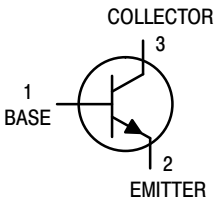
General Purpose Transistors

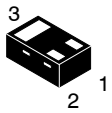
NPN Silicon

NST846BMX2, NST847AMX2, NST847BMX2

Features

- Moisture Sensitivity Level: 1
- ESD Rating – Human Body Model: > 4000 V
  – Machine Model: > 350 V
- These Devices are Pb–Free, Halogen Free/BFR Free and are RoHS Compliant





X2DFN3 (1.0x0.6)
CASE 714AC

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

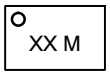
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Power Dissipation (Note 1) @ T_A = 25°C Derate above 25°C	P_D	 165 1.39	 mW mW/°C
Thermal Resistance, Junction–to–Ambient (Note 1)	$R_{\theta JA}$	720	°C/W
Total Power Dissipation (Note 2) @ T_A = 25°C Derate above 25°C	P_D	 590 4.93	 mW mW/°C
Thermal Resistance, Junction–to–Ambient (Note 2)	$R_{\theta JA}$	203	°C/W
Junction and Storage Temperature Range	T_J, T_{stg}	–55 to +150	°C

1. Surface–mounted on FR4 board using a 0.6 mm^2, 2 oz. Cu pad
2. Surface–mounted on FR4 board using a 100 mm^2, 2 oz. Cu pad

MARKING DIAGRAM



XX = Specific Device Code
M = Date Code

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 11 of this data sheet.

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Collector – Emitter Breakdown Voltage (I_C = 10 mA)	NST846B NST847A, B	$V_{(BR)CEO}$	65 45	– –	– –	V
Collector – Emitter Breakdown Voltage (I_C = 10 μA, V_{EB} = 0)	NST846B NST847A, B	$V_{(BR)CES}$	80 50	– –	– –	V
Collector – Base Breakdown Voltage (I_C = 10 μA)	NST846B NST847A, B	$V_{(BR)CBO}$	80 50	– –	– –	V
Emitter – Base Breakdown Voltage (I_E = 1.0 μA)	NST846B NST847A/B	$V_{(BR)EBO}$	6.0 6.0	– –	– –	V
Collector Cutoff Current (V_{CB} = 30 V) (V_{CB} = 30 V, T_A = 150°C)		I_{CBO}	– –	– –	15 5.0	nA μA
ON CHARACTERISTICS						
DC Current Gain (I_C = 100 μA, V_{CE} = 1.0 V) (I_C = 2.0 mA, V_{CE} = 5.0 V)	NST847A NST846B, NST847B NST847A NST846B, NST847B	h_{FE}	– – 110 200	160 270 180 290	– – 220 450	–
Collector – Emitter Saturation Voltage	(I_C = 10 mA, I_B = 0.5 mA) (I_C = 100 mA, I_B = 5.0 mA)	$V_{CE(sat)}$	– –	– –	0.25 0.6	V
Base – Emitter Saturation Voltage	(I_C = 10 mA, I_B = 0.5 mA) (I_C = 100 mA, I_B = 5.0 mA)	$V_{BE(sat)}$	– –	0.7 0.9	– –	V
Base – Emitter Voltage	(I_C = 2.0 mA, V_{CE} = 5.0 V) (I_C = 10 mA, V_{CE} = 5.0 V)	$V_{BE(on)}$	580 –	660 –	700 770	mV
SMALL– SIGNAL CHARACTERISTICS						
Current – Gain – Bandwidth Product (I_C = 10 mA, V_{CE} = 5.0 Vdc, f = 100 MHz)		f_T	100	–	–	MHz
Output Capacitance (V_{CB} = 10 V, f = 1.0 MHz)		C_{obo}	–	–	4.5	pF
Noise Figure (I_C = 0.2 mA, V_{CE} = 5.0 Vdc, R_S = 2.0 kΩ, f = 1.0 kHz, BW = 200 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.

