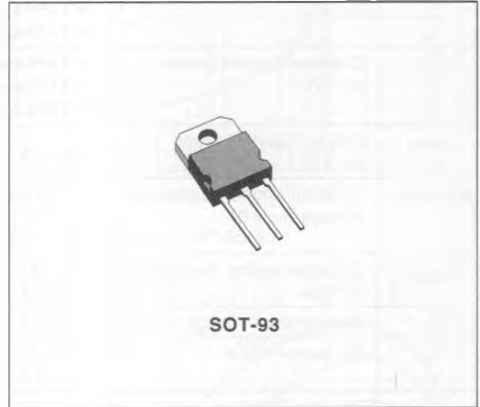


POWER DARLINGTONS
DESCRIPTION

The TIP140, TIP141, TIP142 are silicon epitaxial-base NPN transistors in monolithic Darlington configuration and are mounted in SOT-93 plastic package. They are intended for use in power linear and switching applications. The complementary PNP types are the TIP145, TIP146, TIP147 respectively.


INTERNAL SCHEMATIC DIAGRAMS

ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | NPN *PNP | Value | | | Unit |
|-----------|---------------------------------------------------------------------|-------------|------------------|------------------|------------------|------------------|
| | | | TIP140 TIP145 | TIP141 TIP146 | TIP142 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 (repetitive) | | 20 | | | A |
| I_B | Base Current | | 0.5 | | | A |
| P_{Tot} | Total Power Dissipation at $T_{case} \leq 25\text{ }^\circ\text{C}$ | | 125 | | | W |
| T_{stg} | Storage Temperature | | - 65 to 150 | | | $^\circ\text{C}$ |
| T_j | Junction Temperature | | 150 | | | $^\circ\text{C}$ |

* For PNP types voltage and current values are negative.

THERMAL DATA

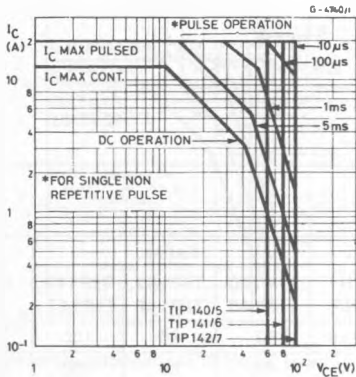
| | | | | |
|------------------|----------------------------------|-----|---|---------------|
| $R_{th\ j-case}$ | Thermal Resistance Junction-case | Max | 1 | $^{\circ}C/W$ |
|------------------|----------------------------------|-----|---|---------------|

ELECTRICAL CHARACTERISTICS ($T_{case} = 25\ ^{\circ}C$ unless otherwise specified)

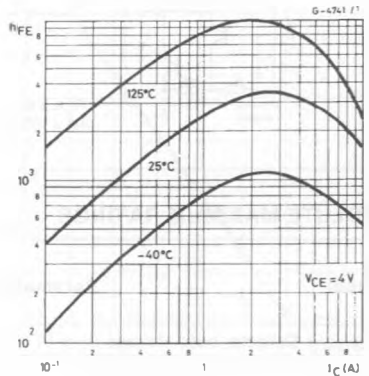
| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|------------------|----------------------------------------------------|--------------------------------------------------------------------------------------------------|--------------------------------------------------------|------|--------|---------|
| I_{CBO} | Collector Cutoff Current ($I_E = 0$) | for TIP140/5 $V_{CB} = 60\ V$ for TIP141/6 $V_{CB} = 80\ V$ for TIP142/7 $V_{CB} = 100\ V$ | | | 1 | mA |
| I_{CEO} | Collector Cutoff Current ($I_B = 0$) | for TIP140/5 $V_{CB} = 30\ V$ for TIP141/6 $V_{CE} = 40\ V$ for TIP142/7 $V_{CE} = 50\ V$ | | | 2 | mA |
| I_{EBO} | Emitter Cutoff Current ($I_C = 0$) | $V_{EBO} = 5\ V$ | | | 2 | mA |
| $V_{CE0(sus)}^*$ | Collector-emitter Sustaining Voltage ($I_B = 0$) | $I_C = 30\ mA$ | for TIP140/5 60 for TIP141/6 80 for TIP142/7 100 | | | 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_{BE}^* | 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} | Turn-on Time | $I_C = 10\ A$ $I_{B1} = 40\ mA$ | | 0.9 | | μs |
| t_{off} | Turn-off Time | $I_{B2} = -40\ mA$ $R_L = 3\ \Omega$ | | 4 | | μs |

