

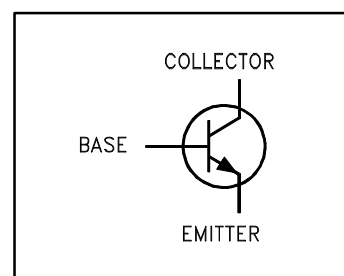
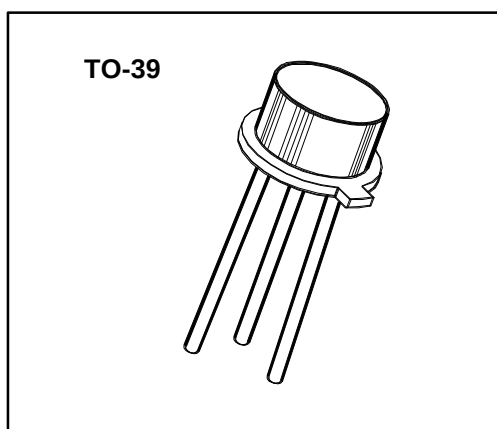
2N2218A

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_{CBO}	75	Vdc
Emitter - Base Voltage	V_{EBO}	6	Vdc
Collector Current - Continuous	I_C	800	mA dc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$	P_D	0.8	WATTS
Derate above 25°C		4.6	mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$	P_D	3.0	WATTS
Derate above 25°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	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case	$R_{\theta JC}$	59	$^\circ\text{C/W}$

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

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

ON CHARACTERISTIC	SYMBOL	MIN	MAX	UNIT
DC Current Gain	h_{FE}			
($I_C = 0.1\text{ mA dc}, V_{CE} = 10\text{ Vdc}$) (1)		30		
($I_C = 1\text{ mA dc}, V_{CE} = 10\text{ Vdc}$) (1)		35	150	
($I_C = 10\text{ mA dc}, V_{CE} = 10\text{ Vdc}$) (1)		40		
($I_C = 150\text{ mA dc}, V_{CE} = 10\text{ Vdc}$) (1)		40	120	
($I_C = 500\text{ mA dc}, V_{CE} = 10\text{ Vdc}$) (1)		20		
($I_C = 10\text{ mA dc}, V_{CE} = 10\text{ Vdc}, T_J = -55^\circ\text{C}$) (1)		35		
Collector - Emitter Saturation Voltage	$V_{CE(sat)}$			
($I_C = 150\text{ mAdc}, I_B = 15\text{ mAdc}$) (1)			0.3	Vdc
($I_C = 500\text{ mAdc}, I_B = 50\text{ mAdc}$) (1)			1.0	Vdc
Base - Emitter Saturation Voltage	$V_{BE(sat)}$			
($I_C = 150\text{ mAdc}, I_B = 15\text{ mAdc}$) (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 $\leq 300\text{ }\mu\text{s}$, Duty Cycle $\leq 2\%$

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

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

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

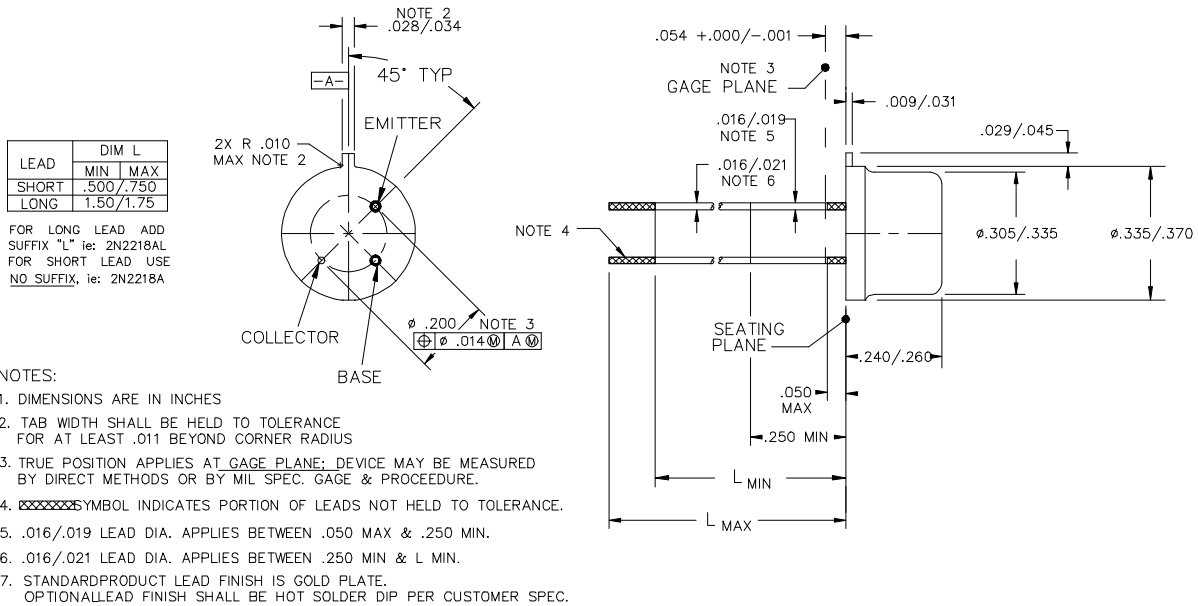
Small - Signal AC Characteristics ($T_A = 25^\circ\text{C}$)

