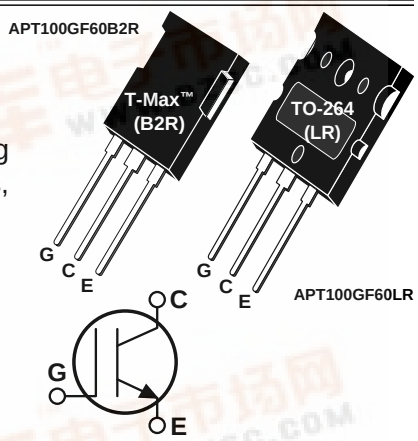
ADVANCED POWER TECHNOLOGY®

APT100GF60B2R
APT100GF60LR
600V 100A

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°C unless otherwise specified.

Symbol	Parameter	APT100GF60B2R/LR	UNIT
V_{CES}	Collector-Emitter Voltage	600	Volts
V_{CGR}	Collector-Gate Voltage (R_{GE} = 20KΩ)	600	
V_{EC}	Emitter-Collector Voltage	15	
V_{GE}	Gate-Emitter Voltage	±20	
I_{C1}	Continuous Collector Current ⑤ @ T_C = 25°C	100	Amps
I_{C2}	Continuous Collector Current @ T_C = 90°C	100	
I_{CM1}	Pulsed Collector Current ① @ T_C = 25°C	280	
I_{CM2}	Pulsed Collector Current ① @ T_C = 90°C	200	
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	°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 = 1.0mA)	600			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 = 700µA, T_j = 25°C)	4.5	5.5	6.5	
$V_{CE}(ON)$	Collector-Emitter On Voltage (V_{GE} = 15V, I_C = 50A, T_j = 25°C)		2.2	2.7	
	Collector-Emitter On Voltage (V_{GE} = 15V, I_C = 50A, T_j = 125°C)		2.8	3.4	
I_{CES}	Collector Cut-off Current (V_{CE} = V_{CES}, V_{GE} = 0V, T_j = 25°C)			1.0	mA
	Collector Cut-off Current (V_{CE} = V_{CES}, V_{GE} = 0V, T_j = 125°C)			TBD	
I_{GES}	Gate-Emitter Leakage Current (V_{GE} = ±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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052-6217 Rev A

DYNAMIC CHARACTERISTICS (IGBT)

APT100GF60B2R/LR

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{ies}	Input Capacitance	**Capacitance** V_{GE} = 0V, V_{CE} = 25V, f = 1 MHz		4400	6000	pF
C_{oes}	Output Capacitance			480	675	
C_{res}	Reverse Transfer Capacitance			300	450	
Q_g	Total Gate Charge ③	**Gate Charge** V_{GE} = 15V, V_{CC} = 0.5V_{CES}, I_C = I_{C2}		126		nC
Q_{ge}	Gate-Emitter Charge			20		
Q_{gc}	Gate-Collector ("Miller") Charge			75		
$t_d(on)$	Turn-on Delay Time	**Resistive Switching (25°C)** V_{GE} = 15V, V_{CC} = 0.80V_{CES}, I_C = I_{C2}, R_G = 10Ω		50		ns
t_r	Rise Time			200		
$t_d(off)$	Turn-off Delay Time			190		
t_f	Fall Time			270		
$t_d(on)$	Turn-on Delay Time	**Inductive Switching (150°C)** V_{CLAMP}(Peak) = 0.66V_{CES}, V_{GE} = 15V, I_C = I_{C2}, R_G = 10Ω, T_J = +150°C		50		ns
t_r	Rise Time			170		
$t_d(off)$	Turn-off Delay Time			400		
t_f	Fall Time			95		
E_{on}	Turn-on Switching Energy			6.3		mJ
E_{off}	Turn-off Switching Energy			5.2		
E_{ts}	Total Switching Losses			11.5		
$t_d(on)$	Turn-on Delay Time	**Inductive Switching (25°C)** V_{CLAMP}(Peak) = 0.66V_{CES}, V_{GE} = 15V, I_C = I_{C2}, R_G = 10Ω, T_J = +25°C		5.5		ns
t_r	Rise Time			180		
$t_d(off)$	Turn-off Delay Time			360		
t_f	Fall Time			90		
E_{ts}	Total Switching Losses ④			10.5		mJ
gfe	Forward Transconductance	V_{CE} = 20V, I_C = I_{C2}	6			S

