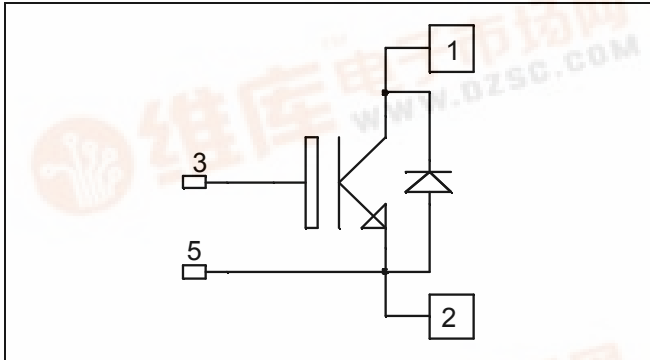




APTGF360U60D4

Single switch NPT IGBT Power Module

$V_{CES} = 600V$
 $I_C = 360A @ T_c = 80^\circ C$



Application

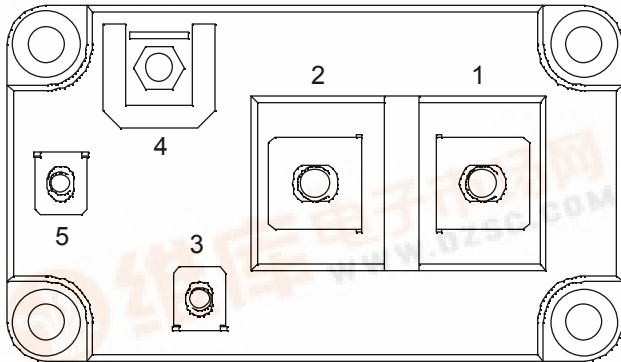
- Welding converters
- Switched Mode Power Supplies
- Uninterruptible Power Supplies
- Motor control

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
- Low stray inductance
 - M6 connectors for power
 - M4 connectors for signal
- High level of integration

Benefits

- Outstanding performance at high frequency operation
- Stable temperature behavior
- Very rugged
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Easy paralleling due to positive TC of VCEsat



Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{CES}	Collector - Emitter Breakdown Voltage	600	V
I_C	Continuous Collector Current	$T_C = 25^\circ C$	A
		$T_C = 80^\circ C$	
I_{CM}	Pulsed Collector Current	$T_C = 25^\circ C$	720
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_C = 25^\circ C$	1560
RBSOA	Reverse Bias Safe Operation Area	$T_j = 125^\circ C$	720A@520V

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



All ratings @ $T_j = 25^\circ\text{C}$ unless otherwise specified

Electrical Characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
I_{CES}	Zero Gate Voltage Collector Current	$V_{GE} = 0\text{V}$ $V_{CE} = 600\text{V}$	$T_j = 25^\circ\text{C}$		1	500	μA
			$T_j = 125^\circ\text{C}$		1		mA
$V_{CE(on)}$	Collector Emitter on Voltage	$V_{GE} = 15\text{V}$ $I_C = 360\text{A}$	$T_j = 25^\circ\text{C}$		1.95	2.45	V
			$T_j = 125^\circ\text{C}$		2.2		
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 6\text{mA}$		4.5	5.5	6.5	V
I_{GES}	Gate – Emitter Leakage Current	$V_{GE} = 20\text{V}, V_{CE} = 0\text{V}$				400	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0\text{V}, V_{CE} = 25\text{V}$ $f = 1\text{MHz}$			17		nF
C_{res}	Reverse Transfer Capacitance				1.6		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = \pm 15\text{V}$ $V_{Bus} = 300\text{V}$ $I_C = 400\text{A}$ $R_G = 2.2\Omega$			150		ns
T_r	Rise Time				72		
$T_{d(off)}$	Turn-off Delay Time				350		
T_f	Fall Time				50		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (125°C) $V_{GE} = \pm 15\text{V}$ $V_{Bus} = 300\text{V}$ $I_C = 400\text{A}$ $R_G = 2.2\Omega$			175		ns
T_r	Rise Time				75		
$T_{d(off)}$	Turn-off Delay Time				375		
T_f	Fall Time				55		
E_{on}	Turn on Energy				9		mJ
E_{off}	Turn off Energy				15		

