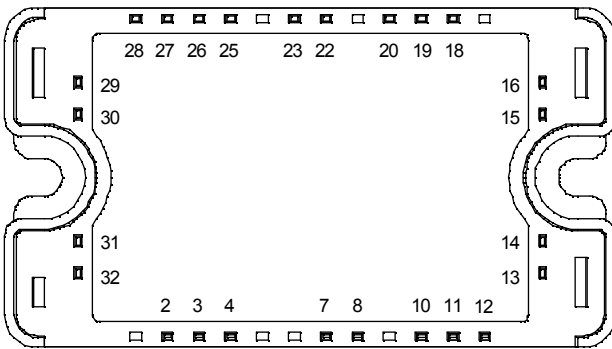
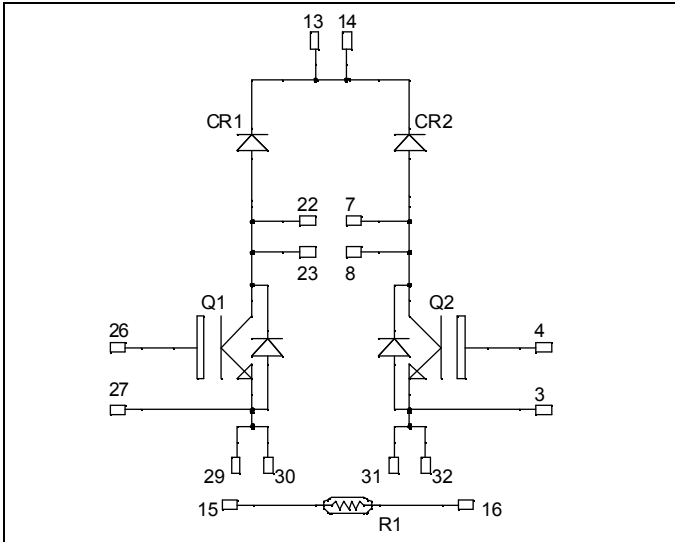


**Dual Boost chopper  
Trench + Field Stop IGBT®  
Power Module**

**$V_{CES} = 600V$   
 $I_C = 50A @ T_c = 80^\circ C$**



All multiple inputs and outputs must be shorted together  
Example: 13/14 ; 29/30 ; 22/23 ...

**Application**

- AC and DC motor control
- Switched Mode Power Supplies
- Power Factor Correction

**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
- High level of integration
- Internal thermistor for temperature monitoring

**Benefits**

- Stable temperature behavior
- Very rugged
- Solderable terminals for easy PCB mounting
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Easy paralleling due to positive TC of VCEsat
- Low profile
- Each leg can be easily paralleled to achieve a single boost of twice the current capability.

**Absolute maximum ratings**

Symbol	Parameter	Max ratings	Unit
$V_{CES}$	Collector - Emitter Breakdown Voltage	600	V
$I_C$	Continuous Collector Current	$T_C = 25^\circ C$	80
		$T_C = 80^\circ C$	50
$I_{CM}$	Pulsed Collector Current	$T_C = 25^\circ C$	100
$V_{GE}$	Gate - Emitter Voltage	$\pm 20$	V
$P_D$	Maximum Power Dissipation	$T_C = 25^\circ C$	176
RBSOA	Reverse Bias Safe Operating Area	$T_j = 150^\circ C$	100A @ 550V

**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	$V_{GE} = 0\text{V}, V_{CE} = 600\text{V}$			250	$\mu\text{A}$
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	$V_{GE} = 15\text{V}$ $I_C = 50\text{A}$	$T_j = 25^\circ\text{C}$	1.5	1.9	V
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 600\mu\text{A}$		5.8	6.5	V
$I_{GES}$	Gate – Emitter Leakage Current	$V_{GE} = 20\text{V}, V_{CE} = 0\text{V}$			600	nA

