Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

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Tel: +86-755-8981 8866 Fax: +86-755-8427 6832
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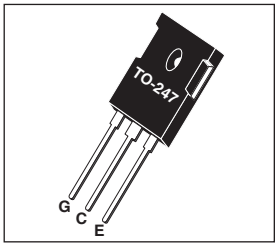
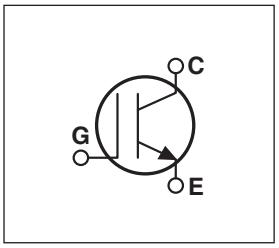
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

900V
APT15GP90B
APT15GP90BG*

***G Denotes RoHS Compliant, Pb Free Terminal Finish.**

POWER MOS 7® IGBT





The POWER MOS 7® IGBT is a new generation of high voltage power IGBTs. Using Punch Through Technology this IGBT is ideal for many high frequency, high voltage switching applications and has been optimized for high frequency switchmode power supplies.

- **Low Conduction Loss**
- **Low Gate Charge**
- **Ultrafast Tail Current shutoff**
- **SSOA Rated**

MAXIMUM RATINGS

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

Symbol	Parameter	APT15GP90B(G)	UNIT
V_{CES}	Collector-Emitter Voltage	900	Volts
V_{GE}	Gate-Emitter Voltage	±30	
I_{C1}	Continuous Collector Current @ T_C = 25°C	43	Amps
I_{C2}	Continuous Collector Current @ T_C = 110°C	21	
I_{CM}	Pulsed Collector Current ①	60	
SSOA	Switching Safe Operating Area @ T_J = 150°C	60A @ 900V	
P_D	Total Power Dissipation	250	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 = 350µA)	900			Volts
$V_{GE(TH)}$	Gate Threshold Voltage (V_{CE} = V_{GE}, I_C = 1mA, T_j = 25°C)	3	4.5	6	
$V_{CE(ON)}$	Collector-Emitter On Voltage (V_{GE} = 15V, I_C = 15A, T_j = 25°C)		3.2	3.9	
	Collector-Emitter On Voltage (V_{GE} = 15V, I_C = 15A, T_j = 125°C)		2.7		
I_{CES}	Collector Cut-off Current (V_{CE} = 900V, V_{GE} = 0V, T_j = 25°C) ②			250	µA
	Collector Cut-off Current (V_{CE} = 900V, V_{GE} = 0V, T_j = 125°C) ②			2500	
I_{GES}	Gate-Emitter Leakage Current (V_{GE} = ±20V)			±100	nA

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

DYNAMIC CHARACTERISTICS

APT15GP90B(G)

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{ies}	Input Capacitance	**Capacitance**		1100		pF
C_{oes}	Output Capacitance	V_{GE} = 0V, V_{CE} = 25V		120		
C_{res}	Reverse Transfer Capacitance	f = 1 MHz		32		
V_{GEP}	Gate-to-Emitter Plateau Voltage	Gate Charge		7.5		V
Q_g	Total Gate Charge ③	V_{GE} = 15V		60		nC
Q_{ge}	Gate-Emitter Charge	V_{CE} = 450V		10		
Q_{gc}	Gate-Collector ("Miller") Charge	I_C = 15A		27		
SSOA	Switching Safe Operating Area	T_J = 150°C, R_G = 4.3Ω, V_{GE} = 15V, L = 100µH, V_{CE} = 900V	60			A
$t_{d(on)}$	Turn-on Delay Time	**Inductive Switching (25°C)**		9		ns
t_r	Current Rise Time	V_{CC} = 600V		14		
$t_{d(off)}$	Turn-off Delay Time	V_{GE} = 15V		33		
t_f	Current Fall Time	I_C = 15A		55		
E_{on1}	Turn-on Switching Energy ④	R_G = 4.3Ω		TBD		µJ
E_{on2}	Turn-on Switching Energy (Diode) ⑤	T_J = +25°C		430		
E_{off}	Turn-off Switching Energy ⑥			200		
$t_{d(on)}$	Turn-on Delay Time	**Inductive Switching (125°C)**		9		ns
t_r	Current Rise Time	V_{CC} = 600V		14		
$t_{d(off)}$	Turn-off Delay Time	V_{GE} = 15V		70		
t_f	Current Fall Time	I_C = 15A		100		
E_{on1}	Turn-on Switching Energy ④	R_G = 4.3Ω		TBD		µJ
E_{on2}	Turn-on Switching Energy (Diode) ⑤	T_J = +125°C		790		
E_{off}	Turn-off Switching Energy ⑥			500		

