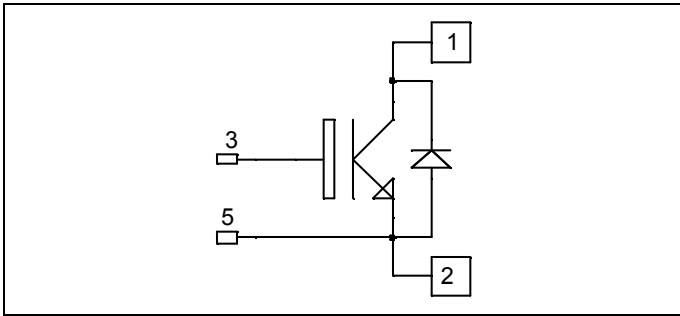


**Single switch  
Trench + Field Stop IGBT®  
Power Module**

**$V_{CES} = 1700V$   
 $I_C = 600A @ T_c = 80°C$**

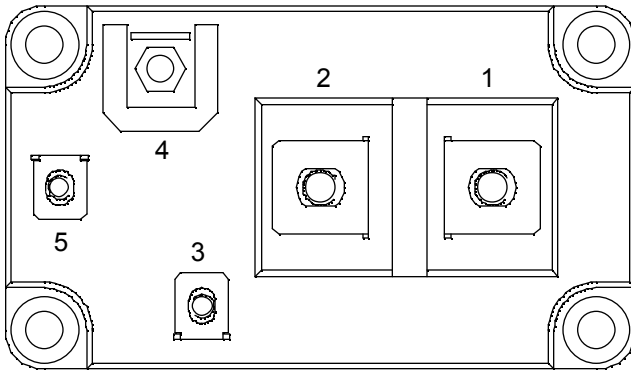


**Application**

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

**Features**

- Trench + Field Stop IGBT® Technology
  - Low voltage drop
  - Low tail current
  - Switching frequency up to 20 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
- High level of integration
- Kelvin emitter for easy drive
- Low stray inductance
  - M6 connectors for power
  - M4 connectors for signal



**Benefits**

- Stable temperature behavior
- Very rugged
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Easy paralleling due to positive  $T_C$  of  $V_{CESat}$
- RoHS Compliant

**Absolute maximum ratings**

Symbol	Parameter	Max ratings	Unit
$V_{CES}$	Collector - Emitter Breakdown Voltage	1700	V
$I_C$	Continuous Collector Current	$T_C = 25°C$	1100
		$T_C = 80°C$	600
$I_{CM}$	Pulsed Collector Current	$T_C = 25°C$	1200
$V_{GE}$	Gate - Emitter Voltage	$\pm 20$	V
$P_D$	Maximum Power Dissipation	$T_C = 25°C$	2900
RBSOA	Reverse Bias Safe Operation Area	$T_j = 125°C$	1200A@1600V

**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	$V_{GE} = 0\text{V}, V_{CE} = 1700\text{V}$			1	mA
$V_{CE(sat)}$	Collector Emitter saturation Voltage	$V_{GE} = 15\text{V}$ $I_C = 600\text{A}$	$T_j = 25^\circ\text{C}$	2.0	2.4	V
			$T_j = 125^\circ\text{C}$	2.4		
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 24\text{ mA}$	5.2	5.8	6.4	V
$I_{GES}$	Gate – Emitter Leakage Current	$V_{GE} = 20\text{V}, V_{CE} = 0\text{V}$			800	nA

## Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$C_{ies}$	Input Capacitance	$V_{GE} = 0\text{V}, V_{CE} = 25\text{V}$		51		nF
$C_{res}$	Reverse Transfer Capacitance	$f = 1\text{MHz}$		1.8		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching ( $25^\circ\text{C}$ ) $V_{GE} = \pm 15\text{V}$ $V_{Bus} = 900\text{V}$ $I_C = 600\text{A}$ $R_G = 2.4\Omega$		280		ns
$T_r$	Rise Time			100		
$T_{d(off)}$	Turn-off Delay Time			850		
$T_f$	Fall Time			150		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching ( $125^\circ\text{C}$ ) $V_{GE} = \pm 15\text{V}$ $V_{Bus} = 900\text{V}$ $I_C = 600\text{A}$ $R_G = 2.4\Omega$		330		ns
$T_r$	Rise Time			100		
$T_{d(off)}$	Turn-off Delay Time			1000		
$T_f$	Fall Time			230		
$E_{on}$	Turn On Energy	$V_{GE} = \pm 15\text{V}$ $V_{Bus} = 900\text{V}$ $I_C = 600\text{A}$ $R_G = 2.4\Omega$	$T_j = 125^\circ\text{C}$	200		mJ
$E_{off}$	Turn Off Energy		$T_j = 125^\circ\text{C}$	190		

