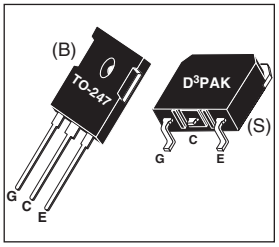
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1200V

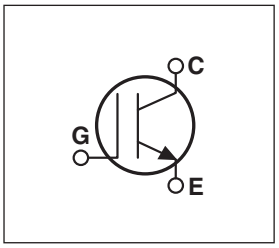
APT25GN120B APT25GN120S
APT25GN120BG* APT25GN120SG*

*G Denotes RoHS Compliant, Pb Free Terminal Finish.

Utilizing the latest Field Stop and Trench Gate technologies, these IGBT's have ultra low $V_{CE(ON)}$ and are ideal for low frequency applications that require absolute minimum conduction loss. Easy paralleling is a result of very tight parameter distribution and a slightly positive $V_{CE(ON)}$ temperature coefficient. A built-in gate resistor ensures extremely reliable operation, even in the event of a short circuit fault. Low gate charge simplifies gate drive design and minimizes losses.



- **1200V Field Stop**
- **Trench Gate: Low $V_{CE(on)}$**
- **Easy Paralleling**
- **Integrated Gate Resistor: Low EMI, High Reliability**



Applications: Welding, Inductive Heating, Solar Inverters, SMPS, Motor drives, UPS

MAXIMUM RATINGS

All Ratings: T_C = 25°C unless otherwise specified.

Symbol	Parameter	APT25GN120B(G)	UNIT
V_{CES}	Collector-Emitter Voltage	1200	Volts
V_{GE}	Gate-Emitter Voltage	±30	
I_{C1}	Continuous Collector Current @ T_C = 25°C	67	Amps
I_{C2}	Continuous Collector Current @ T_C = 110°C	33	
I_{CM}	Pulsed Collector Current ①	75	
SSOA	Switching Safe Operating Area @ T_J = 150°C	75A @ 1200V	
P_D	Total Power Dissipation	272	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	Units
$V_{(BR)CES}$	Collector-Emitter Breakdown Voltage (V_{GE} = 0V, I_C = 150µA)	1200			Volts
$V_{GE(TH)}$	Gate Threshold Voltage (V_{CE} = V_{GE}, I_C = 1mA, T_j = 25°C)	5	5.8	6.5	
$V_{CE(ON)}$	Collector-Emitter On Voltage (V_{GE} = 15V, I_C = 25A, T_j = 25°C)	1.4	1.7	2.1	
	Collector-Emitter On Voltage (V_{GE} = 15V, I_C = 25A, T_j = 125°C)		1.9		
I_{CES}	Collector Cut-off Current (V_{CE} = 1200V, V_{GE} = 0V, T_j = 25°C) ②			100	µA
	Collector Cut-off Current (V_{CE} = 1200V, V_{GE} = 0V, T_j = 125°C) ②			TBD	
I_{GES}	Gate-Emitter Leakage Current (V_{GE} = ±20V)			600	nA
$R_{G(int)}$	Integrated Gate Resistor		8		Ω

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

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DYNAMIC CHARACTERISTICS

APT25GN120B_S(G)

