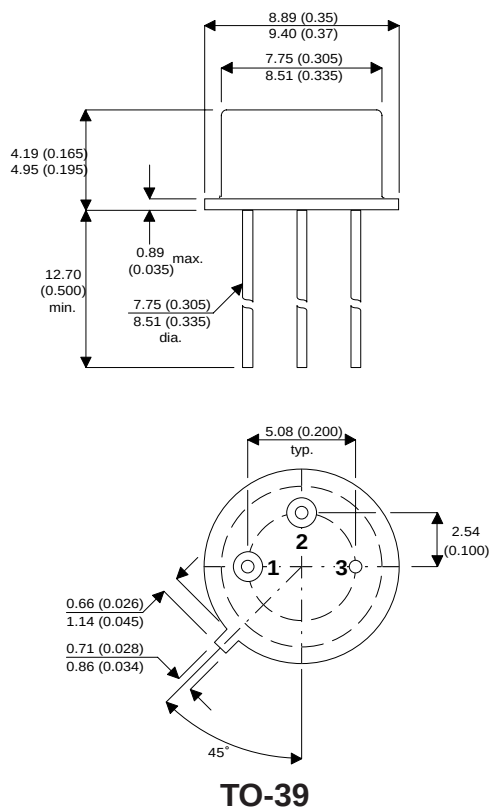


## MECHANICAL DATA

Dimensions in mm (inches)



TO-39

Pin 1 – Emitter

Pin 2 – Base

Pin 3 – Collector

## HIGH SPEED MEDIUM VOLTAGE SWITCHES

### DESCRIPTION

The 2N5151 and the 2N5153 are silicon epitaxial planar PNP transistors in jedec TO-39 metal case intended for use in switching applications.

The complementary NPN types are the 2N5152 and 2N5154 respectively

## ABSOLUTE MAXIMUM RATINGS

$T_{CASE} = 25^{\circ}C$  unless otherwise stated

|             |                                              | 2N5151        | 2N5153 |
|-------------|----------------------------------------------|---------------|--------|
| $V_{CBO}$   | Collector – Base Voltage                     | -100V         |        |
| $V_{CEO}$   | Collector – Emitter Voltage ( $I_B = 0$ )    | -80V          |        |
| $V_{EBO}$   | Emitter – Base Voltage ( $I_C = 0$ )         | -5.5V         |        |
| $I_C$       | Continuous Collector Current                 | -5A           |        |
| $I_{C(PK)}$ | Peak Collector Current                       | -10A          |        |
| $I_B$       | Base Current                                 | -2.5A         |        |
| $P_{tot}$   | Total Dissipation at $T_{amb} = 25^{\circ}C$ | 1W            |        |
|             | $T_{case} = 50^{\circ}C$                     | 10W           |        |
|             | $T_{case} = 100^{\circ}C$                    | 6.7W          |        |
| $T_{stg}$   | Operating and Storage Temperature Range      | -65 to +200°C |        |
| $T_j$       | Junction temperature                         | 200°C         |        |

## THERMAL DATA

|                |                                     |     |     |      |
|----------------|-------------------------------------|-----|-----|------|
| $R_{thj-case}$ | Thermal Resistance Junction-case    | Max | 15  | °C/W |
| $R_{thj-amb}$  | Thermal Resistance Junction-ambient | Max | 175 | °C/W |

## ELECTRICAL CHARACTERISTICS FOR 2N5151 ( $T_{case} = 25^{\circ}C$ unless otherwise stated)

| Parameter                                           | Test Conditions                                            | Min. | Typ. | Max.  | Unit    |
|-----------------------------------------------------|------------------------------------------------------------|------|------|-------|---------|
| $I_{CES}$ Collector Cut Off Current                 | $V_{CE} = -60V$ $V_{BE} = 0$                               |      |      | -1    | $\mu A$ |
|                                                     | $V_{CE} = -100V$ $V_{BE} = 0$                              |      |      | -1    | mA      |
| $I_{CEV}$ Collector Cut Off Current                 | $V_{CE} = -60V$ $T_{case} = 150^{\circ}C$<br>$V_{BE} = 2V$ |      |      | -500  | $\mu A$ |
| $I_{CEO}$ Collector Cut Off Current                 | $V_{CE} = -40V$ $I_B = 0$                                  |      |      | -50   |         |
| $I_{EBO}$ Emitter Cut Off Current                   | $V_{EB} = -4V$ $I_C = 0$                                   |      |      | -1    | $\mu A$ |
|                                                     | $V_{EB} = -5.5V$ $I_C = 0$                                 |      |      | -1    | mA      |
| $V_{CEO(SUS)}$ Collector Emitter Saturation Voltage | $I_C = -100mA$ $I_B = 0$                                   | 80   |      |       | V       |
| $V_{CE(sat)}$ Collector Emitter Saturation Voltage  | $I_C = -2.5A$ $I_B = -250mA$                               |      |      | -0.75 |         |
|                                                     | $I_C = -5A$ $I_B = -500mA$                                 |      |      | -1.5  |         |
| $V_{BE(sat)}$ Base Emitter Saturation Voltage       | $I_C = -2.5A$ $I_B = -250mA$                               |      |      | -1.45 |         |
|                                                     | $I_C = -5A$ $I_B = -500mA$                                 |      |      | -2.2  |         |
| $V_{BE}$ Base Emitter Voltage                       | $I_C = -2.5A$ $V_{CE} = -5V$                               |      |      | -1.45 |         |
| $h_{FE}$ DC Current Gain                            | $I_C = -50mA$ $V_{CE} = -5V$                               | 20   |      | 90    |         |
|                                                     | $I_C = -2.5A$ $V_{CE} = -5V$                               | 30   |      |       |         |
|                                                     | $I_C = -5A$ $V_{CE} = -5V$                                 | 20   |      |       |         |
|                                                     | $T_{case} = -55^{\circ}C$                                  |      |      |       |         |
|                                                     | $I_C = 2.5A$ $V_{CE} = -5V$                                | 15   |      |       |         |
| $C_{CBO}$ Collector Base Capacitance                | $I_E = 0$ $V_{CB} = -10V$<br>$f = 1MHz$                    |      |      | 250   | pF      |
| $h_{FE}$ Small Signal Current Gain                  | $I_C = -0.1A$ $V_{CE} = -5V$<br>$f = 1KHz$                 | 20   |      |       |         |
|                                                     | $I_C = -0.5A$ $V_{CE} = -5V$<br>$f = 20MHz$                | 3    |      |       |         |
| $t_{on}$ Turn On Time                               | $I_C = -5A$ $V_{CC} = 30V$<br>$I_{B1} = -0.5A$             |      | 0.5  |       | $\mu s$ |
| $t_{off}$ Turn Off Time                             | $I_C = -5A$ $V_{CC} = 30V$<br>$I_{B1} = -I_{B2} = 0.5A$    |      | 1.3  |       | $\mu s$ |

