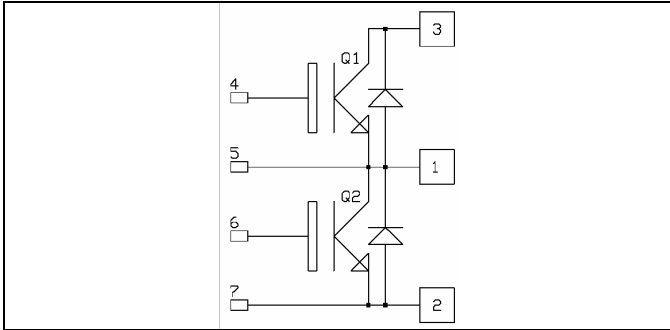


**Phase Leg
NPT IGBT Power Module**

**$V_{CES} = 600V$
 $I_C = 330A @ T_c = 80^\circ C$**

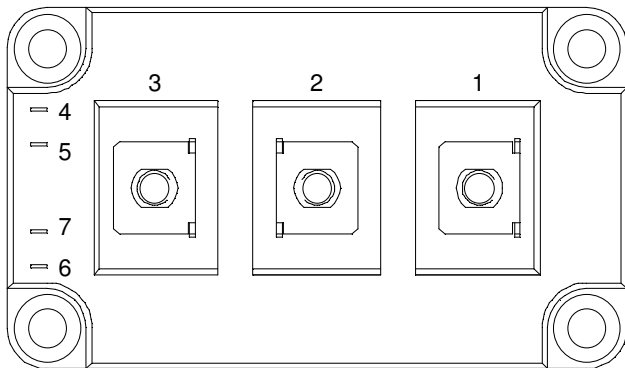


Application

- 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 power connectors
- 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	$T_C = 25^\circ C$	460
		$T_C = 80^\circ C$	330
I_{CM}	Pulsed Collector Current	$T_C = 25^\circ C$	800
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_C = 25^\circ C$	1400
RBSOA	Reverse Bias Safe Operation Area	$T_j = 125^\circ C$	800A@420V

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

Electrical Characteristics

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

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
BV_{CES}	Collector - Emitter Breakdown Voltage	$V_{GE} = 0V, I_C = 10\text{ mA}$	600			V
I_{CES}	Zero Gate Voltage Collector Current	$V_{GE} = 0V$		2	750	μA
		$V_{CE} = 600V$		1.5		mA
$V_{CE(on)}$	Collector Emitter on Voltage	$V_{GE} = 15V$		2.0	2.5	V
		$I_C = 400A$		2.2		
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 8\text{ mA}$	4.5		6.5	V
I_{GES}	Gate - Emitter Leakage Current	$V_{GE} = 20V, V_{CE} = 0V$			600	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0V, V_{CE} = 25V$		18		nF
C_{res}	Reverse Transfer Capacitance	$f = 1\text{MHz}$		1.6		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = \pm 15V$ $V_{Bus} = 300V$ $I_C = 400A$ $R_G = 0.82\Omega$		165		ns
T_r	Rise Time			40		
$T_{d(off)}$	Turn-off Delay Time			250		
T_f	Fall Time			35		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (125°C) $V_{GE} = \pm 15V$ $V_{Bus} = 300V$ $I_C = 400A$ $R_G = 0.82\Omega$		180		ns
T_r	Rise Time			50		
$T_{d(off)}$	Turn-off Delay Time			285		
T_f	Fall Time			40		
E_{off}	Turn off energy			13		mJ

