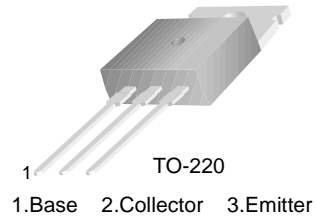


## TIP140T/141T/142T

### Monolithic Construction With Built In Base-Emitter Shunt Resistors

- High DC Current Gain :  $h_{FE} = 1000$  @  $V_{CE} = 4V$ ,  $I_C = 5A$  (Min.)
- Industrial Use
- Complement to TIP145T/146T/147T

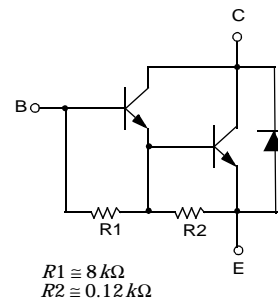


### NPN Epitaxial Silicon Darlington Transistor

#### Absolute Maximum Ratings $T_C=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Value	Units
$V_{CBO}$	Collector-Base Voltage : TIP140T	60	V
	: TIP141T	80	V
	: TIP142T	100	V
$V_{CEO}$	Collector-Emitter Voltage : TIP140T	60	V
	: TIP141T	80	V
	: TIP142T	100	V
$V_{EBO}$	Emitter-Base Voltage	5	V
$I_C$	Collector Current (DC)	10	A
$I_{CP}$	Collector Current (Pulse)	15	A
$I_B$	Base Current (DC)	0.5	A
$P_C$	Collector Dissipation ( $T_C=25^\circ\text{C}$ )	80	W
$T_J$	Junction Temperature	150	$^\circ\text{C}$
$T_{STG}$	Storage Temperature	- 65 ~ 150	$^\circ\text{C}$

Equivalent Circuit



#### Electrical Characteristics $T_C=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
$V_{CE(sus)}$	Collector-Emitter Sustaining Voltage : TIP140T : TIP141T : TIP142T	$I_C = 30\text{mA}$ , $I_B = 0$	60			V
			80			V
			100			V
$I_{CEO}$	Collector Cut-off Current : TIP140T : TIP141T : TIP142T	$V_{CE} = 30\text{V}$ , $I_B = 0$ $V_{CE} = 40\text{V}$ , $I_B = 0$ $V_{CE} = 50\text{V}$ , $I_B = 0$			2	mA
					2	mA
					2	mA
$I_{CBO}$	Collector Cut-off Current : TIP140T : TIP141T : TIP142T	$V_{CB} = 60\text{V}$ , $I_E = 0$ $V_{CB} = 80\text{V}$ , $I_E = 0$ $V_{CB} = 100\text{V}$ , $I_E = 0$			1	mA
					1	mA
					1	mA
$I_{EBO}$	Emitter Cut-off Current	$V_{BE} = 5\text{V}$ , $I_C = 0$			2	mA
$h_{FE}$	DC Current Gain	$V_{CE} = 4\text{V}$ , $I_C = 5\text{A}$ $V_{CE} = 4\text{V}$ , $I_C = 10\text{A}$	1000 500			mA
$V_{CE(sat)}$	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	V
					3	V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C = 10\text{A}$ , $I_B = 40\text{mA}$			3.5	V
$V_{BE(on)}$	Base-Emitter On Voltage	$V_{CE} = 4\text{V}$ , $I_C = 10\text{A}$			3	V
$t_D$	Delay Time	$V_{CC} = 30\text{V}$ , $I_C = 5\text{A}$ $I_{B1} = 20\text{mA}$ $I_{B2} = -20\text{mA}$ $R_L = 6\Omega$		0.15		$\mu\text{s}$
$t_R$	Rise Time			0.55		$\mu\text{s}$
$t_{STG}$	Storage Time			2.5		$\mu\text{s}$
$t_F$	Fall Time			2.5		$\mu\text{s}$

