

# 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

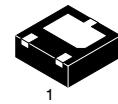
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

#### THERMAL CHARACTERISTICS

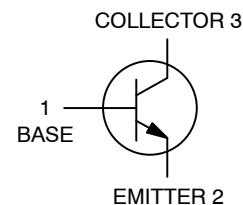
Characteristic	Symbol	Max	Unit
Total Power Dissipation (Note 2) @ $T_A = 25^\circ\text{C}$ Derate above 25°C	$P_D$	350 2.8	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	145	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature Range	$T_J, T_{stg}$	-65 to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

1. Reference SOA Curve

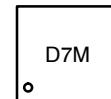
2. Per JESD51-7 with standard PCB footprint and 2 oz Cu.



XDFNW3  
CASE 521AC



#### MARKING DIAGRAM



D7 = Specific Device Code  
M = Date Code

#### ORDERING INFORMATION

Device	Package	Shipping <sup>†</sup>
NST817CMTWFTBG	XDFNW3	3000 / Tape & Reel
NSVT817CMTWFTBG	(Pb-Free)	

<sup>†</sup>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
-----------------	--------	-----	-----	-----	------

## OFF CHARACTERISTICS

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

## ON CHARACTERISTICS (Note 3)

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

## SMALL SIGNAL CHARACTERISTICS

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

## SWITCHING CHARACTERISTICS

Delay Time ( $V_{\text{CC}} = 30 \text{ Vdc}$ , $I_C = 150 \text{ mA}$ , $I_{\text{B}1} = 15 \text{ mA}$ )	$t_d$	—	9.8	—	ns
Rise Time ( $V_{\text{CC}} = 30 \text{ Vdc}$ , $I_C = 150 \text{ mA}$ , $I_{\text{B}1} = 15 \text{ mA}$ )	$t_r$	—	13	—	ns
Storage Time ( $V_{\text{CC}} = 30 \text{ Vdc}$ , $I_C = 150 \text{ mA}$ , $I_{\text{B}1} = 15 \text{ mA}$ , $I_{\text{B}2} = 15 \text{ mA}$ )	$t_s$	—	483	—	ns
Fall Time ( $V_{\text{CC}} = 30 \text{ Vdc}$ , $I_C = 150 \text{ mA}$ , $I_{\text{B}1} = 15 \text{ mA}$ , $I_{\text{B}2} = 15 \text{ mA}$ )	$t_f$	—	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  $\mu\text{s}$ , Duty Cycle  $\leq 2\%$ .

