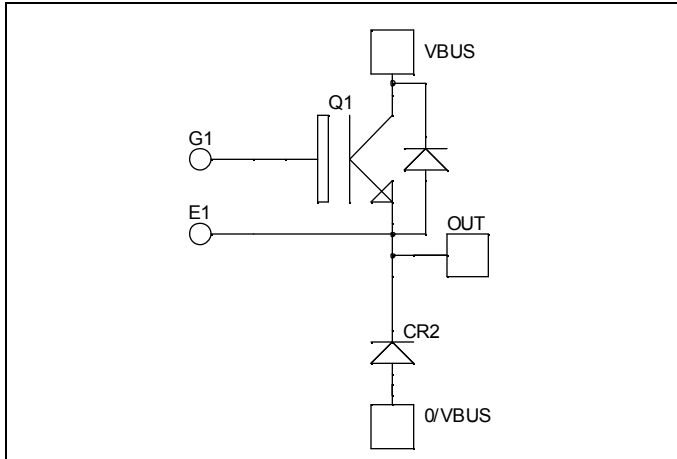


***Buck chopper  
Trench + Field Stop IGBT®  
Power Module***

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



**Application**

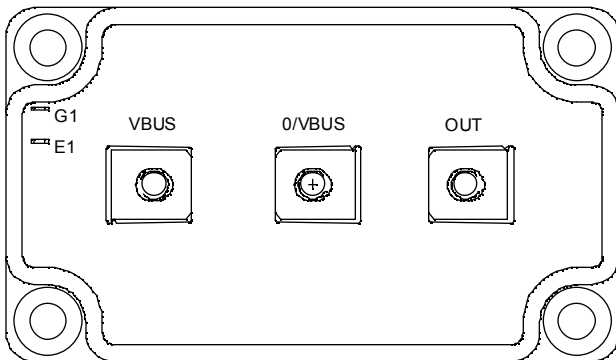
- AC and DC motor control
- Switched Mode Power Supplies

**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
- Very low stray inductance
  - Symmetrical design
  - M5 power connectors
- High level of integration

**Benefits**

- 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
- Low profile



**Absolute maximum ratings**

Symbol	Parameter	Max ratings	Unit
$V_{CES}$	Collector - Emitter Breakdown Voltage	600	V
$I_C$	Continuous Collector Current	$T_C = 25^\circ C$	700 *
		$T_C = 80^\circ C$	600 *
$I_{CM}$	Pulsed Collector Current	$T_C = 25^\circ C$	800
$V_{GE}$	Gate - Emitter Voltage	$\pm 20$	V
$P_D$	Maximum Power Dissipation	$T_C = 25^\circ C$	2300
RBSOA	Reverse Bias Safe Operating Area	$T_j = 150^\circ C$	1200A @ 550V

\* Specification of IGBT device but output current must be limited to 500A to not exceed a delta of temperature greater than 100°C for the connectors.

**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	$V_{GE} = 0\text{V}, V_{CE} = 600\text{V}$			750	$\mu\text{A}$
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	$V_{GE} = 15\text{V}$ $I_C = 600\text{A}$	$T_j = 25^\circ\text{C}$	1.4	1.8	V
			$T_j = 150^\circ\text{C}$	1.5		
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 2\text{mA}$	5.0	5.8	6.5	V
$I_{GES}$	Gate – Emitter Leakage Current	$V_{GE} = 20\text{V}, V_{CE} = 0\text{V}$			800	nA

