

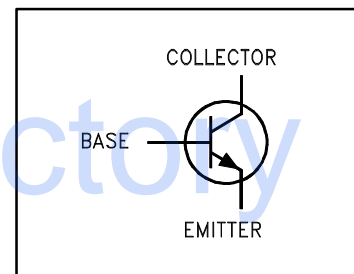
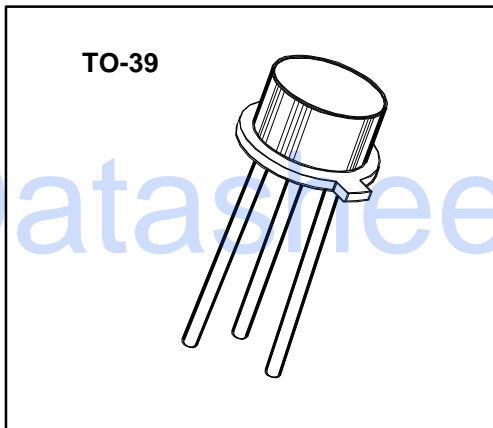
**2N2218A**

## Features

- Meets MIL 19500 /251
- Collector - Base Voltage 75V
- Collector - Current 800 mA
- Medium Current, Bipolar Transistor
- Available in TO-5

**SWITCHING  
 TRANSISTOR  
 JAN, JANTX, JANTXV**

**SMALL SIGNAL  
 BIPOLAR  
 NPN SILICON**



## Maximum Ratings

RATING	SYMBOL	VALUE	UNIT
Collector - Emitter Voltage	$V_{CEO}$	50	Vdc
Collector - Base Voltage	$V_{CB0}$	75	Vdc
Emitter - Base Voltage	$V_{EBO}$	6	Vdc
Collector Current - Continuous	$I_C$	800	mAdc
Total Device Dissipation @ $T_A = 25\text{ }^\circ\text{C}$	$P_D$	0.8	WATTS
Derate above $25\text{ }^\circ\text{C}$		4.6	mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25\text{ }^\circ\text{C}$	$P_D$	3.0	WATTS
Derate above $25\text{ }^\circ\text{C}$		17.0	mW/ $^\circ\text{C}$
Operating Junction&Storage Temperature Range	$T_J, T_{stg}$	-55 to +200	$^\circ\text{C}$

## Thermal Characteristics

CHARACTERISTIC	SYMBOL	MAX	UNIT
Thermal Resistance, Junction to Ambient	$R\theta_{JA}$	217	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Case	$R\theta_{JC}$	59	$^\circ\text{C}/\text{W}$

Electrical Characteristics ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

OFF CHARACTERISTIC	SYMBOL	MIN	MAX	UNIT
Collector - Emitter Breakdown Voltage (1) ( $I_C = 10 \text{ mA dc}, I_B = 0$ )	$V(\text{BR})_{\text{CEO}}$	50		Vdc
Collector - Base Breakdown Voltage ( $I_C = 10 \mu\text{Adc}, I_E = 0$ )	$V(\text{BR})_{\text{CBO}}$	75		Vdc
Emitter - Base Breakdown Voltage ( $I_E = 10 \mu\text{Adc}, I_C = 0$ )	$V(\text{BR})_{\text{EBO}}$	6		Vdc
Collector - Emitter Cutoff Current ( $V_{\text{CE}} = 50 \text{ Vdc}$ )	$I_{\text{CES}}$		10	nAdc
Collector - Base Cutoff Current ( $V_{\text{CB}} = 60 \text{ Vdc}, I_E = 0$ )	$I_{\text{CBO}}$		10	nAdc
( $V_{\text{CB}} = 60 \text{ Vdc}, I_E = 0, T_A = 150^\circ\text{C}$ )			10	$\mu\text{Adc}$
Emitter - Base Cutoff Current ( $V_{\text{EB}} = 4 \text{ Vdc}$ )	$I_{\text{EBO}}$		10	nAdc
( $V_{\text{EB}} = 6 \text{ Vdc}$ )			10	$\mu\text{Adc}$

