

**NPN EPITAXIAL SILICON  
DARLINGTON TRANSISTOR**

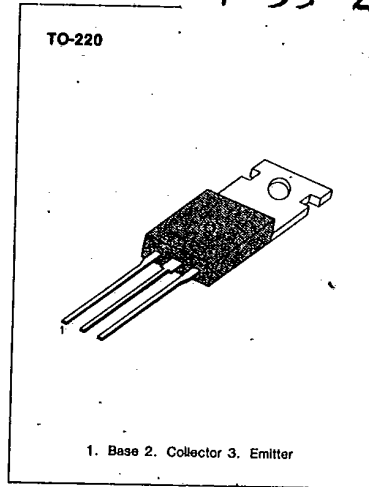
**TIP120**

**MEDIUM POWER LINEAR  
SWITCHING APPLICATIONS**

• Complement to TIP125

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

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	$V_{CB0}$	60	V
Collector-Emitter Voltage	$V_{CEO}$	60	V
Emitter-Base Voltage	$V_{EBO}$	5	V
Collector Current (DC)	$I_C$	5	A
Collector Current (Pulse)	$I_C$	8	A
Base Current	$I_B$	120	mA
Collector Dissipation ( $T_c=25^\circ\text{C}$ )	$P_C$	65	W
Collector Dissipation ( $T_a=25^\circ\text{C}$ )	$P_C$	2	W
Junction Temperature	$T_J$	150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-65~150	$^\circ\text{C}$

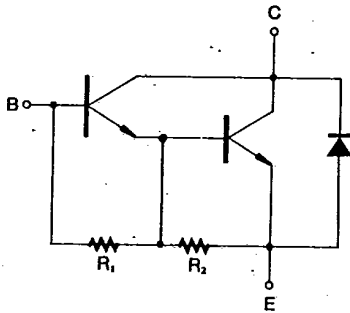


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**ELECTRICAL CHARACTERISTICS ( $T_c=25^\circ\text{C}$ )**

Characteristic	Symbol	Test Condition	Min	Max	Unit
*Collector Emitter Sustaining Voltage	$BV_{CEO} (sus)$	$I_C=100\text{mA}, I_B=0$	60		V
Collector Cutoff Current	$I_{CEO}$	$V_{CE}=30\text{V}, I_B=0$		0.5	mA
Collector Cutoff Current	$I_{CBO}$	$V_{CB}=60\text{V}, I_E=0$		0.2	mA
Emitter Cutoff Current	$I_{EBO}$	$V_{EB}=5\text{V}, I_C=0$		2.0	mA
*DC Current Gain	$h_{FE}$	$V_{CE}=3\text{V}, I_C=0.5\text{A}$ $V_{CE}=3\text{V}, I_C=3\text{A}$	1000 1000		
*Collector-Emitter Saturation Voltage	$V_{CE} (sat)$	$I_C=3\text{A}, I_B=12\text{mA}$ $I_C=5\text{A}, I_B=20\text{mA}$		2.0 4.0	V
*Base-Emitter On Voltage	$V_{BE} (on)$	$V_{CE}=3\text{V}, I_C=3\text{A}$		2.5	V
Output Capacitance	$C_{ob}$	$V_{CB}=10\text{V}, I_E=0, f=0.1\text{MHz}$		200	pF

