10-Ampere P-N-P Darlington Power Transistors

40-60-80 Volts, 70 Watts
Gain of 1000 at 5 A

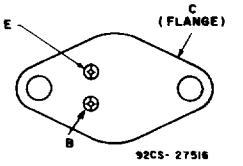
Features:

- **Operates from IC without predriver**

Applications:

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

TERMINAL DESIGNATIONS



JEDEC TO-204AA

The 2N6648, 2N6649 and 2N6650● are monolithic silicon p-n-p Darlington transistors designed for low- and medium-frequency power applications. The high gain of these devices makes it possible for them to be driven directly from integrated circuits. They are complementary to the 2N6383, 2N6384, and 2N6385▲.

The 2N6648, 2N6649, and 2N6650 are supplied in hermetic steel JEDEC TO-204AA packages.

● Formerly RCA Dev. Nos. TA8351, TA8488, and TA8350, respectively.

▲ Technical data for 2N6383, 2N6384, and 2N6385 are given in RCA bulletin File No. 609.

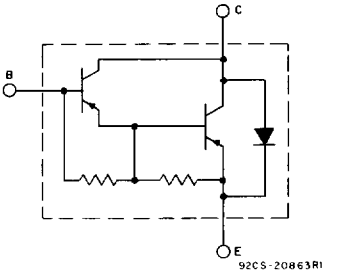


Fig. 1 – Schematic diagram for all types.

MAXIMUM RATINGS, *Absolute-Maximum Values:*

	2N6648	2N6649	2N6650	
* V_{CBO}	–40	–60	–80	V
$V_{CER(sus)}$ R_{BE} = 100 Ω	–40	–60	–80	V
* $V_{CEO(sus)}$	–40	–60	–80	V
$V_{CEV(sus)}$ V_{BE} = –1.5 V	–40	–60	–80	V
* V_{EBO}	–5	–5	–5	V
* I_C	–10	–10	–10	A
I_{CM}	–15	–15	–15	A
* I_B	–0.25	–0.25	–0.25	A
* P_T				
$T_C \leq 25^oC$	70	70	70	W
$T_C > 25^oC$ ..... Derate linearly		0.56		W/°C
* T_{stg}, T_J		–65 to +150		°C
* T_L At distances ≥ 1/32 in. (0.8 mm) from seating plane for 10 s max.		235		°C

* In accordance with JEDEC registration data format (JS-6 RDF-4)

ELECTRICAL CHARACTERISTICS, *At Case Temperature (T_C) = 25°C Unless Otherwise Specified*

	CHARACTERISTIC	TEST CONDITIONS				LIMITS						UNITS
		VOLTAGE V dc		CURRENT A dc		2N6648		2N6649		2N6650		
		V_{CE}	V_{BE}	I_C	I_B	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	
	I_{CEO}	−40			0	–	−1	–	–	–	–	mA
		−60			0	–	–	–	−1	–	–	
		−80			0	–	–	–	–	–	−1	
*	I_{CEV}	−40	1.5			–	−0.3	–	–	–	–	
		−60	1.5			–	–	–	−0.3	–	–	
		−80	1.5			–	–	–	–	–	−0.3	
	T_C = 150°C	−40	1.5			–	−3	–	–	–	–	
		−60	1.5			–	–	–	−3	–	–	
		−80	1.5			–	–	–	–	–	−3	
*	I_{EBO}		5	0		–	−10	–	−10	–	−10	mA
*	$V_{CEO(sus)}$			−0.2[a]	0	−40	–	−60	–	−80	–	V
	$V_{CER(sus)}$ R_{BE} = 100 Ω			−0.2[a]		−40	–	−60	–	−80	–	
	$V_{CEV(sus)}$		1.5	−0.2[a]		−40	–	−60	–	−80	–	
*	h_{FE}	−3		−5[a]		1000	20,000	1000	20,000	1000	20,000	
		−3		−10[a]		100	–	100	–	100	–	
	V_{BE}	−3		−5[a]		–	−2.8	–	−2.8	–	−2.8	V
		−3		−10[a]		–	−4.5*	–	−4.5*	–	−4.5*	
	$V_{CE(sat)}$			−5[a]	−0.01[a]	–	−2	–	−2	–	−2	V
				−10[a]	−0.1[a]	–	−3*	–	−3*	–	−3*	
	V_F			10[a]		–	4	–	4	–	4	V
	h_{fe} f = 1 kHz	−5		−1		1000	–	1000	–	1000	–	
*	$\|h_{fe}\|$ f = 1 MHz	−5		−1		20	–	20	–	20	–	
	$I_{S/b}$ t = 1 s, nonrep.	−35				−1	–	−1	–	−1	–	A
		−25				−2.8	–	−2.8	–	−2.8	–	
	$R_{\theta JC}$					–	1.75	–	1.75	–	1.75	°C/W

