter Voltage	$\pm 20$	V
$P_D$	Maximum Power Dissipation	$T_C = 25^\circ C$	250
SCSOA	Short Circuit Safe Operating Area	$T_j = 125^\circ C$	225A@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	$V_{GE} = 15V$ $I_C = 50A$	$T_j = 25^\circ C$	1.95	2.45	V
			$T_j = 125^\circ C$	2.2		
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 1mA$	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	$V_{GE} = 0V, V_{CE} = 25V$ $f = 1MHz$		2200		pF
$C_{res}$	Reverse Transfer Capacitance			200		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching ( $25^\circ C$ ) $V_{GE} = \pm 15V$ $V_{Bus} = 300V$ $I_C = 50A$ $R_G = 2.7\Omega$		40		ns
$T_r$	Rise Time			9		
$T_{d(off)}$	Turn-off Delay Time			120		
$T_f$	Fall Time			12		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching ( $125^\circ C$ ) $V_{GE} = \pm 15V$ $V_{Bus} = 300V$ $I_C = 50A$ $R_G = 2.7\Omega$		42		ns
$T_r$	Rise Time			10		
$T_{d(off)}$	Turn-off Delay Time			130		
$T_f$	Fall Time			21		
$E_{off}$	Turn off Energy			1.0		mJ

## Reverse diode ratings and characteristics

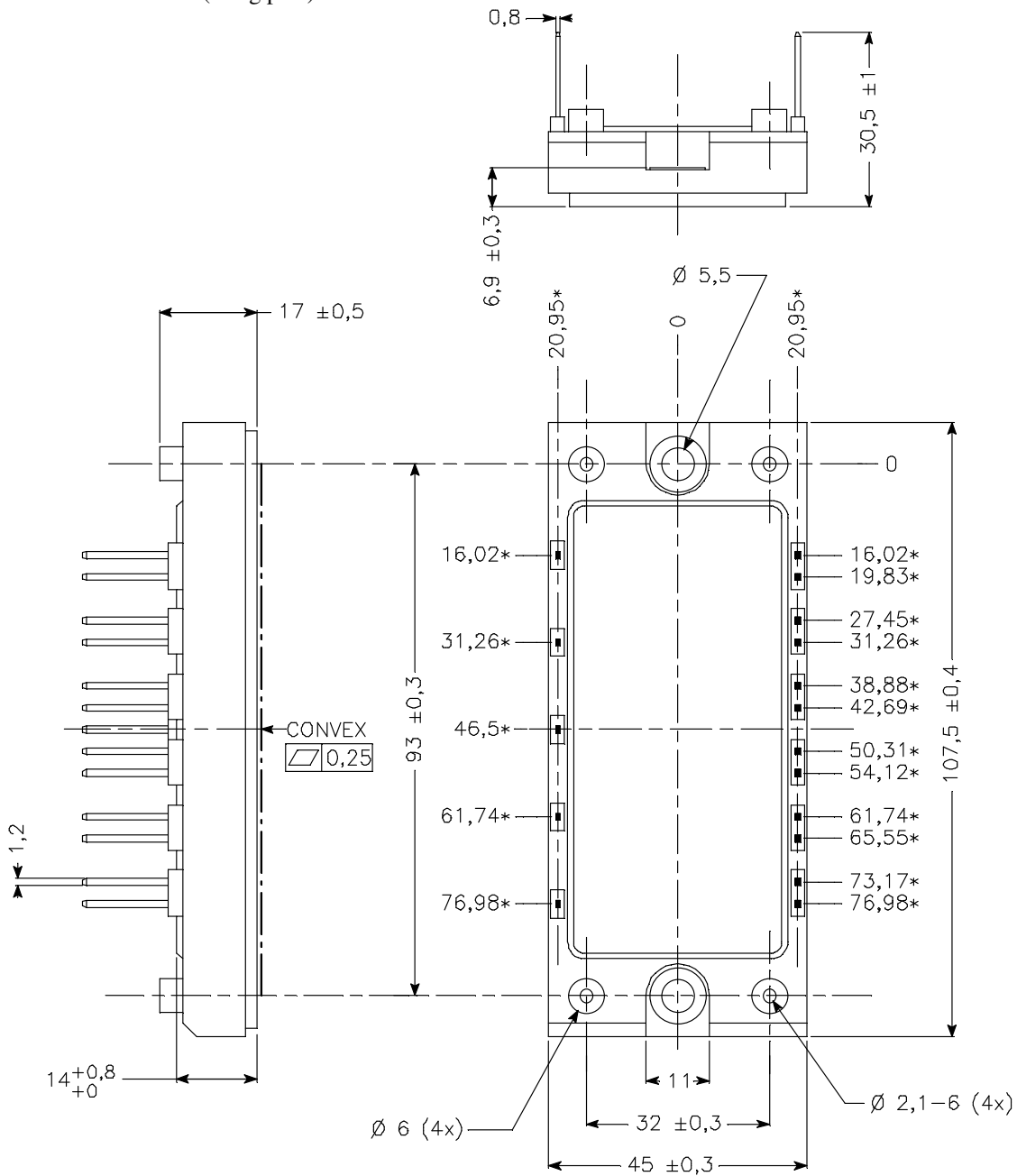
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$V_F$	Diode Forward Voltage	$I_F = 50A$ $V_{GE} = 0V$	$T_j = 25^\circ C$	1.25	1.6	V
			$T_j = 125^\circ C$	1.2		
$E_R$	Reverse Recovery Energy	$I_F = 50A$ $V_R = 300V$ $di/dt = 800A/\mu s$		1.5		mJ
$Q_{rr}$	Reverse Recovery Charge	$I_F = 50A$ $V_R = 300V$ $di/dt = 800A/\mu s$	$T_j = 25^\circ C$	3.4		$\mu C$
			$T_j = 125^\circ C$	5.6		

