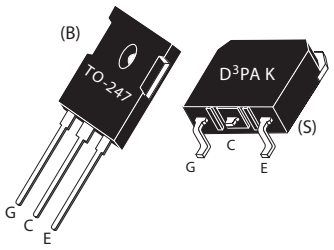
Microsemi
POWER PRODUCTS GROUP

APT15GT120BR APT15GT120SR
APT15GT120BR(G) APT15GT120SR(G)
1200V

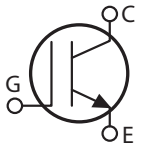
*G Denotes RoHS Compliant, Pb Free Terminal Finish.

Thunderbolt IGBT®



The Thunderblot IGBT® is a new generation of high voltage power IGBTs. Using Non- Punch Through Technology, the Thunderblot IGBT® offers superior ruggedness and ultrafast switching speed.

- Low Forward Voltage Drop
- High Freq. Switching to 50KHz
- Low Tail Current
- Ultra Low Leakage Current
- RBSOA and SCSOA Rated



MAXIMUM RATINGS

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

Symbol	Parameter	APT15GT120BR_SR(G)	UNIT
V_{CES}	Collector-Emitter Voltage	1200	Volts
V_{GE}	Gate-Emitter Voltage	±30	
I_{C1}	Continuous Collector Current @ T_C = 25°C	36	Amps
I_{C2}	Continuous Collector Current @ T_C = 110°C	18	
I_{CM}	Pulsed Collector Current [1] @ T_C = 150°C	45	
SSOA	Switching Safe Operating Area @ T_J = 150°C	45A @ 960V	
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 = 1mA)	1200			Volts
$V_{GE(TH)}$	Gate Threshold Voltage (V_{CE} = V_{GE}, I_C = 0.6mA, T_j = 25°C)	4.5	5.5	6.5	
$V_{CE(ON)}$	Collector-Emitter On Voltage (V_{GE} = 15V, I_C = 15A, T_j = 25°C)	2.5	3.0	3.6	
	Collector-Emitter On Voltage (V_{GE} = 15V, I_C = 15A, T_j = 125°C)		3.8		
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)			480	nA

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

DYNAMIC CHARACTERISTICS

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{ies}	Input Capacitance	Capacitance		1250		pF
C_{oes}	Output Capacitance	V_{GE} = 0V, V_{CE} = 25V		100		
C_{res}	Reverse Transfer Capacitance	f = 1 MHz		65		
V_{GEP}	Gate-to-Emitter Plateau Voltage	Gate Charge		10		V
Q_g	Total Gate Charge [3]	V_{GE} = 15V		105		nC
Q_{ge}	Gate-Emitter Charge	V_{CE} = 600V		10		
Q_{gc}	Gate-Collector ("Miller") Charge	I_C = 15A		60		
SSOA	Switching Safe Operating Area	T_J = 150°C, R_G = 5Ω, V_{GE} = 15V, L = 100µH, V_{CE} = 960V	45			A
$t_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C)		10		ns
t_r	Current Rise Time	V_{CC} = 800V		11		
$t_{d(off)}$	Turn-off Delay Time	V_{GE} = 15V		85		
t_f	Current Fall Time	I_C = 15A		35		
E_{on1}	Turn-on Switching Energy [4]	R_G = 5Ω		585		µJ
E_{on2}	Turn-on Switching Energy (Diode) [5]	T_J = +25°C		800		
E_{off}	Turn-off Switching Energy [6]			260		
$t_{d(on)}$	Turn-on Delay Time	Inductive Switching (125°C)		10		ns
t_r	Current Rise Time	V_{CC} = 800V		11		
$t_{d(off)}$	Turn-off Delay Time	V_{GE} = 15V		95		
t_f	Current Fall Time	I_C = 15A		42		
E_{on1}	Turn-on Switching Energy [4]	R_G = 5Ω		590		µJ
E_{on2}	Turn-on Switching Energy (Diode) [5]	T_J = +125°C		1440		
E_{off}	Turn-off Switching Energy [6]			340		

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.)