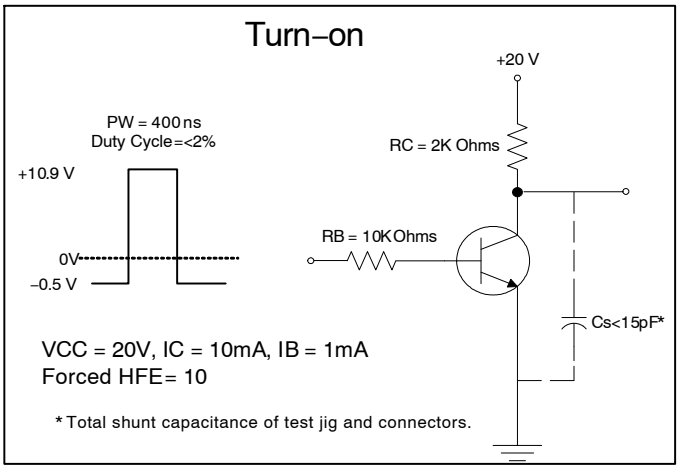


Figure 1. Delay and Rise Time Equivalent Test Circuit

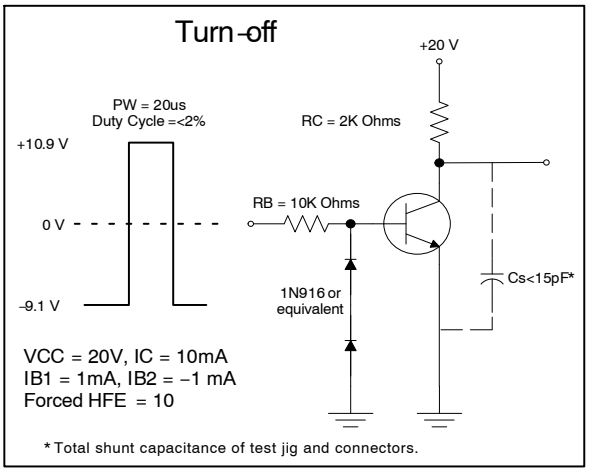


Figure 2. Storage and Fall Time Equivalent Test Circuit

TYPICAL CHARACTERISTICS – NST846BMX2

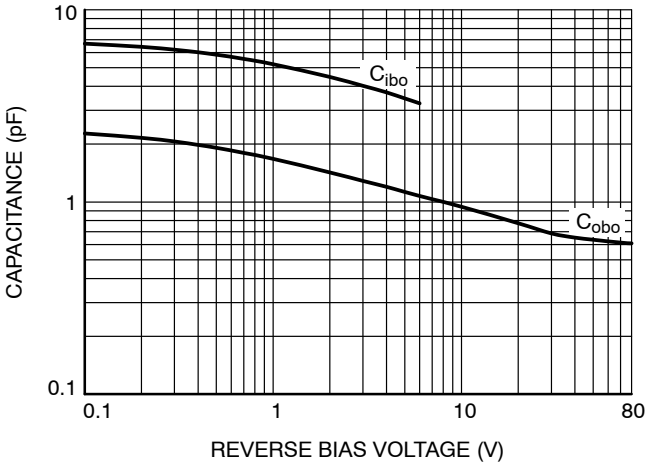


Figure 3. Capacitance

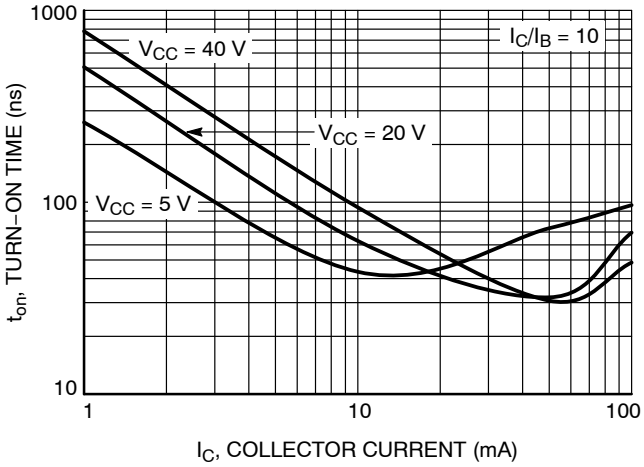


Figure 4. Turn−On Time

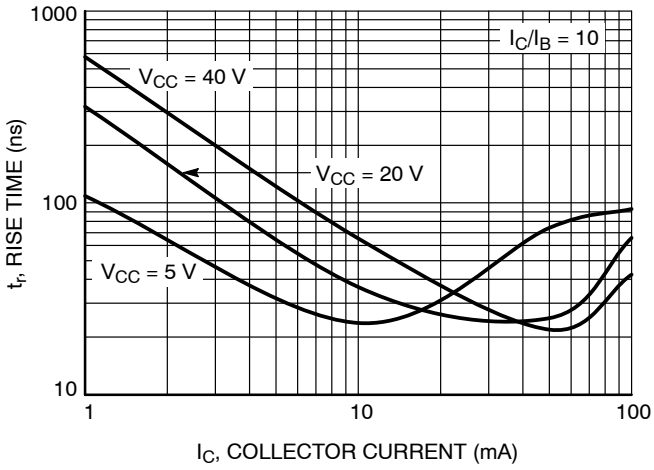


Figure 5. Rise Time

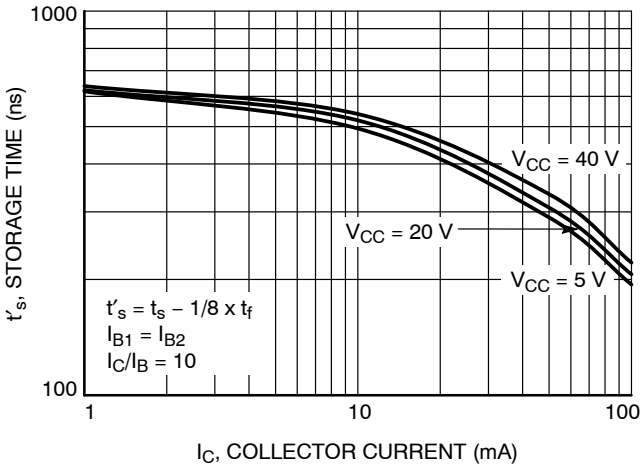


Figure 6. Storage Time

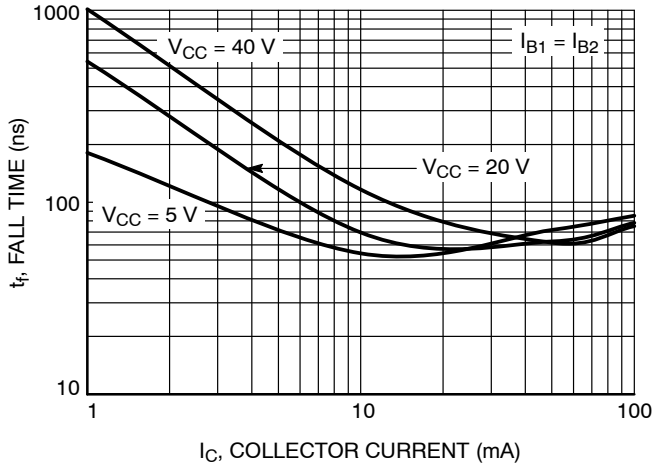


Figure 7. Fall Time

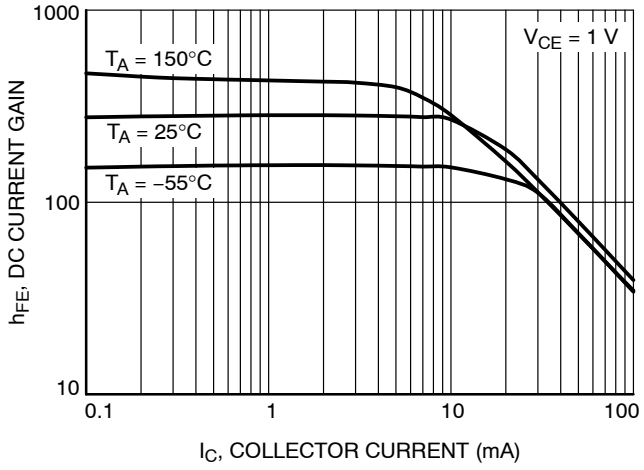


Figure 8. DC Current Gain

TYPICAL CHARACTERISTICS – NST846BMX2

