

NPN Darlington Power Silicon Transistor

Rev. V1

Features

- Available in JAN, JANTX, JANTXV per MIL-PRF-19500/518
- TO-66 (TO-213AA) Package



Electrical Characteristics

| Parameter | Test Conditions | Symbol | Units | Min. | Max. |
|---|--|---------------|-----------------|-------------------|------------|
| Off Characteristics | | | | | |
| Collector - Emitter Breakdown Voltage | $I_C = 100 \text{ mAdc}$, 2N6300 $I_C = 100 \text{ mAdc}$, 2N6301 | $V_{(BR)CEO}$ | Vdc | 60 80 | — |
| Collector - Emitter Cutoff Current | $V_{CE} = 30 \text{ Vdc}$, 2N6300 $V_{CE} = 40 \text{ Vdc}$, 2N6301 | I_{CEO} | μAdc | — | 500 500 |
| Collector - Emitter Cutoff Current | $V_{CE} = 60 \text{ Vdc}$, $V_{BE} = 1.5 \text{ Vdc}$, 2N6300 $V_{CE} = 80 \text{ Vdc}$, $V_{BE} = 1.5 \text{ Vdc}$, 2N6301 | I_{CEX} | μAdc | — | 10 10 |
| Emitter - Base Cutoff Current | $V_{EB} = 6 \text{ Vdc}$ | I_{EBO} | μAdc | — | 500 |
| On Characteristics¹ | | | | | |
| Forward Current Transfer Ratio | $I_C = 1 \text{ Adc}$, $V_{CE} = 3 \text{ Vdc}$ $I_C = 4 \text{ Adc}$, $V_{CE} = 3 \text{ Vdc}$ $I_C = 8 \text{ Adc}$, $V_{CE} = 3 \text{ Vdc}$ | H_{FE} | - | 500 700 100 | 18,000 |
| Collector - Emitter Saturation Voltage | $I_C = 4 \text{ Adc}$, $I_B = 16 \text{ Adc}$ $I_C = 8 \text{ Adc}$, $I_B = 80 \text{ Adc}$ | $V_{CE(SAT)}$ | Vdc | — | 2.0 3.0 |
| Base - Emitter Saturation Voltage | $I_C = 8 \text{ Adc}$, $I_B = 80 \text{ Adc}$ | $V_{CE(SAT)}$ | Vdc | — | 4.0 |
| Base - Emitter Voltage | $I_C = 1 \text{ Adc}$, $V_{CE} = 10 \text{ Vdc}$ | $V_{BE(ON)}$ | Vdc | — | 2.8 |
| Dynamic Characteristics | | | | | |
| Magnitude of Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio | $I_C = 3 \text{ Adc}$, $V_{CE} = 3 \text{ Vdc}$, $f = 1.0 \text{ kHz}$ | $ H_{FE} $ | - | 25 | 350 |
| Small-Signal Short-Circuit Forward Current Transfer Ratio | $I_C = 3 \text{ Adc}$, $V_{CE} = 3 \text{ Vdc}$, $f = 1.0 \text{ kHz}$ | $ H_{FE} $ | - | 300 | — |
| Output Capacitance | $V_{CB} = 10 \text{ Vdc}$, $I_E = 0$, $100 \text{ kHz} \leq f \leq 1 \text{ MHz}$ | C_{OBO} | pF | — | 200 |
| Switching Characteristics | | | | | |
| Turn-On Time | $V_{CC} = 30 \text{ Vdc}$; $I_C = 4.0 \text{ Adc}$; $I_{B1} = 16 \text{ mAdc}$ | T_{ON} | μs | — | 2.0 |
| Turn-Off Time | $V_{CC} = 30 \text{ Vdc}$; $I_C = 4.0 \text{ Adc}$; $I_{B1} = 16 \text{ mAdc}$ | T_{OFF} | μs | — | 8.0 |
| Safe Operating Area | | | | | |
| DC Tests: | $T_C = +25 \text{ }^\circ\text{C}$, 1 Cycle, $t = 1.0 \text{ s}$ | | | | |
| Test 1: | $V_{CE} = 8.0 \text{ Vdc}$, $I_C = 8.0 \text{ Adc}$ | | | | |
| Test 2: | $V_{CE} = 20 \text{ Vdc}$, $I_C = 2.0 \text{ Adc}$ | | | | |
| Test 3: | $V_{CE} = 60 \text{ Vdc}$, $I_C = 100 \text{ Adc}$, 2N6300 | | | | |
| | $V_{CE} = 80 \text{ Vdc}$, $I_C = 100 \text{ Adc}$, 2N6301 | | | | |