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{ies}	Input Capacitance	**Capacitance**		1800		pF
C_{oes}	Output Capacitance	V_{GE} = 0V, V_{CE} = 25V		105		
C_{res}	Reverse Transfer Capacitance	f = 1 MHz		85		
V_{GEP}	Gate-to-Emitter Plateau Voltage	Gate Charge		9.5		V
Q_g	Total Gate Charge ③	V_{GE} = 15V		155		nC
Q_{ge}	Gate-Emitter Charge	V_{CE} = 600V		10		
Q_{gc}	Gate-Collector ("Miller") Charge	I_C = 25A		85		
SSOA	Switching Safe Operating Area	T_J = 150°C, R_G = 4.3Ω⑦, V_{GE} = 15V, L = 100µH, V_{CE} = 1200V	75			A
$t_{d(on)}$	Turn-on Delay Time	**Inductive Switching (25°C)**		22		ns
t_r	Current Rise Time	V_{CC} = 800V		17		
$t_{d(off)}$	Turn-off Delay Time	V_{GE} = 15V		280		
t_f	Current Fall Time	I_C = 25A		135		
E_{on1}	Turn-on Switching Energy ④	R_G = 1.0Ω⑦		TBD		mJ
E_{on2}	Turn-on Switching Energy (Diode) ⑤	T_J = +25°C		1490		
E_{off}	Turn-off Switching Energy ⑥			2150		
$t_{d(on)}$	Turn-on Delay Time	**Inductive Switching (125°C)**		22		ns
t_r	Current Rise Time	V_{CC} = 800V		17		
$t_{d(off)}$	Turn-off Delay Time	V_{GE} = 15V		335		
t_f	Current Fall Time	I_C = 25A		225		
E_{on1}	Turn-on Switching Energy ④	R_G = 1.0Ω⑦		TBD		mJ
E_{on2}	Turn-on Switching Energy (Diode) ⑤	T_J = +125°C		2390		
E_{off}	Turn-off Switching Energy ⑥			3075		

THERMAL AND MECHANICAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case **(IGBT)**			.46	°C/W
$R_{\theta JC}$	Junction to Case **(DIODE)**			N/A	
W_T	Package Weight		5.9		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. Tested in inductive switching test circuit shown in figure 21, but with a Silicon Carbide diode.

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.)

⑦ R_G is external gate resistance, not including $R_{G(int)}$ nor gate driver impedance. (MIC4452)

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

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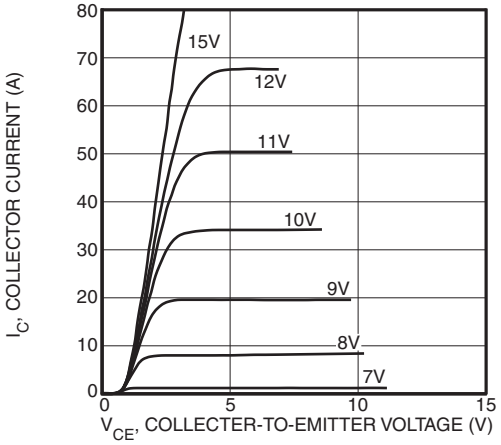


FIGURE 1, Output Characteristics(T_J = 25°C)

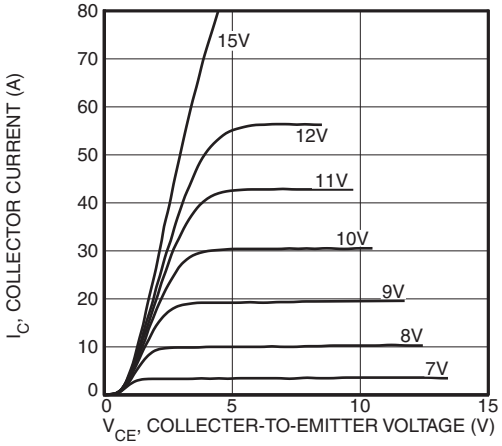


FIGURE 2, Output Characteristics (T_J = 125°C)