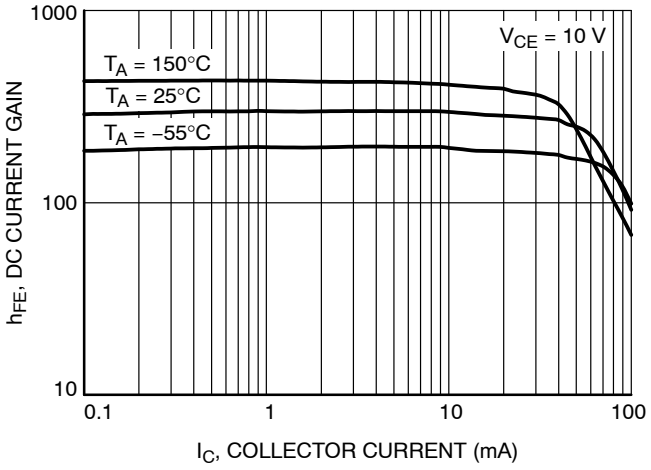


Figure 9. DC Current Gain

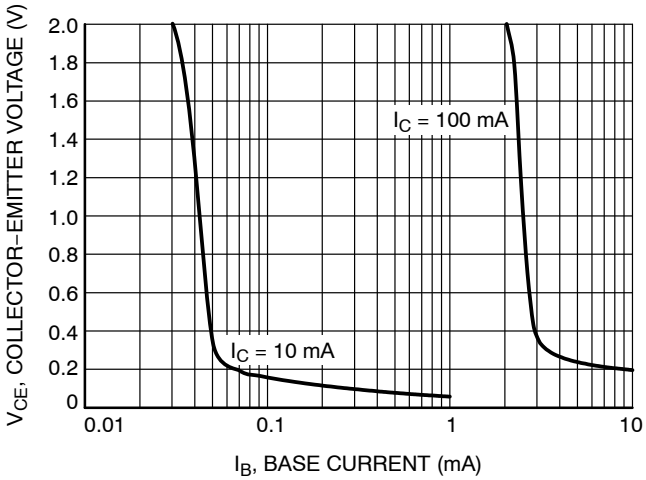


Figure 10. Collector Saturation Region

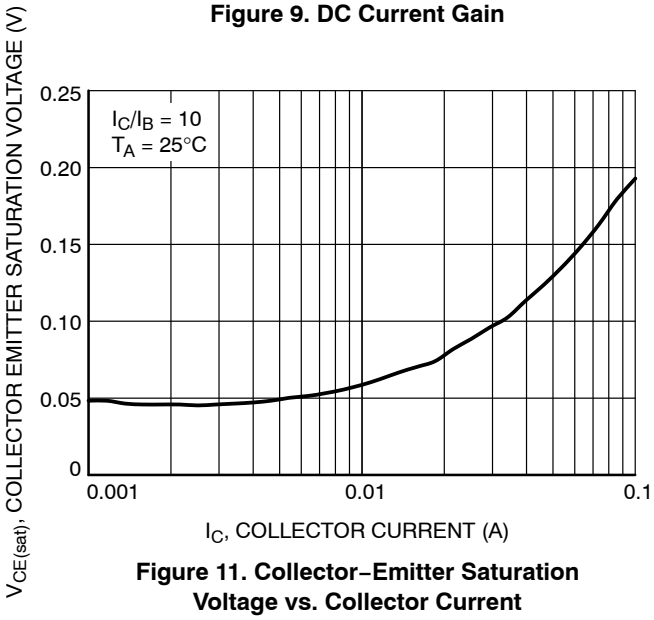


Figure 11. Collector−Emitter Saturation Voltage vs. Collector Current

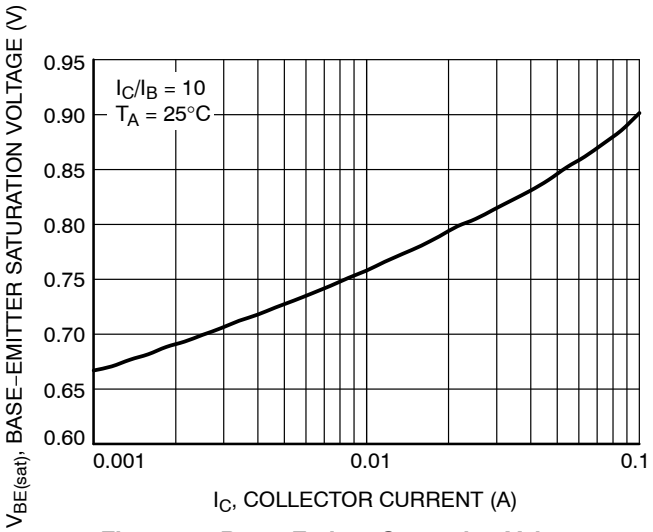


Figure 12. Base−Emitter Saturation Voltage vs. Collector Current

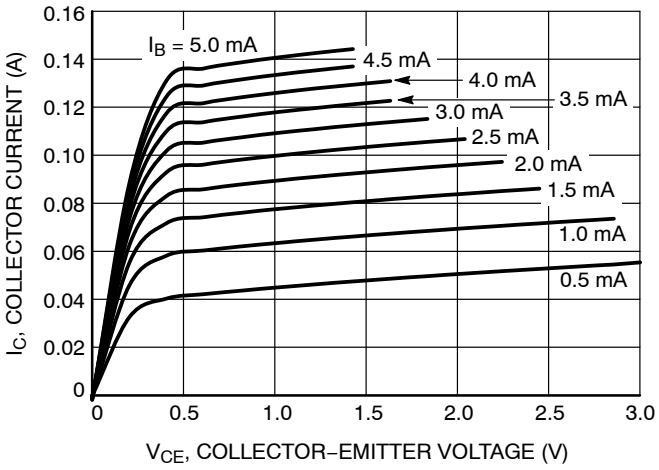


Figure 13. Collector Current vs. Collector−Emitter Voltage

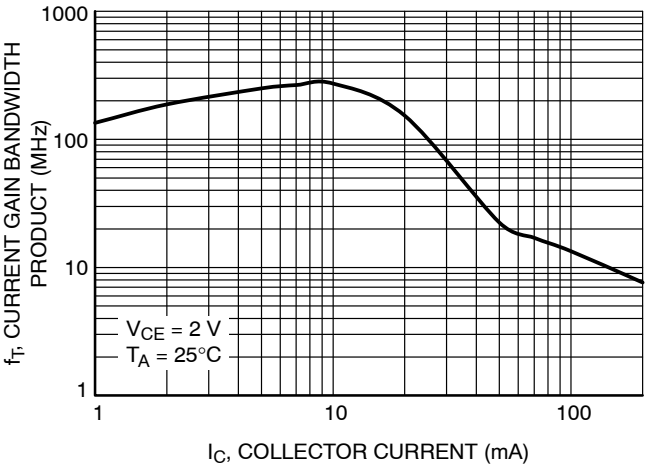


Figure 14. Current Gain Bandwidth vs. Collector Current

TYPICAL CHARACTERISTICS – NST846BMX2

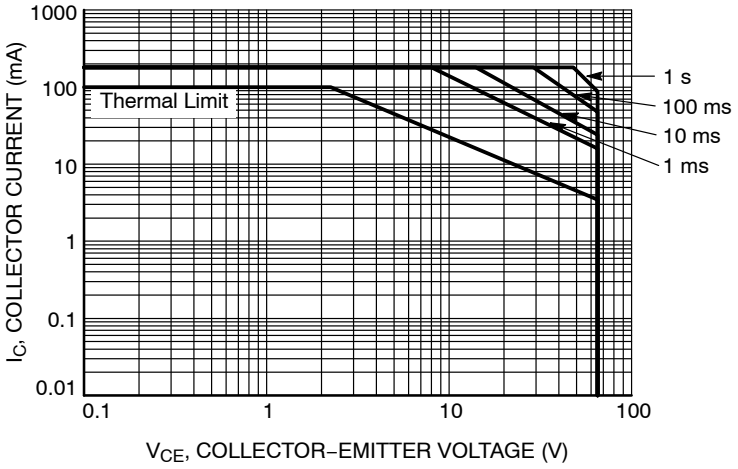


Figure 15. Safe Operating Area