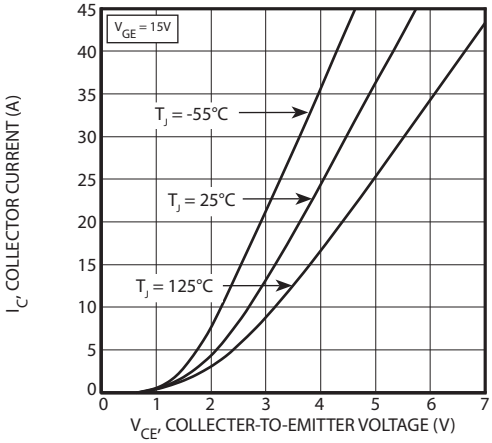


FIGURE 1, Output Characteristics(T_J = 25°C)

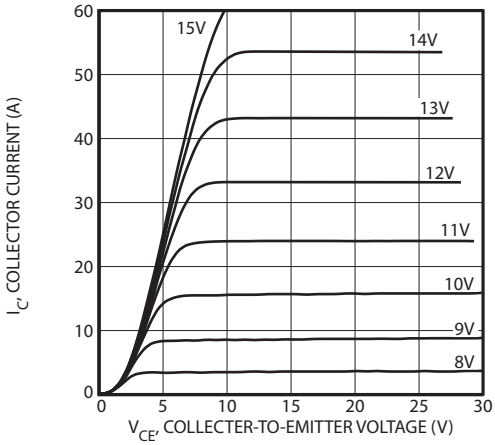


FIGURE 2, Output Characteristics (T_J = 125°C)

