BDX34, BDX34A, BDX34B, BDX34C, BDX34D

File Number **694**

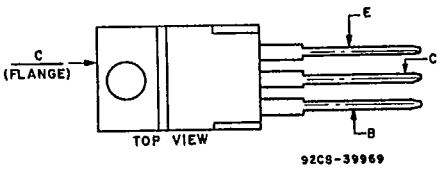
10-Ampere P-N-P Darlington Power Transistors

45-60-80-100-120 Volts, 70 Watts
Gain of 750 at 4 A (BDX34, BDX34A)
Gain of 750 at 3 A (BDX34B, BDX34C, BDX34D)

Features:
- *Operates from IC without predriver*
- *Low leakage at high temperature*

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

TERMINAL DESIGNATIONS



JEDEC TO-220AB

The BDX34, BDX34A, BDX34B, BDX34C, and BDX34D are monolithic p-n-p silicon 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 BDX33, BDX33A, BDX33B, BDX33C, and BDX33D described in RCA Bulletin File No. 693.

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

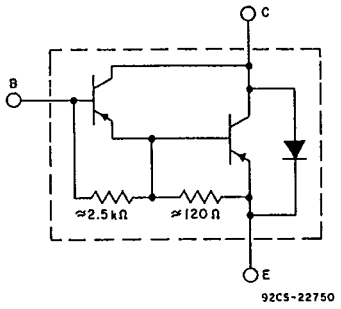


Fig. 1 - Schematic diagram for all types.

MAXIMUM RATINGS, *Absolute-Maximum Values:*

	BDX34	BDX34A	BDX34B	BDX34C	BDX34D	
V_{CBO}	-45	-60	-80	-100	-120	V
$V_{CER(sus)}$ (R_{BE})=100 Ω	-45	-60	-80	-100	-120	V
$V_{CEO(sus)}$	-45	-60	-80	-100	-120	V
$V_{CEX(sus)}$ V_{BE}=-1.5 V	-45	-60	-80	-100	-120	V
V_{EBO}			-5			V
I_C			-10			A
I_B			-0.25			A
P_T						
$T_C \leq 25°C$			70			W
$T_C > 25°C$			Derate linearly 0.56			W/°C
T_{stg}, T_J			-65 to +150			°C
T_L At distances ≥ 1/8 in. (3.17 mm) from case for 10 s max.			235			°C

BDX34, BDX34A, BDX34B, BDX34C, BDX34D

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

CHARACTERISTIC	TEST CONDITIONS				LIMITS						UNITS
	VOLTAGE V dc			CURRENT A dc	BDX34		BDX34A		BDX34B		
	V_{CB}	V_{CE}	V_{BE}	I_C	Min.	Max.	Min.	Max.	Min.	Max.	
I_{CEO}		-40			—	—	—	—	—	-0.5	mA
		-30			—	—	—	-0.5	—	—	
		-20			—	-0.5	—	—	—	—	
T_C=100°C		-40			—	—	—	—	—	-10	
		-30			—	—	—	-10	—	—	
		-20			—	-10	—	—	—	—	
I_{CBO}	-80				—	—	—	—	—	-1	
	-60				—	—	—	-1	—	—	
	-45				—	-1	—	—	—	—	
T_C=100°C	-80				—	—	—	—	—	-5	
	-60				—	—	—	-5	—	—	
	-45				—	-5	—	—	—	—	
I_{EBO}			5	0	—	-10	—	-10	—	-10	
V_{CEO}(sus)				-0.1[a]	-45	—	-60	—	-80	—	V
V_{CER}(sus) (R_{BE})=100 Ω				-0.1[a]	-45	—	-60	—	-80	—	
V_{CEV}(sus)			1.5	-1.0[a]	-45	—	-60	—	-80	—	
h_{FE}		-3		-3[a]	—	—	—	—	750	—	
		-3		-4[a]	750	—	750	—	—	—	
V_{BE}		-3		-3[a]	—	—	—	—	—	-2.5	V
		-3		-4[a]	—	-2.5	—	-2.5	—	—	
V_{CE}(sat)											
I_B=-0.006 A				-3[a]	—	—	—	—	—	-2.5	
=-0.008 A				-4[a]	—	-2.5	—	-2.5	—	—	
V_F				-8	—	-4	—	-4	—	-4	
h_{fe} (f=1.0 kHz)		-5		-1	1000	—	1000	—	1000	—	
$\|h_{fe}\|$ (f=1.0 MHz)		-5		-1	20	—	20	—	20	—	
$I_{S/b}$		-20			-3.5	—	-3.5	—	-3.5	—	A
t_p=0.5s non-rep.		-33			-1	—	-1	—	-1	—	
$R_{\theta JC}$					—	1.78	—	1.78	—	1.78	°C/W