TYPICAL CHARACTERISTICS – NST847AMX2

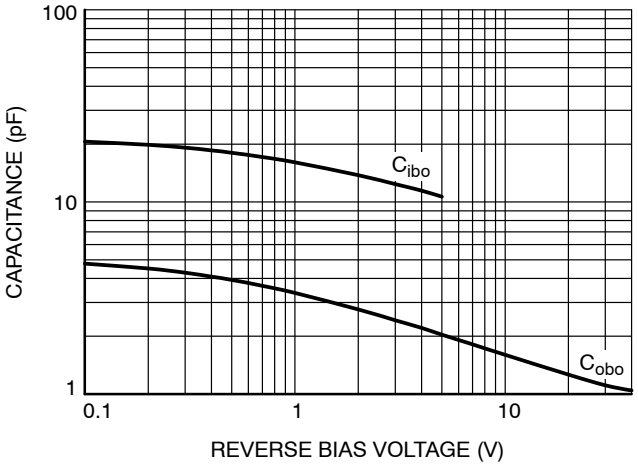


Figure 16. Capacitance

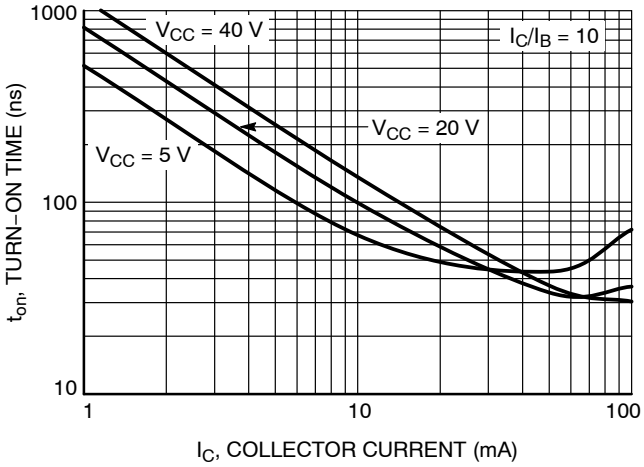


Figure 17. Turn−On Time

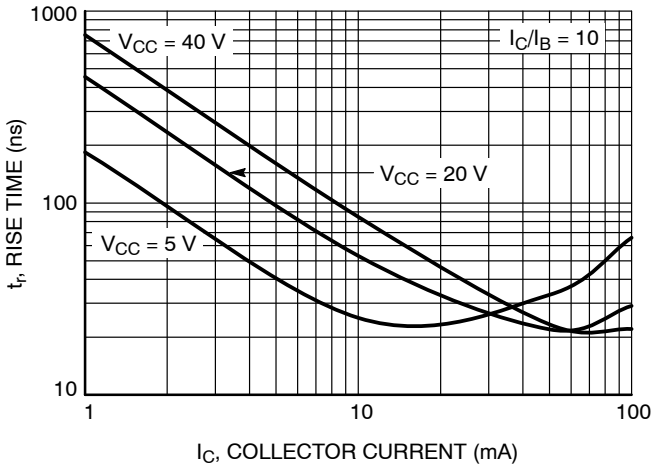


Figure 18. Rise Time

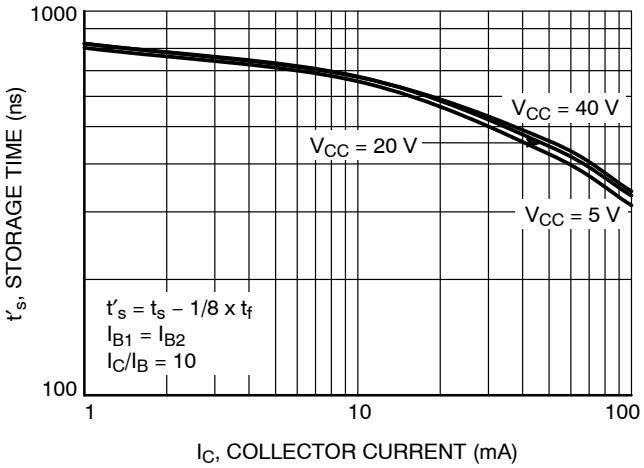


Figure 19. Storage Time

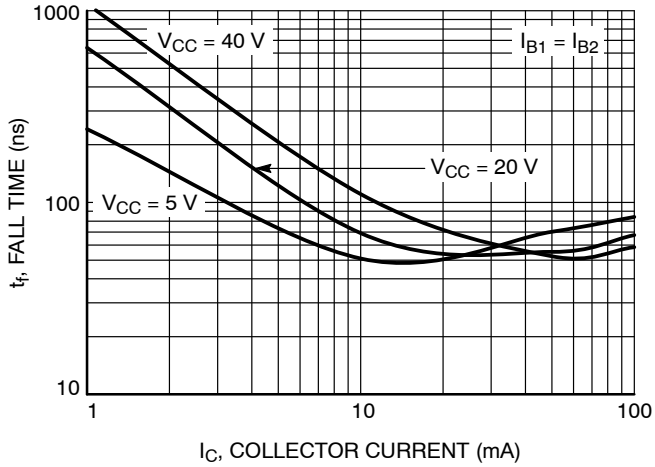


Figure 20. Fall Time

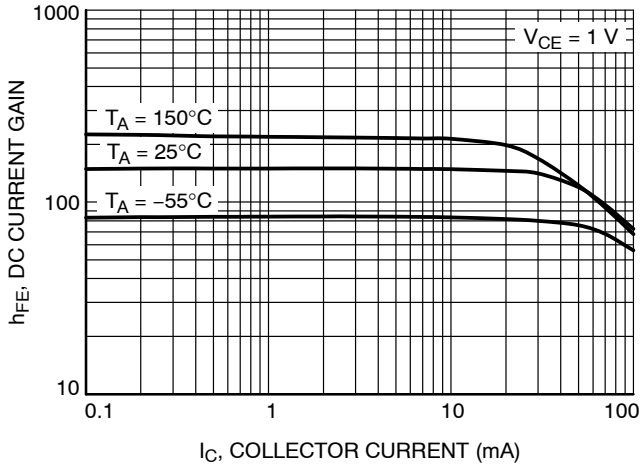


Figure 21. DC Current Gain

TYPICAL CHARACTERISTICS – NST847AMX2

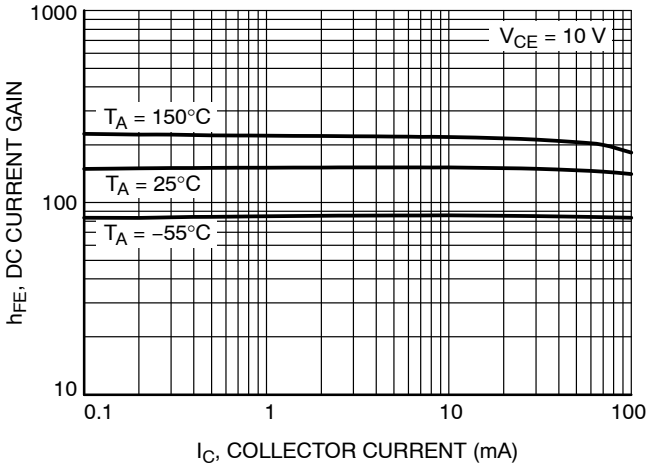


Figure 22. DC Current Gain

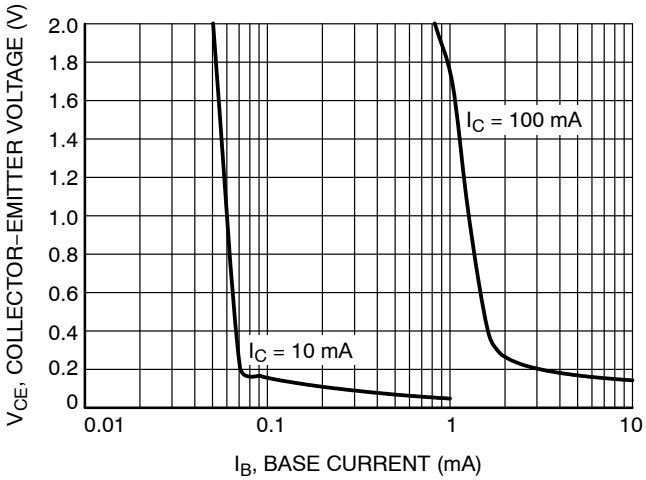


Figure 23. Collector Saturation Region

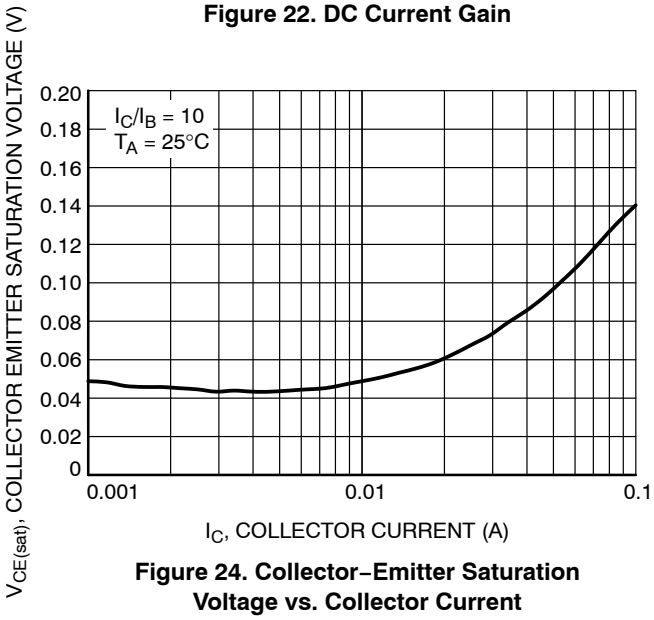