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

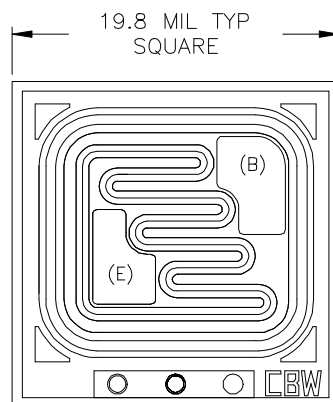
Spice Model (based upon typical device characteristics) *1

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.



TO-39 CASE OUTLINE



DIE CHARACTERISTICS

Back is Collector

Chip Thickness is:
 10 MILS TYP

Metalization is:
 Top = Al, Back = Au

DIE OUTLINE

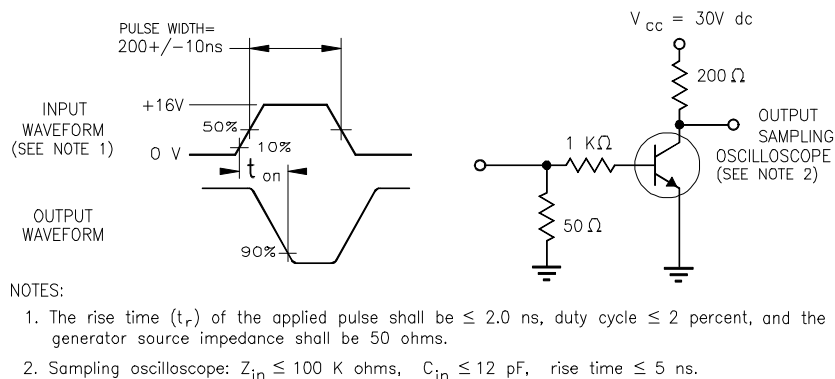


FIGURE 1 Saturated Turn-on Time Test Circuit

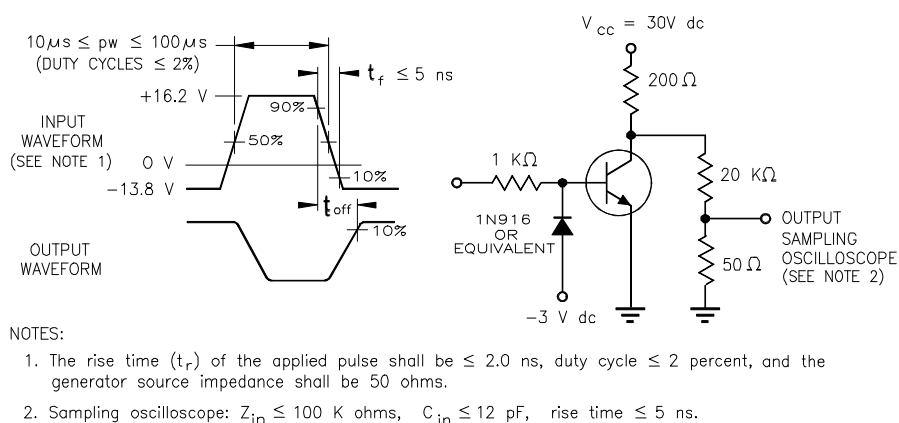


FIGURE 2 Saturated Turn-off Time Test Circuit

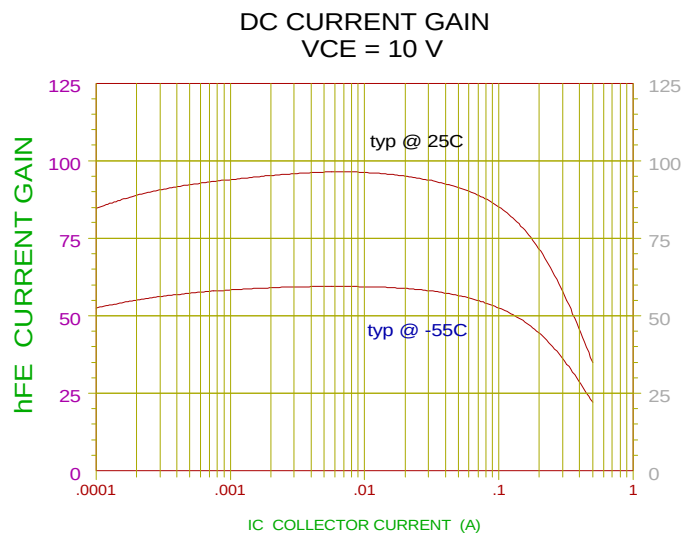


FIGURE 3

