

NPN Darlington Transistor

NZT605

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

ABSOLUTE MAXIMUM RATINGS

($T_C = 25^\circ\text{C}$ unless otherwise noted.) (Notes 1, 2)

Symbol	Parameter	Value	Unit
V_{CEO}	Collector-Emitter Voltage	110	V
V_{CBO}	Collector-Base Voltage	140	V
V_{EBO}	Emitter-Base Voltage	10	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°C .
- These are steady limits. The factory should be consulted on application involving pulsed or low duty cycle operations.

THERMAL CHARACTERISTICS

($T_A = 25^\circ\text{C}$ unless otherwise noted.) (Note 3)

Symbol	Parameter	Max	Unit
P_D	Total Device Dissipation Derate above 25°C	1.0 8.0	W $\text{mW}/^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	125	$^\circ\text{C}/\text{W}$

- Device mounted on FR-4PCB 36 mm x 18 mm x 1.5 mm; mounting pad for the collector lead min. 6 cm^2 .

ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted.) (Note 4)

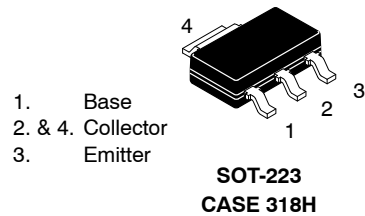
Symbol	Parameter	Test Conditions	Min	Max	Unit
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OFF CHARACTERISTICS

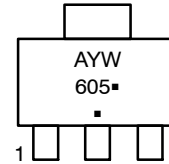
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage (Note 4)	$I_C = 10\text{ mA}, I_B = 0$	110	–	V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	$I_C = 100\text{ }\mu\text{A}, I_E = 0$	140	–	V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	$I_E = 100\text{ }\mu\text{A}, I_C = 0$	10	–	V
I_{CBO}	Collector Cut-off Current	$V_{CB} = 120\text{ V}, I_E = 0$	–	10	nA
I_{CES}	Collector Cut-off Current	$V_{CE} = 120\text{ V}, I_E = 0$	–	10	nA
I_{EBO}	Emitter Cut-off Current	$V_{EB} = 8.0\text{ V}, I_C = 0$	–	100	nA

ON CHARACTERISTICS (Note 4)

h_{FE}	DC Current Gain	$V_{CE} = 5.0\text{ V}, I_C = 50\text{ mA}$ $V_{CE} = 5.0\text{ V}, I_C = 500\text{ mA}$ $V_{CE} = 5.0\text{ V}, I_C = 1.0\text{ A}$ $V_{CE} = 5.0\text{ V}, I_C = 1.5\text{ A}$ $V_{CE} = 5.0\text{ V}, I_C = 2.0\text{ A}$	2,000 5,000 2,000 300 200	– – 100K – –	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 250\text{ mA}, I_B = 0.25\text{ mA}$ $I_C = 1.0\text{ A}, I_B = 1.0\text{ mA}$	– –	1 1.5	V



MARKING DIAGRAM



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

(Note: Microdot may be in either location)

ORDERING INFORMATION

Device	Package	Shipping
NZT605	SOT-223 (Pb-Free)	4,000 / 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.

NZT605

ELECTRICAL CHARACTERISTICS ($T_C = 25\text{ }^{\circ}\text{C}$ unless otherwise noted.) (Note 4) (continued)

Symbol	Parameter	Test Conditions	Min	Max	Unit
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ON CHARACTERISTICS (Note 4)

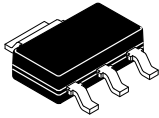
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C = 1.0\text{ A}$, $I_B = 1.0\text{ mA}$	–	1.8	V
$V_{BE(on)}$	Base-Emitter On Voltage	$I_C = 1.0\text{ A}$, $V_{CE} = 5.0\text{ V}$	–	1.7	V

SMALL SIGNAL CHARACTERISTICS

f_T	Transition Frequency	$I_C = 100\text{ mA}$, $V_{CE} = 10\text{ V}$, $f = 20\text{ MHz}$	150	–	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. Device mounted on FR-4PCB 36 mm x 18 mm x 1.5 mm; mounting pad for the collector lead min. 6 cm².