Figure 24. Collector−Emitter Saturation Voltage vs. Collector Current

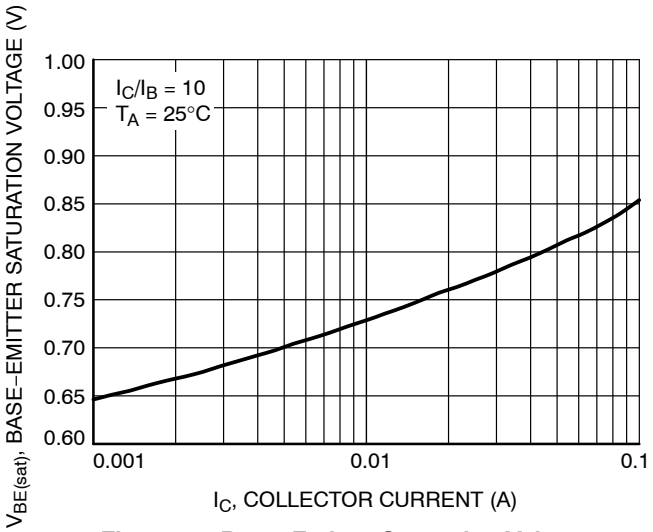


Figure 25. Base−Emitter Saturation Voltage vs. Collector Current

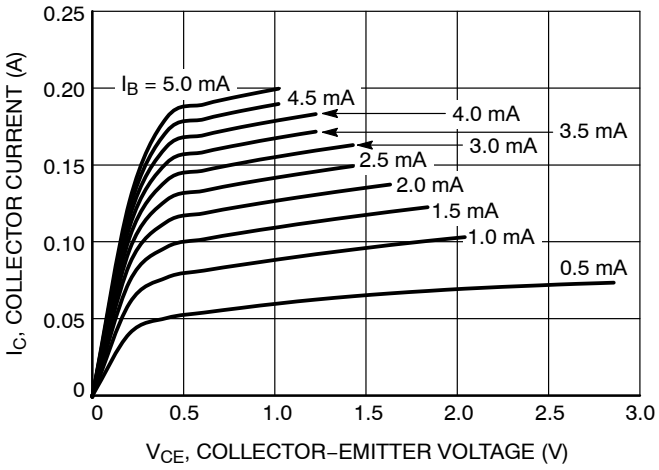


Figure 26. Collector Current vs. Collector−Emitter Voltage

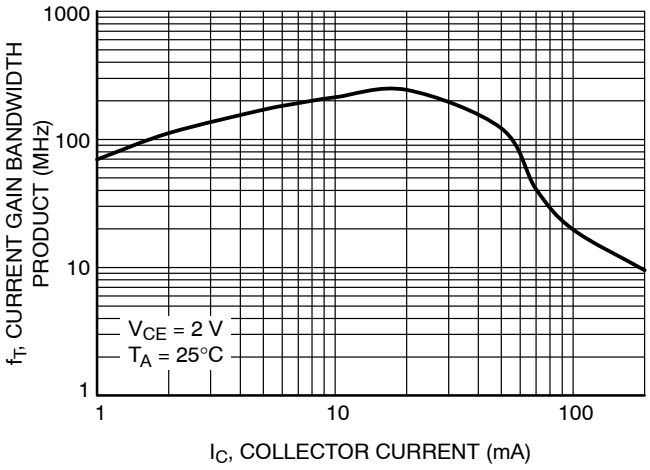


Figure 27. Current Gain Bandwidth vs. Collector Current

TYPICAL CHARACTERISTICS – NST847AMX2

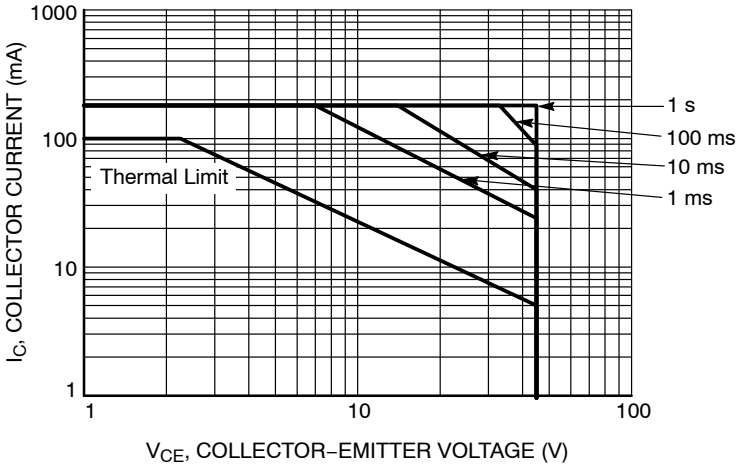


Figure 28. Safe Operating Area

TYPICAL CHARACTERISTICS – NST847BMX2

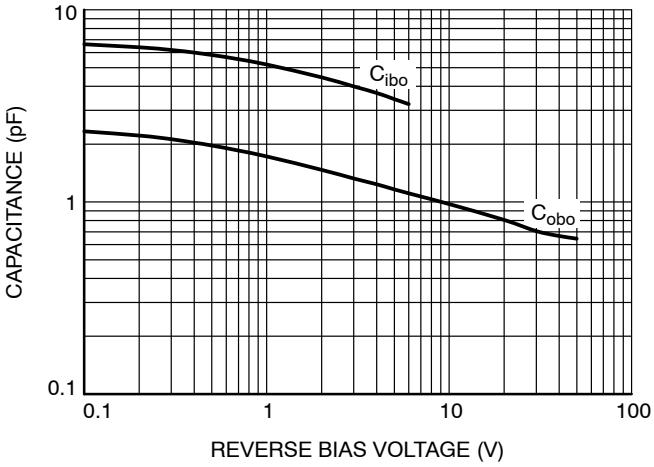


Figure 29. Capacitance

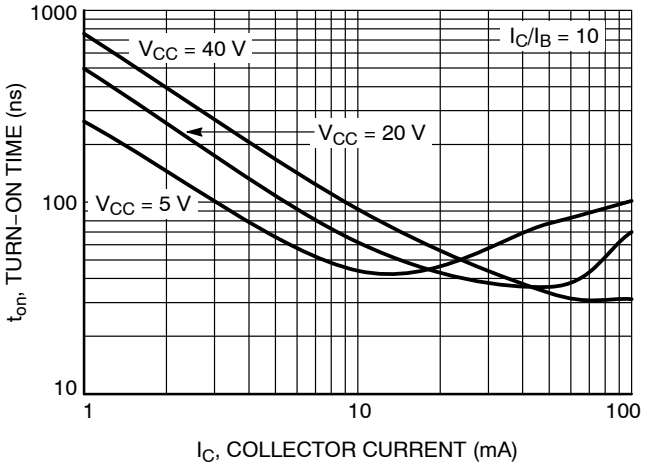


Figure 30. Turn−On Time

