

# General Purpose Transistors

## PNP Silicon

### NST857AMX2, NST857BMX2

#### Features

- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

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

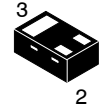
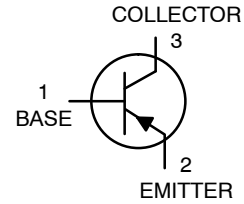
| Rating                         | Symbol    | Value | Unit |
|--------------------------------|-----------|-------|------|
| Collector-Emitter Voltage      | $V_{CE0}$ | -45   | V    |
| Collector-Base Voltage         | $V_{CB0}$ | -50   | V    |
| Emitter-Base Voltage           | $V_{EB0}$ | -5.0  | V    |
| Collector Current – Continuous | $I_C$     | -100  | mA   |

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.

#### THERMAL CHARACTERISTICS

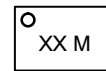
| Characteristic  | Symbol          | Max            | Unit                       |
|---|-----------------|----------------|----------------------------|
| Total Power Dissipation (Note 1)<br>@ $T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$           | 166<br>1.39    | mW<br>mW/ $^\circ\text{C}$ |
| Thermal Resistance,<br>Junction-to-Ambient (Note 1)   | $R_{\theta JA}$ | 722            | $^\circ\text{C}/\text{W}$  |
| Total Power Dissipation (Note 2)<br>@ $T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$           | 640<br>5.41    | mW<br>mW/ $^\circ\text{C}$ |
| Thermal Resistance,<br>Junction-to-Ambient (Note 2)   | $R_{\theta JA}$ | 185            | $^\circ\text{C}/\text{W}$  |
| Junction and Storage Temperature Range  | $T_J, T_{stg}$  | -55 to<br>+150 | $^\circ\text{C}$           |

1. Surface-mounted on FR4 board using a  $0.6\text{ mm}^2$ , 2 oz. Cu pad
2. Surface-mounted on FR4 board using a  $100\text{ mm}^2$ , 2 oz. Cu pad



X2DFN3 (1.0 x 0.6 mm)  
CASE 714AC

#### MARKING DIAGRAM



XX = Specific Device Code  
M = Date Code

#### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 8 of this data sheet.

# NST857AMX2, NST857BMX2

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

| Characteristic  | Symbol        | Min  | Typ | Max         | Unit                |
|---|---------------|------|-----|-------------|---------------------|
| <b>OFF CHARACTERISTICS</b>  |               |      |     |             |                     |
| Collector – Emitter Breakdown Voltage<br>( $I_C = -10\text{ mA}$ )  | $V_{(BR)CEO}$ | -45  | -   | -           | V                   |
| Collector – Emitter Breakdown Voltage<br>( $I_C = -10\ \mu\text{A}$ , $V_{EB} = 0$ )                            | $V_{(BR)CES}$ | -50  | -   | -           | V                   |
| Collector – Base Breakdown Voltage<br>( $I_C = -10\ \mu\text{A}$ )  | $V_{(BR)CBO}$ | -50  | -   | -           | V                   |
| Emitter – Base Breakdown Voltage<br>( $I_E = -1.0\ \mu\text{A}$ )   | $V_{(BR)EBO}$ | -5.0 | -   | -           | V                   |
| Collector Cutoff Current ( $V_{CB} = -30\text{ V}$ )<br>( $V_{CB} = -30\text{ V}$ , $T_A = 150^\circ\text{C}$ ) | $I_{CBO}$     | -    | -   | -15<br>-4.0 | nA<br>$\mu\text{A}$ |

