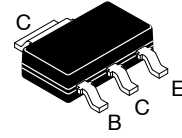


# NPN Darlington Transistor

## NZT7053

This device is designed for applications requiring extremely high gain at collector currents to 1.0 A and high breakdown voltage. Sourced from Process 06.



SOT-223  
CASE 318H

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

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

Symbol	Parameter	Value	Unit
$V_{CEO}$	Collector–Emitter Voltage	100	V
$V_{CB0}$	Collector–Base Voltage	100	V
$V_{EBO}$	Emitter–Base Voltage	12	V
$I_C$	Collector Current – Continuous	1.5	A
$T_J, T_{STG}$	Operating and Storage Junction 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.

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

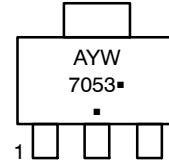
### THERMAL CHARACTERISTICS (Note 3)

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

Symbol	Characteristics	Value	Unit
$P_D$	Total Device Dissipation	1000	mW
	Derate Above $25^\circ\text{C}$	8.0	mW/ $^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	125	$^\circ\text{C}/\text{W}$

- Device mounted on FR-4 PCB  $36\text{ mm} \times 18\text{ mm} \times 1.5\text{ mm}$ ; mounting pad for the collector lead min.  $6\text{ cm}^2$ .

### MARKING DIAGRAM



- A = Assembly Location
- Y = Year
- W = Work Week
- 7053 = Specific Device Code
- = Pb-Free Package

### ORDERING INFORMATION

Device	Package	Shipping <sup>†</sup>
NZT7053	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](#).

# NZT7053

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise noted.)

Symbol	Parameter	Conditions	Min.	Max.	Unit
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### OFF CHARACTERISTICS

V <sub>(BR)CEO</sub>	Collector–Emitter Breakdown Voltage (Note 4)	I <sub>C</sub> = 1.0 mA, I <sub>B</sub> = 0	100	–	V
V <sub>(BR)CBO</sub>	Collector–Base Breakdown Voltage	I <sub>C</sub> = 100 μA, I <sub>E</sub> = 0	100	–	V
V <sub>(BR)EBO</sub>	Emitter–Base Breakdown Voltage	I <sub>E</sub> = 1.0 mA, I <sub>C</sub> = 0	12	–	V
I <sub>CBO</sub>	Collector–Cutoff Current	V <sub>CB</sub> = 80 V, I <sub>E</sub> = 0	–	0.1	μA
I <sub>CES</sub>	Emitter–Cutoff Current	V <sub>CE</sub> = 80 V, I <sub>E</sub> = 0	–	0.2	μA
I <sub>EBO</sub>	Emitter–Cutoff Current	V <sub>EB</sub> = 7.0 V, I <sub>C</sub> = 0	–	0.1	μA

### ON CHARACTERISTICS (Note 4)

h <sub>FE</sub>	DC Current Gain	I <sub>C</sub> = 100 mA, V <sub>CE</sub> = 5.0 V	10000	–	
		I <sub>C</sub> = 1.0 A, V <sub>CE</sub> = 5.0 V	1000	20000	
V <sub>CE(sat)</sub>	Collector–Emitter Saturation Voltage	I <sub>C</sub> = 100 mA, I <sub>B</sub> = 0.1 mA	–	1.5	V
V <sub>BE(on)</sub>	Base–Emitter On Voltage	I <sub>C</sub> = 100 mA, V <sub>BE</sub> = 5.0 V	–	2.0	V

### SMALL SIGNAL CHARACTERISTICS

F <sub>T</sub>	Transition Frequency	I <sub>C</sub> = 100 mA, V <sub>CE</sub> = 5.0 V	200	–	MHz
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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 ≤ 300 μs, duty cycle ≤ 2%