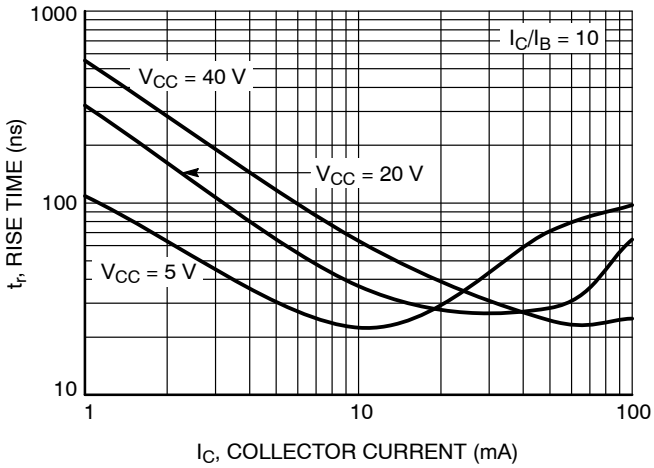


Figure 31. Rise Time

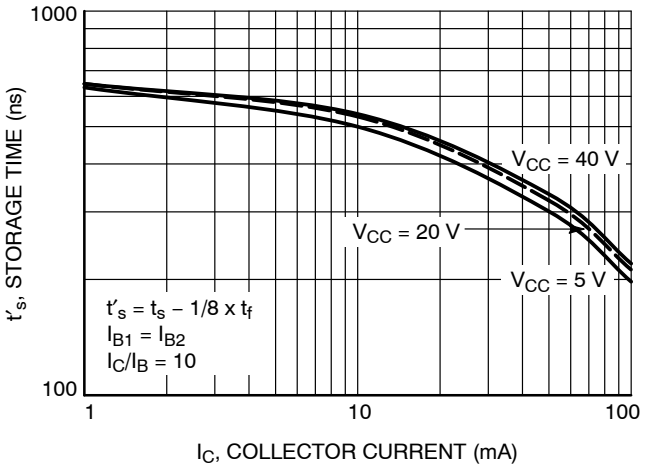


Figure 32. Storage Time

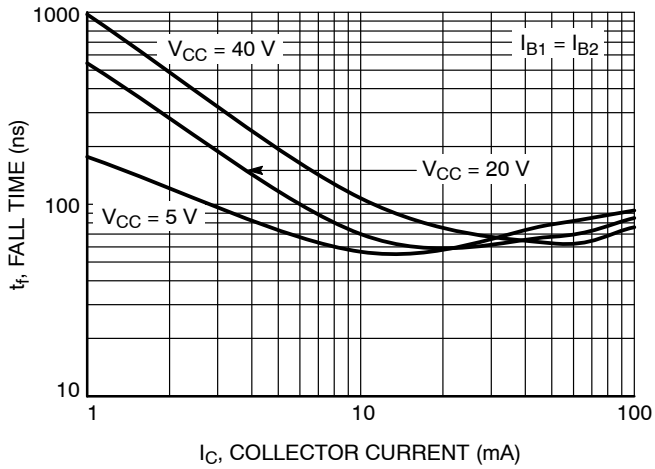


Figure 33. Fall Time

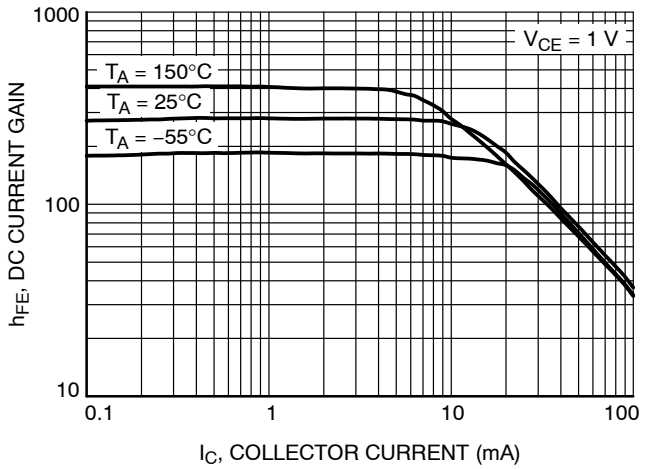


Figure 34. DC Current Gain

TYPICAL CHARACTERISTICS – NST847BMX2

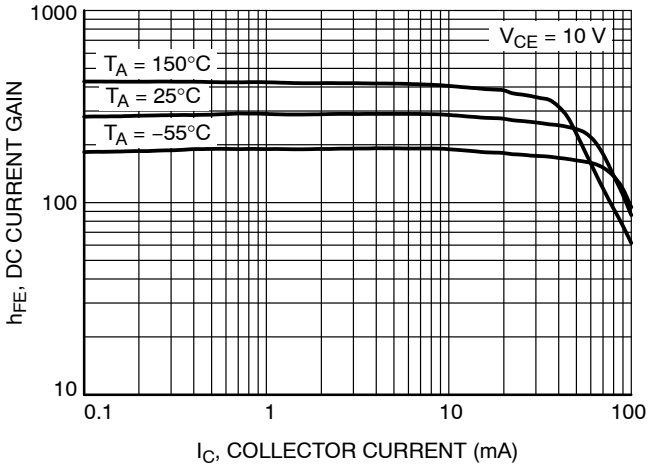


Figure 35. DC Current Gain

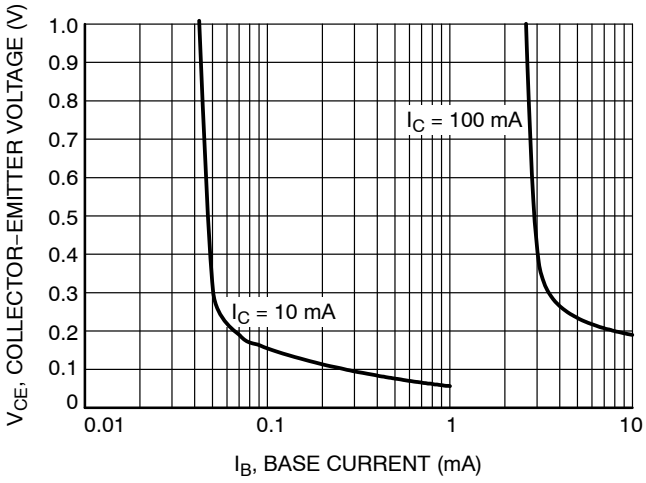


Figure 36. Collector Saturation Region

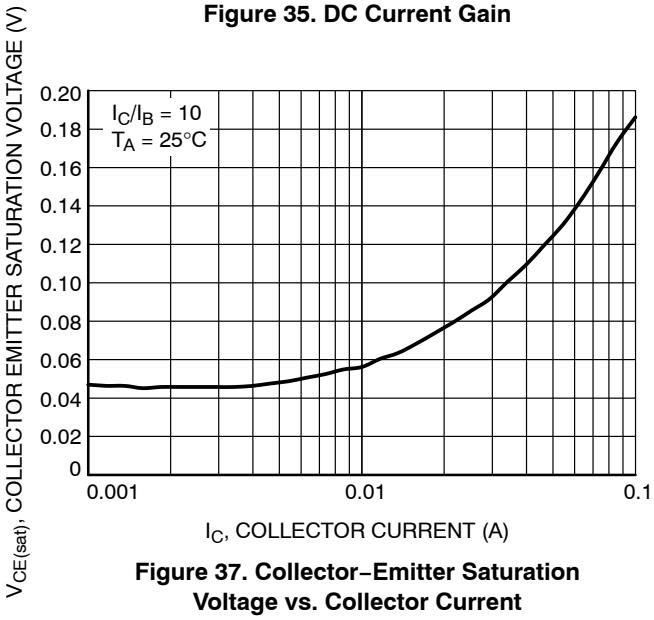


Figure 37. Collector−Emitter Saturation Voltage vs. Collector Current

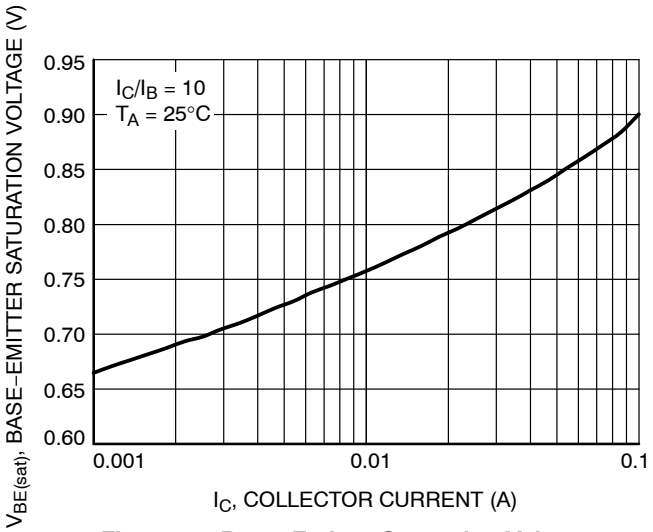


Figure 38. Base−Emitter Saturation Voltage vs. Collector Current

