

# 2N2222A

## Small Signal Switching Transistor

### NPN Silicon

#### Features

- MIL-PRF-19500/255 Qualified
- Available as JAN, JANTX, and JANTXV

#### MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Value	Unit
Collector-Emitter Voltage	$V_{CEO}$	50	Vdc
Collector-Base Voltage	$V_{CBO}$	75	Vdc
Emitter-Base Voltage	$V_{EBO}$	6.0	Vdc
Collector Current - Continuous	$I_C$	800	mAdc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$	$P_T$	500	mW
Total Device Dissipation @ $T_C = 25^\circ\text{C}$	$P_T$	1.0	W
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	-65 to +200	$^\circ\text{C}$

#### THERMAL CHARACTERISTICS

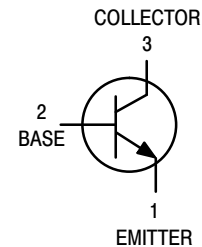
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	325	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case	$R_{\theta JC}$	150	$^\circ\text{C/W}$

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.



ON Semiconductor®

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TO-18  
CASE 206AA  
STYLE 1

#### ORDERING INFORMATION

Device	Package	Shipping
JAN2N2222A	TO-18	Bulk
JANTX2N2222A		
JANTXV2N2222A		

## 2N2222A

### ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
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#### OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage ( $I_C = 10\text{ mAdc}$ )	$V_{(BR)CEO}$	50	–	Vdc
Collector–Base Cutoff Current ( $V_{CB} = 75\text{ Vdc}$ ) ( $V_{CB} = 60\text{ Vdc}$ )	$I_{CBO}$	– –	10 10	$\mu\text{Adc}$ $\text{nAdc}$
Emitter–Base Cutoff Current ( $V_{EB} = 6.0\text{ Vdc}$ ) ( $V_{EB} = 4.0\text{ Vdc}$ )	$I_{EBO}$	– –	10 10	$\mu\text{Adc}$ $\text{nAdc}$
Collector–Emitter Cutoff Current ( $V_{CE} = 50\text{ Vdc}$ )	$I_{CES}$	–	50	$\text{nAdc}$

#### ON CHARACTERISTICS (Note 1)

DC Current Gain ( $I_C = 0.1\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ ) ( $I_C = 1.0\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ ) ( $I_C = 10\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ ) ( $I_C = 150\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ ) ( $I_C = 500\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ )	$h_{FE}$	50 75 100 100 30	– 325 – 300 –	–
Collector–Emitter Saturation Voltage ( $I_C = 150\text{ mAdc}$ , $I_B = 15\text{ mAdc}$ ) ( $I_C = 500\text{ mAdc}$ , $I_B = 50\text{ mAdc}$ )	$V_{CE(sat)}$	– –	0.3 1.0	Vdc
Base–Emitter Saturation Voltage ( $I_C = 150\text{ mAdc}$ , $I_B = 15\text{ mAdc}$ ) ( $I_C = 500\text{ mAdc}$ , $I_B = 50\text{ mAdc}$ )	$V_{BE(sat)}$	0.6 –	1.2 2.0	Vdc

#### SMALL–SIGNAL CHARACTERISTICS

Magnitude of Small–Signal Current Gain ( $I_C = 20\text{ mAdc}$ , $V_{CE} = 20\text{ Vdc}$ , $f = 100\text{ MHz}$ )	$ h_{fe} $	2.5	–	–
Small–Signal Current Gain ( $I_C = 1.0\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ , $f = 1\text{ kHz}$ )	$h_{fe}$	50	–	–
Input Capacitance ( $V_{EB} = 0.5\text{ Vdc}$ , $I_C = 0$ , $100\text{ kHz} \leq f \leq 1.0\text{ MHz}$ )	$C_{ibo}$	–	25	pF
Output Capacitance ( $V_{CB} = 10\text{ Vdc}$ , $I_E = 0$ , $100\text{ kHz} \leq f \leq 1.0\text{ MHz}$ )	$C_{obo}$	–	8.0	pF

#### SWITCHING (SATURATED) CHARACTERISTICS

Turn–On Time (Reference Figure in MIL–PRF–19500/255)	$t_{on}$	–	35	ns
Turn–Off Time (Reference Figure in MIL–PRF–19500/255)	$t_{off}$	–	300	ns

