

NPN EPITAXIAL SILICON DARLINGTON TRANSISTOR

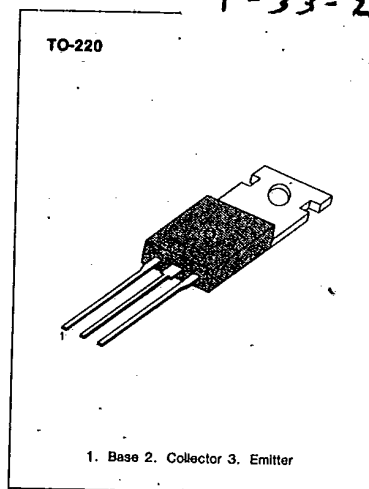
TIP120

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_{CE0}	60	V
Emitter-Base Voltage	V_{EB0}	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	$^\circ\text{C}$

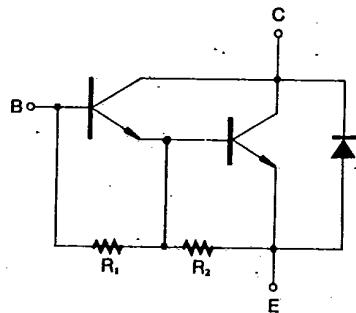


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ELECTRICAL CHARACTERISTICS ($T_c=25^\circ\text{C}$)

Characteristic	Symbol	Test Condition	Min	Max	Unit
*Collector Emitter Sustaining Voltage	$BV_{CE0} \text{ (sus)}$	$I_C=100\text{mA}, I_B=0$	60		V
Collector Cutoff Current	I_{CE0}	$V_{CE}=30\text{V}, I_B=0$		0.5	mA
Collector Cutoff Current	I_{CB0}	$V_{CB}=60\text{V}, I_E=0$		0.2	mA
Emitter Cutoff Current	I_{EB0}	$V_{EB}=5\text{V}, I_C=0$		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	$V_{CE} \text{ (sat)}$	$I_C=3\text{A}, I_B=12\text{mA}$ $I_C=5\text{A}, I_B=20\text{mA}$		2.0 4.0	V
*Base-Emitter On Voltage	$V_{BE} \text{ (on)}$	$V_{CE}=3\text{V}, I_C=3\text{A}$		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 $\leq 2\%$

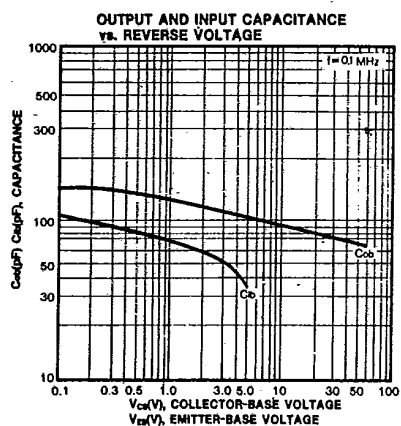
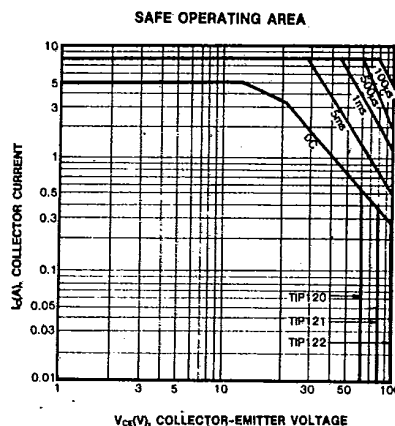
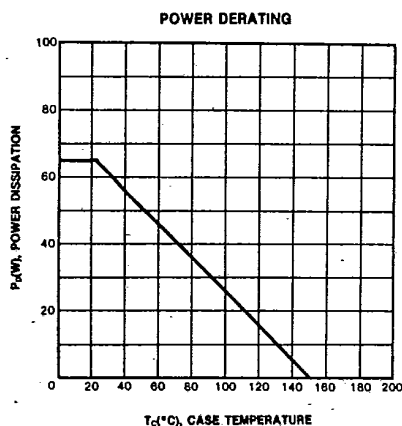
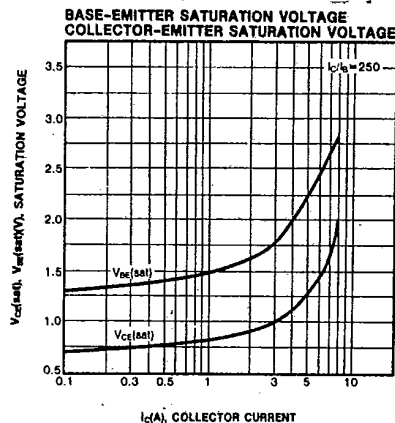
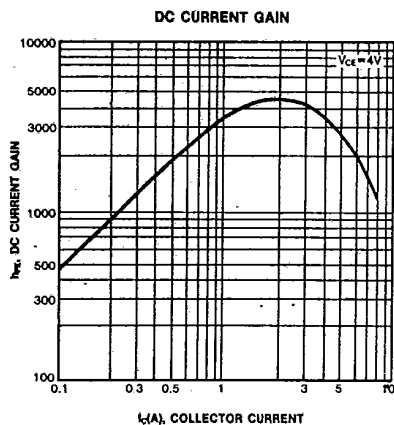


