

# NPN Low Saturation Transistor

## NZT902

These devices are designed with high current gain and low saturation voltage with collector currents up to 3 A continuous.

### Features

- This is a Pb-Free Device

### ABSOLUTE MAXIMUM RATINGS (Notes 1, 2)

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

Symbol	Parameter	Value	Unit
$V_{CEO}$	Collector-Emitter Voltage	90	V
$V_{CBO}$	Collector-Base Voltage	120	V
$V_{EBO}$	Emitter-Base Voltage	5	V
$I_C$	Collector Current – Continuous	3	A
$T_J$	Junction Temperature	150	$^\circ\text{C}$
$T_{STG}$	Storage Temperature Range	-55 to ~+150	$^\circ\text{C}$

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.

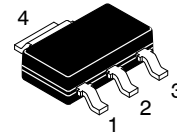
1. These ratings are based on a maximum junction temperature of  $150^\circ\text{C}$ .
2. These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

### THERMAL CHARACTERISTICS (Note 3)

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

Symbol	Characteristics	Value	Unit
$P_D$	Total Device Dissipation	1	W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	125	$^\circ\text{C}/\text{W}$

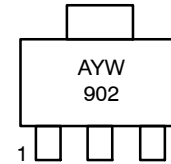
3. Device mounted on FR-4 PCB  $36\text{ mm} \times 18\text{ mm} \times 1.5\text{ mm}$ .



SOT-223  
CASE 318H

1:Base  
2:Collector  
3:Emitter

### MARKING DIAGRAM



A = Assembly Location  
Y = Year  
W = Work Week  
902 = Specific Device Code

### ORDERING INFORMATION

Device	Package	Shipping <sup>†</sup>
NZT902	SOT-223 (Pb-Free)	4000 / Tape & Reel

<sup>†</sup>For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, [BRD8011/D](#).

# NZT902

## ELECTRICAL CHARACTERISTICS (Note 4)

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

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
$BV_{CEO}$	Collector–Emitter Breakdown Voltage	$I_C = 10\text{ mA}$	90			V
$BV_{CBO}$	Collector–Base Breakdown Voltage	$I_C = 100\text{ }\mu\text{A}$	120			V
$BV_{EBO}$	Emitter–Base Breakdown Voltage	$I_E = 100\text{ }\mu\text{A}$	5			V
$I_{CBO}$	Collector–Base Cut–Off Current	$V_{CB} = 100\text{ V}$			100	nA
		$V_{CB} = 100\text{ V}, T_A = 100^\circ\text{C}$			10	$\mu\text{A}$
$I_{EBO}$	Emitter–Base Cut–Off Current	$V_{EB} = 4\text{ V}$			100	nA
$h_{FE}$	DC Current Gain	$I_C = 0.1\text{ A}, V_{CE} = 2\text{ V}$	80			
		$I_C = 1\text{ A}, V_{CE} = 2\text{ V}$	80			
		$I_C = 2\text{ A}, V_{CE} = 2\text{ V}$	25			
$V_{CE(sat)}$	Collector–Emitter Saturation Voltage	$I_C = 0.1\text{ A}, I_B = 5.0\text{ mA}$			50	mV
		$I_C = 1.0\text{ A}, I_B = 100\text{ mA}$			250	
		$I_C = 3.0\text{ A}, I_B = 300\text{ mA}$			600	
$V_{BE(sat)}$	Base–Emitter Saturation Voltage	$I_C = 1.0\text{ A}, I_B = 100\text{ mA}$			1.25	V
$C_{obo}$	Output Capacitance	$V_{CB} = 10\text{ V}, I_E = 0, f = 1\text{ MHz}$			35	pF
$f_T$	Transition Frequency	$I_C = 100\text{ mA}, V_{CE} = 5\text{ V}, f = 100\text{ MHz}$	75			MHz

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.