TYPICAL CHARACTERISTICS

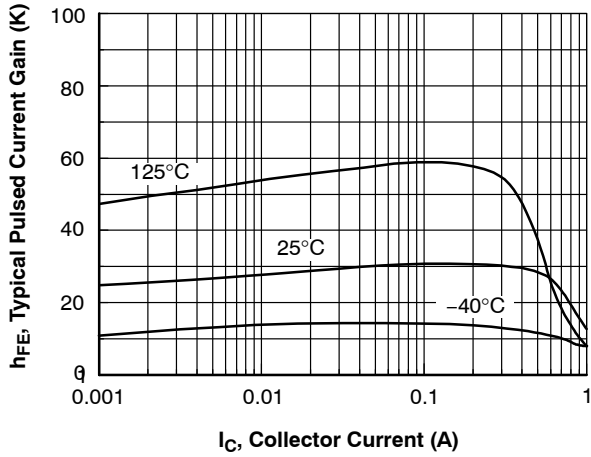


Figure 1. Typical Pulsed Current Gain vs. Collector Current

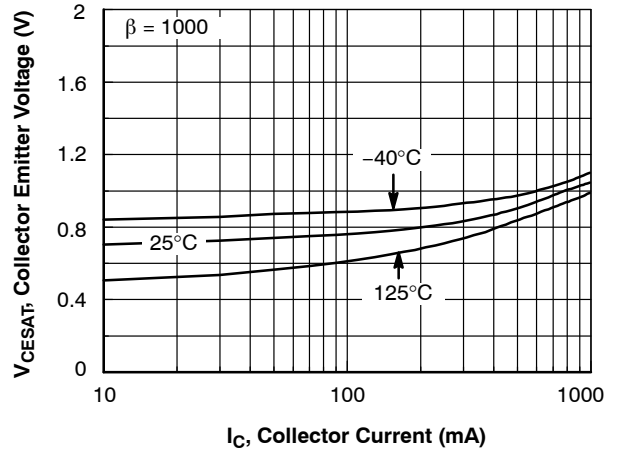


Figure 2. Collector-Emitter Saturation Voltage vs. Collector Current

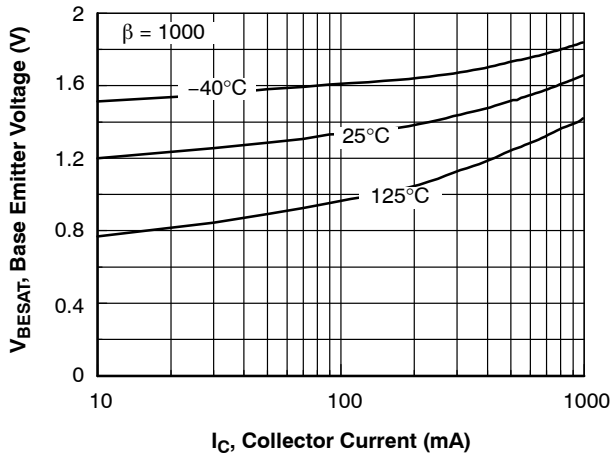


Figure 3. Base-Emitter Saturation Voltage vs. Collector Current

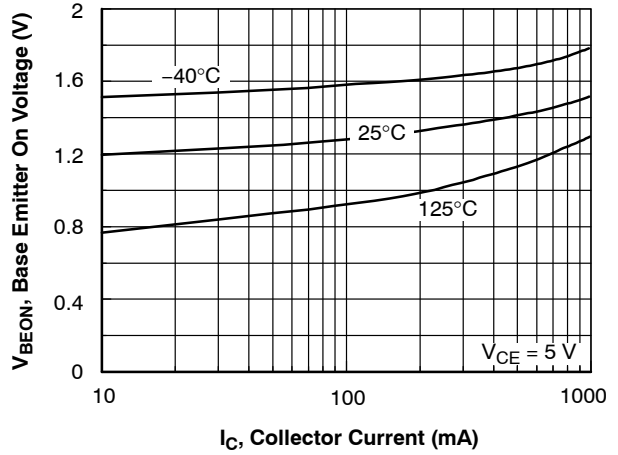


Figure 4. Base Emitter ON Voltage vs. Collector Current

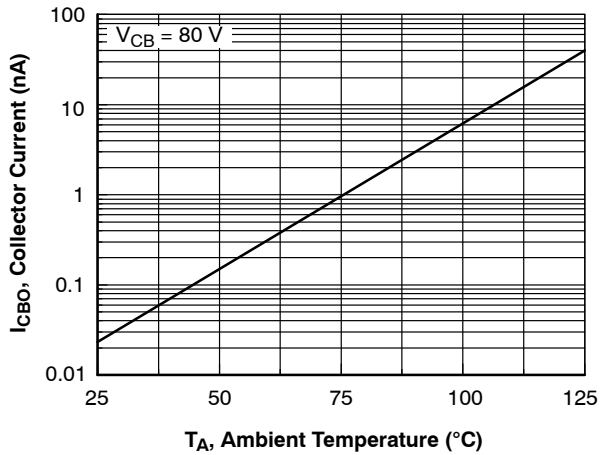


Figure 5. Collector-Cutoff Current vs. Ambient Temperature

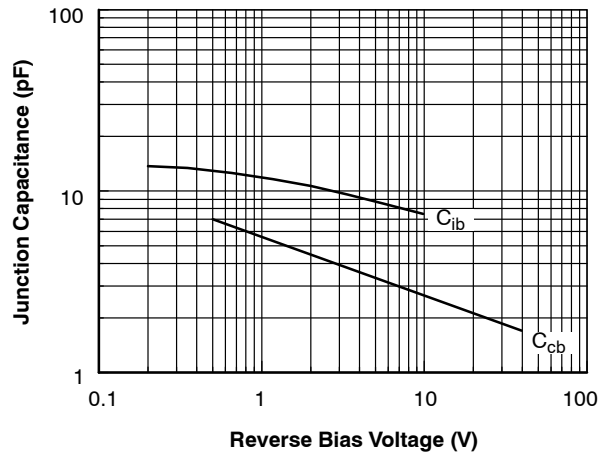


Figure 6. Junction Capacitance vs. Reverse Bias Voltage

# NZT7053

## TYPICAL CHARACTERISTICS (continued)

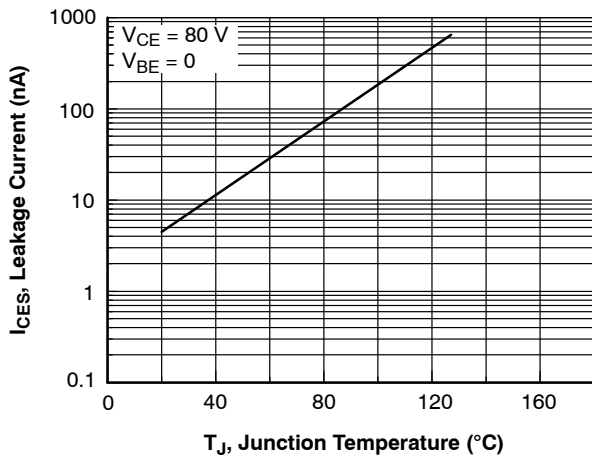


Figure 7. Typical Collector-Emitter Leakage Current vs. Temperature

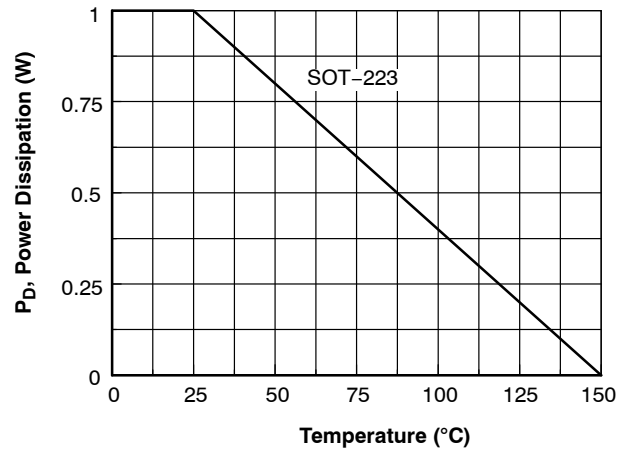
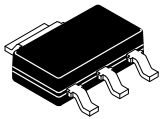


