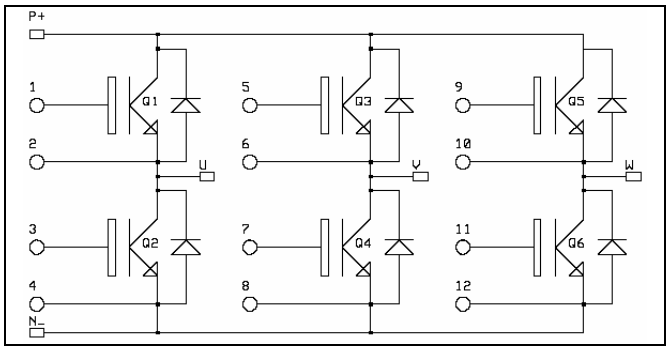
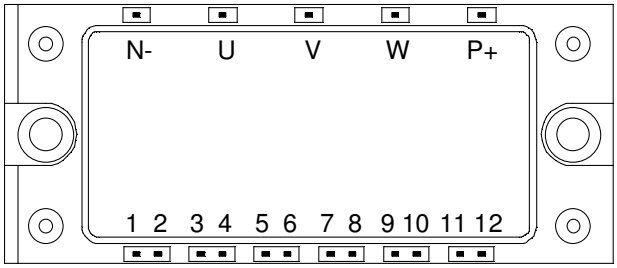
3 Phase bridge
NPT IGBT Power Module

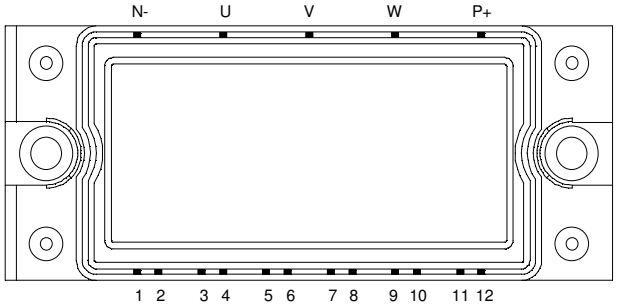
V_{CES} = 600V
I_C = 50A @ Tc = 80°C



Pin out: APTGF50X60E2 (Long pins)



Pin out: APTGF50X60P2 (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°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°C	70	A
		T_C = 80°C	50	
I_{CM}	Pulsed Collector Current	T_C = 25°C	125	
V_{GE}	Gate – Emitter Voltage		±20	V
P_D	Maximum Power Dissipation	T_C = 25°C	250	W
SCSOA	Short Circuit Safe Operating Area	T_j = 125°C	225A@360V	

CAUTION: These Devices are sensitive to Electrostatic Discharge. Proper Handing 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 = 500µA		600			V
I_{CES}	Zero Gate Voltage Collector Current	V_{GE} = 0V V_{CE} = 600V	T_j = 25°C		1	500	µA
			T_j = 125°C		1		mA
$V_{CE(on)}$	Collector Emitter on Voltage	V_{GE} = 15V I_C = 50A	T_j = 25°C		1.95	2.45	V
			T_j = 125°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°C) V_{GE} = ±15V V_{Bus} = 300V I_C = 50A R_G = 2.7Ω		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°C) V_{GE} = ±15V V_{Bus} = 300V I_C = 50A R_G = 2.7Ω		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

