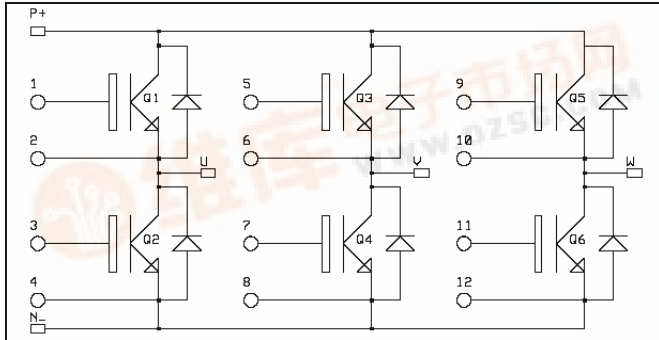
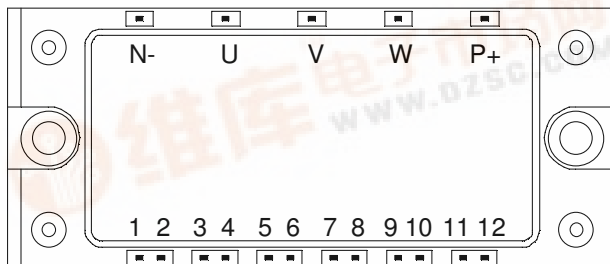


3 Phase bridge NPT IGBT Power Module

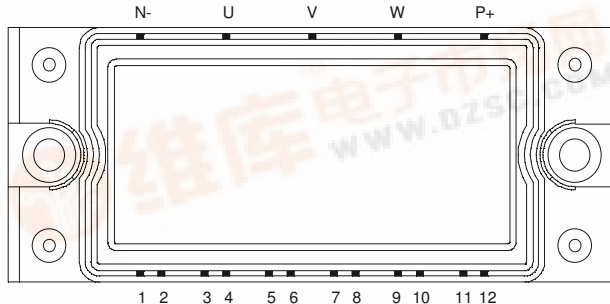
$V_{CES} = 600V$
 $I_C = 20A @ T_c = 80^\circ C$



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	A
I_{CM}	Pulsed Collector Current	$T_C = 25^\circ C$ 50	A
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_C = 25^\circ C$ 125	W
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
BV_{CES}	Collector - Emitter Breakdown Voltage	$V_{GE} = 0V, I_C = 500\mu A$	600			V
I_{CES}	Zero Gate Voltage Collector Current	$V_{GE} = 0V$ $V_{CE} = 600V$		1	500	μA
		$T_j = 25^\circ C$ $T_j = 125^\circ C$		1		mA
$V_{CE(on)}$	Collector Emitter on Voltage	$V_{GE} = 15V$ $I_C = 20A$		2.0	2.5	V
		$T_j = 25^\circ C$ $T_j = 125^\circ C$		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	$V_{GE} = 0V, V_{CE} = 25V$		1100		pF
C_{res}	Reverse Transfer Capacitance	$f = 1MHz$		70		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching ($25^\circ C$) $V_{GE} = \pm 15V$ $V_{Bus} = 300V$ $I_C = 20A$ $R_G = 27\Omega$		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 ($125^\circ C$) $V_{GE} = \pm 15V$ $V_{Bus} = 300V$ $I_C = 20A$ $R_G = 27\Omega$		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