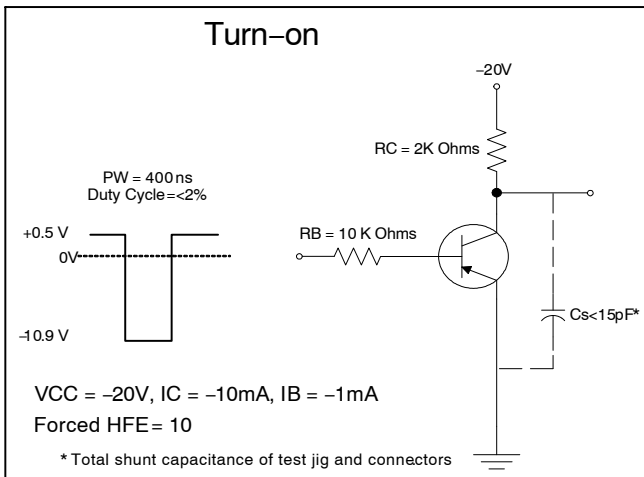
## ON CHARACTERISTICS

|   |                    |               |            |              |                |   |
|---|--------------------|---------------|------------|--------------|----------------|---|
| DC Current Gain<br>( $I_C = -100\ \mu\text{A}$ , $V_{CE} = -1.0\text{ V}$ )   | NST857A<br>NST857B | $h_{FE}$      | -          | 180<br>270   | -              | - |
| ( $I_C = -2.0\text{ mA}$ , $V_{CE} = -5.0\text{ V}$ )   | NST857A<br>NST857B |               | 125<br>220 | 180<br>290   | 250<br>475     |   |
| Collector – Emitter Saturation Voltage<br>( $I_C = -10\text{ mA}$ , $I_B = -0.5\text{ mA}$ )<br>( $I_C = -100\text{ mA}$ , $I_B = -5.0\text{ mA}$ ) |                    | $V_{CE(sat)}$ | -          | -            | -0.3<br>-0.65  | V |
| Base – Emitter Saturation Voltage<br>( $I_C = -10\text{ mA}$ , $I_B = -0.5\text{ mA}$ )<br>( $I_C = -100\text{ mA}$ , $I_B = -5.0\text{ mA}$ )      |                    | $V_{BE(sat)}$ | -          | -0.7<br>-0.9 | -              | V |
| Base – Emitter On Voltage<br>( $I_C = -2.0\text{ mA}$ , $V_{CE} = -5.0\text{ V}$ )<br>( $I_C = -10\text{ mA}$ , $V_{CE} = -5.0\text{ V}$ )          |                    | $V_{BE(on)}$  | -0.6<br>-  | -            | -0.75<br>-0.82 | V |

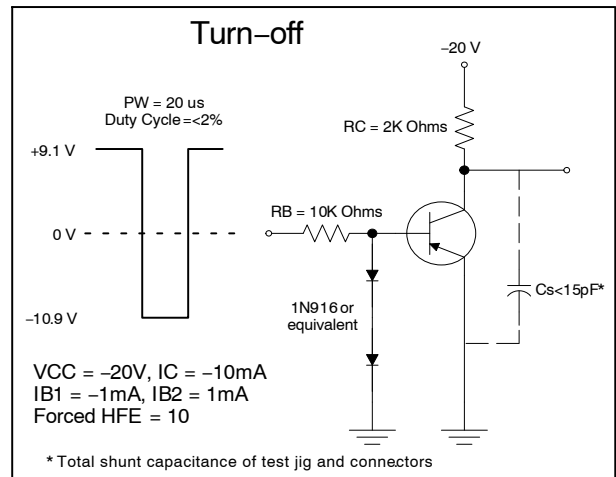
## SMALL-SIGNAL CHARACTERISTICS

|  |                    |          |     |   |           |     |
|--|--------------------|----------|-----|---|-----------|-----|
| Current – Gain – Bandwidth Product<br>( $I_C = -10\text{ mA}$ , $V_{CE} = -5.0\text{ Vdc}$ , $f = 100\text{ MHz}$ )                                |                    | $f_T$    | 100 | - | -         | MHz |
| Output Capacitance<br>( $V_{CB} = -10\text{ V}$ , $f = 1.0\text{ MHz}$ )   |                    | $C_{ob}$ | -   | - | 4.5       | pF  |
| Noise Figure<br>( $I_C = -0.2\text{ mA}$ , $V_{CE} = -5.0\text{ Vdc}$ , $R_S = 2.0\text{ k}\Omega$ , $f = 1.0\text{ kHz}$ , $BW = 200\text{ Hz}$ ) | NST857A<br>NST857B | NF       | -   | - | 10<br>4.0 | dB  |

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.



