

## Silicon NPN Darlington Power Transistors

## TIP120/121/122

## DESCRIPTION

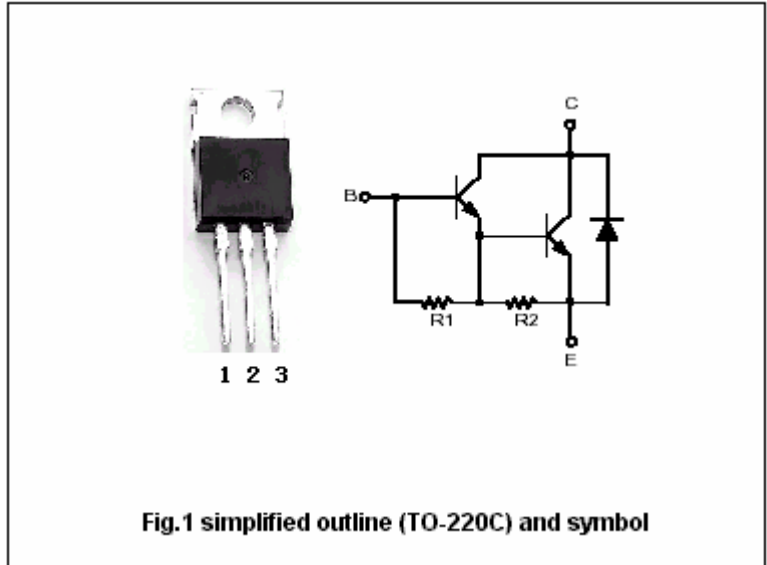
- With TO-220C package
- DARLINGTON
- High DC current gain
- Low collector saturation voltage
- Complement to type TIP125/126/127

## APPLICATIONS

- Designed for general-purpose amplifier and low-speed switching applications.

## PINNING

PIN	DESCRIPTION
1	Base
2	Collector;connected to mounting base
3	Emitter

ABSOLUTE MAXIMUM RATINGS ( $T_c=25^\circ\text{C}$ )

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$V_{CBO}$	Collector-base voltage	TIP120	60	V
		TIP121	80	
		TIP122	100	
$V_{CEO}$	Collector-emitter voltage	TIP120	60	V
		TIP121	80	
		TIP122	100	
$V_{EBO}$	Emitter-base voltage	Open collector	5	V
$I_C$	Collector current-DC		5	A
$I_{CM}$	Collector current-Pulse		8	A
$I_B$	Base current-DC		120	mA
$P_C$	Collector power dissipation	$T_c=25^\circ\text{C}$	65	W
		$T_a=25^\circ\text{C}$	2	
$T_j$	Junction temperature		150	$^\circ\text{C}$
$T_{stg}$	Storage temperature		-65~150	$^\circ\text{C}$

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## CHARACTERISTICS

T<sub>j</sub>=25 °C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP.	MAX	UNIT	
V <sub>CE(SUS)</sub>	Collector-emitter sustaining voltage	TIP120	I <sub>C</sub> =0.1A, I <sub>B</sub> =0	60			V
		TIP121		80			
		TIP122		100			
V <sub>CE(sat)-1</sub>	Collector-emitter saturation voltage	I <sub>C</sub> =3A, I <sub>B</sub> =12mA			2.0	V	
V <sub>CE(sat)-2</sub>	Collector-emitter saturation voltage	I <sub>C</sub> =5A, I <sub>B</sub> =20mA			4.0	V	
V <sub>BE</sub>	Base-emitter on voltage	I <sub>C</sub> =3.0A; V <sub>CE</sub> =3V			2.5	V	
I <sub>CBO</sub>	Collector cut-off current	TIP120	V <sub>CB</sub> =60V, I <sub>E</sub> =0			0.2	mA
		TIP121		V <sub>CB</sub> =80V, I <sub>E</sub> =0			
		TIP122		V <sub>CB</sub> =100V, I <sub>E</sub> =0			
I <sub>CEO</sub>	Collector cut-off current	TIP120	V <sub>CE</sub> =30V, I <sub>B</sub> =0			0.5	mA
		TIP121		V <sub>CE</sub> =40V, I <sub>B</sub> =0			
		TIP122		V <sub>CE</sub> =50V, I <sub>B</sub> =0			
I <sub>EBO</sub>	Emitter cut-off current	V <sub>EB</sub> =5V; I <sub>C</sub> =0			2	mA	
h <sub>FE-1</sub>	DC current gain	I <sub>C</sub> =0.5A; V <sub>CE</sub> =3V	1000				
h <sub>FE-2</sub>	DC current gain	I <sub>C</sub> =3.0A; V <sub>CE</sub> =3V	1000				
C <sub>ob</sub>	Output capacitance	I <sub>E</sub> =0; V <sub>CB</sub> =10V, f=0.1MHz			200	pF	

