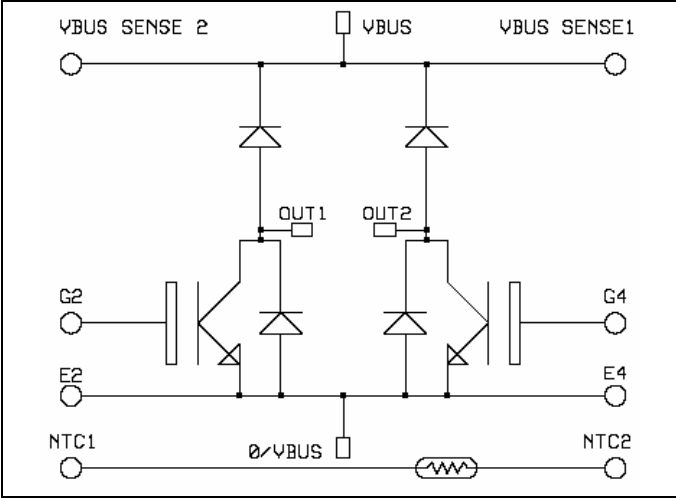


Dual Boost Chopper NPT IGBT Power Module

$V_{CES} = 1200V$
 $I_C = 75A @ T_c = 80^\circ C$



Application

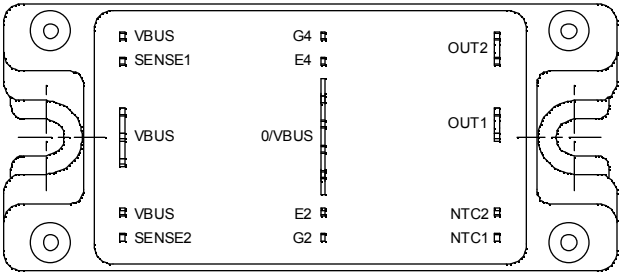
- AC and DC motor control
- Switched Mode Power Supplies
- Power factor correction

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
- Very low stray inductance
 - Symmetrical design
 - Lead frames for power connections
- Internal thermistor for temperature monitoring
- 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
- Solderable terminals both for power and signal for easy PCB mounting
- Easy paralleling due to positive TC of VCEsat
- Low profile



Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{CES}	Collector - Emitter Breakdown Voltage	1200	V
I_C	Continuous Collector Current	$T_c = 25^\circ C$	100
		$T_c = 80^\circ C$	75
I_{CM}	Pulsed Collector Current	$T_c = 25^\circ C$	150
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	500
RBSOA	Reverse Bias Safe Operating Area	$T_j = 150^\circ C$	150A @ 1200V

 **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	$V_{GE} = 0\text{V}$ $V_{CE} = 1200\text{V}$	$T_j = 25^\circ\text{C}$		0.1	2	mA
			$T_j = 125^\circ\text{C}$		4		
$V_{CE(on)}$	Collector Emitter on Voltage	$V_{GE} = 15\text{V}$ $I_C = 75\text{A}$	$T_j = 25^\circ\text{C}$		3.2	3.7	V
			$T_j = 125^\circ\text{C}$		3.9		
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 2.5\text{mA}$	4.5		6.5	V	
I_{GES}	Gate – Emitter Leakage Current	$V_{GE} = \pm 20\text{V}, V_{CE} = 0\text{V}$			± 500	nA	

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0\text{V}$ $V_{CE} = 25\text{V}$ $f = 1\text{MHz}$		5.1		nF
C_{oes}	Output Capacitance			0.7		
C_{res}	Reverse Transfer Capacitance			0.4		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = 15\text{V}$ $V_{Bus} = 600\text{V}$ $I_C = 75\text{A}$ $R_G = 7.5\Omega$		120		ns
T_r	Rise Time			50		
$T_{d(off)}$	Turn-off Delay Time			310		
T_f	Fall Time			20		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (125°C) $V_{GE} = 15\text{V}$ $V_{Bus} = 600\text{V}$ $I_C = 75\text{A}$ $R_G = 7.5\Omega$		130		ns
T_r	Rise Time			60		
$T_{d(off)}$	Turn-off Delay Time			360		
T_f	Fall Time			30		
E_{on}	Turn-on Switching Energy			9		mJ
E_{off}	Turn-off Switching Energy			4		