4. Pulse Test: Pulse Width  $\leq 300\text{ }\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$

TYPICAL PERFORMANCE CHARACTERISTICS

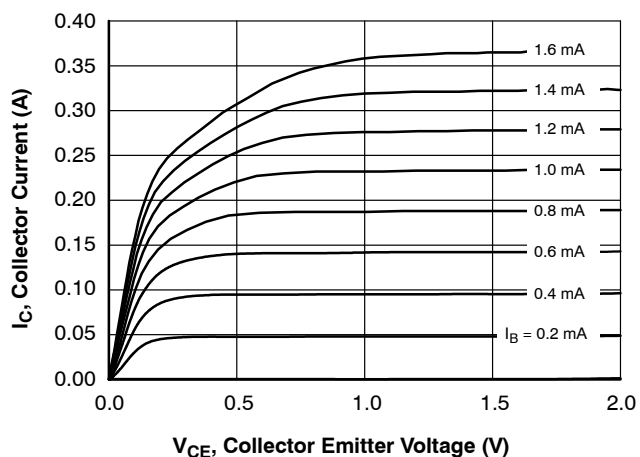


Figure 1. Static Characteristic

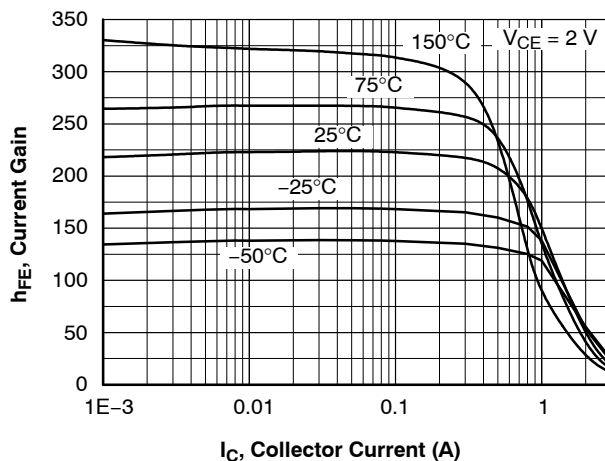


Figure 2. DC Current Gain

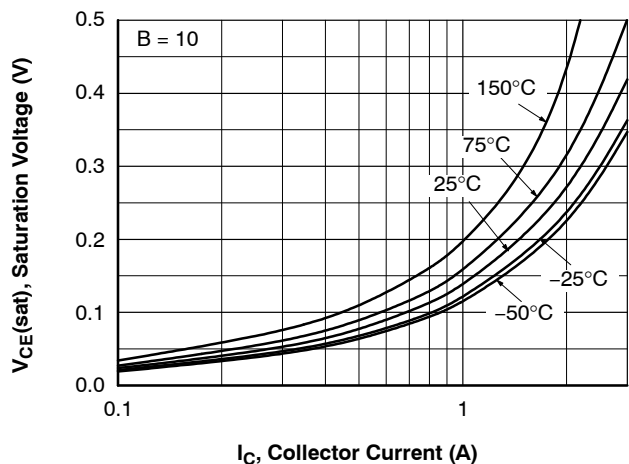


Figure 3. Collector-Emitter Saturation Voltage

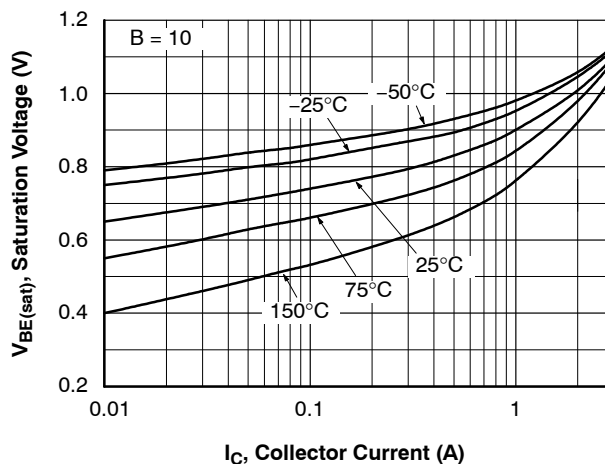


Figure 4. Base-Emitter Saturation Voltage

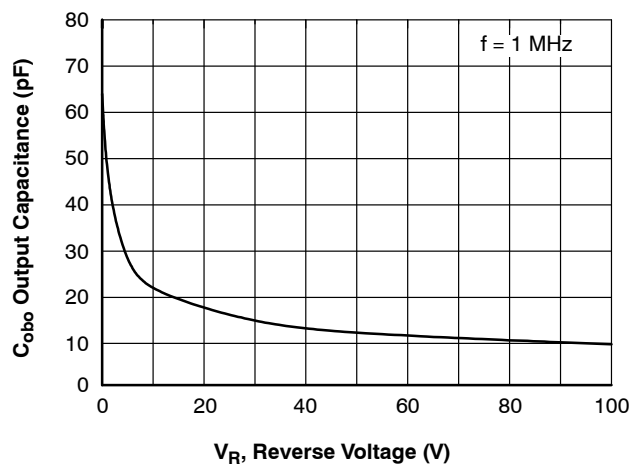


Figure 5. Output Capacitance

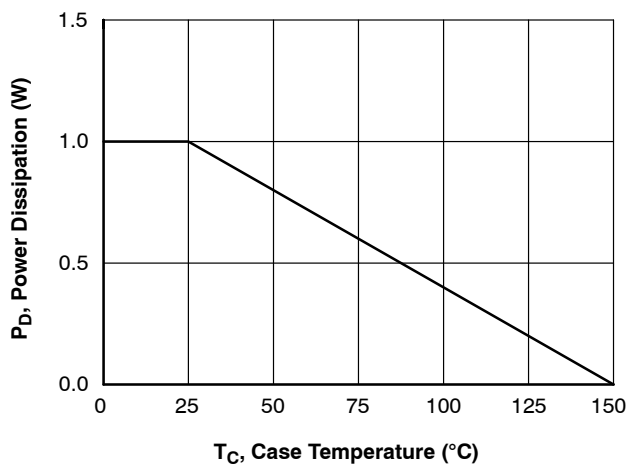


Figure 6. Power Dissipation vs. Ambient Temperature

# NZT902

## TYPICAL PERFORMANCE CHARACTERISTICS

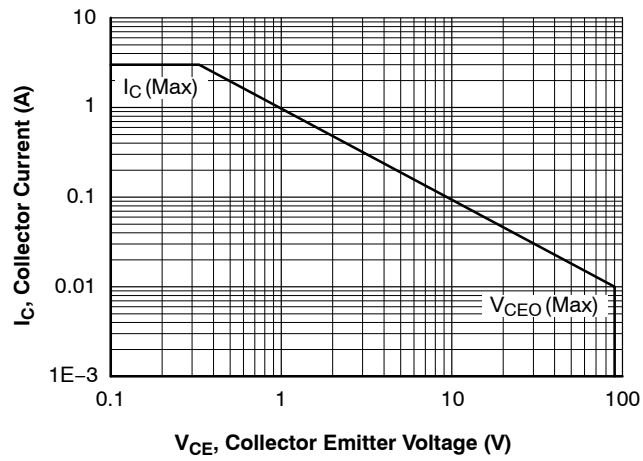
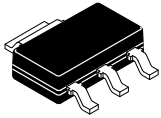


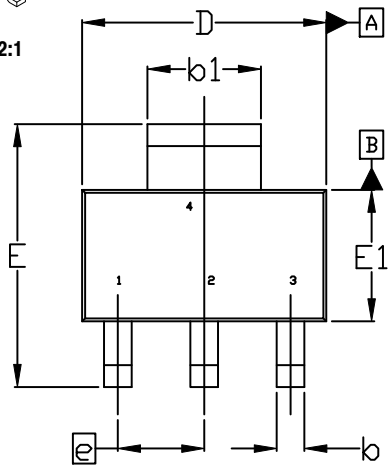
Figure 7. Safe Operating Area



SCALE 2:1

SOT-223  
CASE 318H  
ISSUE B

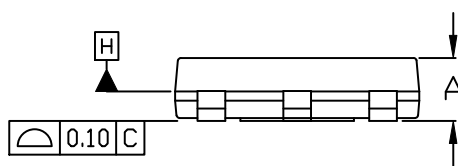
DATE 13 MAY 2020



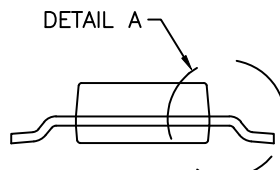
TOP VIEW

$\phi 0.10 \text{ (M)}$  C A B

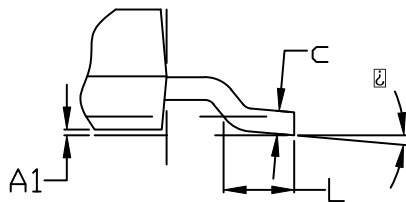
NOTE 7



SIDE VIEW



END VIEW



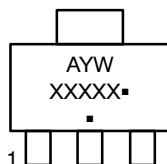
DETAIL A

