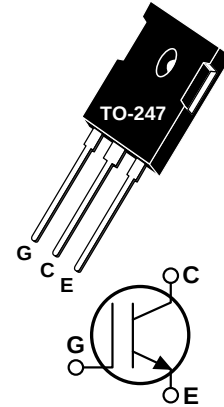


Fast IGBT

The Fast IGBT is a new generation of high voltage power IGBTs. Using Non-Punch Through Technology the Fast IGBT offers superior ruggedness, fast switching speed and low Collector-Emitter On voltage.

- Low Forward Voltage Drop
- Low Tail Current
- Avalanche Rated
- High Freq. Switching to 20KHz
- Ultra Low Leakage Current
- RBSOA and SCSOA Rated



MAXIMUM RATINGS

All Ratings: $T_C = 25^\circ\text{C}$ unless otherwise specified.

Symbol	Parameter	APT15GF170BR	UNIT
V_{CES}	Collector-Emitter Voltage	1700	Volts
V_{CGR}	Collector-Gate Voltage ($R_{GE} = 20\text{K}\Omega$)	1700	
V_{EC}	Emitter-Collector Voltage	15	
V_{GE}	Gate-Emitter Voltage	± 20	
I_{C1}	Continuous Collector Current @ $T_C = 25^\circ\text{C}$	25	Amps
I_{C2}	Continuous Collector Current @ $T_C = 90^\circ\text{C}$	15	
I_{CM1}	Pulsed Collector Current ^① @ $T_C = 25^\circ\text{C}$	50	
I_{CM2}	Pulsed Collector Current ^① @ $T_C = 90^\circ\text{C}$	32	
E_{AS}	Single Pulse Avalanche Energy ^②	23	mJ
P_D	Total Power Dissipation	310	Watts
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to 150	$^\circ\text{C}$
T_L	Max. Lead Temp. for Soldering: 0.063" from Case for 10 Sec.	300	

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
BV_{CES}	Collector-Emitter Breakdown Voltage ($V_{GE} = 0\text{V}, I_C = 0.25\text{mA}$)	1700			Volts
RBV_{CES}	Collector-Emitter Reverse Breakdown Voltage ($V_{GE} = 0\text{V}, I_C = 50\text{mA}$)	-15			
$V_{GE(TH)}$	Gate Threshold Voltage ($V_{CE} = V_{GE}, I_C = 350\mu\text{A}, T_J = 25^\circ\text{C}$)	4.5	5.5	6.5	
$V_{CE(ON)}$	Collector-Emitter On Voltage ($V_{GE} = 15\text{V}, I_C = 15\text{A}, T_J = 25^\circ\text{C}$)		3.5	4.2	
	Collector-Emitter On Voltage ($V_{GE} = 15\text{V}, I_C = 15\text{A}, T_J = 125^\circ\text{C}$)		TBD		
I_{CES}	Collector Cut-off Current ($V_{CE} = V_{CES}, V_{GE} = 0\text{V}, T_J = 25^\circ\text{C}$)			250	μA
	Collector Cut-off Current ($V_{CE} = V_{CES}, V_{GE} = 0\text{V}, T_J = 125^\circ\text{C}$)			1000	
I_{GES}	Gate-Emitter Leakage Current ($V_{GE} = \pm 25\text{V}, V_{CE} = 0\text{V}$)			± 100	nA

