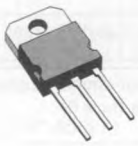
SGS-THOMSON MICROELECTRONICS

TIP140-141-142
TIP145-146-147

POWER DARLINGTONS

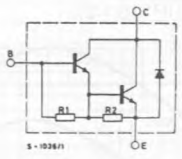
DESCRIPTION

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.

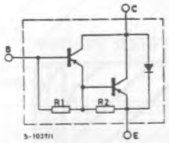


SOT-93

INTERNAL SCHEMATIC DIAGRAMS



R1 ≡ 5 KΩ
R2 ≡ 150 Ω



R1 ≡ 5 KΩ
R2 ≡ 150 Ω

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 $T_{case} \leq 25$ °C		125			W
T_{stg}	Storage Temperature		– 65 to 150			°C
T_j	Junction Temperature		150			°C

* For PNP types voltage and current values are negative.

THERMAL DATA

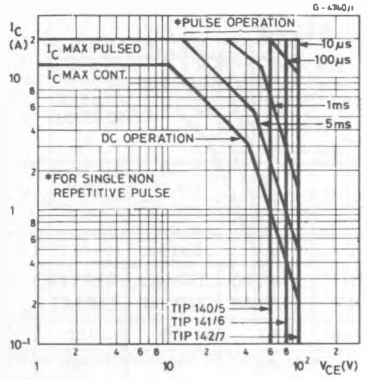
$R_{th\ j\text{-}case}$	Thermal Resistance Junction-case	Max	1	°C/W

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

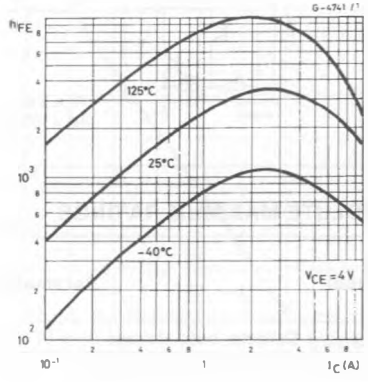
Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
I_{CBO}	Collector Cutoff Current (I_E = 0)	for **TIP140/5**	V_{CB} = 60 V			1	mA
		for **TIP141/6**	V_{CB} = 80 V			1	mA
		for **TIP142/7**	V_{CB} = 100 V			1	mA
I_{CEO}	Collector Cutoff Current (I_B = 0)	for **TIP140/5**	V_{CB} = 30 V			2	mA
		for **TIP141/6**	V_{CE} = 40 V			2	mA
		for **TIP142/7**	V_{CE} = 50 V			2	mA
I_{EBO}	Emitter Cutoff Current (I_C = 0)	V_{EBO} = 5 V				2	mA
$V_{CEO(sus)}$*	Collector-emitter Sustaining Voltage (I_B = 0)	I_C = 30 mA	for **TIP140/5**	60			V
			for **TIP141/6**	80			V
			for **TIP142/7**	100			V
$V_{CE(sat)}$*	Collector-emitter Saturation Voltage	I_C = 5 A	I_B = 10 mA			2	V
		I_C = 10 A	I_B = 40 mA			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	1000			
		I_C = 10 A	V_{CE} = 4 V	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 Ω		4		µs

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

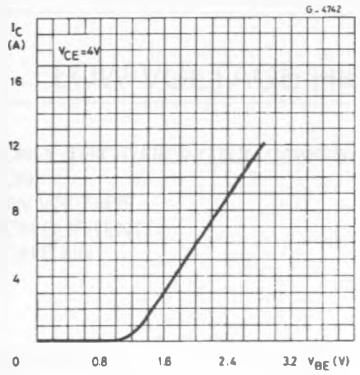
Safe Operating Areas.



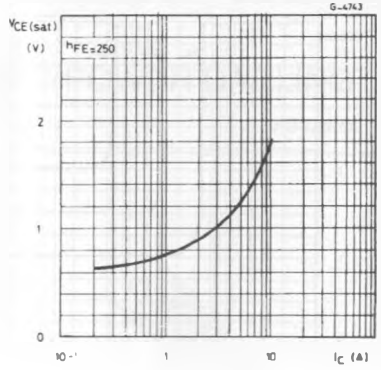
DC Current Gain (TIP140/1/2).



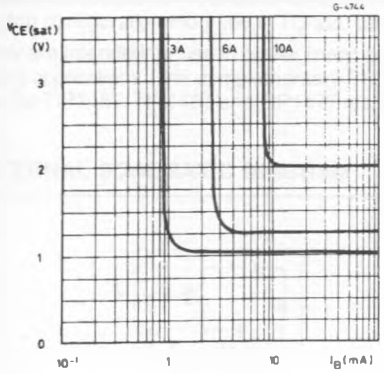
DC Transconductance (TIP140/1/2).



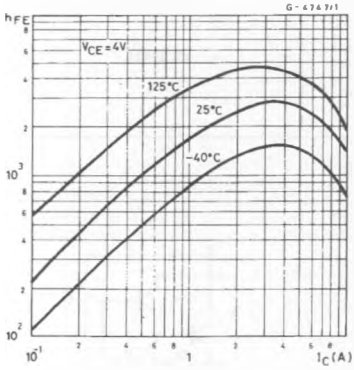
Collector-emitter Saturation Voltage (TIP140/1/2).



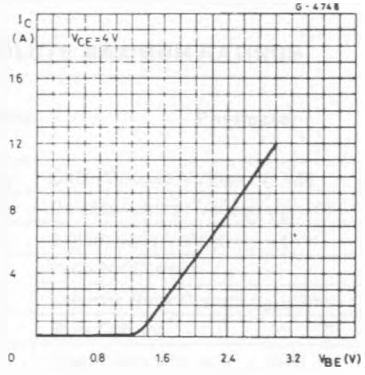
Collector-emitter Saturation Voltage (TIP140/1/2).



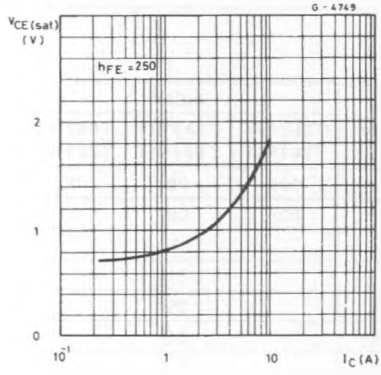
DC Current Gain (TIP145/6/7)



DC Transconductance (TIP145/6/7).



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



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