## Reverse diode ratings and characteristics

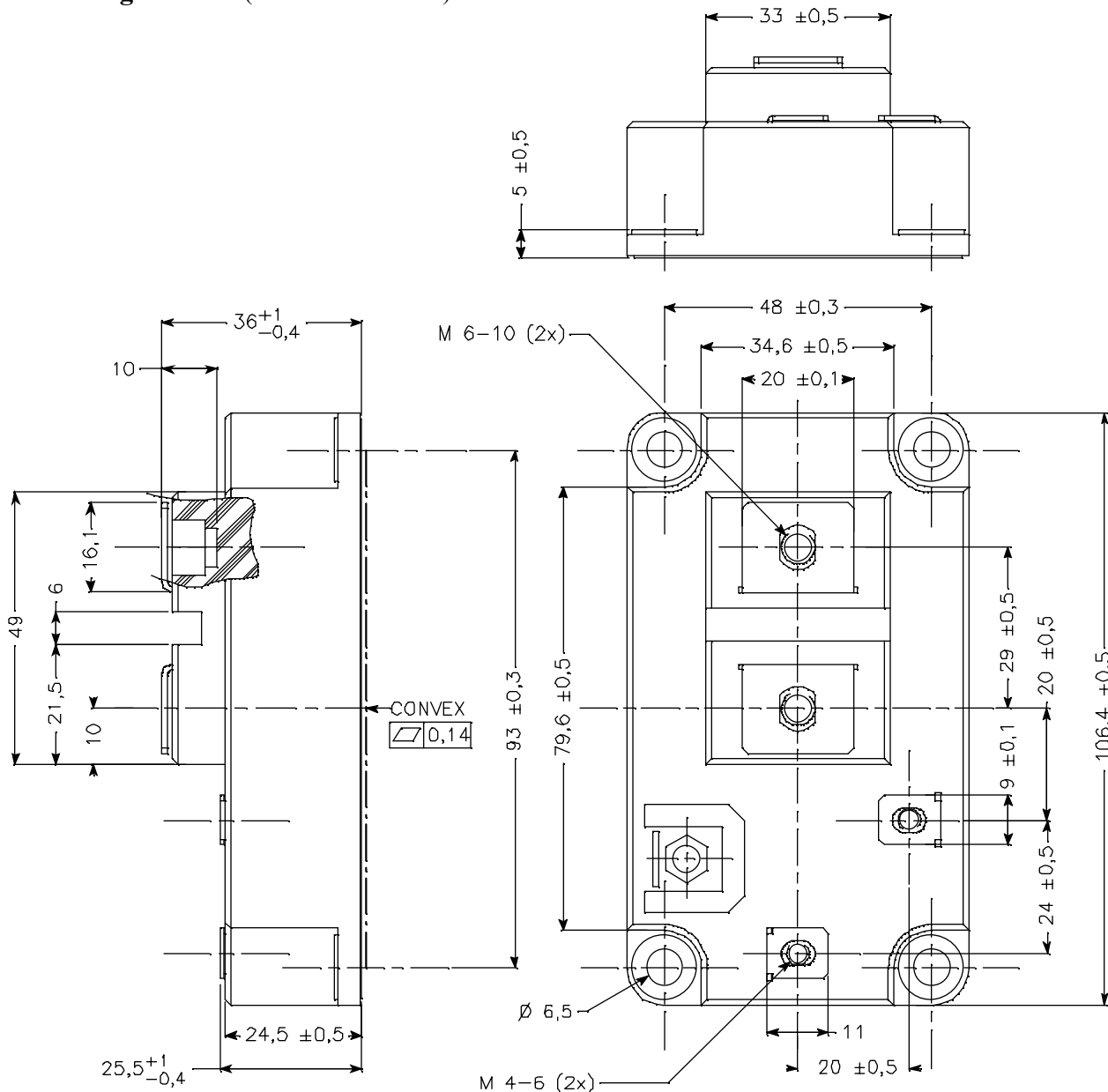
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$V_{RRM}$	Maximum Peak Repetitive Reverse Voltage		1700			V
$I_{RM}$	Maximum Reverse Leakage Current	$V_R = 1700\text{V}$	$T_j = 25^\circ\text{C}$		750	$\mu\text{A}$
			$T_j = 125^\circ\text{C}$		1000	
$I_F$	DC forward current		$T_c = 80^\circ\text{C}$	600		A
$V_F$	Diode Forward Voltage	$I_F = 600\text{A}$ $V_{GE} = 0\text{V}$	$T_j = 25^\circ\text{C}$	1.8	2.2	V
			$T_j = 125^\circ\text{C}$	1.9		
$E_r$	Reverse Recovery Energy	$I_F = 600\text{A}$ $V_R = 900\text{V}$ $di/dt = 5200\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$	85		mJ
			$T_j = 125^\circ\text{C}$	145		
$t_{rr}$	Reverse Recovery Time		$T_j = 25^\circ\text{C}$	450		ns
			$T_j = 125^\circ\text{C}$	600		
$Q_{rr}$	Reverse Recovery Charge		$T_j = 25^\circ\text{C}$	150		$\mu\text{C}$
			$T_j = 125^\circ\text{C}$	250		

