

DYNAMIC CHARACTERISTICS

APT35GP120B(G)

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{ies}	Input Capacitance	Capacitance $V_{GE} = 0V, V_{CE} = 25V$ $f = 1 \text{ MHz}$		3240		pF
C_{oes}	Output Capacitance			248		
C_{res}	Reverse Transfer Capacitance			31		
V_{GEP}	Gate-to-Emitter Plateau Voltage	Gate Charge $V_{GE} = 15V$ $V_{CE} = 600V$ $I_C = 35A$		7.5		V
Q_g	Total Gate Charge ^③			150		nC
Q_{ge}	Gate-Emitter Charge			21		
Q_{gc}	Gate-Collector ("Miller") Charge			62		
RBSOA	Reverse Bias Safe Operating Area	$T_J = 150^\circ C, R_G = 5\Omega, V_{GE} = 15V, L = 100\mu H, V_{CE} = 960V$	140			A
$t_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{CC} = 600V$ $V_{GE} = 15V$ $I_C = 35A$ $R_G = 5\Omega$ $T_J = +25^\circ C$		16		ns
t_r	Current Rise Time			20		
$t_{d(off)}$	Turn-off Delay Time			94		
t_f	Current Fall Time			40		
E_{on1}	Turn-on Switching Energy ^④			750		μJ
E_{on2}	Turn-on Switching Energy (Diode) ^⑤			1305		
E_{off}	Turn-off Switching Energy ^⑥			680		
$t_{d(on)}$	Turn-on Delay Time	Inductive Switching (125°C) $V_{CC} = 600V$ $V_{GE} = 15V$ $I_C = 35A$ $R_G = 5\Omega$ $T_J = +125^\circ C$		16		ns
t_r	Current Rise Time			20		
$t_{d(off)}$	Turn-off Delay Time			147		
t_f	Current Fall Time			75		
E_{on1}	Turn-on Switching Energy ^④			750		μJ
E_{on2}	Turn-on Switching Energy (Diode) ^⑤			2132		
E_{off}	Turn-off Switching Energy ^⑥			1744		

THERMAL AND MECHANICAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case (IGBT)			.23	$^\circ C/W$
$R_{\theta JC}$	Junction to Case (DIODE)			N/A	
W_T	Package Weight			5.90	gm

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

② For Combi devices, I_{ces} includes both IGBT and FRED leakages

③ See MIL-STD-750 Method 3471.

④ E_{on1} is the clamped inductive turn-on-energy of the IGBT only, without the effect of a commutating diode reverse recovery current adding to the IGBT turn-on loss. (See Figure 24.)

⑤ E_{on2} is the clamped inductive turn-on energy that includes a commutating diode reverse recovery current in the IGBT turn-on switching loss. (See Figures 21, 22.)

⑥ E_{off} is the clamped inductive turn-off energy measured in accordance with JEDEC standard JESD24-1. (See Figures 21, 23.)

Microsemi reserves the right to change, without notice, the specifications and information contained herein.

TYPICAL PERFORMANCE CURVES

APT35GP120B(G)

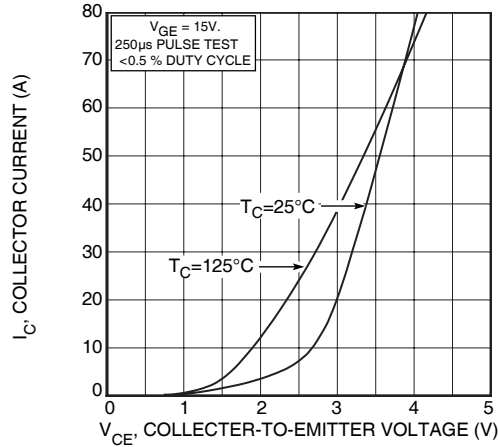


FIGURE 1, Output Characteristics ($V_{GE} = 15V$)

