

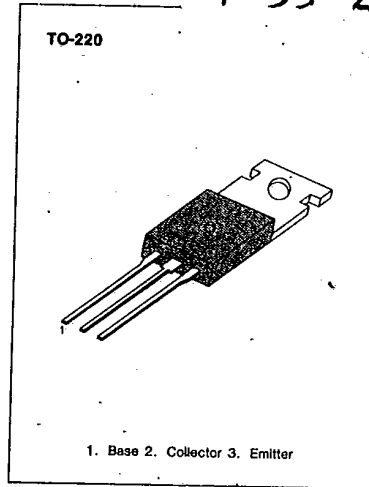
**NPN EPITAXIAL SILICON  
DARLINGTON TRANSISTOR**

**TIP120**

**MEDIUM POWER LINEAR  
SWITCHING APPLICATIONS**  
• Complement to TIP125

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

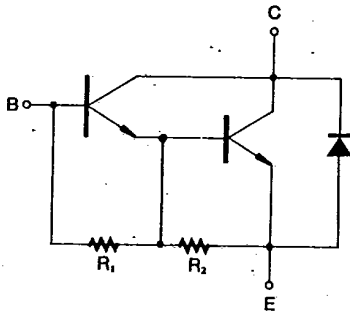


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**ELECTRICAL CHARACTERISTICS (T<sub>c</sub> = 25°C)**

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>CEO</sub>	V <sub>CE</sub> = 30V, I <sub>B</sub> = 0		0.5	mA
Collector Cutoff Current	I <sub>CBO</sub>	V <sub>CB</sub> = 60V, I <sub>E</sub> = 0		0.2	mA
Emitter Cutoff Current	I <sub>EBO</sub>	V <sub>EB</sub> = 5V, I <sub>C</sub> = 0		2.0	mA
*DC Current Gain	h <sub>FE</sub>	V <sub>CE</sub> = 3V, I <sub>C</sub> = 0.5A V <sub>CE</sub> = 3V, I <sub>C</sub> = 3A	1000 1000		
*Collector-Emitter Saturation Voltage	V <sub>CE</sub> (sat)	I <sub>C</sub> = 3A, I <sub>B</sub> = 12mA I <sub>C</sub> = 5A, I <sub>B</sub> = 20mA		2.0 4.0	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		200	pF

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

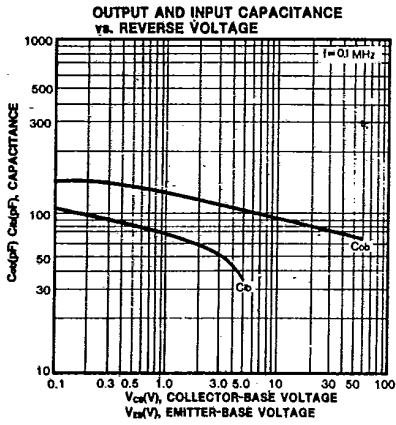
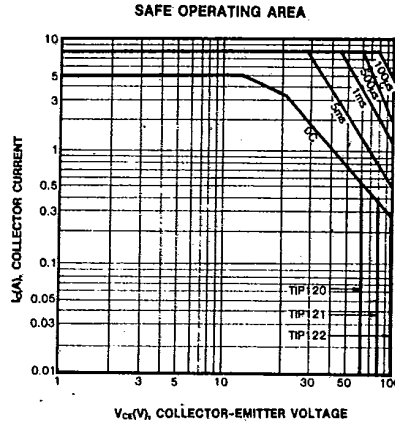
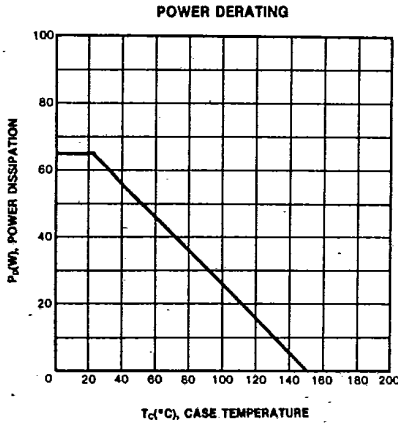
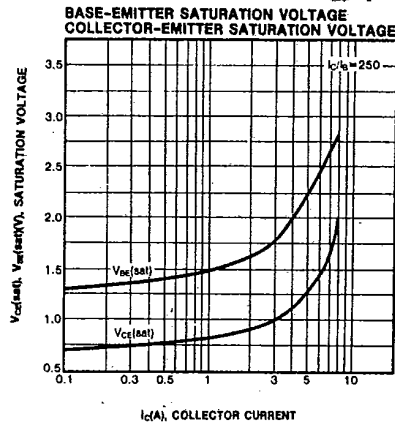
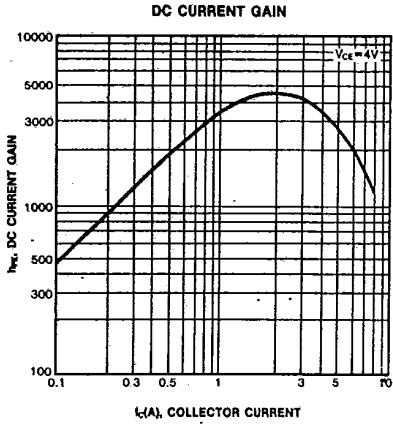