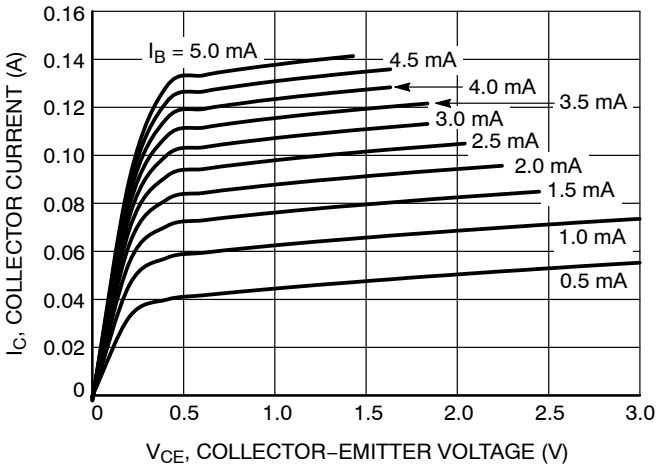


Figure 39. Collector Current vs. Collector−Emitter Voltage

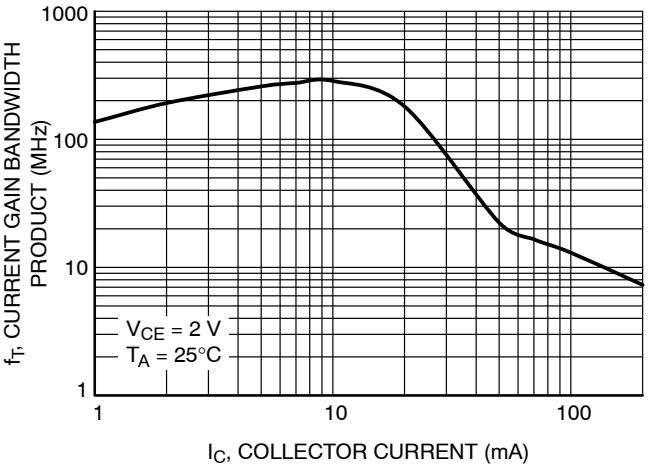


Figure 40. Current Gain Bandwidth vs. Collector Current

TYPICAL CHARACTERISTICS – NST847BMX2

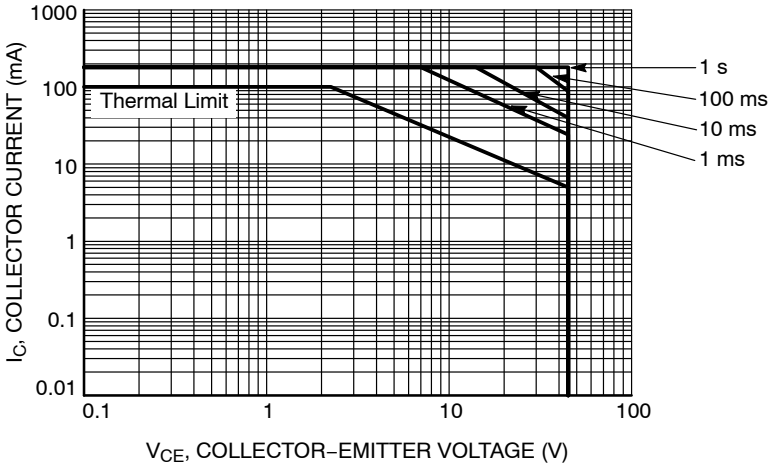


Figure 41. Safe Operating Area

ORDERING INFORMATION

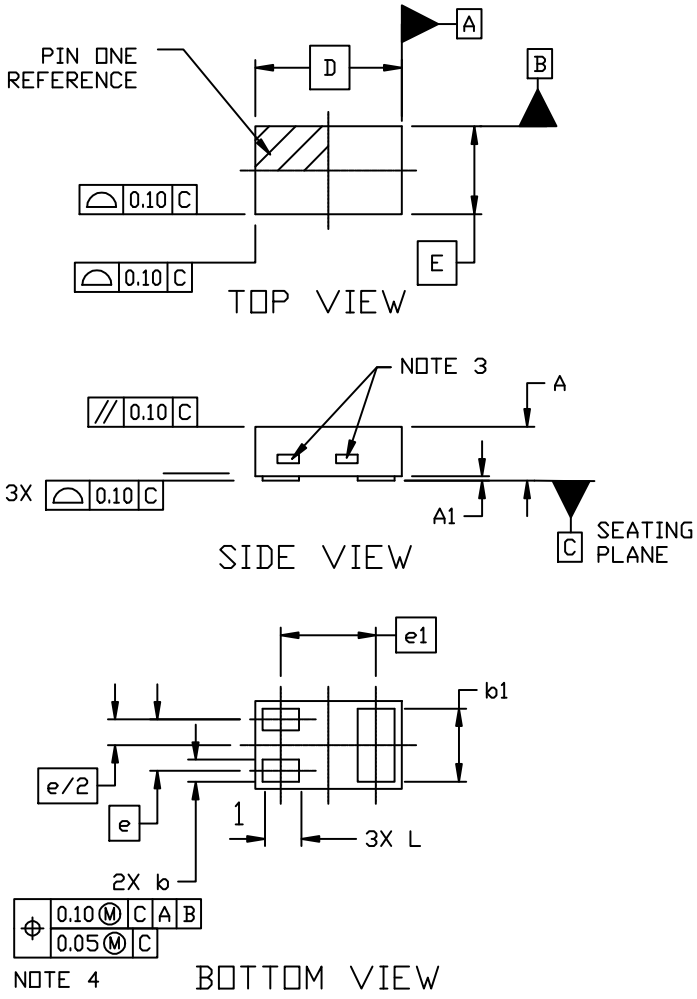
Device	Marking	Package	Shipping†
NST846BMX2T5G	AD	X2DFN3 (1.0x0.6)	8,000 / Tape & Reel
NST847AMX2T5G	AA		
NST847BMX2T5G	AE		

†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.

SCALE 8:1

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

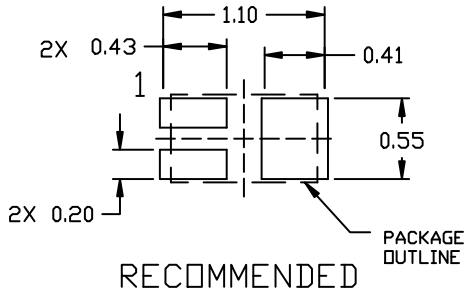
DATE 08 JAN 2019



NOTES:

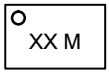
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS
3. EXPOSED COPPER ALLOWED AS SHOWN.
4. ALL PAD LOCATIONS CONTROLLED WITH THIS POSITIONAL TOLERANCE.

DIM	MILLIMETERS		
	MIN.	NOM.	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



RECOMMENDED MOUNTING FOOTPRINT

GENERIC MARKING DIAGRAM*



XX = Specific Device Code
M = Date Code

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G”, may or not be present. Some products may not follow the Generic Marking.

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DESCRIPTION:	**X2DFN3 1.0x0.6, 0.35P**	**PAGE 1 OF 1**

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