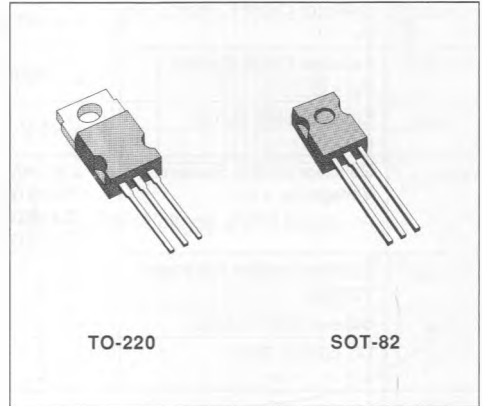
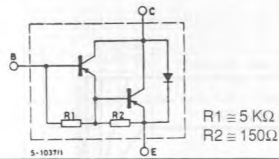
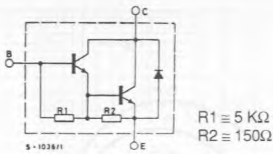


**POWER DARLINGTONS**
**DESCRIPTION**

The TIP110, TIP111, TIP112 and SGS110, SGS111, SGS112 are silicon epitaxial-base NPN transistors in monolithic Darlington configuration respectively in TO-220 and SOT-82 plastic package. They are intended for use in medium power linear and switching applications. The complementary PNP types are the TIP115, TIP116, TIP117 and SGS115, SGS116, SGS117 respectively.


**INTERNAL SCHEMATIC DIAGRAMS**

**ABSOLUTE MAXIMUM RATINGS**

Symbol	Parameter	NPN NPN PNP PNP	Value			Unit
			TIP110 SGS110 TIP115 SGS115	TIP111 SGS111 TIP116 SGS116	TIP112 SGS112 TIP117 SGS117	
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		2			A
I <sub>CM</sub>	Collector Peak Current		4			A
I <sub>B</sub>	Base Current		50			mA
P <sub>tot</sub>	Total Power Dissipation at T <sub>case</sub> ≤ 25 °C T <sub>amb</sub> ≤ 25 °C		50 2			W W
T <sub>stg</sub>	Storage Temperature		- 65 to 150			°C
T <sub>j</sub>	Junction Temperature		150			°C

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

**THERMAL DATA**

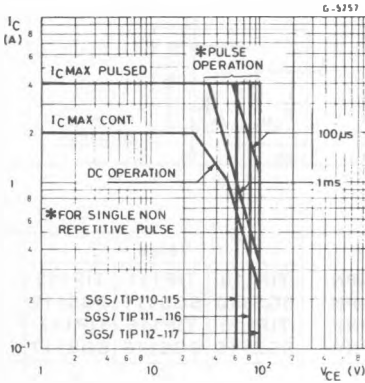
$R_{th\ j-case}$	Thermal Resistance Junction-case	Max	2.5	$^{\circ}C/W$
$R_{th\ j-amb}$	Thermal Resistance Junction-ambient	Max	62.5	$^{\circ}C/W$

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

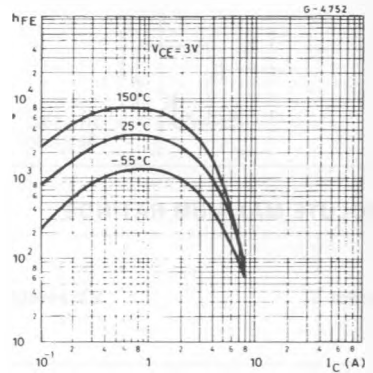
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{CEO}$	Collector Cutoff Current ( $I_B = 0$ )	$V_{CE} = \text{Half Rated } V_{CEO}$			2	mA
$I_{CBO}$	Collector Cutoff Current ( $I_E = 0$ )	$V_{CB} = \text{Rated } V_{CBO}$			1	mA
$I_{EBO}$	Emitter Cutoff Current ( $I_C = 0$ )	$V_{EB} = 5\ V$			2	mA
$V_{CEO(sus)}^*$	Collector-emitter Sustaining Voltage ( $I_B = 0$ )	$I_C = 30\ mA$ for TIP/SGS110 and TIP/SGS115 for TIP/SGS111 and TIP/SGS116 for TIP/SGS112 and TIP/SGS117	60 80 100			V V V
$V_{CE(sat)}^*$	Collector-emitter Saturation Voltage	$I_C = 2\ A$ $I_B = 8\ mA$			2.5	V
$V_{BE}^*$	Base-emitter Voltage	$I_C = 2\ A$ $V_{CE} = 4\ V$			2.8	V
$h_{FE}^*$	DC current Gain	$I_C = 1\ A$ $V_{CE} = 4\ V$ $I_C = 2\ A$ $V_{CE} = 4\ V$	1000 500			

\* Pulsed : pulse duration = 300  $\mu s$ , duty cycle  $\leq 2\%$ .  
For PNP types voltage and current values are negative.