 **CAUTION:** These Devices are Sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed.

USA

405 S.W. Columbia Street

EUROPE

Avenue J.F. Kennedy Bât B4 Parc Cadéra Nord

Bend, Oregon 97702-1035

F-33700 Merignac - France

Phone: (541) 382-8028

Phone: (33) 5 57 92 15 15

FAX: (541) 388-0364

FAX: (33) 5 56 47 97 61

DYNAMIC CHARACTERISTICS

APT15GF170BR

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{ies}	Input Capacitance	Capacitance $V_{GE} = 0V$ $V_{CE} = 25V$ $f = 1\text{ MHz}$		2000		pF
C_{oes}	Output Capacitance			160		
C_{res}	Reverse Transfer Capacitance			65		
Q_g	Total Gate Charge ^③	Gate Charge $V_{GE} = 15V$ $V_{CC} = 0.66V_{CES}$ $I_C = 0.8I_{C2}$		TBD		nC
Q_{ge}	Gate-Emitter Charge			TBD		
Q_{gc}	Gate-Collector ("Miller") Charge			TBD		
$t_{d(on)}$	Turn-on Delay Time	Resistive Switching (25°C) $V_{GE} = 15V$ $V_{CC} = 0.66V_{CES}$ $I_C = 0.8I_{C2}$ $R_G = 5\Omega$		TBD		ns
t_r	Rise Time			TBD		
$t_{d(off)}$	Turn-off Delay Time			TBD		
t_f	Fall Time			TBD		
$t_{d(on)}$	Turn-on Delay Time	Inductive Switching (150°C) $V_{CLAMP(Peak)} = 0.66V_{CES}$ $V_{GE} = 15V$ $I_C = 0.8I_{C2}$ $R_G = 5\Omega$ $T_J = +150^\circ C$		TBD		ns
t_r	Rise Time			TBD		
$t_{d(off)}$	Turn-off Delay Time			120		
t_f	Fall Time			35		
E_{on}	Turn-on Switching Energy	$R_G = 5\Omega$ $T_J = +150^\circ C$		TBD		mJ
E_{off}	Turn-off Switching Energy			TBD		
E_{ts}	Total Switching Losses			TBD		
$t_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{CLAMP(Peak)} = 0.66V_{CES}$ $V_{GE} = 15V$ $I_C = 0.8I_{C2}$ $R_G = 5\Omega$ $T_J = +25^\circ C$		TBD		ns
t_r	Rise Time			TBD		
$t_{d(off)}$	Turn-off Delay Time			TBD		
t_f	Fall Time			TBD		
E_{ts}	Total Switching Losses			TBD		mJ
gfe	Forward Transconductance	$V_{CE} = 20V, I_C = 15A$		TBD		S

THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.40	°C/W
$R_{\theta JA}$	Junction to Ambient			40	
Torque	Mounting Torque using a 6-32 or 3mm Binding Head Machine Screw		10		lb•in

① Repetitive Rating: Pulse width limited by maximum junction temperature.

② $I_C = 15A, V_{CC} = 50V, R_{GE} = 25\Omega, L = 200\mu H, T_J = 25^\circ C$

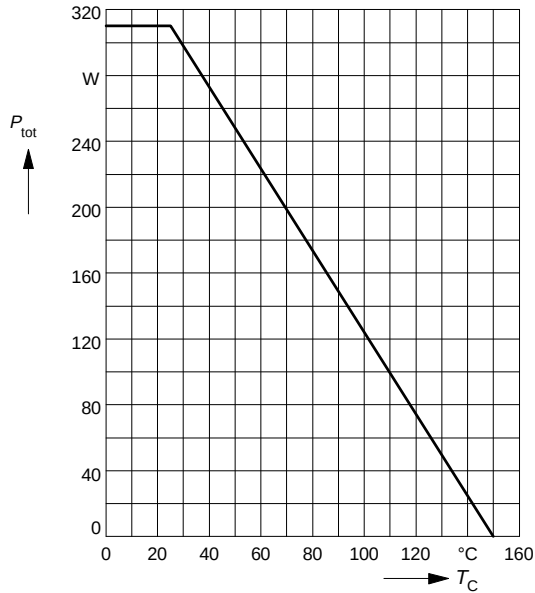
③ See MIL-STD-750 Method 3471

APT Reserves the right to change, without notice, the specifications and information contained herein.

