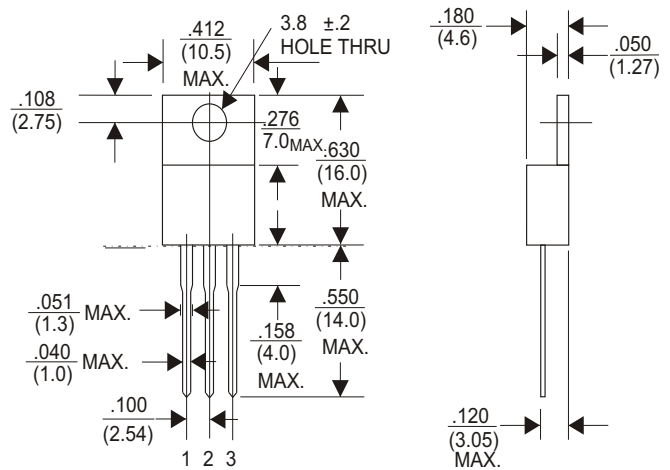


Features

- High voltage, high speed switching
- High reliability

TO-220



Dimensions in inches and (millimeters)

Absolute Maximum Rating ($T_C=25^\circ\text{C}$)

Parameter	Symbol	Value	Unit
Collector-Base Voltage	BV_{CBO}	700	V
Collector-Emitter Voltage	BV_{CEO}	410	V
Emitter-Base Voltage	BV_{EBO}	9	V
Collector Current	I_C	12	A
Collector Current pulse	I_{CM}	24	A
Base Current	I_B	6	A
Base Current pulse	I_{BM}	12	A
Power Dissipation	P_D	$T_a=25^\circ\text{C}$	2
		$T_C=25^\circ\text{C}$	80
Junction Temperature	T_j	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55 ~ 150	$^\circ\text{C}$

Note: 1. Pulse Test: Pulse Width = 5ms, Duty Cycle $\leq 10\%$

2. Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

13009

Electrical Characteristics (Ta=25°C)

Parameter	Symbol	Conditions	Value			Unit
			Min	Typ	Max	
Collector-base breakdown voltage	BV_{CBO}	$I_C = 1\text{mA}, I_E = 0$	700			V
Collector-emitter breakdown voltage	BV_{CEO}	$I_C = 5\text{mA}, I_B = 0$	410		520	V
Emitter-base breakdown voltage	BV_{EBO}	$I_E = 0.1\text{mA}, I_C = 0$	9			V
Collector cut-off current	I_{CBO}	$V_{CB} = 700\text{V}, I_E = 0$			1	mA
Emitter cut-off current	I_{EBO}	$V_{EB} = 9\text{V}, I_C = 0$			1	mA
DC current gain	$h_{FE(1)}$	$V_{CE} = 5\text{V}, I_C = 3\text{A}$	10		35	
	$h_{FE(2)}$	$V_{CE} = 5\text{V}, I_C = 2\text{mA}$	10			
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = 5\text{A}, I_B = 1\text{A}$ $I_C = 8\text{A}, I_B = 1.6\text{A}$ $I_C = 12\text{A}, I_B = 3\text{A}$			1.0 1.5 3	V
Base-emitter on voltage	$V_{BE(sat)}$	$I_C = 5\text{A}, I_B = 1\text{A}$ $I_C = 8\text{A}, I_B = 1.6\text{A}$			1.2 1.6	V
Transition frequency	f_T	$I_C = 0.5\text{A}, V_{CE} = 10\text{V},$ $f = 1\text{MHz}$	4			MHz
Output Capacitance	C_{ob}	$V_{CB} = 10\text{V}, I_E = 0$ $f = 0.1\text{MHz}$		180		pF
Delay Time	t_d	$V_C = 125\text{V}, I_C = 8\text{A},$ $I_{B1} = I_{B2} = 1.6\text{A}$ $t_p = 25\mu\text{s}, \text{Duty} \leq 1\%$			0.1	μs
Rise Time	t_R				1	μs
Fall Time	t_F				0.7	μs
Switching Time	t_S	$I_C = 500\text{mA}$			0.7	μs

*Pulse Test: Pulse Width = 300 μs , Duty Cycle = 2%

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance Junction to Ambient	θ_{JA}	54	$^{\circ}\text{C}/\text{W}$
Thermal Resistance Junction to Case	θ_{JC}	4	$^{\circ}\text{C}/\text{W}$

RATING AND CHARACTERISTIC CURVES (13009)

