TIP115, TIP116, TIP117

File Number **1387**

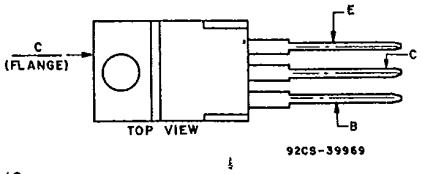
2-Ampere P-N-P Darlington Power Transistors

For Low and Medium Frequency Power Switching, Hammer Driver, Audio Amplifier, and Series and Shunt Regulator Applications

Features:

- *Operates from IC without predriver*
- *Gain of 1000 at 1A*
- *Low leakage at high temperatures*
- *Designed for completementary use with TIP110, TIP111 and TIP112*
- *Hard glass passivation*
- *Wire-bonded construction*

TERMINAL DESIGNATIONS



JEDEC TO-220AB

The RCA-TIP115, TIP116, and TIP117 series are monolithic p-n-p silicon Darlington transistors designed for low and medium frequency power applications. The construction of these devices provides good foward-bias 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.

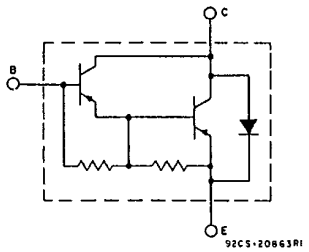


Fig. 1 - Schematic diagram for all types.

MAXIMUM RATINGS, *Absolute Maximum Values:*

	TIP115	TIP116	TIP117	UNITS
V_{CBO}	60	80	100	V
$V_{CEO(SUS)}$	60	80	100	V
V_{EBO}		5		V
I_C		2		A
I_{CM}		4		A
I_B		0.05		A
P_T:				
T_C up to 25°C		50		W
T_C above 25°C ..... Derate linearly at		0.4		W/°C
T_{stg}, T_J		-65 to 150		°C
T_L				
At distance 1/8 in. (3.17 mm) from case for 10 s max.		260		°C

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

CHARACTERISTIC	TEST CONDITIONS				LIMITS						UNITS
	Voltage V dc		Current A dc		TIP115		TIP116		TIP117		
	V_{CE}	V_{BE}	I_C	I_B	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	
I_{CBO} $I_E = 0$	-60[a]	—	—	—	—	-1	—	—	—	—	mA
	-80[a]	—	—	—	—	—	—	-1	—	—	
	-100[a]	—	—	—	—	—	—	—	—	-1	
I_{CEO}	-30	—	—	0	—	-2	—	—	—	—	
	-40	—	—	0	—	—	—	-2	—	—	
	-50	—	—	0	—	—	—	—	—	-2	
I_{EBO}	—	5	0	—	—	-2	—	-2	—	-2	mA
$V_{CEO}(sus)$	—	—	-0.03[b]	0	-60	—	-80	—	-100	—	V
h_{FE}	-4	—	-1[b]	—	1000	—	1000	—	1000	—	—
	-4	—	-2[b]	—	500	—	500	—	500	—	
V_{BE}	-4	—	-2[b]	—	—	-2.8	—	-2.8	—	-2.8	V
$V_{CE}(sat)$	—	—	-2[b]	-0.008	—	-2.5	—	-2.5	—	-2.5	
C_{obo}	-10[a]	—	—	—	—	100	—	100	—	100	pF
h_{fe} f = 1.0 mHz	-10	—	-0.75	—	25 TYP.		25 TYP.		25 TYP.		—
$I_{s/b}$ t = 0, 5 s non-rep. pulse	-40	—	—	—	-1.25	—	-1.25	—	-1.25	—	A
$R_{\theta JC}$	—	—	—	—	—	2.5	—	2.5	—	2.5	°C/W
$R_{\theta JA}$	—	—	—	—	—	62.5	—	62.5	—	62.5	

[a] V_{CB} value.

[b] Pulsed: Pulsed duration = 300 μs, duty factor ≤ 2%.

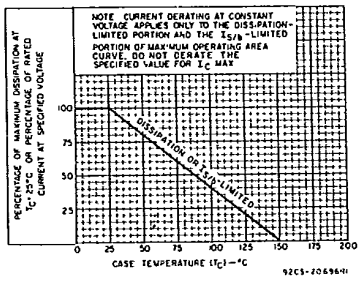

Fig. 2 - Derating curve for all types.

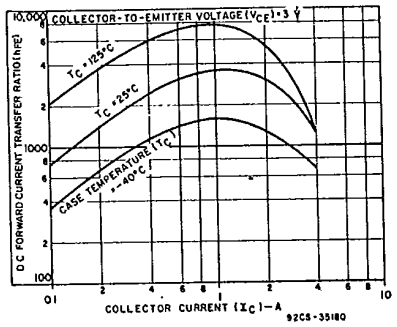

Fig. 3 - Typical dc-beta characteristics for all types.

