

General Purpose Transistor

NPN, 45 V, 500 mA

NST817

The NST817CMTW is designed for general purpose amplifier applications. It is housed in DFN1010-3 offering superior thermal performance. The transistor is ideal for surface mount applications where board space and reliability are at a premium.

Specification Features

- Wettable Flank Package for Optimal Automated Optical Inspection (AOI)
- NSV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

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

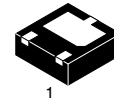
Rating	Symbol	Max	Unit
Collector-Emitter Voltage	V_{CEO}	45	Vdc
Collector-Base Voltage	V_{CBO}	50	Vdc
Emitter-Base Voltage	V_{EBO}	5.0	Vdc
Collector Current – Continuous (Note 1)	I_C	500	mA
Collector Current – Peak (Note 1)	I_{CM}	1.0	A

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.

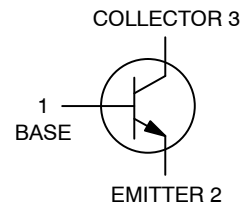
THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Power Dissipation (Note 2) @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	350 2.8	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	145	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature Range	T_J, T_{stg}	-65 to +150	$^\circ\text{C}$

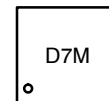
1. Reference SOA Curve
2. Per JESD51-7 with standard PCB footprint and 2 oz Cu.



XDFNW3
CASE 521AC



MARKING DIAGRAM



D7 = Specific Device Code
M = Date Code

ORDERING INFORMATION

Device	Package	Shipping [†]
NST817CMTWFTBG	XDFNW3	3000 / Tape & Reel
NSVT817CMTWFTBG	(Pb-Free)	

[†]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.

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

Characteristics	Symbol	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage ($I_C = 10\text{ mA}$, $I_B = 0\text{ A}$)	$V_{(BR)CEO}$	45	–	–	V
Collector-Base Breakdown Voltage ($I_C = 100\text{ }\mu\text{A}$, $I_E = 0\text{ A}$)	$V_{(BR)CBO}$	50	–	–	V
Emitter-Base Breakdown Voltage ($I_E = 100\text{ }\mu\text{A}$, $I_C = 0$)	$V_{(BR)EBO}$	5	–	–	V
Collector-Base Cutoff Current ($V_{CB} = 20\text{ V}$, $I_E = 0$)	I_{CBO}	–	–	100	nA
Emitter-Base Cutoff Current ($V_{EB} = 5\text{ V}$, $I_C = 0$)	I_{EBO}	–	–	100	nA

ON CHARACTERISTICS (Note 3)

DC Current Gain ($I_C = 100\text{ mA}$, $V_{CE} = 1.0\text{ V}$)	h_{FE}	250	–	600	
Collector-Emitter Saturation Voltage ($I_C = 500\text{ mA}$, $I_B = 50\text{ mA}$)	$V_{CE(sat)}$	–	–	0.70	V
Base-Emitter Saturation Voltage ($I_C = 500\text{ mA}$, $I_B = 50\text{ mA}$)	$V_{BE(sat)}$	–	–	2.0	V
Base-Emitter Turn-on Voltage ($I_C = 500\text{ mA}$, $V_{CE} = 1.0\text{ V}$)	$V_{BE(on)}$	–	–	1.2	V

SMALL SIGNAL CHARACTERISTICS

Transition Frequency ($I_C = 10\text{ mA}$, $V_{CE} = 5.0\text{ V}$, $f = 100\text{ MHz}$)	f_T	–	180	–	MHz
Output Capacitance ($V_{CB} = 10\text{ V}$, $f = 1.0\text{ MHz}$)	C_{obo}	–	4.2	–	pF
Input Capacitance ($V_{EB} = -0.5\text{ Vdc}$, $I_C = 0$, $f = 1.0\text{ MHz}$)	C_{ibo}	–	52	–	pF
Input Impedance ($I_C = -1.0\text{ mAdc}$, $V_{CE} = -10\text{ Vdc}$, $f = 1.0\text{ kHz}$)	h_{ie}	–	15	–	k
Voltage Feedback Ratio ($I_C = -1.0\text{ mAdc}$, $V_{CE} = -10\text{ Vdc}$, $f = 1.0\text{ kHz}$)	h_{re}	–	3.4	–	$\times 10^{-4}$
Small-Signal Current Gain ($I_C = -1.0\text{ mAdc}$, $V_{CE} = -10\text{ Vdc}$, $f = 1.0\text{ kHz}$)	h_{fe}	–	508	–	–
Output Admittance ($I_C = -1.0\text{ mAdc}$, $V_{CE} = -10\text{ Vdc}$, $f = 1.0\text{ kHz}$)	H_{oe}	–	28.5	–	μmhos
Noise Figure ($I_C = 0.2\text{ mA}$, $V_{CE} = 5.0\text{ Vdc}$, $R_S = 2.0\text{ k}\Omega$, $f = 1.0\text{ kHz}$, $BW = 200\text{ Hz}$)	NF	–	0.75	–	dB