THERMAL AND MECHANICAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case **(IGBT)**			.50	°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.)

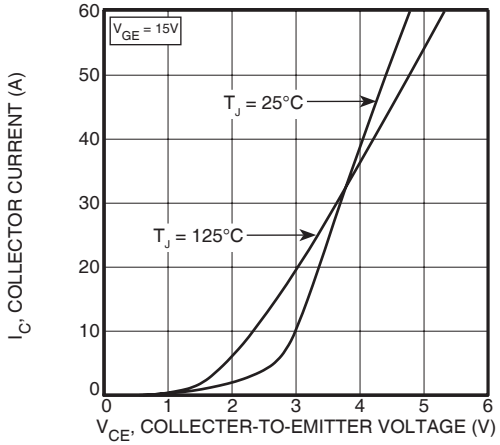


FIGURE 1, Output Characteristics(T_J = 25°C)

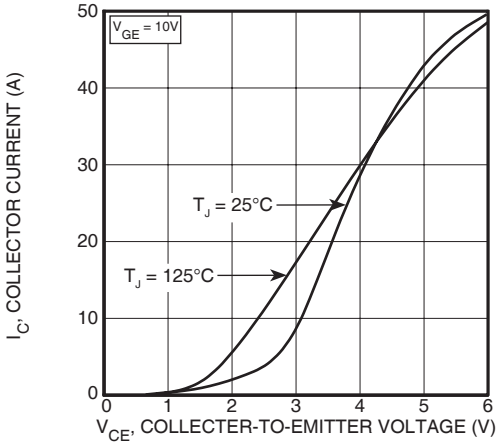


FIGURE 2, Output Characteristics (T_J = 125°C)