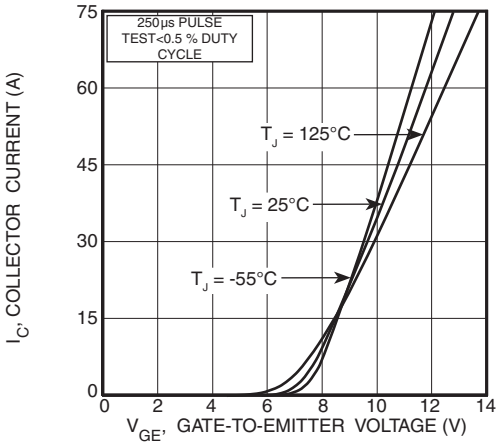


FIGURE 3, Transfer Characteristics

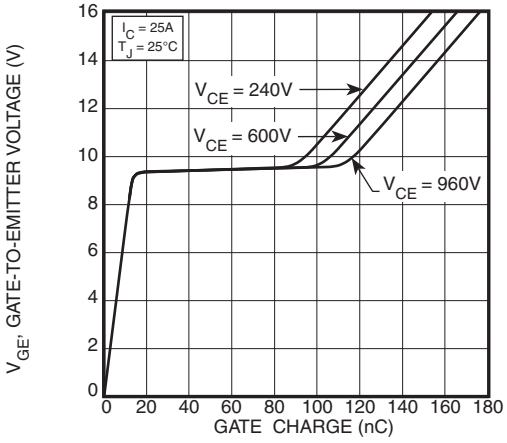


FIGURE 4, Gate Charge

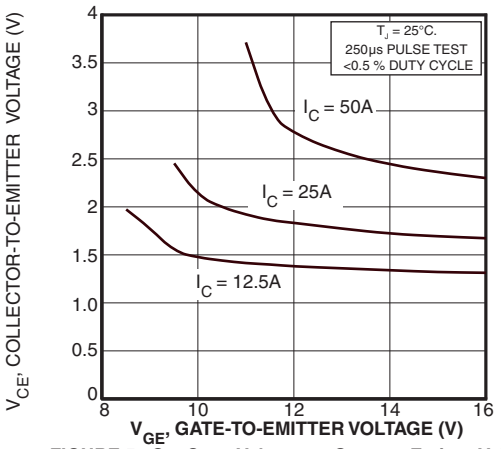


FIGURE 5, On State Voltage vs Gate-to- Emitter Voltage

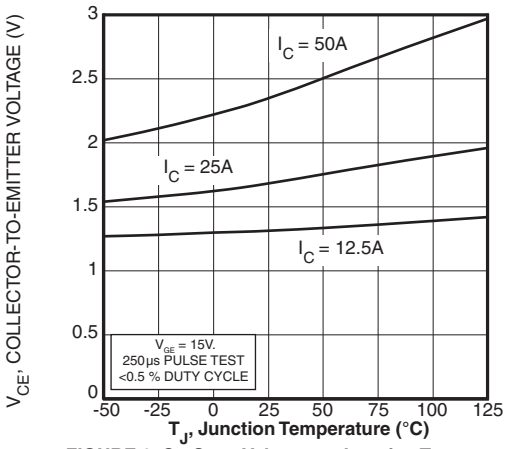


FIGURE 6, On State Voltage vs Junction Temperature

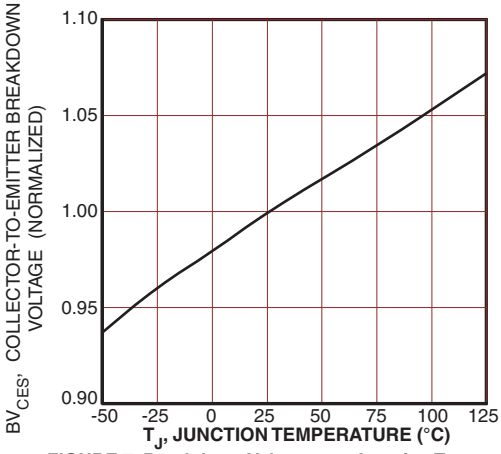


FIGURE 7, Breakdown Voltage vs. Junction Temperature

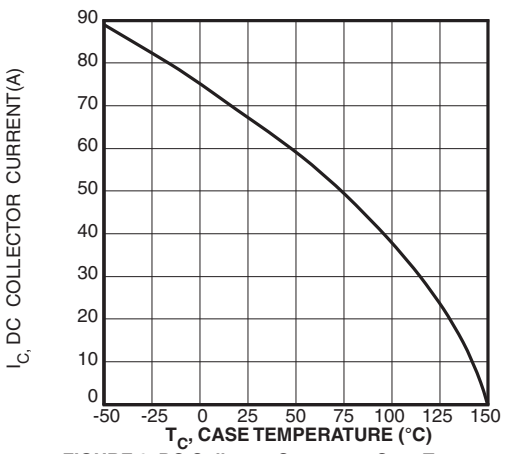


FIGURE 8, DC Collector Current vs Case Temperature

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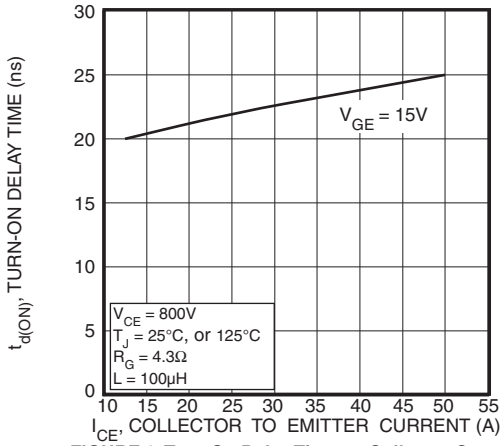