1. Pulse Test: Pulse Width = 300 μs , Duty Cycle $\leq 2.0\%$.

Absolute Maximum Ratings

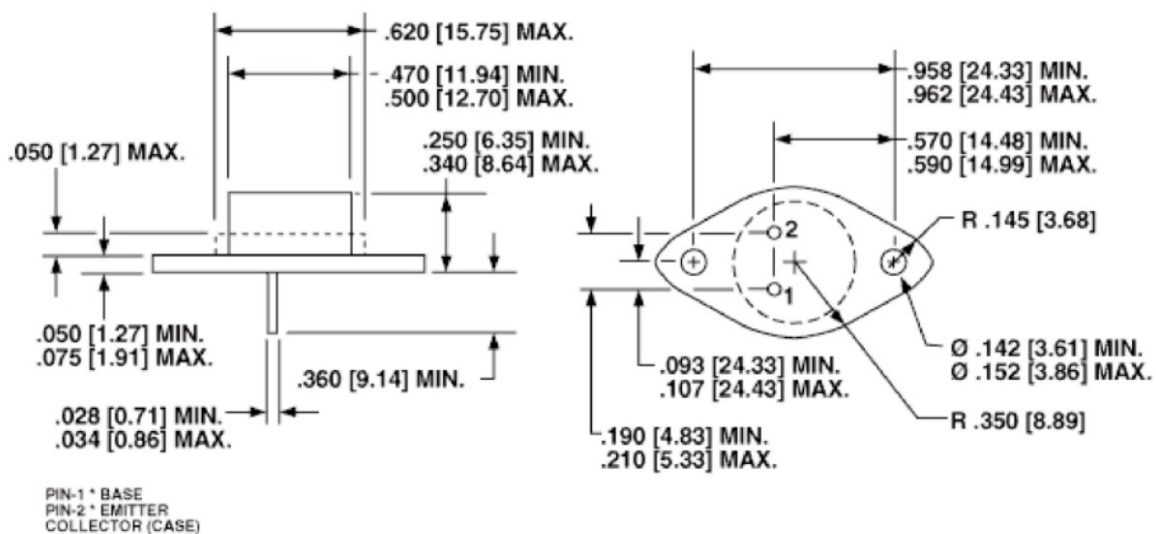
| Ratings | Symbol | Value |
|---|-------------------|---|
| Collector - Emitter Voltage 2N6300 2N6301 | V_{CEO} | 60 Vdc 80 Vdc |
| Collector - Base Voltage 2N6300 2N6301 | V_{CBO} | 60 Vdc 80 Vdc |
| Emitter - Base Voltage | V_{EBO} | 5 Vdc |
| Base Current | I_B | 120 mAdc |
| Collector Current | I_C | 8 Adc |
| Total Power Dissipation @ $T_C = 0^\circ\text{C}$ @ $T_C = 100^\circ\text{C}$ | P_T | 75 W 37 W |
| Operating & Storage Temperature Range | T_{OP}, T_{STG} | -55°C to $+200^\circ\text{C}$ |

1. Derate linearly @ 143 mW / °C between $T_C = 25^\circ\text{C}$ and $T_C = 200^\circ\text{C}$

Thermal Characteristics

| Characteristics | Symbol | Max. Value |
|--------------------------------------|-----------------|------------|
| Thermal Resistance, Junction to Case | $R_{\theta JC}$ | 2.66°C/W |

Outline Drawing



NOTE: Dimensions in Inches [mm]

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