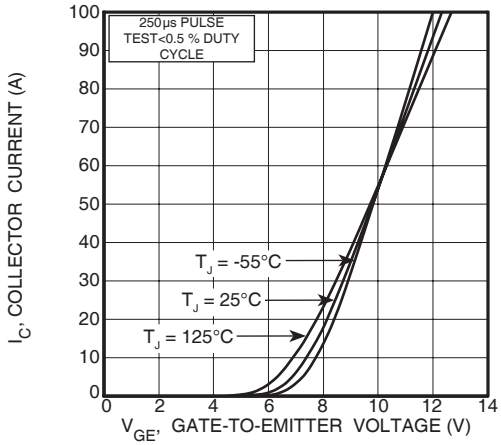


FIGURE 3, Transfer Characteristics

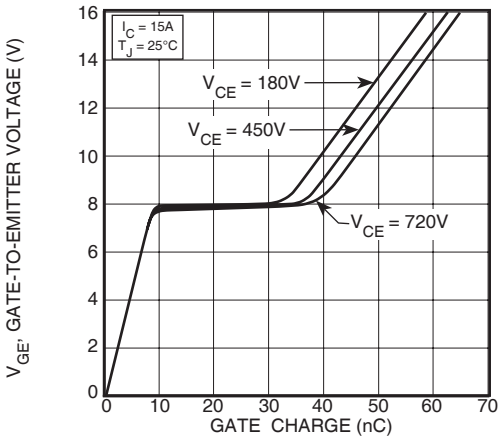


FIGURE 4, Gate Charge

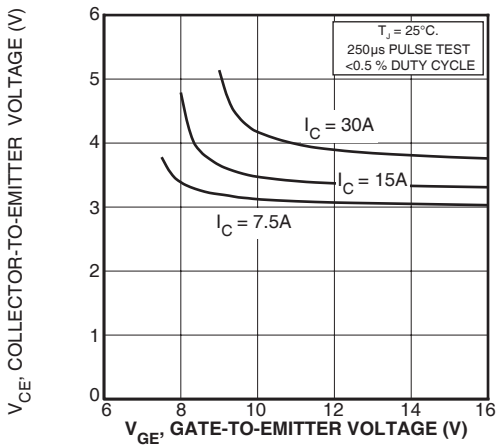


FIGURE 5, On State Voltage vs Gate-to- Emitter Voltage

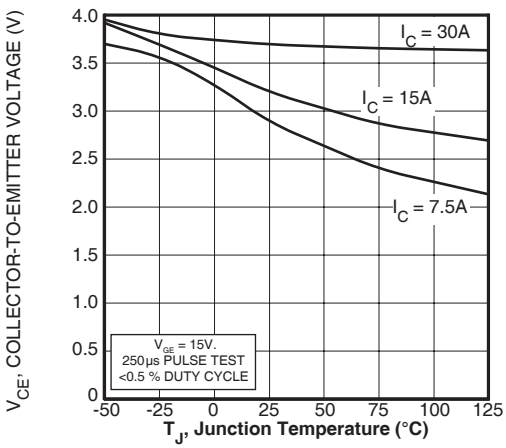


FIGURE 6, On State Voltage vs Junction Temperature

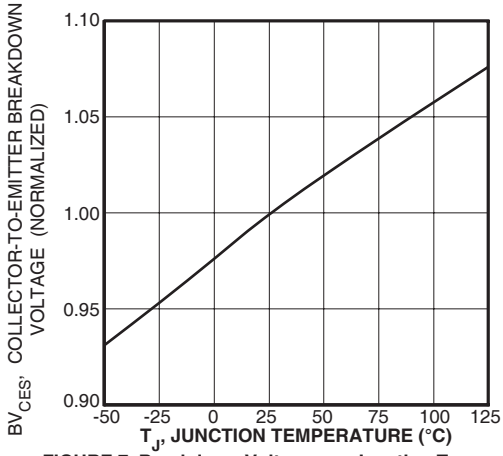


