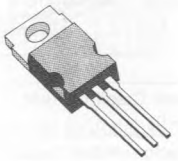
SGS-THOMSON MICROELECTRONICS

# TIP47/TIP48 TIP49/TIP50

## LINEAR AND SWITCHING APPLICATIONS

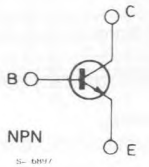
### DESCRIPTION

The TIP47 to TIP50 are silicon multiepitaxial planar transistors in TO-220 plastic package intended for linear and switching applications.



TO-220

### INTERNAL SCHEMATIC DIAGRAM




### 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 Power Dissipation at $T_{case} \leq 25$ °C | 40 | | | | W |
| $P_{tot}$ | Total Power Dissipation at $T_{amb} \leq 25$°C | 2 | | | | W |
| $T_{stg}$ | Storage Temperature | – 65 to 150 | | | | °C |
| $T_j$ | Junction Temperature | 150 | | | | °C |

## THERMAL DATA

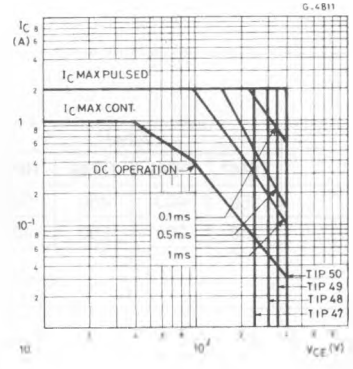
| | | | | |
|---|---|---|---|---|
| $R_{th\ j\ case}$ | Thermal Resistance Junction-case | Max | 3.125 | °C/W |
| $R_{th\ j\ amb}$ | Thermal Resistance Junction-ambient | Max | 62.5 | °C/W |

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

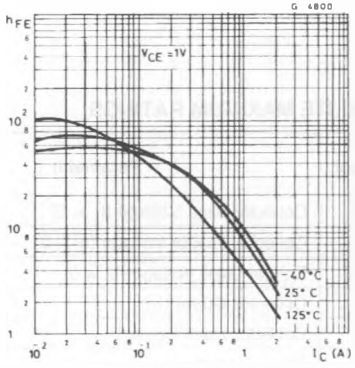
| Symbol | Parameter | Test Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| $I_{CES}$ | Collector Cutoff Current ($V_{BE}$ = 0) | for **TIP47** | $V_{CE}$ = 350 V | | | 1 | mA |
| | | for **TIP48** | $V_{CE}$ = 400 V | | | 1 | mA |
| | | for **TIP49** | $V_{CE}$ = 450 V | | | 1 | mA |
| | | for **TIP50** | $V_{CE}$ = 500 V | | | 1 | mA |
| $I_{CEO}$ | Collector Cutoff Current ($I_B$ = 0) | for **TIP47** | $V_{CE}$ = 150 V | | | 1 | mA |
| | | for **TIP48** | $V_{CE}$ = 200 V | | | 1 | mA |
| | | for **TIP49** | $V_{CE}$ = 250 V | | | 1 | mA |
| | | for **TIP50** | $V_{CE}$ = 300 V | | | 1 | mA |
| $I_{EBO}$ | Emitter Cutoff Current ($I_C$ = 0) | $V_{EB}$ = 5 V | | | | 1 | mA |
| $V_{CEO(sus)}$* | Collector-emitter Sustaining Voltage | $I_C$ = 30 mA | for **TIP47** | 250 | | | V |
| | | | for **TIP48** | 300 | | | V |
| | | | for **TIP49** | 350 | | | V |
| | | | for **TIP50** | 400 | | | V |
| $V_{CE(sat)}$* | Collector-emitter Saturation Voltage | $I_C$ = 1 A | $I_B$ = 0.2 A | | | 1 | V |
| $V_{BE(on)}$* | Base-emitter on Voltage | $I_C$ = 1 A | $V_{CE}$ = 10 V | | | 1.5 | V |
| $h_{FE}$* | DC current Gain | $I_C$ = 0.3 A | $V_{CE}$ = 10 V | 30 | | 150 | |
| | | $I_C$ = 1 A | $V_{CE}$ = 10 V | 10 | | | |
| $f_T$ | Transition Frequency | $V_{CE}$ = 10 V f = 2 MHz | $I_C$ = 0.2 A | 10 | | | MHz |
| $h_{fe}$ | Small Signal Current Gain | $V_{CE}$ = 10 V f = 1 KHz | $I_C$ = 0.2 A | 25 | | | |

* Pulsed : pulse duration = 300 µs, duty cycle < 2 %.