ON CHARACTERISTIC	SYMBOL	MIN	MAX	UNIT
DC Current Gain	$h_{\text{FE}}$			
( $I_C = 0.1 \text{ mA dc}, V_{\text{CE}} = 10 \text{ Vdc}$ ) (1)		30		
( $I_C = 1 \text{ mA dc}, V_{\text{CE}} = 10 \text{ Vdc}$ ) (1)		35	150	
( $I_C = 10 \text{ mA dc}, V_{\text{CE}} = 10 \text{ Vdc}$ ) (1)		40		
( $I_C = 150 \text{ mA dc}, V_{\text{CE}} = 10 \text{ Vdc}$ ) (1)		40	120	
( $I_C = 500 \text{ mA dc}, V_{\text{CE}} = 10 \text{ Vdc}$ ) (1)		20		
( $I_C = 10 \text{ mA dc}, V_{\text{CE}} = 10 \text{ Vdc}, T_J = -55^\circ\text{C}$ ) (1)		35		
Collector - Emitter Saturation Voltage	$V_{\text{CE}(\text{sat})}$			
( $I_C = 150 \text{ mAdc}, I_B = 15 \text{ mAdc}$ ) (1)			0.3	Vdc
( $I_C = 500 \text{ mAdc}, I_B = 50 \text{ mAdc}$ ) (1)			1.0	Vdc
Base - Emitter Saturation Voltage	$V_{\text{BE}(\text{sat})}$			
( $I_C = 150 \text{ mAdc}, I_B = 15 \text{ mAdc}$ ) (1)		0.6	1.2	Vdc
( $I_C = 500 \text{ mAdc}, I_B = 50 \text{ mAdc}$ ) (1)			2.0	Vdc

1. Pulse Test: Pulse Width  $\leq 300 \mu\text{s}$ , Duty Cycle  $\leq 2\%$

# 2N2218A

**Electrical Characteristics** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

SMALL - SIGNAL CHARACTERISTICS	SYMBOL	MIN	MAX	UNIT
<b>Output Capacitance</b>	$C_{obo}$			
( $V_{CB} = 10 \text{ Vdc}$ , $I_E = 0$ , $100\text{kHz} \leq f \leq 1 \text{ MHz}$ )			8.0	pF
<b>Input Capacitance</b>	$C_{ibo}$			
( $V_{EB} = 0.5 \text{ Vdc}$ , $I_C = 0$ , $100\text{kHz} \leq f \leq 1 \text{ MHz}$ )			25	pF

SWITCHING CHARACTERISTICS	SYMBOL	MIN	MAX	UNIT
<b>Turn - On Time</b>	$t_{on}$			
( $V_{CC} = 30 \text{ Vdc}$ , $I_C = 150 \text{ mAdc}$ , $I_{B1} = 15 \text{ mAdc}$ ) ( See FIGURE 1 )			35	ns
<b>Turn - Off Time</b>	$t_{off}$			
( $V_{CC} = 30 \text{ Vdc}$ , $I_C = 150 \text{ mAdc}$ , $I_{B1} = -I_{B2} = 15 \text{ mAdc}$ ) ( See FIGURE 2 )			300	ns