\*Pulse Test:  $PW \leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$

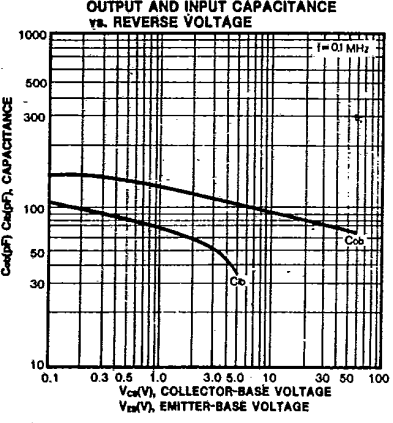
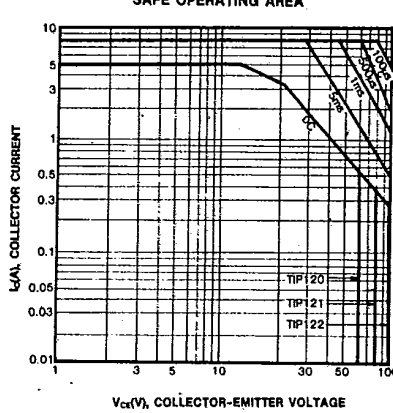
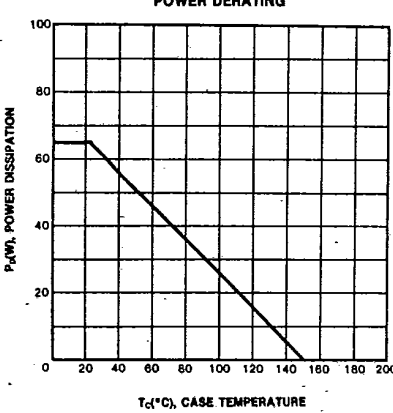
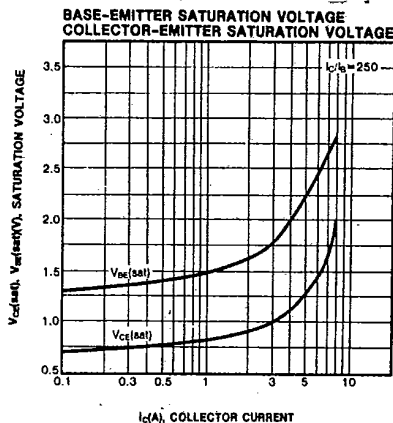
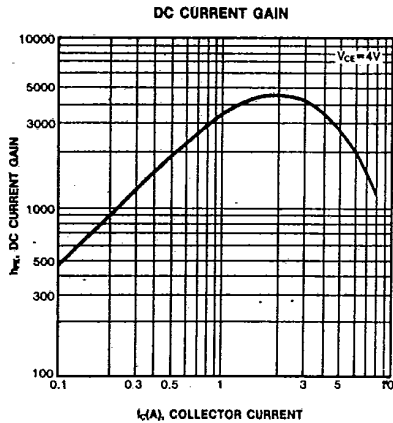


$R_1 \approx 8\text{k}\Omega$   
 $R_2 \approx 120\Omega$

**NPN EPITAXIAL SILICON  
DARLINGTON TRANSISTOR**

**TIP120**

T-33-29



**NPN EPITAXIAL SILICON  
DARLINGTON TRANSISTOR**

**TIP121**

T-33-29

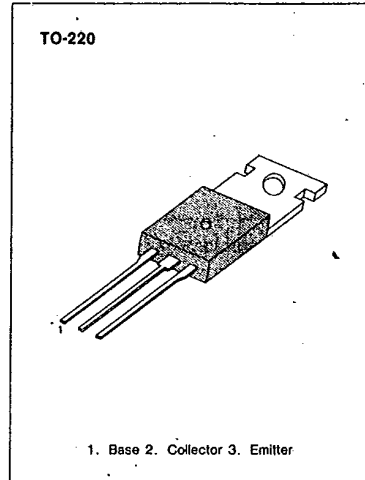
**MEDIUM POWER LINEAR  
SWITCHING APPLICATIONS**

- Complement to TIP126

**ABSOLUTE MAXIMUM RATINGS (T<sub>a</sub> = 25°C)**

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V <sub>CB0</sub>	80	V
Collector-Emitter Voltage	V <sub>CEO</sub>	80	V
Emitter-Base Voltage	V <sub>EB0</sub>	5	V
Base Current	I <sub>B</sub>	120	mA
Collector Current (DC)	I <sub>C</sub>	5	A
Collector Current (Pulse)	I <sub>C</sub>	8	A
Collector Dissipation (T <sub>a</sub> = 25°C)	P <sub>C</sub>	2	W
Collector Dissipation (T <sub>C</sub> = 25°C)	P <sub>C</sub>	65	W
Junction Temperature	T <sub>J</sub>	150	°C
Storage Temperature	T <sub>stg</sub>	-65~150	°C

\* Refer to TIP120 for graphs

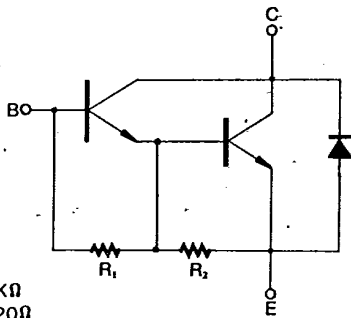


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**ELECTRICAL CHARACTERISTICS (T<sub>C</sub> = 25°C)**

