

TIP120, TIP121, TIP122

File Number 998

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 RCA-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 (VERSAWATT) plastic package.

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

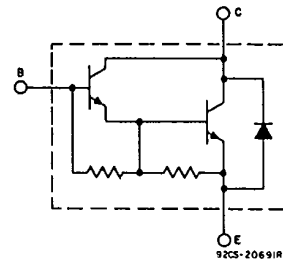
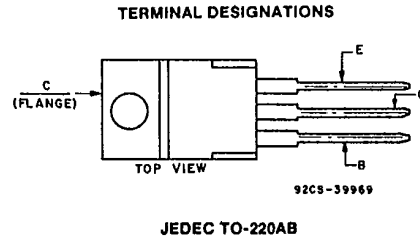


Fig. 1 - Schematic diagram for all types.

MAXIMUM RATINGS, Absolute-Maximum Values:

	TIP120	TIP121	TIP122	
V_{CB0}	60	80	100	V
$V_{CER(SUS)}$ $R_{FE} = 100 \Omega$	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 T_C up to 25°C	65	65	65	W
T_C above 25°C	Derate linearly at 0.52			W/°C
$T_{STP} T_J$	-65 to 150			°C
T_L At distances $\geq 1/8$ in. (3.17 mm) from case for 10 s max.	235		1	°C

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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 80 100				-	0.2	-	0.2	-	0.2	mA
I _{CEO}	30 40 50			0 0 0	-	0.5	-	0.5	-	0.5	
I _{EBO}		-5	0		-	2	-	2	-	2	
V _{CEO(sus)}			0.2 ^a	0	60	-	80	-	100	-	V
h _{FE}	3 3		3 ^a 0.5 ^a		1000 1000	-	1000 1000	-	1000 1000	-	
V _{BE}	3		3 ^a		-	2.5	-	2.5	-	2.5	V
V _{CE(sat)}			3 ^a 5 ^a	0.012 0.02	-	2 3	-	2 3	-	2 3	V
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 _{θJC}					-	1.92	-	1.92	-	1.92	°C/W

^a Pulsed, pulse duration = 300 μs, duty factor ≤ 2%.

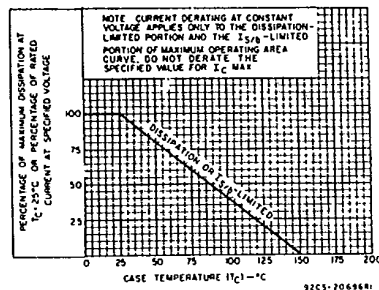


Fig. 2 — Derating curve for all types.

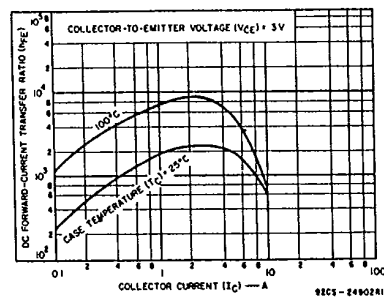


Fig. 3 — Typical dc beta characteristics for all types.

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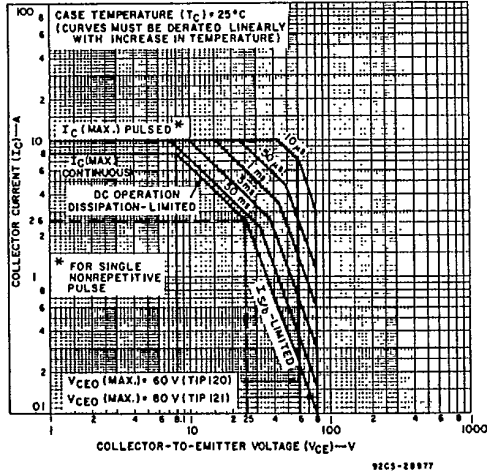


Fig. 4 - Maximum operating areas for TIP120 and TIP121.

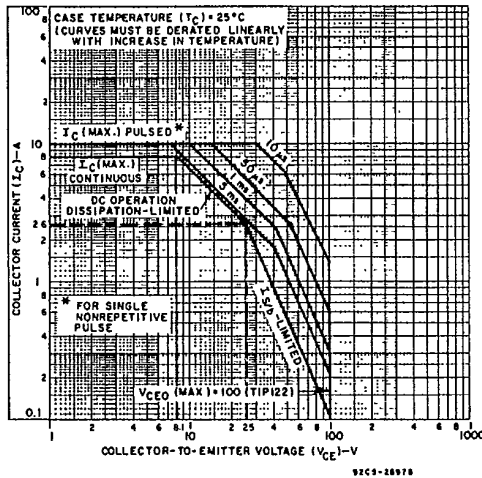


Fig. 5 - Maximum operating areas for TIP122.

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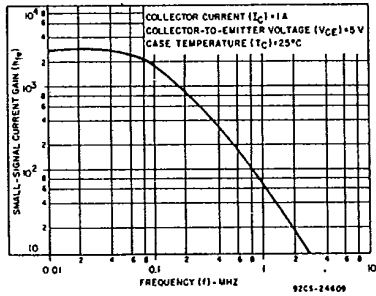


Fig. 6 — Typical small-signal current gain for all types.

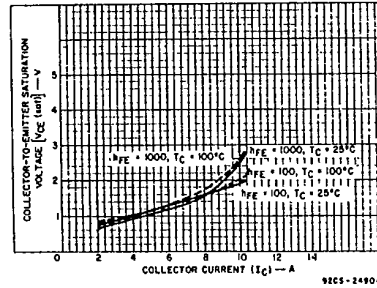


Fig. 7 — Typical saturation characteristics for all types.

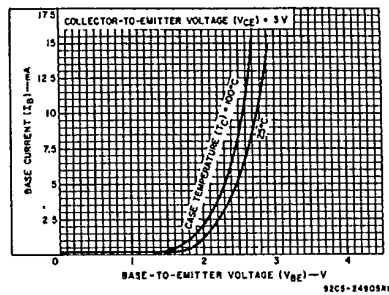


Fig. 8 — Typical input characteristics for all types.

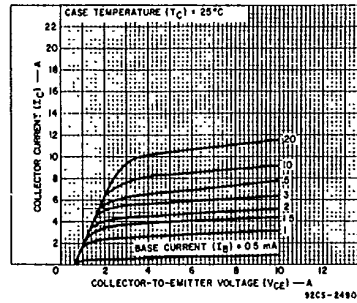


Fig. 9 — Typical output characteristics for all types.

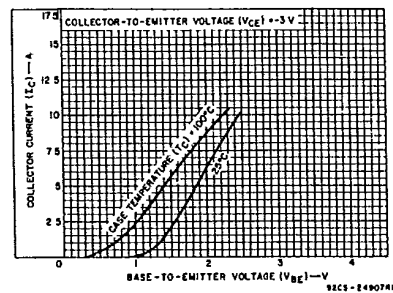


Fig. 10 — Typical transfer characteristics for all types.

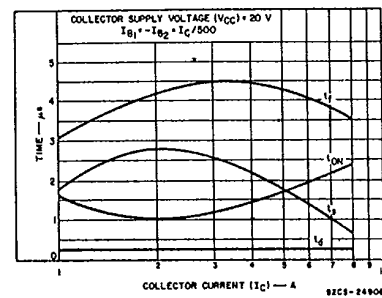


Fig. 11 — Typical saturated switching characteristics for all types.