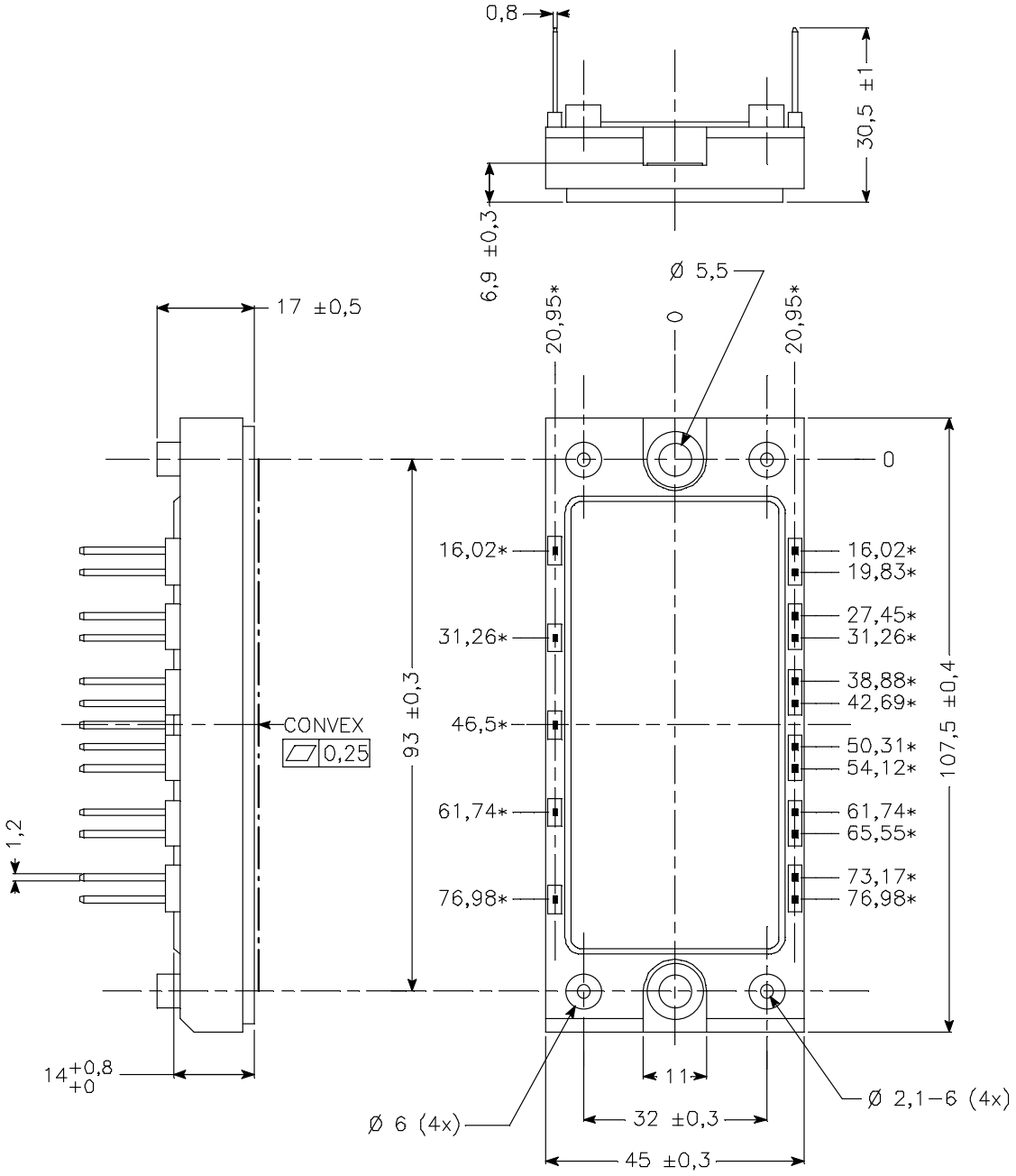
Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
V_F	Diode Forward Voltage	I_F = 50A V_{GE} = 0V	T_j = 25°C		1.25	1.6	V
			T_j = 125°C		1.2		
E_R	Reverse Recovery Energy	I_F = 50A V_R = 300V di/dt =800A/µs	T_j = 125°C		1.5		mJ
Q_{rr}	Reverse Recovery Charge	I_F = 50A V_R = 300V di/dt =800A/µs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

Thermal and package characteristics

Symbol	Characteristic			Min	Typ	Max	Unit
R_{thJC}	Junction to Case		IGBT			0.5	°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	°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