## TYPICAL CHARACTERISTICS

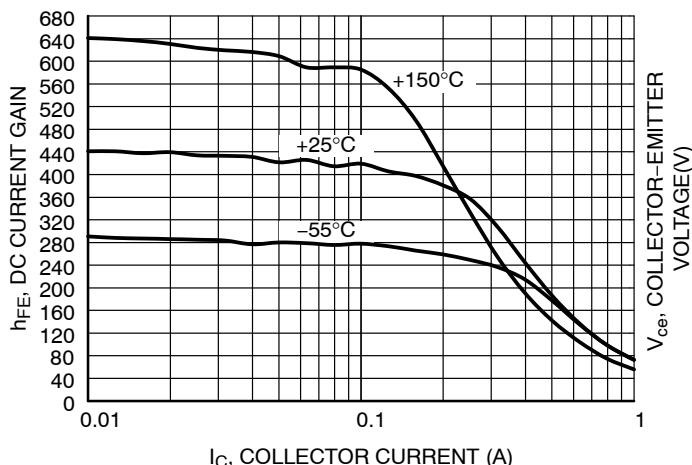


Figure 1. DC Current Gain

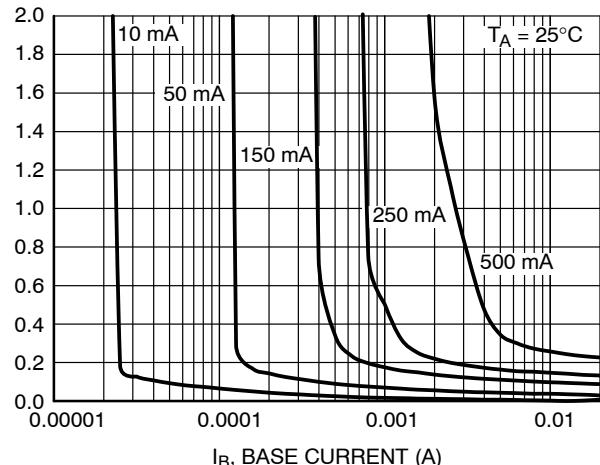


Figure 2. Saturation Region

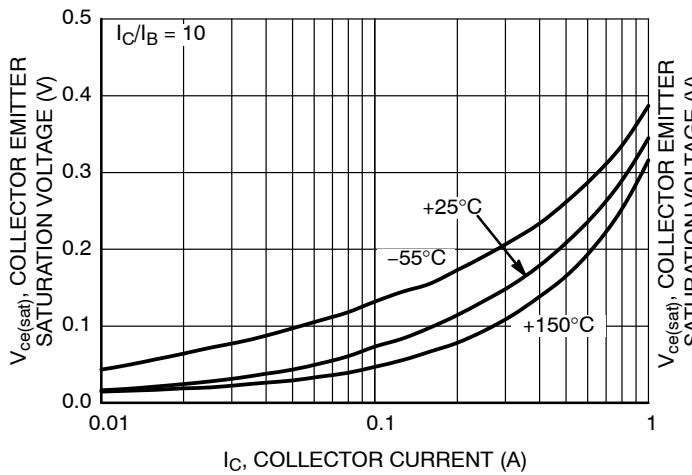


Figure 3. Collector-Emitter Saturation Voltage

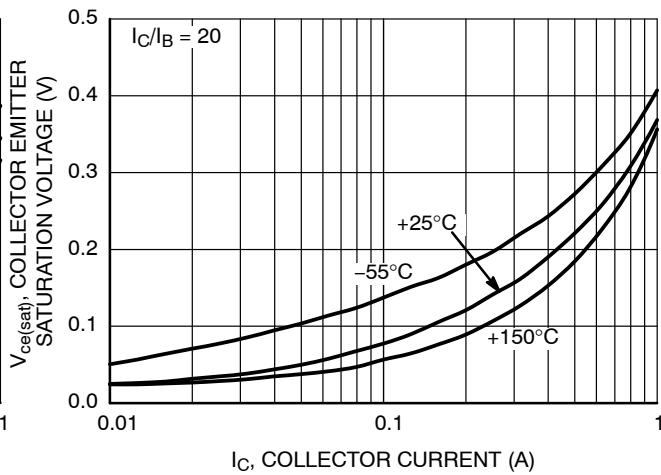


Figure 4. Collector-Emitter Saturation Voltage

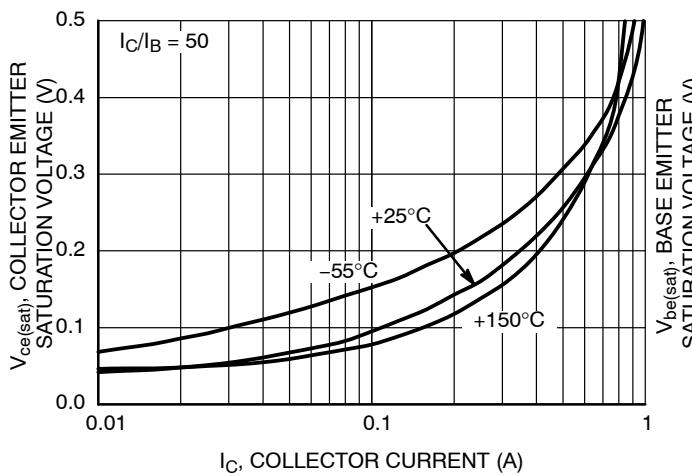