**Figure 1. Delay and Rise Time Equivalent Test Circuit**



**Figure 2. Storage and Fall Time Equivalent Test Circuit**

# NST857AMX2, NST857BMX2

## TYPICAL CHARACTERISTICS – NST857AMX2

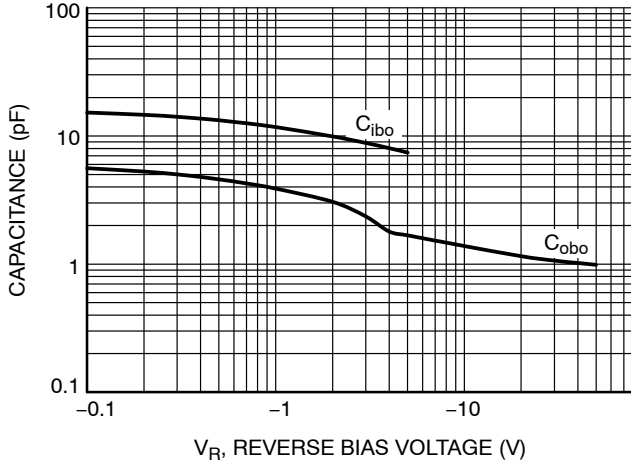


Figure 3. Capacitance

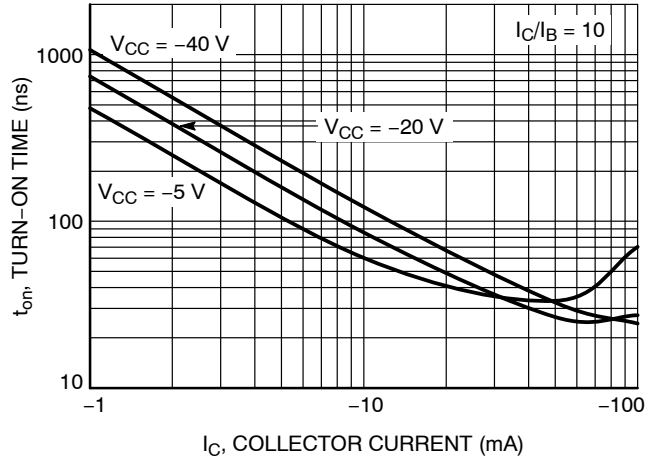


Figure 4. Turn-On Time

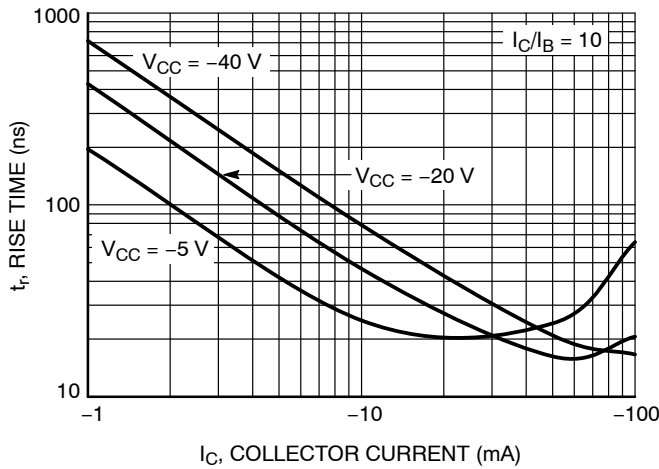


Figure 5. Rise Time

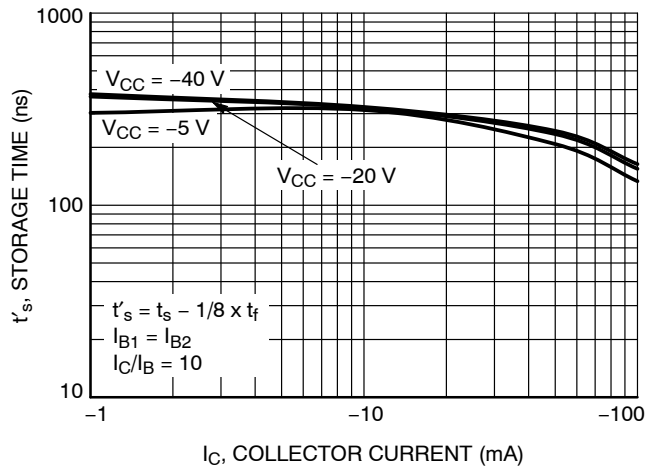


Figure 6. Storage Time

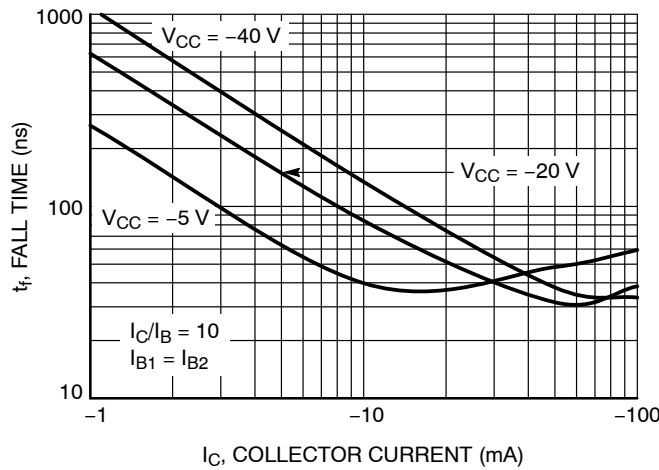


