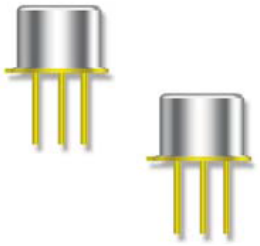
# 2N4150

## NPN Power Silicon Transistor

Rev. V1

### Features

- Available in commercial, JAN, JANTX, JANTXV, JANS and JANSR 100K rads (Si) per MIL-PRF-19500/394
- TO-5 Package



### Electrical Characteristics[1]

| Parameter | Test Conditions | Symbol | Units | Min. | Max. |
|---|---|---|---|---|---|
| **Off Characteristics** | | | | | |
| Collector - Emitter Breakdown Voltage | $I_C$ = 100 mAdc | $V_{(BR)CEO}$ | Vdc | 70 | — |
| Emitter - Base Cutoff Current | $V_{EB}$ = 7.0 Vdc<br>$V_{EB}$ = 5.0 Vdc | $I_{EBO}$ | µAdc | —<br>— | 10<br>0.1 |
| Collector - Emitter Cutoff Current | $V_{BE}$ = 0.5 Vdc, $V_{CE}$ = 60 Vdc | $I_{CEX}$ | µAdc | — | 10 |
| Collector - Emitter Cutoff Current | $V_{CE}$ = 60 Vdc | $I_{CEO}$<br>$I_{CEO}$ | µAdc | —<br>— | 10 |
| Collector - Base Cutoff Current | $V_{CB}$ = 100 Vdc<br>$V_{CB}$ = 100 Vdc | $I_{CBO}$ | µAdc | —<br>— | 10<br>0.1 |
| **On Characteristics** | | | | | |
| Collector - Base Cutoff Current | $I_C$ = 1.0 Adc, $V_{CE}$ = 5.0 Vdc<br>$I_C$ = 5.0 Adc, $V_{CE}$ = 5.0 Vdc<br>$I_C$ = 10.0 Adc, $V_{CE}$ = 5.0 Vdc | $H_{FE}$ | Vdc | 50<br>40<br>10 | 200<br>120<br>— |
| Collector-Emitter Saturation Voltage | $I_C$ = 5.0 Adc, $I_B$ = 0.5 Adc<br>$I_C$ = 10.0 Adc, $I_B$ = 1.0 Adc | $V_{CE(SAT)}$ | Vdc | —<br>— | 0.6<br>2.5 |
| Base-Emitter Saturation Voltage | $I_C$ = 5.0 Adc, $I_B$ = 0.5 Adc<br>$I_C$ = 10.0 Adc, $I_B$ = 1.0 Adc | $V_{BE(SAT)}$ | Vdc | —<br>— | 1.5<br>2.5 |
| **Dynamic Characteristics** | | | | | |
| Magnitude of Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio | $I_C$ = 0.2 Adc, $V_{CE}$ = 10.0 Vdc, f = 10 MHz | $\lvert H_{FE} \rvert$ | - | 1.5 | 7.5 |
| Output Capacitance | $V_{CB}$ = 10 Vdc, $I_E$ = 0, 100 kHz ≤ f ≤ 1 MHz | $C_{OBO}$ | pF | — | 350 |
| **Switching Characteristics** | | | | | |
| Delay Time | $V_{CC}$ = 20 Vdc, $V_{BB}$ = 5.0 Vdc,<br>$I_C$ = 5.0 Adc, $I_{B1}$ = 0.5 Adc | $t_d$ | ns | — | 50 |
| Rise Time | | $t_r$ | ns | — | 500 |
| Storage Time | | $t_S$ | µs | — | 1.5 |
| Fall Time | | $t_F$ | ns | — | 500 |
| **Safe Operating Area** | | | | | |
| DC Tests:<br>Test 1:<br>Test 2: | $T_C$ = +25°C, I Cycle, t = 1.0 s<br>$V_{CE}$ = 40.0 Vdc, $I_C$ = 0.22 Adc<br>$V_{CE}$ = 70 Vdc, $I_C$ = 90 mAdc | | | | |

1. Pulse Test: Pulse Width = 300 µs, Duty Cycle ≤2.0%.

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### Absolute Maximum Ratings

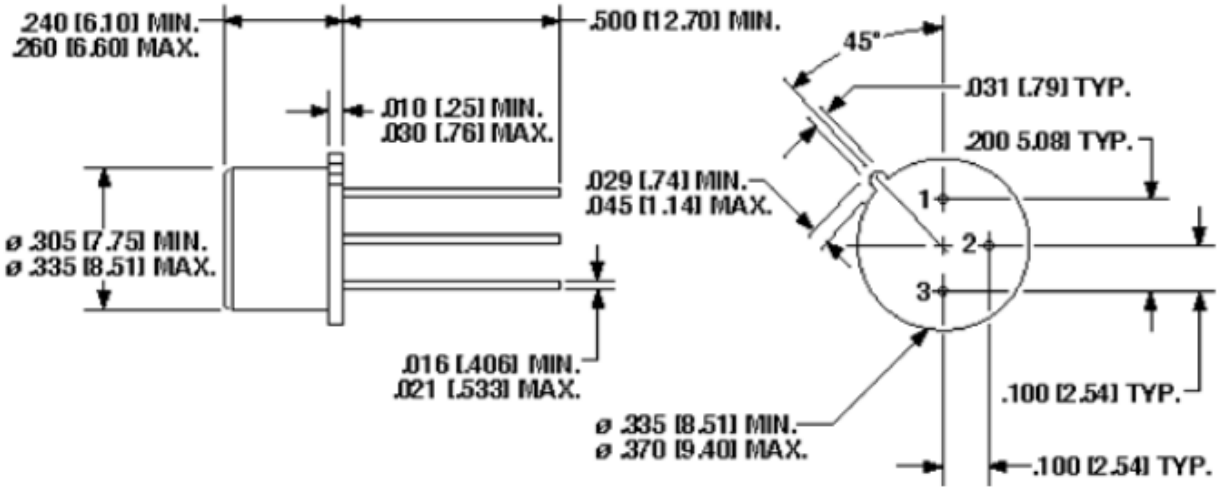
| Ratings | Symbol | Value |
|---|---|---|
| Collector - Emitter Voltage | $V_{CEO}$ | 70 Vdc |
| Collector - Base Voltage | $V_{CBO}$ | 100 Vdc |
| Emitter - Base Voltage | $V_{EBO}$ | 10 Vdc |
| Collector Current | $I_C$ | 10 Adc |
| Total Power Dissipation<br>@ $T_A$ = +25°C<br>@ $T_C$ = +25°C | $P_T$ | 1.0 W<br>0.5 W |
| Operating & Storage Temperature Range | $T_{OP}$, $T_{STG}$ | -65°C to +200°C |

2. Derate linearly @ 5.7 mW / °C for $T_A$ >+25°C.
3. Derate linearly @ 100 mW / °C for $T_C$ >+25°C.

### Thermal Characteristics

| Characteristics | Symbol | Max. Value |
|---|---|---|
| Thermal Resistance<br>Junction to Case<br>Junction to Ambient | <br>$R_{\theta JC}$<br>$R_{\theta JA}$ | <br>+10°C/W<br>+175°C/W |

### Outline Drawings: TO-5 Package




Dimensions are in inches.