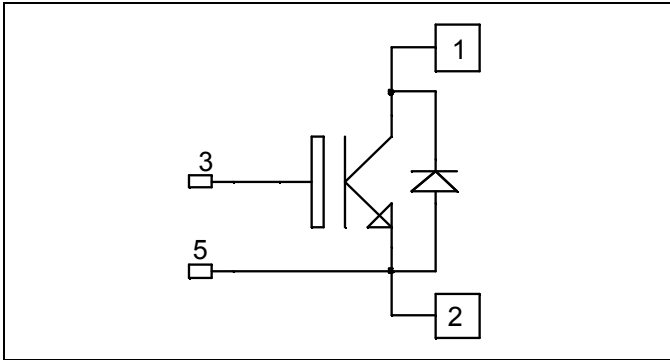


**Single switch  
NPT IGBT Power Module**

**$V_{CES} = 600V$   
 $I_C = 200A @ T_c = 80^\circ C$**

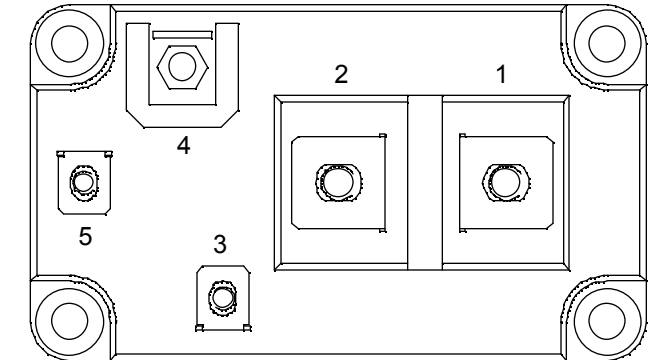


**Application**

- 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	$T_C = 25^\circ C$	250
		$T_C = 80^\circ C$	200
$I_{CM}$	Pulsed Collector Current	$T_C = 25^\circ C$	400
$V_{GE}$	Gate - Emitter Voltage	$\pm 20$	V
$P_D$	Maximum Power Dissipation	$T_C = 25^\circ C$	735
RBSOA	Reverse Bias Safe Operation Area	$T_j = 125^\circ C$	400A@420V

**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**

<i>Symbol</i>	<i>Characteristic</i>	<i>Test Conditions</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>	
$I_{CES}$	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	$V_{GE} = 15\text{V}$ $I_C = 200\text{A}$	$T_j = 25^\circ\text{C}$		1.95	2.45	$\text{V}$
			$T_j = 125^\circ\text{C}$		2.2		
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 4\text{mA}$	4.5	5.5	6.5	$\text{V}$	
$I_{GES}$	Gate – Emitter Leakage Current	$V_{GE} = 20\text{V}, V_{CE} = 0\text{V}$			400	$\text{nA}$	

**Dynamic Characteristics**

<i>Symbol</i>	<i>Characteristic</i>	<i>Test Conditions</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
$C_{ies}$	Input Capacitance	$V_{GE} = 0\text{V}, V_{CE} = 25\text{V}$ $f = 1\text{MHz}$		9		$\text{nF}$
$C_{res}$	Reverse Transfer Capacitance			0.8		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching ( $25^\circ\text{C}$ ) $V_{GE} = \pm 15\text{V}$ $V_{Bus} = 300\text{V}$ $I_C = 200\text{A}$ $R_G = 1.5\Omega$		163		$\text{ns}$
$T_r$	Rise Time			43		
$T_{d(off)}$	Turn-off Delay Time			253		
$T_f$	Fall Time			33		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching ( $125^\circ\text{C}$ ) $V_{GE} = \pm 15\text{V}$ $V_{Bus} = 300\text{V}$ $I_C = 200\text{A}$ $R_G = 1.5\Omega$		183		$\text{ns}$
$T_r$	Rise Time			49		
$T_{d(off)}$	Turn-off Delay Time			285		
$T_f$	Fall Time			41		
$E_{on}$	Turn on Energy			4.6		$\text{mJ}$
$E_{off}$	Turn off Energy			6.3		

