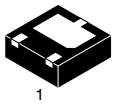
General Purpose Transistor
NPN, 45 V, 500 mA

NST817

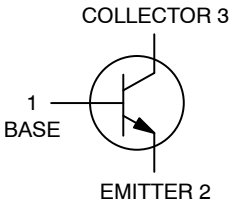
The NST817CMTW is designed for general purpose amplifier applications. It is housed in DFN1010−3 offering superior thermal performance. The transistor is ideal for surface mount applications where board space and reliability are at a premium.

Specification Features

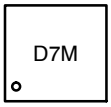
- Wettable Flank Package for Optimal Automated Optical Inspection (AOI)
- NSV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC−Q101 Qualified and PPAP Capable
- These Devices are Pb−Free, Halogen Free/BFR Free and are RoHS Compliant



XDFNW3
CASE 521AC



MARKING DIAGRAM



D7 = Specific Device Code
M = Date Code

MAXIMUM RATINGS (T_A = 25°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°C Derate above 25°C	P_D	 350 2.8	 mW mW/°C
Thermal Resistance, Junction−to−Ambient (Note 2)	$R_{\theta JA}$	145	°C/W
Junction and Storage Temperature Range	T_J, T_{stg}	−65 to +150	°C

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

ORDERING INFORMATION

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

†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°C unless otherwise noted)

Characteristics	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector−Emitter Breakdown Voltage (I_C = 10 mA, I_B = 0 A)	$V_{(BR)CEO}$	45	–	–	V
Collector−Base Breakdown Voltage (I_C = 100 μA, I_E = 0 A)	$V_{(BR)CBO}$	50	–	–	V
Emitter−Base Breakdown Voltage (I_E = 100 μA, I_C = 0)	$V_{(BR)EBO}$	5	–	–	V
Collector−Base Cutoff Current (V_{CB} = 20 V, I_E = 0)	I_{CBO}	–	–	100	nA
Emitter−Base Cutoff Current (V_{EB} = 5 V, I_C = 0)	I_{EBO}	–	–	100	nA
ON CHARACTERISTICS (Note 3)					
DC Current Gain (I_C = 100 mA, V_{CE} = 1.0 V)	h_{FE}	250	–	600	
Collector−Emitter Saturation Voltage (I_C = 500 mA, I_B = 50 mA)	$V_{CE(sat)}$	–	–	0.70	V
Base−Emitter Saturation Voltage (I_C = 500 mA, I_B = 50 mA)	$V_{BE(sat)}$	–	–	2.0	V
Base−Emitter Turn−on Voltage (I_C = 500 mA, V_{CE} = 1.0 V)	$V_{BE(on)}$	–	–	1.2	V
SMALL SIGNAL CHARACTERISTICS					
Transition Frequency (I_C = 10 mA, V_{CE} = 5.0 V, f = 100 MHz)	f_T	–	180	–	MHz
Output Capacitance (V_{CB} = 10 V, f = 1.0 MHz)	C_{obo}	–	4.2	–	pF
Input Capacitance (V_{EB} = −0.5 Vdc, I_C = 0, f = 1.0 MHz)	C_{ibo}	–	52	–	pF
Input Impedance (I_C = −1.0 mAdc, V_{CE} = −10 Vdc, f = 1.0 kHz)	h_{ie}	–	15	–	k
Voltage Feedback Ratio (I_C = −1.0 mAdc, V_{CE} = −10 Vdc, f = 1.0 kHz)	h_{re}	–	3.4	–	X 10^{-4}
Small−Signal Current Gain (I_C = −1.0 mAdc, V_{CE} = −10 Vdc, f = 1.0 kHz)	h_{fe}	–	508	–	–
Output Admittance (I_C = −1.0 mAdc, V_{CE} = −10 Vdc, f = 1.0 kHz)	H_{oe}	–	28.5	–	μmhos
Noise Figure (I_C = 0.2 mA, V_{CE} = 5.0 Vdc, R_S = 2.0 kΩ, f = 1.0 kHz, BW = 200 Hz)	NF	–	0.75	–	dB
SWITCHING CHARACTERISTICS					
Delay Time (V_{CC} = 30 Vdc, I_C = 150 mA, I_{B1} = 15 mA)	t_d	–	9.8	–	ns
Rise Time (V_{CC} = 30 Vdc, I_C = 150 mA, I_{B1} = 15 mA)	t_r	–	13	–	ns
Storage Time (V_{CC} = 30 Vdc, I_C = 150 mA, I_{B1} = 15 mA, I_{B2} = 15 mA)	t_s	–	483	–	ns
Fall Time (V_{CC} = 30 Vdc, I_C = 150 mA, I_{B1} = 15 mA, I_{B2} = 15 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 ≤ 2%.