**Dynamic Characteristics**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$C_{ies}$	Input Capacitance	$V_{GE} = 0\text{V}$		3150		pF
$C_{oes}$	Output Capacitance	$V_{CE} = 25\text{V}$		200		
$C_{res}$	Reverse Transfer Capacitance	$f = 1\text{MHz}$		95		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching ( $25^\circ\text{C}$ )		110		ns
$T_r$	Rise Time	$V_{GE} = \pm 15\text{V}$ $V_{Bus} = 300\text{V}$		45		
$T_{d(off)}$	Turn-off Delay Time	$I_C = 50\text{A}$		200		
$T_f$	Fall Time	$R_G = 10\Omega$		40		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching ( $150^\circ\text{C}$ )		120		ns
$T_r$	Rise Time	$V_{GE} = \pm 15\text{V}$ $V_{Bus} = 300\text{V}$		50		
$T_{d(off)}$	Turn-off Delay Time	$I_C = 50\text{A}$		250		
$T_f$	Fall Time	$R_G = 10\Omega$		60		
$E_{on}$	Turn-on Switching Energy			0.87		mJ
$E_{off}$	Turn-off Switching Energy			1.75		

**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	$V_R = 600\text{V}$	$T_j = 25^\circ\text{C}$		250	$\mu\text{A}$
			$T_j = 150^\circ\text{C}$		500	
$I_{F(AV)}$	Maximum Average Forward Current	50% duty cycle	$T_c = 80^\circ\text{C}$	50		A
$V_F$	Diode Forward Voltage	$I_F = 50\text{A}$ $V_{GE} = 0\text{V}$	$T_j = 25^\circ\text{C}$	1.6	2	V
			$T_j = 150^\circ\text{C}$	1.5		
$t_{rr}$	Reverse Recovery Time	$I_F = 50\text{A}$ $V_R = 300\text{V}$	$T_j = 25^\circ\text{C}$	125		ns
			$T_j = 150^\circ\text{C}$	220		
$Q_{rr}$	Reverse Recovery Charge	$di/dt = 1800\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$	2.6		$\mu\text{C}$
			$T_j = 150^\circ\text{C}$	5.4		

**Temperature sensor NTC** (see application note APT0406 on [www.advancedpower.com](http://www.advancedpower.com) for more information).

Symbol	Characteristic	Min	Typ	Max	Unit
R <sub>25</sub>	Resistance @ 25°C		50		kΩ
B <sub>25/85</sub>	T <sub>25</sub> = 298.15 K		3952		K

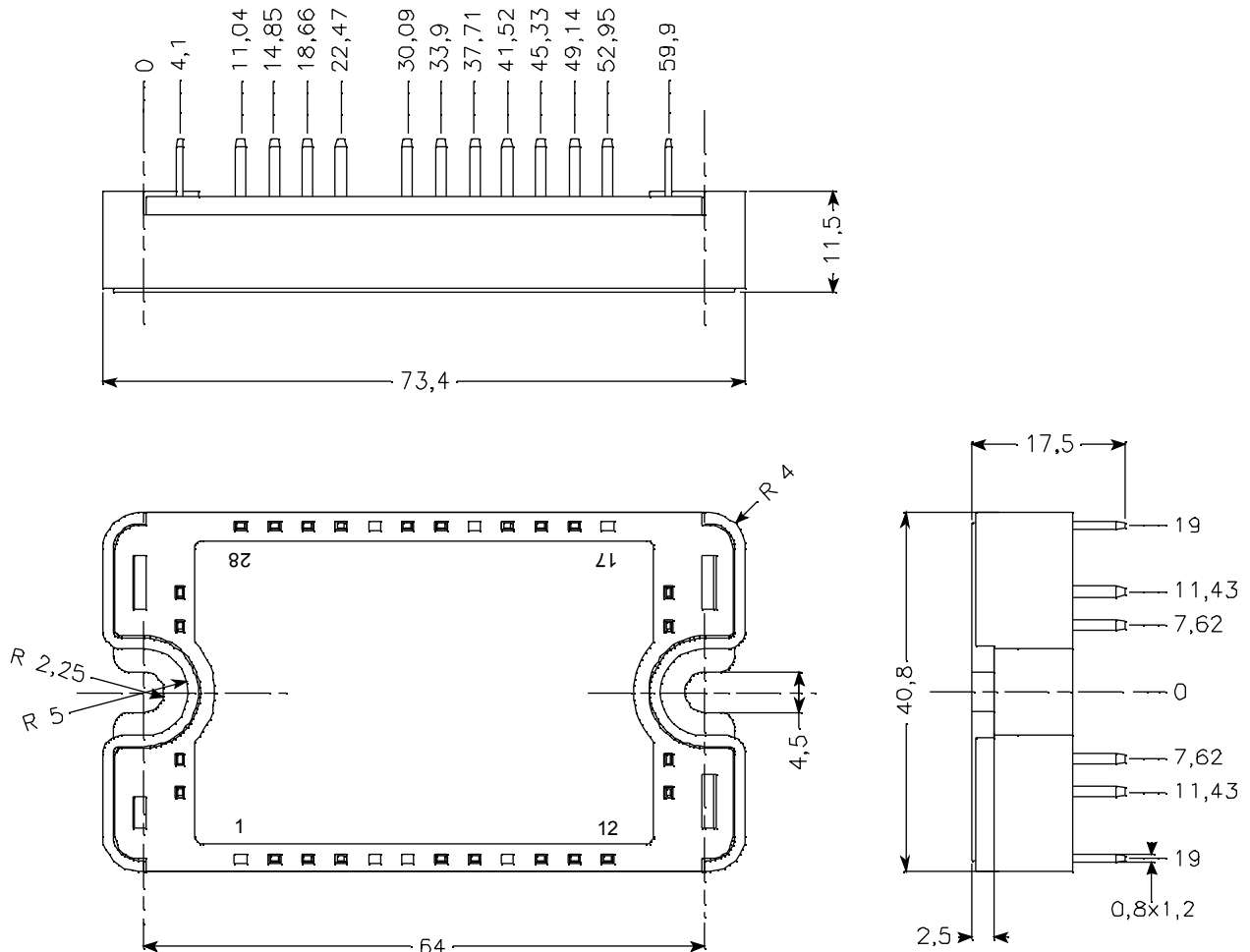
$$R_T = \frac{R_{25}}{\exp\left[B_{25/85}\left(\frac{1}{T_{25}} - \frac{1}{T}\right)\right]}$$

