

**COMPLEMENTARY SILICON POWER DARLINGTON TRANSISTORS**

- SGS-THOMSON PREFERRED SALESTYPES
- COMPLEMENTARY PNP - NPN DEVICES
- INTEGRATED ANTIPARALLEL COLLECTOR-EMITTER DIODE

**APPLICATIONS**

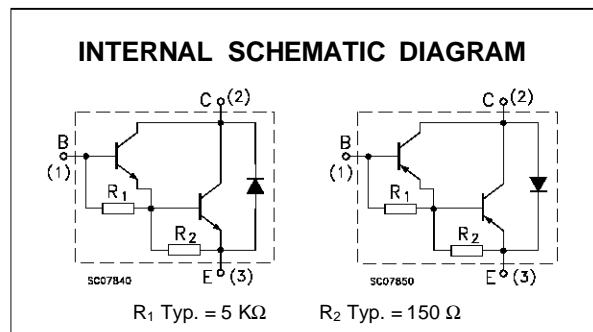
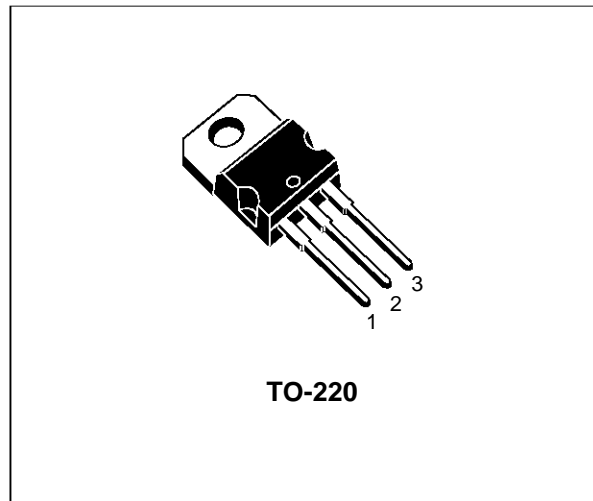
- LINEAR AND SWITCHING INDUSTRIAL EQUIPMENT

**DESCRIPTION**

The TIP100 and TIP102 are silicon epitaxial-base NPN power transistors in monolithic Darlington configuration mounted in TO-220 plastic package, intended for use in power linear and switching applications.

The complementary PNP types are TIP105 and TIP107 respectively.

Also TIP106 is a PNP type.



**ABSOLUTE MAXIMUM RATINGS**

| Symbol           | Parameter  | Value      |                  |                            | Unit |    |
|------------------|--|------------|------------------|----------------------------|------|----|
|                  |  | NPN<br>PNP | TIP100<br>TIP105 | TIP102<br>TIP106<br>TIP107 |      |    |
| V <sub>CBO</sub> | Collector-Base Voltage (I <sub>E</sub> = 0)                                |            | 60               | 80                         | 100  | V  |
| V <sub>CEO</sub> | Collector-Emitter Voltage (I <sub>B</sub> = 0)                             |            | 60               | 80                         | 100  | V  |
| V <sub>EBO</sub> | Emitter-Base Voltage (I <sub>C</sub> = 0)                                  |            | 5                |                            |      | V  |
| I <sub>C</sub>   | Collector Current  |            | 8                |                            |      | A  |
| I <sub>CM</sub>  | Collector Peak Current   |            | 15               |                            |      | A  |
| I <sub>B</sub>   | Base Current   |            | 1                |                            |      | A  |
| P <sub>tot</sub> | Total Dissipation at T <sub>case</sub> ≤ 25 °C<br>T <sub>amb</sub> ≤ 25 °C |            | 80               |                            |      | W  |
|                  |  |            | 2                |                            |      | W  |
| T <sub>stg</sub> | Storage Temperature  |            | -65 to 150       |                            |      | °C |
| T <sub>j</sub>   | Max. Operating Junction Temperature  |            | 150              |                            |      | °C |

\* For PNP types voltage and current values are negative.

