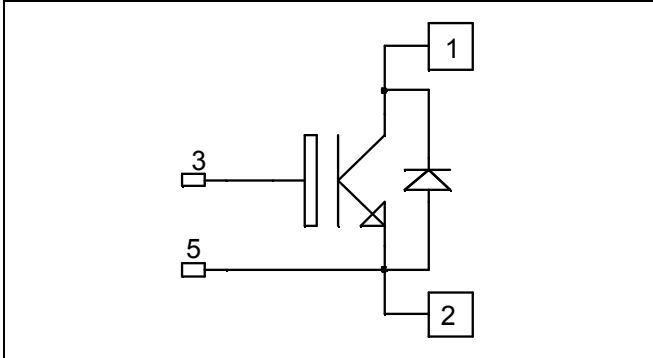


**Single switch  
NPT IGBT Power Module**

**$V_{CES} = 600V$   
 $I_C = 500A @ T_c = 80^\circ C$**

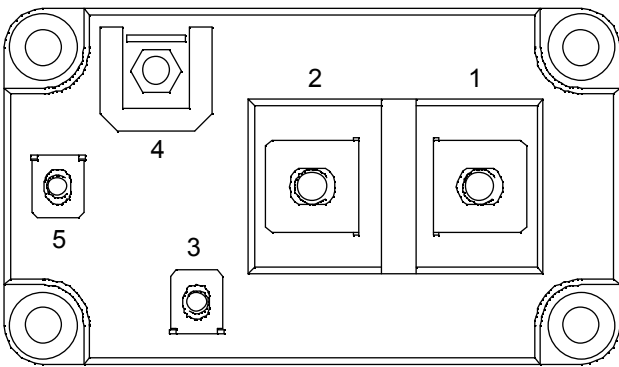


**Application**

- 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	$T_C = 25^\circ C$	625
		$T_C = 80^\circ C$	500
$I_{CM}$	Pulsed Collector Current	$T_C = 25^\circ C$	900
$V_{GE}$	Gate - Emitter Voltage	$\pm 20$	V
$P_D$	Maximum Power Dissipation	$T_C = 25^\circ C$	2000
RBSOA	Reverse Bias Safe Operation Area	$T_j = 125^\circ C$	900A@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	$\mu\text{A}$
			$T_j = 125^\circ\text{C}$	1		$\text{mA}$
$V_{CE(on)}$	Collector Emitter on Voltage	$V_{GE} = 15\text{V}$ $I_C = 500\text{A}$	$T_j = 25^\circ\text{C}$	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	$\text{nA}$

### Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$C_{ies}$	Input Capacitance	$V_{GE} = 0\text{V}, V_{CE} = 25\text{V}$ $f = 1\text{MHz}$		26		$\text{nF}$
$C_{res}$	Reverse Transfer Capacitance			2.4		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching ( $25^\circ\text{C}$ ) $V_{GE} = \pm 15\text{V}$ $V_{Bus} = 300\text{V}$ $I_C = 600\text{A}$ $R_G = 4.7\Omega$		174		$\text{ns}$
$T_r$	Rise Time			80		
$T_{d(off)}$	Turn-off Delay Time			400		
$T_f$	Fall Time			70		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching ( $125^\circ\text{C}$ ) $V_{GE} = \pm 15\text{V}$ $V_{Bus} = 300\text{V}$ $I_C = 600\text{A}$ $R_G = 4.7\Omega$		200		$\text{ns}$
$T_r$	Rise Time			85		
$T_{d(off)}$	Turn-off Delay Time			420		
$T_f$	Fall Time			80		
$E_{on}$	Turn on Energy				11	$\text{mJ}$
$E_{off}$	Turn off Energy				22	

