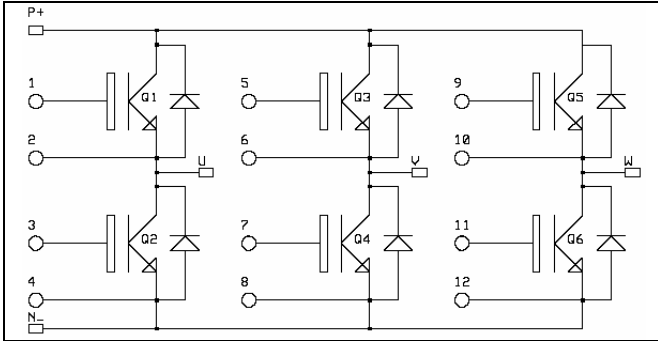
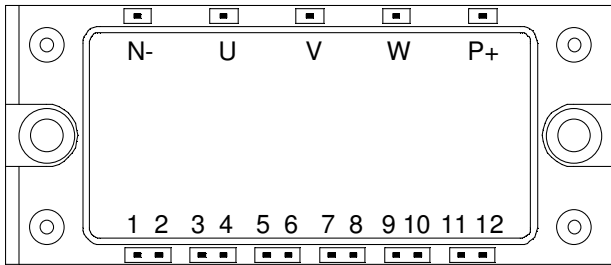


**3 Phase bridge
NPT IGBT Power Module**

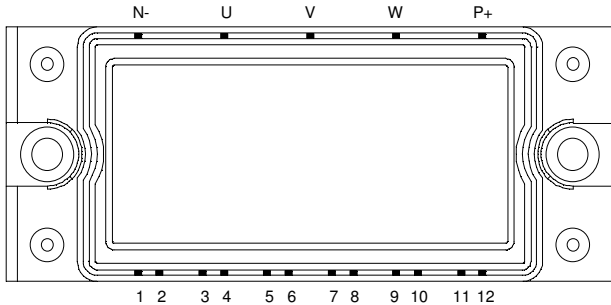
**$V_{CES} = 600V$
 $I_C = 20A @ T_c = 80^\circ C$**



Pin out: APTGF20X60E2 (Long pins)



Pin out: APTGF20X60P2 (Short pins)



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

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	$T_C = 25^\circ C$	32
		$T_C = 80^\circ C$	20
I_{CM}	Pulsed Collector Current	$T_C = 25^\circ C$	50
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_C = 25^\circ C$	125
SCSOA	Short Circuit Safe Operating Area	$T_j = 125^\circ C$	80A@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
V_{CES}	Collector - Emitter Breakdown Voltage	$V_{GE} = 0V, I_C = 500\mu A$	600			V
I_{CES}	Zero Gate Voltage Collector Current	$V_{GE} = 0V$		1	500	μA
		$V_{CE} = 600V$		1		mA
$V_{CE(on)}$	Collector Emitter on Voltage	$V_{GE} = 15V$		2.0	2.5	V
		$I_C = 20A$		2.2		
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 0.5mA$	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	$V_{GE} = 0V, V_{CE} = 25V$ $f = 1MHz$		1100		pF
C_{res}	Reverse Transfer Capacitance			70		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = \pm 15V$ $V_{Bus} = 300V$ $I_C = 20A$ $R_G = 27\Omega$		45		ns
T_r	Rise Time			23		
$T_{d(off)}$	Turn-off Delay Time			107		
T_f	Fall Time			18		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (125°C) $V_{GE} = \pm 15V$ $V_{Bus} = 300V$ $I_C = 20A$ $R_G = 27\Omega$		47		ns
T_r	Rise Time			24		
$T_{d(off)}$	Turn-off Delay Time			125		
T_f	Fall Time			21		
E_{off}	Turn off Energy			0.38		mJ