TIP115, TIP116, TIP117

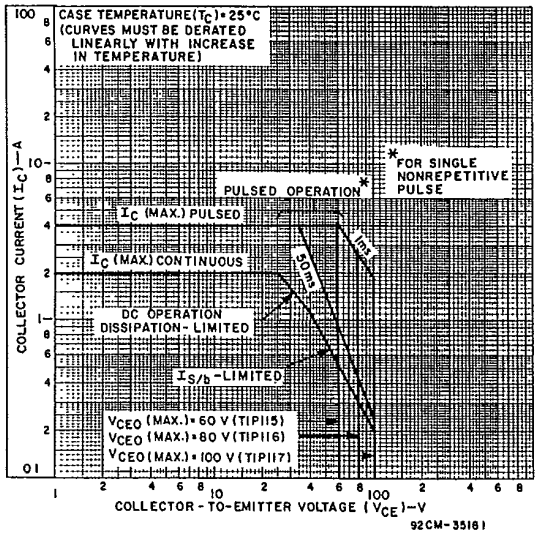

Fig. 4 - Maximum operating areas for all types (Tc = 25° C).

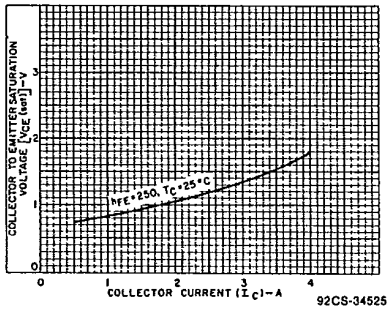

Fig. 5 - Typical saturation characteristics for all types.

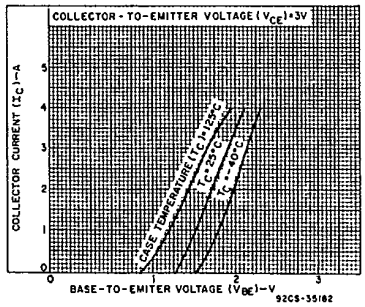

Fig. 6 - Typical transfer characteristics for all types.

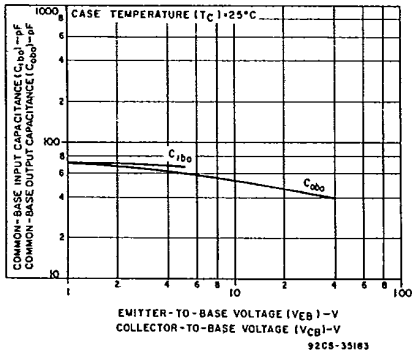

Fig. 7 - Typical common-base input (Cibo) or output (Cobo) capaciatance characteristic (all types).

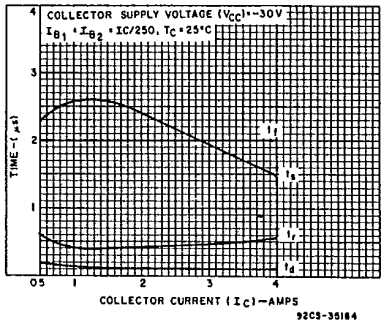

Fig. 8 - Typical saturated switching characteristics (all types).

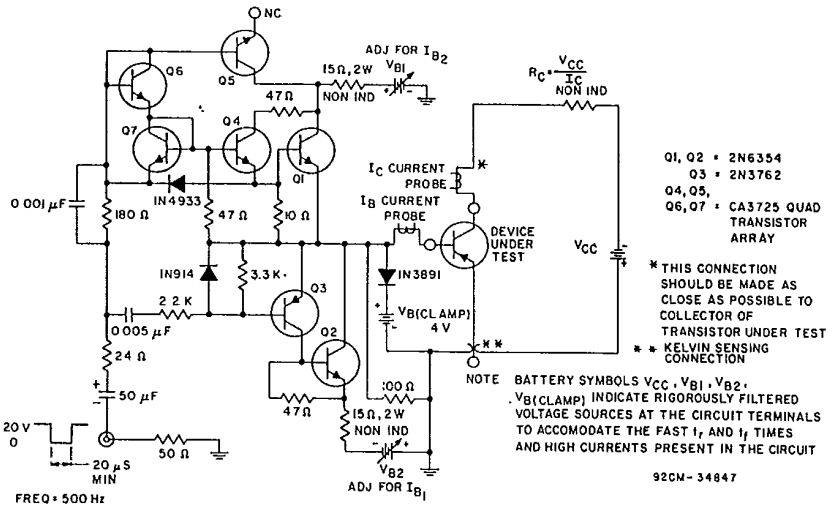

Fig. 9 - Circuit for measuring switching times.

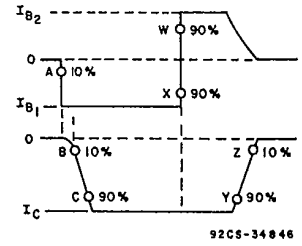

Fig. 10 - Phase relationship between input and output currents showing reference points for specification of switching times.