# Typical Characteristics

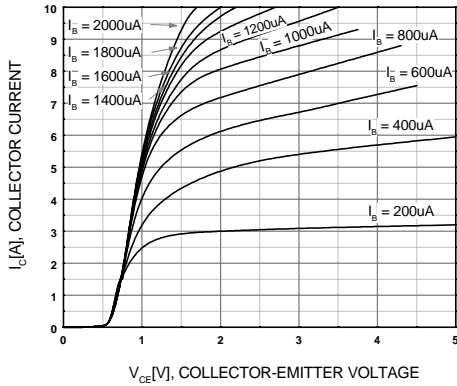


Figure 1. Static Characteristic

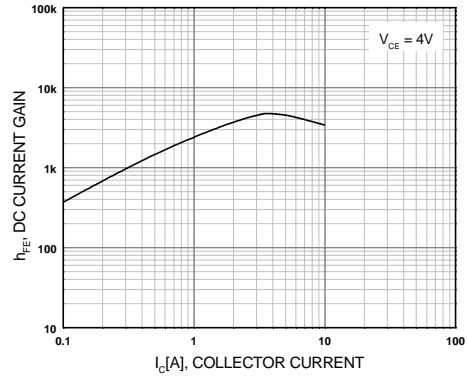


Figure 2. DC current Gain

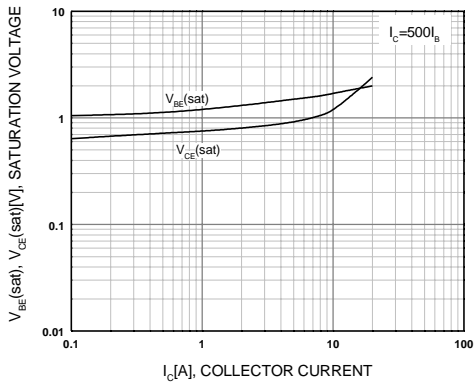


Figure 3. Collector-Emitter Saturation Voltage  
Base-Emitter Saturation Voltage

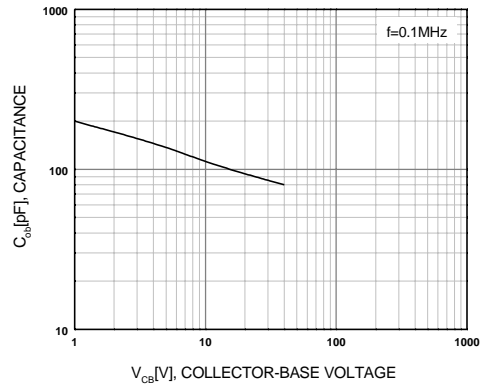


Figure 4. Collector Output Capacitance

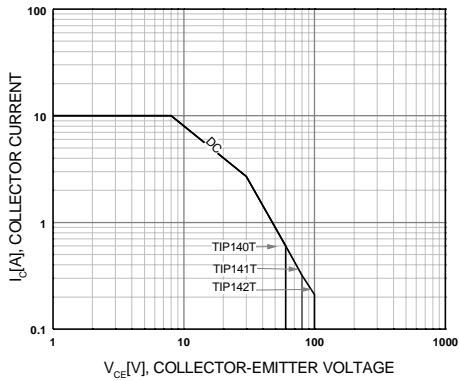


Figure 5. Safe Operating Area

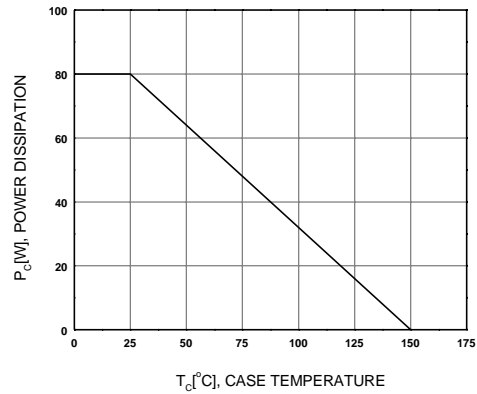
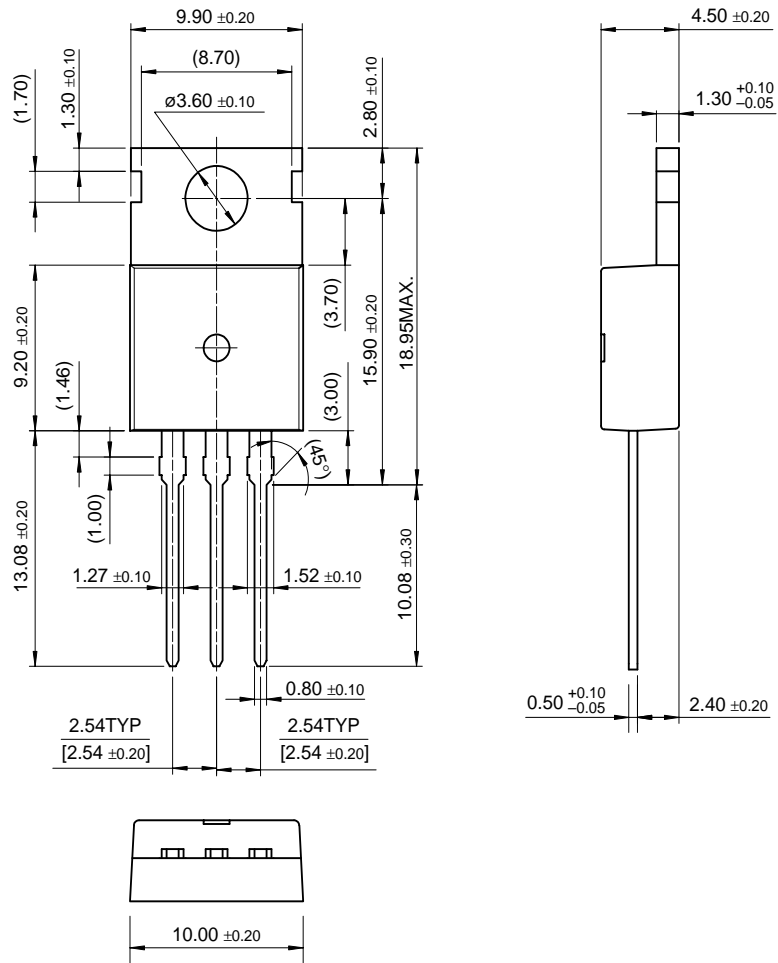


Figure 6. Power Derating

# Package Dimensions

## TO-220



Dimensions in Millimeters

TIP140T/141T/142T

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