FIGURE 9, Turn-On Delay Time vs Collector Current

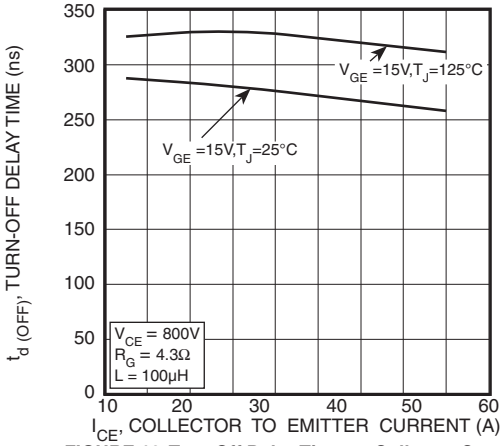


FIGURE 10, Turn-Off Delay Time vs Collector Current

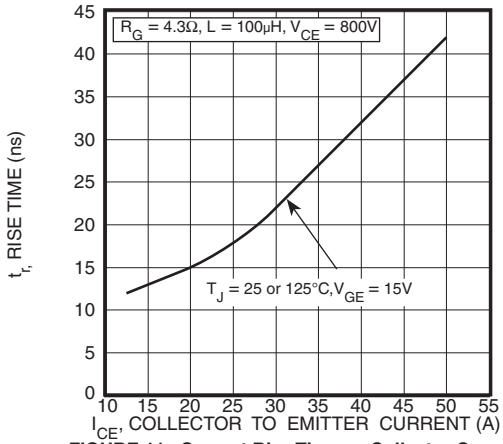


FIGURE 11, Current Rise Time vs Collector Current

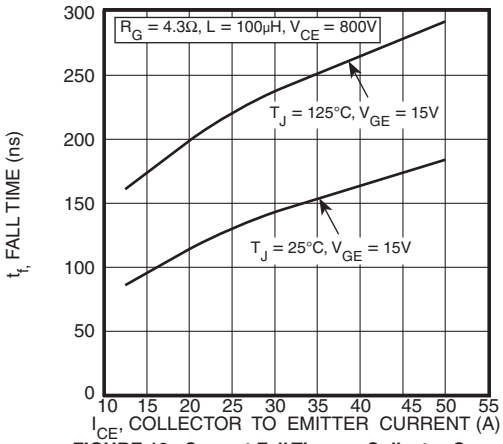


FIGURE 12, Current Fall Time vs Collector Current

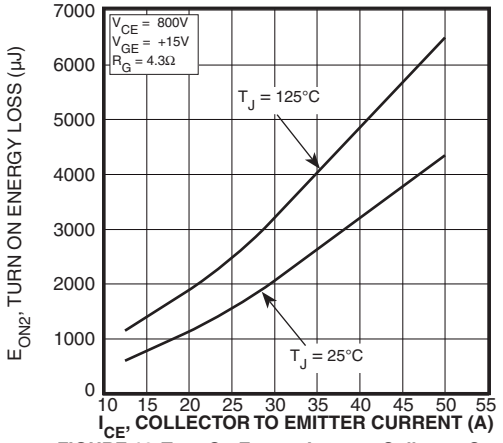


FIGURE 13, Turn-On Energy Loss vs Collector Current