**Small - Signal AC Characteristics** ( $T_A = 25^\circ\text{C}$ )

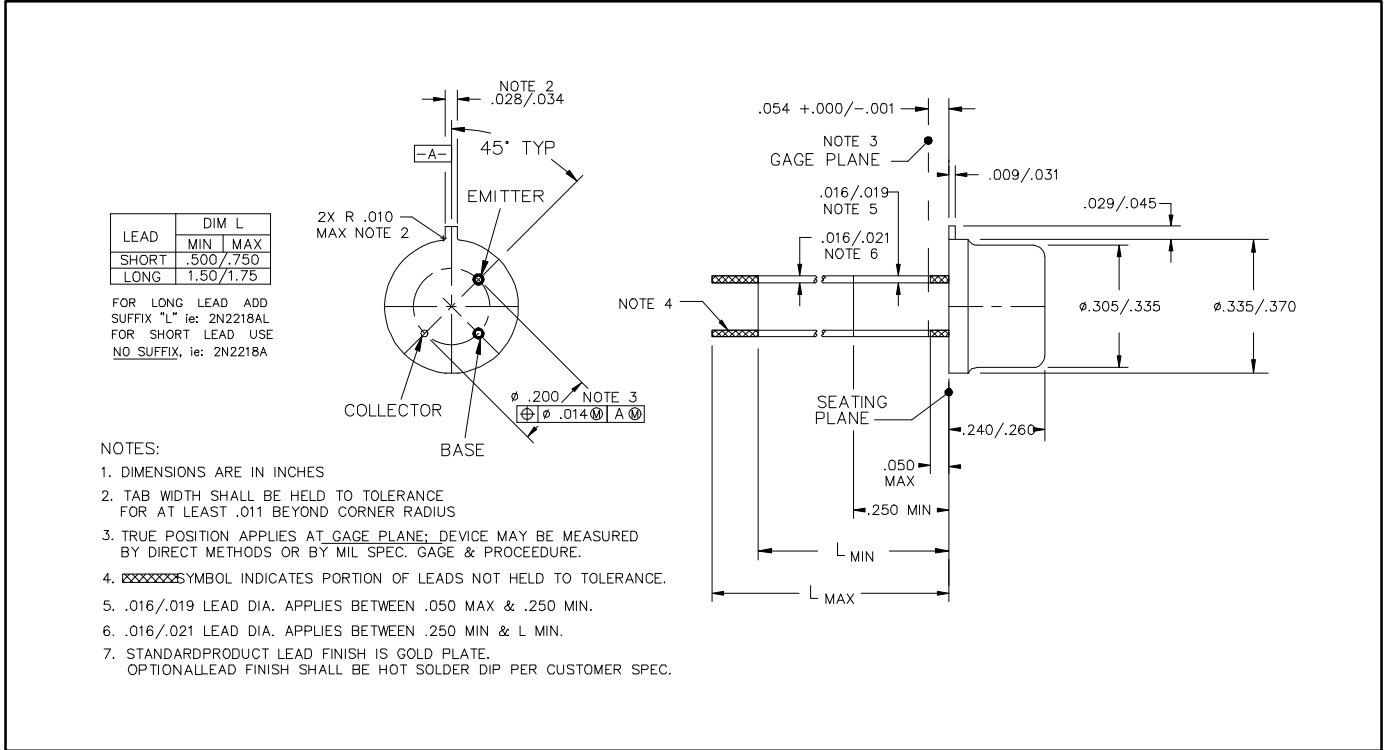
LOW FREQUENCY	SYMBOL	MIN	MAX	UNIT
<b>Common - Emitter Forward Current Transfer Ratio</b>	$h_{fe}$			
( $I_C = 1 \text{ mA}$ , $V_{CE} = 10 \text{ V}$ , $f = 1 \text{ kHz}$ )		35		
<b>HIGH FREQUENCY</b>				
<b>Common - Emitter Forward Current Transfer Ratio</b>	$ h_{fe} $			
( $I_C = 20 \text{ mA}$ , $V_{CE} = 20 \text{ V}$ , $f = 100 \text{ MHz}$ )		2.5	12	

