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2N2222A

Small Signal Switching Transistor

NPN Silicon



ON Semiconductor®

<http://onsemi.com>

Features

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

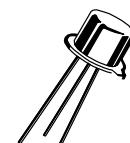
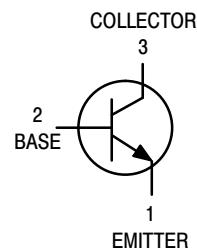
MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

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	°C

THERMAL CHARACTERISTICS

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



TO-18
CASE 206AA
STYLE 1

ORDERING INFORMATION

Device	Package	Shipping
JAN2N2222A		
JANTX2N2222A	TO-18	Bulk
JANTXV2N2222A		

2N222A

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage ($I_C = 10 \text{ mA}_\text{dc}$)	$V_{(\text{BR})\text{CEO}}$	50	—	Vdc
Collector-Base Cutoff Current ($V_{CB} = 75 \text{ Vdc}$) ($V_{CB} = 60 \text{ Vdc}$)	I_{CBO}	— —	10 10	μA_dc nA_dc
Emitter-Base Cutoff Current ($V_{EB} = 6.0 \text{ Vdc}$) ($V_{EB} = 4.0 \text{ Vdc}$)	I_{EBO}	— —	10 10	μA_dc nA_dc
Collector-Emitter Cutoff Current ($V_{CE} = 50 \text{ Vdc}$)	I_{CES}	—	50	nA_dc
ON CHARACTERISTICS (Note 1)				
DC Current Gain ($I_C = 0.1 \text{ mA}_\text{dc}, V_{CE} = 10 \text{ Vdc}$) ($I_C = 1.0 \text{ mA}_\text{dc}, V_{CE} = 10 \text{ Vdc}$) ($I_C = 10 \text{ mA}_\text{dc}, V_{CE} = 10 \text{ Vdc}$) ($I_C = 150 \text{ mA}_\text{dc}, V_{CE} = 10 \text{ Vdc}$) ($I_C = 500 \text{ mA}_\text{dc}, V_{CE} = 10 \text{ Vdc}$)	h_{FE}	50 75 100 100 30	— 325 — 300 —	—
Collector-Emitter Saturation Voltage ($I_C = 150 \text{ mA}_\text{dc}, I_B = 15 \text{ mA}_\text{dc}$) ($I_C = 500 \text{ mA}_\text{dc}, I_B = 50 \text{ mA}_\text{dc}$)	$V_{CE(\text{sat})}$	— —	0.3 1.0	Vdc
Base-Emitter Saturation Voltage ($I_C = 150 \text{ mA}_\text{dc}, I_B = 15 \text{ mA}_\text{dc}$) ($I_C = 500 \text{ mA}_\text{dc}, I_B = 50 \text{ mA}_\text{dc}$)	$V_{BE(\text{sat})}$	0.6 —	1.2 2.0	Vdc
SMALL-SIGNAL CHARACTERISTICS				
Magnitude of Small-Signal Current Gain ($I_C = 20 \text{ mA}_\text{dc}, V_{CE} = 20 \text{ Vdc}, f = 100 \text{ MHz}$)	$ \text{h}_{\text{fe}} $	2.5	—	—
Small-Signal Current Gain ($I_C = 1.0 \text{ mA}_\text{dc}, V_{CE} = 10 \text{ Vdc}, f = 1 \text{ kHz}$)	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 μs , Duty Cycle $\leq 2.0\%$.

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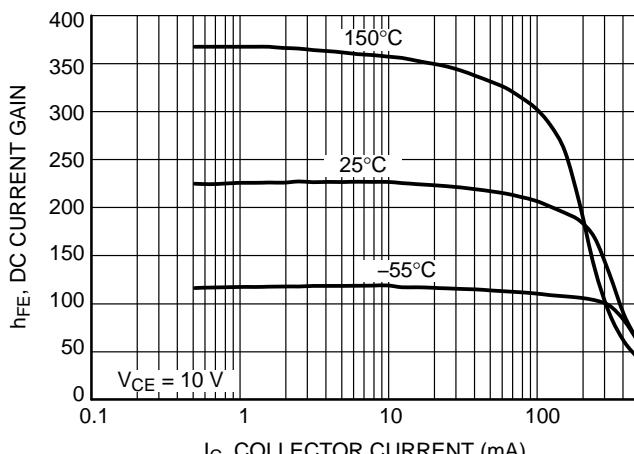


