

NST846BMX2, NST847AMX2, NST847BMX2

Product Preview General Purpose Transistors

NPN Silicon

Features

- Moisture Sensitivity Level: 1
- ESD Rating – Human Body Model: > 4000 V
– Machine Model: > 400 V
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage NST846 NST847	V_{CEO}	65 45	Vdc
Collector-Base Voltage NST846 NST847	V_{CBO}	80 50	Vdc
Emitter-Base Voltage NST846 NST847	V_{EBO}	6.0 6.0	Vdc
Collector Current – Continuous	I_C	100	mAdc

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 Device Dissipation FR-5 Board, (Note 1) $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	225 1.8	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient (Note 1)	$R_{\theta JA}$	556	$^\circ\text{C}/\text{W}$
Total Device Dissipation Alumina Substrate (Note 2) $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	300 2.4	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	417	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature Range	T_J, T_{stg}	-55 to +150	$^\circ\text{C}$

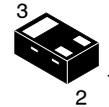
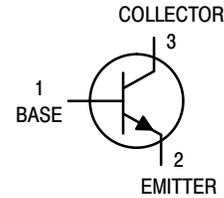
- FR-5 = $1.0 \times 0.75 \times 0.062$ in.
- Alumina = $0.4 \times 0.3 \times 0.024$ in 99.5% alumina.

This document contains information on a product under development. ON Semiconductor reserves the right to change or discontinue this product without notice.



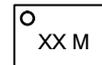
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X2DFN3 (1.0x0.6)
CASE 714AC

MARKING DIAGRAM



XX = Specific Device Code
M = Date Code

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 9 of this data sheet.

NST846BMX2, NST847AMX2, NST847BMX2

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

Characteristic	Symbol	Min	Typ	Max	Unit	
OFF CHARACTERISTICS						
Collector – Emitter Breakdown Voltage ($I_C = 10\text{ mA}$)	NST846B NST847A, B	$V_{(BR)CEO}$	65 45	– –	– –	V
Collector – Emitter Breakdown Voltage ($I_C = 10\ \mu\text{A}$, $V_{EB} = 0$)	NST846B NST847A, B	$V_{(BR)CES}$	80 50	– –	– –	V
Collector – Base Breakdown Voltage ($I_C = 10\ \mu\text{A}$)	NST846B NST847A, B	$V_{(BR)CBO}$	80 50	– –	– –	V
Emitter – Base Breakdown Voltage ($I_E = 1.0\ \mu\text{A}$)	BC846A, B BC847A, B, C, BC850B, C BC848A, B, C, BC849B, C	$V_{(BR)EBO}$	6.0 6.0	– –	– –	V
Collector Cutoff Current ($V_{CB} = 30\text{ V}$) ($V_{CB} = 30\text{ V}$, $T_A = 150^\circ\text{C}$)		I_{CBO}	– –	– –	15 5.0	nA μA
ON CHARACTERISTICS						
DC Current Gain ($I_C = 10\ \mu\text{A}$, $V_{CE} = 5.0\text{ V}$)	NST847A NST846B, NST847B	h_{FE}	– –	90 150	– –	–
($I_C = 2.0\text{ mA}$, $V_{CE} = 5.0\text{ V}$)	NST847A NST846B, NST847B		110 200	180 290	220 450	
Collector – Emitter Saturation Voltage ($I_C = 10\text{ mA}$, $I_B = 0.5\text{ mA}$) ($I_C = 100\text{ mA}$, $I_B = 5.0\text{ mA}$)		$V_{CE(sat)}$	– –	– –	0.25 0.6	V
Base – Emitter Saturation Voltage ($I_C = 10\text{ mA}$, $I_B = 0.5\text{ mA}$) ($I_C = 100\text{ mA}$, $I_B = 5.0\text{ mA}$)		$V_{BE(sat)}$	– –	0.7 0.9	– –	V
Base – Emitter Voltage ($I_C = 2.0\text{ mA}$, $V_{CE} = 5.0\text{ V}$) ($I_C = 10\text{ mA}$, $V_{CE} = 5.0\text{ V}$)		$V_{BE(on)}$	580 –	660 –	700 770	mV
SMALL-SIGNAL CHARACTERISTICS						
Current – Gain – Bandwidth Product ($I_C = 10\text{ mA}$, $V_{CE} = 5.0\text{ Vdc}$, $f = 100\text{ MHz}$)		f_T	100	–	–	MHz
Output Capacitance ($V_{CB} = 10\text{ V}$, $f = 1.0\text{ MHz}$)		C_{obo}	–	–	4.5	pF
Noise Figure ($I_C = 0.2\text{ mA}$, $V_{CE} = 5.0\text{ Vdc}$, $R_S = 2.0\text{ k}\Omega$, $f = 1.0\text{ kHz}$, $BW = 200\text{ Hz}$)	NST847A NST846B, NST847B	NF	– –	– –	10 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.