## Dynamic Characteristics

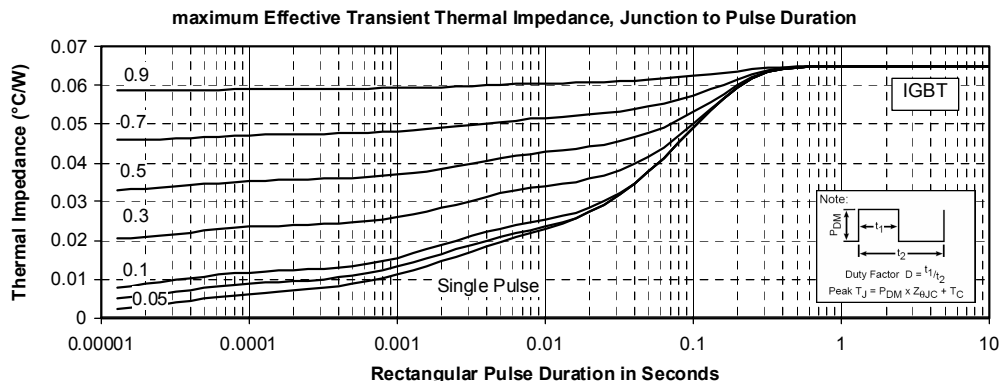
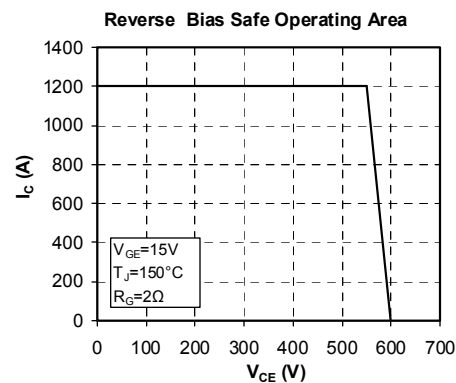
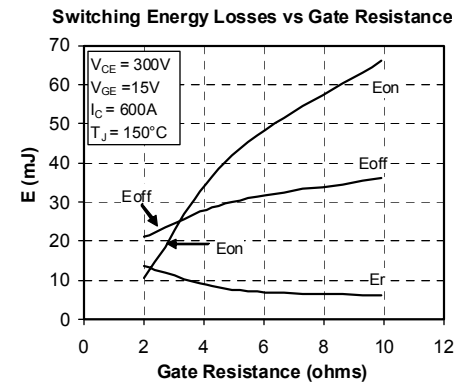
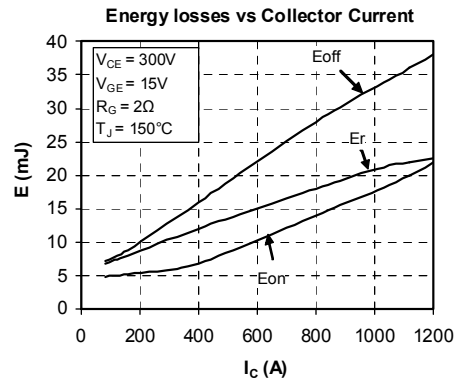
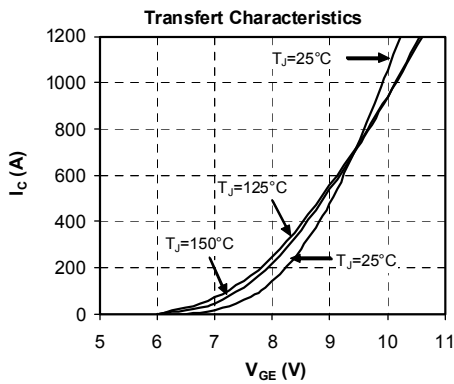
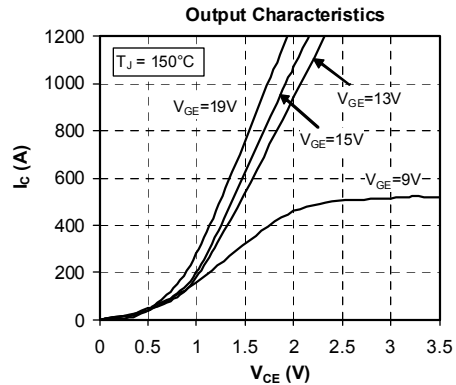
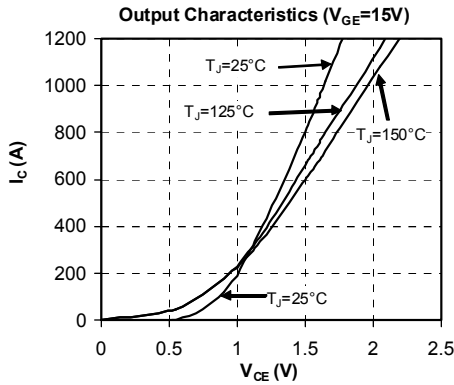
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit	
$C_{ies}$	Input Capacitance	$V_{GE} = 0\text{V}$		49		nF	
$C_{oes}$	Output Capacitance	$V_{CE} = 25\text{V}$		3.1			
$C_{res}$	Reverse Transfer Capacitance	$f = 1\text{MHz}$		1.5			
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching ( $25^\circ\text{C}$ ) $V_{GE} = \pm 15\text{V}$ $V_{Bus} = 300\text{V}$ $I_C = 600\text{A}$ $R_G = 2\Omega$		130		ns	
$T_r$	Rise Time			55			
$T_{d(off)}$	Turn-off Delay Time			250			
$T_f$	Fall Time			60			
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching ( $150^\circ\text{C}$ ) $V_{GE} = \pm 15\text{V}$ $V_{Bus} = 300\text{V}$ $I_C = 600\text{A}$ $R_G = 2\Omega$		145		ns	
$T_r$	Rise Time			60			
$T_{d(off)}$	Turn-off Delay Time			320			
$T_f$	Fall Time			80			
$E_{on}$	Turn on Energy			10.5			mJ
$E_{off}$	Turn off Energy			21			