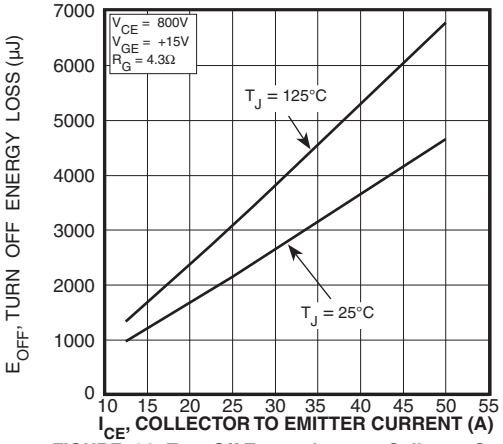


FIGURE 14, Turn Off Energy Loss vs Collector Current

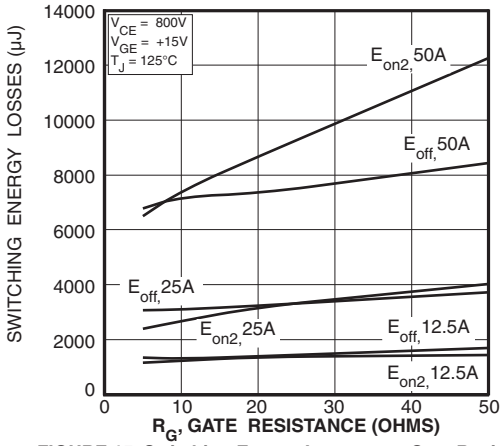


FIGURE 15, Switching Energy Losses vs. Gate Resistance

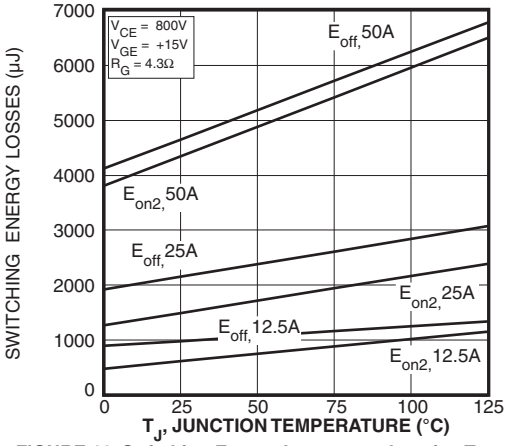


FIGURE 16, Switching Energy Losses vs Junction Temperature

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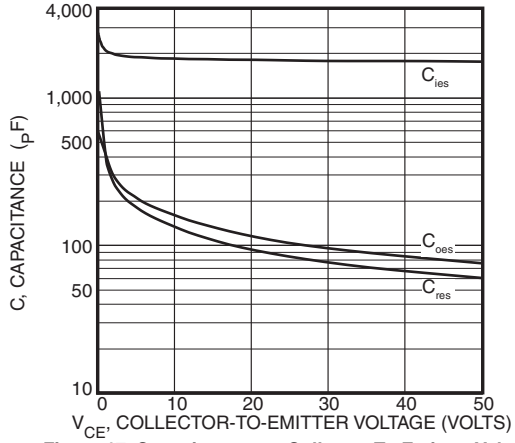