**Reverse diode ratings and characteristics**

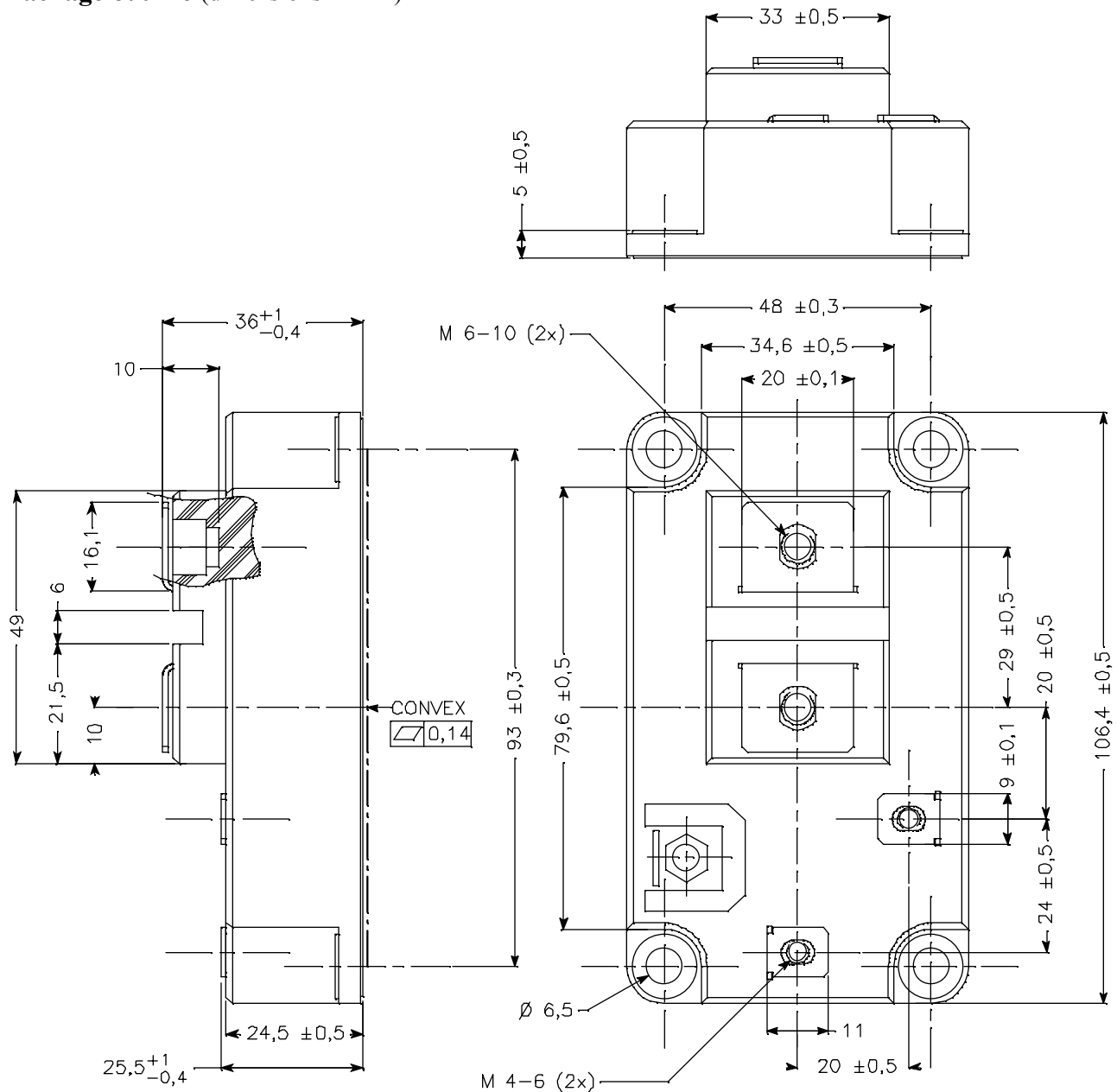
<i>Symbol</i>	<i>Characteristic</i>	<i>Test Conditions</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>	
$V_{RRM}$	Maximum Peak Repetitive Reverse Voltage		600			$\text{V}$	
$I_{RM}$	Maximum Reverse Leakage Current	$V_R = 600\text{V}$	$T_j = 25^\circ\text{C}$		250	$\mu\text{A}$	
			$T_j = 125^\circ\text{C}$		500		
$V_F$	Diode Forward Voltage	$I_F = 200\text{A}$ $V_{GE} = 0\text{V}$	$T_j = 25^\circ\text{C}$		1.25	1.6	$\text{V}$
			$T_j = 125^\circ\text{C}$		1.2		
$E_R$	Reverse Recovery Energy	$I_F = 200\text{A}$ $V_R = 300\text{V}$	$T_j = 125^\circ\text{C}$	4.1		$\text{mJ}$	
$Q_{rr}$	Reverse Recovery Charge	$di/dt = 4000\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$	12		$\mu\text{C}$	
			$T_j = 125^\circ\text{C}$	19			