T: Thermistor temperature  
R<sub>T</sub>: Thermistor value at T

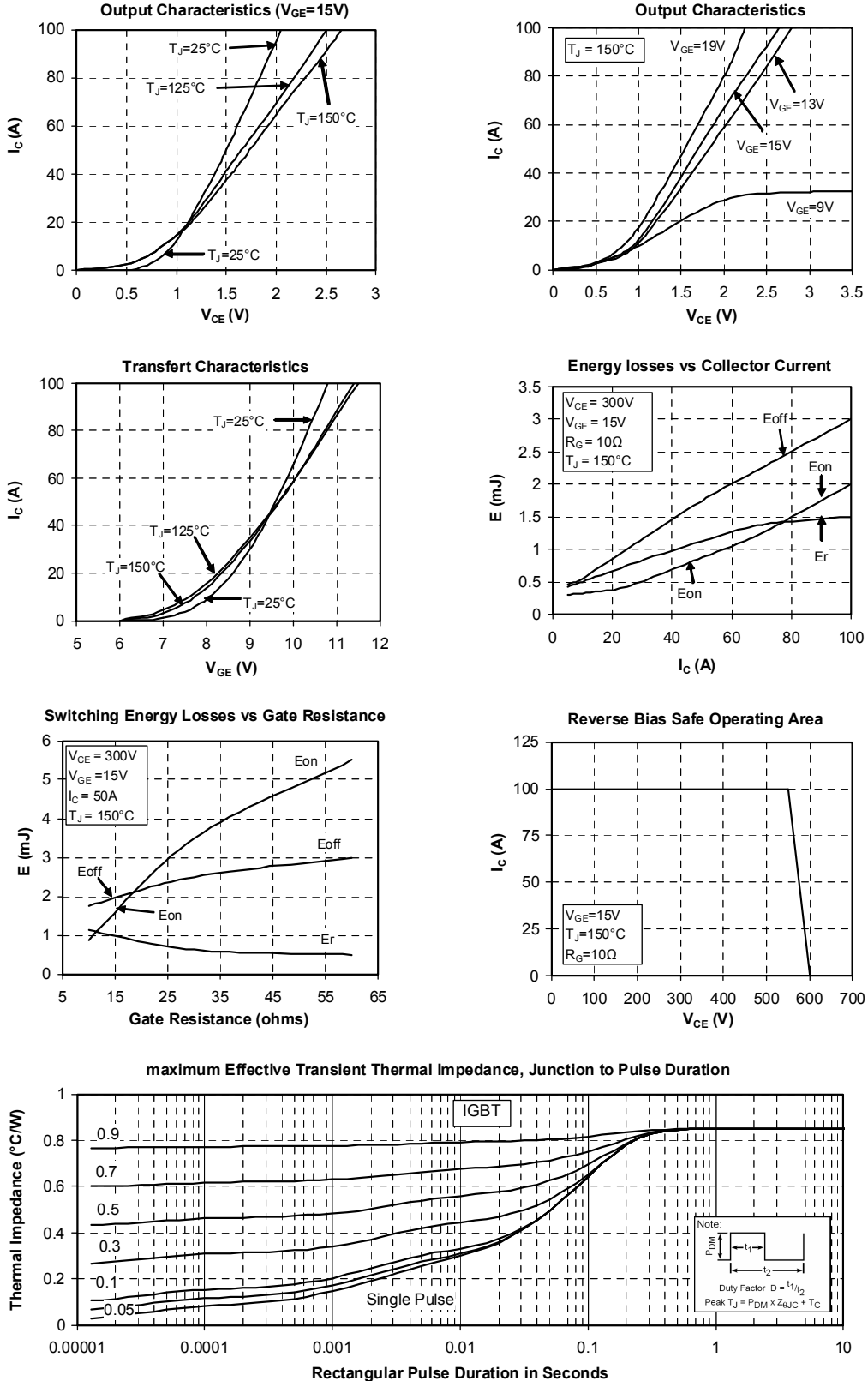
**Thermal and package characteristics**

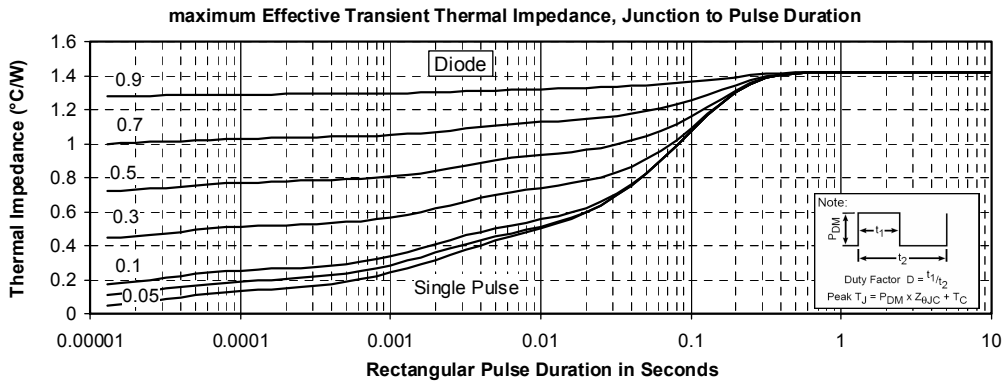
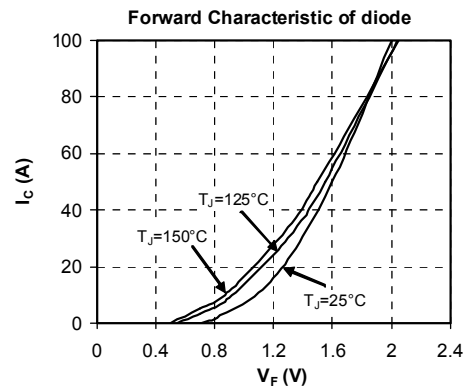
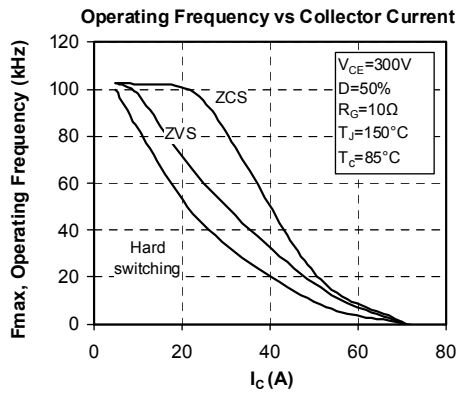
Symbol	Characteristic	Min	Typ	Max	Unit	
R <sub>thJC</sub>	Junction to Case	IGBT		0.85	°C/W	
		Diode		1.42		
V <sub>ISOL</sub>	RMS Isolation Voltage, any terminal to case t = 1 min, I <sub>isol</sub> < 1mA, 50/60Hz	2500			V	
T <sub>J</sub>	Operating junction temperature range	-40		175	°C	
T <sub>STG</sub>	Storage Temperature Range	-40		125		
T <sub>C</sub>	Operating Case Temperature	-40		100		
Torque	Mounting torque	To heatsink	M4	1.5	4.7	N.m
Wt	Package Weight			110		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.