Power dissipation

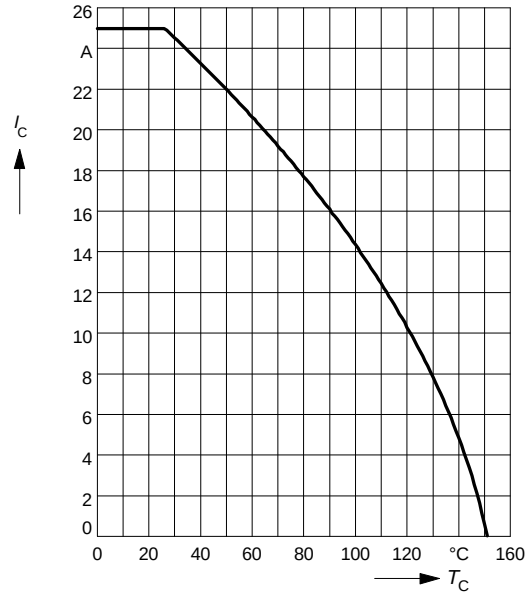
$$P_{\text{tot}} = f(T_C)$$

parameter: $T_j \leq 150^\circ\text{C}$


Collector current

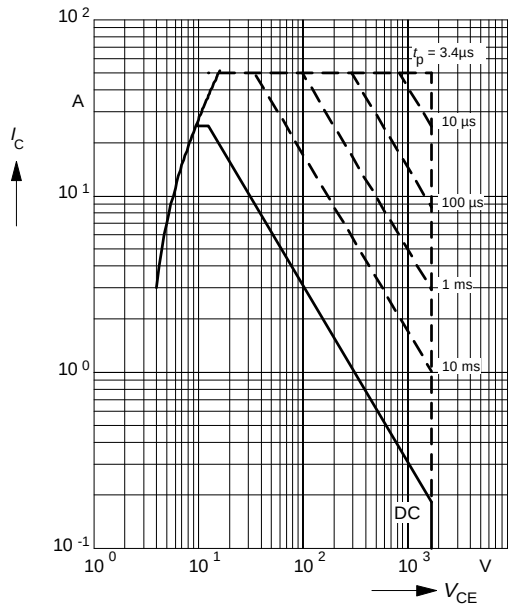
$$I_C = f(T_C)$$

parameter: $V_{GE} \geq 15\text{ V}$, $T_j \leq 150^\circ\text{C}$


Safe operating area

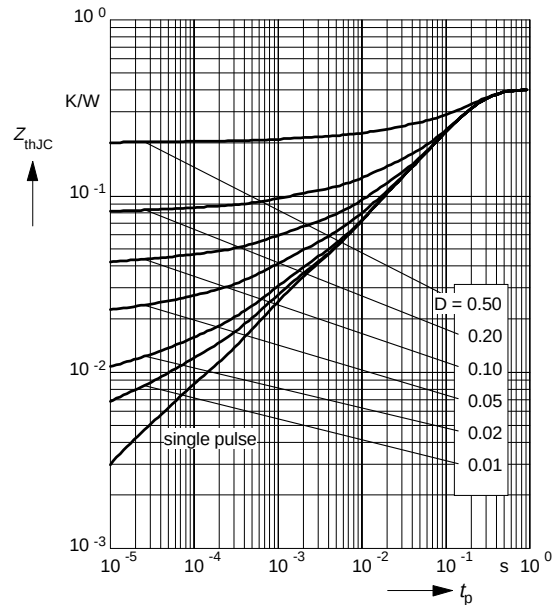
$$I_C = f(V_{CE})$$

parameter: $D = 0$, $T_C = 25^\circ\text{C}$, $T_j \leq 150^\circ\text{C}$


Transient thermal impedance IGBT

$$Z_{thJC} = f(t_p)$$

parameter: $D = t_p / T$


EUROPE

Avenue J.F. Kennedy Bât B4 Parc Cadéra Nord
USA
405 S.W. Columbia Street

F-33700 Merignac - France

Bend, Oregon 97702-1035

Phone: (33) 5 57 92 15 15

Phone: (541) 382-8028

FAX: (33) 5 56 47 97 61

FAX: (541) 388-0364