

8-Ampere N-P-N Darlington Power Transistors

60, 80, and 100 Volts, 65 Watts
 Gain of 1000 at 0.5 A
 Gain of 1000 at 3 A

Features:

- Operates from IC without predriver
- Low leakage at high temperature

Applications:

- Power switching
- Hammer drivers
- Series and shunt regulators
- Audio amplifiers

The TIP120, TIP121 and TIP122 are monolithic n-p-n silicon Darlington transistors designed for low- and medium-frequency power applications. The construction of these devices provides good forward second-breakdown capability; their high gain makes it possible for them to be driven directly from integrated circuits.

These devices are supplied in the JEDEC TO-220AB (VER-SAWATT) plastic package.

The TIP120, TIP121 and TIP122 are n-p-n complements of the TIP125, TIP126 and TIP127 described in data bulletin File 997.

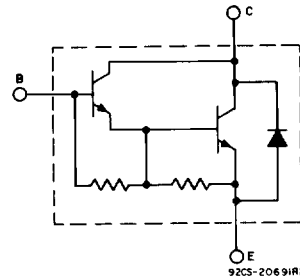
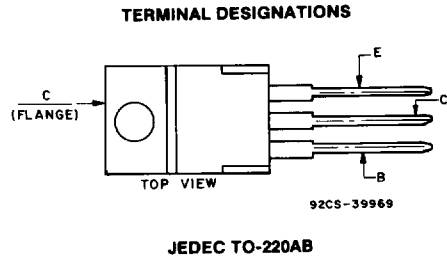


Fig. 1 - Schematic diagram for all types.

MAXIMUM RATINGS, Absolute-Maximum Values:

	TIP120	TIP121	TIP122	
V_{CBO}	60	80	100	V
$V_{CER(SUS)}$ $R_{RE} = 100 \Omega$	60	80	100	V
$V_{CEO(SUS)}$	60	80	100	V
$V_{CEV(SUS)}$ $V_{BE} = -1.5 V$	60	80	100	V
V_{EBO}	5	5	5	V
I_C	8	8	8	A
I_{CM}	10	10	10	A
I_B	0.25	0.25	0.25	A
P_T	65	65	65	W
T_C up to 25°C	Derate linearly at 0.52			W/°C
T_C above 25°C				°C
T_{stg} T_J	-65 to 150			°C
T_L At distances $\geq 1/8$ in. (3.17 mm) from case for 10 s max.	235			°C

TIP120, TIP121, TIP122

ELECTRICAL CHARACTERISTICS, At Case Temperature (T_C) = 25°C

CHARACTERISTIC	TEST CONDITIONS				LIMITS						UNITS
	Voltage V dc		Current A dc		TIP120		TIP121		TIP122		
	V_{CE}	V_{BE}	I_C	I_B	Min.	Max.	Min.	Max.	Min.	Max.	
I_{CBO} $I_E=0$	60				—	0.2	—	—	—	—	mA
	80				—	—	—	0.2	—	—	
	100				—	—	—	—	—	0.2	
I_{CEO}	30			0	—	0.5	—	—	—	—	mA
	40			0	—	—	—	0.5	—	—	
	50			0	—	—	—	—	—	0.5	
I_{EBO}		-5	0		—	2	—	2	—	2	mA
$V_{CEO}(sus)$			0.2 ^a	0	60	—	80	—	100	—	V
h_{FE}	3		3 ^a		1000	—	1000	—	1000	—	
	3		0.5 ^a		1000	—	1000	—	1000	—	
V_{BE}	3		3 ^a		—	2.5	—	2.5	—	2.5	V
$V_{CE}(sat)$			3 ^a	0.012	—	2	—	2	—	2	V
			5 ^a	0.02	—	3	—	3	—	3	
h_{fe} f=1 kHz	5		1		1000	—	1000	—	1000	—	
$ h_{fe} $ f=1 MHz	5		1		20	—	20	—	20	—	
C_{obo} $V_{CB}=10$ V f=1 MHz					—	200	—	200	—	200	pF
$I_{S/b}$ t=0.5 s non- rep. pulse	25				2.6	—	2.6	—	2.6	—	A
$R_{\theta JC}$					—	1.92	—	1.92	—	1.92	°C/W

^a Pulsed, pulse duration = 300 μ s, duty factor \leq 2%.

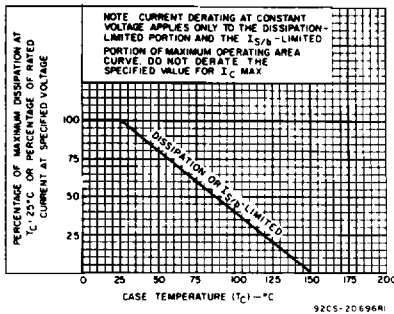


Fig. 2 — Derating curve for all types.

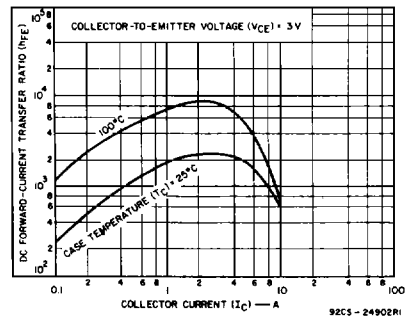


Fig. 3 — Typical dc beta characteristics for all types.