Figure 17, Capacitance vs Collector-To-Emitter Voltage

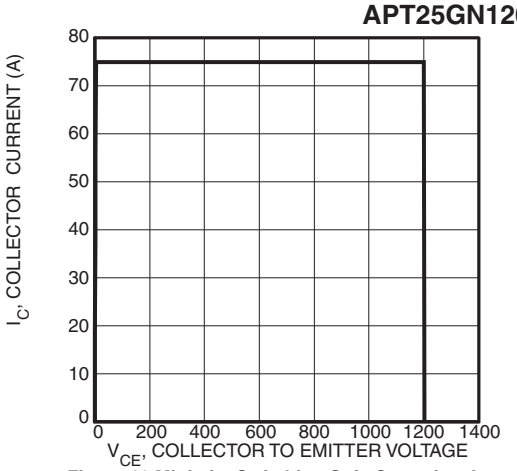


Figure 18,Minimim Switching Safe Operating Area

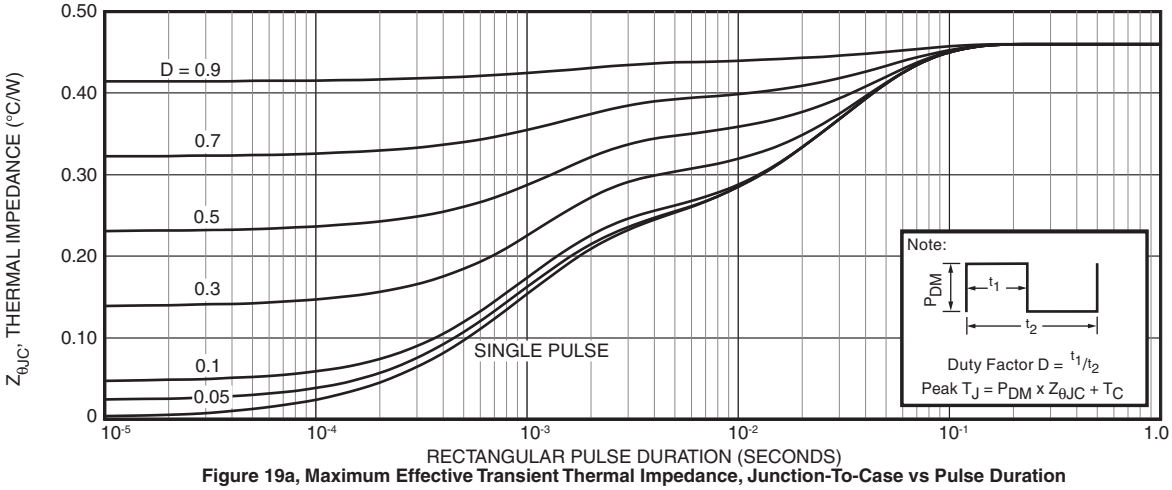


Figure 19a, Maximum Effective Transient Thermal Impedance, Junction-To-Case vs Pulse Duration

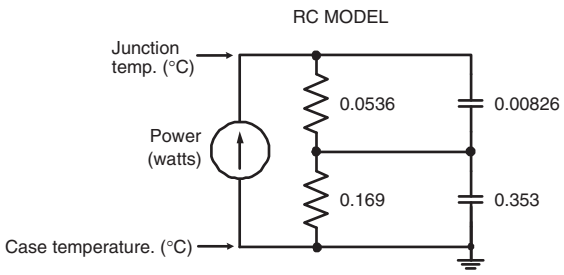


FIGURE 19b, TRANSIENT THERMAL IMPEDANCE MODEL

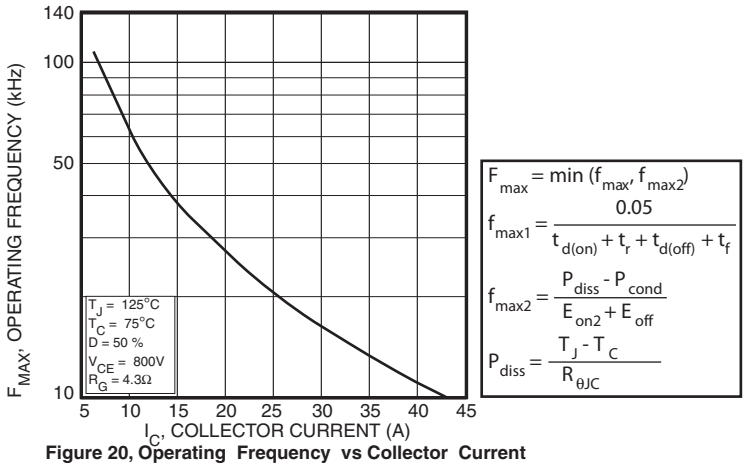


Figure 20, Operating Frequency vs Collector Current

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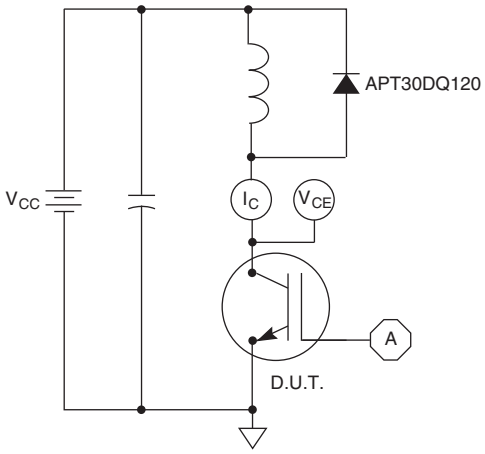


