DYNAMIC CHARACTERISTICS

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{ies}	Input Capacitance	**Capacitance**		4500		pF
C_{oes}	Output Capacitance	V_{GE} = 0V, V_{CE} = 25V		370		
C_{res}	Reverse Transfer Capacitance	f = 1 MHz		150		
V_{GEP}	Gate-to-Emitter Plateau Voltage	Gate Charge		9.5		V
Q_g	Total Gate Charge ③	V_{GE} = 15V		485		nC
Q_{ge}	Gate-Emitter Charge	V_{CE} = 300V		30		
Q_{gc}	Gate-Collector ("Miller") Charge	I_C = 75A		270		
SSOA	Switching Safe Operating Area	T_J = 175°C, R_G = 4.3Ω⑦, V_{GE} = 15V, L = 100µH,V_{CE} = 600V	225			A
SCSOA	Short Circuit Safe Operating Area	V_{CC} = 600V, V_{GE} = 15V, T_J = 125°C, R_G = 4.3Ω⑦	6			µs
$t_{d(on)}$	Turn-on Delay Time	**Inductive Switching (25°C)**		47		ns
t_r	Current Rise Time	V_{CC} = 400V		48		
$t_{d(off)}$	Turn-off Delay Time	V_{GE} = 15V		385		
t_f	Current Fall Time	I_C = 75A		38		
E_{on1}	Turn-on Switching Energy ④	R_G = 1.0Ω⑦		2500		µJ
E_{on2}	Turn-on Switching Energy (Diode) ⑤	T_J = +25°C		3725		
E_{off}	Turn-off Switching Energy ⑥			2140		
$t_{d(on)}$	Turn-on Delay Time	**Inductive Switching (125°C)**		47		ns
t_r	Current Rise Time	V_{CC} = 400V		48		
$t_{d(off)}$	Turn-off Delay Time	V_{GE} = 15V		430		
t_f	Current Fall Time	I_C = 75A		55		
E_{on1}	Turn-on Switching Energy ④	R_G = 1.0Ω⑦		2600		µJ
E_{on2}	Turn-on Switching Energy (Diode) ⑤	T_J = +125°C		4525		
E_{off}	Turn-off Switching Energy ⑥			2585		

THERMAL AND MECHANICAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case **(IGBT)**			.28	°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)

⑧ Continuous current limited by package pin temperature to 100A.

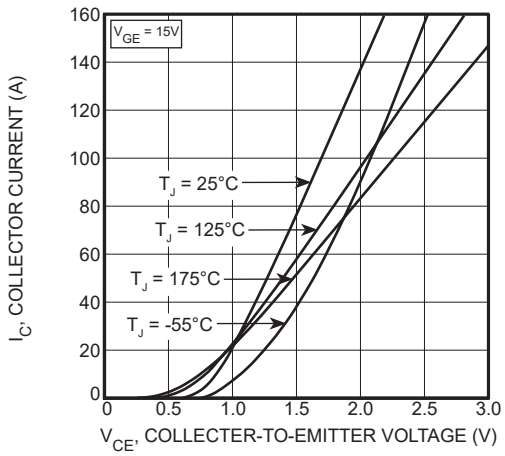


FIGURE 1, Output Characteristics(T_J = 25°C)

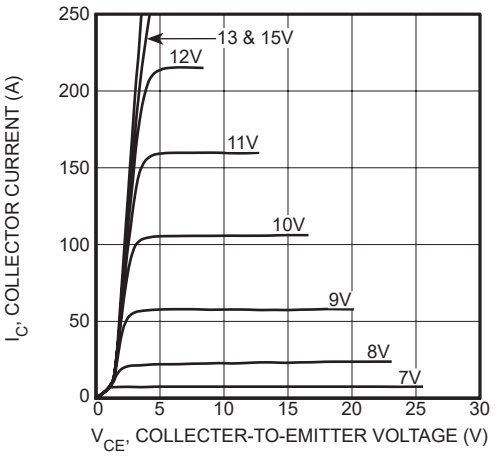


FIGURE 2, Output Characteristics (T_J = 125°C)