R<sub>1</sub> ≈ 8kΩ  
R<sub>2</sub> ≈ 120Ω

**NPN EPITAXIAL SILICON  
DARLINGTON TRANSISTOR**

**TIP120**

T-33-29



**NPN EPITAXIAL SILICON  
DARLINGTON TRANSISTOR**

**TIP121**

T-33-29

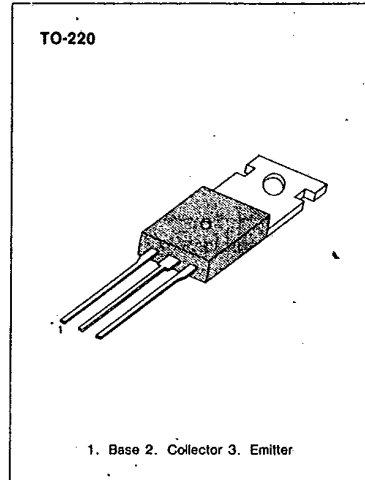
**MEDIUM POWER LINEAR  
SWITCHING APPLICATIONS**

- 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

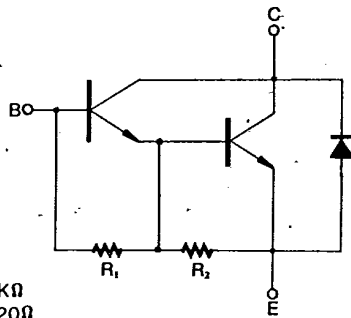


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**ELECTRICAL CHARACTERISTICS (T<sub>C</sub> = 25°C)**

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

**TIP122**

**NPN EPITAXIAL SILICON  
DARLINGTON TRANSISTOR**

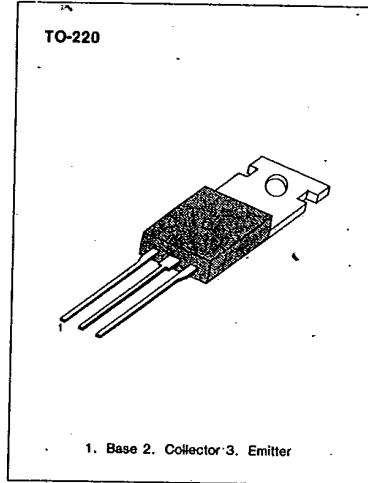
T-33-29

**MEDIUM POWER LINEAR  
SWITCHING APPLICATIONS**

• Complement to TIP127

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

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V <sub>CB0</sub>	100	V
Collector-Emitter Voltage	V <sub>CE0</sub>	100	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

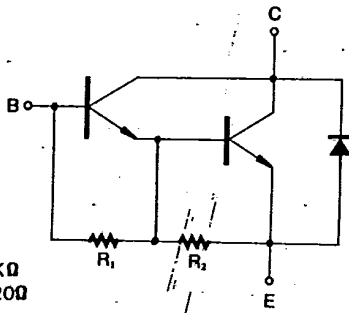


• Refer to TIP120 for graphs

**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	100		V
Collector Cutoff Current	I <sub>CB0</sub>	V <sub>CB</sub> =100V, I <sub>E</sub> =0		0.2	mA
Collector Cutoff Current	I <sub>CEO</sub>	V <sub>CE</sub> =50V, 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</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(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>E</sub> =0, f=0.1MHz		200	pF

\* Pulse test : PW ≤ 300μs, duty cycle ≤ 2%



**PNP EPITAXIAL SILICON  
DARLINGTON TRANSISTOR**

**TIP125**

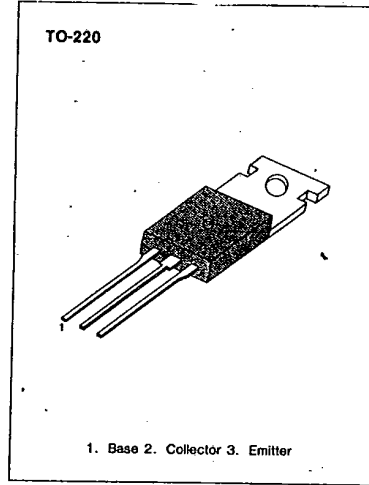
T-33-31

**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

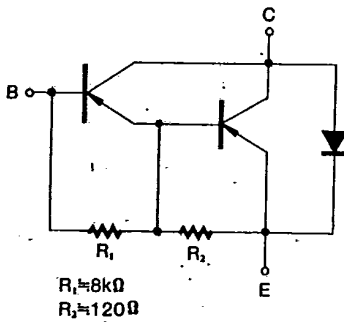


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**ELECTRICAL CHARACTERISTICS (T<sub>C</sub>=25°C)**

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**

T-33-31