* In accordance with JEDEC registration data format (JS-6 RDF-4).

[a] Pulsed: Pulse duration = 300 μs, duty factor = 1.8%.

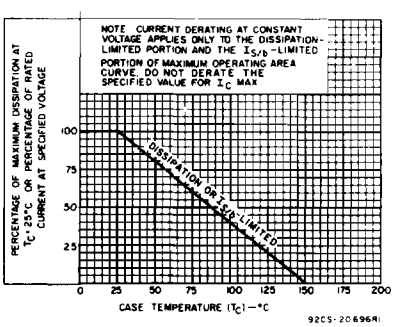


Fig.2 — Derating curve for all types.

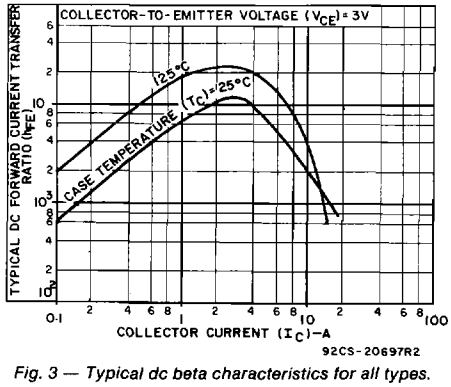


Fig. 3 — Typical dc beta characteristics for all types.

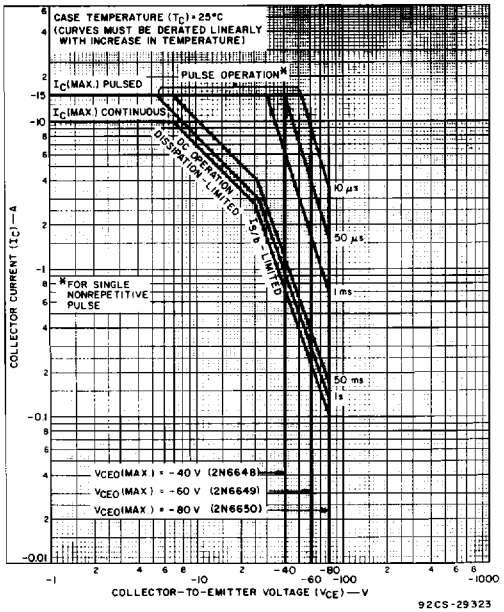


Fig. 4 — Maximum operating areas for all types.

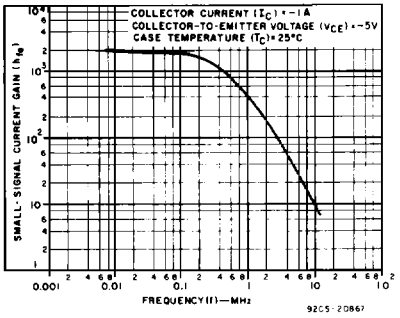


Fig. 5 — Typical small-signal gain for all types.

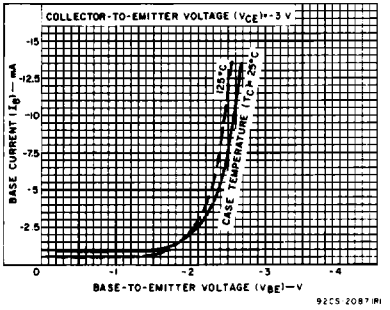


Fig. 6 — Typical input characteristics for all types.