## Thermal and package characteristics

Symbol	Characteristic	Min	Typ	Max	Unit	
$R_{thJC}$	Junction to Case	IGBT		0.5	$^\circ C/W$	
		Diode		0.8		
$V_{ISOL}$	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**

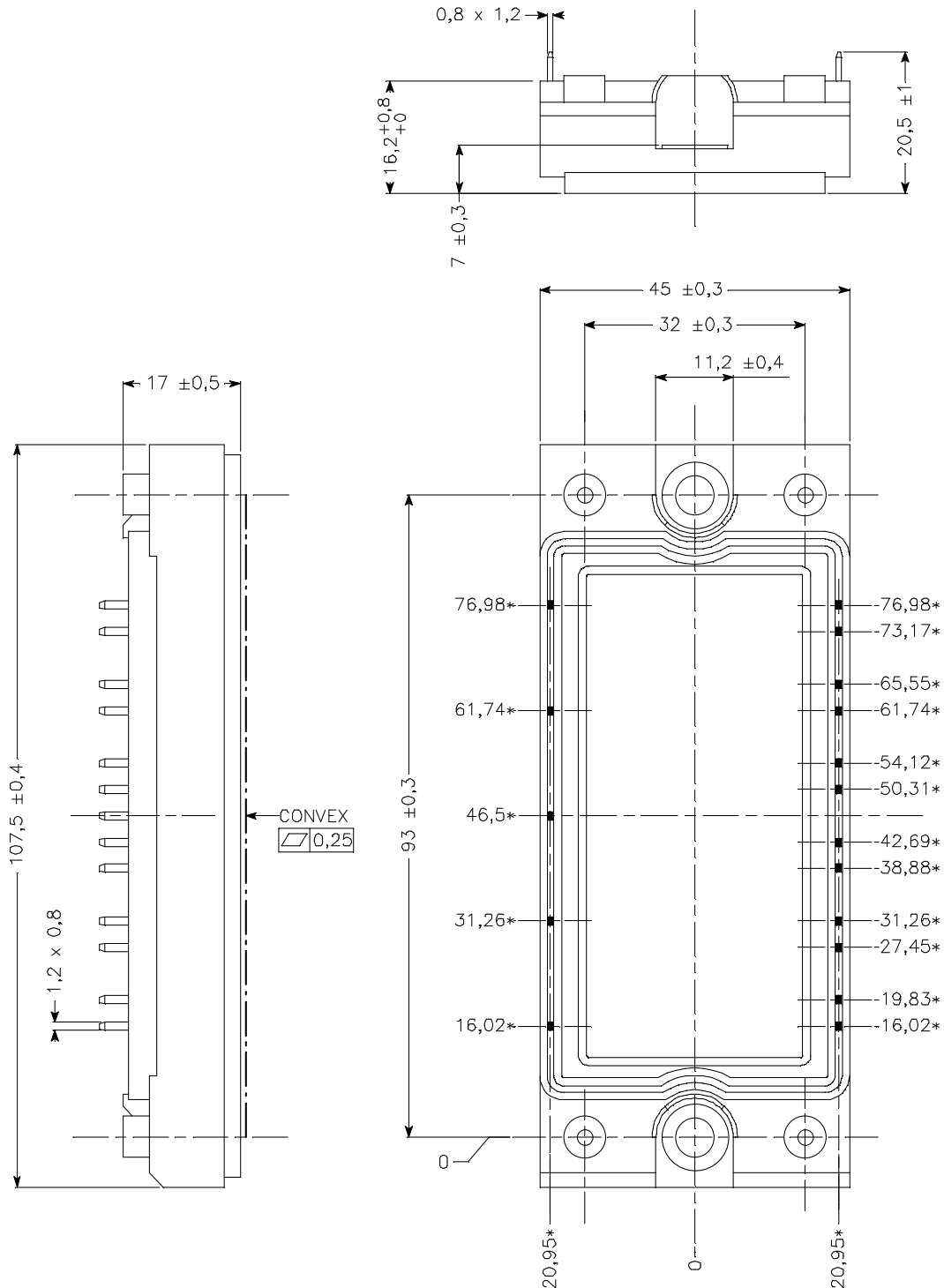
Pin out: APTGF50X60E2 (Long pins)



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

**Package outline**

Pin out: APTGF50X60P2 (Short pins)



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

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