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

1. Pulse Test: Pulse Width = 300  $\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

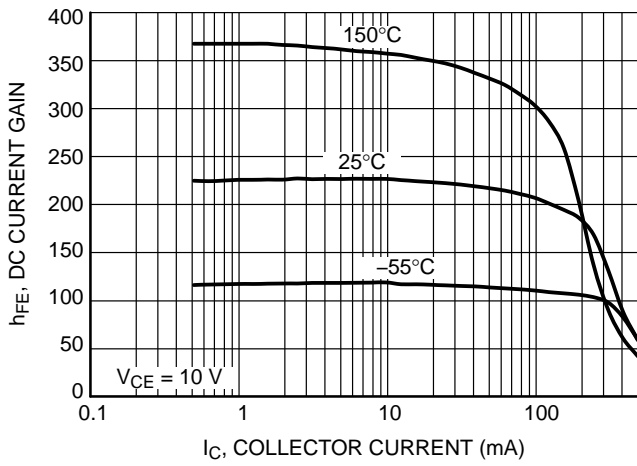


Figure 1. DC Current Gain

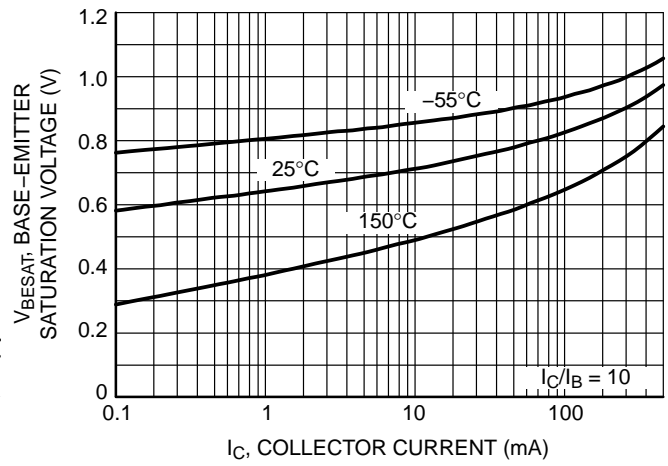


Figure 2. Base-Emitter Saturation Voltage

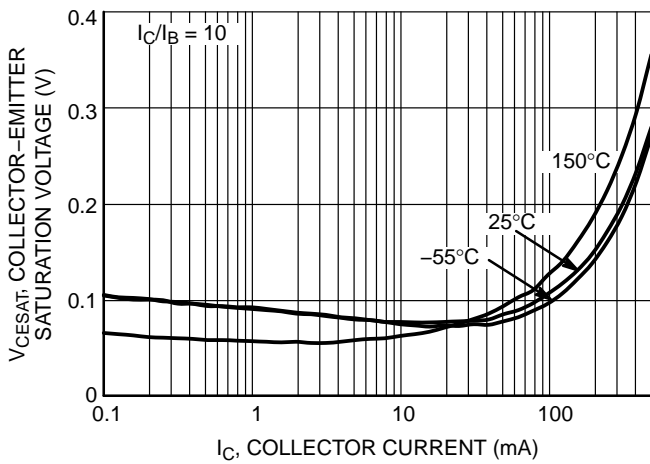


Figure 3. Collector-Emitter Saturation Voltage

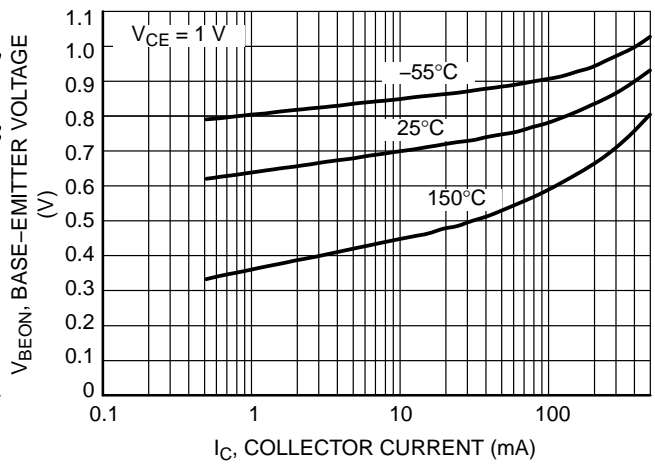


Figure 4. Base-Emitter Voltage

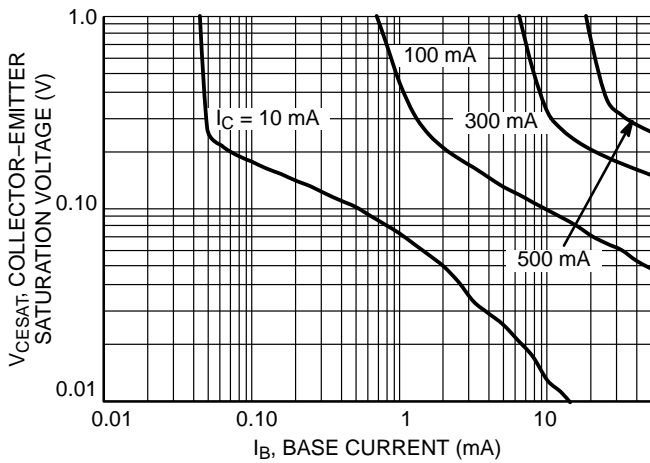


Figure 5. Collector Saturation Region

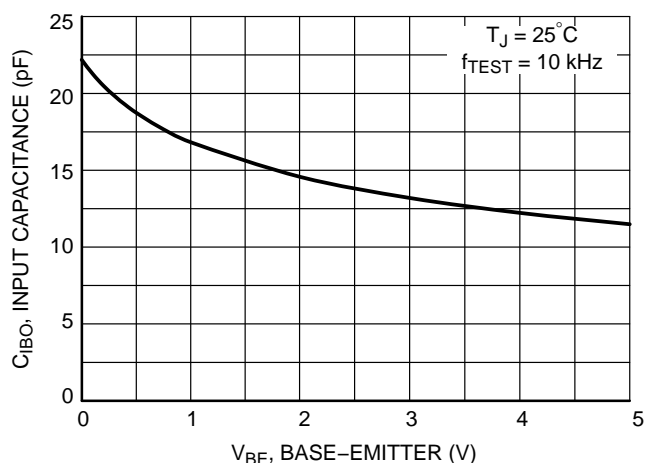


Figure 6. Input Capacitance

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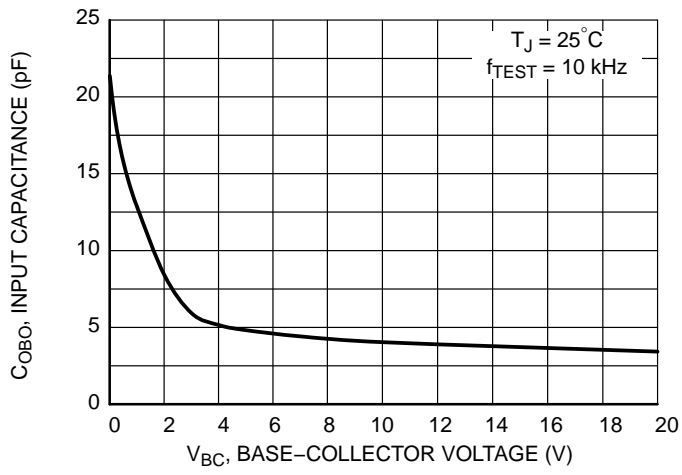


Figure 7. Output Capacitance

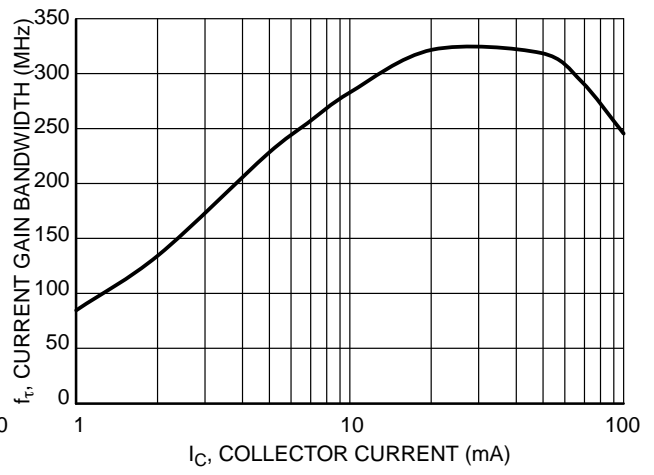
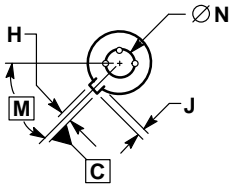
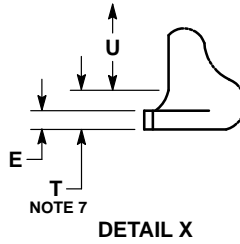
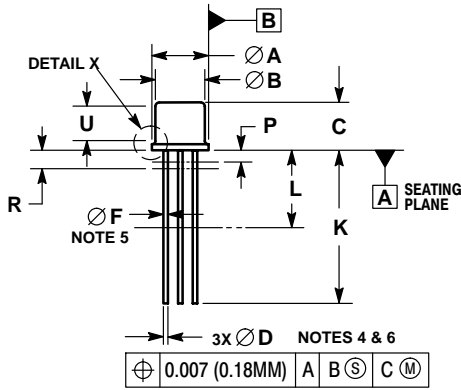


Figure 8. Current Gain Bandwidth Product