$R_1 \approx 8\text{k}\Omega$
 $R_2 \approx 120\Omega$

NPN EPITAXIAL SILICON DARLINGTON TRANSISTOR

TIP120

T-33-29



NPN EPITAXIAL SILICON DARLINGTON TRANSISTOR

TIP121

T-33-29

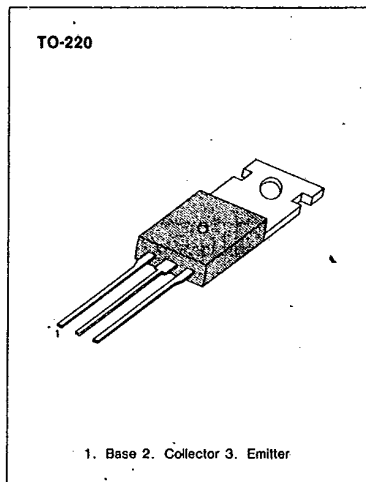
MEDIUM POWER LINEAR SWITCHING APPLICATIONS

- Complement to TIP126

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

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V_{CB0}	80	V
Collector-Emitter Voltage	V_{CE0}	80	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

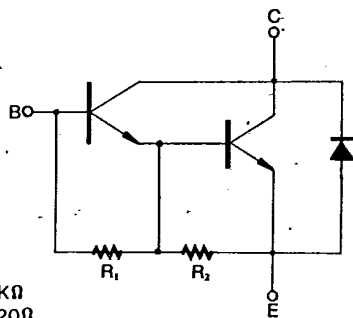


3

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

Characteristic	Symbol	Test Condition	Min	Max	Unit
*Collector-Emitter Sustaining Voltage	$BV_{CE0} \text{ (sus)}$	$I_C = 100\text{mA}, I_B = 0$	80		V
Collector Cutoff Current	I_{CBO}	$V_{CB} = 80\text{V}, I_E = 0$		0.2	mA
Collector Cutoff Current	I_{CEO}	$V_{CE} = 40\text{V}, I_B = 0$		0.5	mA
Emitter Cutoff Current	I_{EBO}	$V_{EB} = 5\text{V}, I_C = 0$		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}	$V_{CB} = 10\text{V}, I_C = 0, f = 0.1\text{MHz}$		200	pF

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



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



SAMSUNG SEMICONDUCTOR

TIP122**NPN EPITAXIAL SILICON
DARLINGTON TRANSISTOR**

T-33-29

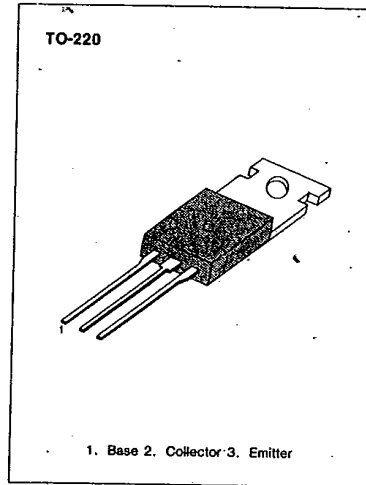
**MEDIUM POWER LINEAR
SWITCHING APPLICATIONS**

- Complement to TIP127

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

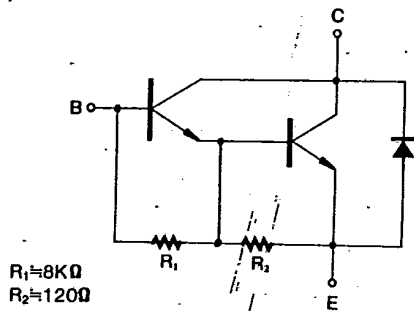
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V_{CB0}	100	V
Collector-Emitter Voltage	V_{CE0}	100	V
Emitter-Base Voltage	V_{EB0}	5	V
Base Current	I_B	120	mA
Collector Current (DC)	I_C	5	A
Collector Current (Pulse)	I_C	8	A
Collector Dissipation ($T_A=25^\circ\text{C}$)	P_C	2	W
Collector Dissipation ($T_C=25^\circ\text{C}$)	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_{C0}	$V_{CB}=100\text{V}$, $I_E=0$		0.2	mA
Collector Cutoff Current	I_{CE0}	$V_{CE}=50\text{V}$, $I_B=0$		0.5	mA
Emitter Cutoff Current	I_{E0}	$V_{EB}=5\text{V}$, $I_C=0$		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 $\leq 2\%$