NST847A

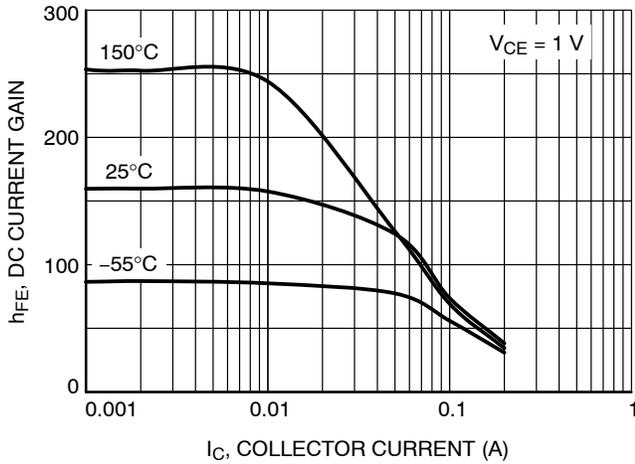


Figure 1. DC Current Gain vs. Collector Current

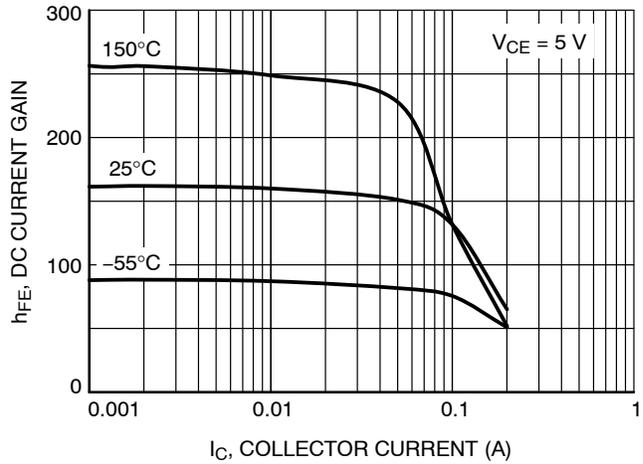


Figure 2. DC Current Gain vs. Collector Current

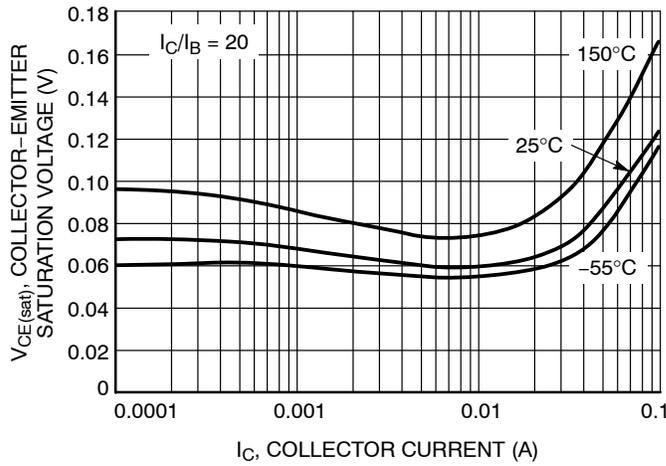


Figure 3. Collector Emitter Saturation Voltage vs. Collector Current

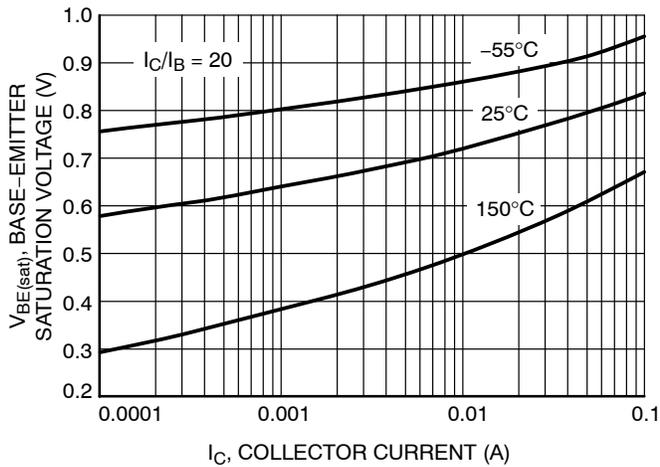


Figure 4. Base Emitter Saturation Voltage vs. Collector Current

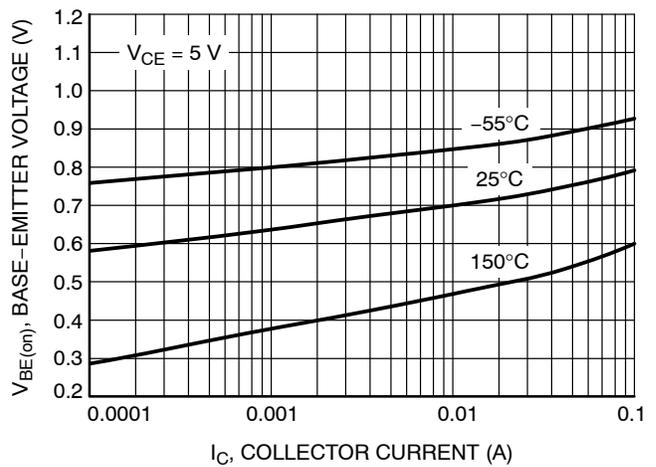