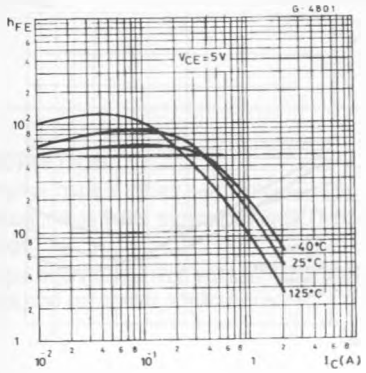
Safe Operating Areas.



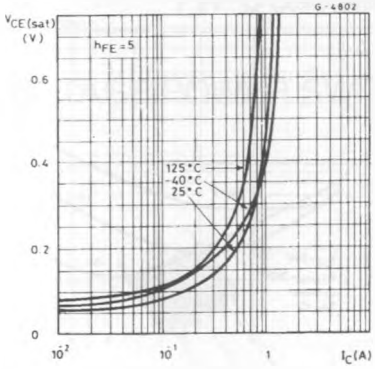

DC Current Gain.



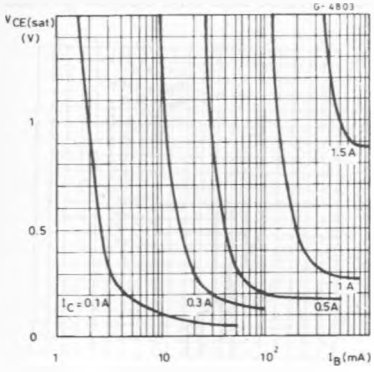
DC Current Gain.



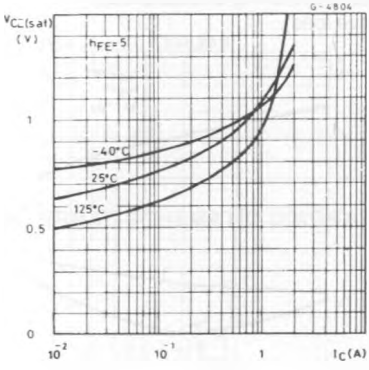

Collector-emitter Saturation Voltage.



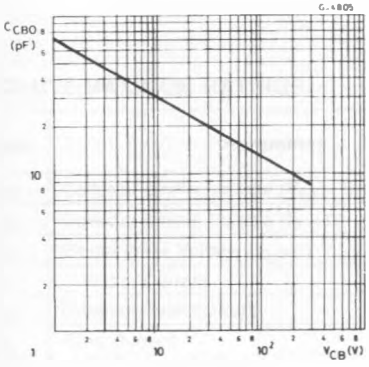

Collector-emitter Saturation Voltage.



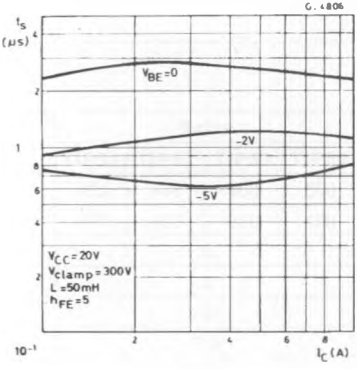

Base-emitter Saturation Voltage.




Collector-base capacitance.




Saturated Swtiching Characteristics (inductive load).



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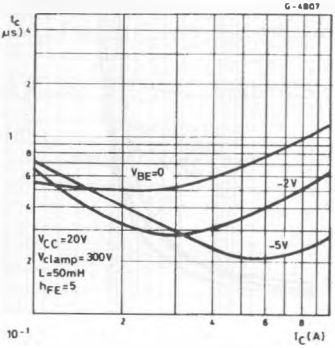
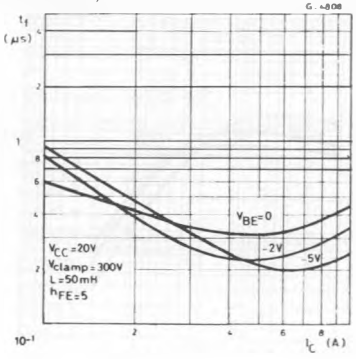
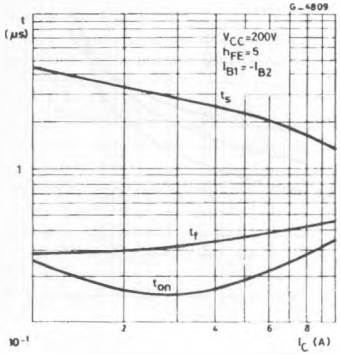



Saturated Swtiching Characteristics (inductive load).




Saturated Swtiching Characteristics (resistive load).




Campled Reverse Bias Safe Operating Areas.