Figure 1. DC Current Gain

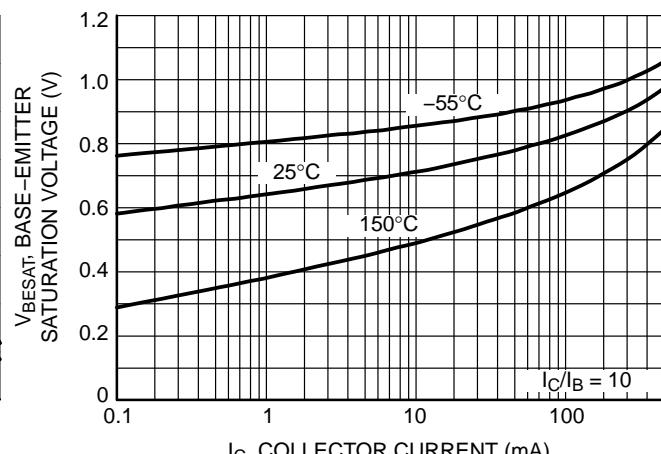


Figure 2. Base-Emitter Saturation Voltage

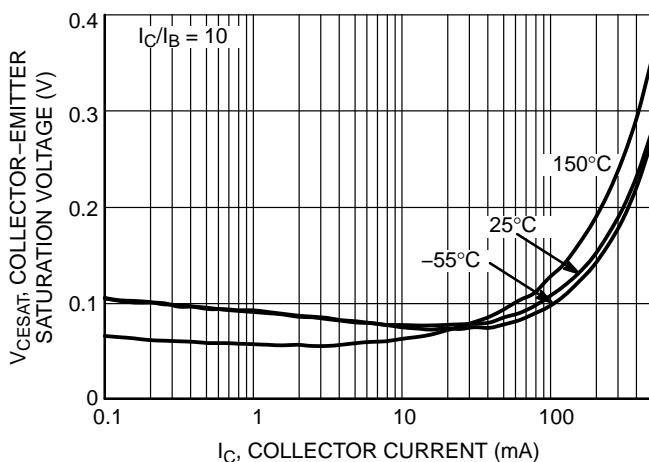


Figure 3. Collector-Emitter Saturation Voltage

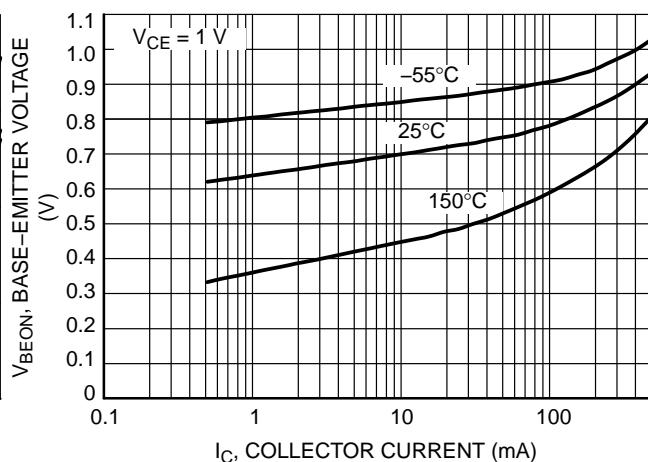


Figure 4. Base-Emitter Voltage

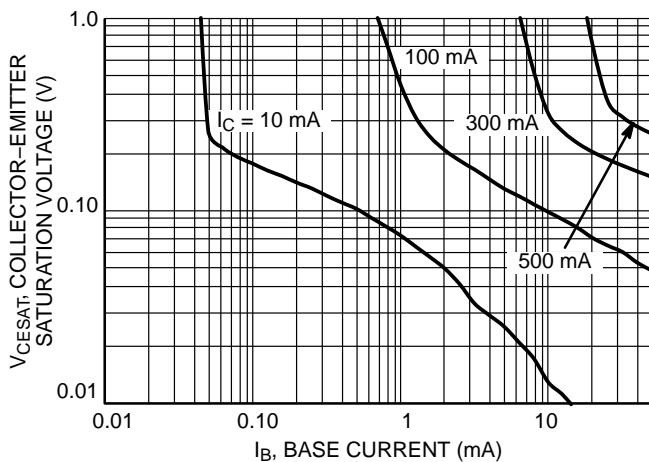


Figure 5. Collector Saturation Region

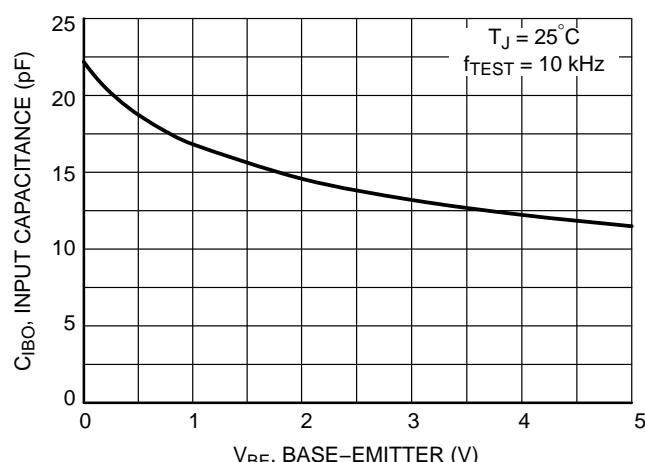