Figure 8. Power Dissipation vs. Ambient Temperature

# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS

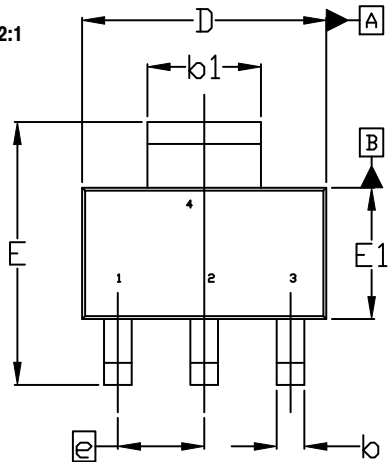
ON Semiconductor®



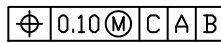
**SOT-223**  
**CASE 318H**  
**ISSUE B**

DATE 13 MAY 2020

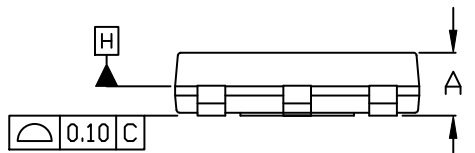
SCALE 2:1



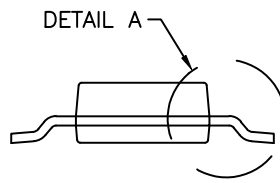
TOP VIEW



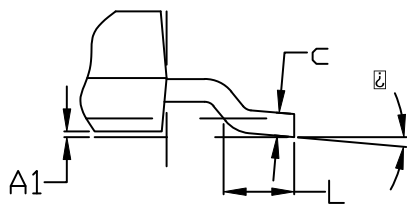
NOTE 7



SIDE VIEW



END VIEW

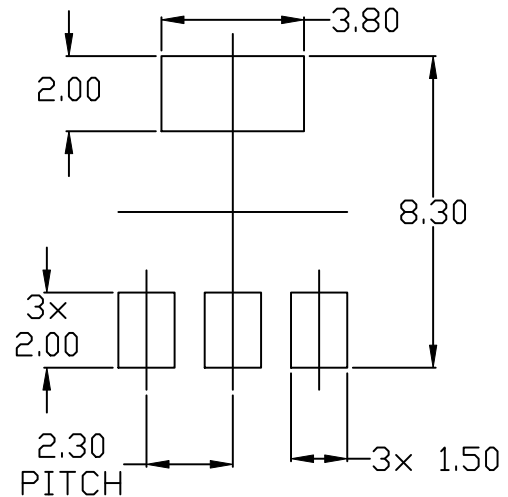


DETAIL A

**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.

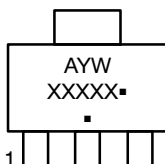
DIM	MILLIMETERS		
	MIN.	NDM.	MAX.
A	---	---	1.80
A1	0.02	0.06	0.11
b	0.60	0.74	0.88
b1	2.90	3.00	3.10
c	0.24	---	0.35
D	6.30	6.50	6.70
E	6.70	7.00	7.30
E1	3.30	3.50	3.70
e	2.30 BSC		
L	0.25	---	---
$\square$	0°	---	10°



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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