# TIP100/TIP102/TIP105/TIP106/TIP107

## THERMAL DATA

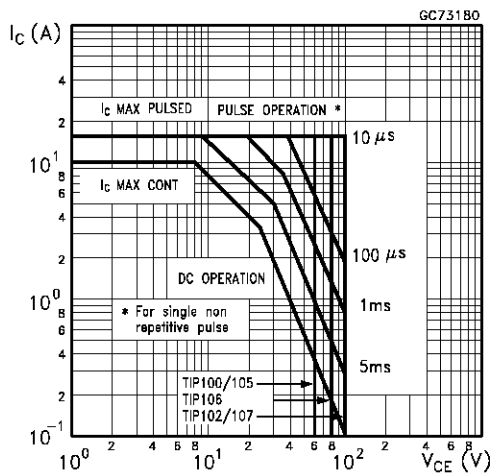
|                       |                                     |     |      |      |
|-----------------------|-------------------------------------|-----|------|------|
| R <sub>thj-case</sub> | Thermal Resistance Junction-case    | Max | 1.56 | °C/W |
| R <sub>thj-amb</sub>  | Thermal Resistance Junction-ambient | 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>CEO</sub>        | Collector Cut-off Current (I <sub>B</sub> = 0)            | for <b>TIP100/TIP105</b> V <sub>CE</sub> = 30 V<br>for <b>TIP106</b> V <sub>CE</sub> = 40 V<br>for <b>TIP102/TIP107</b> V <sub>CE</sub> = 50 V  |                 |      | 50<br>50<br>50 | μA<br>μA<br>μA |
| I <sub>CBO</sub>        | Collector Cut-off Current (I <sub>E</sub> = 0)            | for <b>TIP100/TIP105</b> V <sub>CE</sub> = 60 V<br>for <b>TIP106</b> V <sub>CE</sub> = 80 V<br>for <b>TIP102/TIP107</b> V <sub>CE</sub> = 100 V |                 |      | 50<br>50<br>50 | μA<br>μA<br>μA |
| I <sub>EBO</sub>        | Emitter Cut-off Current (I <sub>C</sub> = 0)              | V <sub>EB</sub> = -5 V  |                 |      | 8              | mA             |
| V <sub>CEO(sus)</sub> * | Collector-Emitter Sustaining Voltage (I <sub>B</sub> = 0) | I <sub>C</sub> = 30 mA<br>for <b>TIP100/TIP105</b><br>for <b>TIP106</b><br>for <b>TIP102/TIP107</b>   | 60<br>80<br>100 |      |                | V<br>V<br>V    |
| V <sub>CE(sat)</sub> *  | Collector-Emitter Saturation Voltage                      | I <sub>C</sub> = 3 A I <sub>B</sub> = 6 mA<br>I <sub>C</sub> = 8 A I <sub>B</sub> = 80 mA   |                 |      | 2<br>2.5       | V<br>V         |
| V <sub>BE</sub> *       | Base-Emitter Voltage                                      | I <sub>C</sub> = 8 A V <sub>CE</sub> = 4 V  |                 |      | 2.8            | V              |
| h <sub>FE</sub> *       | DC Current Gain   | I <sub>C</sub> = 3 A V <sub>CE</sub> = 4 V<br>I <sub>C</sub> = 8 A V <sub>CE</sub> = 4 V  | 1000<br>200     |      | 20000          |                |
| V <sub>F</sub> *        | Forward Voltage of Commutation Diode (I <sub>B</sub> = 0) | I <sub>F</sub> = - I <sub>C</sub> = 10 A  |                 |      | 2.8            | V              |

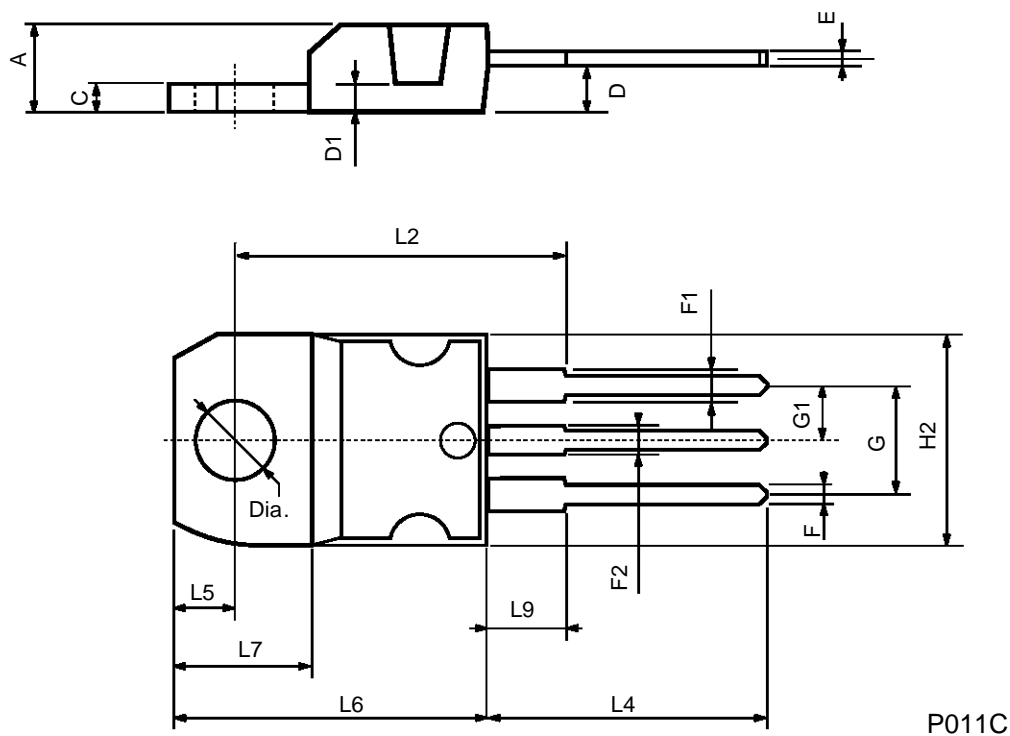
\* For PNP types voltage and current values are negative.

## Safe Operating Area



## 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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