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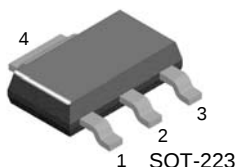
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# NZT605

## NPN Darlington Transistor

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



1. Base 2.4. Collector 3. Emitter

### Absolute Maximum Ratings \* $T_C = 25^\circ\text{C}$ unless otherwise noted

| Symbol         | Parameter                                        | Value       | Units            |
|----------------|--------------------------------------------------|-------------|------------------|
| $V_{CEO}$      | 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 | $^\circ\text{C}$ |

\* These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

#### NOTES:

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

### Electrical Characteristics \* $T_C = 25^\circ\text{C}$ unless otherwise noted

| Symbol                              | Parameter                             | Conditions                                                                                                                                                                                                                     | Min.                               | Max      | Units |
|-------------------------------------|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|----------|-------|
| <b>Off Characteristics</b>          |                                       |                                                                                                                                                                                                                                |                                    |          |       |
| $V_{(BR)CEO}$                       | Collector-Emitter Breakdown Voltage * | $I_C = 10\text{mA}, I_B = 0$                                                                                                                                                                                                   | 110                                |          | V     |
| $V_{(BR)CBO}$                       | Collector-Base Breakdown Voltage      | $I_C = 100\mu\text{A}, I_E = 0$                                                                                                                                                                                                | 140                                |          | V     |
| $V_{(BR)EBO}$                       | Emitter-Base Breakdown Voltage        | $I_E = 100\mu\text{A}, I_C = 0$                                                                                                                                                                                                | 10                                 |          | V     |
| $I_{CBO}$                           | Collector Cutoff Current              | $V_{CB} = 120\text{V}, I_E = 0$                                                                                                                                                                                                |                                    | 10       | nA    |
| $I_{CES}$                           | Collector Cutoff 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    |
| <b>On Characteristics *</b>         |                                       |                                                                                                                                                                                                                                |                                    |          |       |
| $h_{FE}$                            | DC Current Gain                       | $V_{CE} = 5.0\text{V}, I_C = 50\text{mA}$<br>$V_{CE} = 5.0\text{V}, I_C = 500\text{mA}$<br>$V_{CE} = 5.0\text{V}, I_C = 1.0\text{A}$<br>$V_{CE} = 5.0\text{V}, I_C = 1.5\text{A}$<br>$V_{CE} = 5.0\text{V}, I_C = 2.0\text{A}$ | 2000<br>5000<br>2000<br>300<br>200 | 100K     |       |
| $V_{CE(sat)}$                       | Collector-Emitter Saturation Voltage  | $I_C = 250\text{mA}, I_B = 0.25\text{mA}$<br>$I_C = 1.0\text{A}, I_B = 1.0\text{mA}$                                                                                                                                           |                                    | 1<br>1.5 | V     |
| $V_{BE(sat)}$                       | 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     |
| <b>Small Signal characteristics</b> |                                       |                                                                                                                                                                                                                                |                                    |          |       |
| $f_T$                               | Transition Frequency                  | $I_C = 100\text{mA}, V_{CE} = 10\text{V}, f = 20\text{MHz}$                                                                                                                                                                    | 150                                |          | MHz   |

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

# Thermal Characteristics

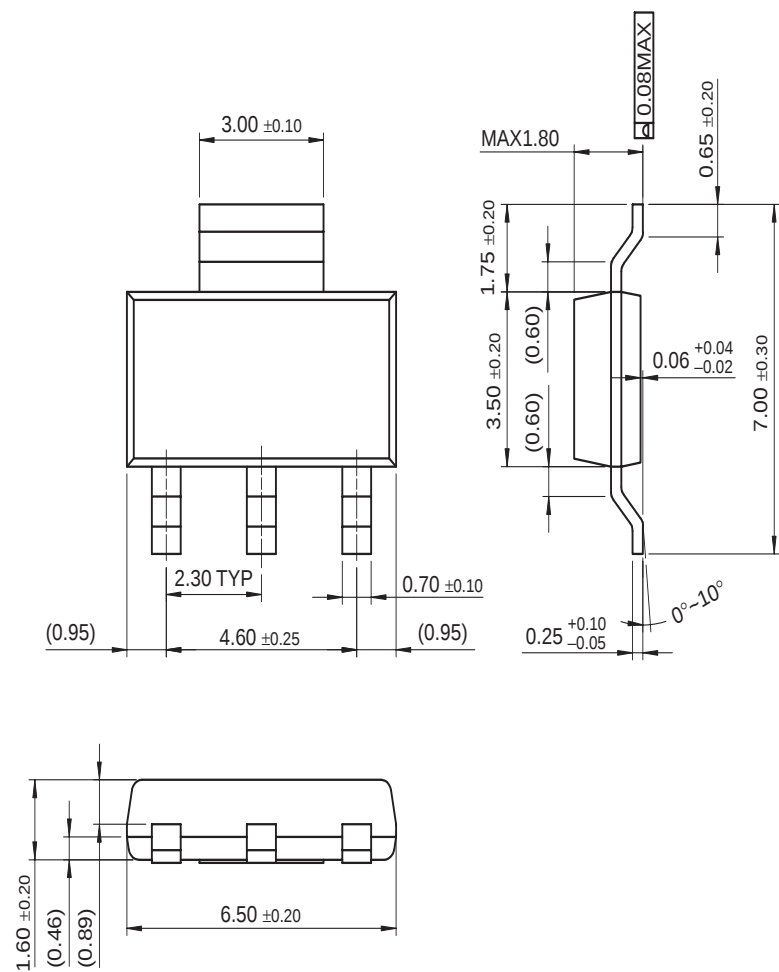
$T_a = 25^{\circ}\text{C}$  unless otherwise noted

| Symbol          | Parameter                               | Max.  | Units                       |
|-----------------|-----------------------------------------|-------|-----------------------------|
| $P_D$           | Total Device Dissipation                | 1,000 | 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-4PCB  $36\text{mm} \times 18\text{mm} \times 1.5\text{mm}$ ; mounting pad for the collector lead min.  $6\text{cm}^2$

Mechanical Dimensions

SOT-223



Dimensions in Millimeters

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