FIGURE 7, Breakdown Voltage vs. Junction Temperature

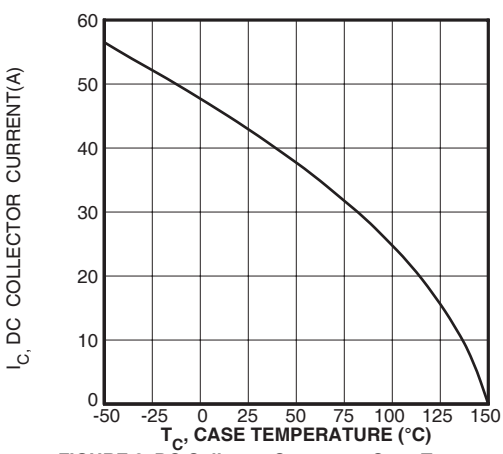


FIGURE 8, DC Collector Current vs Case Temperature

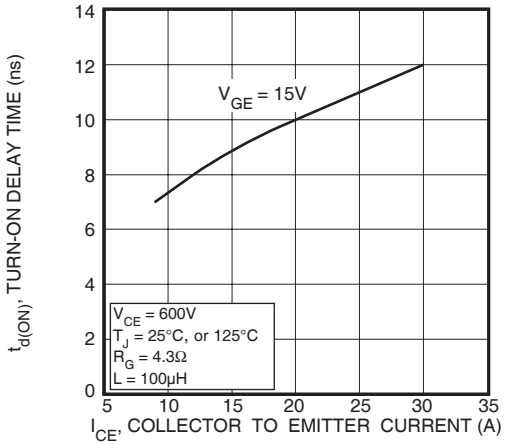


FIGURE 9, Turn-On Delay Time vs Collector Current

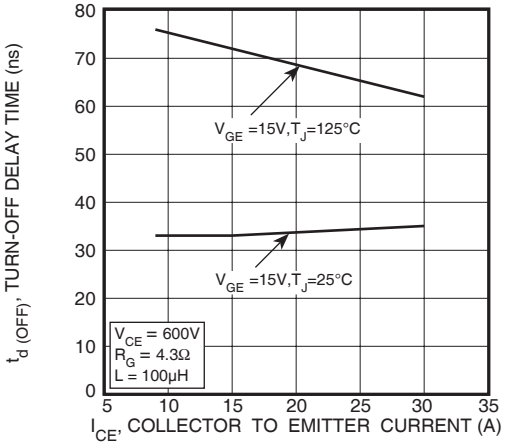


FIGURE 10, Turn-Off Delay Time vs Collector Current

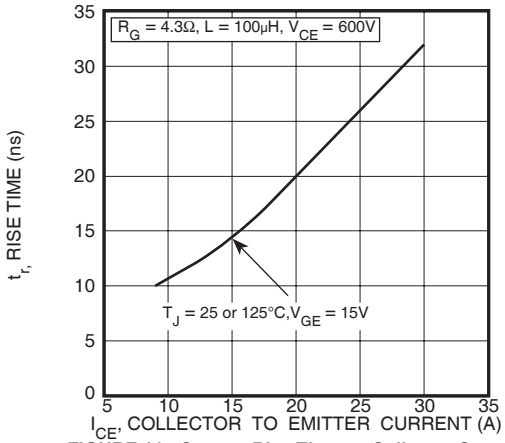


FIGURE 11, Current Rise Time vs Collector Current