Figure 7. Fall Time

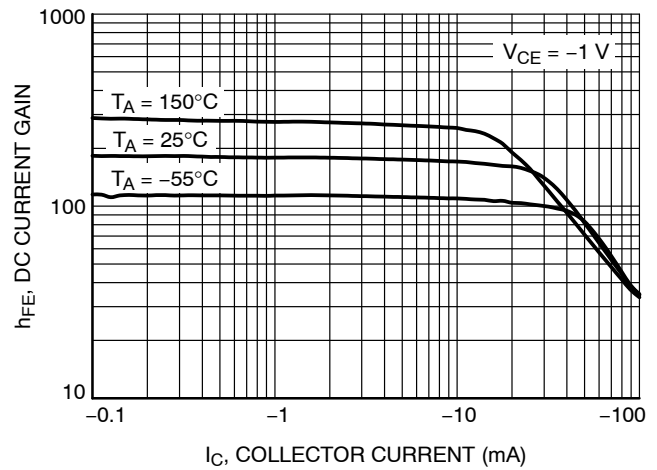


Figure 8. DC Current Gain

TYPICAL CHARACTERISTICS – NST857AMX2

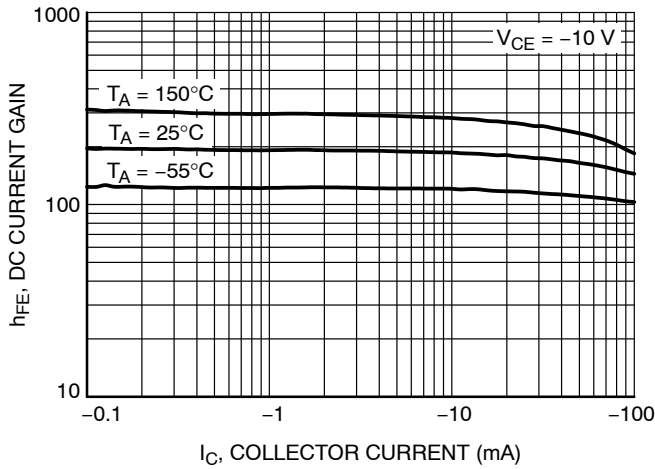


Figure 9. DC Current Gain

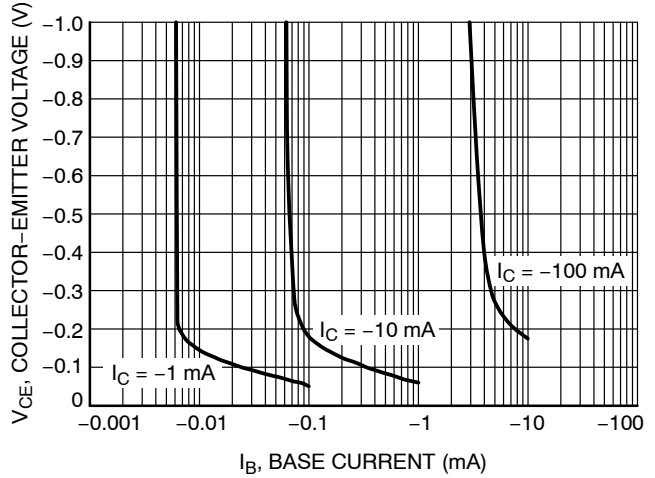


Figure 10. Collector Saturation Region

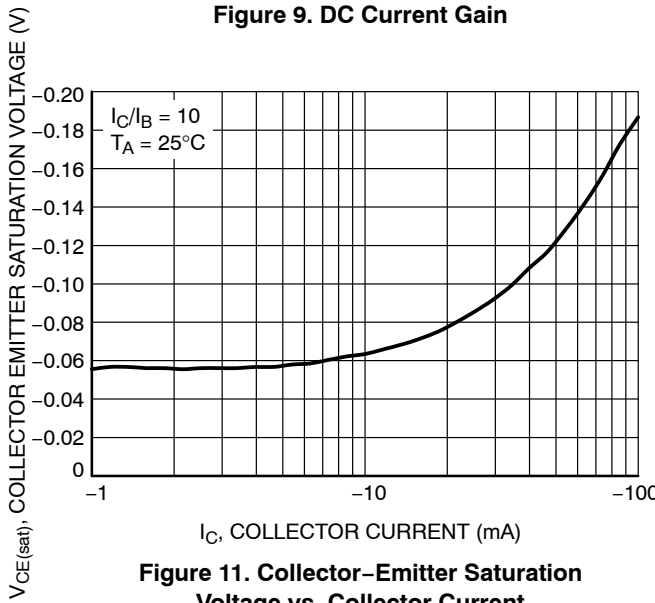


Figure 11. Collector-Emitter Saturation Voltage vs. Collector Current

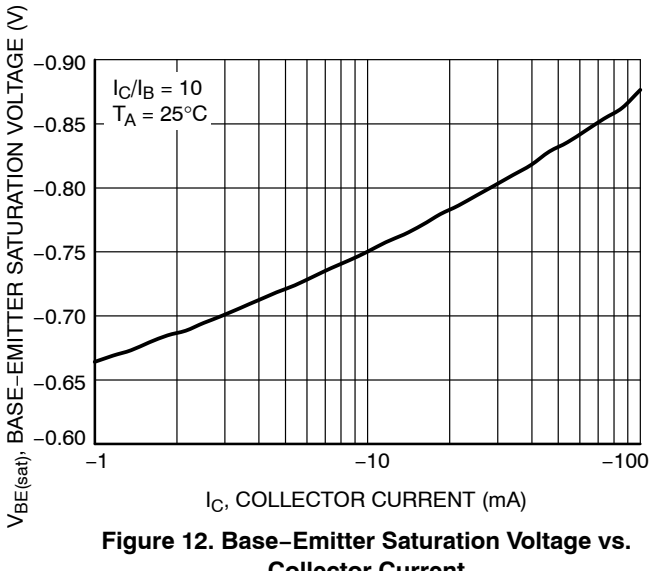