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## PACKAGE DIMENSIONS

### TO-18 3 CASE 206AA ISSUE A



#### NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: INCHES.
3. DIMENSION J MEASURED FROM DIAMETER A TO EDGE.
4. LEAD TRUE POSITION TO BE DETERMINED AT THE GAUGE PLANE DEFINED BY DIMENSION R.
5. DIMENSION F APPLIES BETWEEN DIMENSION P AND L.
6. DIMENSION D APPLIES BETWEEN DIMENSION L AND K.
7. BODY CONTOUR OPTIONAL WITHIN ZONE DEFINED BY DIMENSIONS A, B, AND T.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	5.31	5.84	0.209	0.230
B	4.52	4.95	0.178	0.195
C	4.32	5.33	0.170	0.210
D	0.41	0.53	0.016	0.021
E	---	0.76	---	0.030
F	0.41	0.48	0.016	0.019
H	0.91	1.17	0.036	0.046
J	0.71	1.22	0.028	0.048
K	12.70	19.05	0.500	0.750
L	6.35	---	0.250	---
M	45° BSC		45° BSC	
N	2.54 BSC		0.100 BSC	
P	---	1.27	---	0.050
R	1.37 BSC		0.054 BSC	
T	---	0.76	---	0.030
U	2.54	---	0.100	---

#### STYLE 1:

1. EMITTER
2. BASE
3. COLLECTOR

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