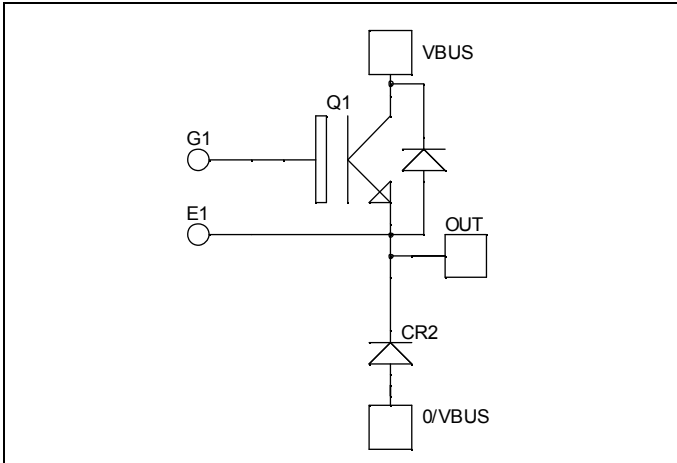


***Buck chopper
Trench + Field Stop IGBT®
Power Module***

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

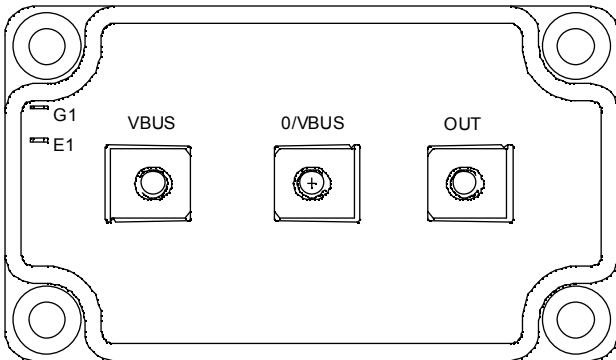


Application

- 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 *	A
		$T_C = 80^\circ C$	600 *	
I_{CM}	Pulsed Collector Current	$T_C = 25^\circ C$	800	
V_{GE}	Gate - Emitter Voltage		± 20	V
P_D	Maximum Power Dissipation	$T_C = 25^\circ C$	2300	W
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	μA
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	$V_{GE} = 15\text{V}$ $I_C = 600\text{A}$		1.4	1.8	V
		$T_j = 25^\circ\text{C}$				
		$T_j = 150^\circ\text{C}$		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