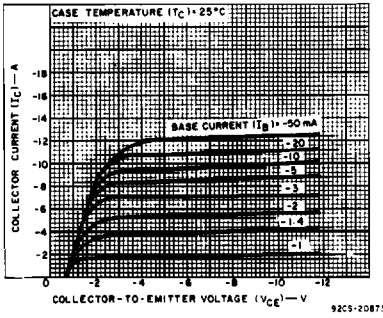


Fig. 7 — Typical output characteristics for all types.

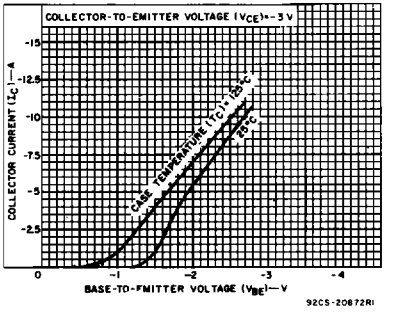


Fig. 8 — Typical transfer characteristics for all types.

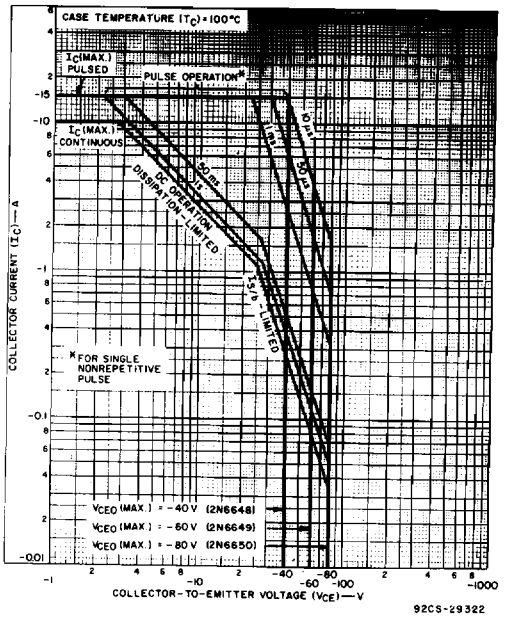


Fig. 9 — Maximum operating areas for all types at T_C = 100° C.

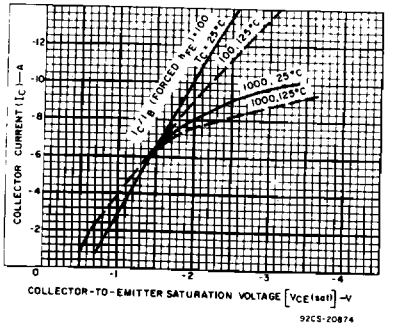


Fig. 10 — Typical saturation characteristics for all types.

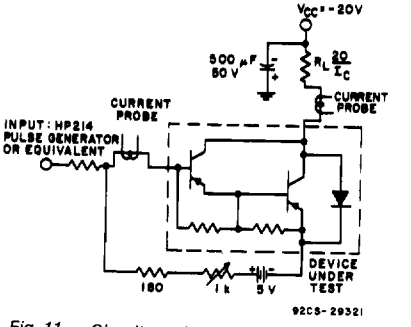


Fig. 11 — Circuit used to measure saturated switching times.

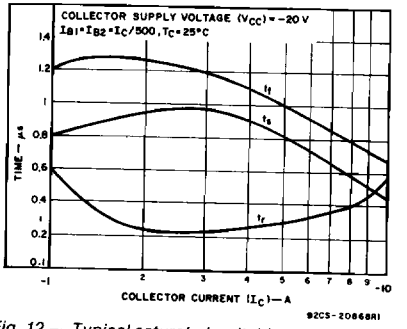


Fig. 12 — Typical saturated switching-time characteristics for all types.

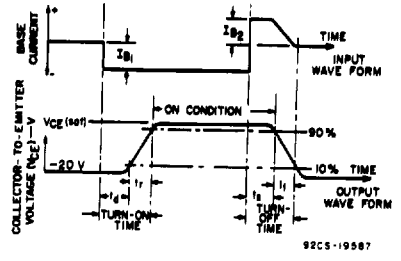


Fig. 13 — Phase relationship between input current and output current showing reference points for specification of switching times.