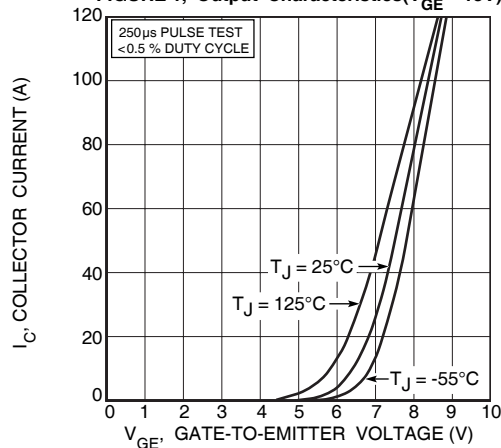


FIGURE 3, Transfer Characteristics

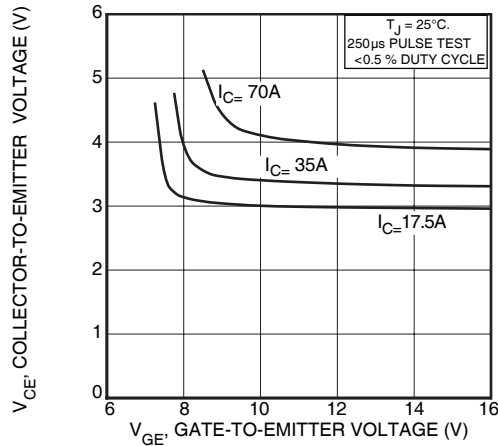


FIGURE 5, On State Voltage vs Gate-to-Emitter Voltage

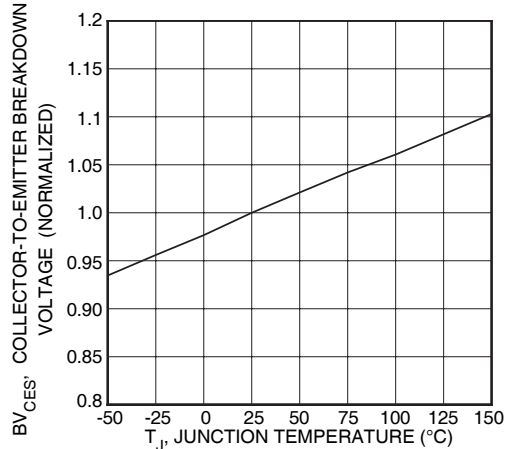


FIGURE 7, Breakdown Voltage vs. Junction Temperature

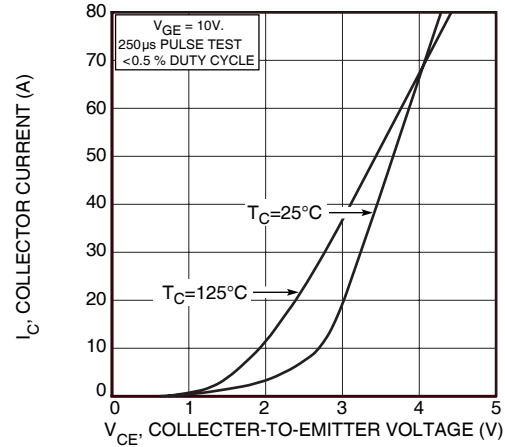


FIGURE 2, Output Characteristics ($V_{GE} = 10V$)