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

BDX34, BDX34A, BDX34B, BDX34C, BDX34D

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

CHARACTERISTIC	TEST CONDITIONS				LIMITS				UNITS
	VOLTAGE V dc			CURRENT A dc	BDX34C		BDX34D		
	V_{CB}	V_{CE}	V_{BE}	I_C	Min.	Max.	Min.	Max.	
I_{CEO}		-60			—	—	—	-0.5	mA
		-50			—	-0.5	—	—	
T_C=100°C		-60			—	—	—	-10	
		-50			—	-10	—	—	
I_{CBO}	-120				—	—	—	-1	
	-100				—	-1	—	—	
T_C=100°C	-120				—	—	—	-5	
	-100				—	-5	—	—	
I_{EBO}			5	0	—	-10	—	-10	
$V_{CEO(sus)}$				-0.1[a]	-100	—	-120	—	V
$V_{CER(sus)}$ (R_{BE})=100 Ω				-0.1[a]	-100	—	-120	—	
$V_{CEV(sus)}$			1.5	-1.0[a]	-100	—	-120	—	
h_{FE}		-3		-3[a]	750	—	750	—	
V_{BE}		-3		-3[a]	—	-2.5	—	-2.5	V
$V_{CE(sat)}$ I_B=-0.006 A				-3[a]	—	-2.5	—	-2.5	
V_F				-8	—	-4	—	-4	
h_{fe} (f=1.0 kHz)		-5		-1	1000	—	1000	—	
$\|h_{fe}\|$ (f=1.0 MHz)		-5		-1	20	—	20	—	
$I_{S/b}$ t_p=0.5 s non-rep.		-20			-3.5	—	-3.5	—	A
		-33			-1	—	-1	—	
$R_{\theta JC}$					—	1.78	—	1.78	°C/W

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

BDX34, BDX34A, BDX34B, BDX34C, BDX34D

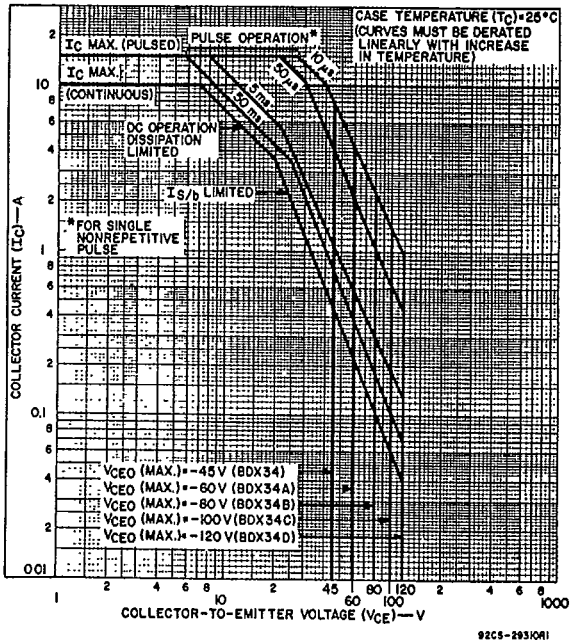


Fig. 2 - Maximum operating areas for BDX34-series types.

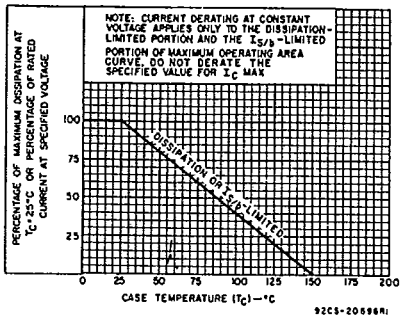


Fig. 3 - Current derating curve for all types.

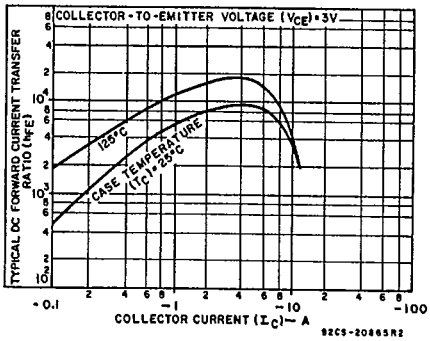


Fig. 4 - Typical dc beta characteristics for all types.