TYPICAL CHARACTERISTICS

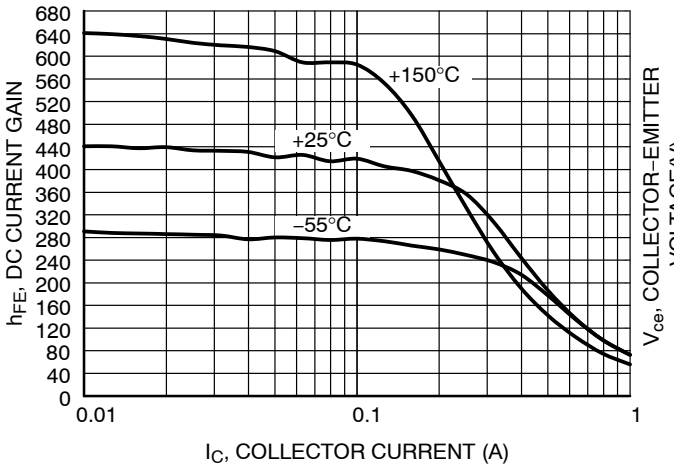


Figure 1. DC Current Gain

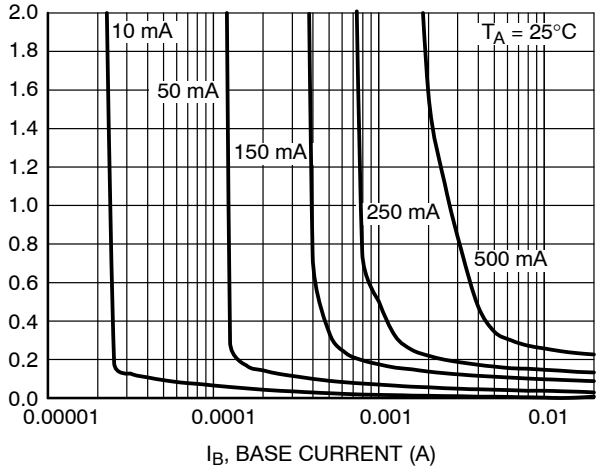


Figure 2. Saturation Region

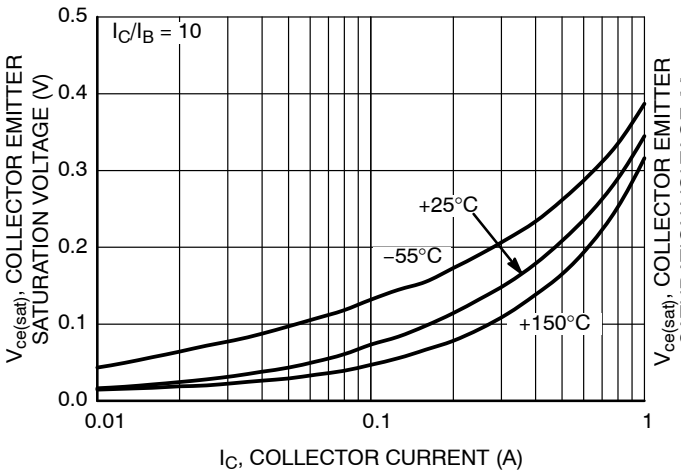


Figure 3. Collector−Emitter Saturation Voltage

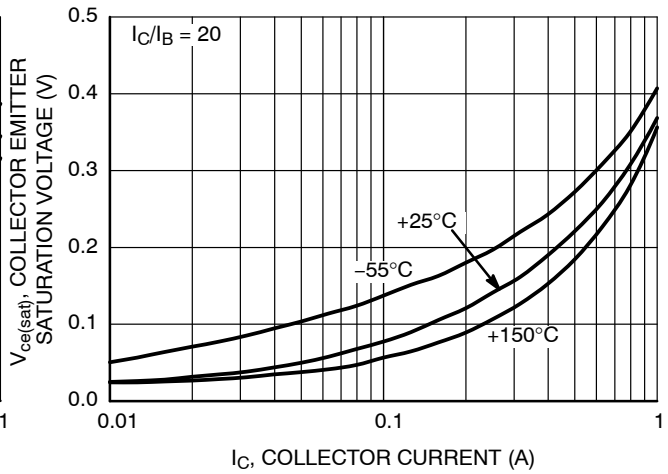


Figure 4. Collector−Emitter Saturation Voltage

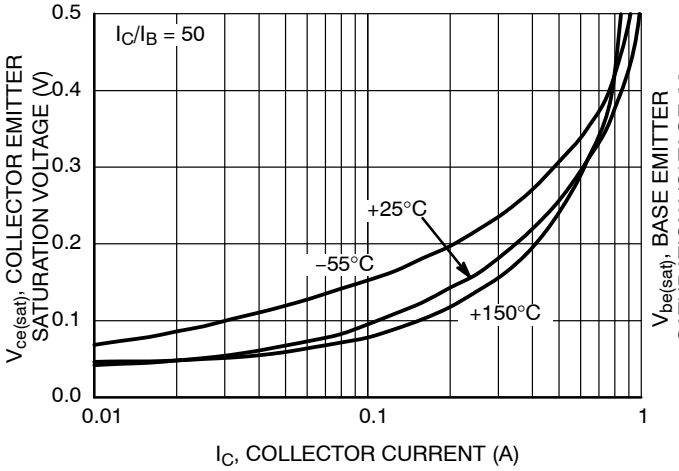