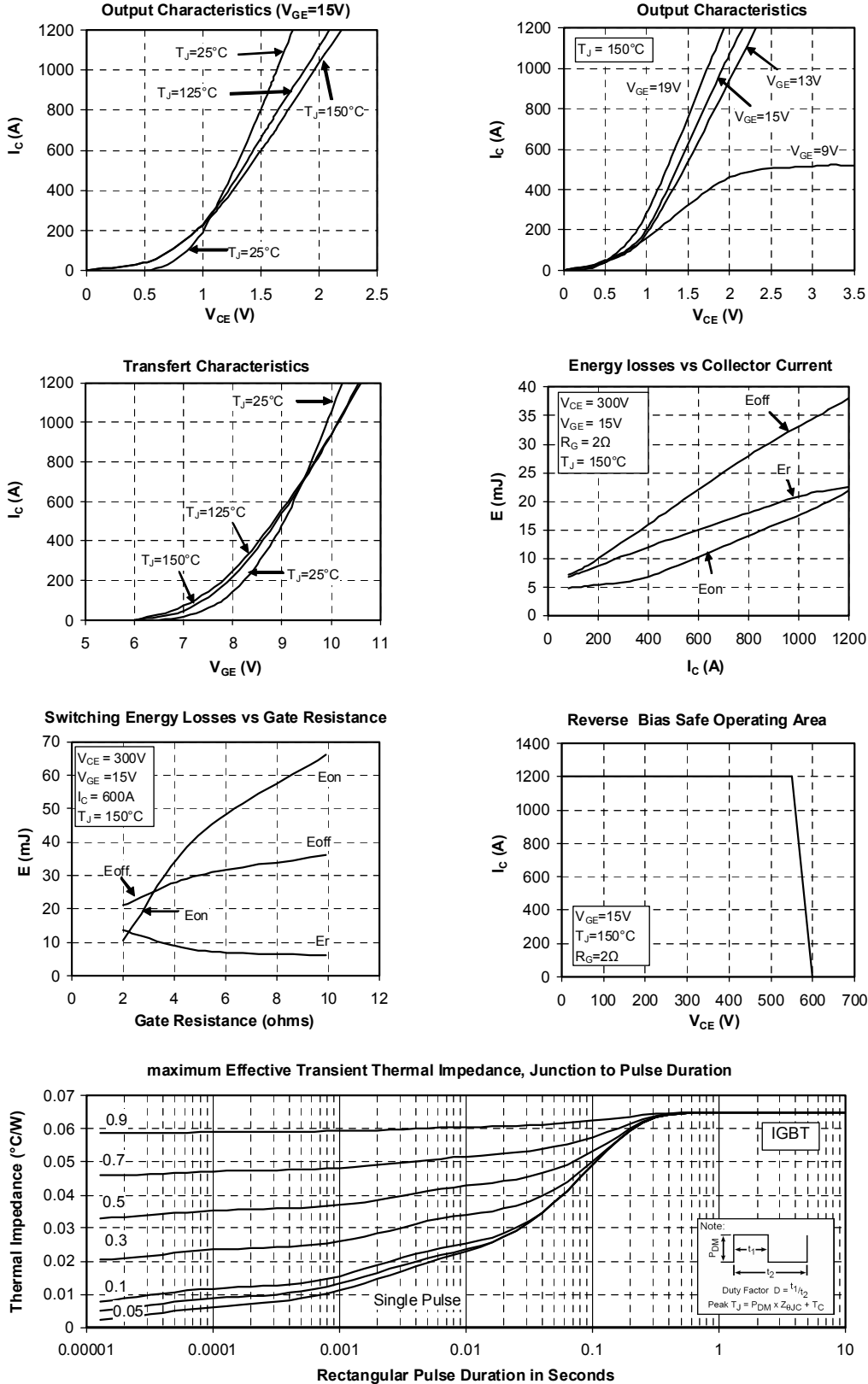
Dynamic Characteristics

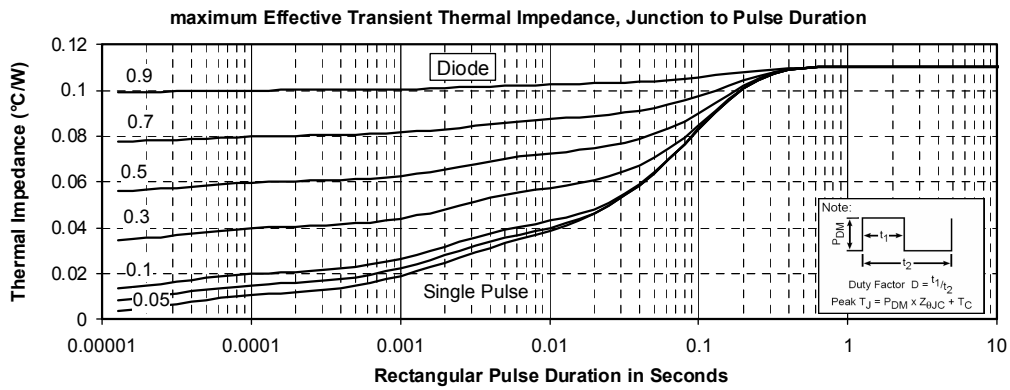
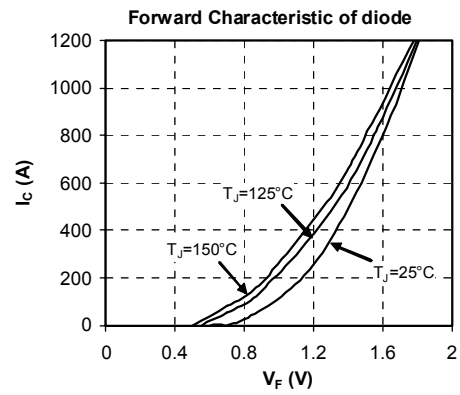
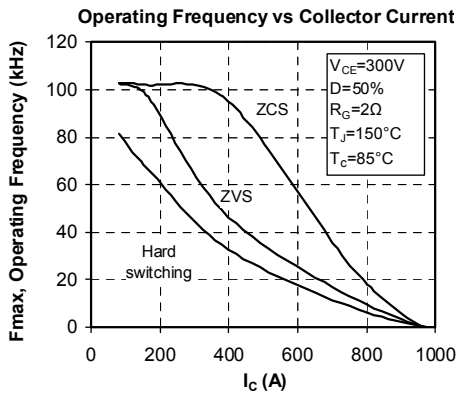
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0\text{V}$		49		nF
C_{oes}	Output Capacitance	$V_{CE} = 25\text{V}$		3.1		
C_{res}	Reverse Transfer Capacitance	$f = 1\text{MHz}$		1.5		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = \pm 15\text{V}$ $V_{Bus} = 300\text{V}$ $I_C = 600\text{A}$ $R_G = 2\Omega$		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°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	
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	$V_R = 600\text{V}$			750	μA
		$T_j = 25^\circ\text{C}$				
		$T_j = 150^\circ\text{C}$			1000	
$I_{F(AV)}$	Maximum Average Forward Current	50% duty cycle $T_c = 80^\circ\text{C}$		600		A
V_F	Diode Forward Voltage	$I_F = 600\text{A}$ $V_{GE} = 0\text{V}$		1.5	1.9	V
		$T_j = 25^\circ\text{C}$				
		$T_j = 150^\circ\text{C}$		1.4		
t_{rr}	Reverse Recovery Time	$I_F = 600\text{A}$ $V_R = 300\text{V}$ $di/dt = 5000\text{A}/\mu\text{s}$		125		ns
			$T_j = 25^\circ\text{C}$		220	
Q_{rr}	Reverse Recovery Charge	$di/dt = 5000\text{A}/\mu\text{s}$		27		μC
			$T_j = 150^\circ\text{C}$		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.