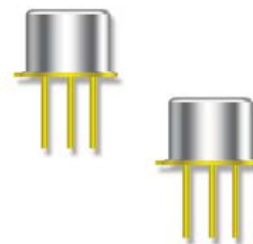


## NPN Power Silicon Transistor

Rev. V1

### Features

- Available in commercial, JAN, JANTX, JANTXV, JANS and JANSR 100K rads (Si) per MIL-PRF-19500/545
- TO-5 Package: 2N5151L, 2N5153L
- TO-39 (TO-205AD) Package: 2N5151, 2N5153



### Electrical Characteristics

| Parameter   | Test Conditions  | Symbol        | Units           | Min.   | Max.         |   |
|---|--|---------------|-----------------|--------|--------------|---|
| <b>Off Characteristics</b>  |  |               |                 |        |              |   |
| Collector - Emitter Breakdown Voltage   | $I_C = 100 \text{ mAdc}, I_B = 0$  | $V_{(BR)CEO}$ | Vdc             | 80     | —            |   |
| Emitter - Base Cutoff Current   | $V_{EB} = 4.0 \text{ Vdc}, I_C = 0$  | $I_{EBO}$     | $\mu\text{Adc}$ | —      | 1.0          |   |
|   | $V_{EB} = 5.5 \text{ Vdc}, I_C = 0$  |               | mAdc            | —      | 1.0          |   |
| Collector - Emitter Cutoff Current  | $V_{CE} = 60 \text{ Vdc}, V_{BE} = 0$  | $I_{CES}$     | $\mu\text{Adc}$ | —      | 1.0          |   |
|   | $V_{CE} = 100 \text{ Vdc}, V_{BE} = 0$   |               | mAdc            | —      | 1.0          |   |
| Collector - Emitter Cutoff Current  | $V_{CE} = 40 \text{ Vdc}, I_B = 0$   | $I_{CEO}$     | $\mu\text{Adc}$ | —      | 50           |   |
| <b>On Characteristics</b>   |  |               |                 |        |              |   |
| Forward Current Transfer Ratio  | $I_C = 50 \text{ mAdc}, V_{CE} = 5.0 \text{ Vdc}$  | $H_{FE}$      | -               | 20     | —            |   |
|   | 2N5151   |               |                 | 50     | —            |   |
|   | 2N5153   |               |                 | 30     | 90           |   |
|   | $I_C = 2.5 \text{ Adc}, V_{CE} = 5.0 \text{ Vdc}$  |               |                 | 70     | 200          |   |
|   | 2N5151   |               |                 | 20     | —            |   |
|   | 2N5153   |               |                 | 40     | —            |   |
| Collector - Emitter Saturation Voltage  | $I_C = 2.5 \text{ Adc}, I_B = 250 \text{ mAdc}$<br>$I_C = 5.0 \text{ Adc}, I_B = 500 \text{ mAdc}$ | $V_{CE(SAT)}$ | Vdc             | —      | 0.75<br>1.50 |   |
| Emitter - Base Voltage Non-Saturation   | $I_C = 2.5 \text{ Adc}, V_{CE} = 5 \text{ Vdc}$  | $V_{BE(ON)}$  | Vdc             | —      | 1.45         |   |
| Emitter - Base Saturation Voltage   | $I_C = 2.5 \text{ Adc}, I_B = 250 \text{ mAdc}$<br>$I_C = 5.0 \text{ Adc}, I_B = 500 \text{ mAdc}$ | $V_{BE(SAT)}$ | Vdc             | —      | 1.45<br>2.20 |   |
| <b>Dynamic Characteristics</b>  |  |               |                 |        |              |   |
| Magnitude of Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio | $I_C = 500 \text{ mAdc}, V_{CE} = 5.0 \text{ Vdc}, f = 10 \text{ mHz}$                             | $ H_{FE} $    | -               | 6<br>7 | —            |   |
| Small-Signal Short-Circuit Forward Current Transfer Ratio                             | $I_C = 100 \text{ mAdc}, V_{CE} = 5.0 \text{ Vdc}, f = 10 \text{ mHz}$                             | $H_{FE}$      | -               | 20     | —            |   |
|   |  |               |                 | 2N5151 | 50           | — |
|   |  |               |                 | 2N5153 | —            | — |
| Output Capacitance  | $V_{CB} = 10 \text{ Vdc}, I_E = 0, f = 1 \text{ MHz}$  | $C_{OBO}$     | pF              | —      | 250          |   |