**Spice Model** (based upon typical device characteristics) <sup>\*1</sup>

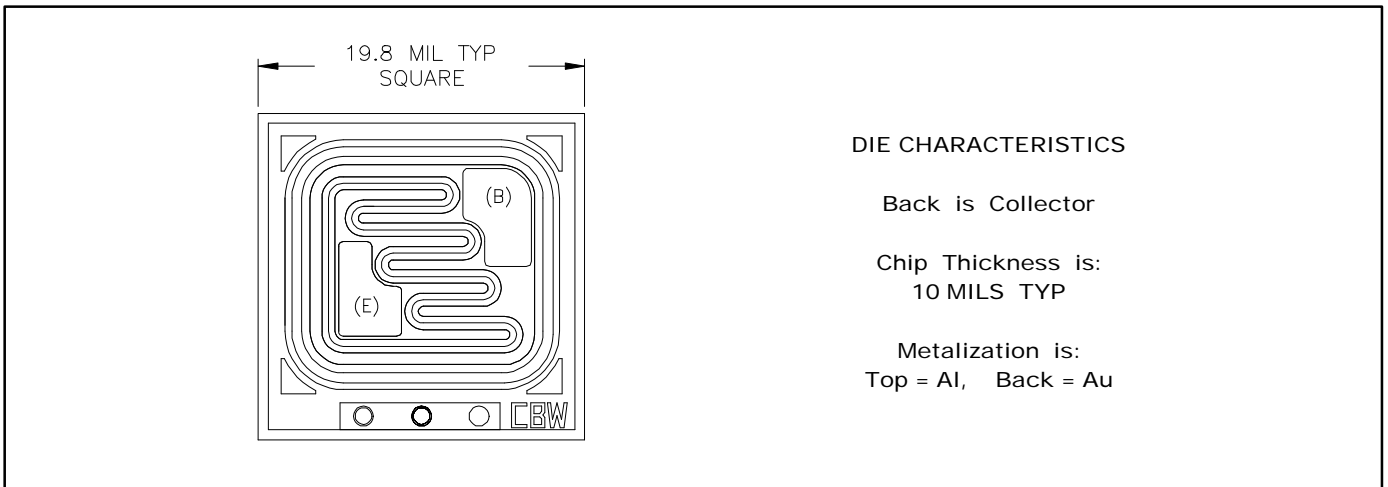
Q2N2218A NPN ( IS = 21.2f XTI = 3.0 EG = 1.11 VAF = 103.8 BF = 90.7 ISE = 3.34p  
 + NE = 2.05 IKF = 1.255 NK = 0.9394 XTB = 1.5 BR = 1.031 ISC = 3.299p  
 + NC = 1.605 IKR = 0.8992 RC = 0.0 CJC = 19.4p MJC = 0.3333 VJC = 0.75  
 + FC = 0.5 CJE = 29.6p MJE = 0.3333 VJE = 0.75 TR = 275.0 n TF = 564.5p  
 + ITF = 1.0 XTF = 0.0 VTF = 10.0 )

\*1. Microsemi Corp. claims no responsibility for misapplication of Spice Model information. Spice modeling should be used as a precursor guide to in-circuit performance. Actual performance is the responsibility of the user/designer.