SWITCHING CHARACTERISTICS

Delay Time ($V_{CC} = 30\text{ Vdc}$, $I_C = 150\text{ mA}$, $I_{B1} = 15\text{ mA}$)	t_d	–	9.8	–	ns
Rise Time ($V_{CC} = 30\text{ Vdc}$, $I_C = 150\text{ mA}$, $I_{B1} = 15\text{ mA}$)	t_r	–	13	–	ns
Storage Time ($V_{CC} = 30\text{ Vdc}$, $I_C = 150\text{ mA}$, $I_{B1} = 15\text{ mA}$, $I_{B2} = 15\text{ mA}$)	t_s	–	483	–	ns
Fall Time ($V_{CC} = 30\text{ Vdc}$, $I_C = 150\text{ mA}$, $I_{B1} = 15\text{ mA}$, $I_{B2} = 15\text{ mA}$)	t_f	–	48	–	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.

3. Pulse Condition: Pulse Width = 300 μs , Duty Cycle $\leq 2\%$.

TYPICAL CHARACTERISTICS

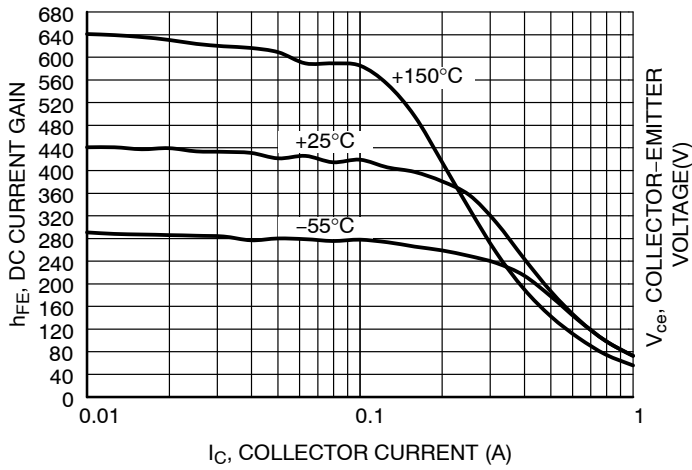


Figure 1. DC Current Gain

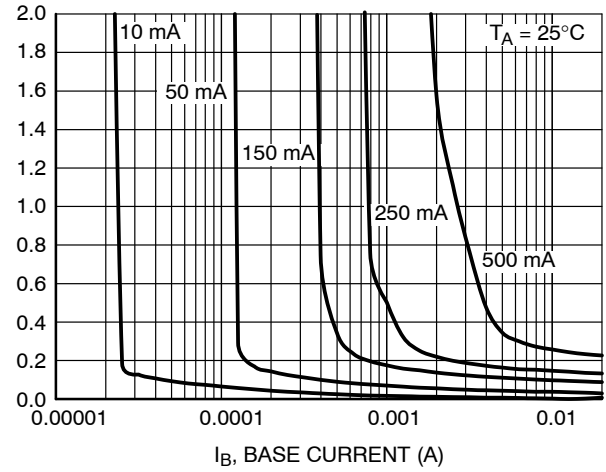


Figure 2. Saturation Region

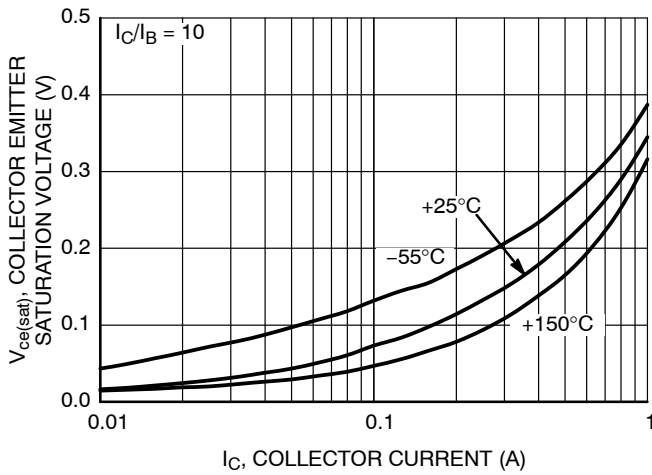


Figure 3. Collector-Emitter Saturation Voltage

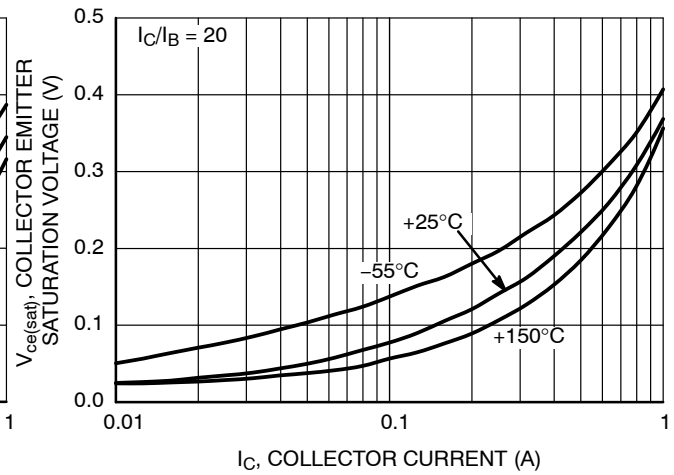


Figure 4. Collector-Emitter Saturation Voltage

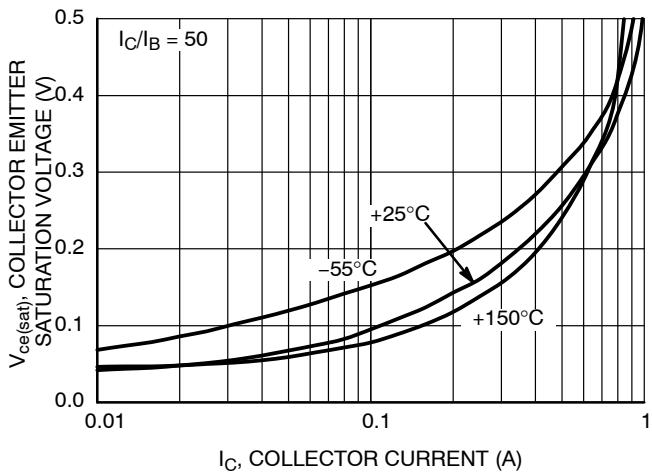


Figure 5. Collector-Emitter Saturation Voltage

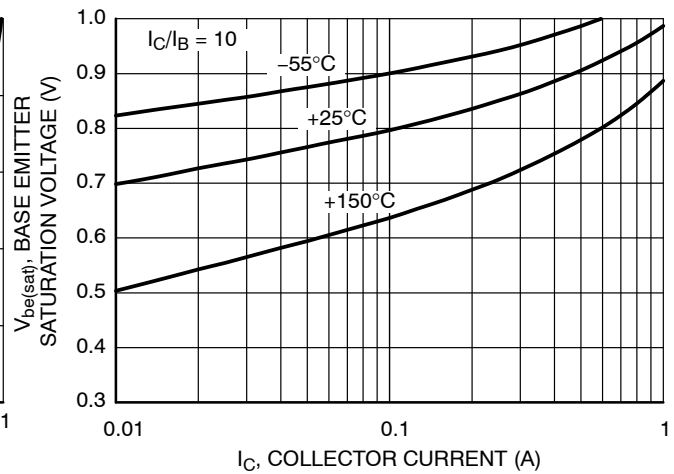