Characteristic	Symbol	Test Condition	Min	Max	Unit
*Collector-Emitter Sustaining Voltage	BV <sub>CEO</sub> (sus)	I <sub>C</sub> = 100mA, I <sub>B</sub> = 0	80		V
Collector Cutoff Current	I <sub>CB0</sub>	V <sub>CB</sub> = 80V, I <sub>E</sub> = 0		0.2	mA
Collector Cutoff Current	I <sub>CEO</sub>	V <sub>CE</sub> = 40V, I <sub>B</sub> = 0		0.5	mA
Emitter Cutoff Current	I <sub>EB0</sub>	V <sub>EB</sub> = 5V, I <sub>C</sub> = 0		2	mA
*DC Current Gain	h <sub>FE</sub>	V <sub>CE</sub> = 3V, I <sub>C</sub> = 0.5A	1000		
		V <sub>CE</sub> = 3V, I <sub>C</sub> = 3A	1000		
*Collector Emitter Saturation Voltage	V <sub>CE(sat)</sub>	I <sub>C</sub> = 3A, I <sub>B</sub> = 12mA		2	V
		I <sub>C</sub> = 5A, I <sub>B</sub> = 20mA		4	V
*Base-Emitter On Voltage	V <sub>BE(on)</sub>	V <sub>CE</sub> = 3V, I <sub>C</sub> = 3A		2.5	V
Collector Output Capacitance	C <sub>ob</sub>	V <sub>CB</sub> = 10V, I <sub>C</sub> = 0, f = 0.1MHz		200	pF

\* Pulse Test: PW ≤ 300μs, Duty Cycle ≤ 2%



R<sub>1</sub> = 8KΩ  
R<sub>2</sub> = 120Ω

# NPN EPITAXIAL SILICON DARLINGTON TRANSISTOR

## TIP122

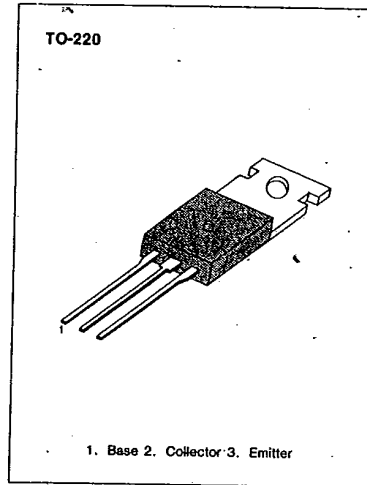
T-33-29

### MEDIUM POWER LINEAR SWITCHING APPLICATIONS

- Complement to TIP127

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

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	$V_{CB0}$	100	V
Collector-Emitter Voltage	$V_{CE0}$	100	V
Emitter-Base Voltage	$V_{EB0}$	5	V
Base Current	$I_b$	120	mA
Collector Current (DC)	$I_c$	5	A
Collector Current (Pulse)	$I_c$	8	A
Collector Dissipation ( $T_a=25^\circ\text{C}$ )	$P_c$	2	W
Collector Dissipation ( $T_C=25^\circ\text{C}$ )	$P_c$	65	W
Junction Temperature	$T_j$	150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-65~150	$^\circ\text{C}$

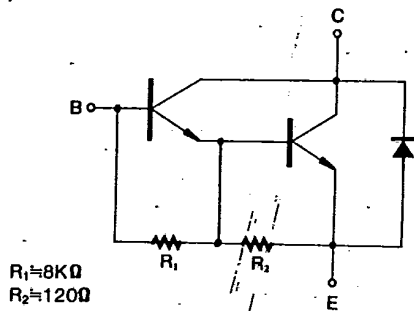


- Refer to TIP120 for graphs

### ELECTRICAL CHARACTERISTICS ( $T_C=25^\circ\text{C}$ )

Characteristic	Symbol	Test Condition	Min	Max	Unit
*Collector-Emitter Sustaining Voltage	$BV_{CE0}$ (sus)	$I_c=100\text{mA}, I_b=0$	100		V
Collector Cutoff Current	$I_{CB0}$	$V_{CB}=100\text{V}, I_E=0$		0.2	mA
Collector Cutoff Current	$I_{CE0}$	$V_{CE}=50\text{V}, I_b=0$		0.5	mA
Emitter Cutoff Current	$I_{EB0}$	$V_{EB}=5\text{V}, I_c=0$		2	mA
*DC Current Gain	$h_{FE}$	$V_{CE}=3\text{V}, I_c=0.5\text{A}$	1000		
		$V_{CE}=3\text{V}, I_c=3\text{A}$	1000		
*Collector Emitter Saturation Voltage	$V_{CE}(\text{sat})$	$I_c=3\text{A}, I_b=12\text{mA}$		2	V
		$I_c=5\text{A}, I_b=20\text{mA}$		4	V
*Base-Emitter On Voltage	$V_{BE(\text{on})}$	$V_{CE}=3\text{V}, I_c=3\text{A}$		2.5	V
Collector Output Capacitance	$C_{ob}$	$V_{CB}=10\text{V}, I_E=0, f=0.1\text{MHz}$		200	pF