Figure 12. Base-Emitter Saturation Voltage vs. Collector Current

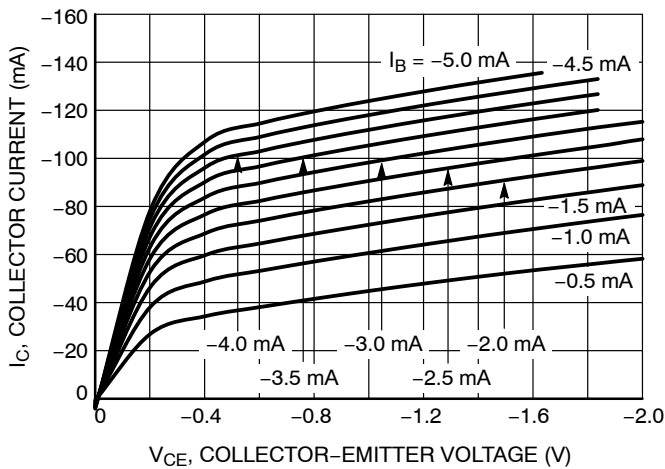


Figure 13. Collector Current vs. Collector-Emitter Voltage

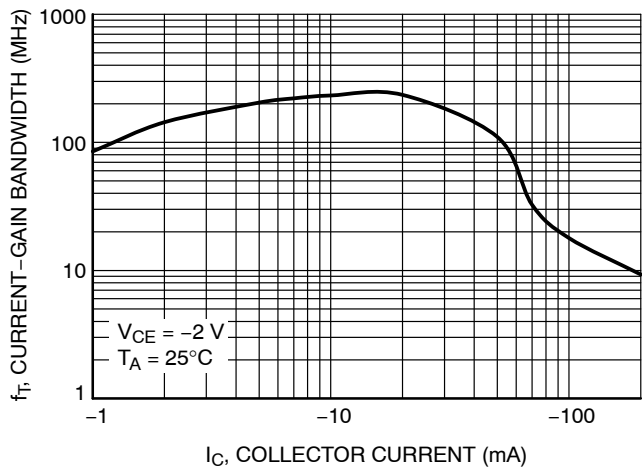


Figure 14. Current Gain Bandwidth vs. Collector Current

# NST857AMX2, NST857BMX2

## TYPICAL CHARACTERISTICS – NST857AMX2

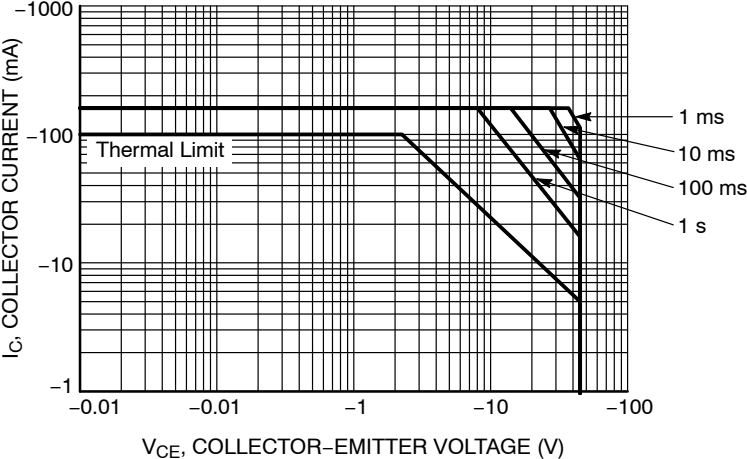


Figure 15. Safe Operating Area

TYPICAL CHARACTERISTICS – NST857BMX2

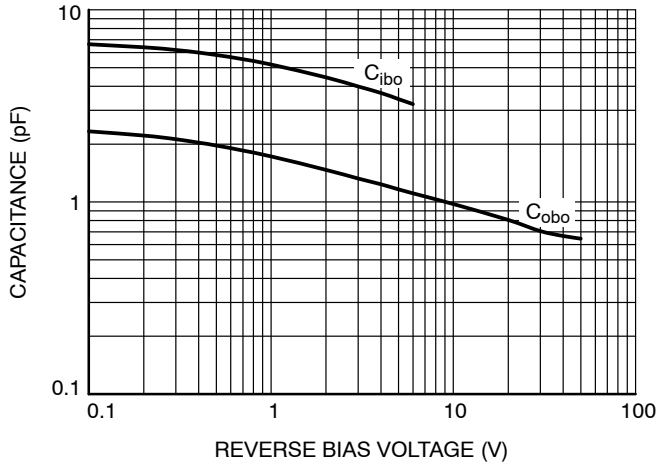