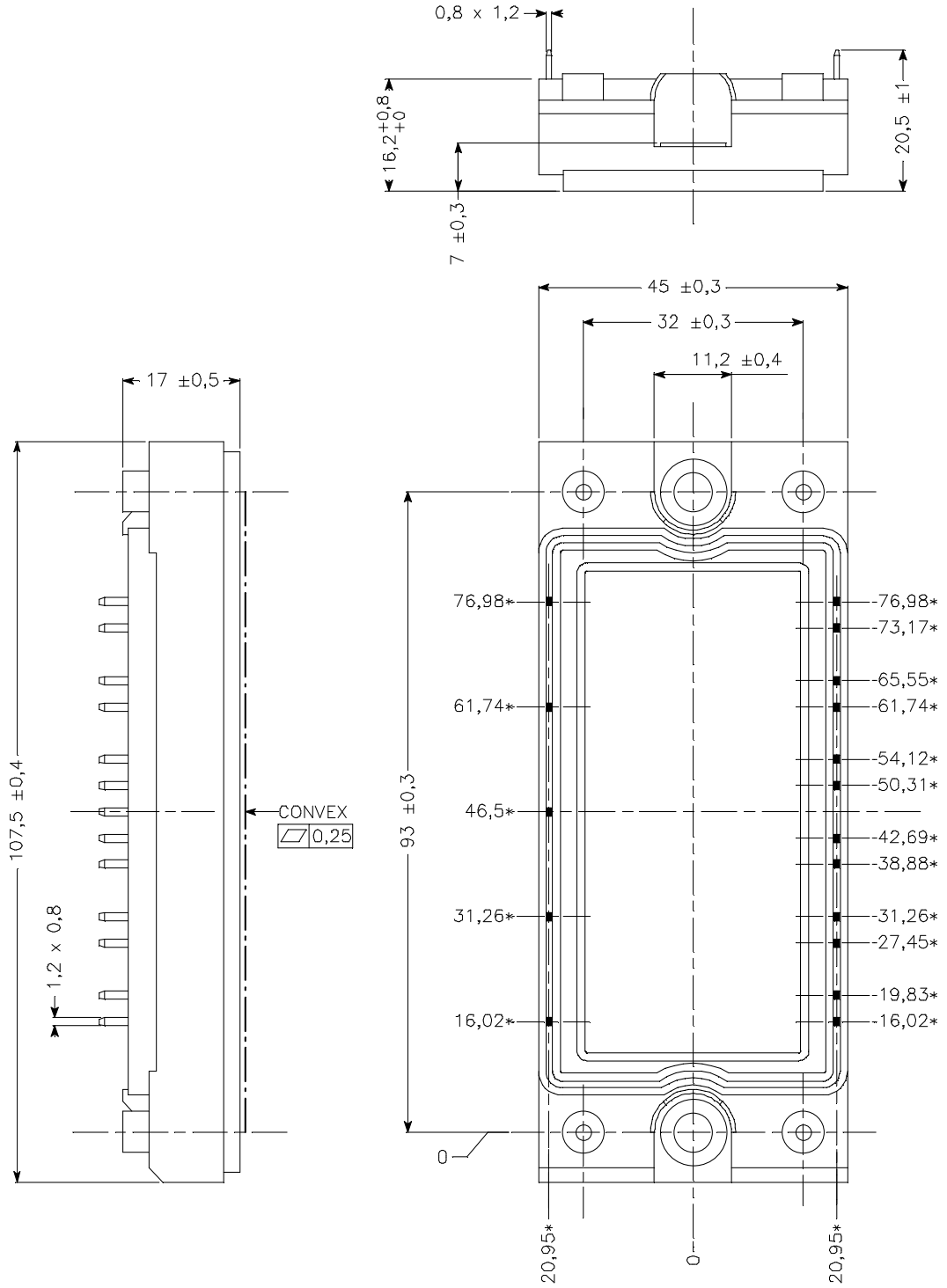
Pin out: APTGF50X60E2 (Long pins)



ALL DIMENSIONS MARKED " * " ARE TOLERENCED AS : ⌖ Ø0,4

Package outline

Pin out: APTGF50X60P2 (Short pins)



ALL DIMENSIONS MARKED " * " ARE TOLERENCED AS : ⌖ Ø 0,4