## Thermal and package characteristics

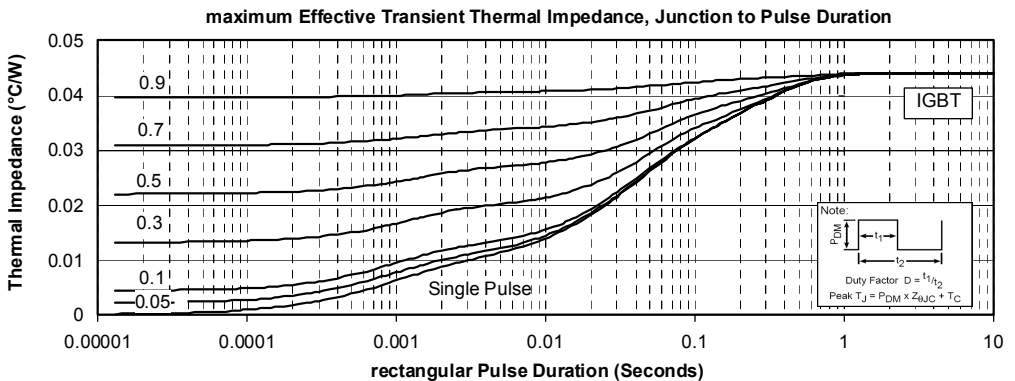
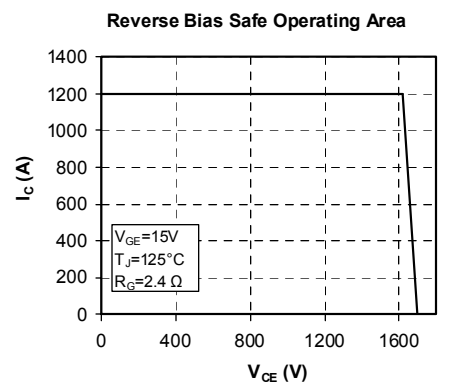
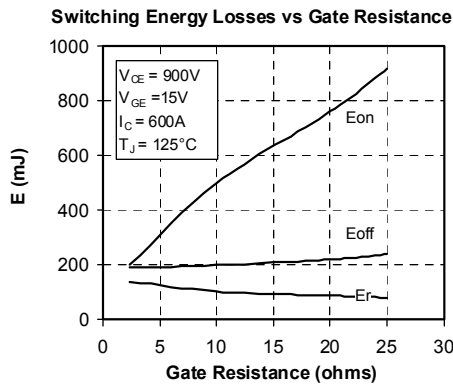
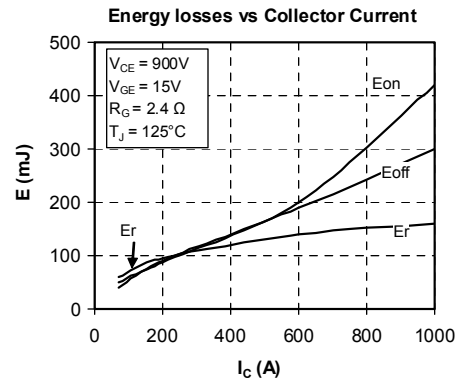
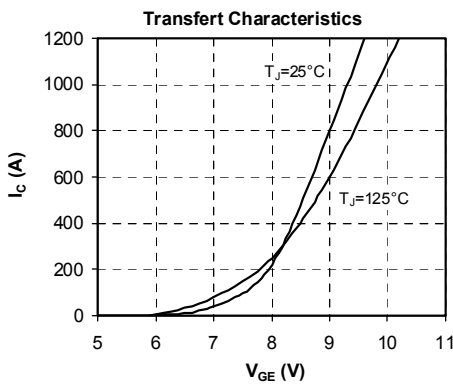
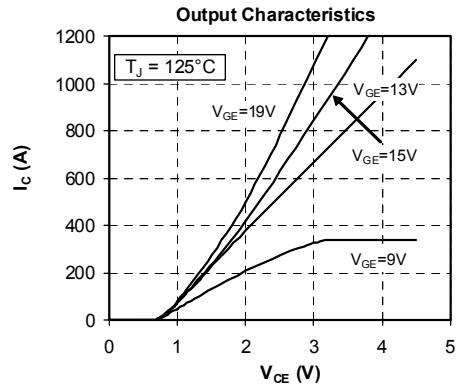
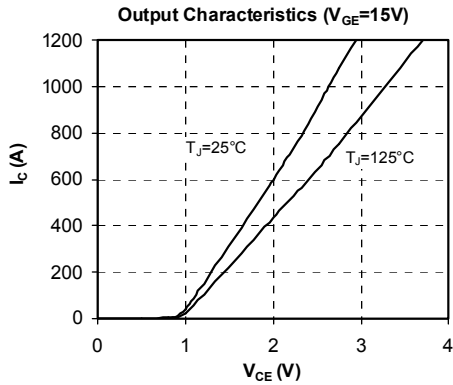
Symbol Characteristic