Chopper diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Maximum Peak Repetitive Reverse Voltage		1200			V
I_{RM}	Maximum Reverse Leakage Current	$V_R = 1200\text{V}$	$T_j = 25^\circ\text{C}$		250	μA
			$T_j = 125^\circ\text{C}$		500	
$I_{F(AV)}$	Maximum Average Forward Current	50% duty cycle $T_c = 70^\circ\text{C}$		100		A
V_F	Diode Forward Voltage	$I_F = 100\text{A}$		2.0	2.5	V
		$I_F = 200\text{A}$		2.3		
		$I_F = 100\text{A}$	$T_j = 125^\circ\text{C}$	1.8		
t_{rr}	Reverse Recovery Time	$I_F = 100\text{A}$ $V_R = 800\text{V}$ $di/dt = 200\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$	420		ns
			$T_j = 125^\circ\text{C}$	580		
Q_{rr}	Reverse Recovery Charge		$T_j = 25^\circ\text{C}$	1.2		μC
			$T_j = 125^\circ\text{C}$	5.3		

Temperature sensor NTC (see application note APT0406 on www.advancedpower.com for more information).

Symbol Characteristic **Min** **Typ** **Max** **Unit**

Symbol	Characteristic	Min	Typ	Max	Unit
R ₂₅	Resistance @ 25°C		50		kΩ
B _{25/85}	T ₂₅ = 298.15 K		3952		K

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

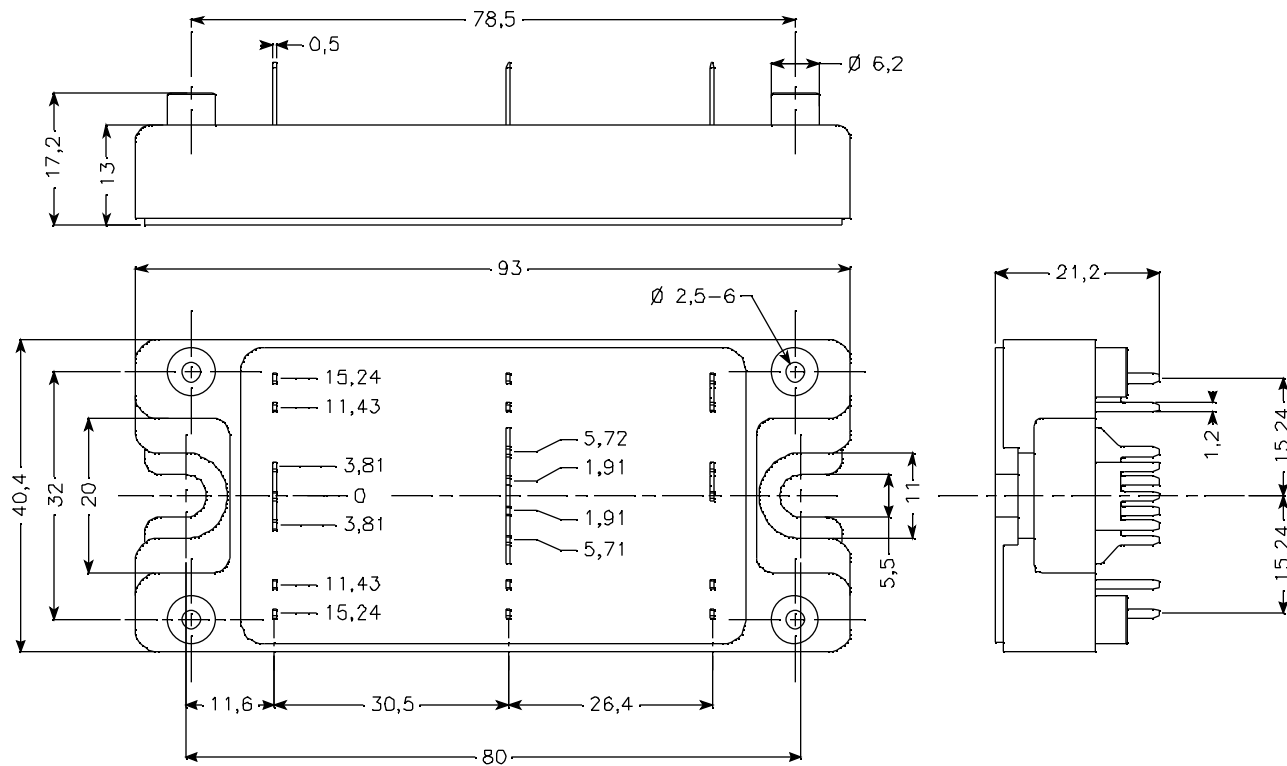
T: Thermistor temperature
R_T: Thermistor value at T