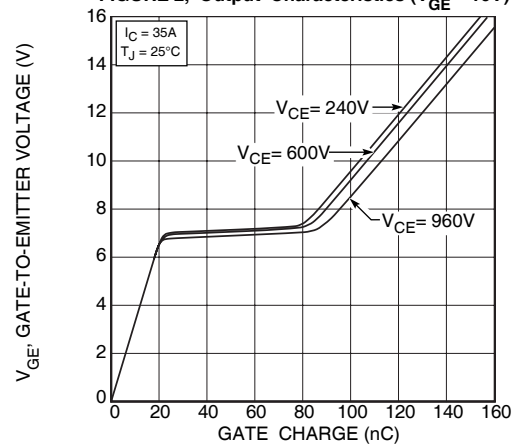


FIGURE 4, Gate Charge

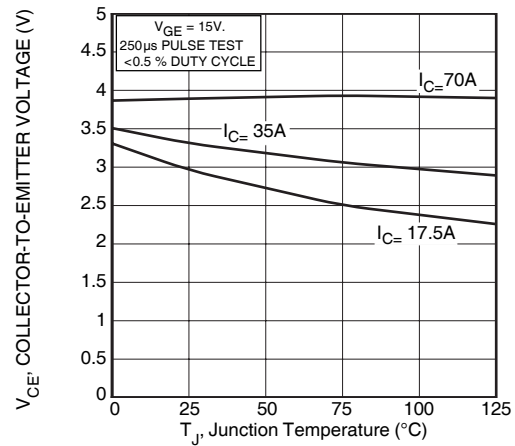


FIGURE 6, On State Voltage vs Junction Temperature

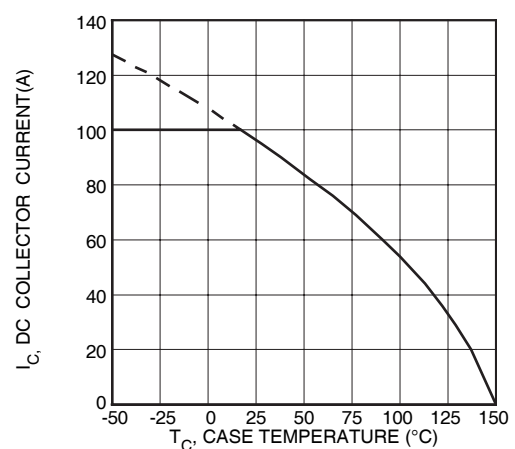


FIGURE 8, DC Collector Current vs Case Temperature

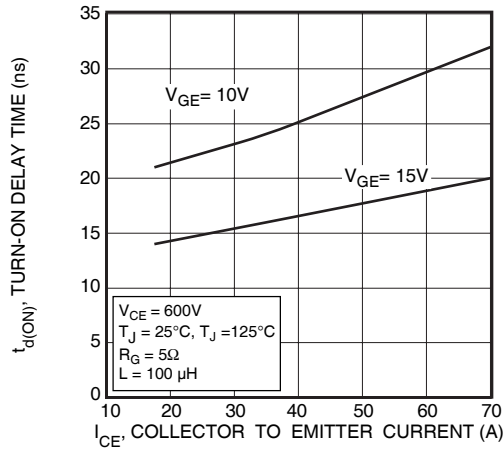


FIGURE 9, Turn-On Delay Time vs Collector Current

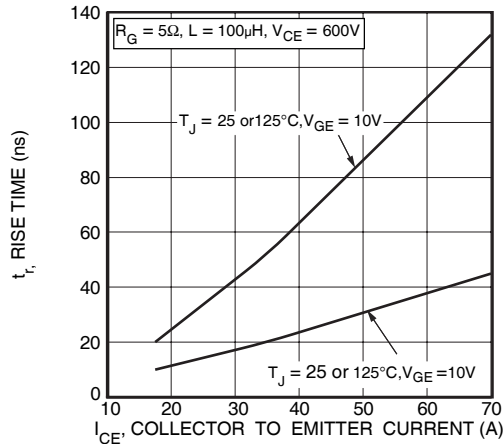


FIGURE 11, Current Rise Time vs Collector Current

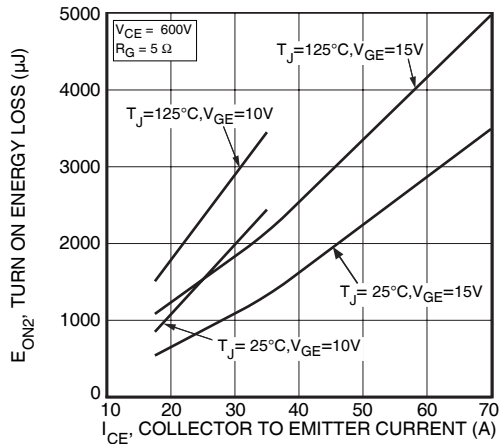


FIGURE 13, Turn-On Energy Loss vs Collector Current