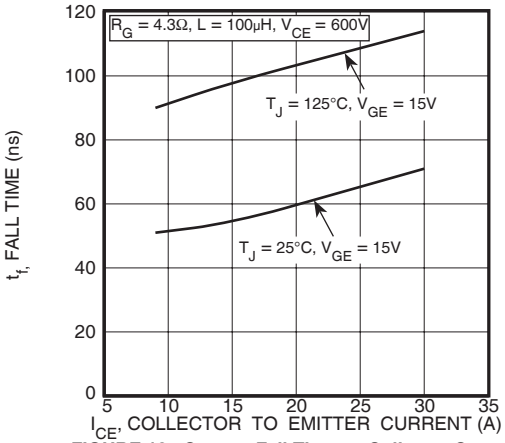


FIGURE 12, Current Fall Time vs Collector Current

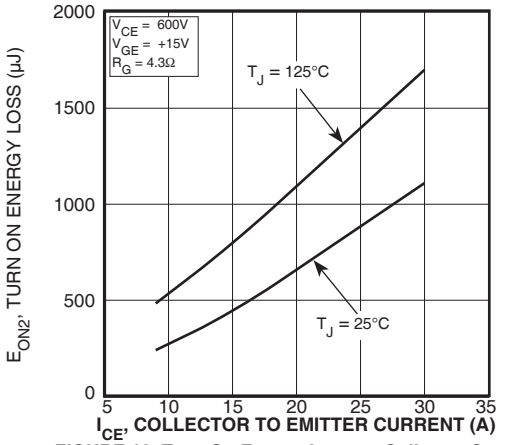


FIGURE 13, Turn-On Energy Loss vs Collector Current

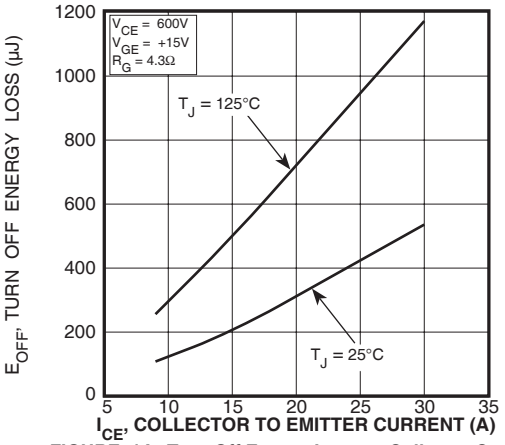


FIGURE 14, Turn Off Energy Loss vs Collector Current

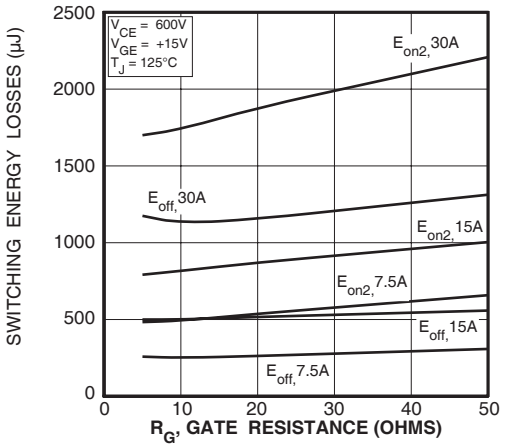


FIGURE 15, Switching Energy Losses vs. Gate Resistance

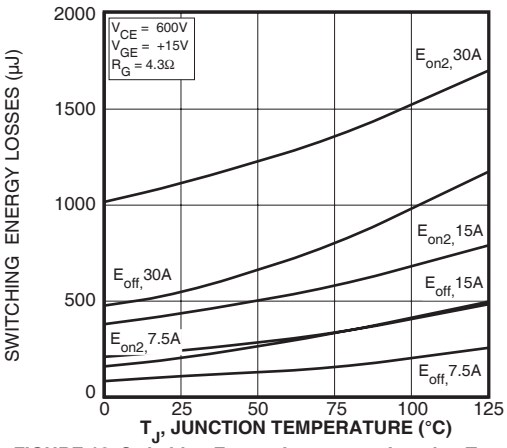