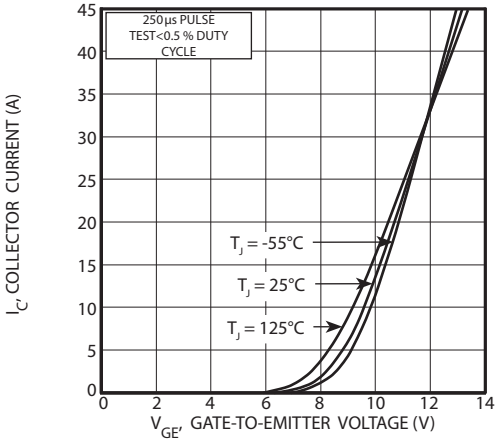


FIGURE 3, Transfer Characteristics

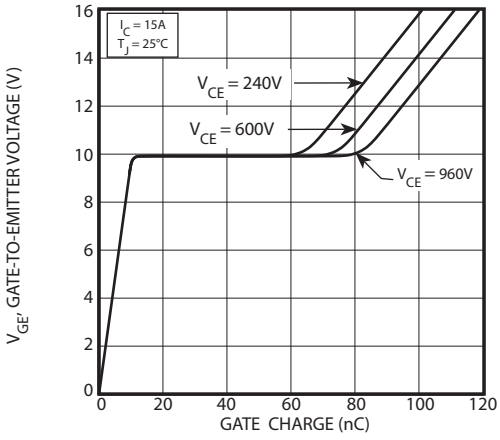


FIGURE 4, Gate Charge

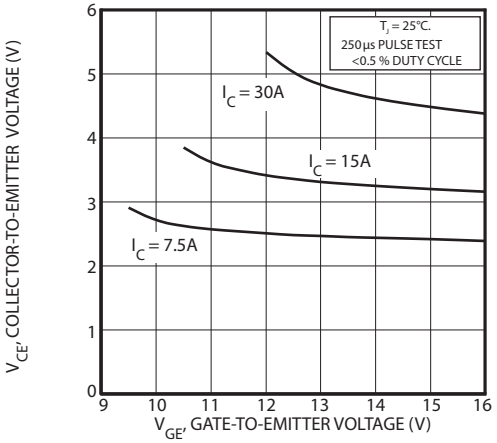


FIGURE 5, On State Voltage vs Gate-to- Emitter Voltage

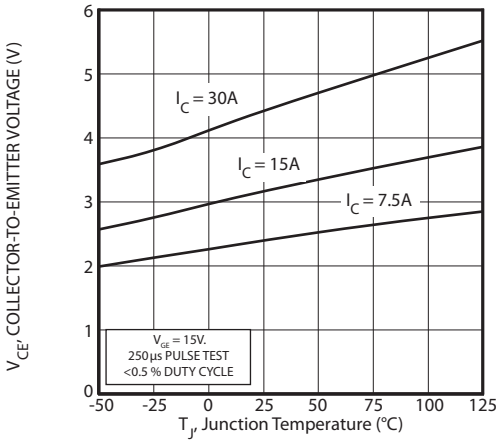


FIGURE 6, On State Voltage vs Junction Temperature

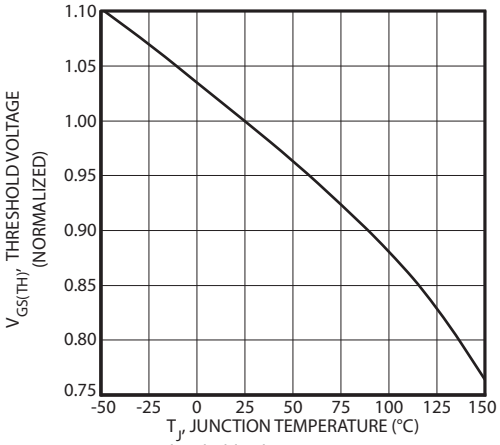


FIGURE 7, Threshold Voltage vs. Junction Temperature

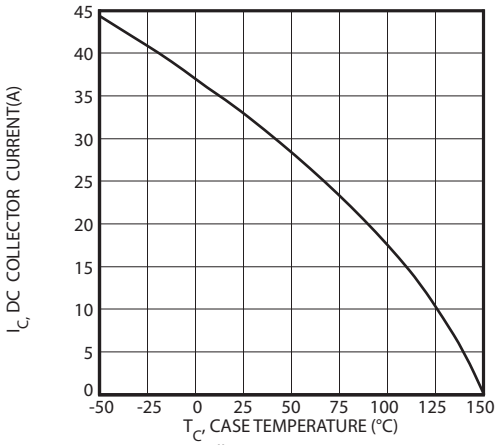


FIGURE 8, DC Collector Current vs Case Temperature