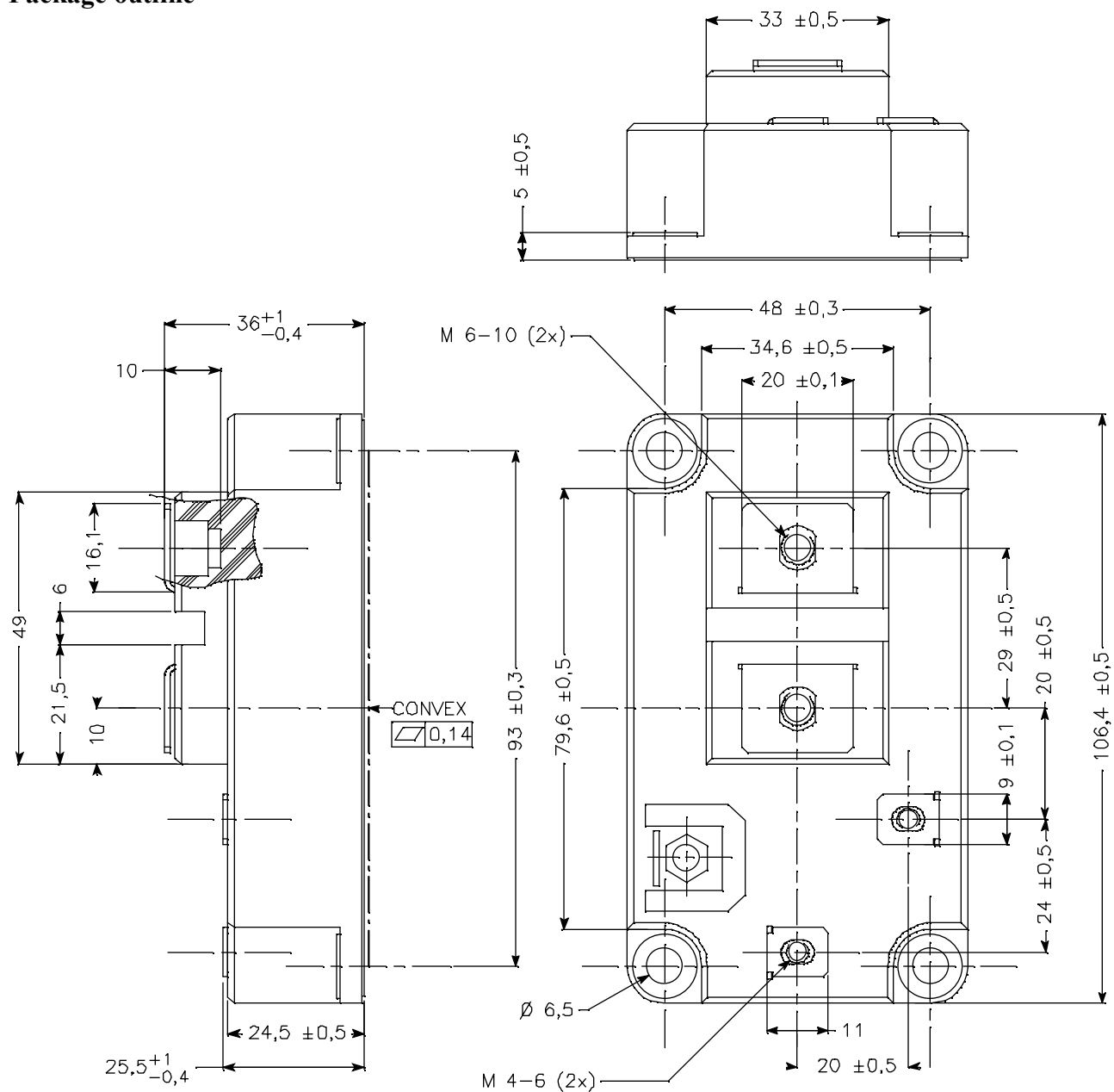
Reverse diode ratings and characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
V_F	Diode Forward Voltage	$I_F = 400\text{A}$ $V_{GE} = 0\text{V}$	$T_j = 25^\circ\text{C}$		1.25	1.6	V
			$T_j = 125^\circ\text{C}$		1.2		
Q_{rr}	Reverse Recovery Charge	$I_F = 400\text{A}$ $V_R = 300\text{V}$ $di/dt = 4400\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$		27		μC
			$T_j = 125^\circ\text{C}$		44		

Thermal and package characteristics

Symbol	Characteristic		Min	Typ	Max	Unit
R_{thJC}	Junction to Case	IGBT			0.08	$^\circ\text{C/W}$
		Diode			0.15	
V_{ISOL}	RMS Isolation Voltage, any terminal to case $t = 1\text{ min}$, $I_{isol} < 1\text{mA}$, 50/60Hz		2500			V
T_j	Operating junction temperature range		-40		150	$^\circ\text{C}$
T_{STG}	Storage Temperature Range		-40		125	
T_C	Operating Case Temperature		-40		125	
Torque	Mounting torque	M6	3		5	N.m
		M4	1		2	
Wt	Package Weight				420	g

Package outline



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.