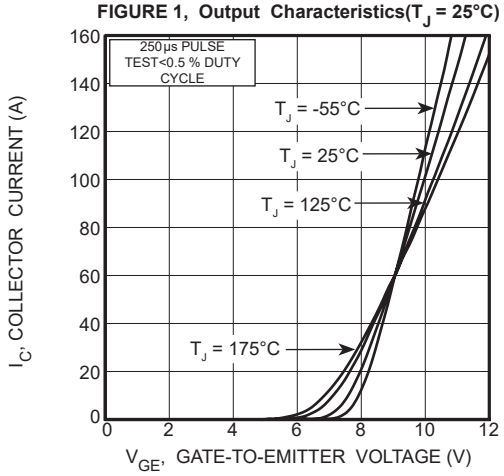


FIGURE 3, Transfer Characteristics

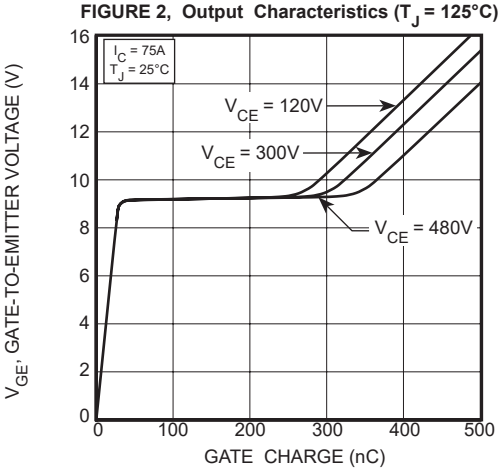


FIGURE 4, Gate Charge

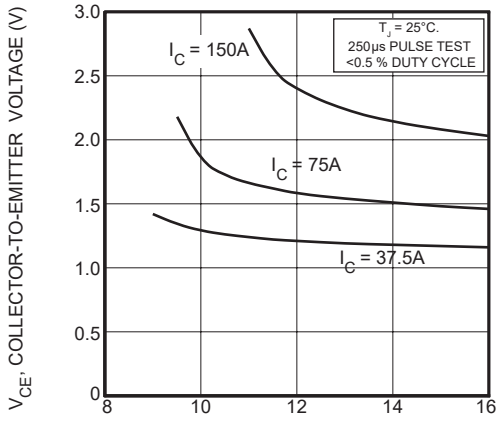


FIGURE 5, On State Voltage vs Gate-to- Emitter Voltage

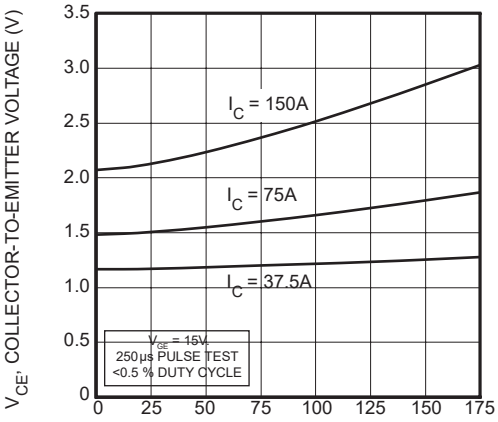


FIGURE 6, On State Voltage vs Junction Temperature

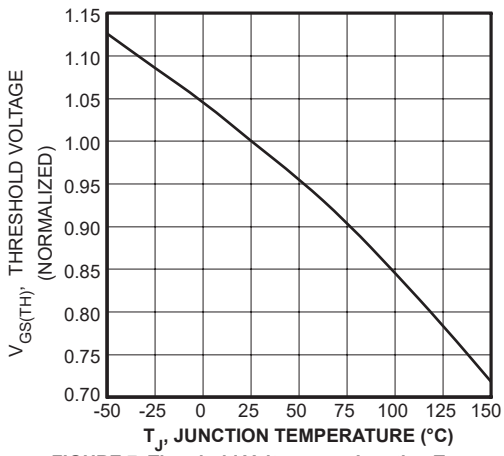