Figure 16. Capacitance

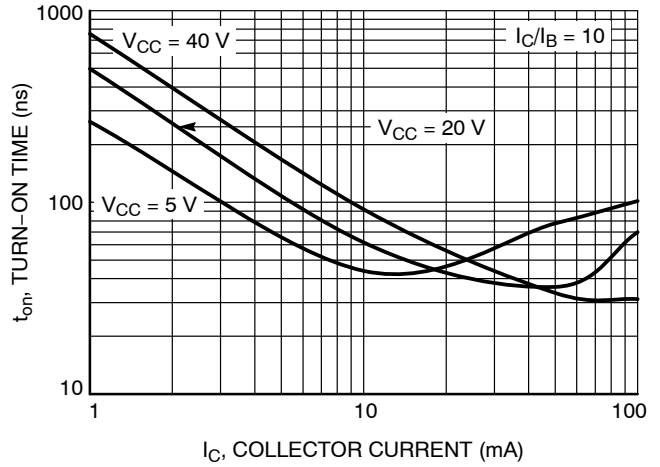


Figure 17. Turn-On Time

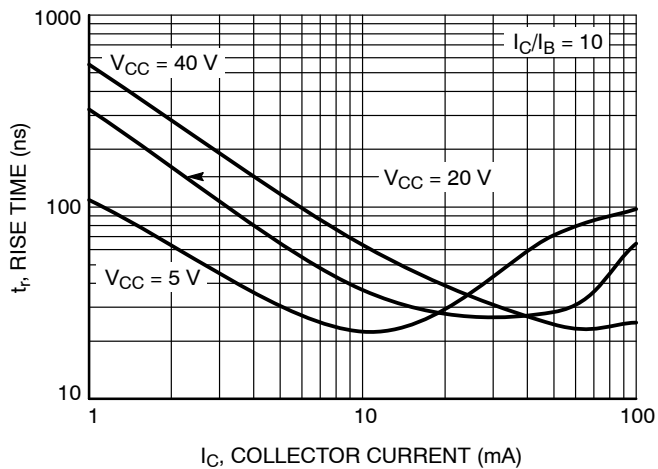


Figure 18. Rise Time

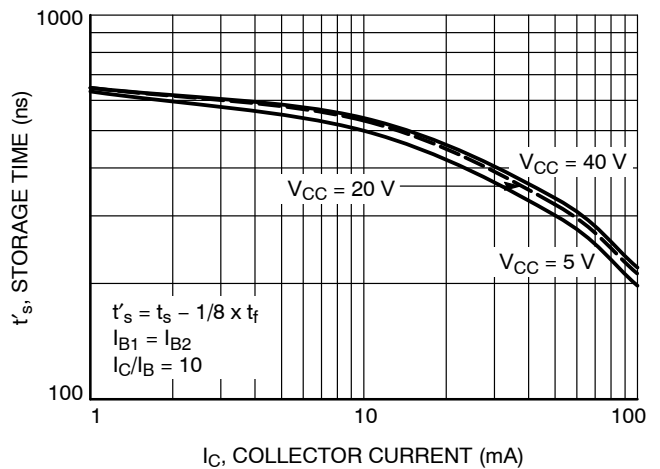


Figure 19. Storage Time

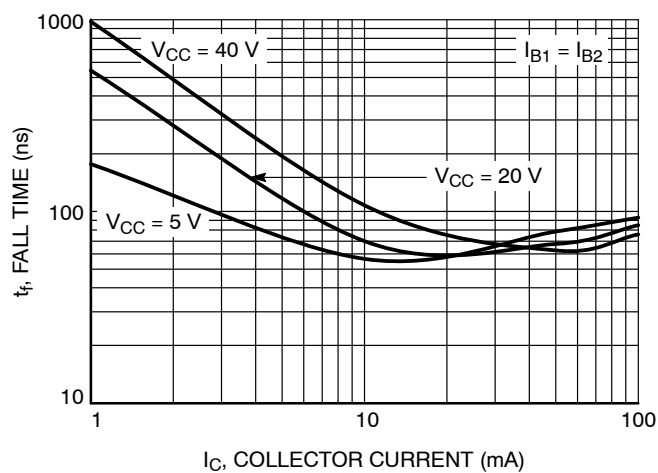


Figure 20. Fall Time

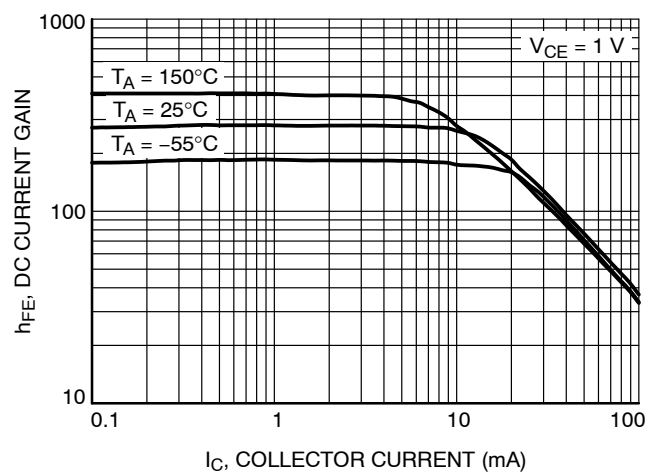


Figure 21. DC Current Gain

TYPICAL CHARACTERISTICS – NST857BMX2

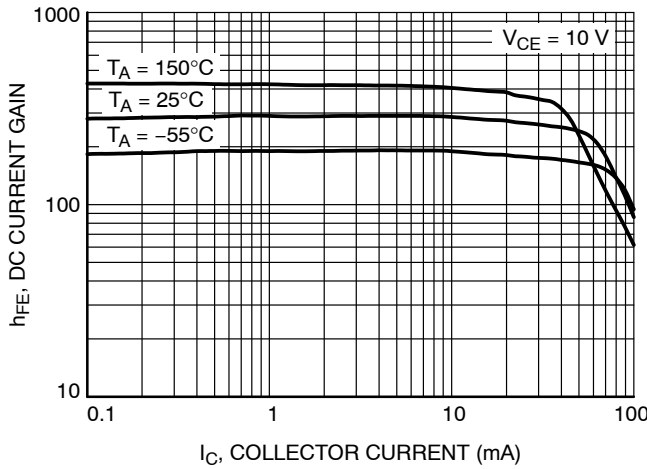


Figure 22. DC Current Gain

