



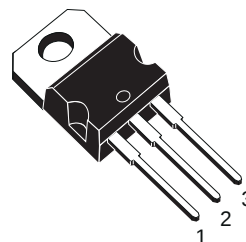
# TIP47/TIP48 TIP49/TIP50

## SILICON NPN SWITCHING TRANSISTORS

- STMicroelectronics PREFERRED SALESTYPES
- NPN TRANSISTOR

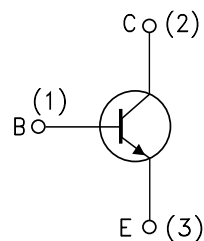
### DESCRIPTION

The TIP47, TIP48, TIP49 and TIP50 are silicon Multiepitaxial NPN Planar transistors mounted in Jedec TO-220 plastic package. It is intended for use in linear and switching applications.



TO-220

### INTERNAL SCHEMATIC DIAGRAM



SC06960

### ABSOLUTE MAXIMUM RATINGS

| Symbol    | Parameter                                                                    | Value      |       |       |       | Unit       |
|-----------|------------------------------------------------------------------------------|------------|-------|-------|-------|------------|
|           |                                                                              | TIP47      | TIP48 | TIP49 | TIP50 |            |
| $V_{CBO}$ | Collector-Base Voltage ( $I_E = 0$ )                                         | 350        | 400   | 450   | 500   | V          |
| $V_{CEO}$ | Collector-Emitter Voltage ( $I_B = 0$ )                                      | 250        | 300   | 350   | 400   | V          |
| $V_{EBO}$ | Emitter-Base Voltage ( $I_C = 0$ )                                           | 5          |       |       |       | V          |
| $I_C$     | Collector Current                                                            | 1          |       |       |       | A          |
| $I_{CM}$  | Collector Peak Current                                                       | 2          |       |       |       | A          |
| $I_B$     | Base Current                                                                 | 0.6        |       |       |       | A          |
| $P_{tot}$ | Total Dissipation at $T_{case} \leq 25^\circ C$<br>$T_{amb} \leq 25^\circ C$ | 40         |       |       |       | W          |
|           |                                                                              | 2          |       |       |       | W          |
| $T_{stg}$ | Storage Temperature                                                          | -65 to 150 |       |       |       | $^\circ C$ |
| $T_j$     | Max. Operating Junction Temperature                                          | 150        |       |       |       | $^\circ C$ |

## TIP47 / TIP48 / TIP49 / TIP50

### THERMAL DATA

|                       |                                     |     |       |      |
|-----------------------|-------------------------------------|-----|-------|------|
| R <sub>thj-case</sub> | Thermal Resistance Junction-case    | Max | 3.125 | °C/W |
| R <sub>thj-amb</sub>  | Thermal Resistance Junction-ambient | Max | 62.5  | °C/W |

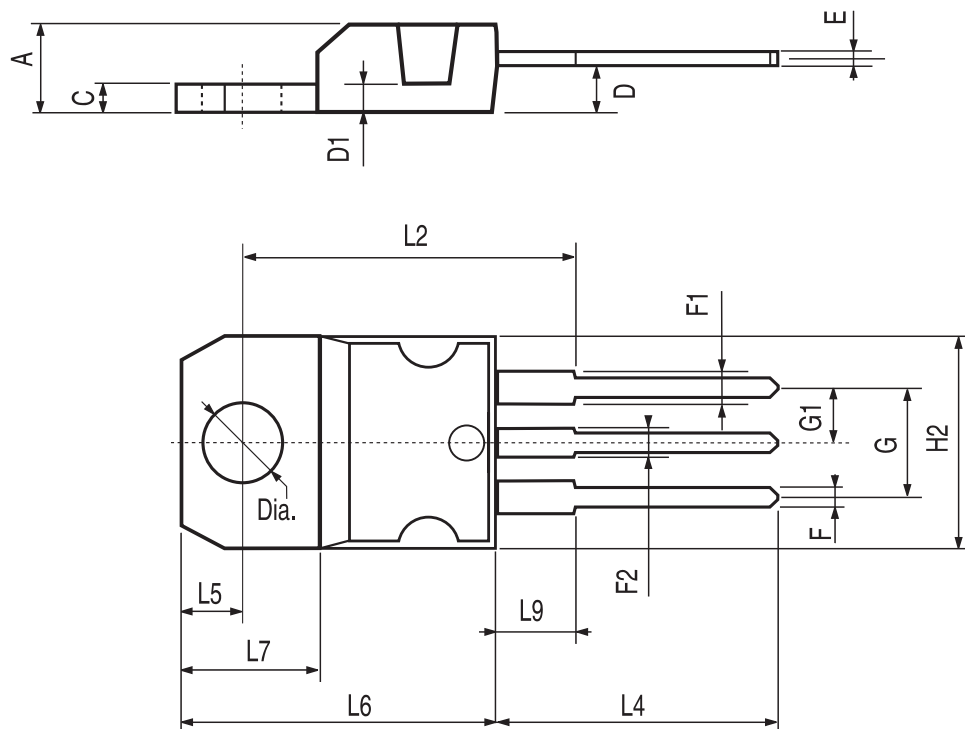
### ELECTRICAL CHARACTERISTICS (T<sub>case</sub> = 25 °C unless otherwise specified)

