



TIP140/141/142 TIP145/146/147

COMPLEMENTARY SILICON POWER DARLINGTON TRANSISTORS

- TIP141, TIP142, TIP145 AND TIP147 ARE STMicroelectronics PREFERRED SALESTYPES
- COMPLEMENTARY PNP - NPN DEVICES
- MONOLITHIC DARLINGTON CONFIGURATION
- INTEGRATED ANTIPARALLEL COLLECTOR-EMITTER DIODE

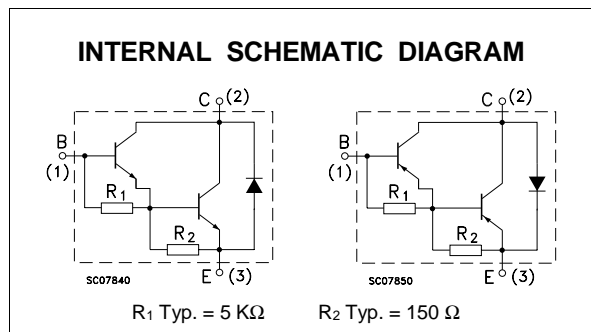
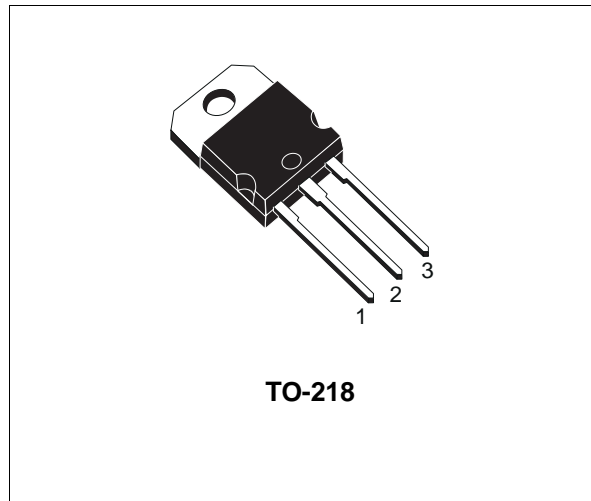
APPLICATIONS

- LINEAR AND SWITCHING INDUSTRIAL EQUIPMENT

DESCRIPTION

The TIP140, TIP141 and TIP142 are silicon Epitaxial-Base NPN power transistors in monolithic Darlington configuration, mounted in TO-218 plastic package. They are intended for use in power linear and switching applications.

The complementary PNP types are TIP145, TIP146 and TIP147 respectively.



ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Value | | | | Unit |
|-----------|---|-------|--------|------------|--------|------------|
| | | NPN | TIP140 | TIP141 | TIP142 | |
| | | PNP | TIP145 | TIP146 | TIP147 | |
| V_{CBO} | Collector-Base Voltage ($I_E = 0$) | | 60 | 80 | 100 | V |
| V_{CEO} | Collector-Emitter Voltage ($I_B = 0$) | | 60 | 80 | 100 | V |
| V_{EBO} | Emitter-Base Voltage ($I_C = 0$) | | | 5 | | V |
| I_C | Collector Current | | | 10 | | A |
| I_{CM} | Collector Peak Current | | | 20 | | A |
| I_B | Base Current | | | 0.5 | | A |
| P_{tot} | Total Dissipation at $T_{case} \leq 25^\circ C$ | | | 125 | | W |
| T_{stg} | Storage Temperature | | | -65 to 150 | | $^\circ C$ |
| T_j | Max. Operating Junction Temperature | | | 150 | | $^\circ C$ |

For PNP types voltage and current values are negative.

TIP140 / TIP141 / TIP142 / TIP145 / TIP146 / TIP147

THERMAL DATA

| | | | | |
|-----------------------|----------------------------------|-----|---|------|
| R _{thj-case} | Thermal Resistance Junction-case | Max | 1 | °C/W |
|-----------------------|----------------------------------|-----|---|------|

ELECTRICAL CHARACTERISTICS (T_{case} = 25 °C unless otherwise specified)