Figure 6. Base-Emitter Saturation Voltage

TYPICAL CHARACTERISTICS

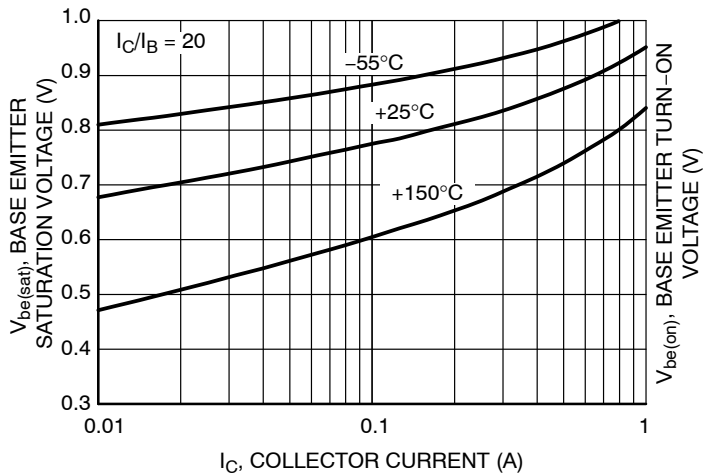


Figure 7. Base-Emitter Saturation Voltage

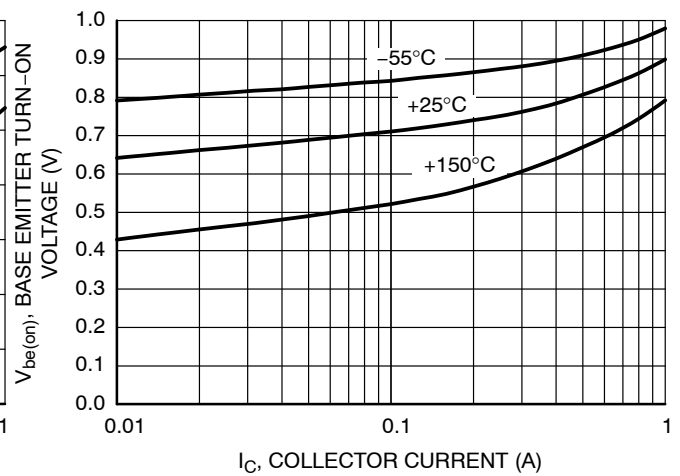


Figure 8. Base-Emitter "ON" Voltage

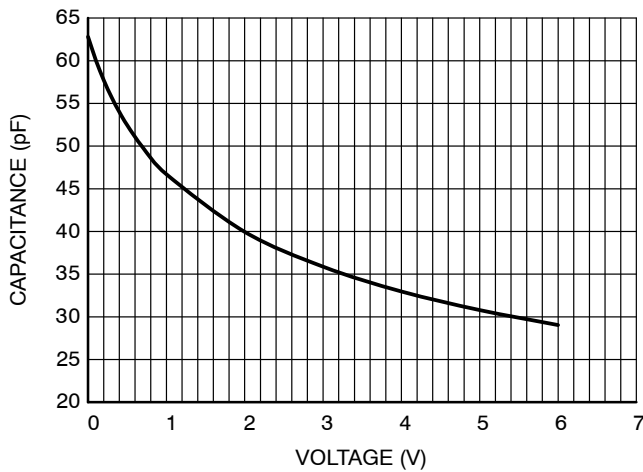


Figure 9. Input Capacitance

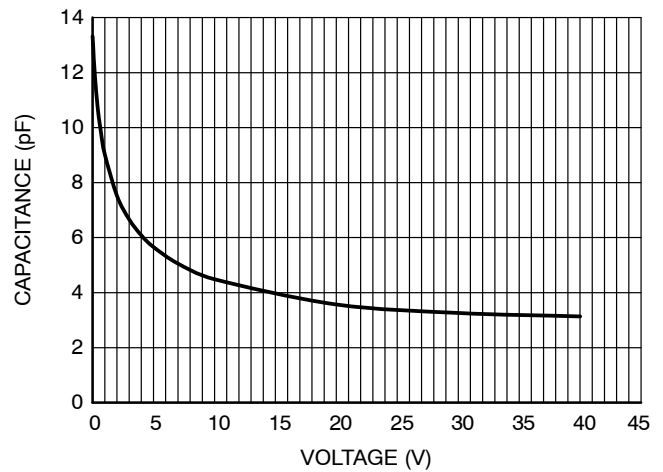


Figure 10. Output Capacitance

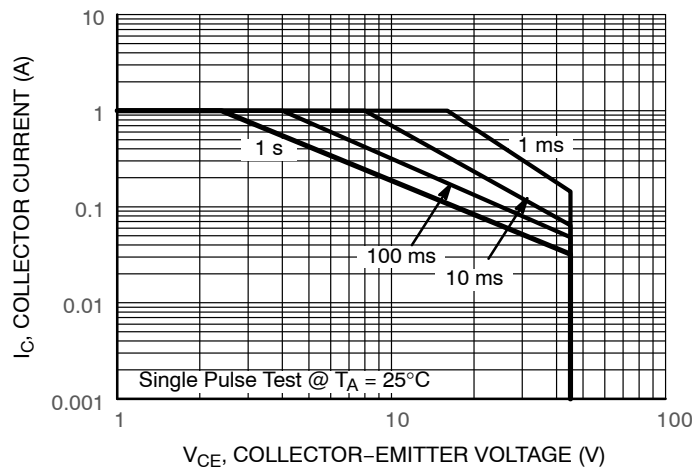
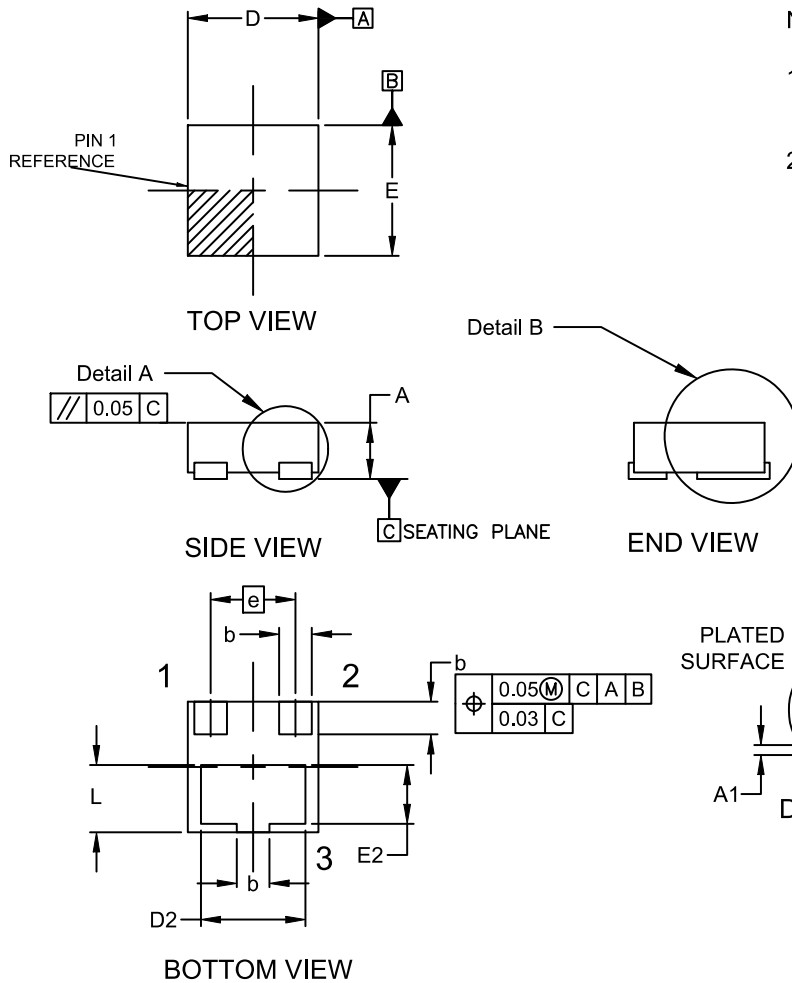


Figure 11. Safe Operating Area

PACKAGE DIMENSIONS

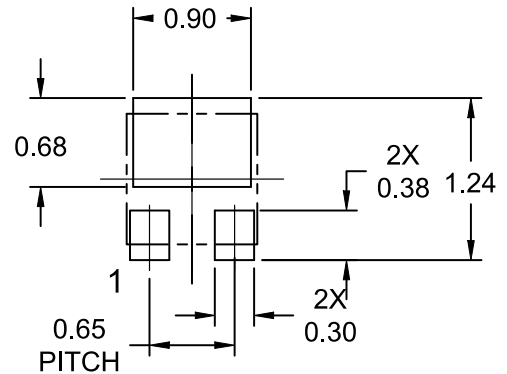
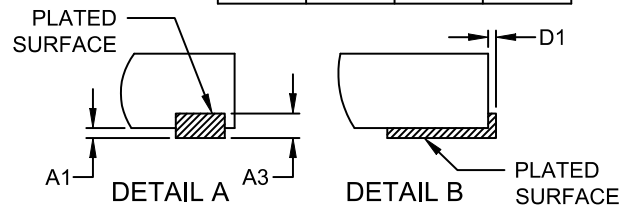
XDFNW3 1x1, 0.65P
CASE 521AC
ISSUE A



NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2009.
2. CONTROLLING DIMENSION: MILLIMETERS

DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.32	0.38	0.44
A1	0.00	---	0.04
A3	0.125 REF		
b	0.20	0.25	0.30
D	0.90	1.00	1.10
D1	0.00	---	0.04
D2	0.75	0.80	0.85
E	0.90	1.00	1.10
E2	0.40	0.45	0.50
e	0.65 BSC		
L	0.465	0.515	0.565



RECOMMENDED MOUNTING FOOTPRINT*

* For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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