

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.

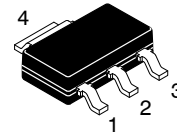
1. These ratings are based on a maximum junction temperature of 150°C .
2. These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

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 | $^\circ\text{C}/\text{W}$ |

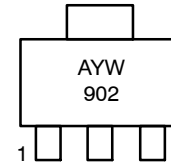
3. Device mounted on FR-4 PCB 36 mm × 18 mm × 1.5 mm.



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 [†] |
|--------|-------------------|-----------------------|
| NZT902 | SOT-223 (Pb-Free) | 4000 / Tape & Reel |

[†]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 | $I_C = 100\ \mu\text{A}$ | 120 | | | V |
| BV_{EBO} | Emitter–Base Breakdown Voltage | $I_E = 100\ \mu\text{A}$ | 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 | μA |
| 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 $\leq 300\ \mu\text{s}$, Duty Cycle $\leq 2.0\%$

TYPICAL PERFORMANCE CHARACTERISTICS

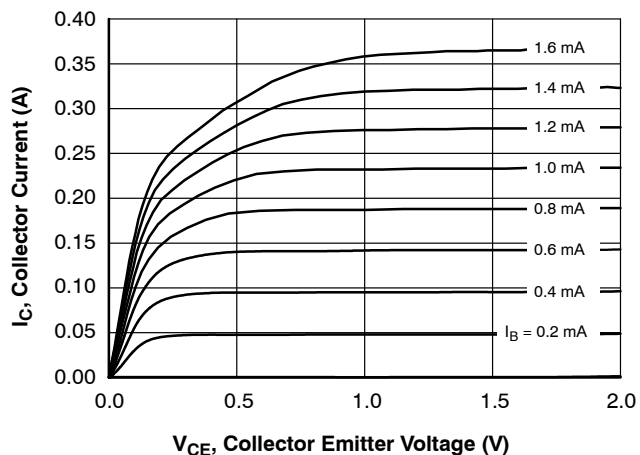


Figure 1. Static Characteristic

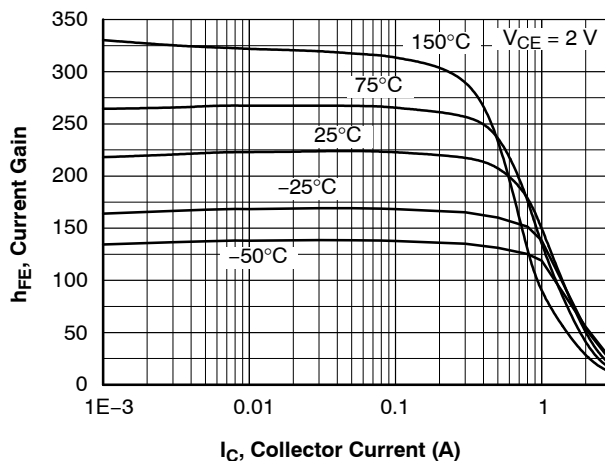


Figure 2. DC Current Gain

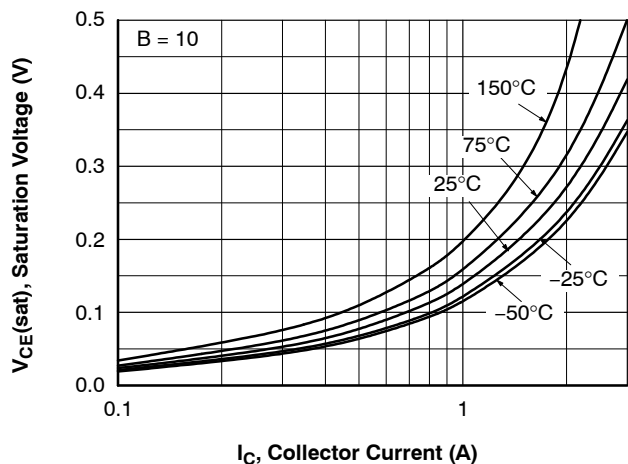


Figure 3. Collector-Emitter Saturation Voltage

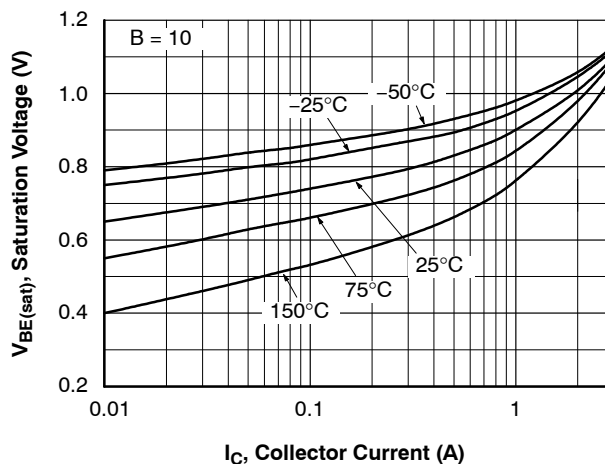


Figure 4. Base-Emitter Saturation Voltage

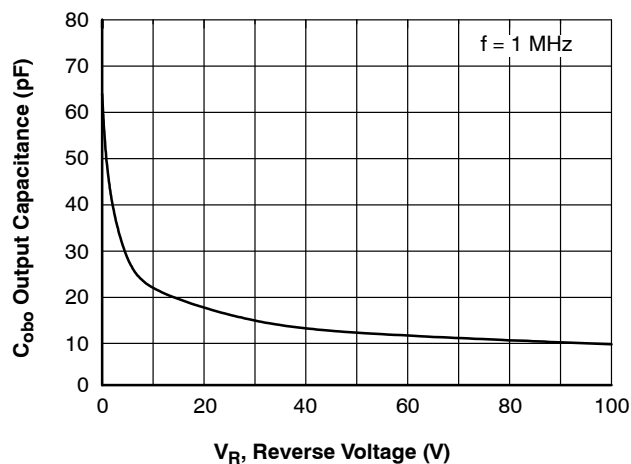


Figure 5. Output Capacitance