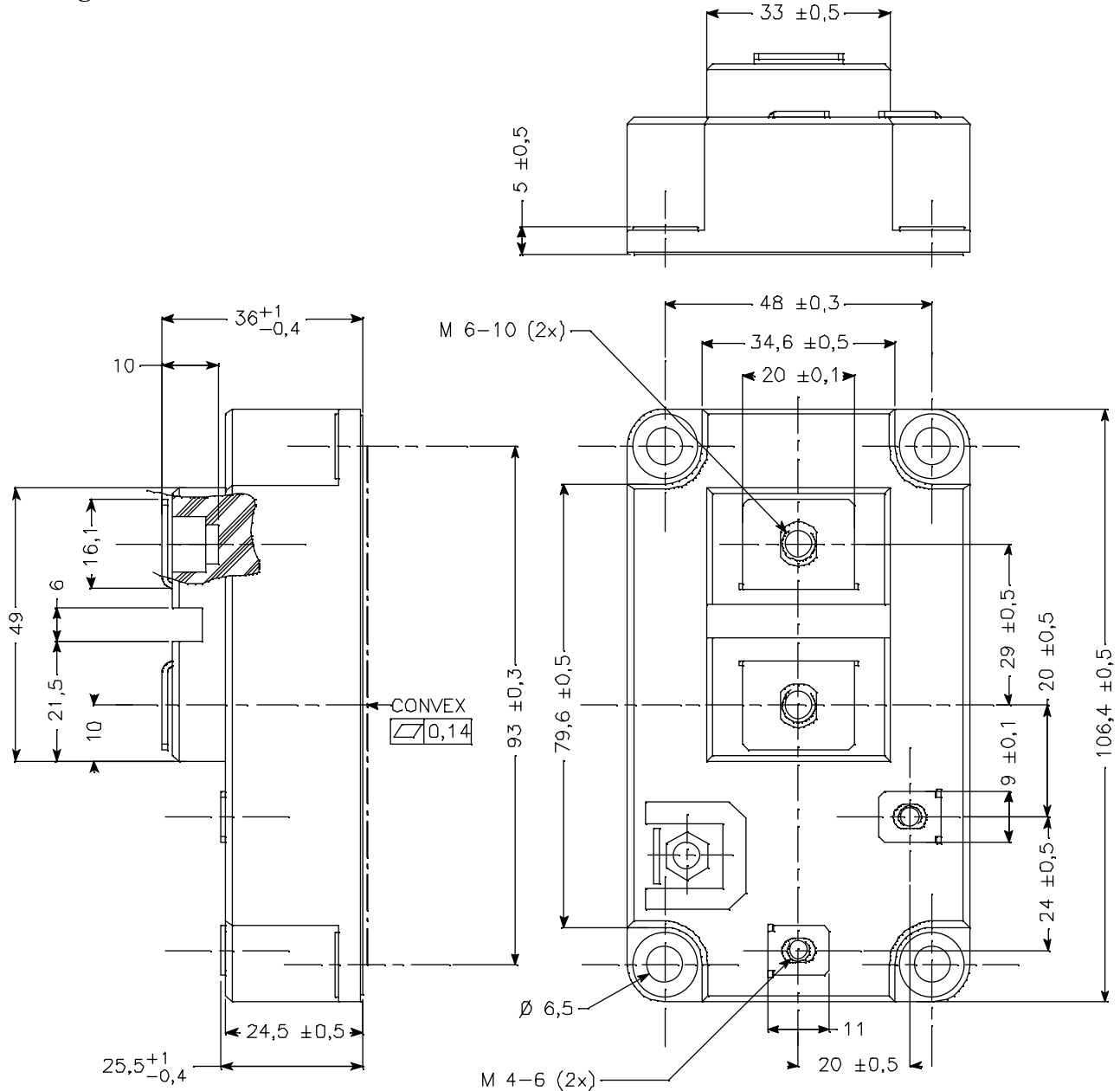
### Reverse diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$V_F$	Diode Forward Voltage	$I_F = 600\text{A}$ $V_{GE} = 0\text{V}$	$T_j = 25^\circ\text{C}$	1.25	1.6	V
			$T_j = 125^\circ\text{C}$	1.2		
$Q_{rr}$	Reverse Recovery Charge	$I_F = 600\text{A}$ $V_R = 300\text{V}$ $di/dt = 5600\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$	40		$\mu\text{C}$
			$T_j = 125^\circ\text{C}$	66		

### Thermal and package characteristics

Symbol	Characteristic		Min	Typ	Max	Unit
$R_{thJC}$	Junction to Case	IGBT			0.06	$^\circ\text{C}/\text{W}$
		Diode			0.12	
$V_{ISOL}$	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.