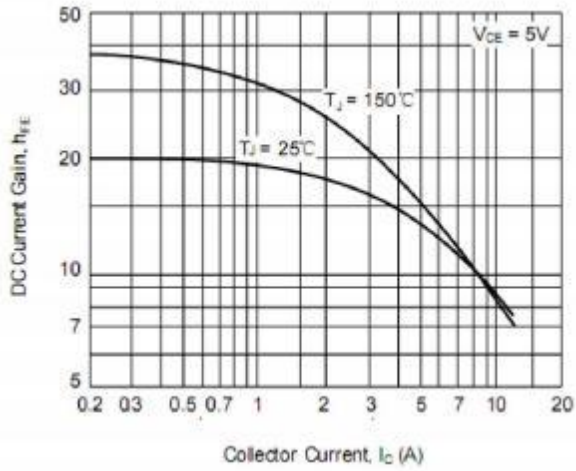


Figure 1. DC current Gain

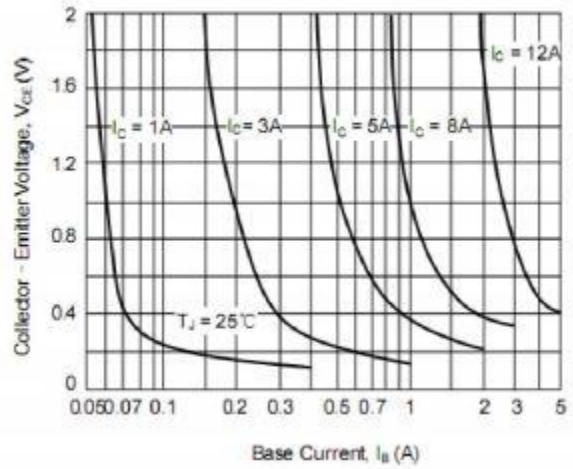


Figure 2. Collector Saturation Region

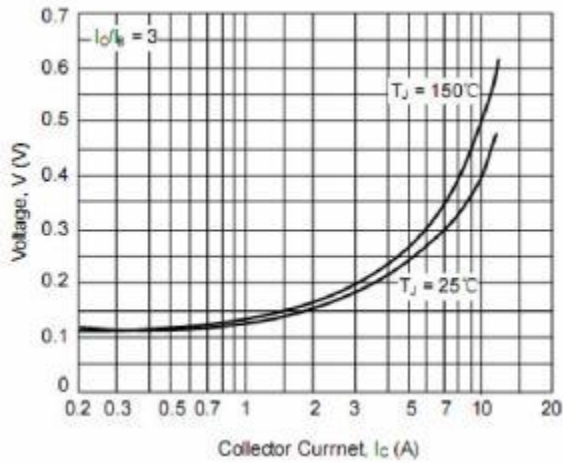


Figure 3. Collector Saturation Voltage

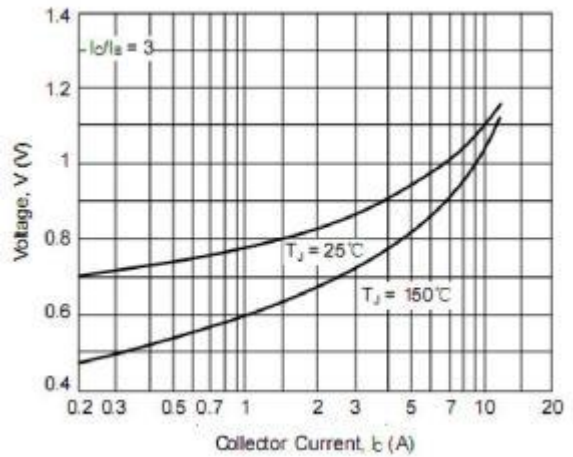


Figure 4. Safe Operating Area Base and

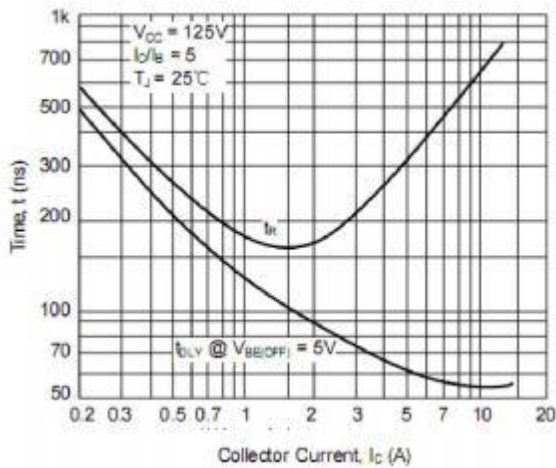


Figure 5. Turn-On Time

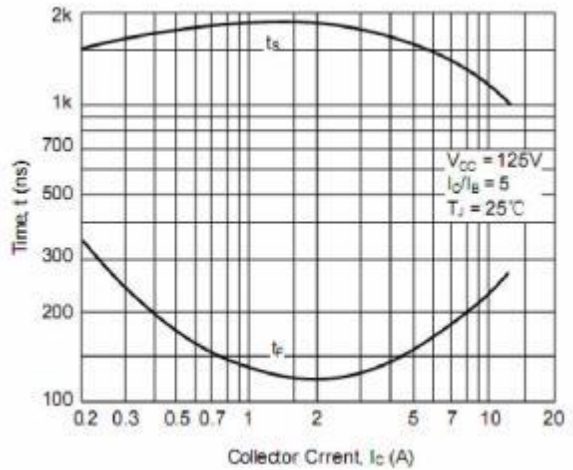


Figure 6. Turn-Off Time