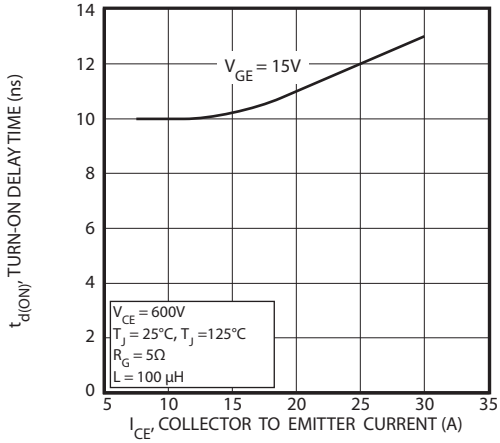


FIGURE 9, Turn-On Delay Time vs Collector Current

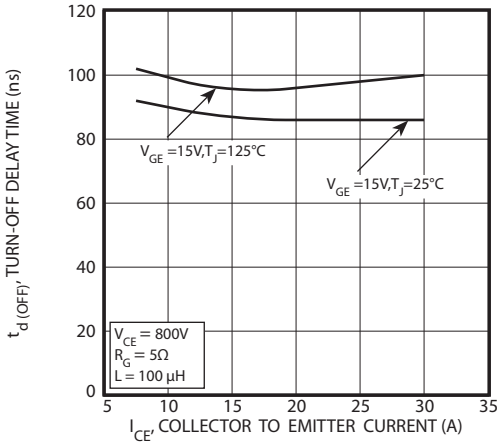


FIGURE 10, Turn-Off Delay Time vs Collector Current

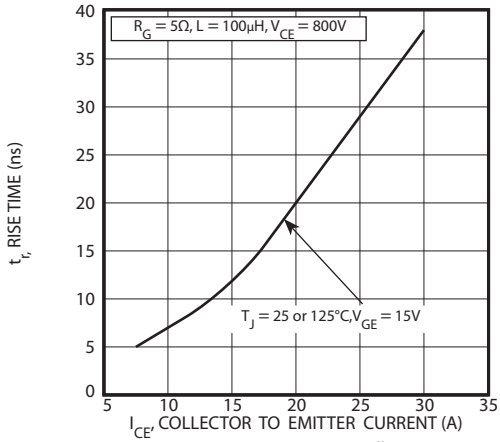


FIGURE 11, Current Rise Time vs Collector Current

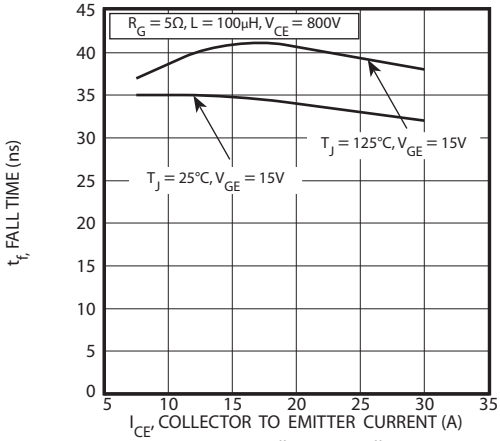


FIGURE 12, Current Fall Time vs Collector Current

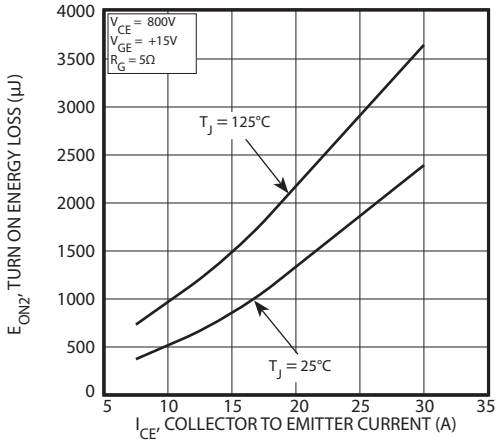


FIGURE 13, Turn-On Energy Loss vs Collector Current

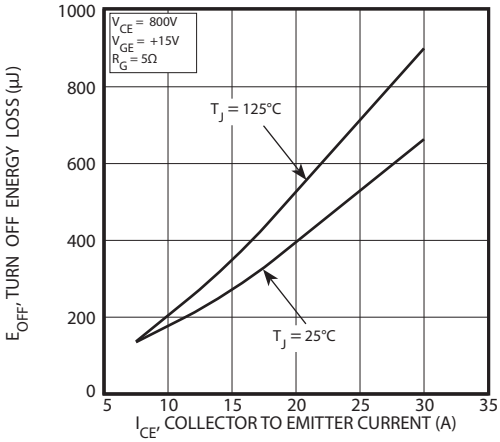


FIGURE 14, Turn Off Energy Loss vs Collector Current