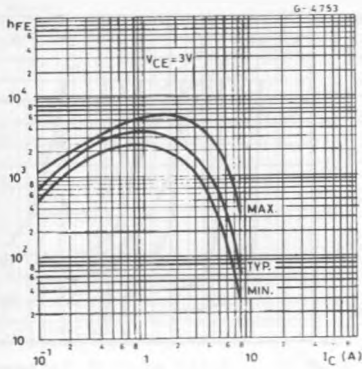
**Safe Operating Areas.**



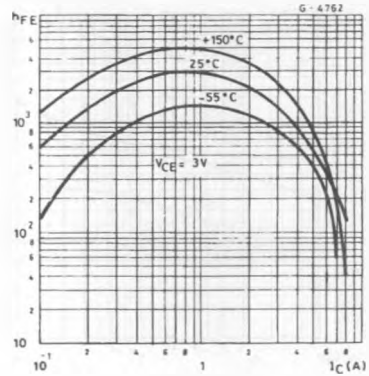
**DC Current Gain (NPN types).**



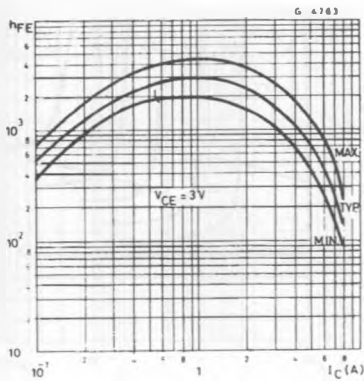
DC Current Gain (NPN types).



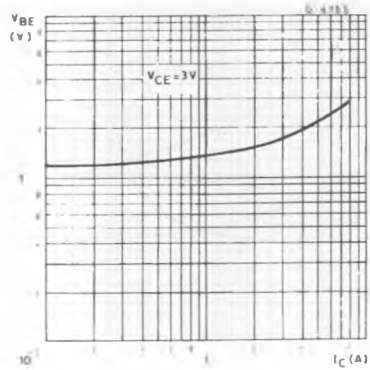
DC Current Gain (PNP types).



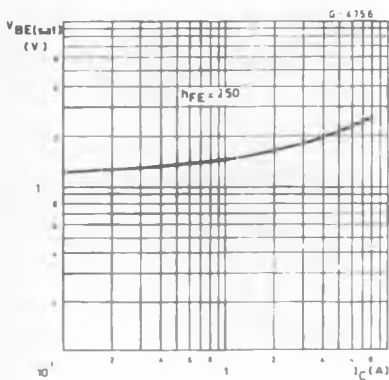
DC Current Gain (PNP types).



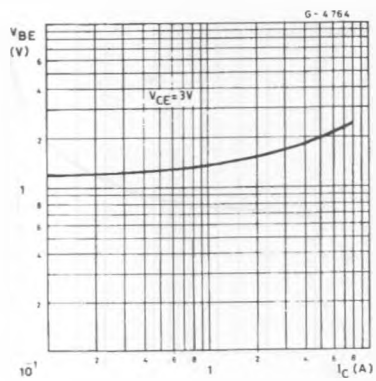
Base-emitter Voltage (NPN types).



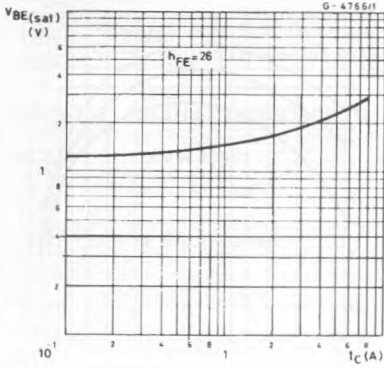
Base-emitter Saturation Voltage (NPN types).



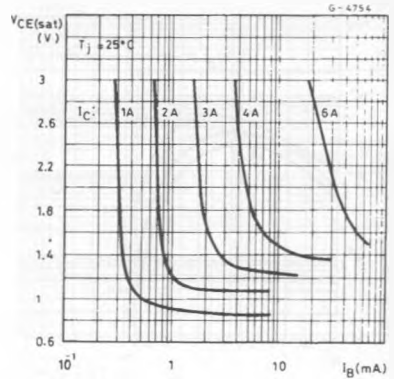
Base-emitter Voltage (PNP types).



