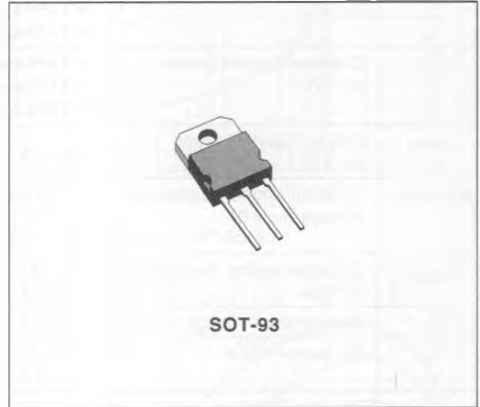


**POWER DARLINGTONS**
**DESCRIPTION**

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**

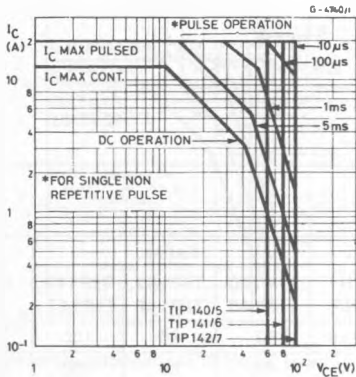
$R_{th\ j-case}$	Thermal Resistance Junction-case	Max	†	°C/W
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**ELECTRICAL CHARACTERISTICS** ( $T_{case} = 25\text{ °C}$  unless otherwise specified)

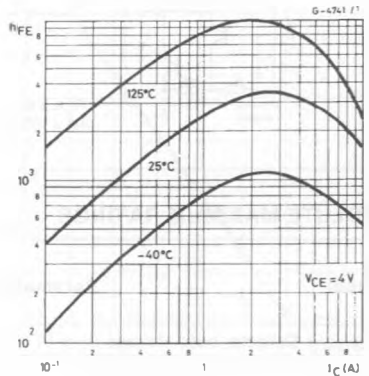
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{CBO}$	Collector Cutoff Current ( $I_E = 0$ )	for TIP140/5 $V_{CB} = 60\text{ V}$ for TIP141/6 $V_{CB} = 80\text{ V}$ for TIP142/7 $V_{CB} = 100\text{ V}$			1	mA
$I_{CEO}$	Collector Cutoff Current ( $I_B = 0$ )	for TIP140/5 $V_{CB} = 30\text{ V}$ for TIP141/6 $V_{CE} = 40\text{ V}$ for TIP142/7 $V_{CE} = 50\text{ V}$			2	mA
$I_{EBO}$	Emitter Cutoff Current ( $I_C = 0$ )	$V_{EBO} = 5\text{ V}$			2	mA
$V_{CE0(sus)}^*$	Collector-emitter Sustaining Voltage ( $I_B = 0$ )	$I_C = 30\text{ mA}$ for TIP140/5 for TIP141/6 for TIP142/7	60 80 100			V
$V_{CE(sat)}^*$	Collector-emitter Saturation Voltage	$I_C = 5\text{ A}$ $I_B = 10\text{ mA}$ $I_C = 10\text{ A}$ $I_B = 40\text{ mA}$			2 3	V
$V_{BE}^*$	Base-emitter Voltage	$I_C = 10\text{ A}$ $V_{CE} = 4\text{ V}$			3	V
$h_{FE}^*$	DC current Gain	$I_C = 5\text{ A}$ $V_{CE} = 4\text{ V}$ $I_C = 10\text{ A}$ $V_{CE} = 4\text{ V}$	1000 500			
$t_{on}$	Turn-on Time	$I_C = 10\text{ A}$ $I_{B1} = 40\text{ mA}$		0.9		$\mu\text{s}$
$t_{off}$	Turn-off Time	$I_{B2} = -40\text{ mA}$ $R_L = 3\ \Omega$		4		$\mu\text{s}$

\* Pulsed : pulse duration = 200  $\mu\text{s}$ , duty cycle = 1.5 %.  
For PNP devices voltage and current values are negative.

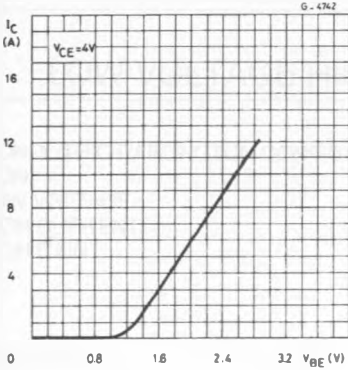
**Safe Operating Areas.**



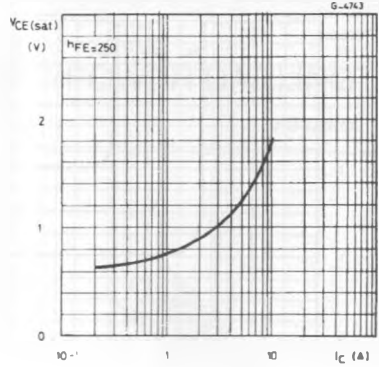
**DC Current Gain (TIP140/1/2).**



DC Transconductance (TIP140/1/2).

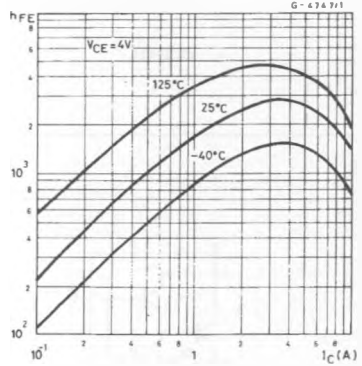
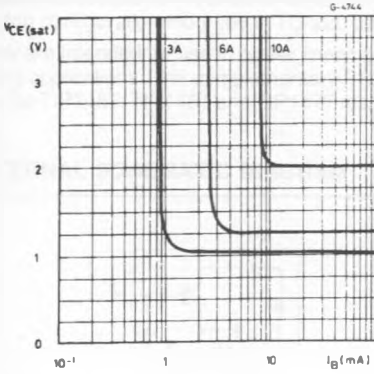


Collector-emitter Saturation Voltage (TIP140/1/2).



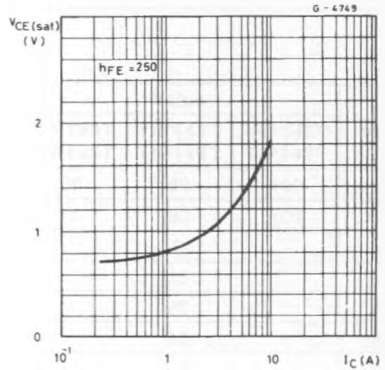
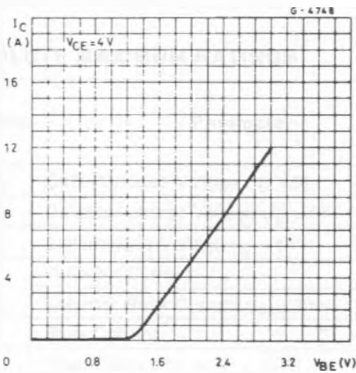
Collector-emitter Saturation Voltage (TIP140/1/2).

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).