Figure 5. Collector-Emitter Saturation Voltage

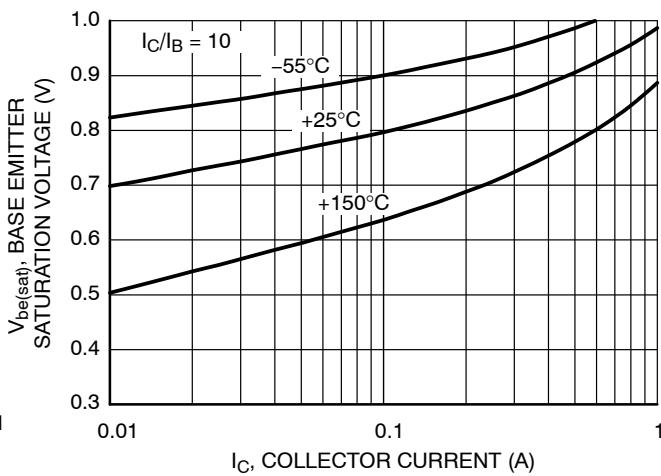


Figure 6. Base-Emitter Saturation Voltage

## TYPICAL CHARACTERISTICS

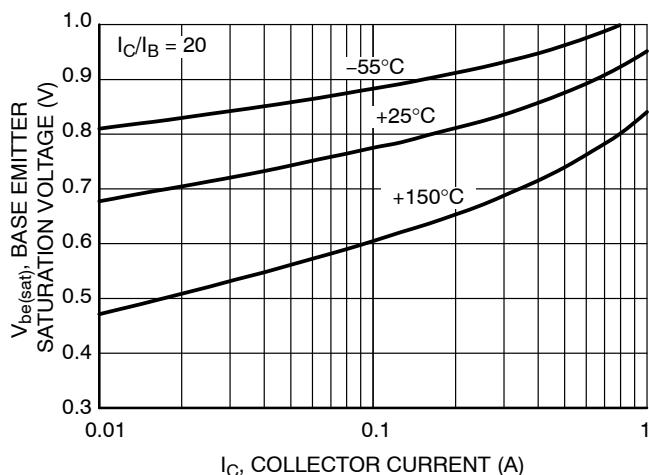


Figure 7. Base-Emitter Saturation Voltage

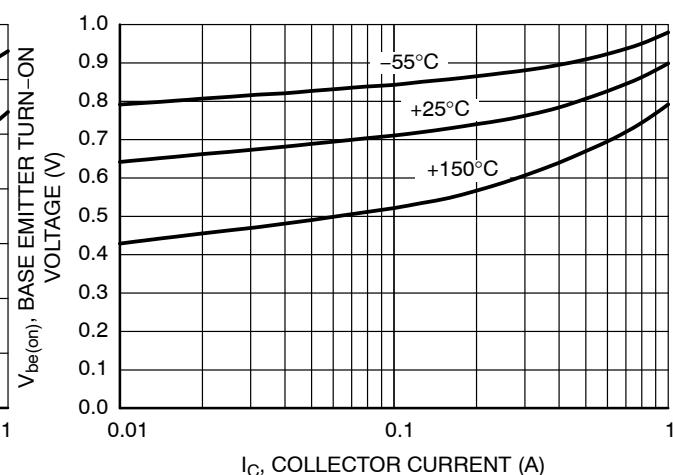


Figure 8. Base-Emitter "ON" Voltage

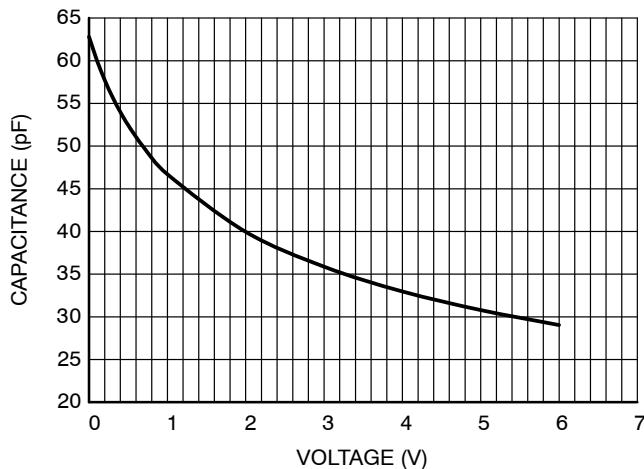