FIGURE 7, Threshold Voltage vs. Junction Temperature

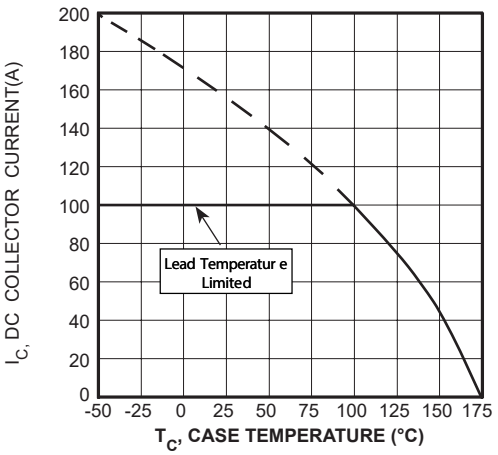


FIGURE 8, DC Collector Current vs Case Temperature

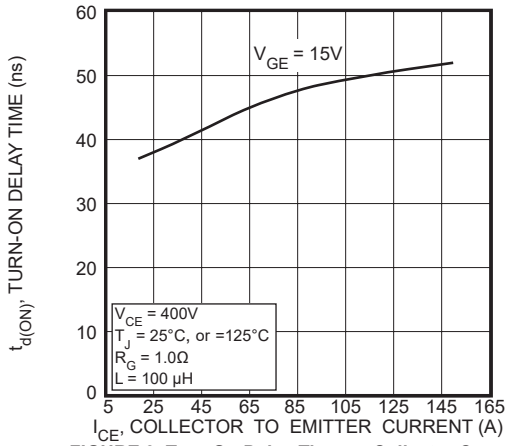


FIGURE 9, Turn-On Delay Time vs Collector Current

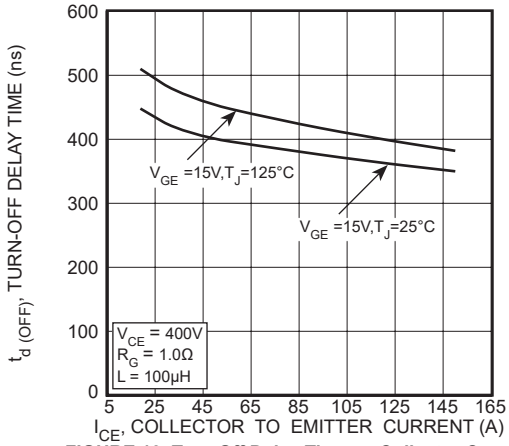


FIGURE 10, Turn-Off Delay Time vs Collector Current

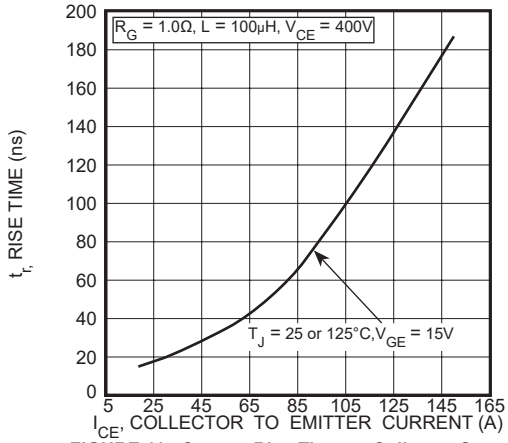


FIGURE 11, Current Rise Time vs Collector Current