\* Pulse test  $t_p = 300\mu s$ ,  $\delta < 2\%$

**ELECTRICAL CHARACTERISTICS FOR 2N5153** ( $T_{case} = 25^{\circ}C$  unless otherwise stated)

| Parameter                                           | Test Conditions                                            | Min. | Typ. | Max.  | Unit    |
|-----------------------------------------------------|------------------------------------------------------------|------|------|-------|---------|
| $I_{CES}$ Collector Cut Off Current                 | $V_{CE} = -60V$ $V_{BE} = 0$                               |      |      | -1    | $\mu A$ |
|                                                     | $V_{CE} = -100V$ $V_{BE} = 0$                              |      |      | -1    | mA      |
| $I_{CEV}$ Collector Cut Off Current                 | $V_{CE} = -60V$ $T_{case} = 150^{\circ}C$<br>$V_{BE} = 2V$ |      |      | -500  | $\mu A$ |
| $I_{CEO}$ Collector Cut Off Current                 | $V_{CE} = -40V$ $I_B = 0$                                  |      |      | -50   |         |
| $I_{EBO}$ Emitter Cut Off Current                   | $V_{EB} = -4V$ $I_C = 0$                                   |      |      | -1    | $\mu A$ |
|                                                     | $V_{EB} = -5.5V$ $I_C = 0$                                 |      |      | -1    | mA      |
| $V_{CEO(SUS)}$ Collector Emitter Saturation Voltage | $I_C = -100mA$ $I_B = 0$                                   | 80   |      |       | V       |
| $V_{CE(sat)}$ Collector Emitter Saturation Voltage  | $I_C = -2.5A$ $I_B = -250mA$                               |      |      | -0.75 |         |
|                                                     | $I_C = -5A$ $I_B = -500mA$                                 |      |      | -1.5  |         |
| $V_{BE(sat)}$ Base Emitter Saturation Voltage       | $I_C = -2.5A$ $I_B = -250mA$                               |      |      | -1.45 |         |
|                                                     | $I_C = -5A$ $I_B = -500mA$                                 |      |      | -2.2  |         |
| $V_{BE}$ Base Emitter Voltage                       | $I_C = -2.5A$ $V_{CE} = -5V$                               |      |      | -1.45 |         |
| $h_{FE}$ DC Current Gain                            | $I_C = -50mA$ $V_{CE} = -5V$                               | 50   |      |       | 200     |
|                                                     | $I_C = -2.5A$ $V_{CE} = -5V$                               | 70   |      |       |         |
|                                                     | $I_C = -5A$ $V_{CE} = -5V$                                 | 40   |      |       |         |
|                                                     | $T_{case} = -55^{\circ}C$                                  |      |      |       |         |
|                                                     | $I_C = 2.5A$ $V_{CE} = -5V$                                | 35   |      |       |         |
| $C_{CBO}$ Collector Base Capacitance                | $I_E = 0$ $V_{CB} = -10V$<br>$f = 1MHz$                    |      |      | 250   | pF      |
| $h_{FE}$ Small Signal Current Gain                  | $I_C = -0.1A$ $V_{CE} = -5V$<br>$f = 1KHz$                 | 50   |      |       |         |
|                                                     | $I_C = -0.5A$ $V_{CE} = -5V$<br>$f = 20MHz$                | 3.5  |      |       |         |
| $t_{on}$ Turn On Time                               | $I_C = -5A$ $V_{CC} = 30V$<br>$I_{B1} = -0.5A$             |      | 0.5  |       | $\mu s$ |
| $t_{off}$ Turn Off Time                             | $I_C = -5A$ $V_{CC} = 30V$<br>$I_{B1} = -I_{B2} = 0.5A$    |      | 1.3  |       | $\mu s$ |

\* Pulse test  $t_p = 300\mu s$ ,  $\delta < 2\%$