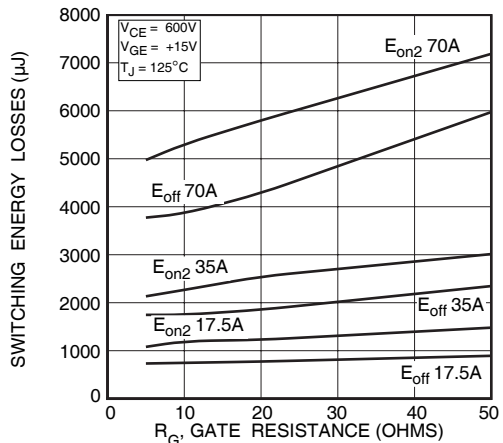


FIGURE 15, Switching Energy Losses vs. Gate Resistance

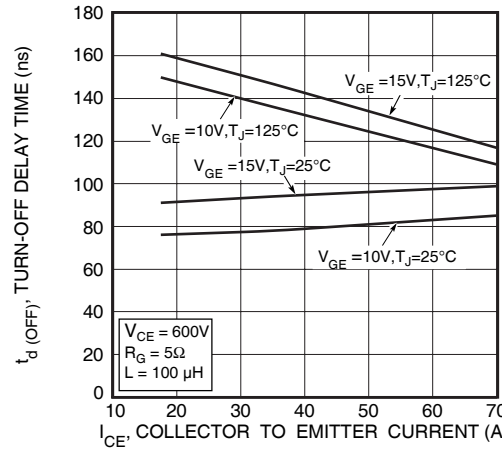


FIGURE 10, Turn-Off Delay Time vs Collector Current

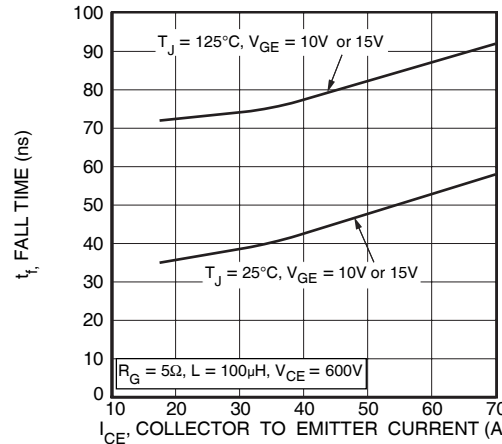


FIGURE 12, Current Fall Time vs Collector Current

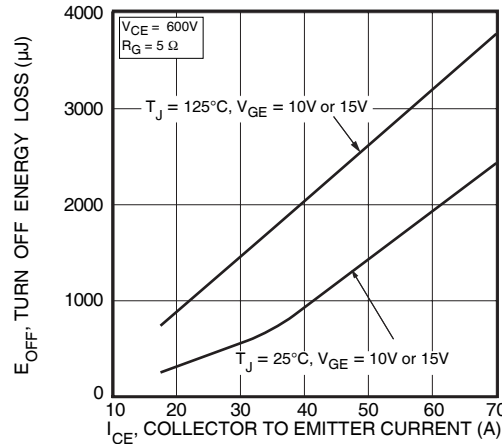


FIGURE 14, Turn Off Energy Loss vs Collector Current

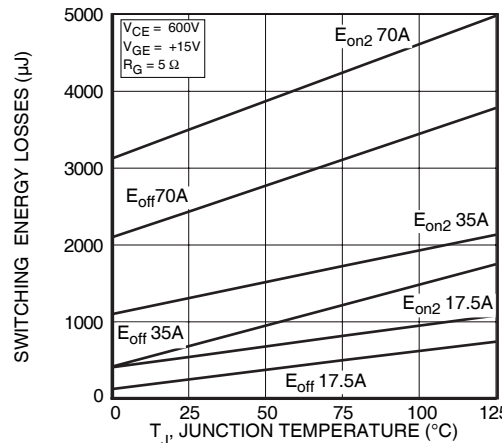


FIGURE 16, Switching Energy Losses vs Junction Temperature

TYPICAL PERFORMANCE CURVES

APT35GP120B(G)