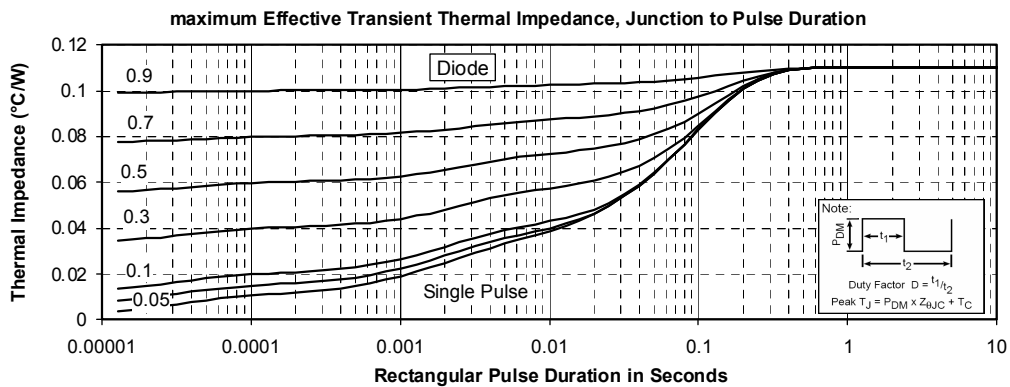
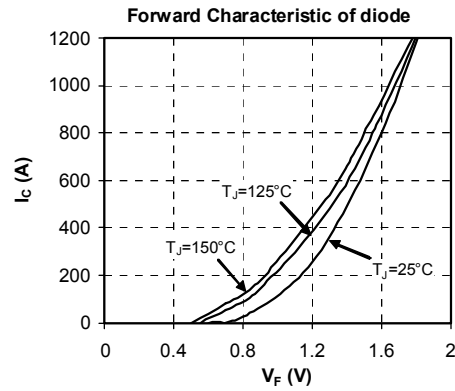
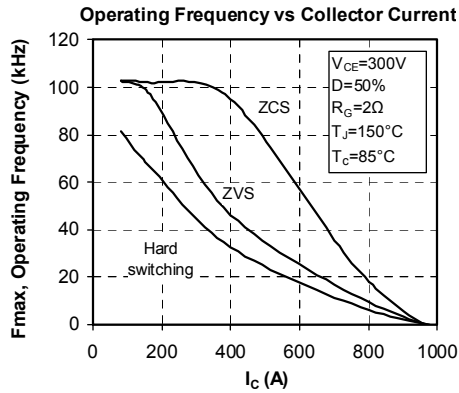
## Chopper diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$V_{RRM}$	Maximum Peak Repetitive Reverse Voltage		600			V
$I_{RM}$	Maximum Reverse Leakage Current	$V_R = 600\text{V}$	$T_j = 25^\circ\text{C}$		750	$\mu\text{A}$
			$T_j = 150^\circ\text{C}$		1000	
$I_{F(AV)}$	Maximum Average Forward Current	50% duty cycle	$T_c = 80^\circ\text{C}$	600		A
$V_F$	Diode Forward Voltage	$I_F = 600\text{A}$ $V_{GE} = 0\text{V}$	$T_j = 25^\circ\text{C}$	1.5	1.9	V
			$T_j = 150^\circ\text{C}$	1.4		
$t_{rr}$	Reverse Recovery Time	$I_F = 600\text{A}$ $V_R = 300\text{V}$	$T_j = 25^\circ\text{C}$	125		ns
			$T_j = 150^\circ\text{C}$	220		
$Q_{rr}$	Reverse Recovery Charge	$di/dt = 5000\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$	27		$\mu\text{C}$
			$T_j = 150^\circ\text{C}$	57		



## 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.