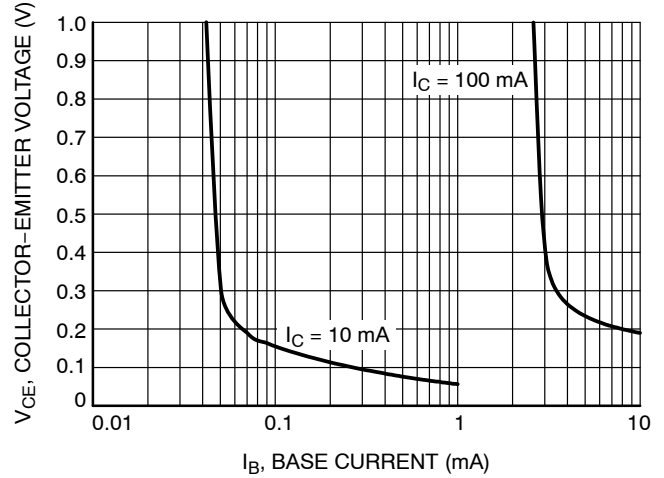


Figure 23. Collector Saturation Region

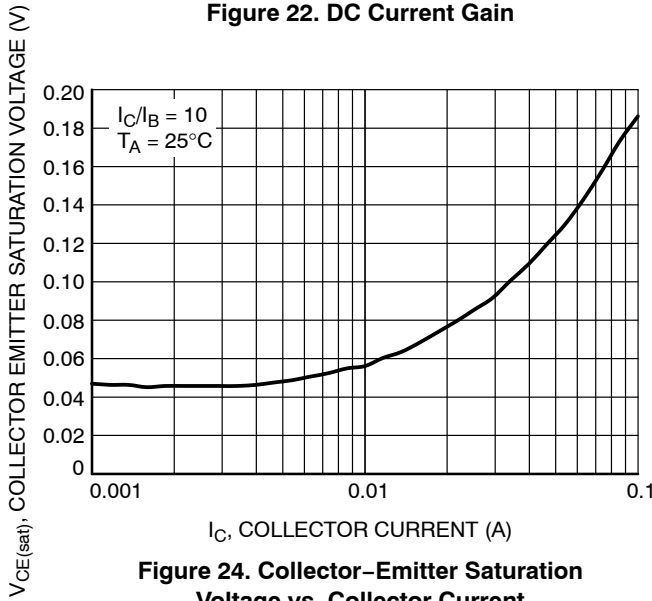


Figure 24. Collector-Emitter Saturation Voltage vs. Collector Current

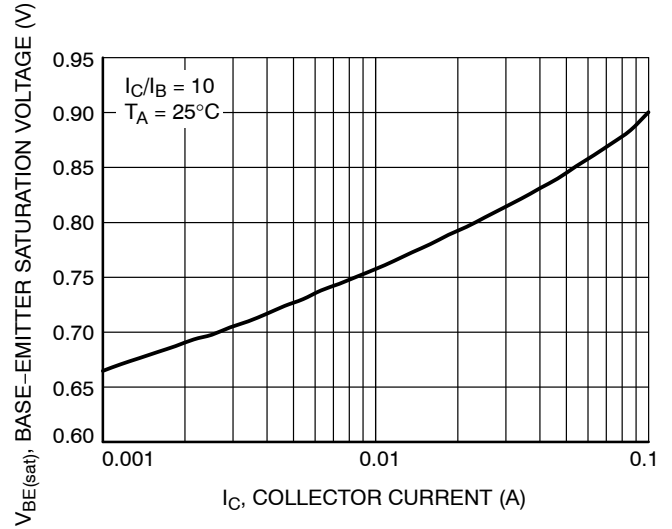


Figure 25. Base-Emitter Saturation Voltage vs. Collector Current

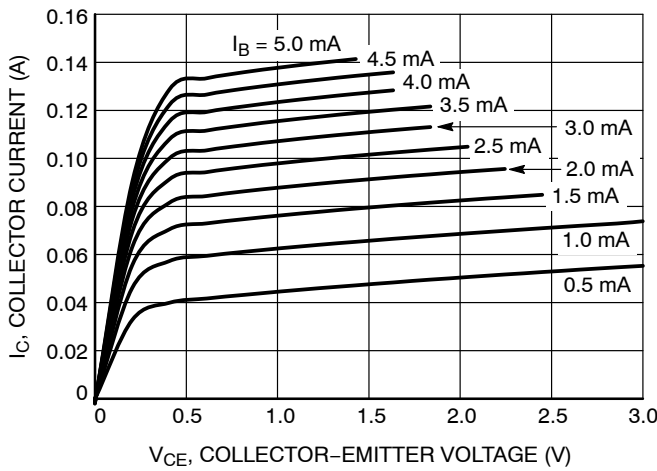


Figure 26. Collector Current vs. Collector-Emitter Voltage

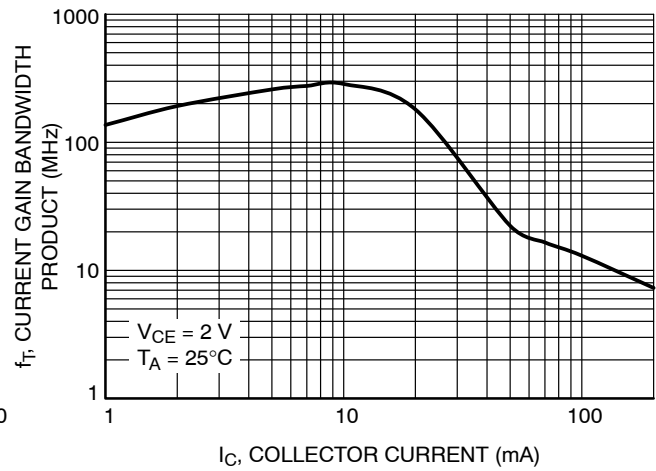
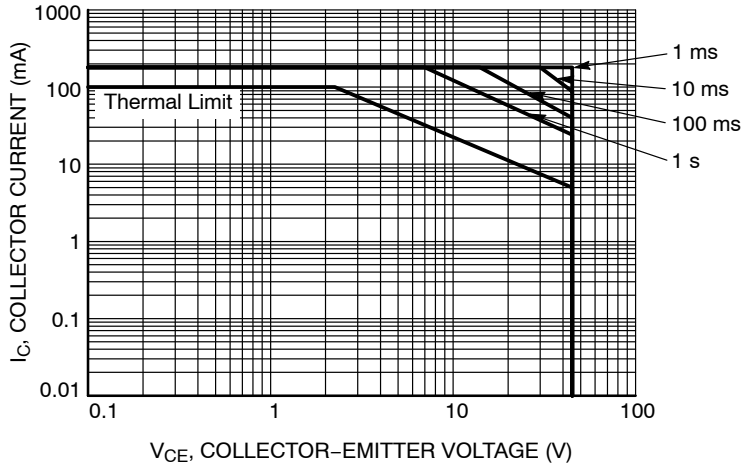