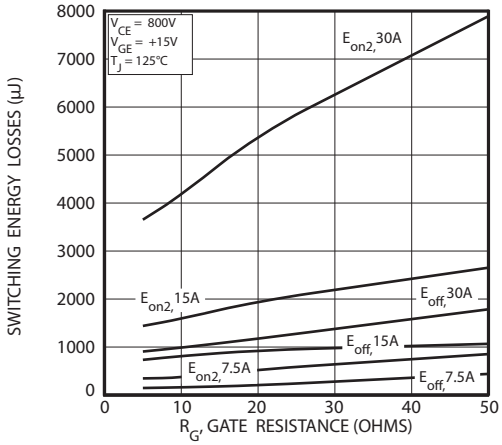


FIGURE 15, Switching Energy Losses vs. Gate Resistance

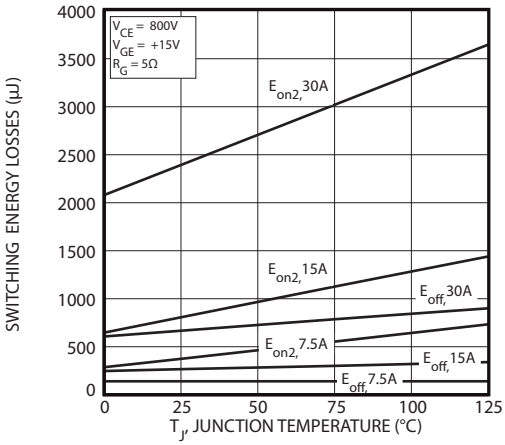


FIGURE 16, Switching Energy Losses vs Junction Temperature

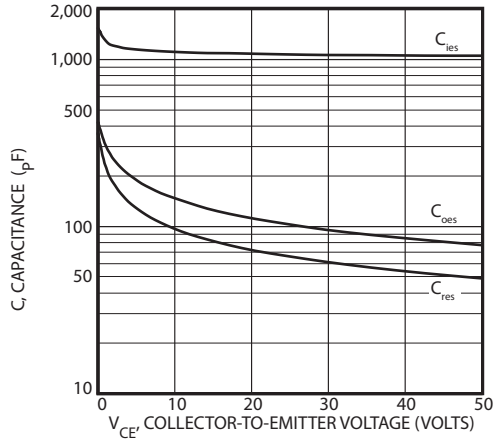


Figure 17, Capacitance vs Collector-To-Emitter Voltage

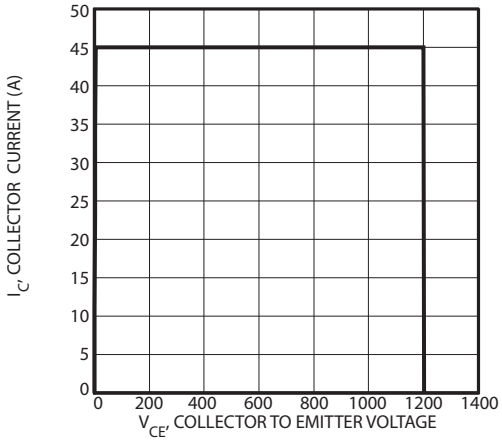


Figure 18,Minimim Switching Safe Operating Area

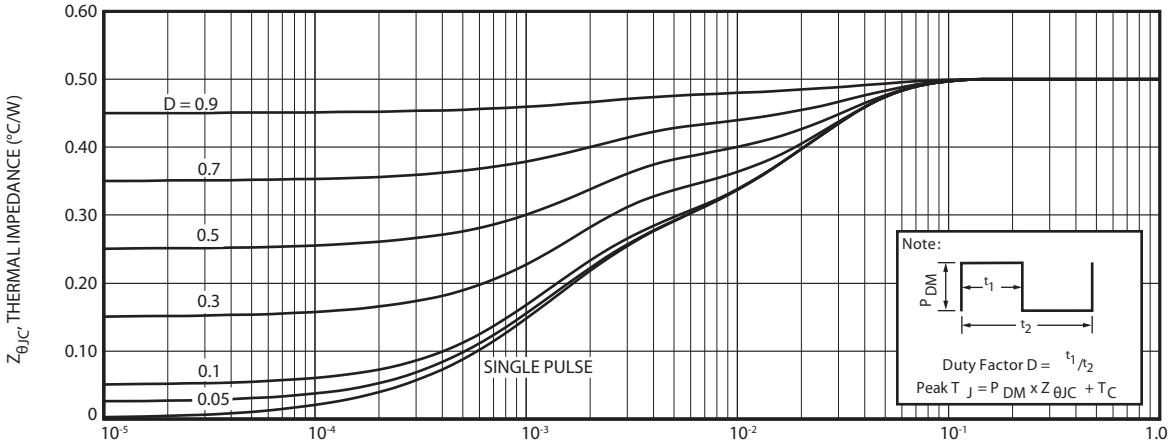


Figure 19, Maximum Effective Transient Thermal Impedance, Junction-To-Case vs Pulse Duration