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2009.
2. CONTROLLING DIMENSION: MILLIMETERS
3. DIMENSIONS D & E1 ARE DETERMINED AT DATUM H. DIMENSIONS DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. SHALL NOT EXCEED 0.23mm PER SIDE.
4. LEAD DIMENSIONS b AND b1 DO NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION IS 0.08mm PER SIDE.
5. DATUMS A AND B ARE DETERMINED AT DATUM H.
6. A1 IS DEFINED AS THE VERTICAL DISTANCE FROM THE SEATING PLANE TO THE LOWEST POINT OF THE PACKAGE BODY.
7. POSITIONAL TOLERANCE APPLIES TO DIMENSIONS b AND b1.

DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	---	---	1.80
A1	0.02	0.06	0.11
b	0.60	0.74	0.88
b1	2.90	3.00	3.10
c	0.24	---	0.35
D	6.30	6.50	6.70
E	6.70	7.00	7.30
E1	3.30	3.50	3.70
e	2.30 BSC		
L	0.25	---	---
$\square$	0°	---	10°

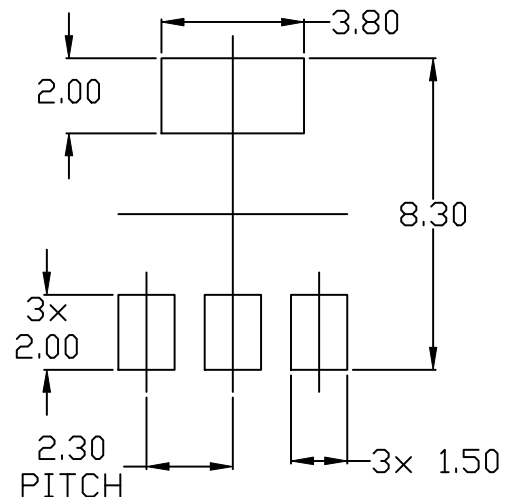
GENERIC MARKING DIAGRAM\*



- A = Assembly Location
- Y = Year
- W = Work Week
- XXXXX = Specific Device Code
- = Pb-Free Package

(Note: Microdot may be in either location)

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



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, SOLDERM/D.

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