Figure 27. Current Gain Bandwidth vs. Collector Current

# NST857AMX2, NST857BMX2

## TYPICAL CHARACTERISTICS – NST857BMX2



**Figure 28. Safe Operating Area**

### ORDERING INFORMATION

| Device        | Marking | Package                  | Shipping†           |
|---------------|---------|--------------------------|---------------------|
| NST857AMX2T5G | AC      | X2DFN3<br>(1.0 x 0.6 mm) | 8,000 / Tape & Reel |
| NST857BMX2T5G | AJ      |                          |                     |

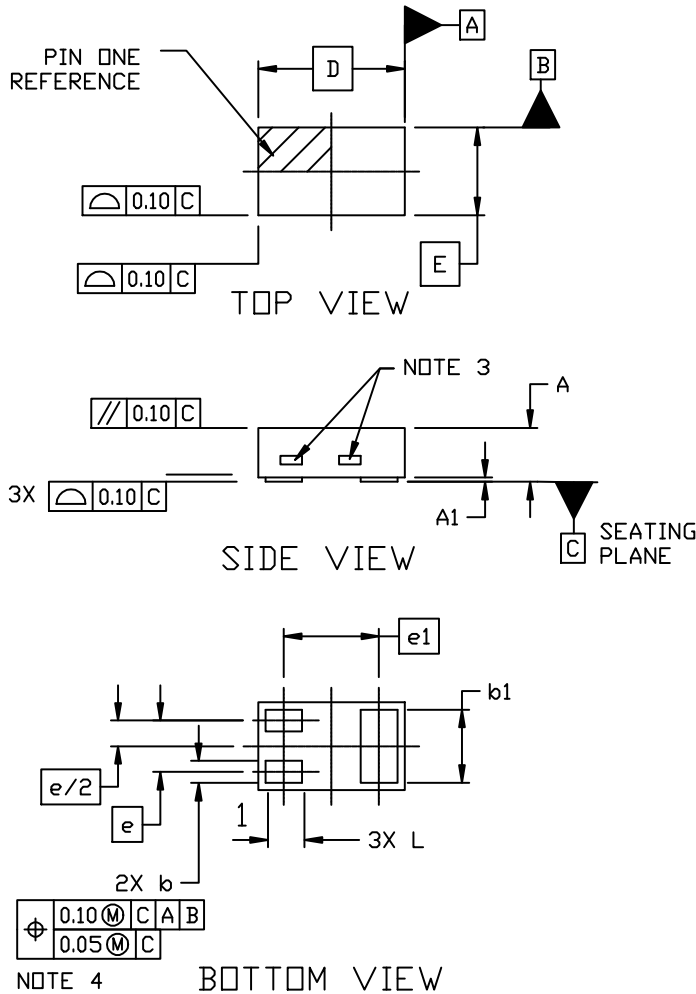
†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.



# NST857AMX2, NST857BMX2

## PACKAGE DIMENSIONS

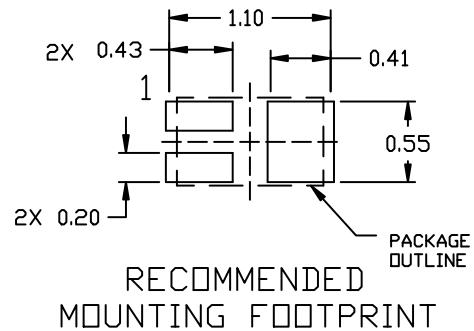
X2DFN3 1.0x0.6, 0.35P  
CASE 714AC  
ISSUE A



### NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS
3. EXPOSED COPPER ALLOWED AS SHOWN.
4. ALL PAD LOCATIONS CONTROLLED WITH THIS POSITIONAL TOLERANCE.

| DIM | MILLIMETERS |      |      |
|-----|-------------|------|------|
|     | MIN.        | MAX. | MAX. |
| A   | 0.34        | 0.37 | 0.40 |
| A1  | 0.00        | ---  | 0.05 |
| b   | 0.10        | 0.15 | 0.20 |
| b1  | 0.45        | 0.50 | 0.55 |
| D   | 0.95        | 1.00 | 1.05 |
| E   | 0.55        | 0.60 | 0.65 |
| e   | 0.35 BSC    |      |      |
| e1  | 0.65 BSC    |      |      |
| L   | 0.20        | 0.25 | 0.30 |



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