THERMAL AND MECHANICAL CHARACTERISTICS (IGBT and FRED)

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\Theta JC}$	Junction to Case (IGBT)			0.42	°C/W
	Junction to Case (FRED)			0.90	
$R_{\Theta JA}$	Junction to Ambient			40	
W_T	Package Weight		0.22		oz
			6.1		gm
Torque	Mounting Torque using a 6-32 or 3mm Binding Head Machine Screw			10	lb•in
				1.1	N•m

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

② I_C = I_{C2}, V_{CC} = 50V, R_{GE} = 25Ω, L = 17μH, T_j = 25°C

③ See MIL-STD-750 Method 3471

④ The maximum current is limited by lead temperature.

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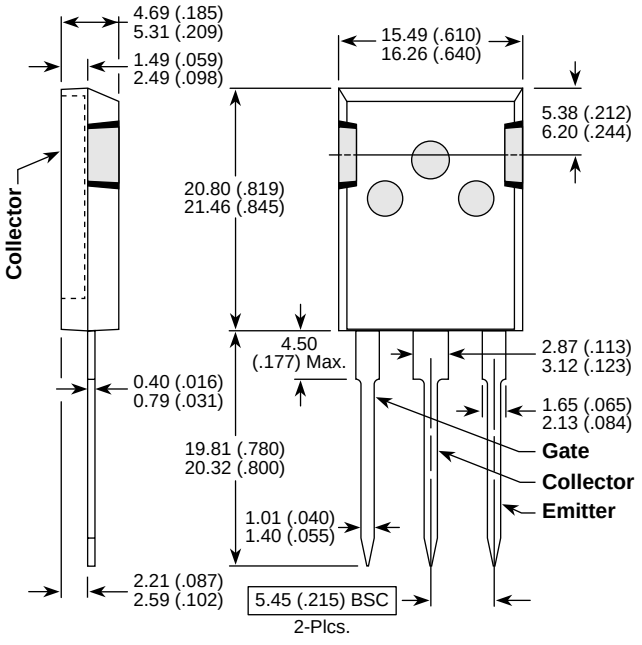
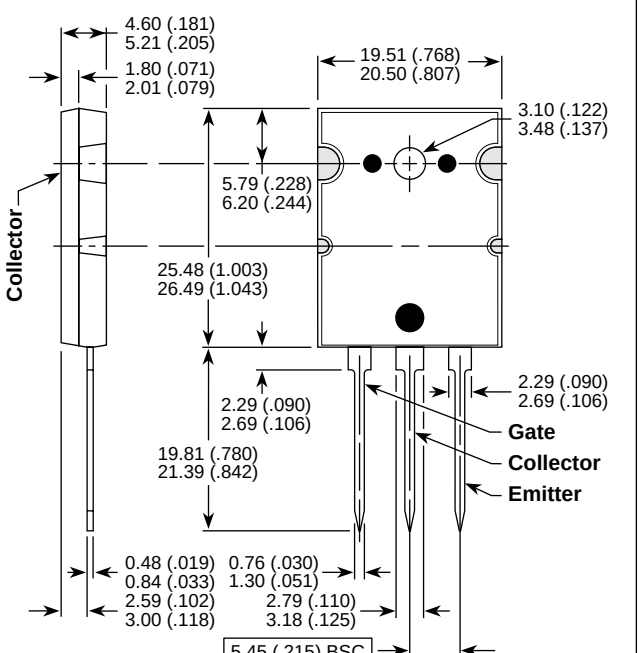
T-MAX™ Package Outline



Dimensions in Millimeters and (Inches)

TO-264 Package Outline



Dimensions in Millimeters and (Inches)