BDX34, BDX34A, BDX34B, BDX34C, BDX34D

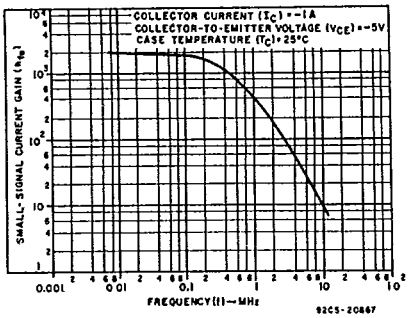


Fig. 5 — Typical small-signal gain for all types.

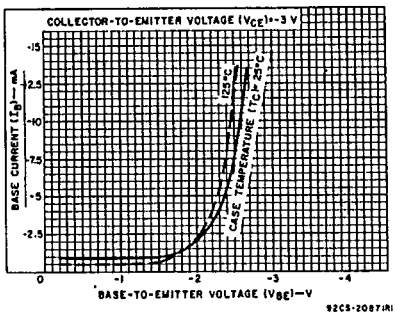


Fig. 6 — Typical input characteristics for all types.

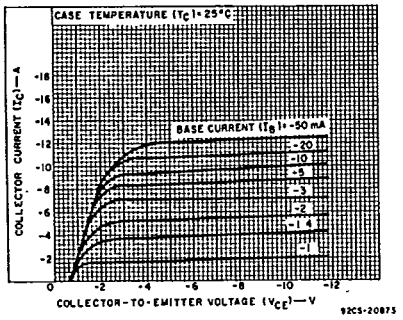


Fig. 7 — Typical output characteristics for all types.

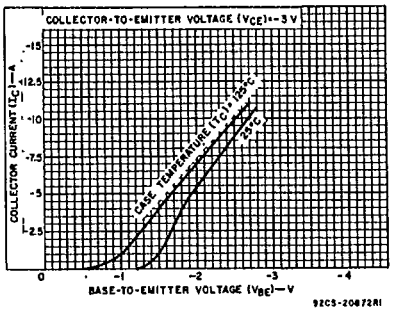


Fig. 8 — Typical transfer characteristics for all types.

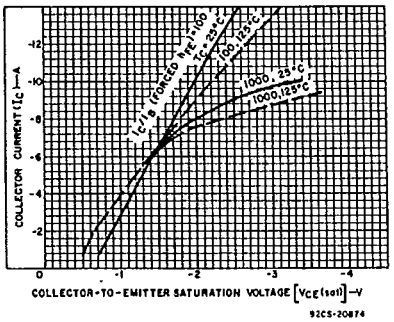


Fig. 9 — Typical saturation characteristics for all types.

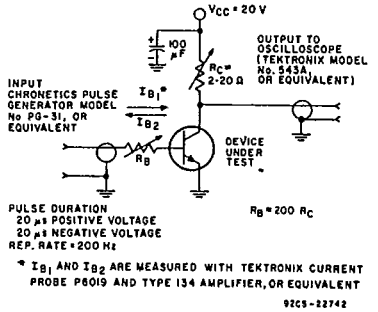


Fig. 10 — Circuit used to measure saturated switching times.

BDX34, BDX34A, BDX34B, BDX34C, BDX34D

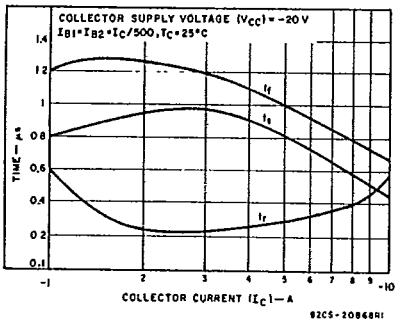


Fig. 11 — Typical saturated switching-time characteristics for all types.

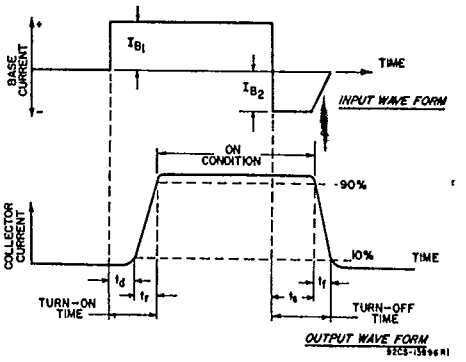


Fig. 12 — Phase relationship between input current and output current showing reference points for specifications of switching.