Figure 9. Input Capacitance

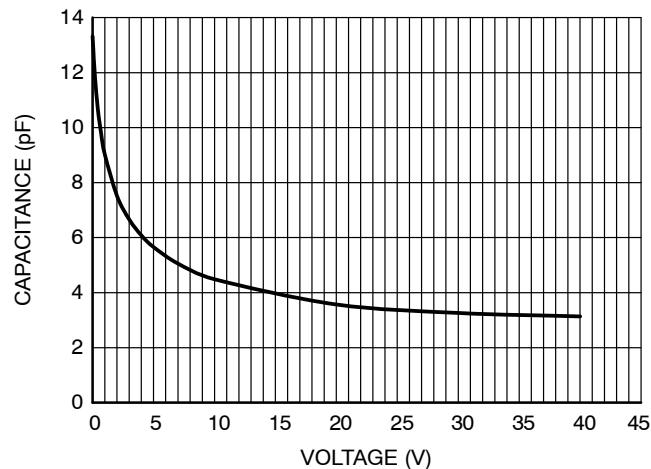


Figure 10. Output Capacitance

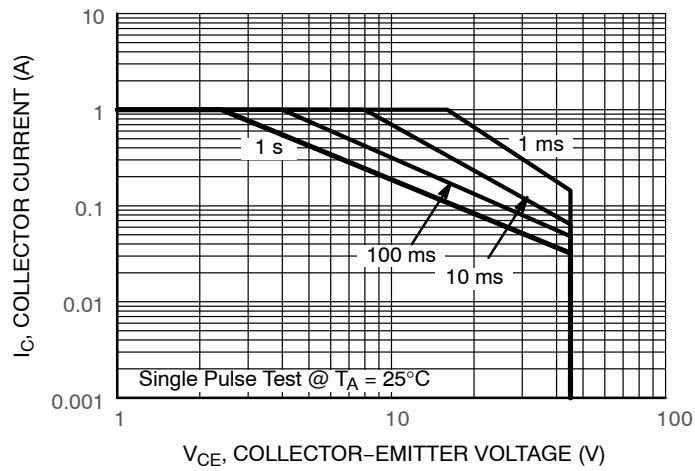
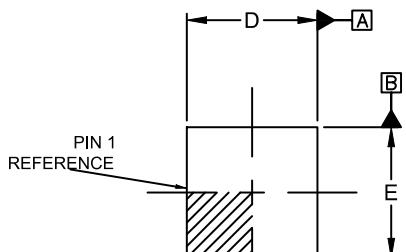


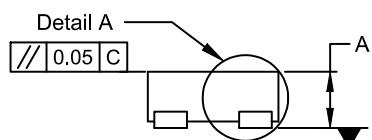
Figure 11. Safe Operating Area

## PACKAGE DIMENSIONS

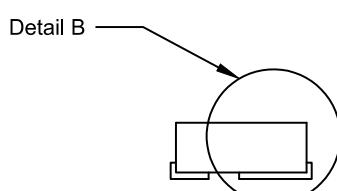
**XDFNW3 1x1, 0.65P**  
**CASE 521AC**  
**ISSUE A**