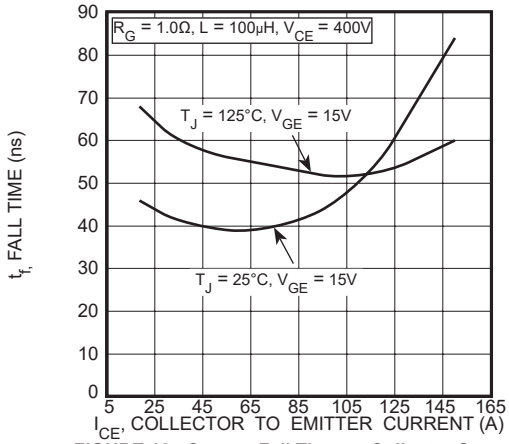


FIGURE 12, Current Fall Time vs Collector Current

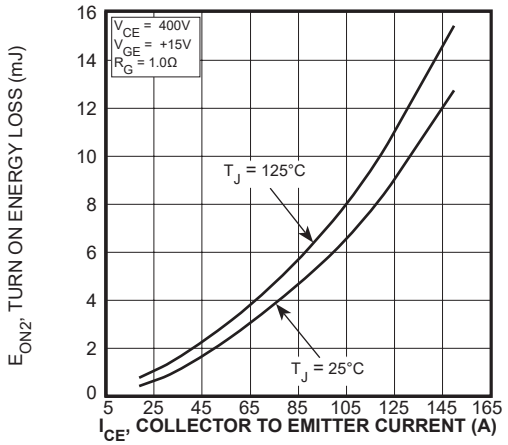


FIGURE 13, Turn-On Energy Loss vs Collector Current

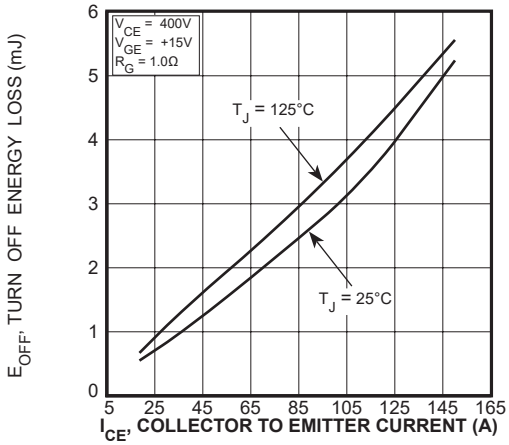


FIGURE 14, Turn Off Energy Loss vs Collector Current

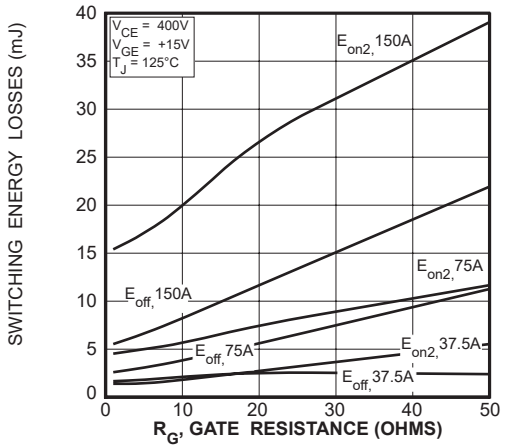


FIGURE 15, Switching Energy Losses vs. Gate Resistance

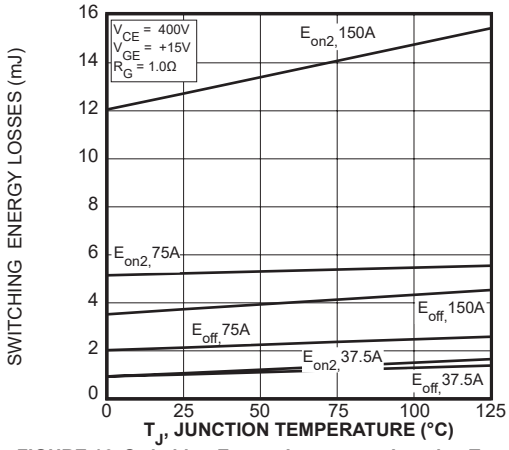