FIGURE 16, Switching Energy Losses vs Junction Temperature

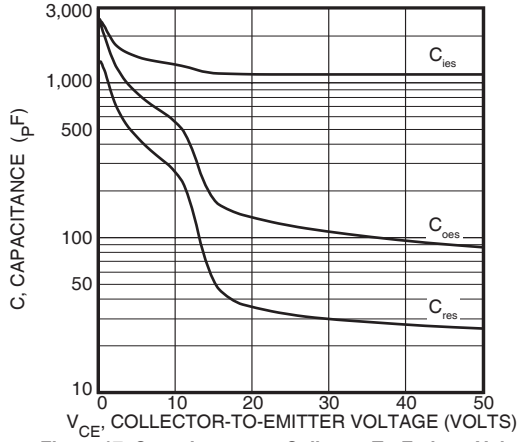


Figure 17, Capacitance vs Collector-To-Emitter Voltage

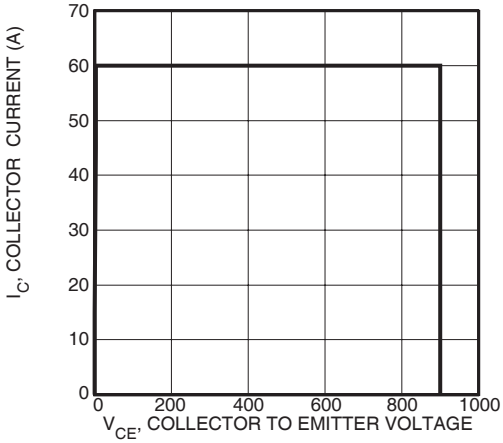


Figure 18,Minimim Switching Safe Operating Area

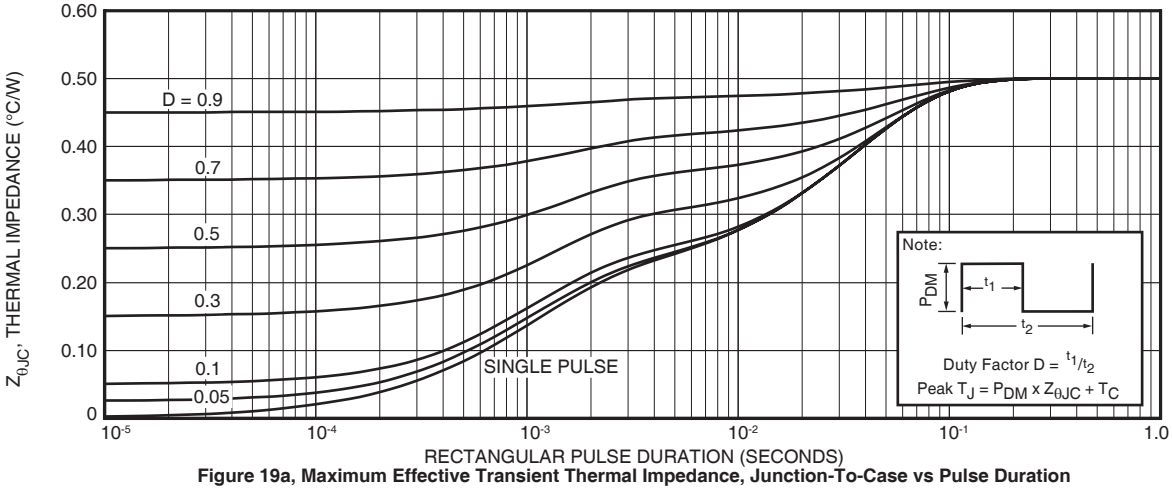


Figure 19a, Maximum Effective Transient Thermal Impedance, Junction-To-Case vs Pulse Duration