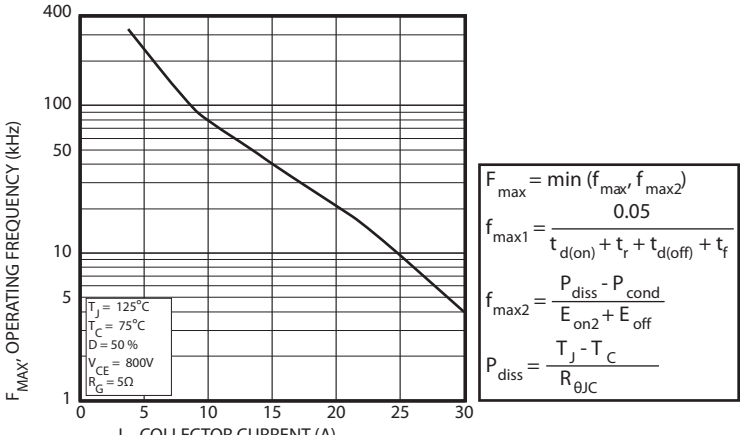


Figure 20, Operating Frequency vs Collector Current

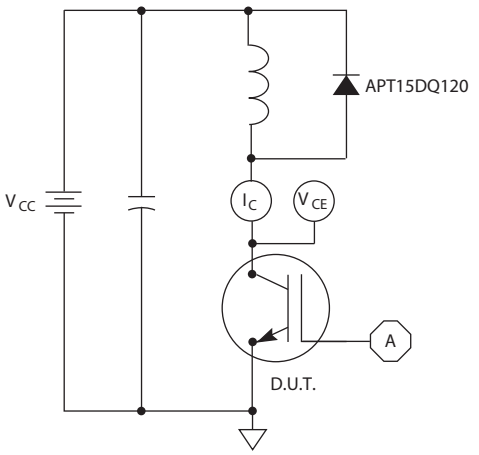


Figure 21, Inductive Switching Test Circui t

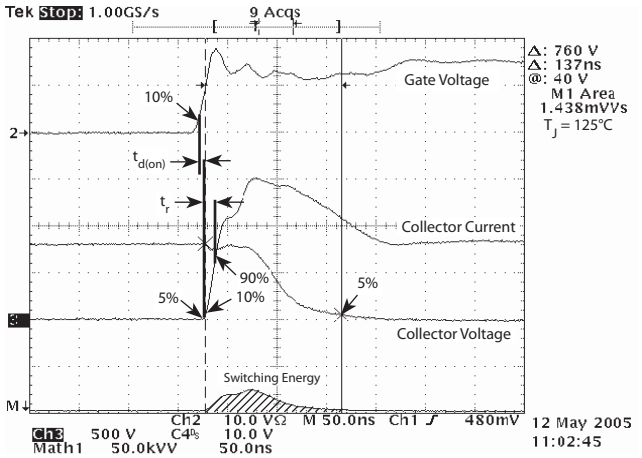


Figure 22, Turn-on Switching Waveforms and Definitions

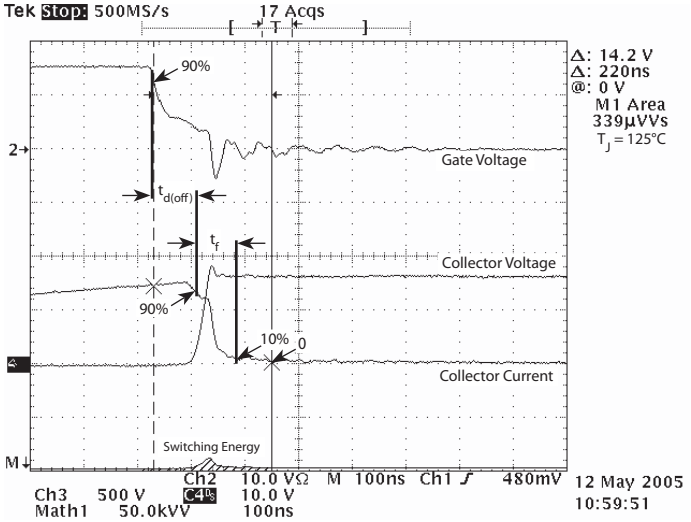
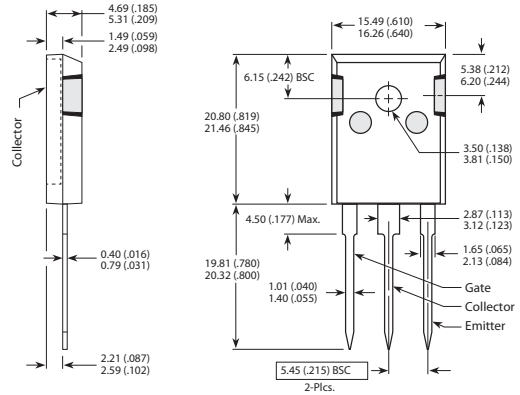


Figure 23, Turn-off Switching Waveforms and Definitions

TO-247 Package Outline

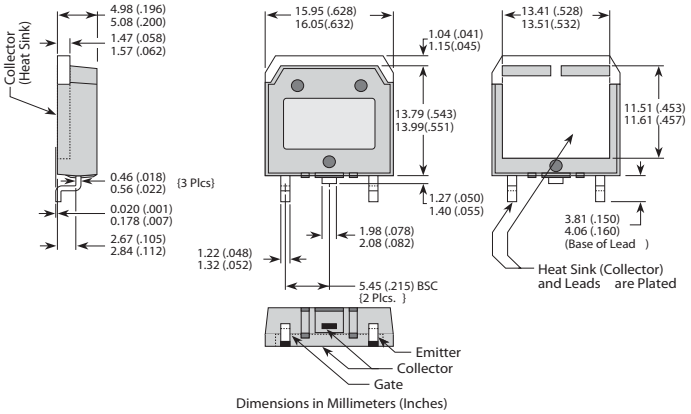
e1 SAC: Tin, Silver, Copper



Dimensions in Millimeters and (Inches)

D^{3}PAK Package Outline

e3 SAC: Tin, Silver, Copper



Dimensions in Millimeters (Inches)

Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

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- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits,General Dynamics и др.);

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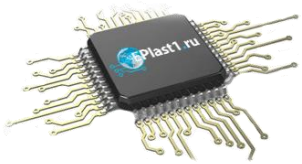
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

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