Figure 5. Base Emitter Voltage vs. Collector Current

NST847A

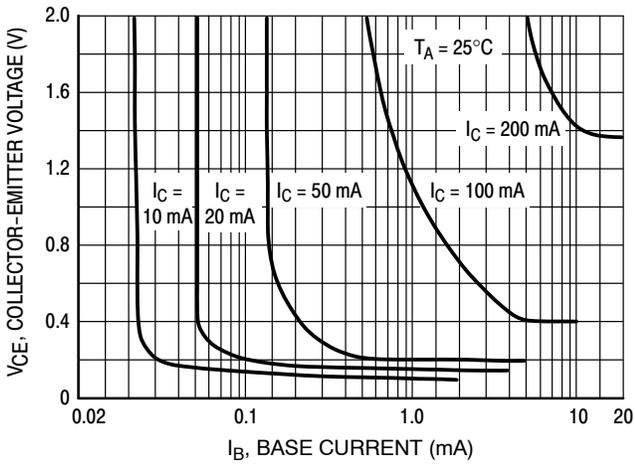


Figure 6. Collector Saturation Region

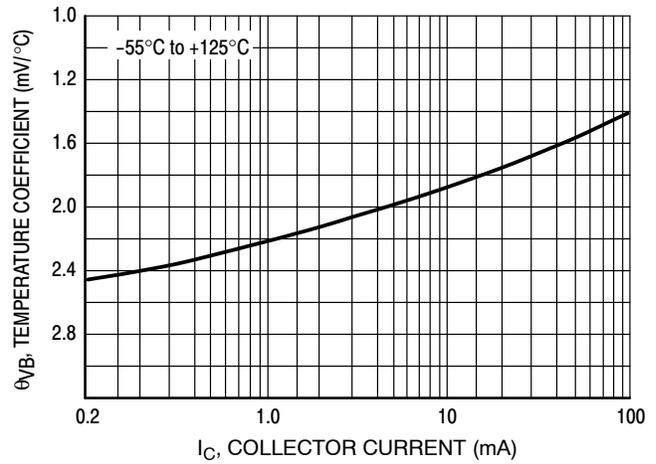


Figure 7. Base-Emitter Temperature Coefficient

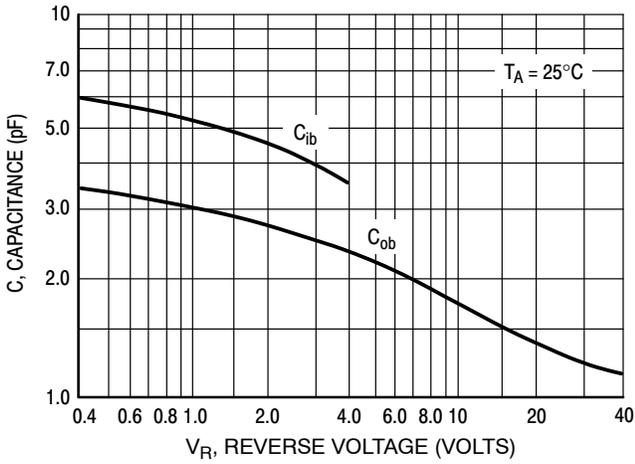


Figure 8. Capacitances

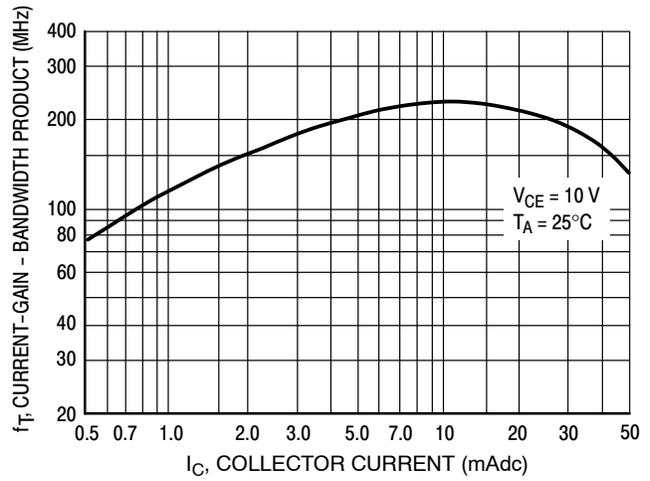


Figure 9. Current-Gain - Bandwidth Product

NST846B

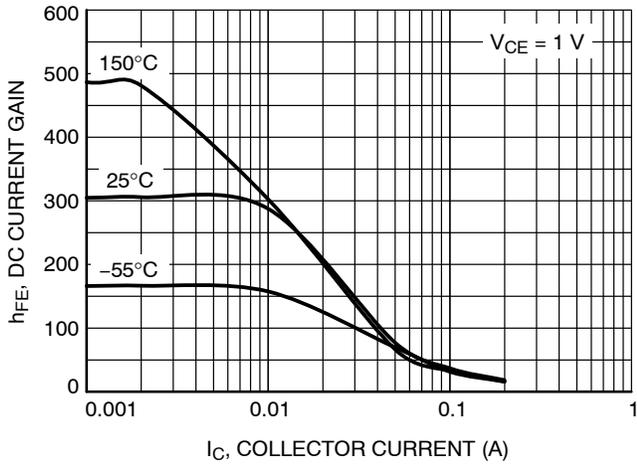


Figure 10. DC Current Gain vs. Collector Current