* Pulsed : pulse duration = 200 μs , duty cycle = 1.5 %.
For PNP devices voltage and current values are negative.

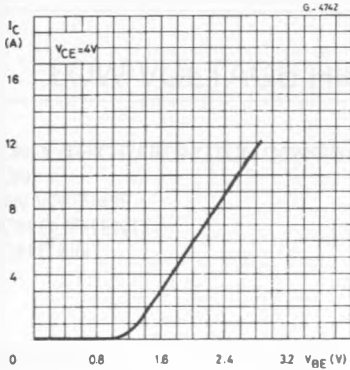
Safe Operating Areas.



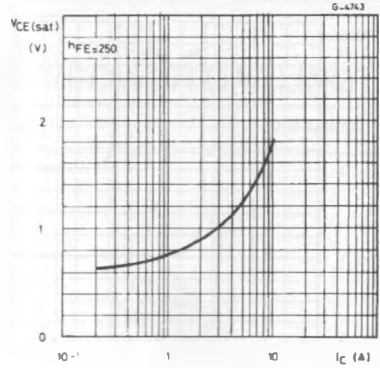
DC Current Gain (TIP140/1/2).



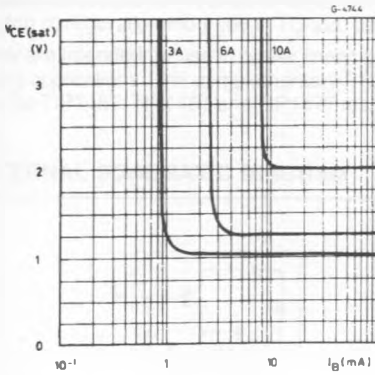
DC Transconductance (TIP140/1/2).



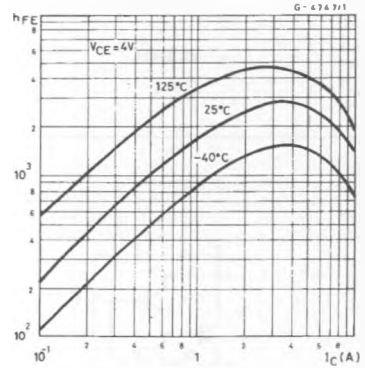
Collector-emitter Saturation Voltage (TIP140/1/2).



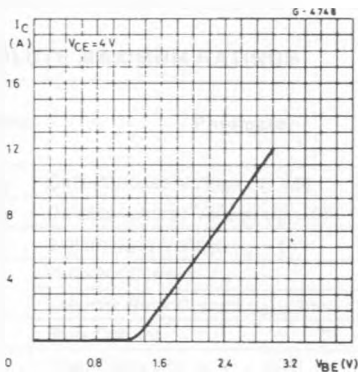
Collector-emitter Saturation Voltage (TIP140/1/2).



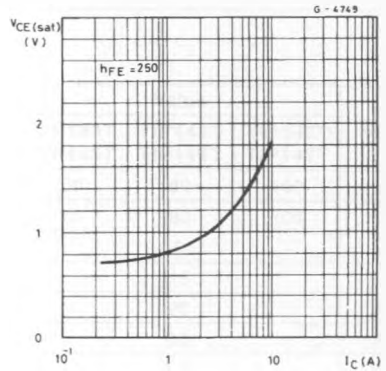
DC Current Gain (TIP145/6/7)



DC Transconductance (TIP145/6/7).



Collector-emitter Saturation Voltage (TIP145/6/7).



Collector-emitter Saturation Voltage (TIP145/6/7).