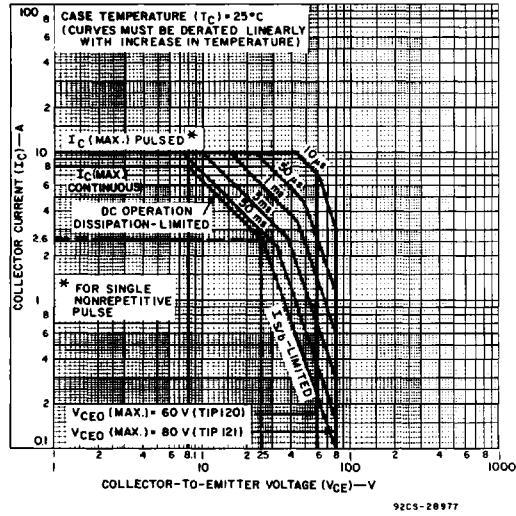


Fig. 4 — Maximum operating areas for TIP120 and TIP121.

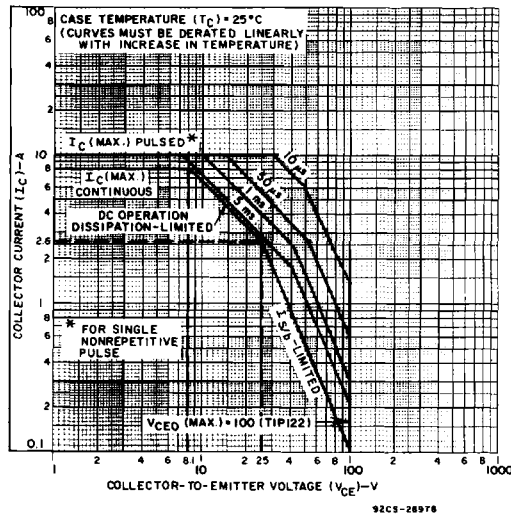


Fig. 5 — Maximum operating areas for TIP122.

TIP120, TIP121, TIP122

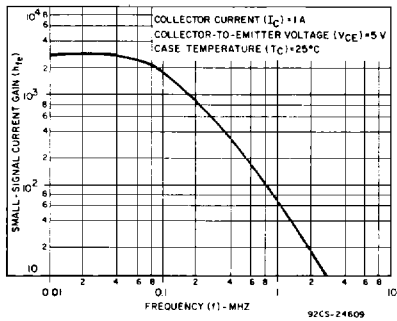


Fig. 6 — Typical small-signal current gain for all types.

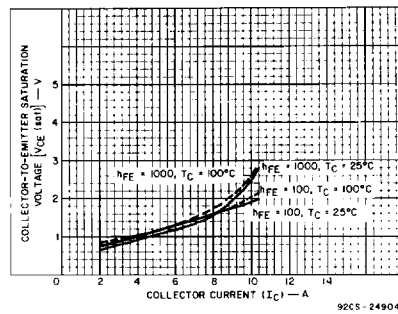


Fig. 7 — Typical saturation characteristics for all types.

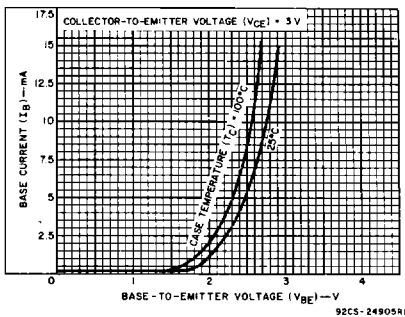


Fig. 8 — Typical input characteristics for all types.

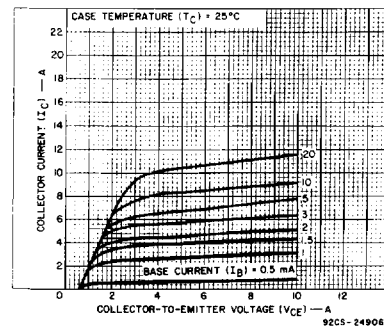


Fig. 9 — Typical output characteristics for all types.

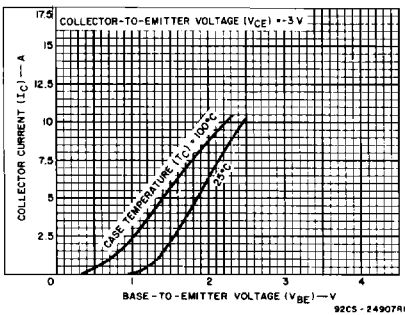


Fig. 10 — Typical transfer characteristics for all types.

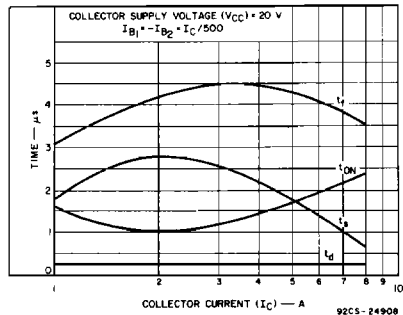


Fig. 11 — Typical saturated switching characteristics for all types.