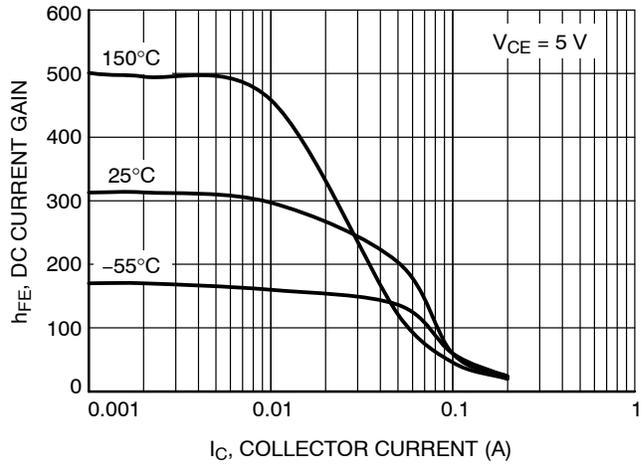


Figure 11. DC Current Gain vs. Collector Current

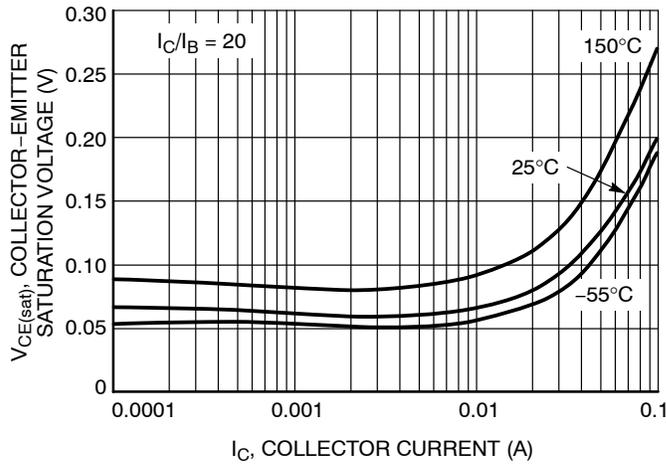


Figure 12. Collector Emitter Saturation Voltage vs. Collector Current

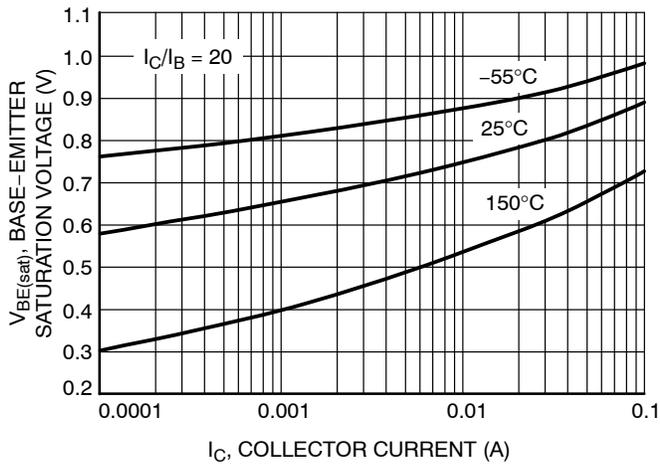


Figure 13. Base Emitter Saturation Voltage vs. Collector Current

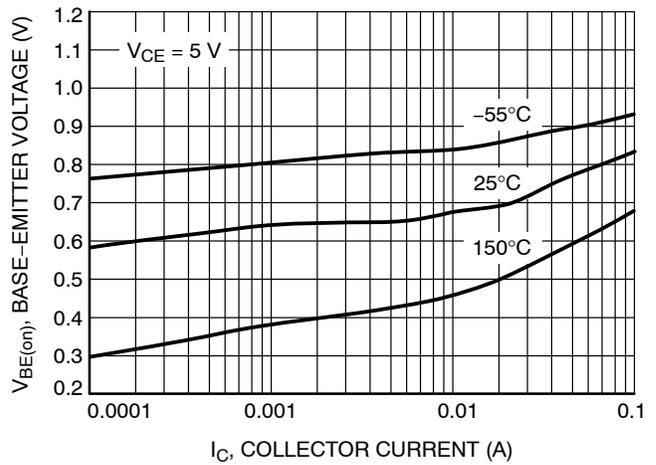


Figure 14. Base Emitter Voltage vs. Collector Current

NST846B

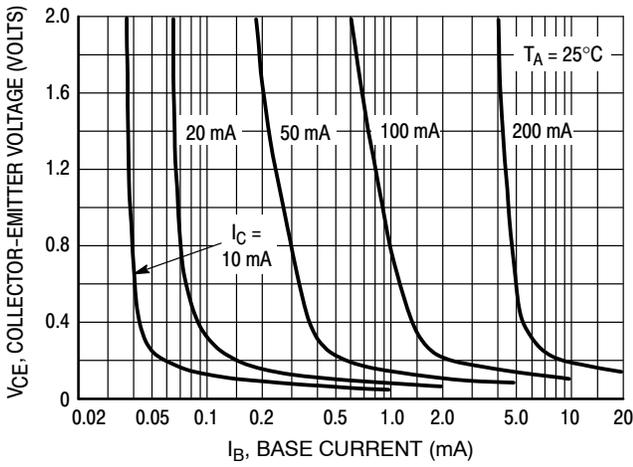