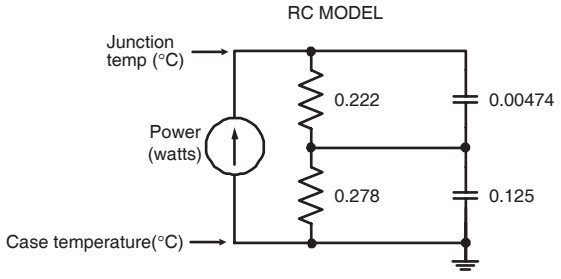


FIGURE 19b, TRANSIENT THERMAL IMPEDANCE MODEL

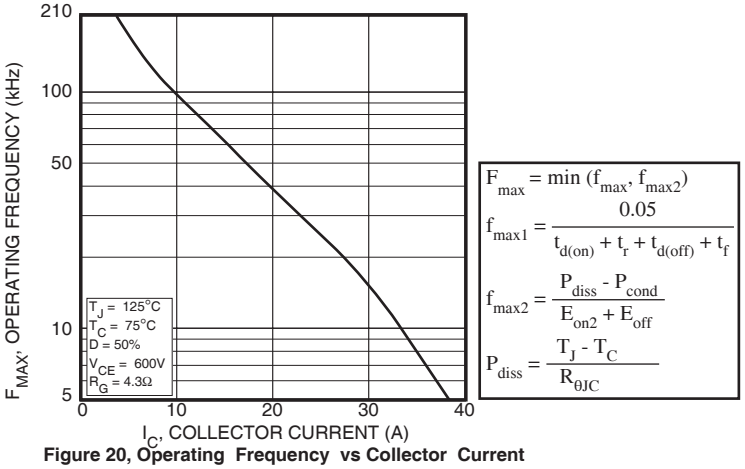


Figure 20, Operating Frequency vs Collector Current

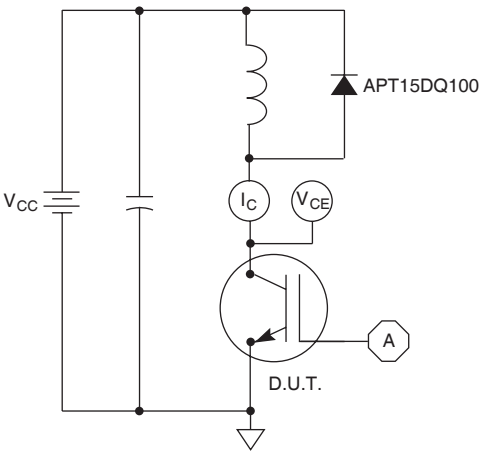


Figure 21, Inductive Switching Test Circuit

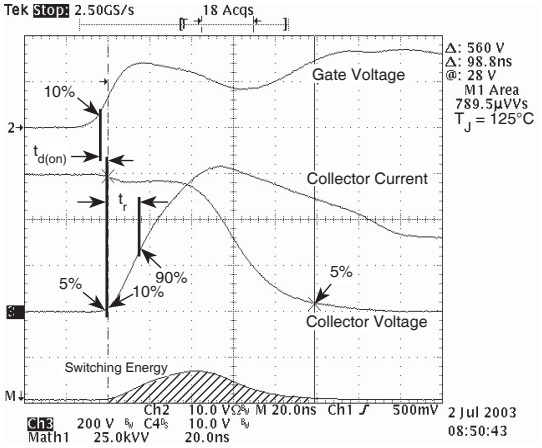


Figure 22, Turn-on Switching Waveforms and Definitions

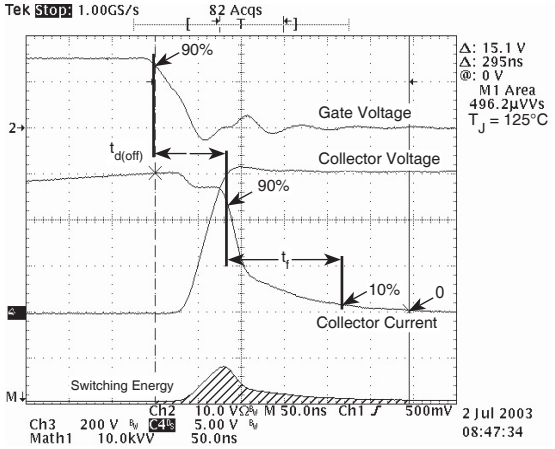
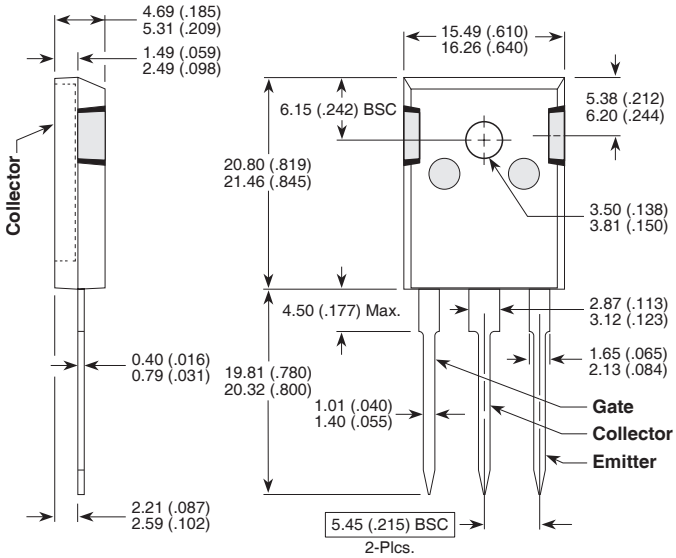


Figure 23, Turn-off Switching Waveforms and Definitions

TO-247 Package Outline

(e1) SAC: Tin, Silver, Copper



Dimensions in Millimeters and (Inches)