Figure 5. Collector−Emitter Saturation Voltage

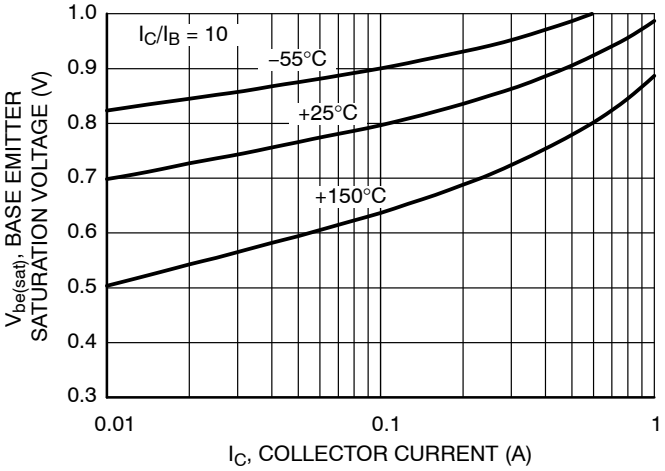


Figure 6. Base−Emitter Saturation Voltage

TYPICAL CHARACTERISTICS

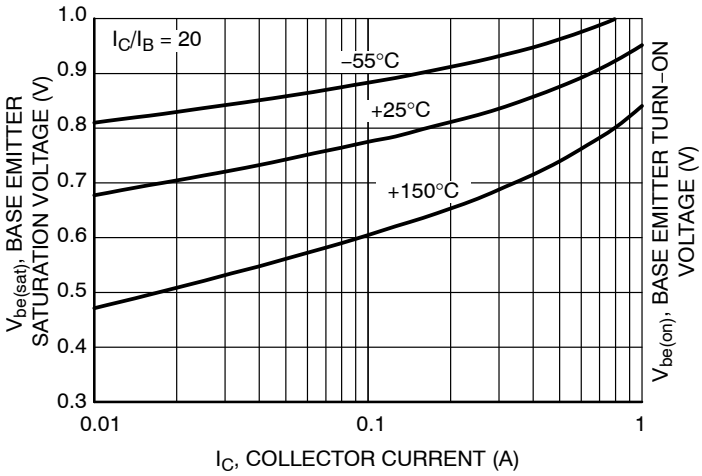


Figure 7. Base−Emitter Saturation Voltage

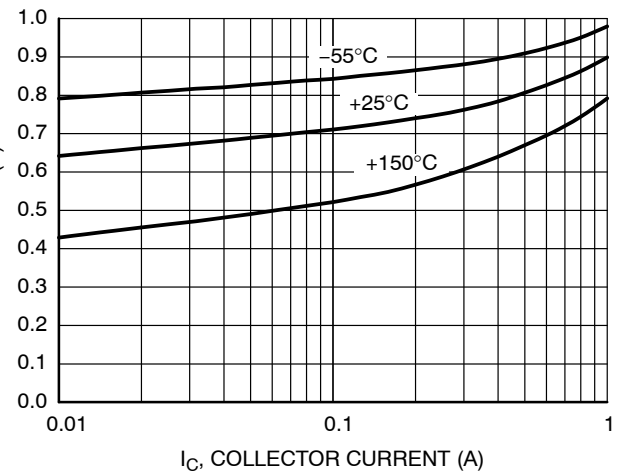


Figure 8. Base−Emitter "ON" Voltage

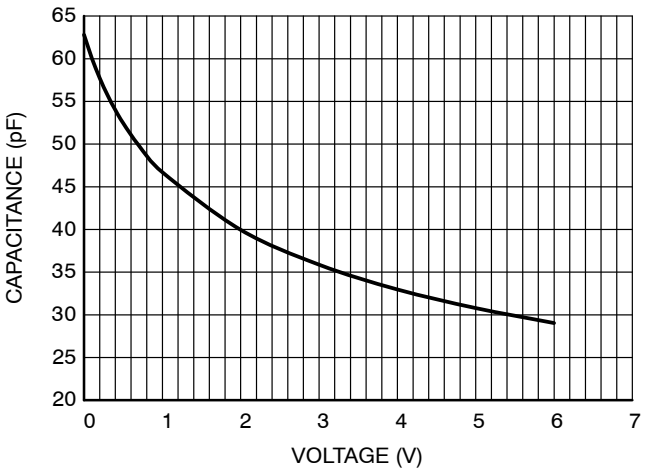


Figure 9. Input Capacitance

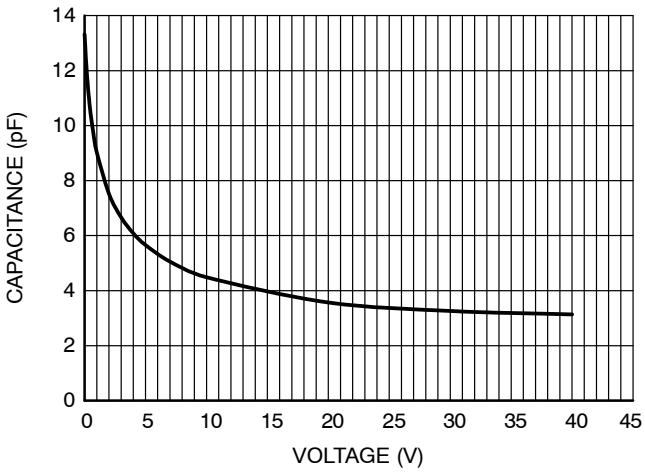