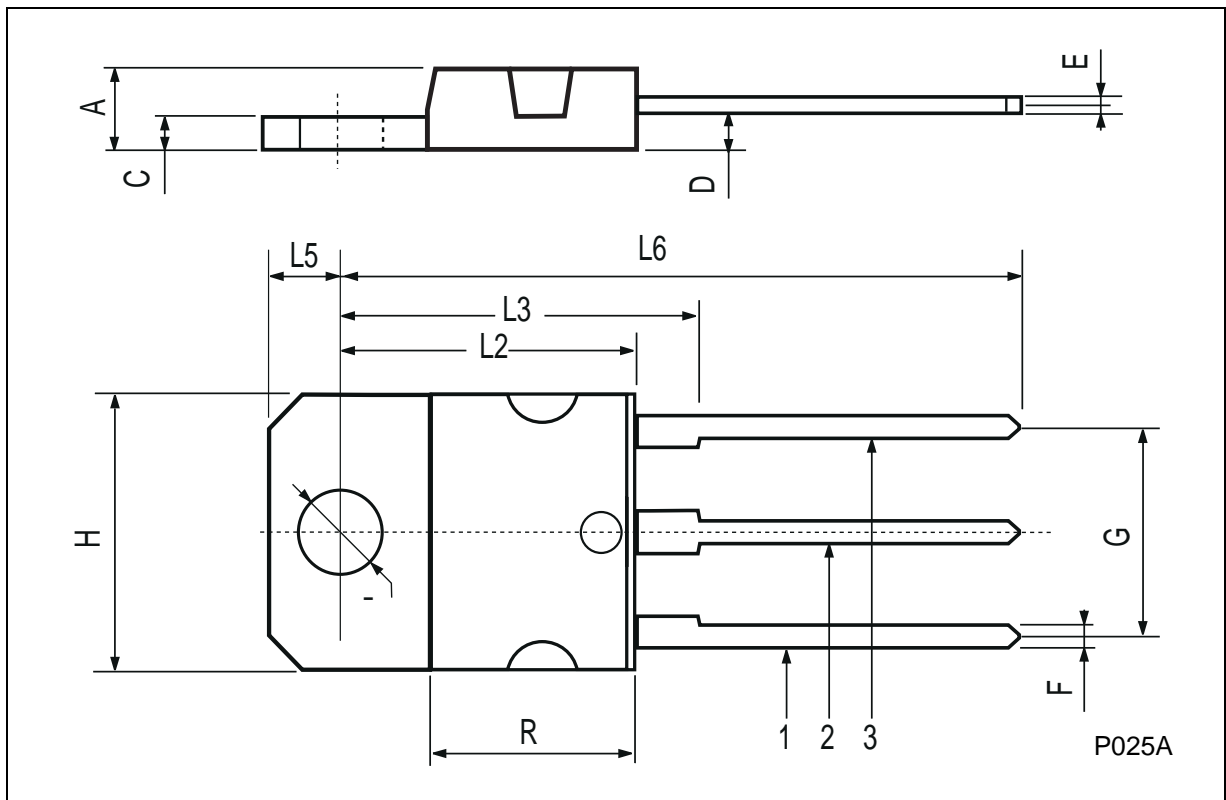
| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|-------------------------------------|---|---|-----------------|----------|-------------|----------------|
| I _{CBO} | Collector Cut-off Current (I _E = 0) | for TIP140/145 V _{CB} = 60 V for TIP141/146 V _{CB} = 80 V for TIP142/147 V _{CB} = 100 V | | | 1 1 1 | mA mA mA |
| I _{CEO} | Collector Cut-off Current (I _B = 0) | for TIP140/145 V _{CE} = 30 V for TIP141/146 V _{CE} = 40 V for TIP142/147 V _{CE} = 50 V | | | 2 2 2 | mA mA mA |
| I _{EBO} | Emitter Cut-off Current (I _C = 0) | V _{EB} = 5 V | | | 2 | mA |
| V _{CEO(sus)} * | Collector-Emitter Sustaining Voltage (I _B = 0) | I _C = 30 mA for TIP140/145 for TIP141/146 for TIP142/147 | 60 80 100 | | | V V V |
| V _{CE(sat)} * | Collector-Emitter Saturation Voltage | I _C = 5 A I _B = 10 mA I _C = 10 A I _B = 40 mA | | | 2 3 | V V |
| V _{BE(on)} * | Base-Emitter Voltage | I _C = 10 A V _{CE} = 4 V | | | 3 | V |
| h _{FE} * | DC Current Gain | I _C = 5 A V _{CE} = 4 V I _C = 10 A V _{CE} = 4 V | 1000 500 | | | |
| t _{on} t _{off} | RESISTIVE LOAD Turn-on Time Turn-off Time | I _C = 10 A I _{B1} = 40 mA I _{B2} = -40 mA R _L = 3 Ω | | 0.9 4 | | μs μs |

For PNP types voltage and current values are negative.

* Pulsed: Pulse duration = 300 μs, duty cycle 1.5 %

TO-218 (SOT-93) MECHANICAL DATA

| DIM. | mm | | | inch | | |
|------|------|------|------|-------|-------|-------|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| A | 4.7 | | 4.9 | 0.185 | | 0.193 |
| C | 1.17 | | 1.37 | 0.046 | | 0.054 |
| D | | 2.5 | | | 0.098 | |
| E | 0.5 | | 0.78 | 0.019 | | 0.030 |
| F | 1.1 | | 1.3 | 0.043 | | 0.051 |
| G | 10.8 | | 11.1 | 0.425 | | 0.437 |
| H | 14.7 | | 15.2 | 0.578 | | 0.598 |
| L2 | - | | 16.2 | - | | 0.637 |
| L3 | | 18 | | | 0.708 | |
| L5 | 3.95 | | 4.15 | 0.155 | | 0.163 |
| L6 | | 31 | | | 1.220 | |
| R | - | | 12.2 | - | | 0.480 |
| Ø | 4 | | 4.1 | 0.157 | | 0.161 |



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