Figure 6. Input Capacitance

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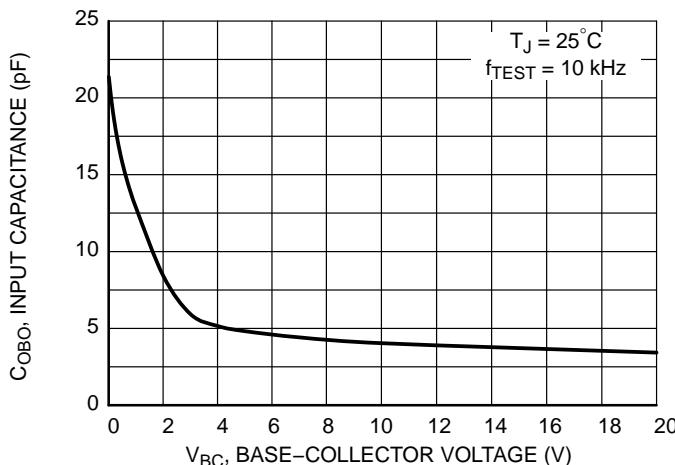


Figure 7. Output Capacitance

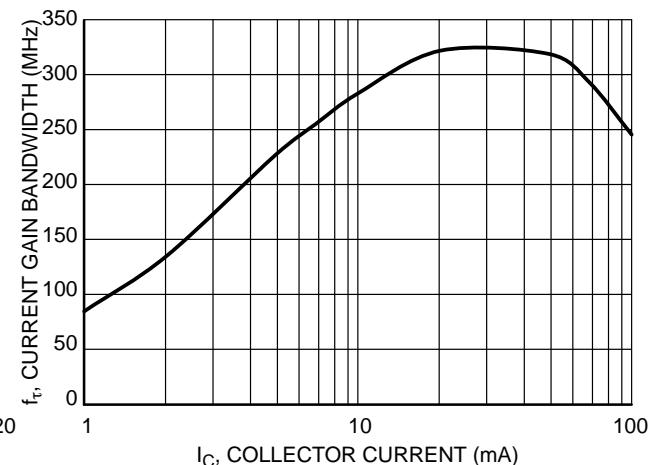
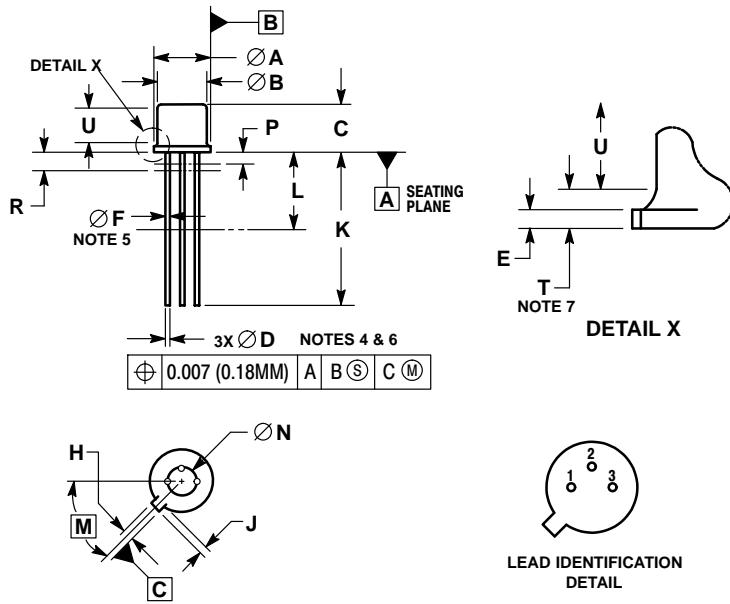


Figure 8. Current Gain Bandwidth Product

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:
PIN 1. Emitter
2. Base
3. Collector

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