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PACKAGE OUTLINE

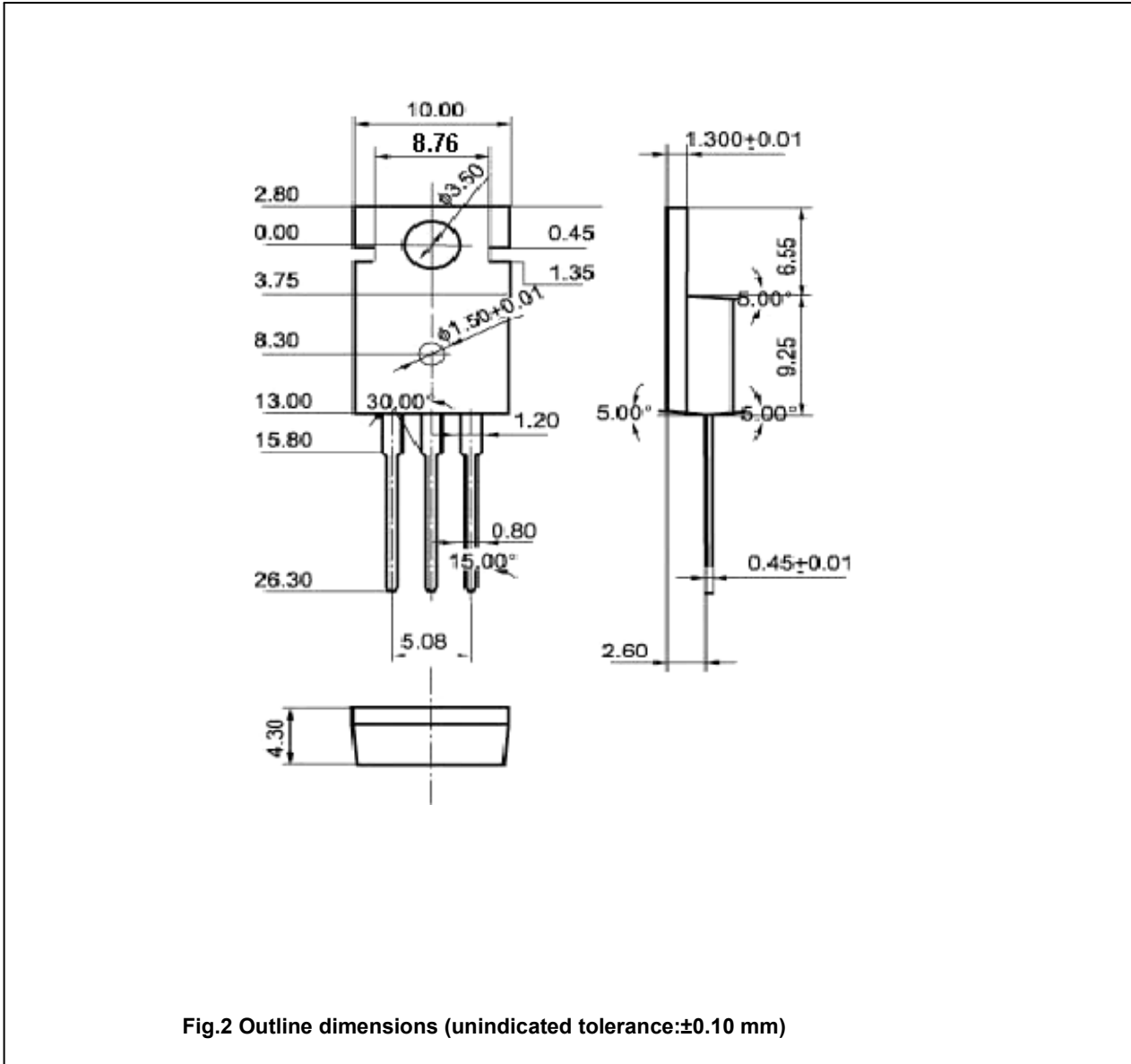


Fig.2 Outline dimensions (unindicated tolerance:  $\pm 0.10$  mm)