## Thermal and package characteristics

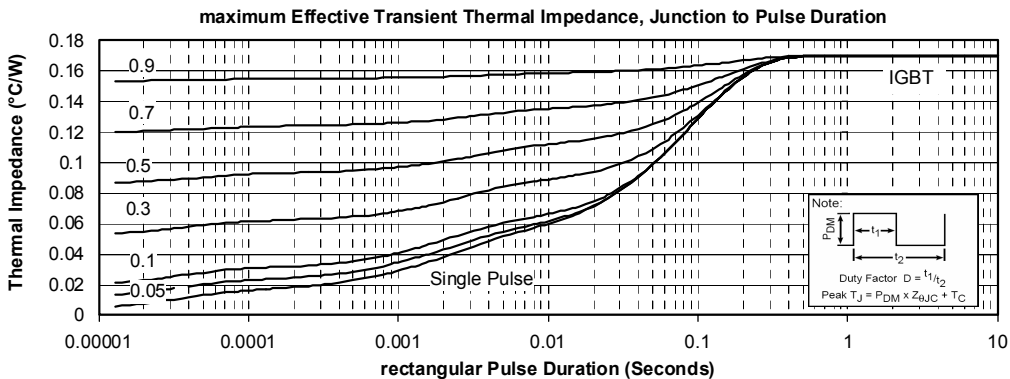
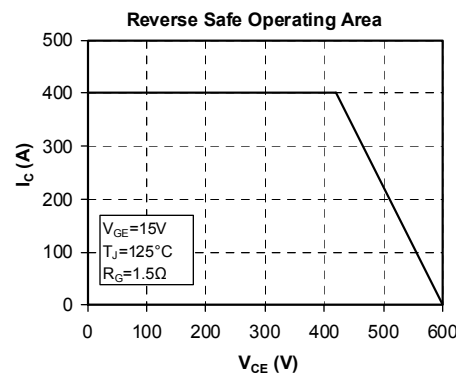
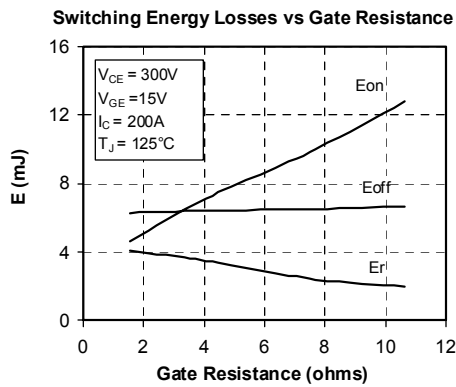
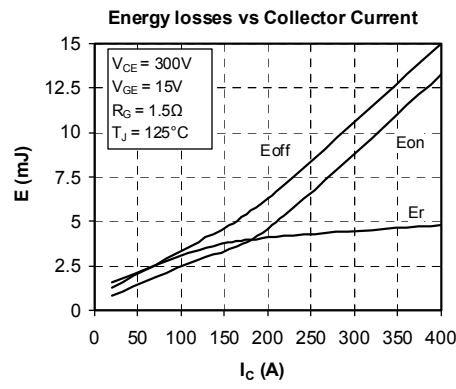
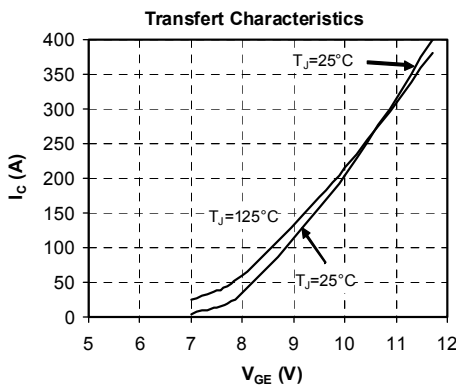
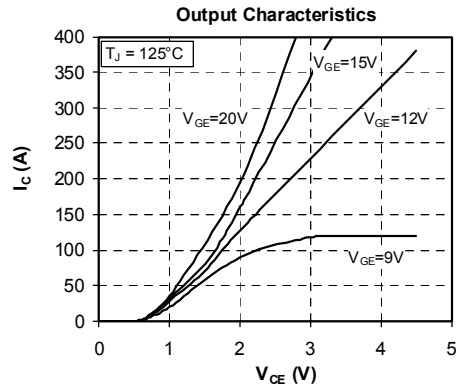
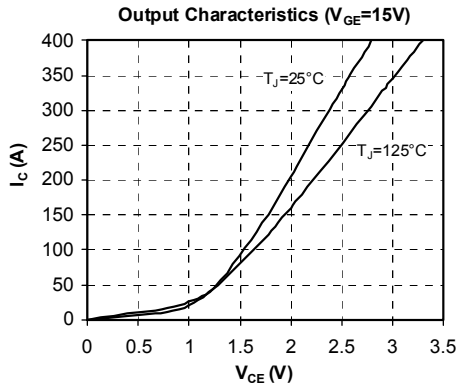
Symbol Characteristic