Figure 21, Inductive Switching Test Circuit

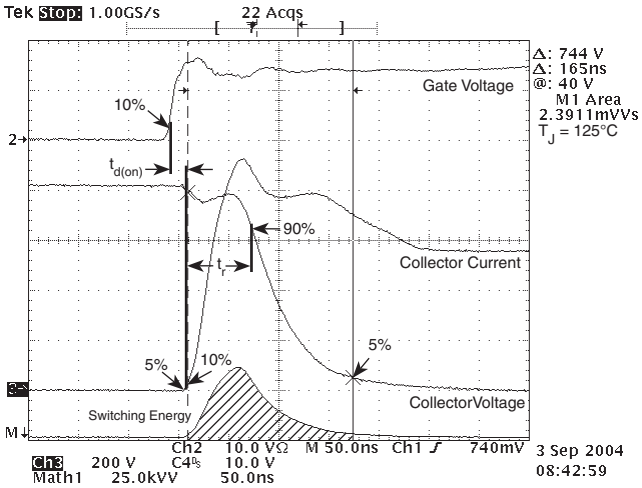


Figure 22, Turn-on Switching Waveforms and Definitions

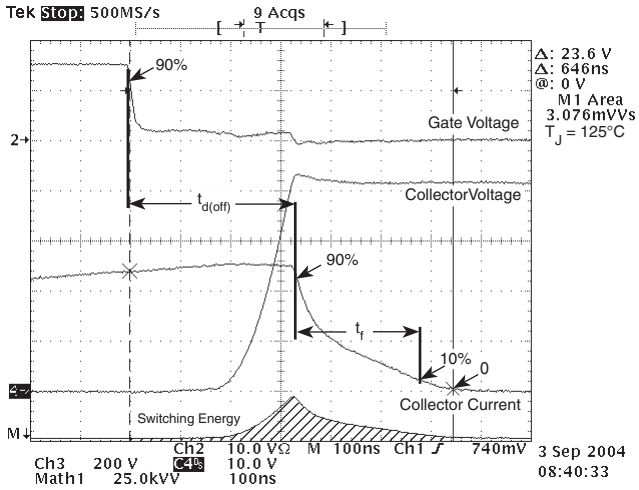
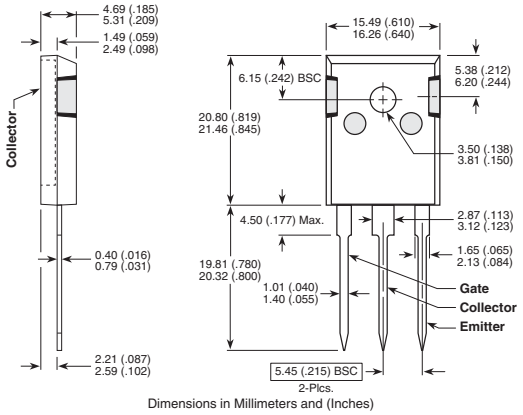


Figure 23, Turn-off Switching Waveforms and Definitions

TO-247 Package Outline

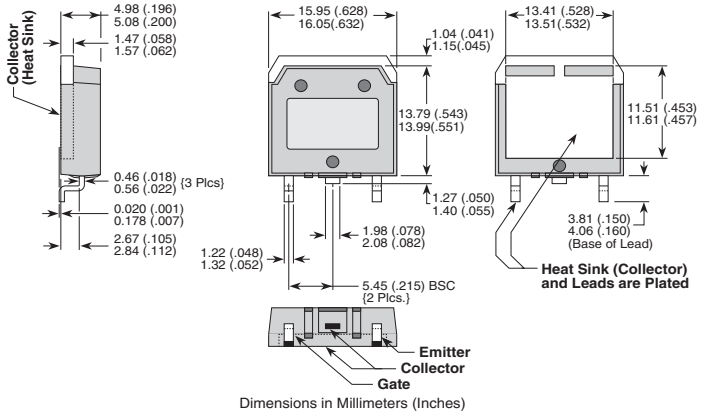
e1 SAC: Tin, Silver, Copper



Dimensions in Millimeters and (Inches)

D^{3}PAK Package Outline

e3 100% Sn Plated



Dimensions in Millimeters (Inches)

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