(Continued next page)

## NPN Power Silicon Transistor

Rev. V1

### Electrical Characteristics

| Parameter                        | Test Conditions  | Symbol    | Units         | Min. | Max. |
|----------------------------------|--|-----------|---------------|------|------|
| <b>Switching Characteristics</b> |  |           |               |      |      |
| Turn-On Time                     | $I_C = 5.0 \text{ Adc}; I_{B1} = 500 \text{ mAdc}$       | $T_{ON}$  | $\mu\text{s}$ | —    | 0.5  |
| Turn-Off Time                    | $R_L = 6 \Omega$   | $T_{OFF}$ | $\mu\text{s}$ | —    | 1.5  |
| Storage Time                     | $I_{B2} = -500 \text{ mAdc}$                             | $T_S$     | $\mu\text{s}$ | —    | 1.4  |
| Fall Time                        | $V_{BE(OFF)} = 3.7 \text{ Vdc}$                          | $T_f$     | $\mu\text{s}$ | —    | 0.5  |
| <b>Safe Operating Area</b>       |  |           |               |      |      |
| DC Tests:                        | $T_C = +25^\circ\text{C}$ , 1 Cycle, $t = 1.0 \text{ s}$ |           |               |      |      |
| Test 1:                          | $V_{CE} = 5.0 \text{ Vdc}$ , $I_C = 2.0 \text{ Adc}$     |           |               |      |      |
| Test 2:                          | $V_{CE} = 32 \text{ Vdc}$ , $I_C = 310 \text{ mAdc}$     |           |               |      |      |
| Test 3:                          | $V_{CE} = 80 \text{ Vdc}$ , $I_C = 12.5 \text{ mAdc}$    |           |               |      |      |

### Absolute Maximum Ratings

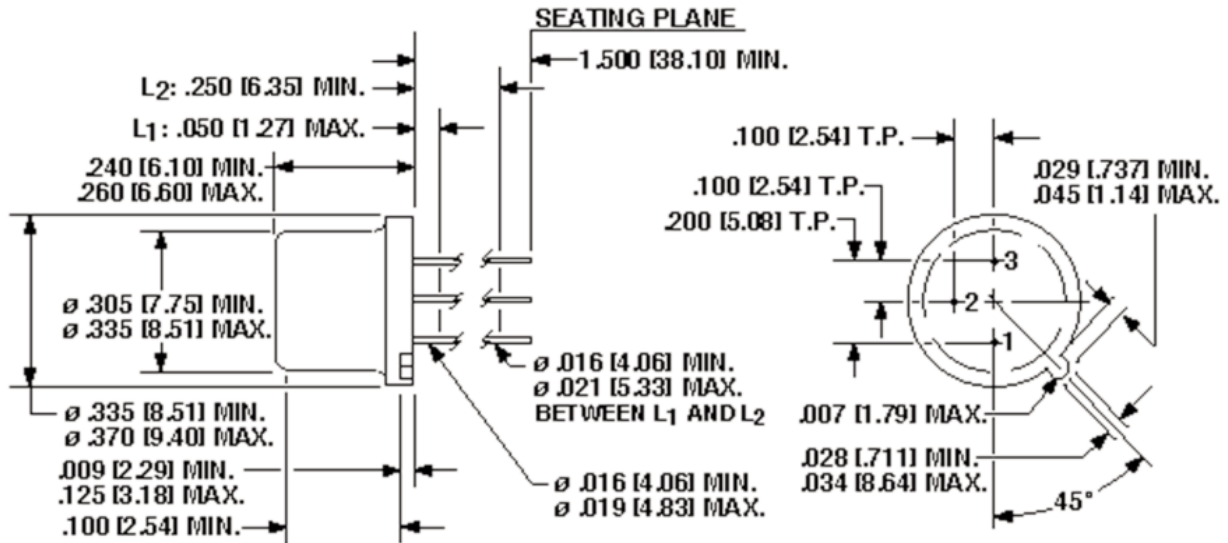
| Ratings   | Symbol            | Value                                       |
|---|-------------------|---|
| Collector - Emitter Voltage   | $V_{CEO}$         | 80 Vdc                                      |
| Collector - Base Voltage  | $V_{CBO}$         | 100 Vdc                                     |
| Emitter - Base Voltage  | $V_{EBO}$         | 5.5 Vdc                                     |
| Collector Current   | $I_C$             | 2 Adc                                       |
| Total Power Dissipation<br>@ $T_A = 25^\circ\text{C}$<br>@ $T_C = 25^\circ\text{C}$ | $P_T$             | 1.0 W<br>100 W                              |
| Operating & Storage Temperature Range   | $T_{OP}, T_{STG}$ | $-65^\circ\text{C}$ to $+200^\circ\text{C}$ |