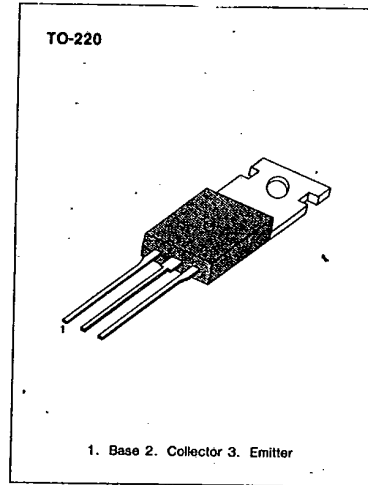


TIP125**PNP EPITAXIAL SILICON
DARLINGTON TRANSISTOR****MEDIUM POWER LINEAR
SWITCHING APPLICATIONS**

- Complement to TIP120

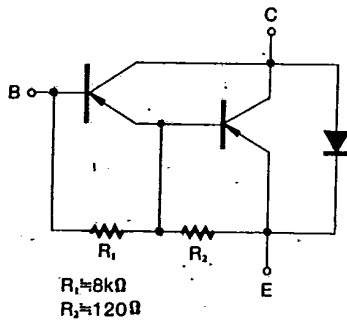
ABSOLUTE MAXIMUM RATINGS ($T_a=25^\circ\text{C}$)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V_{CB0}	-60	V
Collector-Emitter Voltage	V_{CE0}	-60	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	$^\circ\text{C}$

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

Characteristic	Symbol	Test Condition	Min	Max	Unit
* Collector-Emitter Sustaining Voltage	$BV_{CE0} \text{ (sus)}$	$I_C = -100\text{mA}, I_B = 0$	-60		V
Collector Cutoff Current	I_{CB0}	$V_{CB} = -60\text{V}, I_E = 0$		-0.2	mA
Collector Cutoff Current	I_{CE0}	$V_{CE} = -30\text{V}, I_B = 0$		-0.5	mA
Emitter Cutoff Current	I_{EB0}	$V_{BE} = -5\text{V}, I_C = 0$		-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
Output Capacitance	C_{ob}	$V_{CB} = -10\text{V}, I_E = 0, f = 0.1\text{MHz}$		300	pF

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

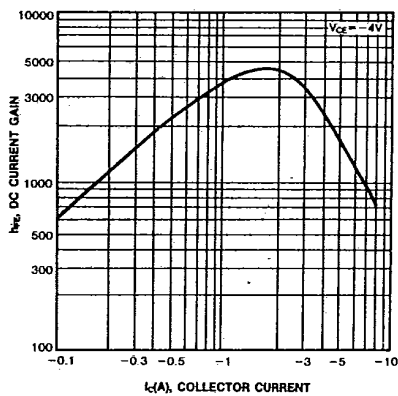
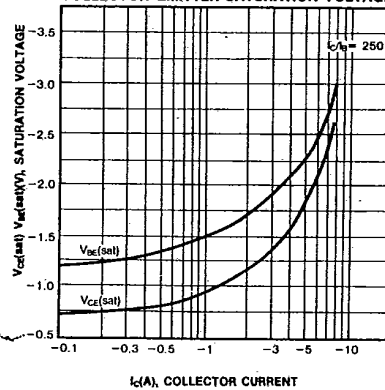


TIP125

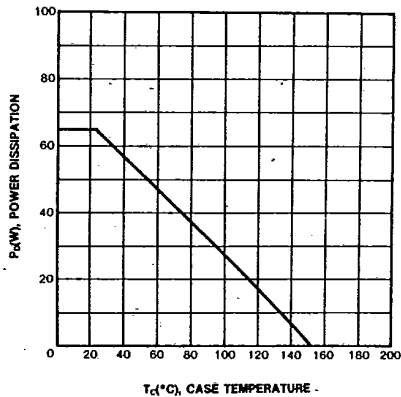
PNP EPITAXIAL SILICON
DARLINGTON TRANSISTOR

T-33.31

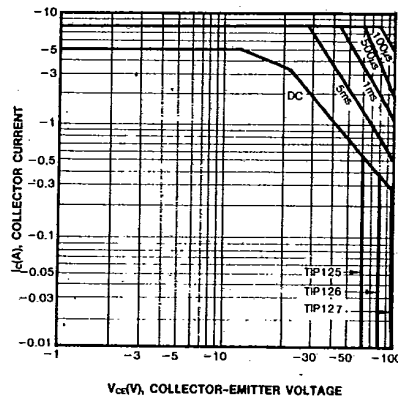
DC CURRENT GAIN

BASE-EMITTER SATURATION VOLTAGE
COLLECTOR-EMITTER SATURATION VOLTAGE

POWER DERATING



SAFE OPERATING AREA

OUTPUT AND INPUT CAPACITANCE
vs. REVERSE VOLTAGE