FIGURE 16, Switching Energy Losses vs Junction Temperature

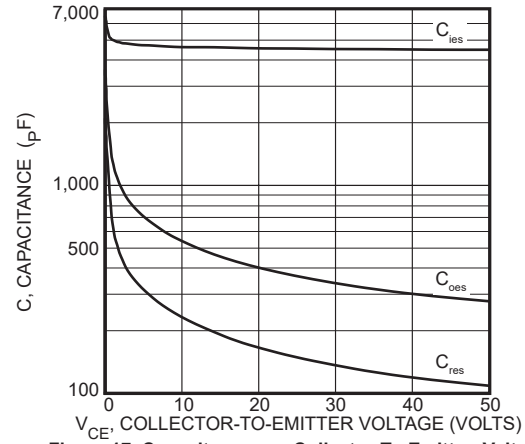


Figure 17, Capacitance vs Collector-To-Emitter Voltage

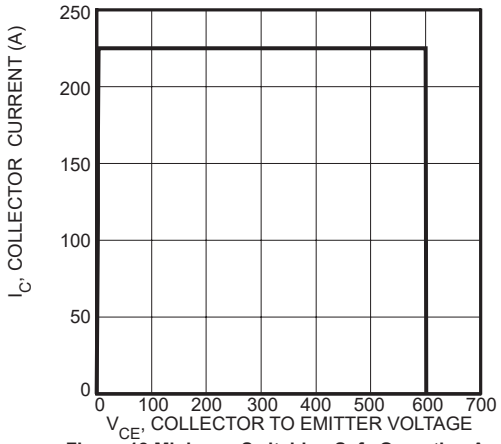


Figure 18,Minimum Switching Safe Operating Area

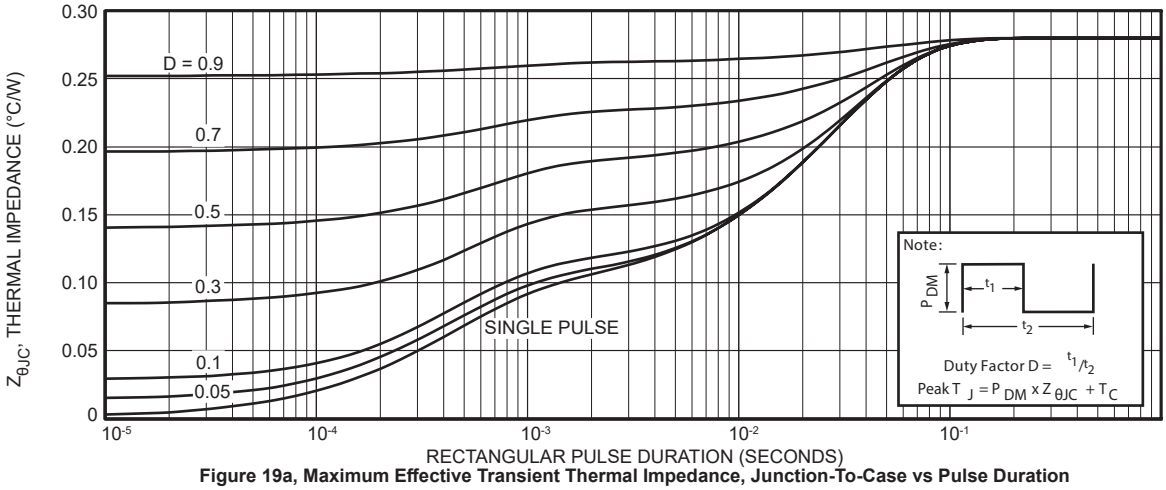


Figure 19a, Maximum Effective Transient Thermal Impedance, Junction-To-Case vs Pulse Duration