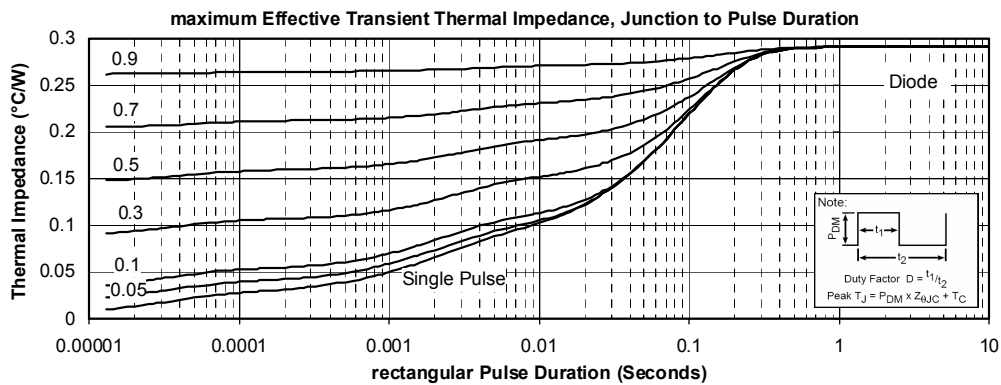
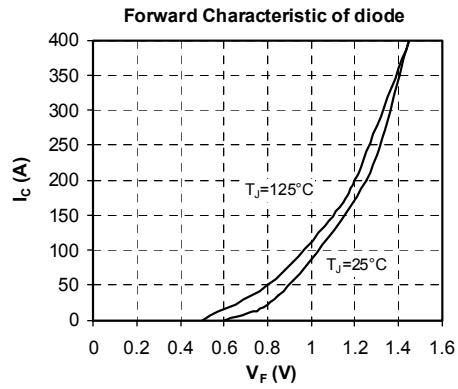
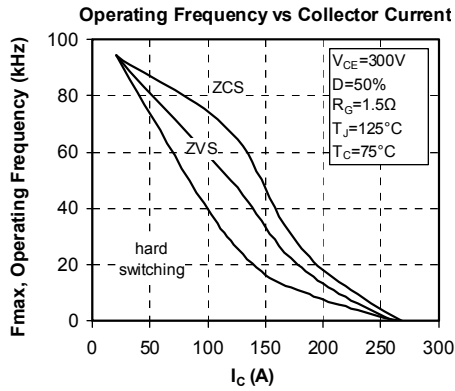
		Min	Typ	Max	Unit
R <sub>thJC</sub>	Junction to Case	IGBT		0.17	°C/W
		Diode		0.29	
V <sub>ISOL</sub>	RMS Isolation Voltage, any terminal to case t=1 min, I <sub>isol</sub> <1mA, 50/60Hz	2500			V
T <sub>J</sub>	Operating junction temperature range	-40		150	°C
T <sub>STG</sub>	Storage Temperature Range	-40		125	
T <sub>C</sub>	Operating Case Temperature	-40		125	
Torque	Mounting torque	M6	3	5	N.m
		M4	1	2	
Wt	Package Weight			420	g

## Package outline (dimensions in mm)



**Typical Performance Curve**





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.