- Pulse test :  $PW \leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$



**PNP EPITAXIAL SILICON  
DARLINGTON TRANSISTOR**

**TIP125**

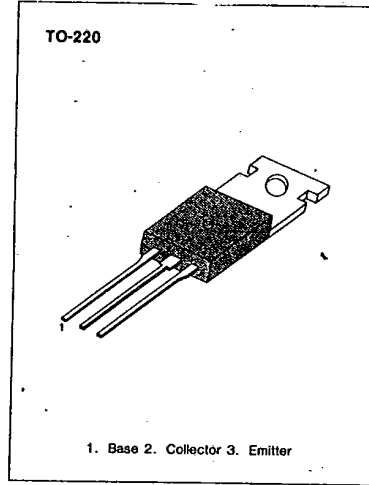
T-33-31

**MEDIUM POWER LINEAR  
SWITCHING APPLICATIONS**

- Complement to TIP120

**ABSOLUTE MAXIMUM RATINGS (T<sub>a</sub>=25°C)**

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V <sub>CB0</sub>	-60	V
Collector-Emitter Voltage	V <sub>CE0</sub>	-60	V
Emitter-Base Voltage	V <sub>EB0</sub>	-5	V
Base Current	I <sub>B</sub>	-120	mA
Collector Current (DC)	I <sub>C</sub>	-5	A
Collector Current (Pulse)	I <sub>C</sub>	-8	A
Collector Dissipation (T <sub>a</sub> =25°C)	P <sub>C</sub>	2	W
Collector Dissipation (T <sub>c</sub> =25°C)	P <sub>C</sub>	65	W
Junction Temperature	T <sub>J</sub>	150	°C
Storage Temperature	T <sub>stg</sub>	-65~150	°C

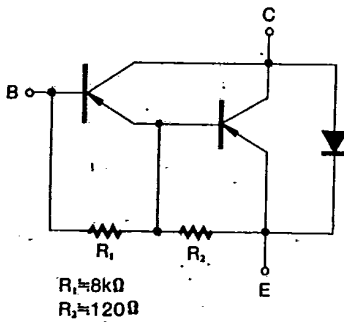


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**ELECTRICAL CHARACTERISTICS (T<sub>C</sub>=25°C)**

Characteristic	Symbol	Test Condition	Min	Max	Unit
* Collector-Emitter Sustaining Voltage	BV <sub>CEO</sub> (sus)	I <sub>C</sub> =-100mA, I <sub>B</sub> =0	-60		V
Collector Cutoff Current	I <sub>CB0</sub>	V <sub>CB</sub> =-60V, I <sub>E</sub> =0		-0.2	mA
Collector Cutoff Current	I <sub>CE0</sub>	V <sub>CE</sub> =-30V, I <sub>B</sub> =0		-0.5	mA
Emitter Cutoff Current	I <sub>EB0</sub>	V <sub>BE</sub> =-5V, I <sub>C</sub> =0		-2	mA
* DC Current Gain	h <sub>FE</sub>	V <sub>CE</sub> =-3V, I <sub>C</sub> =-0.5A	1000		
		V <sub>CE</sub> =-3V, I <sub>C</sub> =-3A	1000		
* Collector-Emitter Saturation Voltage	V <sub>CE</sub> (sat)	I <sub>C</sub> =-3A, I <sub>B</sub> =-12mA		-2	V
		I <sub>C</sub> =-5A, I <sub>B</sub> =-20mA		-4	V
* Base-Emitter On Voltage	V <sub>BE</sub> (on)	V <sub>CE</sub> =-3V, I <sub>C</sub> =-3A		-2.5	V
Output Capacitance	C <sub>ob</sub>	V <sub>CB</sub> =-10V, I <sub>E</sub> =0, f=0.1MHz		300	pF

\* Pulse Test: PW≤300μs, Duty Cycle≤2%



**PNP EPITAXIAL SILICON  
DARLINGTON TRANSISTOR**

**TIP125**

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