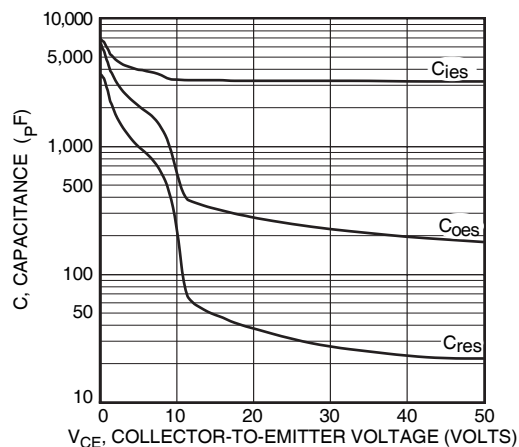


Figure 17, Capacitance vs Collector-To-Emitter Voltage

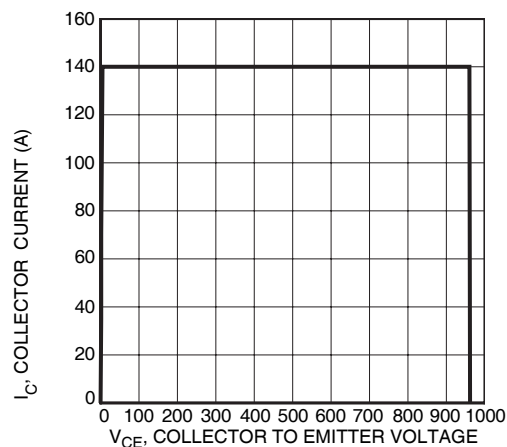


Figure 18, Reverse Bias Safe Operating Area

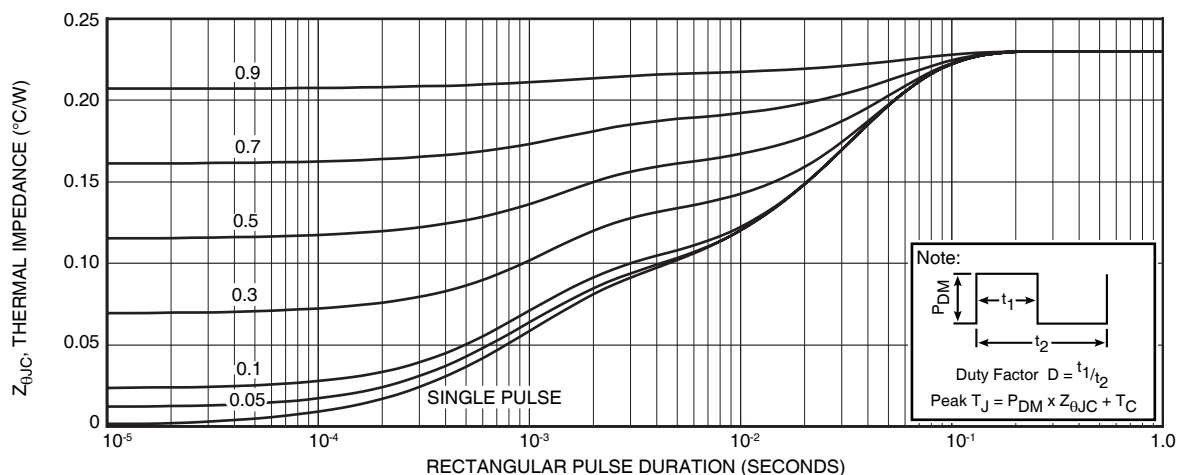


Figure 19, Maximum Effective Transient Thermal Impedance, Junction-To-Case vs Pulse Duration