| Symbol                  | Parameter                                                 | Test Conditions                                                                                                                                                              | Min.                     | Typ. | Max.             | Unit                 |
|-------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|------|------------------|----------------------|
| I <sub>CES</sub>        | Collector Cut-off Current (V <sub>BE</sub> = 0)           | for <b>TIP47</b> V <sub>CE</sub> = 350 V<br>for <b>TIP48</b> V <sub>CE</sub> = 400 V<br>for <b>TIP49</b> V <sub>CE</sub> = 450 V<br>for <b>TIP50</b> V <sub>CE</sub> = 500 V |                          |      | 1<br>1<br>1<br>1 | mA<br>mA<br>mA<br>mA |
| I <sub>CEO</sub>        | Collector Cut-off Current (I <sub>B</sub> = 0)            | for <b>TIP47</b> V <sub>CE</sub> = 150 V<br>for <b>TIP48</b> V <sub>CE</sub> = 200 V<br>for <b>TIP49</b> V <sub>CE</sub> = 250 V<br>for <b>TIP50</b> V <sub>CE</sub> = 300 V |                          |      | 1<br>1<br>1<br>1 | mA<br>mA<br>mA<br>mA |
| I <sub>EBO</sub>        | Emitter Cut-off Current (I <sub>C</sub> = 0)              | V <sub>EB</sub> = 5 V                                                                                                                                                        |                          |      | 1                | mA                   |
| V <sub>CEO(sus)</sub> * | Collector-Emitter Sustaining Voltage (I <sub>B</sub> = 0) | I <sub>C</sub> = 30 mA<br>for <b>TIP47</b><br>for <b>TIP48</b><br>for <b>TIP49</b><br>for <b>TIP50</b>                                                                       | 250<br>300<br>350<br>400 |      |                  | V<br>V<br>V<br>V     |
| V <sub>CE(sat)</sub> *  | Collector-Emitter Saturation Voltage                      | I <sub>C</sub> = 1 A I <sub>B</sub> = 0.2 A                                                                                                                                  |                          |      | 1                | V                    |
| V <sub>BE(on)</sub> *   | Base-Emitter Voltage                                      | I <sub>C</sub> = 1 A V <sub>CE</sub> = 10 V                                                                                                                                  |                          |      | 1.5              | V                    |
| h <sub>FE</sub> *       | DC Current Gain                                           | I <sub>C</sub> = 0.3 A V <sub>CE</sub> = 10 V<br>I <sub>C</sub> = 1 A V <sub>CE</sub> = 10 V                                                                                 | 30<br>10                 |      | 150              |                      |
| f <sub>T</sub>          | Transition Frequency                                      | V <sub>CE</sub> = 10 V I <sub>C</sub> = 0.2 A<br>f = 2 MHz                                                                                                                   | 10                       |      |                  | MHz                  |
| h <sub>fe</sub>         | Small Signal Current Gain                                 | V <sub>CE</sub> = 10 V I <sub>C</sub> = 0.2 A<br>f = 1 KHz                                                                                                                   | 25                       |      |                  |                      |

\* Pulsed: Pulse duration = 300 μs, duty cycle ≤ 2 %

## TO-220 MECHANICAL DATA

| DIM. | mm    |      |       | inch  |       |       |
|------|-------|------|-------|-------|-------|-------|
|      | MIN.  | TYP. | MAX.  | MIN.  | TYP.  | MAX.  |
| A    | 4.40  |      | 4.60  | 0.173 |       | 0.181 |
| C    | 1.23  |      | 1.32  | 0.048 |       | 0.051 |
| D    | 2.40  |      | 2.72  | 0.094 |       | 0.107 |
| D1   |       | 1.27 |       |       | 0.050 |       |
| E    | 0.49  |      | 0.70  | 0.019 |       | 0.027 |
| F    | 0.61  |      | 0.88  | 0.024 |       | 0.034 |
| F1   | 1.14  |      | 1.70  | 0.044 |       | 0.067 |
| F2   | 1.14  |      | 1.70  | 0.044 |       | 0.067 |
| G    | 4.95  |      | 5.15  | 0.194 |       | 0.203 |
| G1   | 2.4   |      | 2.7   | 0.094 |       | 0.106 |
| H2   | 10.0  |      | 10.40 | 0.393 |       | 0.409 |
| L2   |       | 16.4 |       |       | 0.645 |       |
| L4   | 13.0  |      | 14.0  | 0.511 |       | 0.551 |
| L5   | 2.65  |      | 2.95  | 0.104 |       | 0.116 |
| L6   | 15.25 |      | 15.75 | 0.600 |       | 0.620 |
| L7   | 6.2   |      | 6.6   | 0.244 |       | 0.260 |
| L9   | 3.5   |      | 3.93  | 0.137 |       | 0.154 |
| DIA. | 3.75  |      | 3.85  | 0.147 |       | 0.151 |



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