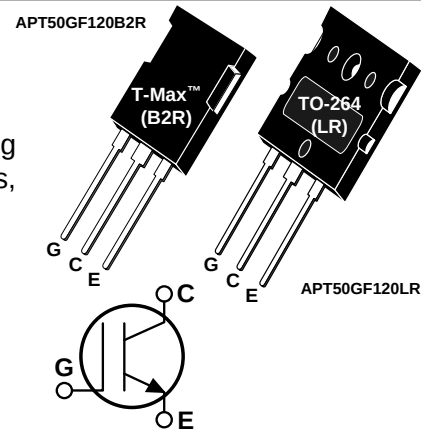


Fast IGBT

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	APT50GF120B2R/LR	UNIT
V_{CES}	Collector-Emitter Voltage	1200	Volts
V_{CGR}	Collector-Gate Voltage ($R_{GE} = 20K\Omega$)	1200	
V_{EC}	Emitter-Collector Voltage	15	
V_{GE}	Gate-Emitter Voltage	± 20	
I_{C1}	Continuous Collector Current @ $T_C = 25^\circ\text{C}$	80	Amps
I_{C2}	Continuous Collector Current @ $T_C = 90^\circ\text{C}$	50	
I_{CM1}	Pulsed Collector Current ^① @ $T_C = 25^\circ\text{C}$	160	
I_{CM2}	Pulsed Collector Current ^① @ $T_C = 90^\circ\text{C}$	100	
E_{AS}	Single Pulse Avalanche Energy ^②	85	mJ
P_D	Total Power Dissipation	390	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 ($V_{GE} = 0V, I_C = 0.5mA$)	1200			Volts
RBV_{CES}	Collector-Emitter Reverse Breakdown Voltage ($V_{GE} = 0V, I_C = 50mA$)	-15			
$V_{GE(TH)}$	Gate Threshold Voltage ($V_{CE} = V_{GE}, I_C = 700\mu A, T_J = 25^\circ\text{C}$)	4.5	5.5	6.5	
$V_{CE(ON)}$	Collector-Emitter On Voltage ($V_{GE} = 15V, I_C = 50A, T_J = 25^\circ\text{C}$)		2.9	3.4	
	Collector-Emitter On Voltage ($V_{GE} = 15V, I_C = 50A, T_J = 125^\circ\text{C}$)		3.5	4.1	
I_{CES}	Collector Cut-off Current ($V_{CE} = V_{CES}, V_{GE} = 0V, T_J = 25^\circ\text{C}$)			0.5	mA
	Collector Cut-off Current ($V_{CE} = V_{CES}, V_{GE} = 0V, T_J = 125^\circ\text{C}$)			TBD	
I_{GES}	Gate-Emitter Leakage Current ($V_{GE} = \pm 20V, V_{CE} = 0V$)			± 100	nA



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

APT Website - <http://www.advancedpower.com>

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DYNAMIC CHARACTERISTICS

APT50GF120B2R/LR

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{ies}	Input Capacitance	Capacitance $V_{GE} = 0V$ $V_{CE} = 25V$ $f = 1\text{ MHz}$		3450	4850	pF
C_{oes}	Output Capacitance			330	500	
C_{res}	Reverse Transfer Capacitance			230	350	
Q_g	Total Gate Charge ^③	Gate Charge $V_{GE} = 15V$ $V_{CC} = 0.50V_{CES}$ $I_C = I_{C2}$		330	450	nC
Q_{ge}	Gate-Emitter Charge			30	50	
Q_{gc}	Gate-Collector ("Miller") Charge			205	290	
$t_{d(on)}$	Turn-on Delay Time	Resistive Switching (25°C) $V_{GE} = 15V$ $V_{CC} = 0.80V_{CES}$ $I_C = I_{C2}$ $R_G = 10\Omega$		55		ns
t_r	Rise Time			245		
$t_{d(off)}$	Turn-off Delay Time			155		
t_f	Fall Time			275		
$t_{d(on)}$	Turn-on Delay Time	Inductive Switching (150°C) $V_{CLAMP(Peak)} = 0.66V_{CES}$ $V_{GE} = 15V$ $I_C = I_{C2}$ $R_G = 10\Omega$ $T_J = +150^\circ C$		45	75	ns
t_r	Rise Time			100	150	
$t_{d(off)}$	Turn-off Delay Time			540	810	
t_f	Fall Time			40	80	
E_{on}	Turn-on Switching Energy			7.0		mJ
E_{off}	Turn-off Switching Energy			7.0		
E_{ts}	Total Switching Losses			14.0		
$t_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{CLAMP(Peak)} = 0.66V_{CES}$ $V_{GE} = 15V$ $I_C = I_{C2}$ $R_G = 10\Omega$ $T_J = +25^\circ C$		50		ns
t_r	Rise Time			115		
$t_{d(off)}$	Turn-off Delay Time			480		
t_f	Fall Time			40		
E_{ts}	Total Switching Losses			12.0		mJ
g_{fe}	Forward Transconductance	$V_{CE} = 20V, I_C = I_{C2}$	8			S

THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.32	°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 $I_C = I_{C2}, V_{CC} = 50V, R_{GE} = 25\Omega, L = 68\mu H, T_J = 25^\circ C$

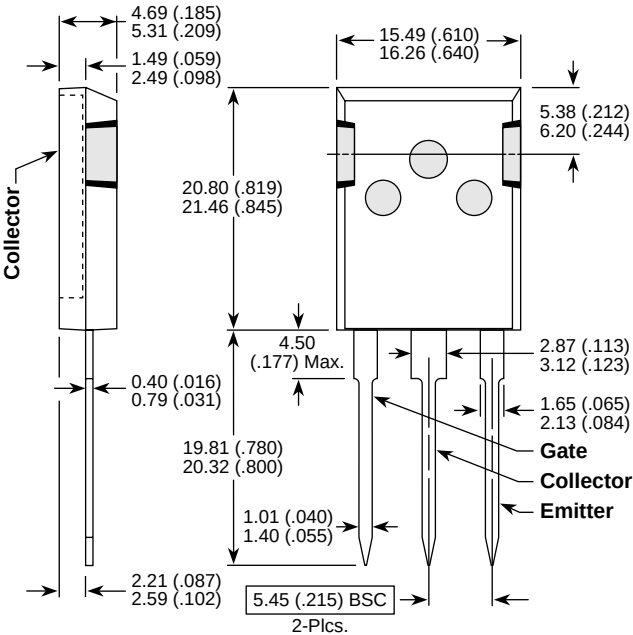
③ See MIL-STD-750 Method 3471

④ The maximum current is limited by lead temperature.

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

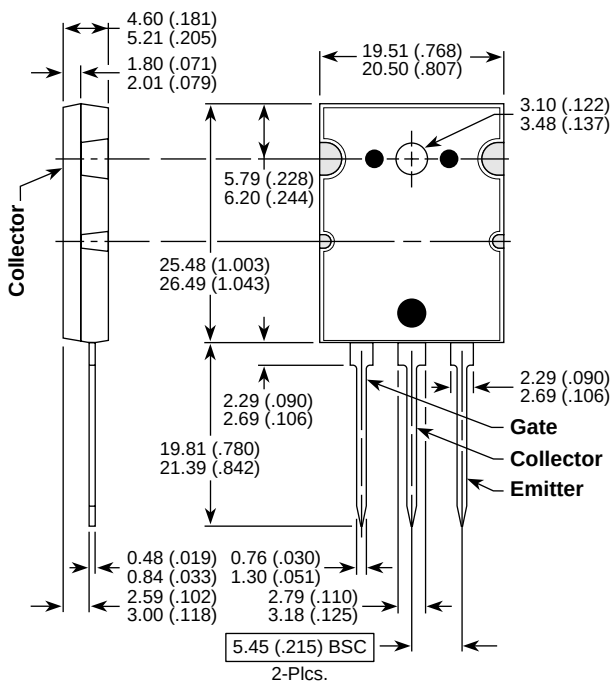
PRELIMINARY

T-MAX™ Package Outline



Dimensions in Millimeters and (Inches)

TO-264 Package Outline



Dimensions in Millimeters and (Inches)