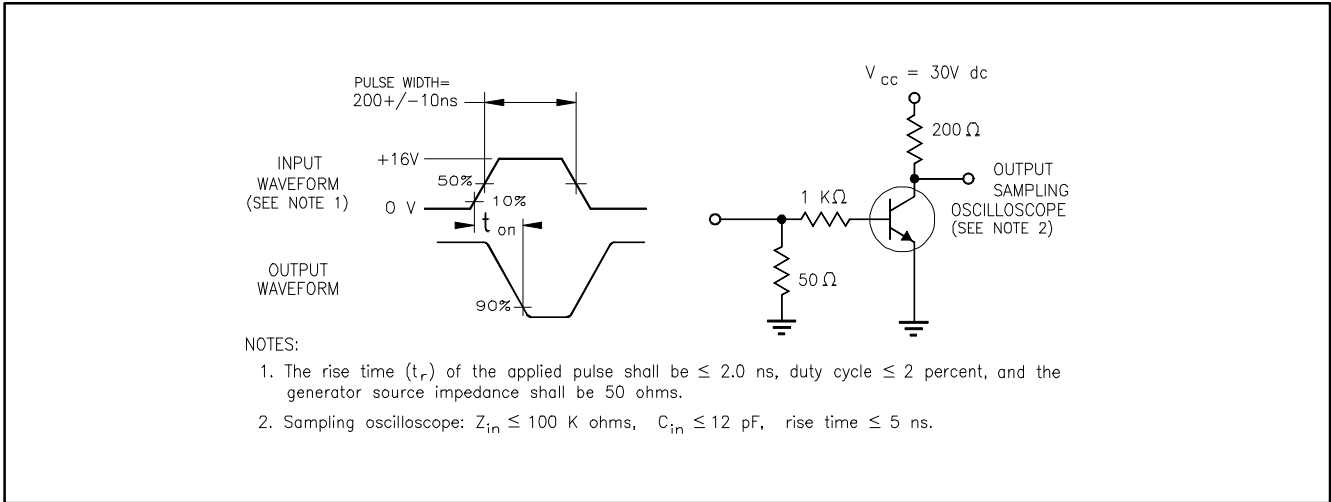
**2N2218A**



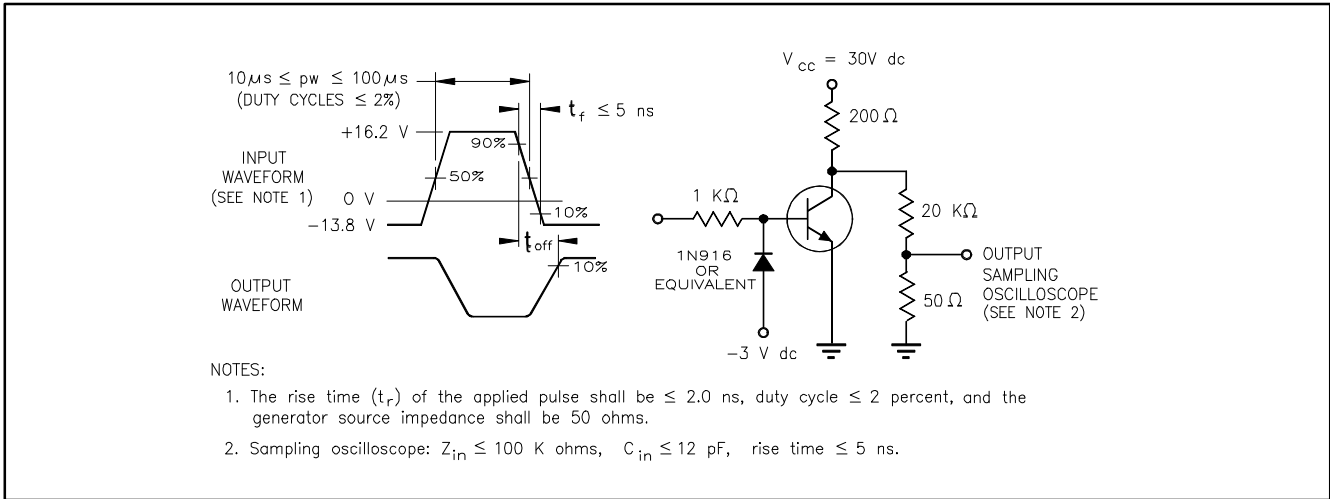
**TO-39 CASE OUTLINE**



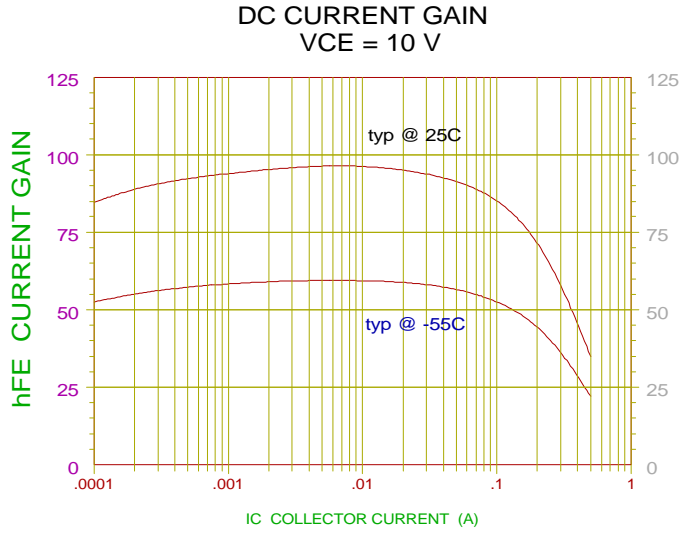