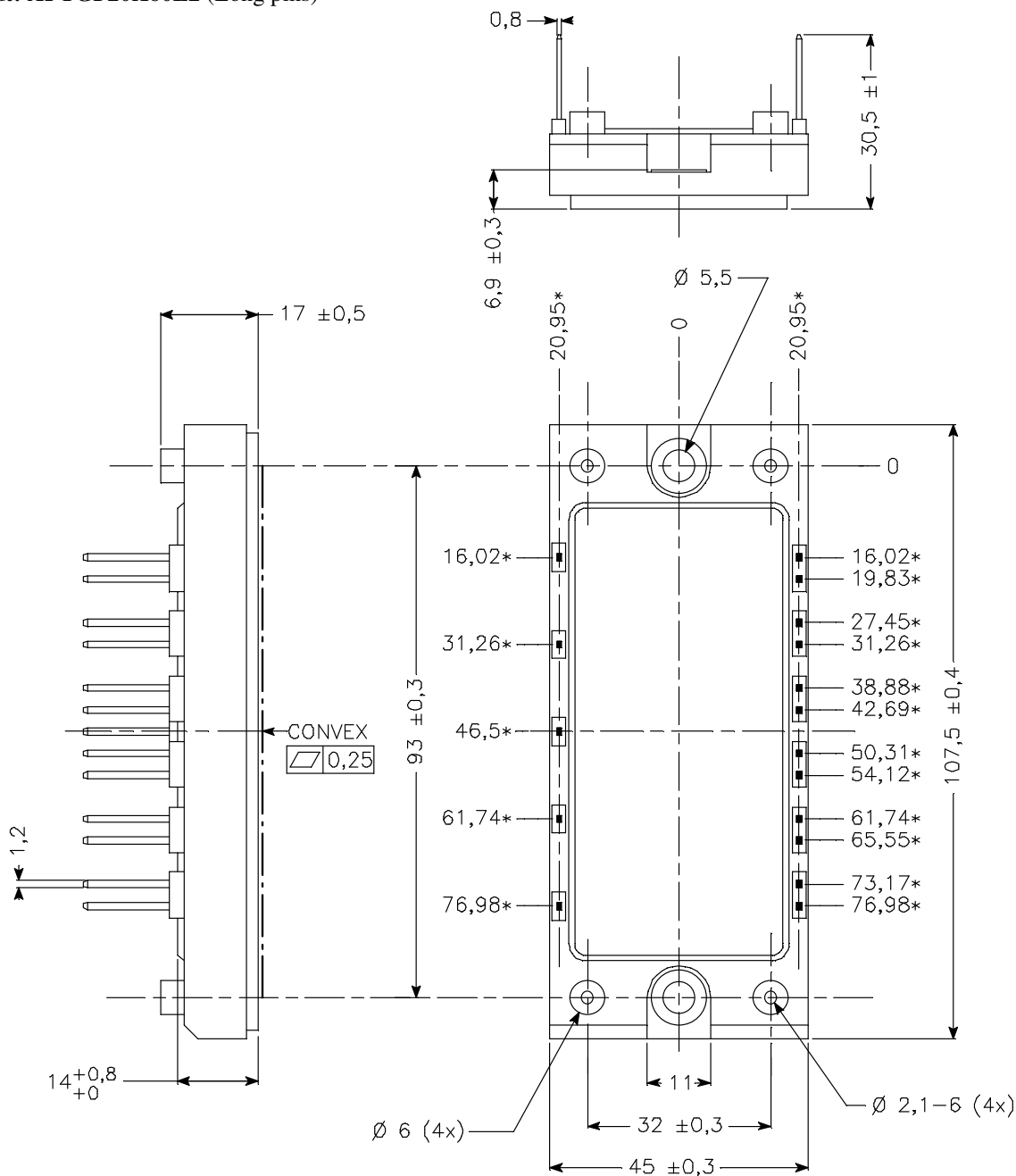
Reverse diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_F	Diode Forward Voltage	$I_F = 20A$ $V_{GE} = 0V$		1.25	1.6	V
		$T_j = 25^\circ C$ $T_j = 125^\circ C$		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	$I_F = 20A$ $V_R = 300V$ $di/dt = 800A/\mu s$		1.4		μC
		$T_j = 25^\circ C$ $T_j = 125^\circ C$		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