Figure 15. Collector Saturation Region

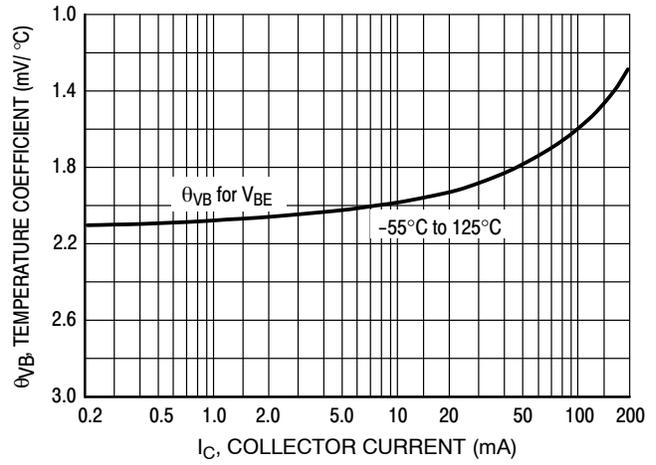


Figure 16. Base-Emitter Temperature Coefficient

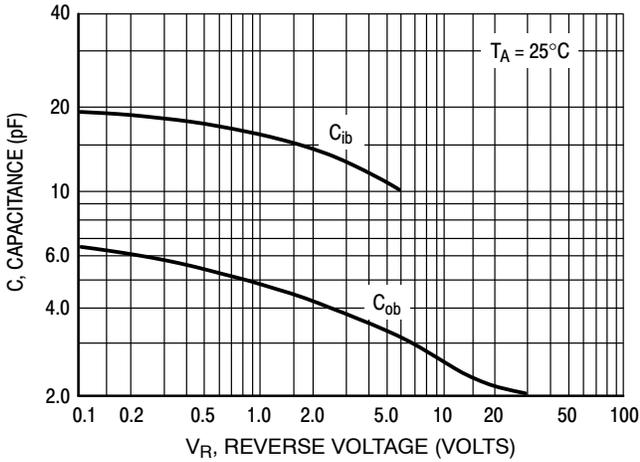


Figure 17. Capacitance

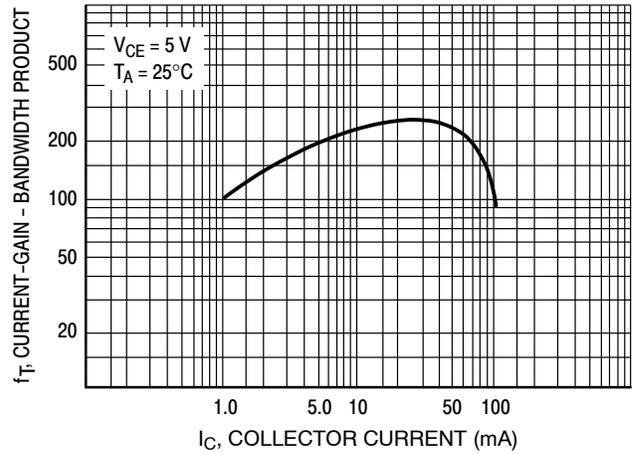


Figure 18. Current-Gain - Bandwidth Product

NST847B

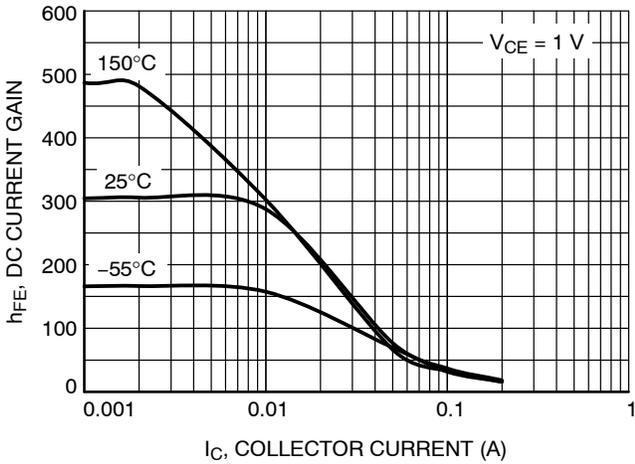


Figure 19. DC Current Gain vs. Collector Current

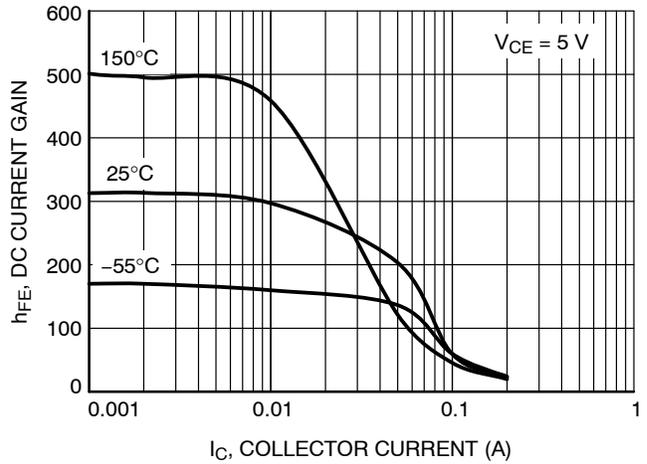


Figure 20. DC Current Gain vs. Collector Current