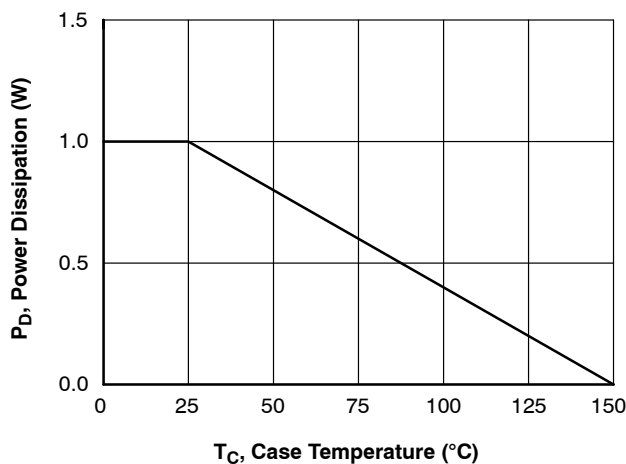


Figure 6. Power Dissipation vs. Ambient Temperature

NZT902

TYPICAL PERFORMANCE CHARACTERISTICS

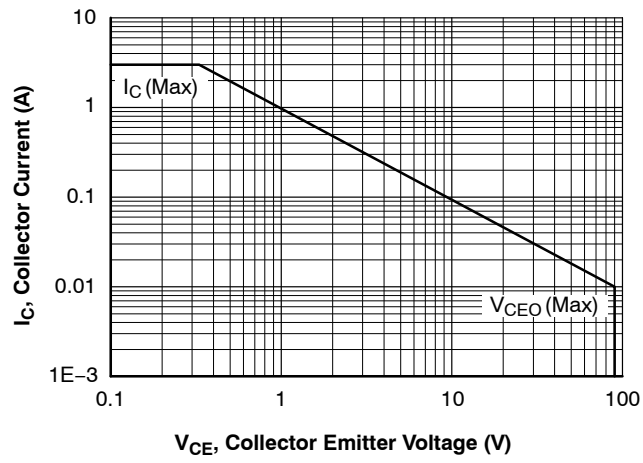


Figure 7. Safe Operating Area

MECHANICAL CASE OUTLINE

PACKAGE DIMENSIONS

ON Semiconductor®



SOT-223
CASE 318H
ISSUE B

DATE 13 MAY 2020

SCALE 2:1



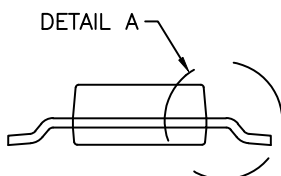
TOP VIEW

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

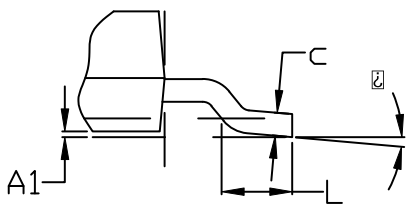
NOTE 7



SIDE VIEW



END VIEW

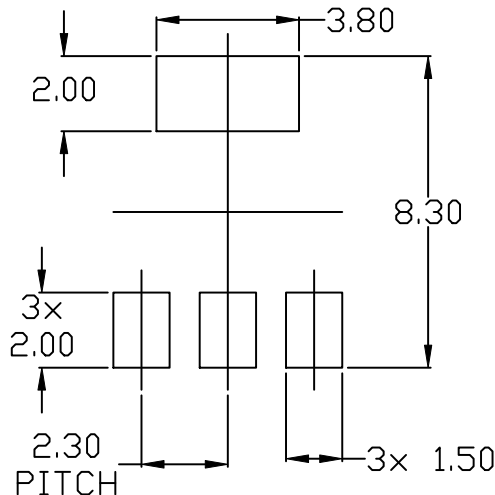


DETAIL A

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.

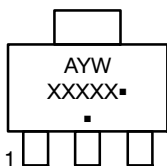
| DIM | MILLIMETERS | | |
|-----------|-------------|------|------|
| | MIN. | NDM. | MAX. |
| A | --- | --- | 1.80 |
| A1 | 0.02 | 0.06 | 0.11 |
| b | 0.60 | 0.74 | 0.88 |
| b1 | 2.90 | 3.00 | 3.10 |
| c | 0.24 | --- | 0.35 |
| D | 6.30 | 6.50 | 6.70 |
| E | 6.70 | 7.00 | 7.30 |
| E1 | 3.30 | 3.50 |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



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.

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.

| | | |
|-------------------------|--------------------|--|
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| DESCRIPTION: | SOT-223 | PAGE 1 OF 1 |

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