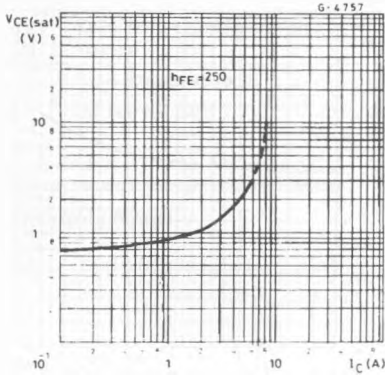
Base-emitter Saturation Voltage (PNP types).



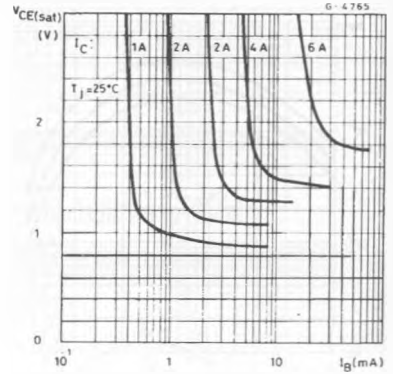
Collector-emitter Saturation Voltage (NPN types).



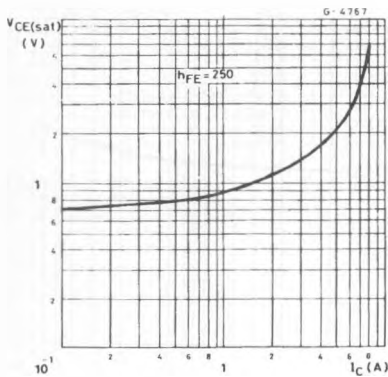
Collector-emitter Saturation Voltage (NPN types).



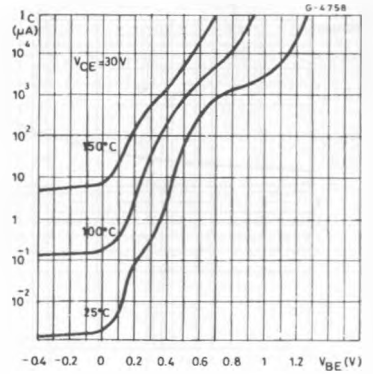
Collector-emitter Saturation Voltage (PNP types).



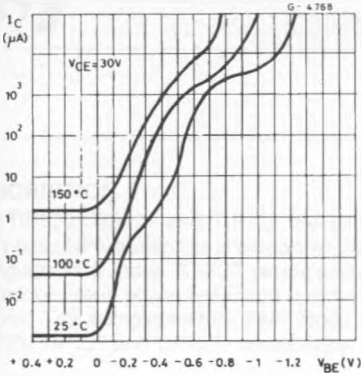
Collector-emitter Saturation Voltage (PNP types).



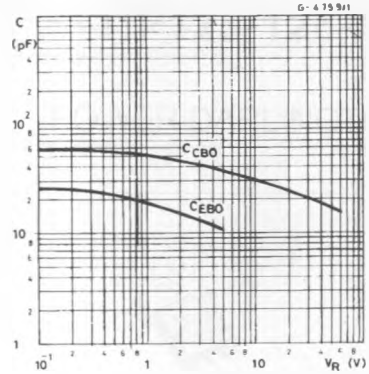
Collector Cutoff Current (NPN types).



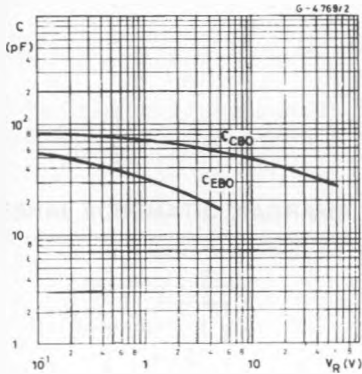
Collector Cutoff Current (NPN types).



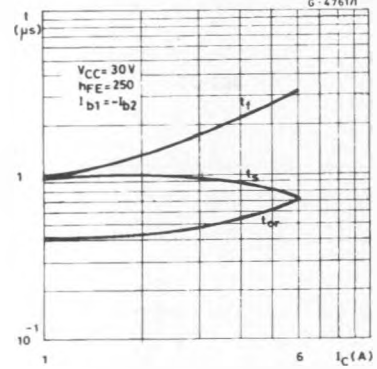
Capacitances (NPN types).



Capacitances (PNP types).



Saturated Switching Characteristics (NPN types).



Saturated Switching Characteristics (PNP types).