### Thermal Characteristics

| Characteristics                      | Symbol          | Max. Value           |
|--------------------------------------|-----------------|----------------------|
| Thermal Resistance, Junction to Case | $R_{\theta JC}$ | $10^\circ\text{C/W}$ |

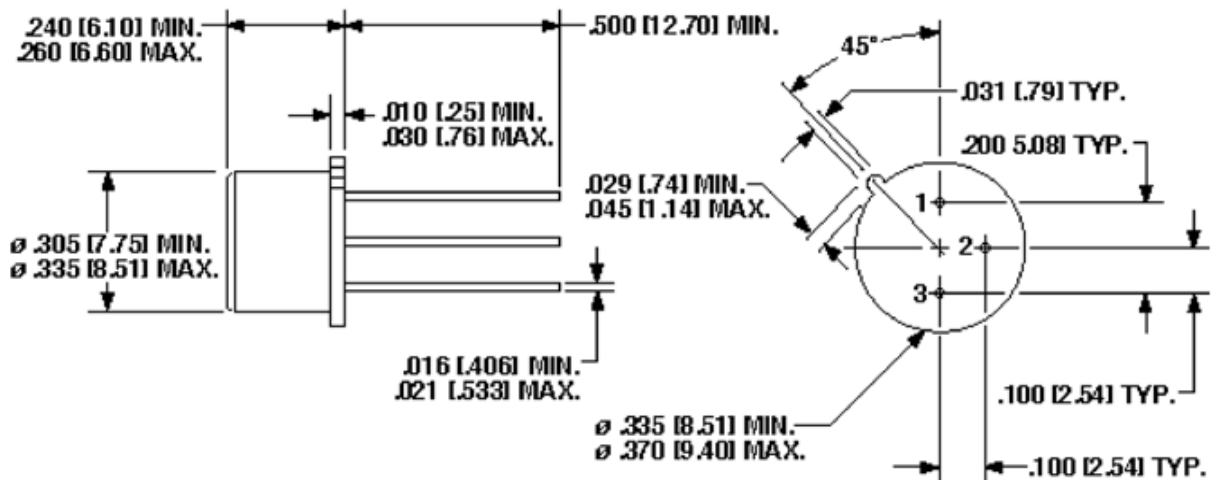
## Outline Drawings

### TO-5 Package (2N5151L, 2N5153L)



Dimensions are in inches.

### TO-39 (TO-205AD) Package (2N5151, 2N5153)



Dimensions are in inches.

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