

NPN POWER SILICON TRANSISTOR

Qualified per MIL-PRF-19500/544

DEVICES

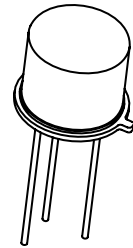
2N5152 2N5154
 2N5152L 2N5154L
 2N5152U3 2N5154U3

LEVELS

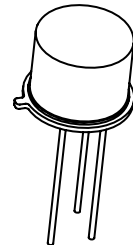
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ABSOLUTE MAXIMUM RATINGS ($T_C = +25^\circ\text{C}$ unless otherwise noted)

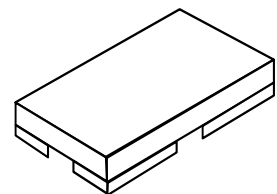
| Parameters / Test Conditions | Symbol | Value | Unit |
|--|-----------------|----------------|--------------------|
| Collector-Emitter Voltage | V_{CEO} | 80 | Vdc |
| Collector-Base Voltage | V_{CBO} | 100 | Vdc |
| Emitter-Base Voltage | V_{EBO} | 5.5 | Vdc |
| Collector Current | I_C | 2.0 | Adc |
| Total Power Dissipation ⁽¹⁾ @ $T_A = +25^\circ\text{C}$ @ $T_C = +25^\circ\text{C}$ | P_T | 1.0 10 | W |
| Operating & Storage Junction Temperature Range | T_J, T_{stg} | -65 to +200 | $^\circ\text{C}$ |
| Thermal Resistance, Junction-to Case ⁽¹⁾ | $R_{\theta JC}$ | 10 1.7 (U3) | $^\circ\text{C/W}$ |



TO-5
 2N5152L, 2N5154L



TO-39 (TO-205AD)
 2N5152, 2N5154



U-3
 2N5152U3, 2N5154U3

Note:

- See 19500/544 for thermal derating curves.
- This value applies for $P_W \leq 8.3\text{ms}$, duty cycle $\leq 1\%$.

ELECTRICAL CHARACTERISTICS ($T_A = +25^\circ\text{C}$, unless otherwise noted)

| Parameters / Test Conditions | Symbol | Min. | Max. | Unit |
|---|---------------|------|------------|-------------------------|
| OFF CHARACTERISTICS | | | | |
| Collector-Emitter Breakdown Voltage $I_C = 100\text{mAdc}, I_B = 0$ | $V_{(BR)CEO}$ | 80 | | Vdc |
| Emitter-Base Cutoff Current $V_{EB} = 4.0\text{Vdc}, I_C = 0$ $V_{EB} = 5.5\text{Vdc}, I_C = 0$ | I_{EBO} | | 1.0 1.0 | μAdc mAdc |
| Collector-Emitter Cutoff Current $V_{CE} = 60\text{Vdc}, V_{BE} = 0$ $V_{CE} = 100\text{Vdc}, V_{BE} = 0$ | I_{CES} | | 1.0 1.0 | μAdc mAdc |
| Collector-Emitter Cutoff Current $V_{CE} = 40\text{Vdc}, I_B = 0$ | I_{CEO} | | 50 | μAdc |
| ON CHARACTERISTICS | | | | |
| Forward-Current Transfer Ratio $I_C = 50\text{mAdc}, V_{CE} = 5\text{Vdc}$ | h_{FE} | 20 | --- | |
| 2N5154 | | 50 | --- | |
| $I_C = 2.5\text{Adc}, V_{CE} = 5\text{Vdc}$ | | 30 | 90 | |
| 2N5154 | | 70 | 200 | |

NPN POWER SILICON TRANSISTOR

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ELECTRICAL CHARACTERISTICS (con't)

| Parameters / Test Conditions | Symbol | Min. | Max. | Unit |
|--|---------------|----------|-------------|------|
| $I_C = 5\text{A dc}$, $V_{CE} = 5\text{V dc}$ 2N5152 2N5154 | h_{FE} | 20 40 | | |
| Collector-Emitter Saturation Voltage $I_C = 2.5\text{A dc}$, $I_B = 250\text{mA dc}$ $I_C = 5.0\text{A dc}$, $I_B = 500\text{mA dc}$ | $V_{CE(sat)}$ | | 0.75 1.5 | Vdc |
| Base-Emitter Voltage Non-Saturation $I_C = 2.5\text{A dc}$, $V_{CE} = 5\text{V dc}$ | V_{BE} | | 1.45 | Vdc |
| Base-Emitter Saturation Voltage $I_C = 2.5\text{A dc}$, $I_B = 250\text{mA dc}$ $I_C = 5.0\text{A dc}$, $I_B = 500\text{mA dc}$ | $V_{BE(sat)}$ | | 1.45 2.2 | Vdc |

DYNAMIC CHARACTERISTICS

| Parameters / Test Conditions | Symbol | Min. | Max. | Unit |
|---|------------|----------|------|------|
| Magnitude of Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio $I_C = 500\text{mA dc}$, $V_{CE} = 5\text{V dc}$, $f = 10\text{MHz}$ 2N5152 2N5154 | $ h_{fe} $ | 6 7 | | |
| Small-signal short Circuit Forward-Current Transfer Ratio $I_C = 100\text{mA dc}$, $V_{CE} = 5\text{V dc}$, $f = 1\text{KHz}$ 2N5152 2N5154 | h_{fe} | 20 50 | | |
| Output Capacitance $V_{CB} = 10\text{V dc}$, $I_E = 0$, $f = 1.0\text{MHz}$ | C_{obo} | | 250 | pF |

SWITCHING CHARACTERISTICS

| Parameters / Test Conditions | Symbol | Min. | Max. | Unit |
|---|-----------|------|------|---------------|
| Turn-On Time $I_C = 5\text{A dc}$, $I_{B1} = 500\text{mA dc}$ | t_{on} | | 0.5 | μs |
| Turn-Off Time $R_L = 6\Omega$ | t_{off} | | 1.5 | μs |
| Storage Time $I_{B2} = -500\text{mA dc}$ | t_s | | 1.4 | μs |
| Fall Time $V_{BE(OFF)} = 3.7\text{V dc}$ | t_f | | 0.5 | μs |

SAFE OPERATING AREA

| |
|---|
| DC Tests $T_C = +25^\circ\text{C}$, 1 Cycle, $t_p = 1.0\text{s}$ Test 1 $V_{CE} = 5.0\text{V dc}$, $I_C = 2.0\text{A dc}$ Test 2 $V_{CE} = 32\text{V dc}$, $I_C = 310\text{mA dc}$ Test 3 $V_{CE} = 80\text{V dc}$, $I_C = 12.5\text{mA dc}$ |
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