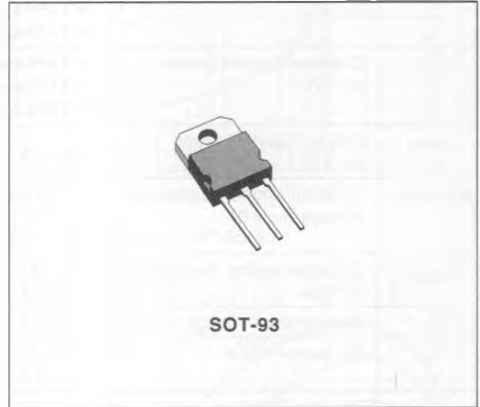


POWER DARLINGTONS
DESCRIPTION

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

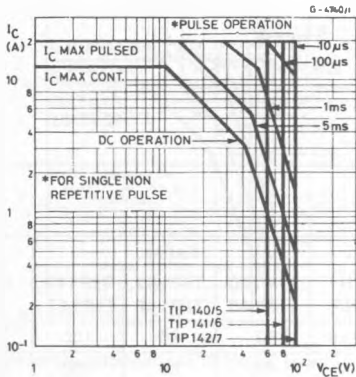
$R_{th\ j-case}$	Thermal Resistance Junction-case	Max	1	$^{\circ}C/W$
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ELECTRICAL CHARACTERISTICS ($T_{case} = 25\ ^{\circ}C$ unless otherwise specified)

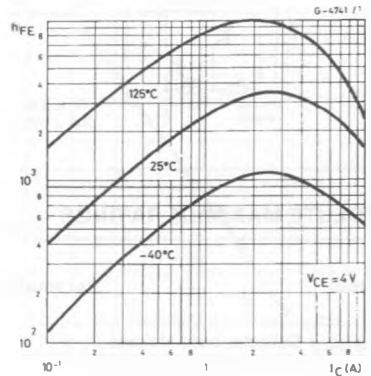
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector Cutoff Current ($I_E = 0$)	for TIP140/5 $V_{CB} = 60\ V$ for TIP141/6 $V_{CB} = 80\ V$ for TIP142/7 $V_{CB} = 100\ V$			1	mA
I_{CEO}	Collector Cutoff Current ($I_B = 0$)	for TIP140/5 $V_{CB} = 30\ V$ for TIP141/6 $V_{CE} = 40\ V$ 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	$I_C = 5\ A$ $I_C = 10\ A$	$I_B = 10\ mA$ $I_B = 40\ mA$		2 3	V
V_{BE}^*	Base-emitter Voltage	$I_C = 10\ A$	$V_{CE} = 4\ V$		3	V
h_{FE}^*	DC current Gain	$I_C = 5\ A$ $I_C = 10\ A$	$V_{CE} = 4\ V$ $V_{CE} = 4\ V$	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.

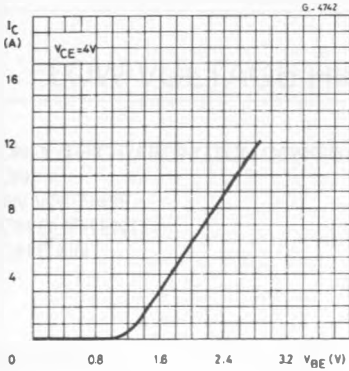
Safe Operating Areas.



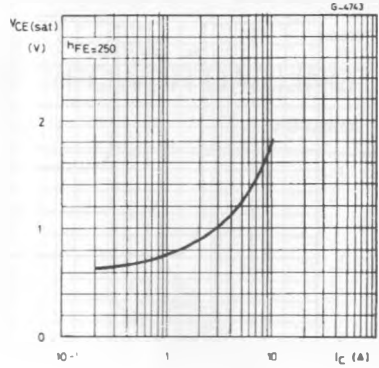
DC Current Gain (TIP140/1/2).



DC Transconductance (TIP140/1/2).

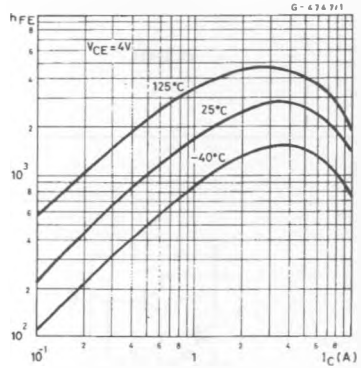
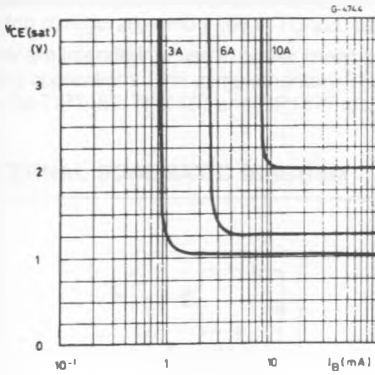


Collector-emitter Saturation Voltage (TIP140/1/2).



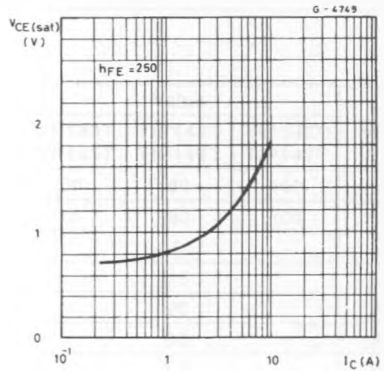
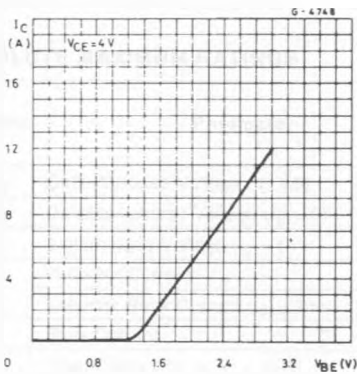
Collector-emitter Saturation Voltage (TIP140/1/2).

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).