**DIE OUTLINE**



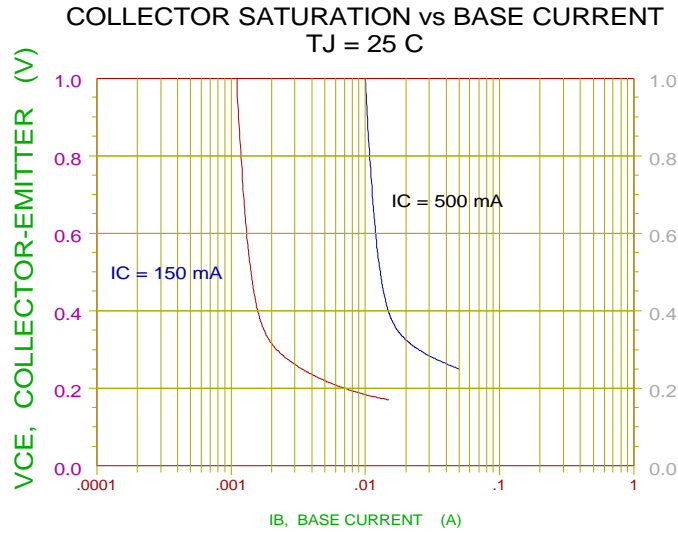
**FIGURE 1 Saturated Turn-on Time Test Circuit**



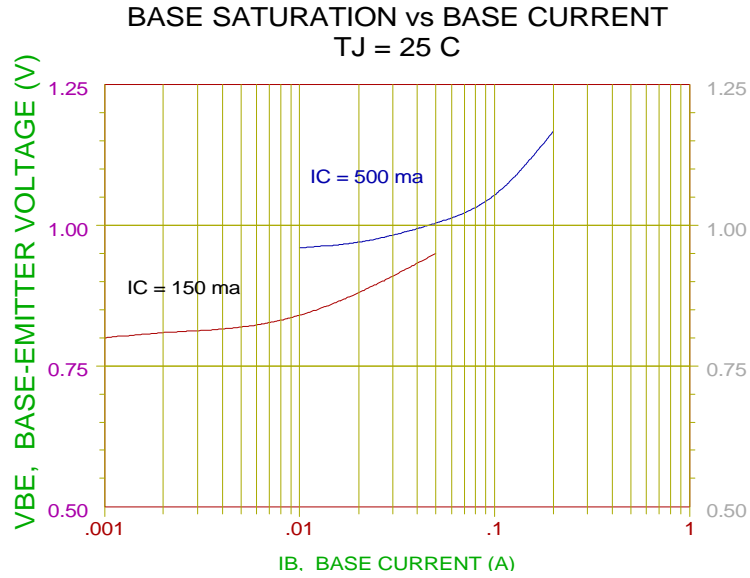
**FIGURE 2 Saturated Turn-off Time Test Circuit**