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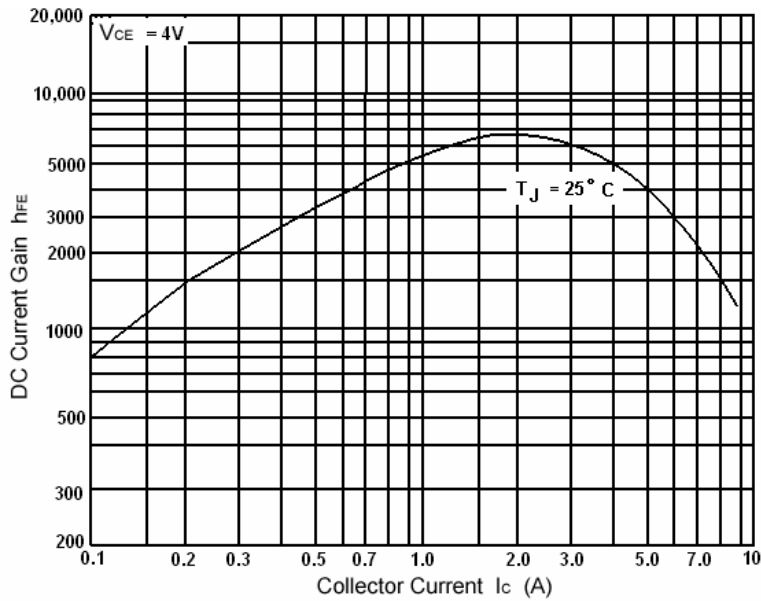


Fig.3 DC current Gain

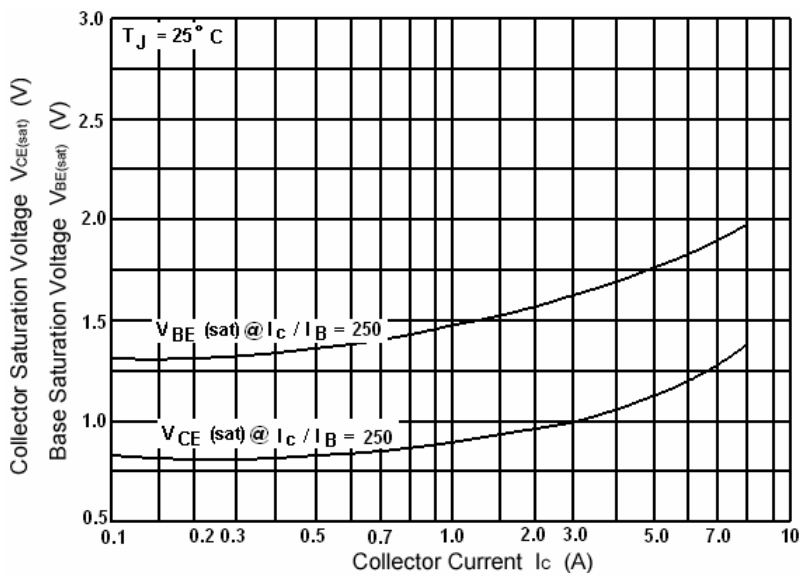


Fig.4 Base-Emitter Saturation Voltage  
Collector-Emitter Saturation Voltage

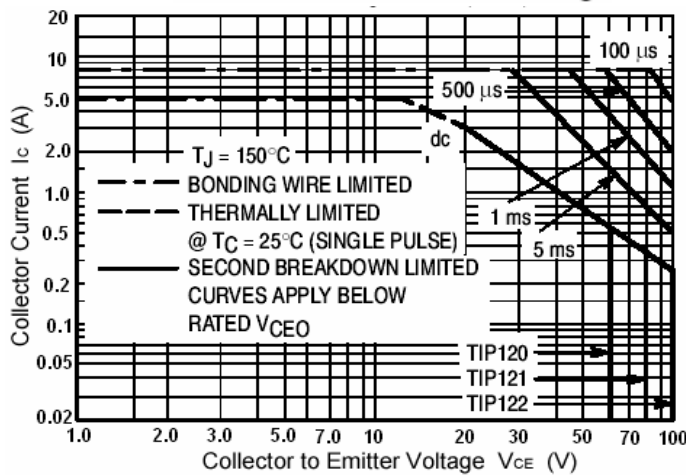


Fig.5 Safe Operating Area