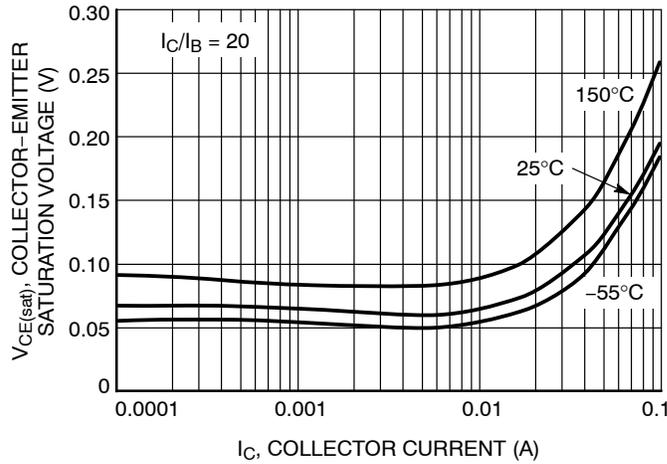


Figure 21. Collector Emitter Saturation Voltage vs. Collector Current

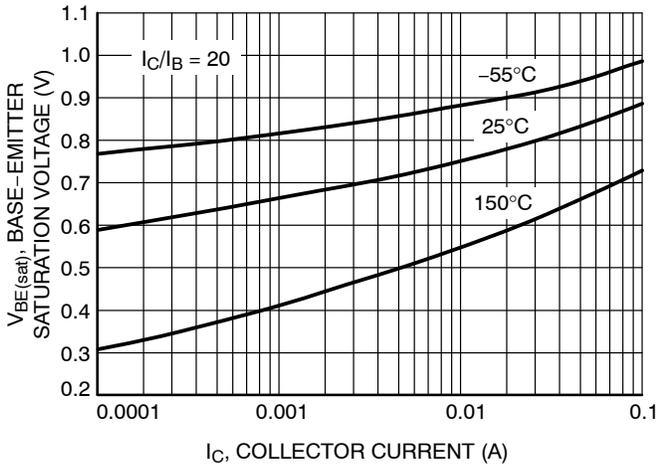


Figure 22. Base Emitter Saturation Voltage vs. Collector Current

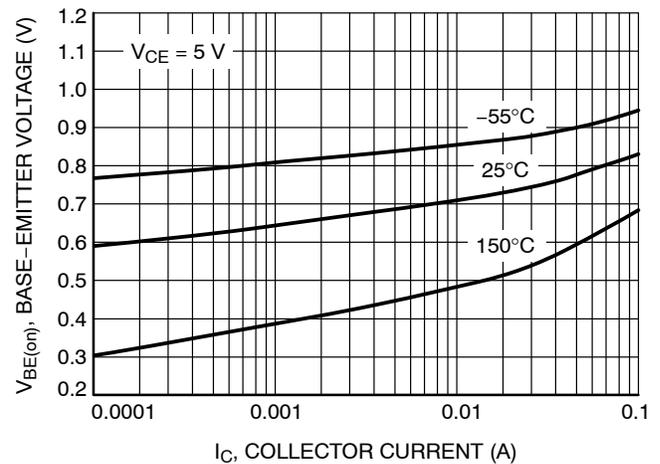


Figure 23. Base Emitter Voltage vs. Collector Current

NST847B

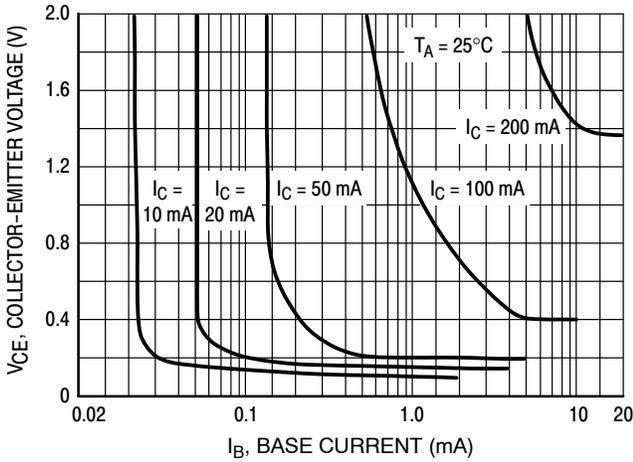


Figure 24. Collector Saturation Region

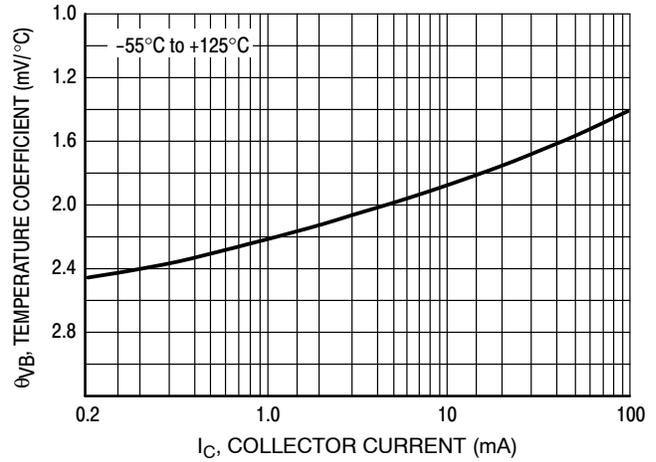