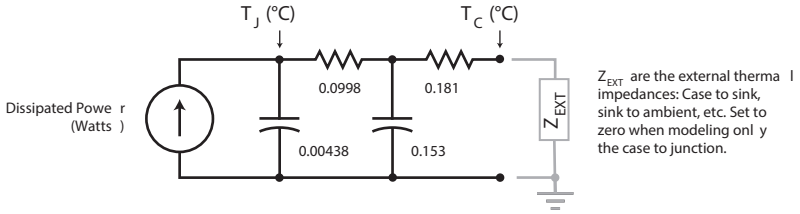


FIGURE 19b, TRANSIENT THERMAL IMPEDANCE MODEL

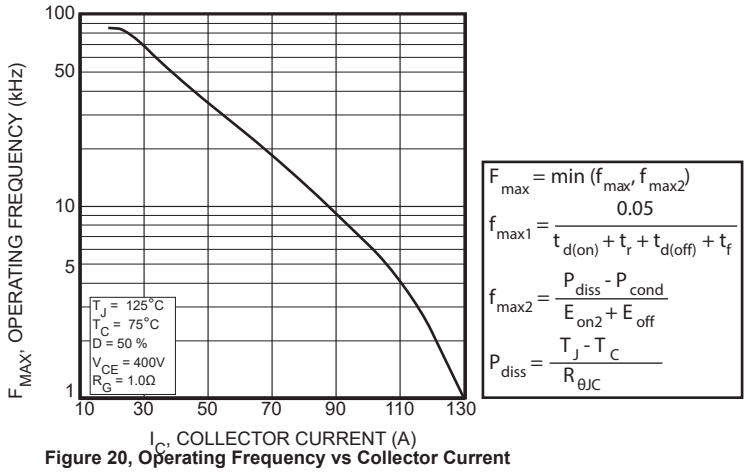


Figure 20, Operating Frequency vs Collector Current

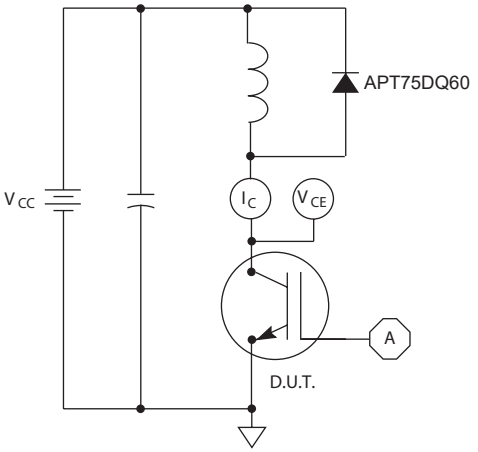


Figure 21, Inductive Switching Test Circuit

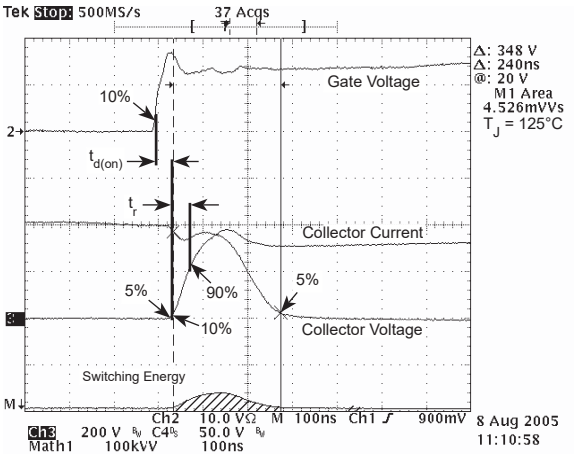


Figure 22, Turn-on Switching Waveforms and Definitions

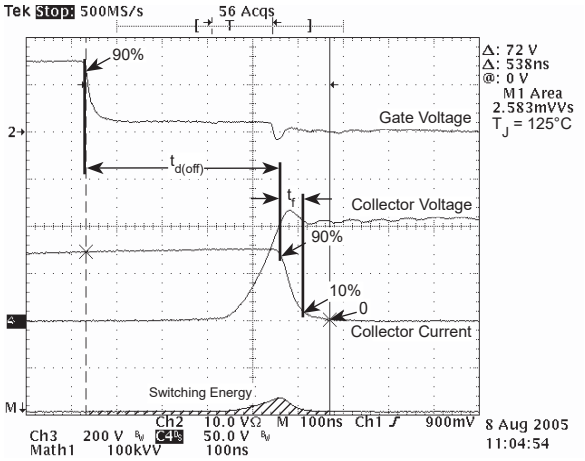
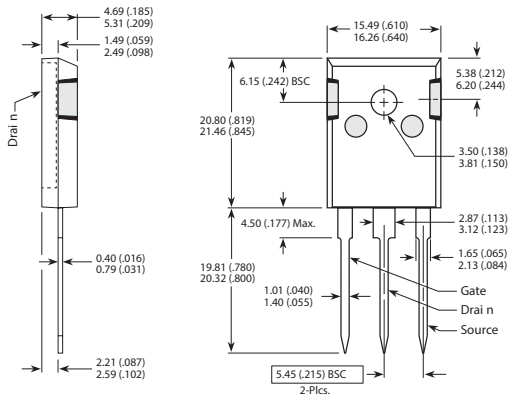
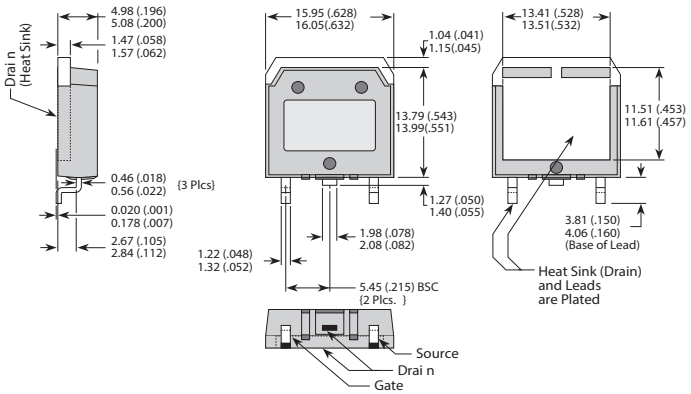


Figure 23, Turn-off Switching Waveforms and Definitions

TO-247 (B) Package Outline



D³PAK (S) Package Outline



Dimensions in Millimeters (Inches)

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