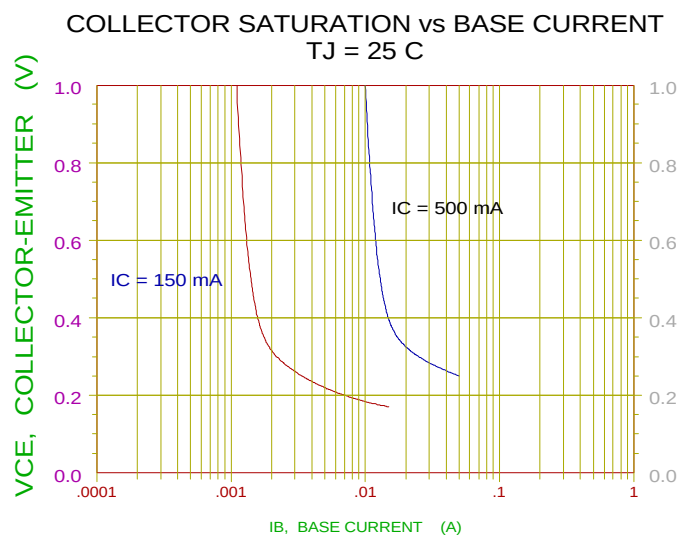


FIGURE 4

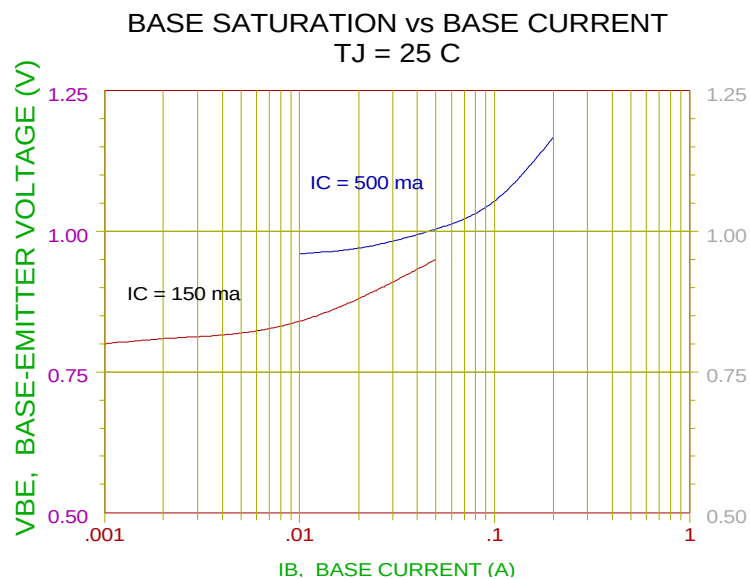


FIGURE 5

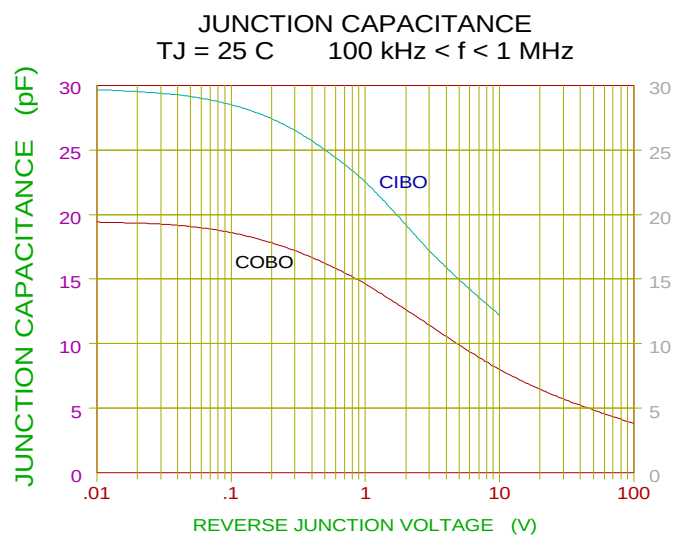


FIGURE 6

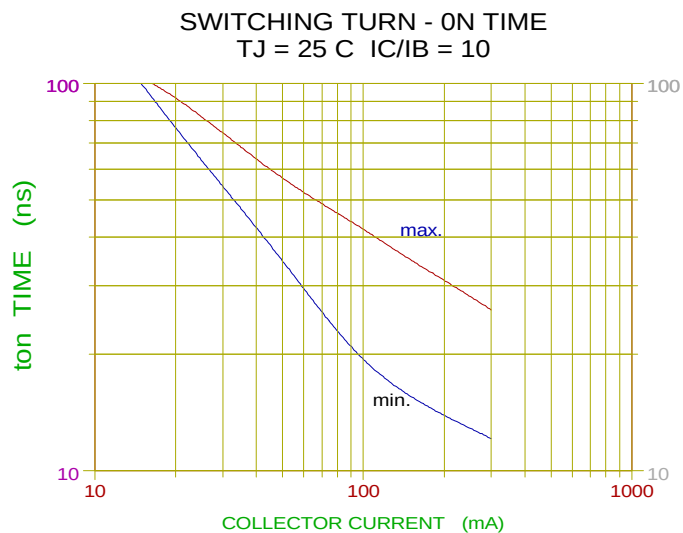


FIGURE 7

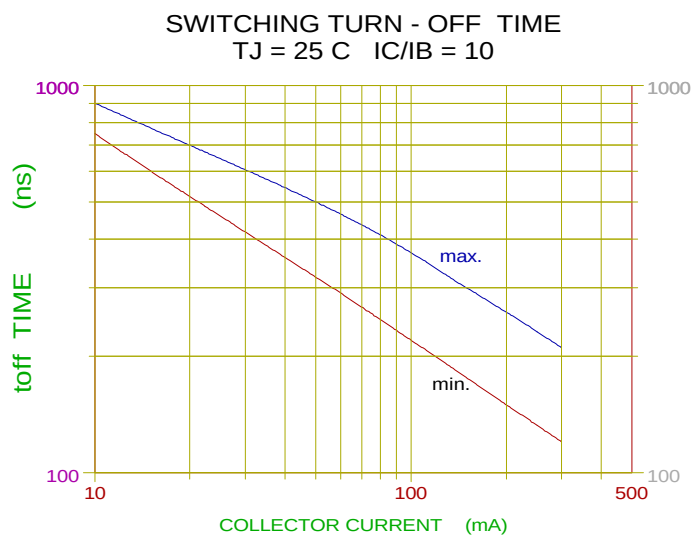


FIGURE 8

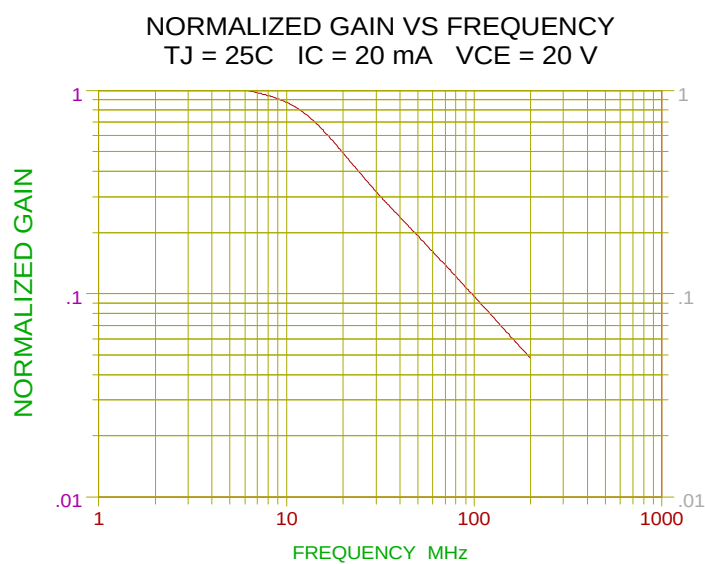


FIGURE 9