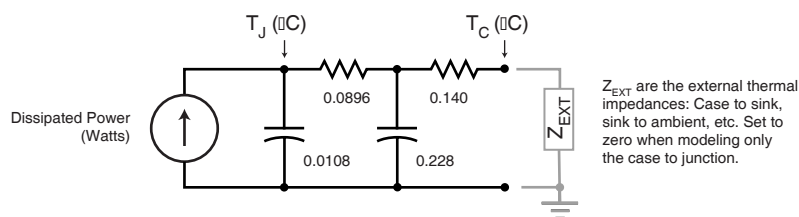


FIGURE 19B, TRANSIENT THERMAL IMPEDANCE MODEL

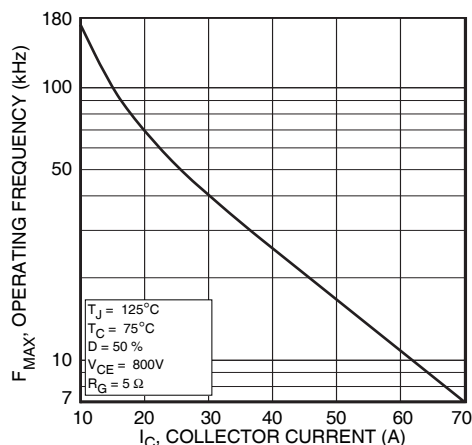


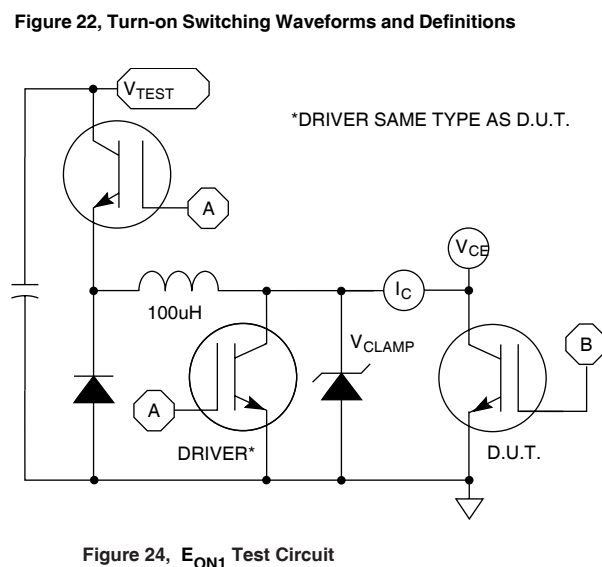
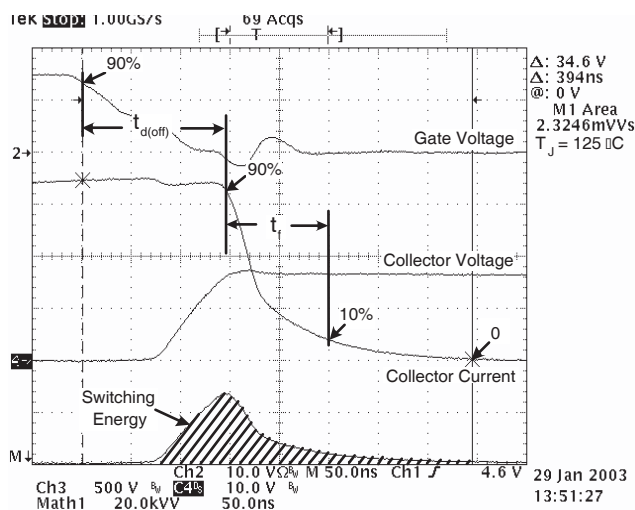
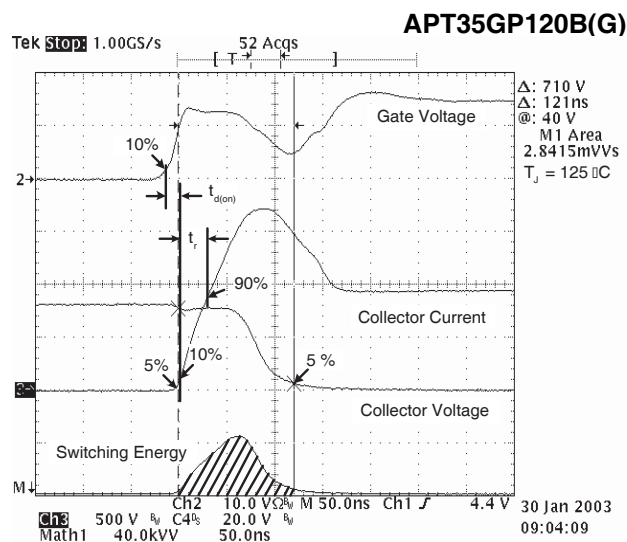
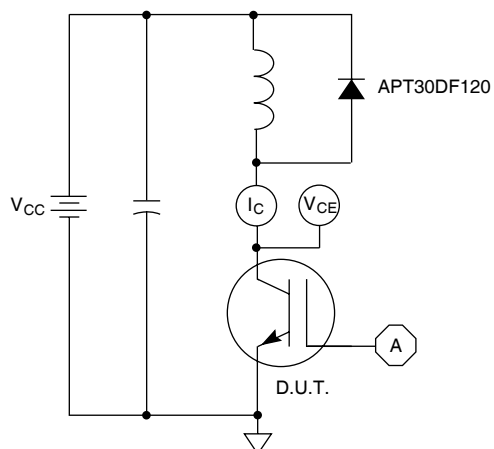
Figure 20, Operating Frequency vs Collector Current