Reverse diode ratings and characteristics

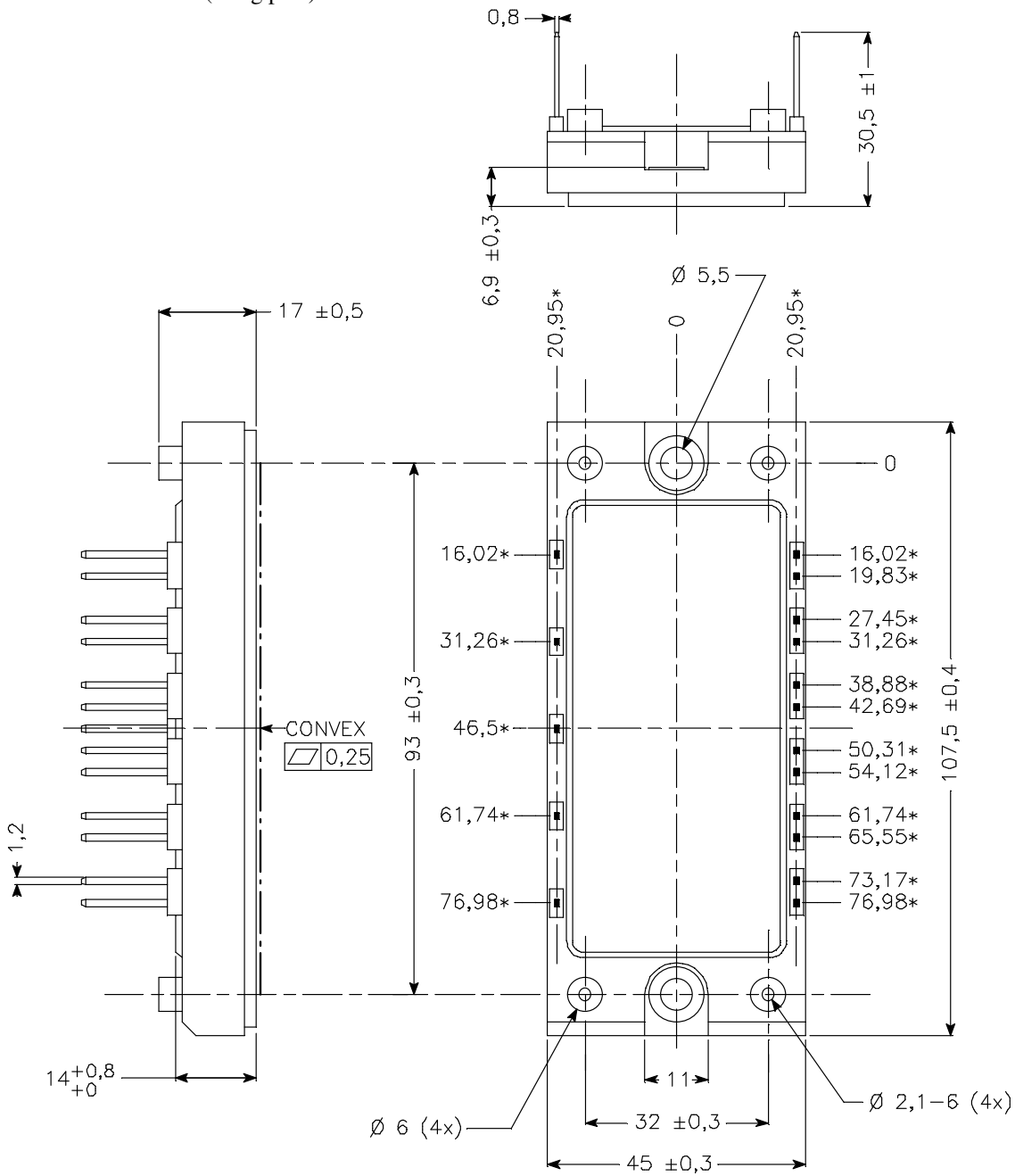
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_F	Diode Forward Voltage	$I_F = 20A$		1.25	1.6	V
		$V_{GE} = 0V$		1.2		
E_R	Reverse Recovery Energy	$I_F = 20A$ $V_R = 300V$ $di/dt = 800A/\mu s$		0.43		mJ
Q_{rr}	Reverse Recovery Charge	$I_F = 20A$		1.4		μC
		$V_R = 300V$ $di/dt = 800A/\mu s$		2.4		

Thermal and package characteristics

Symbol	Characteristic	Min	Typ	Max	Unit	
R_{thJC}	Junction to Case	IGBT		1	°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	°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