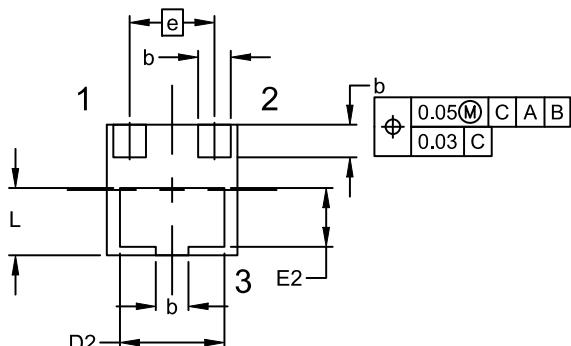
### TOP VIEW



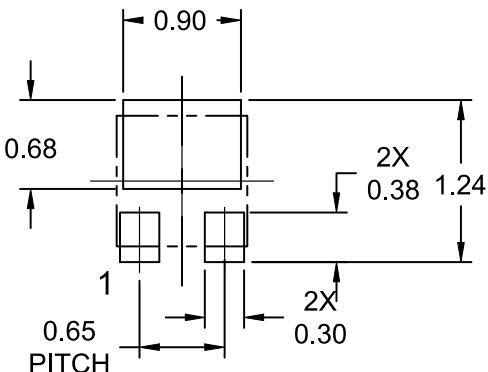
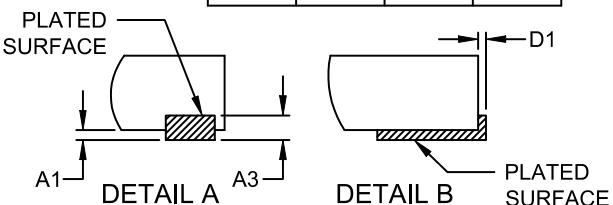
### SIDE VIEW



END VIEW



## BOTTOM VIEW



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.

**onsemi**, **ONSEMI**, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**'s product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marking.pdf](http://www.onsemi.com/site/pdf/Patent-Marking.pdf). **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. "Typical" parameters which may be provided in **onsemi** data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

## ADDITIONAL INFORMATION

### TECHNICAL PUBLICATIONS:

Technical Library: [www.onsemi.com/design/resources/technical-documentation](http://www.onsemi.com/design/resources/technical-documentation)  
onsemi Website: [www.onsemi.com](http://www.onsemi.com)

### ONLINE SUPPORT: [www.onsemi.com/support](http://www.onsemi.com/support)

For additional information, please contact your local Sales Representative at  
[www.onsemi.com/support/sales](http://www.onsemi.com/support/sales)

# X-ON Electronics

Largest Supplier of Electrical and Electronic Components

***Click to view similar products for Bipolar Transistors - BJT category:***

***Click to view products by ON Semiconductor manufacturer:***

Other Similar products are found below :

[MCH4017-TL-H](#) [MMBT-2369-TR](#) [NJVMJD148T4G](#) [NTE195A](#) [2N3442](#) [2N4233A](#) [2N4401-A](#) [2N6728](#) [2SB1204S-TL-E](#) [2SC4731T-AY](#)  
[2SC5488A-TL-H](#) [FMC5AT148](#) [2N2369ADCSM](#) [2N3904-NS](#) [2N5551](#) [2N6729](#) [2SB1324-TD-E](#) [2SC5231C8-TL-E](#) [CPH6501-TL-E](#)  
[BULD128DT4](#) [Jantx2N5416](#) [NSS20500UW3TBG](#) [CPH6021-TL-H](#) [MCH6102-TL-E](#) [2N3879](#) [30A02MH-TL-E](#) [NTE282](#) [NTE350](#) [NTE81](#)  
[JANSR2N2907AUB](#) [JANSR2N2222AUB](#) [CMLT3946EG TR](#) [SNSS40600CF8T1G](#) [CMLT3906EG TR](#) [GRP-DATA-JANS2N2907AUB](#)  
[GRP-DATA-JANS2N2907AUB](#) [GRP-DATA-JANS2N2222AUA](#) [2N4240](#) [JANS2N3019](#) [2N2221AUB](#) [2SD1815T-TL-E](#) [2N6678](#)  
[2N2907Ae4](#) [Jantx2N5416S](#) [2N3963](#) [50C02MH-TL-E](#) [Jantx2N5415](#) [CPH3123-TL-E](#) [SMBT35200MT1G](#) [SMMJT350T1G](#)