Figure 25. Base-Emitter Temperature Coefficient

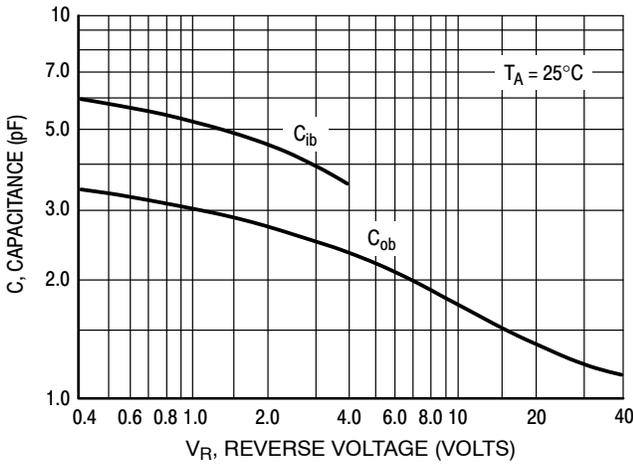


Figure 26. Capacitances

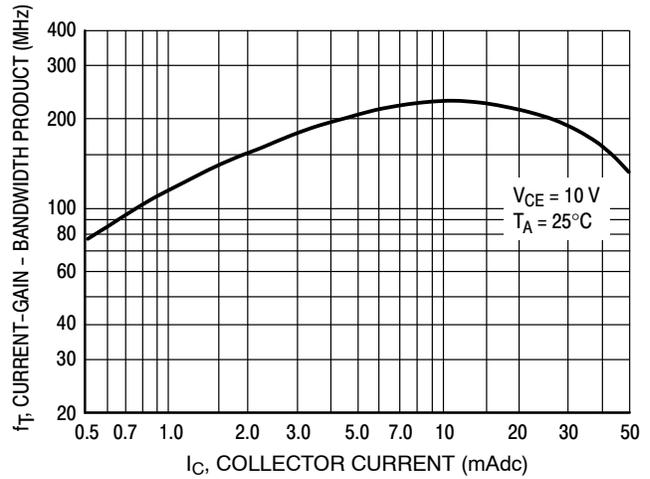


Figure 27. Current-Gain - Bandwidth Product

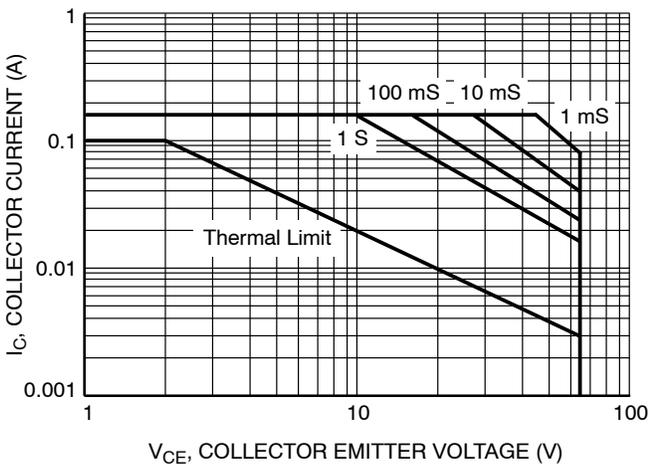


Figure 28. Safe Operating Area for NST847B

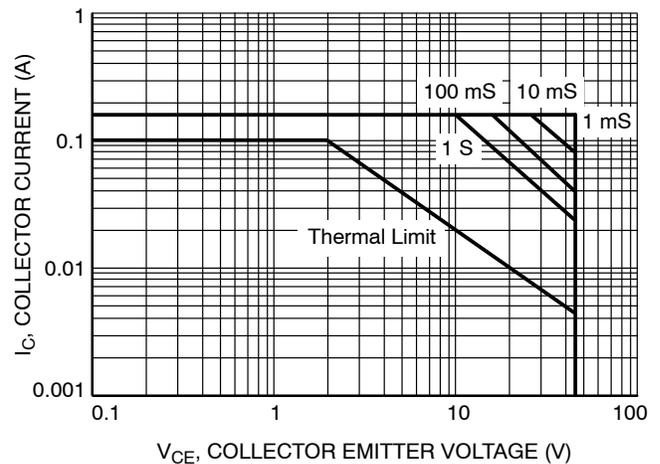


Figure 29. Safe Operating Area for NST847A, NST847B

NST846BMX2, NST847AMX2, NST847BMX2

ORDERING INFORMATION