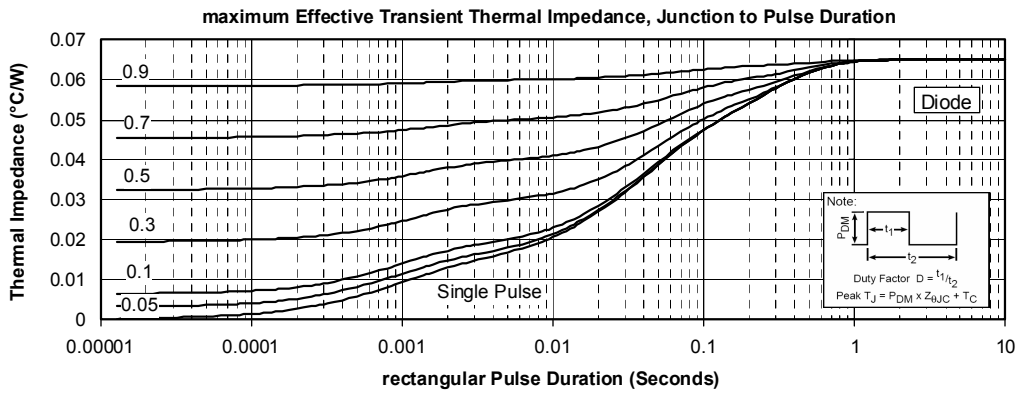
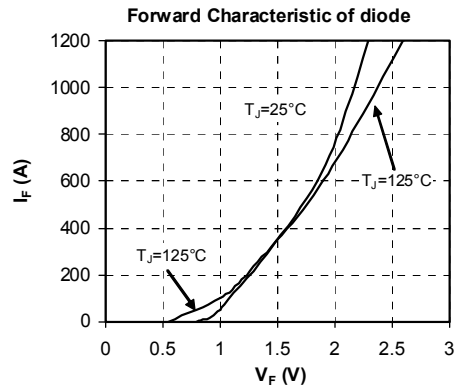
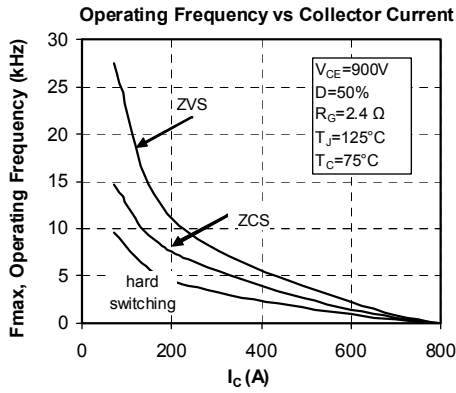
		Min	Typ	Max	Unit
R <sub>thJC</sub>	Junction to Case Thermal Resistance	IGBT		0.044	°C/W
		Diode		0.065	
V <sub>ISOL</sub>	RMS Isolation Voltage, any terminal to case t=1 min, I <sub>isol</sub> <1mA, 50/60Hz	3500			V
T <sub>J</sub>	Operating junction temperature range	-40		150	°C
T <sub>STG</sub>	Storage Temperature Range	-40		125	
T <sub>C</sub>	Operating Case Temperature	-40		125	
Torque	Mounting torque	M4	1	2	N.m
		M6	3	5	
Wt	Package Weight			420	g

## D4 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.