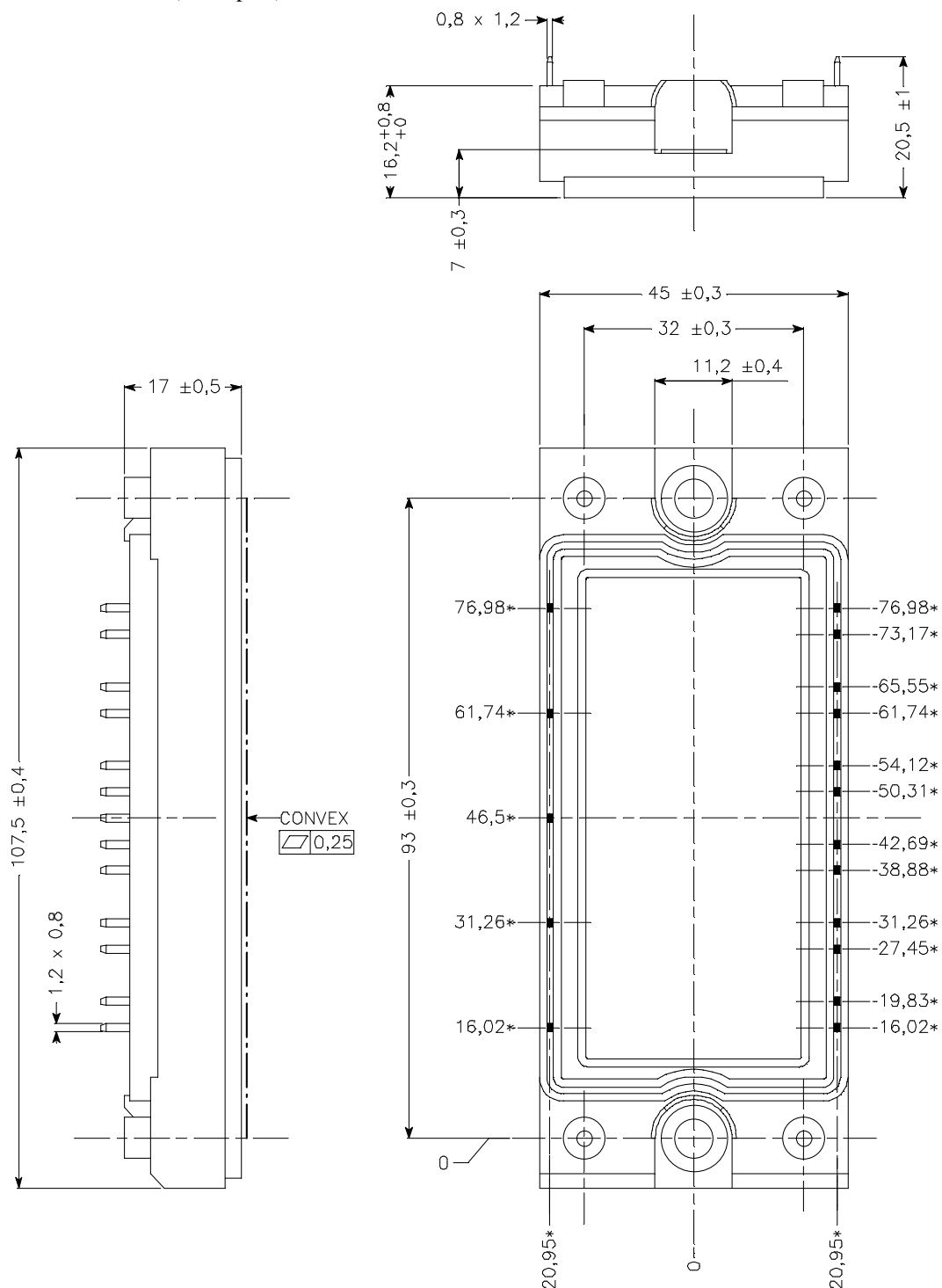
Pin out: APTGF20X60E2 (Long pins)



ALL DIMENSIONS MARKED " * " ARE TOLERANCED AS : $\begin{array}{|c|} \hline \oplus \\ \hline \end{array} \begin{array}{|c|} \hline \varnothing 0,4 \\ \hline \end{array}$

Package outline

Pin out: APTGF20X60P2 (Short pins)



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

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

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