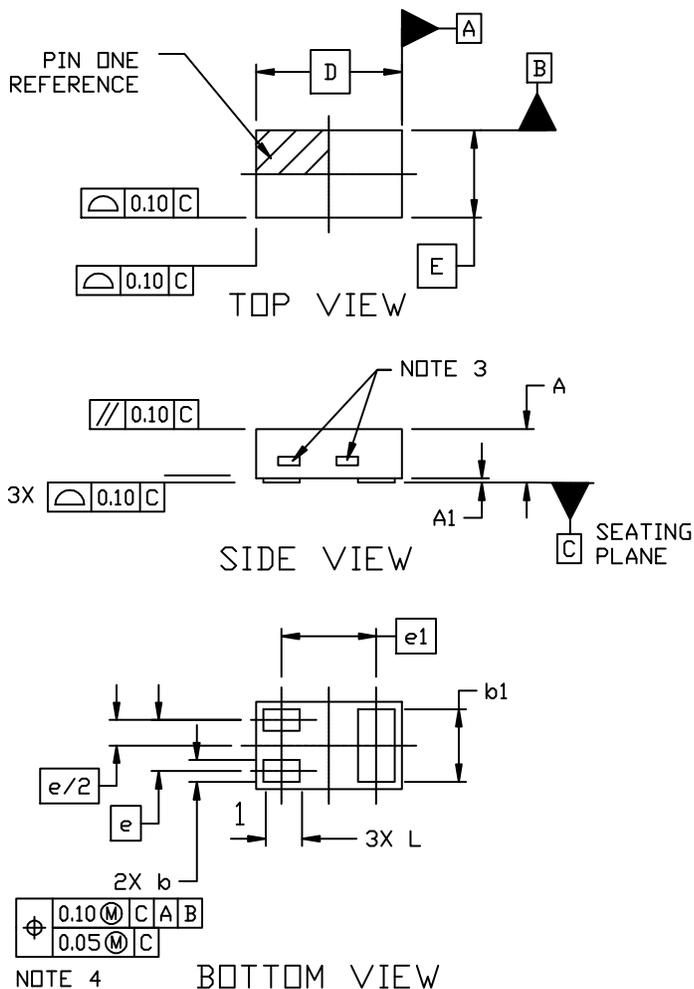
Device	Marking	Package	Shipping [†]
NST846BMX2T5G	TBD	X2DFN3 (1.0x0.6)	8,000 / Tape & Reel
NST847AMX2T5G	TBD		
NST847BMX2T5G	TBD		

[†]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.

NST846BMX2, NST847AMX2, NST847BMX2

PACKAGE DIMENSIONS

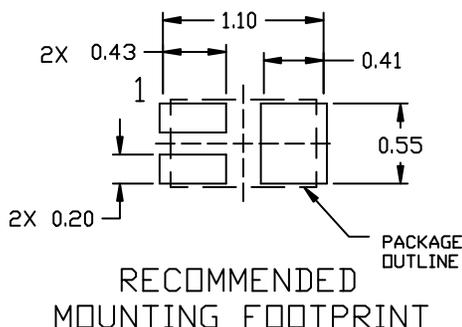
X2DFN3 1.0x0.6, 0.35P
CASE 714AC
ISSUE A



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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