Thermal and package characteristics

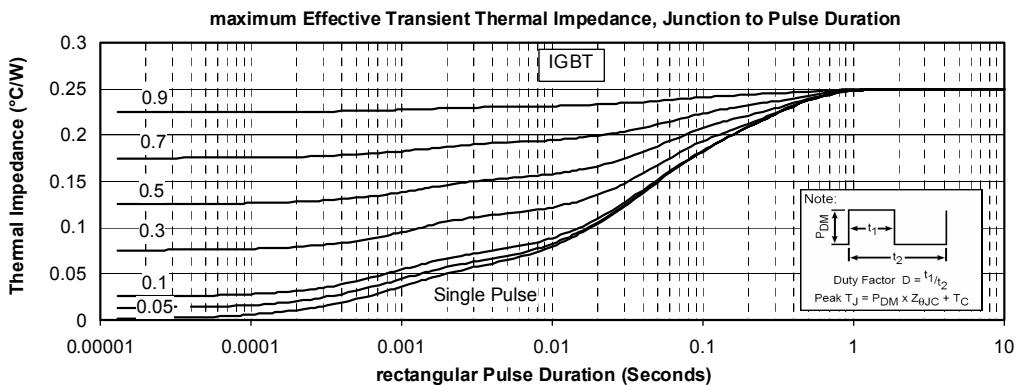
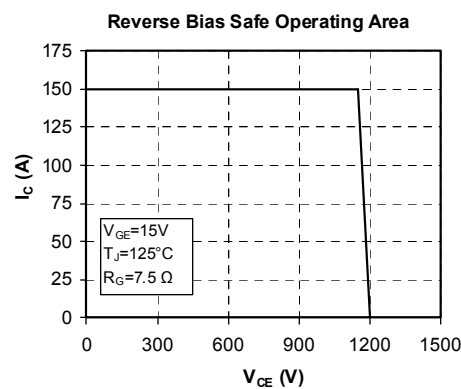
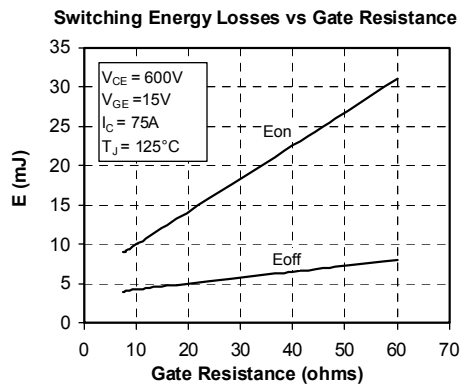
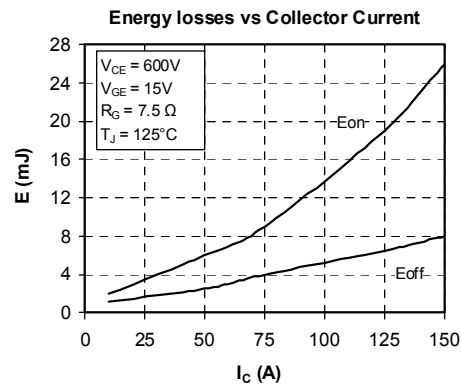
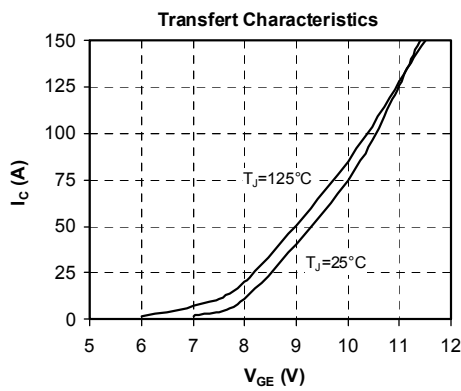
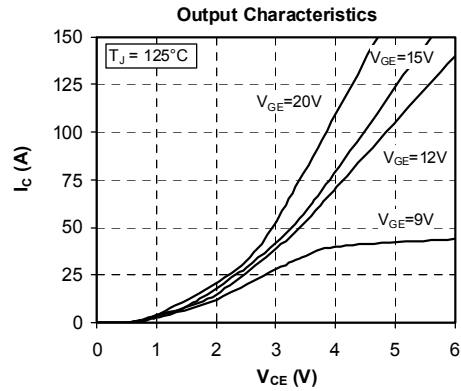
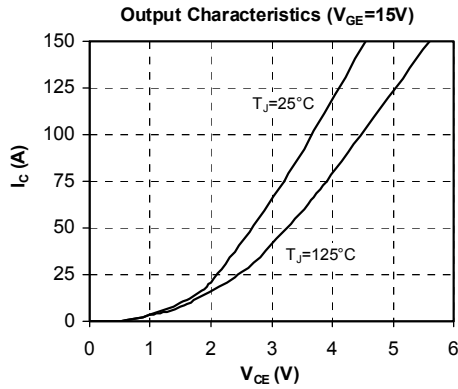
Symbol Characteristic **Min** **Typ** **Max** **Unit**