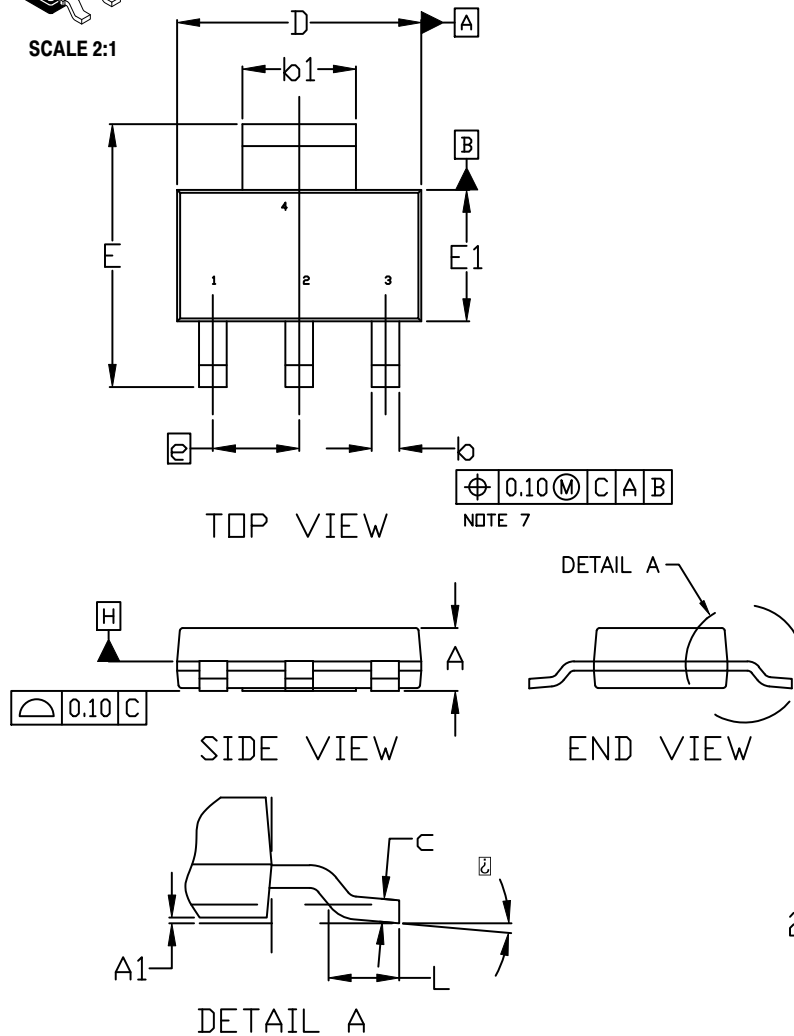
SCALE 2:1

SOT-223
CASE 318H
ISSUE B

DATE 13 MAY 2020

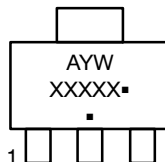
NOTES:

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	---	---
⌀	0°	---	10°

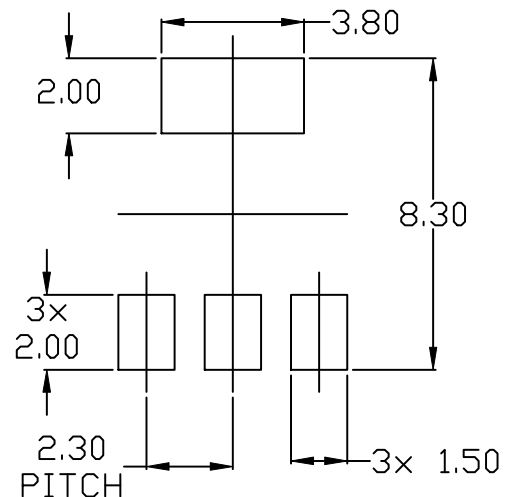
GENERIC
MARKING DIAGRAM*



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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DESCRIPTION:	SOT-223	PAGE 1 OF 1

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