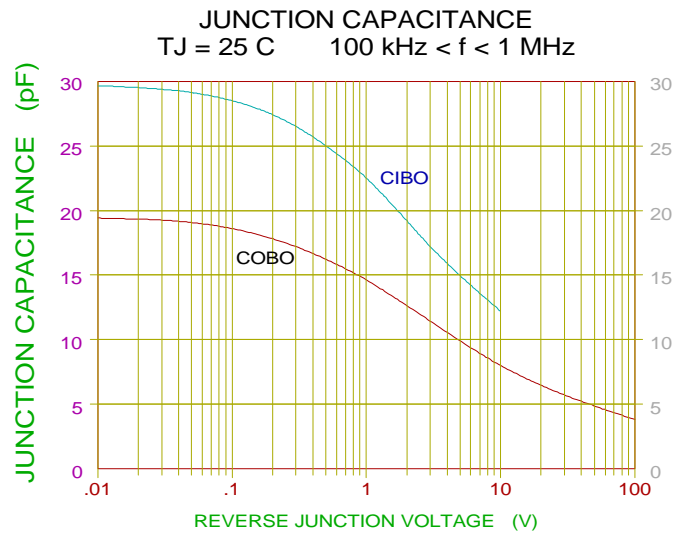
**FIGURE 3**



**FIGURE 4**



**FIGURE 5**



**FIGURE 6**

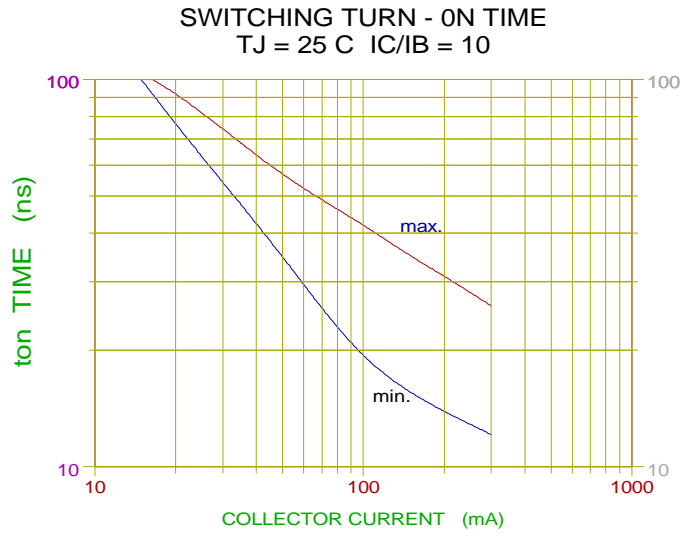


FIGURE 7

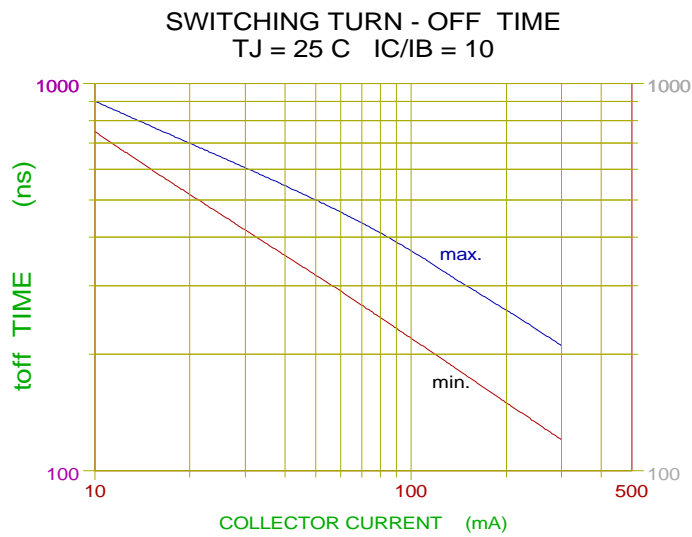
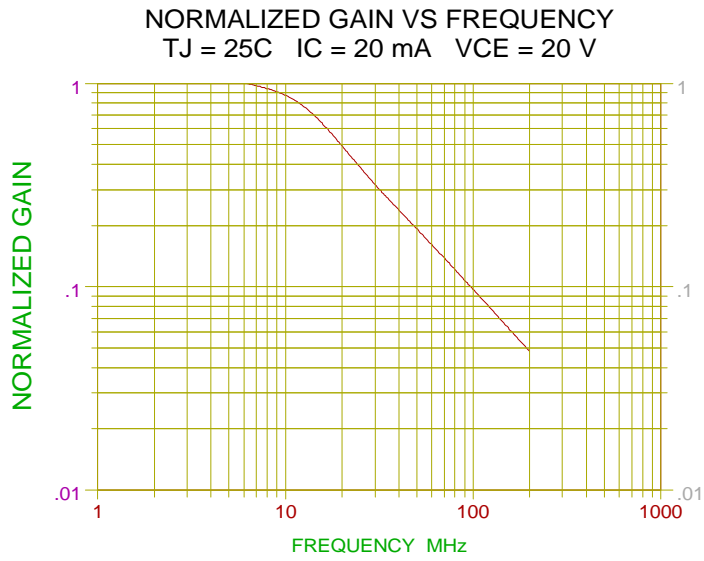


FIGURE 8





**FIGURE 9**