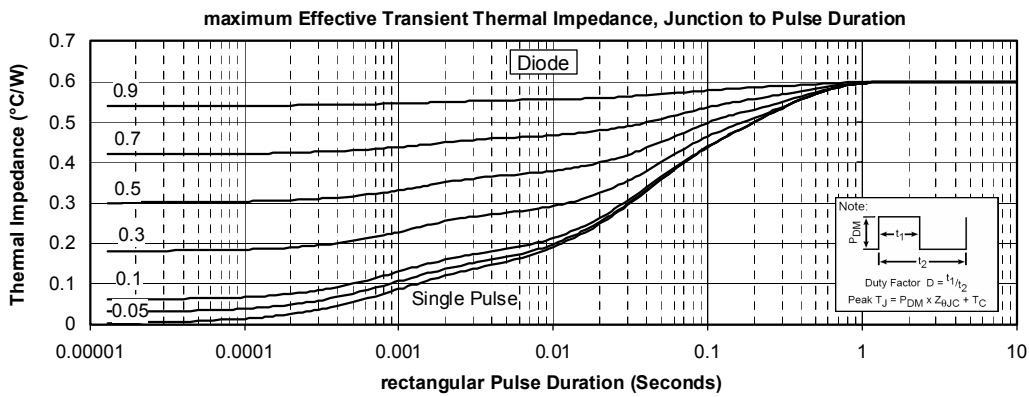
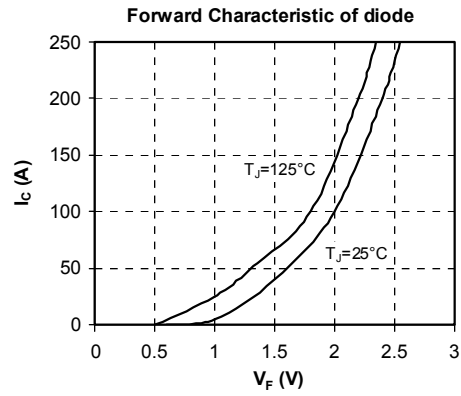
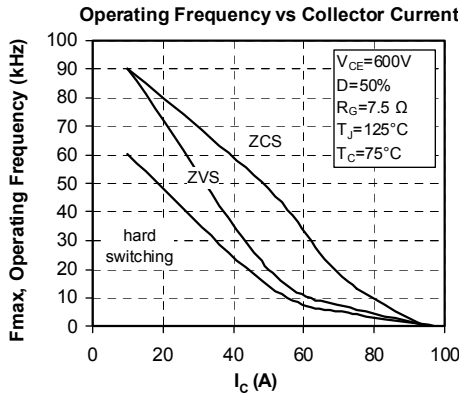
Symbol	Characteristic	Min	Typ	Max	Unit	
R _{thJC}	Junction to Case	IGBT		0.25	°C/W	
		Diode		0.6		
V _{ISOL}	RMS Isolation Voltage, any terminal to case t=1 min, I _{isol} <1mA, 50/60Hz	2500			V	
T _J	Operating junction temperature range	-40		150	°C	
T _{STG}	Storage Temperature Range	-40		125		
T _C	Operating Case Temperature	-40		100		
Torque	Mounting torque	To heatsink	M5	1.5	4.7	N.m
Wt	Package Weight			160		g

SP4 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.