Figure 10. Output Capacitance

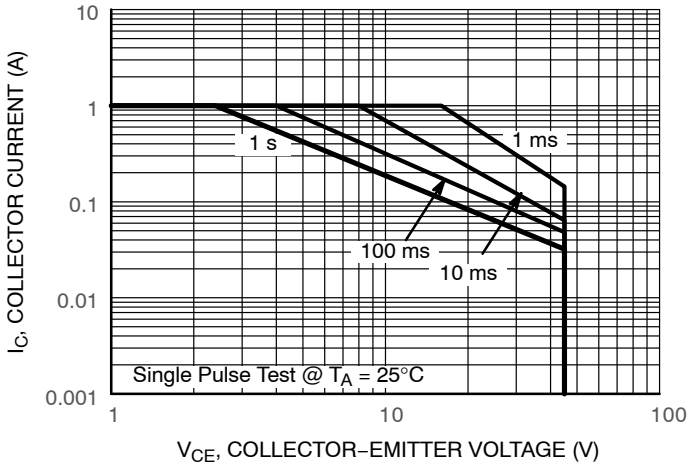
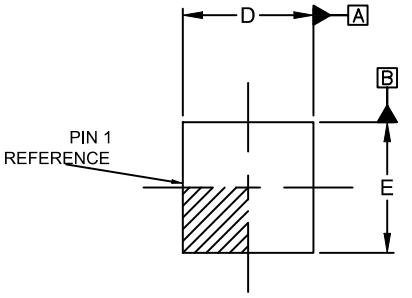


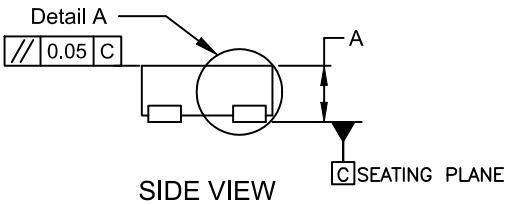
Figure 11. Safe Operating Area

PACKAGE DIMENSIONS

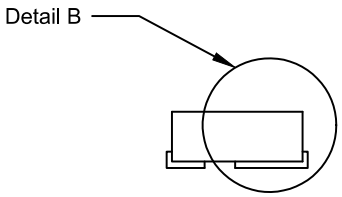
XDFNW3 1x1, 0.65P
CASE 521AC
ISSUE A



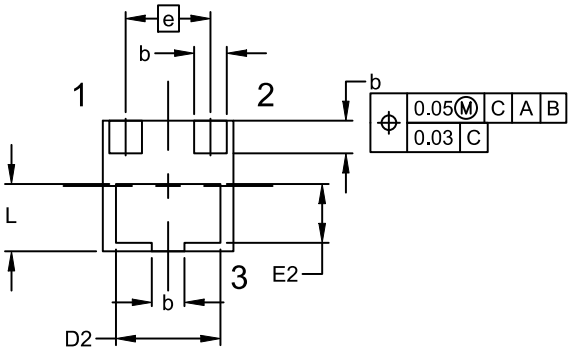
TOP VIEW



SIDE VIEW



END VIEW

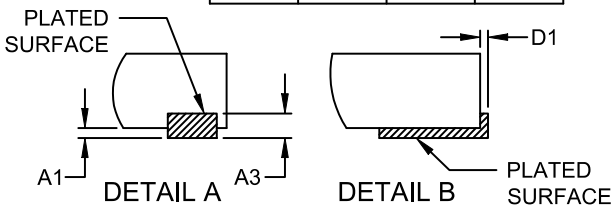


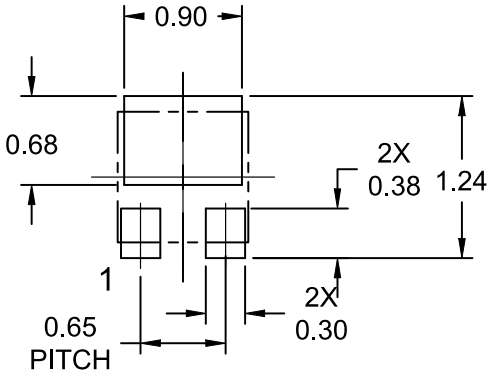
BOTTOM VIEW

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.

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:
Technical Library: www.onsemi.com/design/resources/technical−documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support
For additional information, please contact your local Sales Representative at www.onsemi.com/support/sales