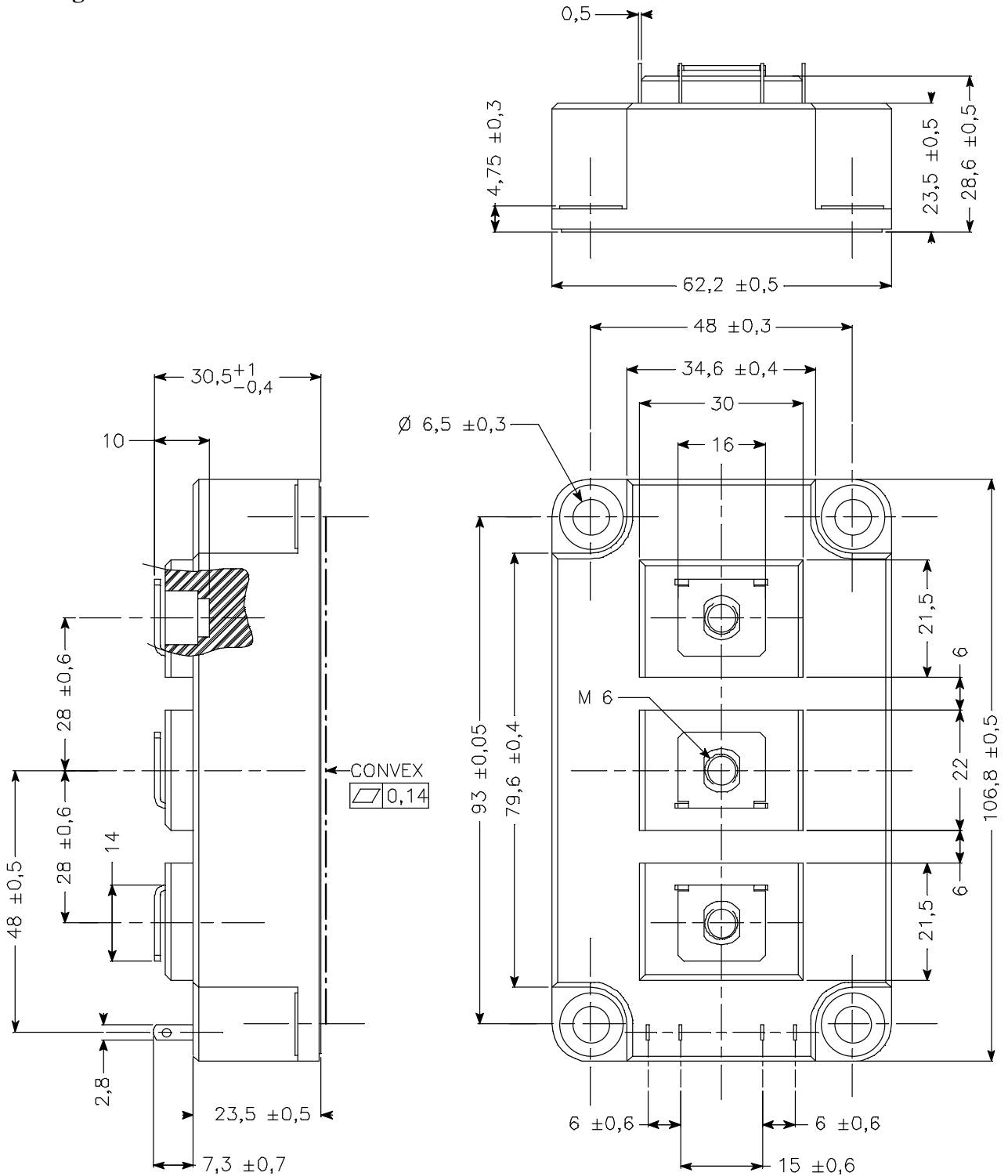
Reverse diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit	
V_F	Diode Forward Voltage	$I_F = 400A$	$T_j = 25^\circ\text{C}$		1.25	1.6	V
		$V_{GE} = 0V$	$T_j = 125^\circ\text{C}$		1.2		
E_r	Reverse Recovery Energy	$I_F = 400A$ $V_R = 300V$ $di/dt = 900A/\mu\text{s}$	$T_j = 125^\circ\text{C}$		8.2	mJ	
Q_{rr}	Reverse Recovery Charge	$I_F = 400A$ $V_R = 300V$ $di/dt = 900A/\mu\text{s}$	$T_j = 25^\circ\text{C}$		24	μC	
			$T_j = 125^\circ\text{C}$		40		

Thermal and package characteristics

Symbol	Characteristic	Min	Typ	Max	Unit	
R_{thJC}	Junction to Case	IGBT			0.089	$^\circ\text{C/W}$
		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	For terminals	M6	3	5	N.m
		To Heatsink	M6	3	5	
Wt	Package Weight			380	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.