



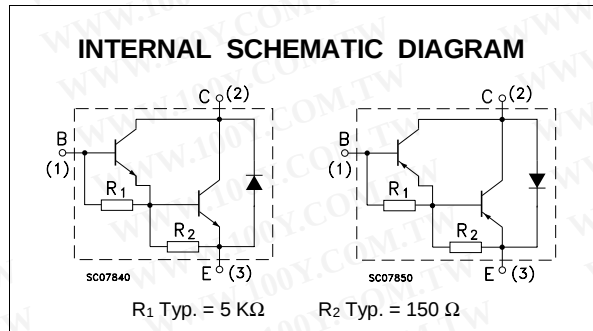
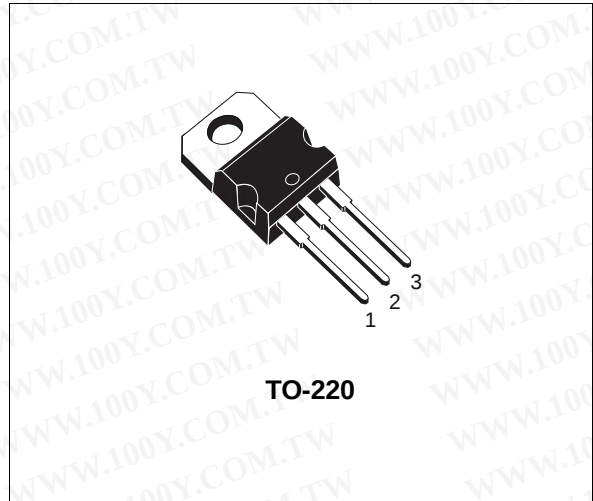
# TIP120/121/122 TIP125/126/127

## COMPLEMENTARY SILICON POWER DARLINGTON TRANSISTORS

- STMicroelectronics PREFERRED SALESTYPES

### DESCRIPTION

The TIP120, TIP121 and TIP122 are silicon Epitaxial-Base NPN power transistors in monolithic Darlington configuration mounted in Jedec TO-220 plastic package. They are intended for use in power linear and switching applications. The complementary PNP types are TIP125, TIP126 and TIP127, respectively.



### ABSOLUTE MAXIMUM RATINGS

| Symbol           | Parameter                                      | Value |        |            |        | Unit |
|------------------|------------------------------------------------|-------|--------|------------|--------|------|
|                  |                                                | NPN   | TIP120 | TIP121     | TIP122 |      |
| V <sub>CBO</sub> | Collector-Base Voltage (I <sub>E</sub> = 0)    | PNP   | TIP125 | TIP126     | TIP127 |      |
| 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                              |       |        | 5          |        | A    |
| I <sub>CM</sub>  | Collector Peak Current                         |       |        | 8          |        | A    |
| I <sub>B</sub>   | Base Current                                   |       |        | 0.1        |        | A    |
| P <sub>tot</sub> | Total Dissipation at T <sub>case</sub> ≤ 25 °C |       |        | 65         |        | W    |
|                  | T <sub>amb</sub> ≤ 25 °C                       |       |        | 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.

# TIP120/TIP121/TIP122/TIP125/TIP126/TIP127

## THERMAL DATA

|                       |                                     |     |      |      |
|-----------------------|-------------------------------------|-----|------|------|
| R <sub>thj-case</sub> | Thermal Resistance Junction-case    | Max | 1.92 | °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 TIP120/125 V <sub>CE</sub> = 30 V<br>for TIP121/126 V <sub>CE</sub> = 40 V<br>for TIP122/127 V <sub>CE</sub> = 50 V  |                 |      | 0.5<br>0.5<br>0.5 | mA<br>mA<br>mA |
| I <sub>CBO</sub>        | Collector Cut-off Current (I <sub>B</sub> = 0)            | for TIP120/125 V <sub>CB</sub> = 60 V<br>for TIP121/126 V <sub>CB</sub> = 80 V<br>for TIP122/127 V <sub>CB</sub> = 100 V |                 |      | 0.2<br>0.2<br>0.2 | mA<br>mA<br>mA |
| I <sub>EBO</sub>        | Emitter Cut-off Current (I <sub>C</sub> = 0)              | V <sub>EB</sub> = 5 V                                                                                                    |                 |      | 2                 | mA             |
| V <sub>CEO(sus)</sub> * | Collector-Emitter Sustaining Voltage (I <sub>B</sub> = 0) | I <sub>C</sub> = 30 mA<br>for TIP120/125<br>for TIP121/126<br>for TIP122/127                                             | 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> = 12 mA<br>I <sub>C</sub> = 5 A I <sub>B</sub> = 20 mA                               |                 |      | 2<br>4            | V<br>V         |
| V <sub>BE(on)</sub> *   | Base-Emitter Voltage                                      | I <sub>C</sub> = 3 A V <sub>CE</sub> = 3 V                                                                               |                 |      | 2.5               | V              |
| h <sub>FE</sub> *       | DC Current Gain                                           | I <sub>C</sub> = 0.5 A V <sub>CE</sub> = 3 V<br>I <sub>C</sub> = 3 A V <sub>CE</sub> = 3 V                               | 1000<br>1000    |      |                   |                |

\* Pulsed: Pulse duration = 300 μs, duty cycle < 2 %  
 For PNP types voltage and current values are negative.

# 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 |