$$F_{\max} = \min(f_{\max 1}, f_{\max 2})$$

$$f_{\max 1} = \frac{0.05}{t_{d(\text{on})} + t_r + t_{d(\text{off})} + t_f}$$

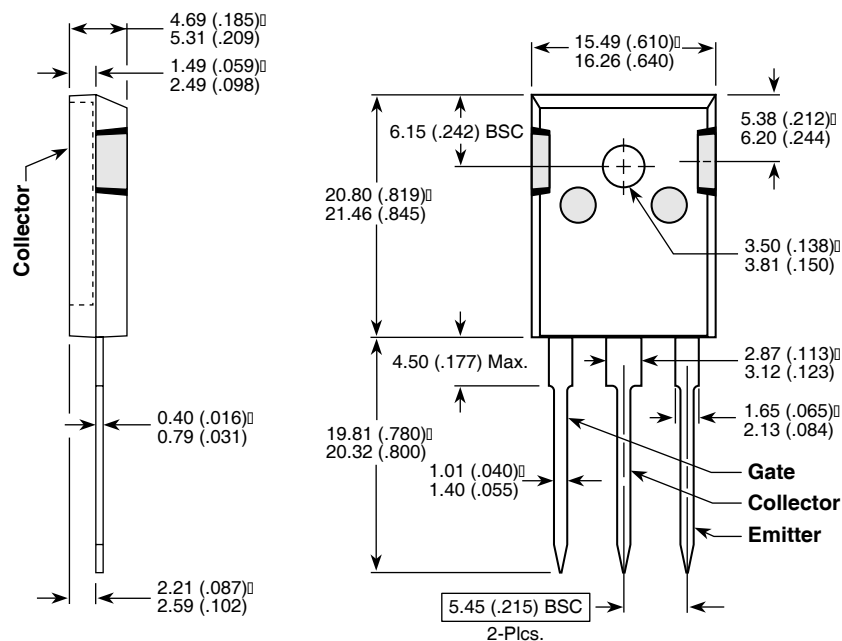
$$f_{\max 2} = \frac{P_{\text{diss}} - P_{\text{cond}}}{E_{\text{on2}} + E_{\text{off}}}$$

$$P_{\text{diss}} = \frac{T_J - T_C}{R_{\theta JC}}$$



T0-247 Package Outline

(e1) SAC: Tin, Silver, Copper



Dimensions in Millimeters and (Inches)

Microsemi's products are covered by one or more of U.S. patents 4,895,810 5,045,903 5,089,434 5,182,234 5,019,522,262,336 6,503,786 5,256,583 4,748,103 5,283,202 5,231,474 5,434,095 5,528,058 and foreign patents. US and Foreign patents pending. All Rights Reserved.