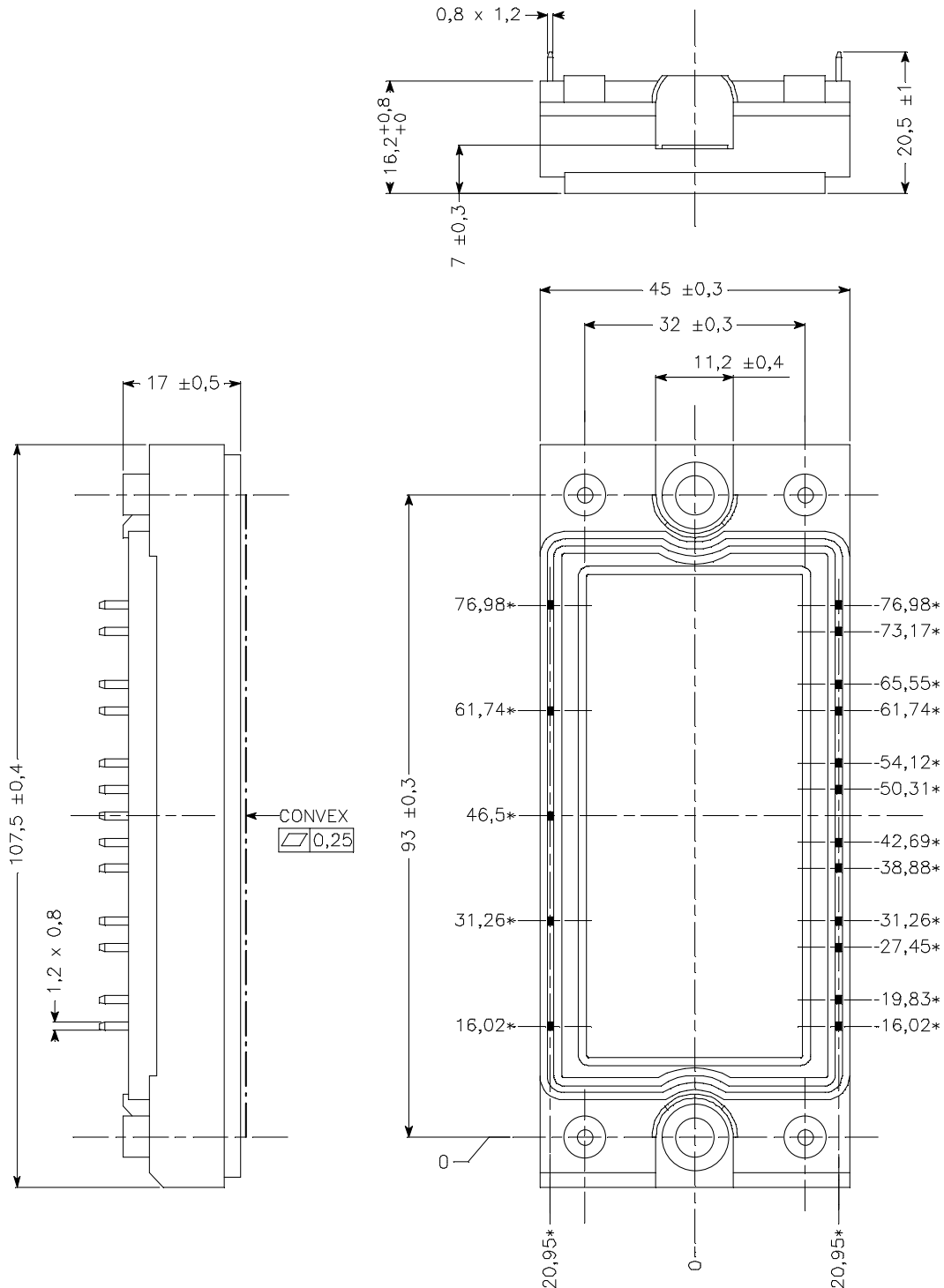
Pin out: APTGF20X60E2 (Long pins)



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

Package outline

Pin out: APTGF20X60P2 (Short pins)



ALL DIMENSIONS MARKED "*" ARE TOLERENCED AS : $\text{⌀} \pm 0,4$

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