File Number **1215**

BDY55, BDY56

High-Current, High-Power, High-Speed Silicon N-P-N Planar Transistors

Devices for Switching and Amplifier Circuits in Industrial and Commercial Applications

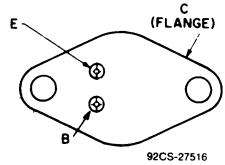
Features:

- *Maximum operating area curves for dc and pulse operation*
- *Large-signal power amplification*
- *High-current fast switching*

The RCA-BDY55 and BDY56 are epitaxial silicon n-p-n planar transistors. They differ in voltage ratings and leakage-current.

The high current-handling capability of these transistors in conjunction with fast switching speeds make them especially suited for switching-control amplifiers, power gates, switching regulators, converters, and inverters. Other recommended applications include dc-rf amplifiers and power oscillators. These transistors are supplied in the steel JEDEC TO-204AA hermetic package.

TERMINAL DESIGNATIONS



92CS-27516

JEDEC TO-204AA

MAXIMUM RATINGS, *Absolute-Maximum Values:*

	BDY55	BDY56	
V_{CBO}	100	150	V
V_{CEO}	60	120	V
V_{EBO}	7		V
I_C	15		A
I_B	7		A
P_T			
T_C = 25°C	117		W
T_{stg}, T_J	-65 to +200		°C
T_L			
At distances ≥ 1/32 in. (0.8 mm) from seating plane for 10 s max.	230		°C

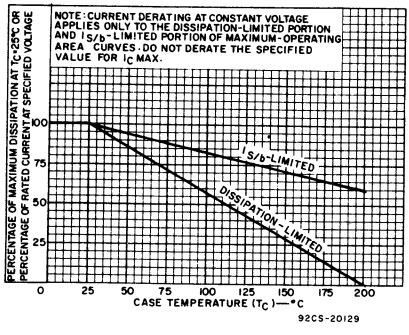


Fig. 1 - Dissipation derating curves for both types.

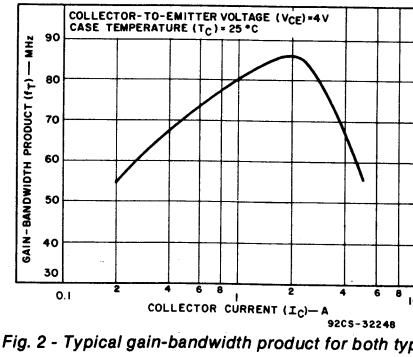


Fig. 2 - Typical gain-bandwidth product for both types.

BDY55, BDY56

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

CHARACTERISTIC	TEST CONDITIONS					LIMITS				UNITS
	VOLTAGE V dc			CURRENT A dc		BDY55		BDY56		
	V_{CE}	V_{EB}	V_{BE}	I_C	I_B	Min.	Max.	Min.	Max.	
I_{CEO}	30 60				0 0	— —	0.7 —	— —	— 0.5	mA
I_{CEV}	100 150		−1.5 −1.5			— —	5 —	— —	— 3	mA
At T_C = 150 °C	100 150		−1.5 −1.5			— —	30 —	— —	— 30	mA
I_{EBO}		7		0		—	5	—	3	mA
h_{FE}	4 4			4[a] 10[a]		20 10	70 —	20 10	70 —	
f_T	4			1		10	—	10	—	MHz
$V_{CEP}(sus)$[b]				0.2	0	60	—	120	—	V
V_{BE}	4			4		—	1.8	—	1.8	V
$V_{CE}(sat)$				4 10	4 3.3	— —	1.1 2.5	— —	1.1 2.5	V
t_{ON} V_{CC} = 50 V				5	1.0	—	0.5	—	0.5	μS
t_{OFF} V_{CC} = 50 V				5	I_{B_1} = 1 A I_{B_2} = −0.5 A	—	2	—	2	μS
$R_{\theta JC}$	10			10		—	1.5	—	1.5	°C/W

a Pulsed; pulse duration ⩽ 350 μs, duty factor = 2%.

b CAUTION: The sustaining voltages $V_{CEO}(sus)$, *MUST NOT* be measured on a curve tracer. These sustaining voltages should be measured by means of the test circuit.

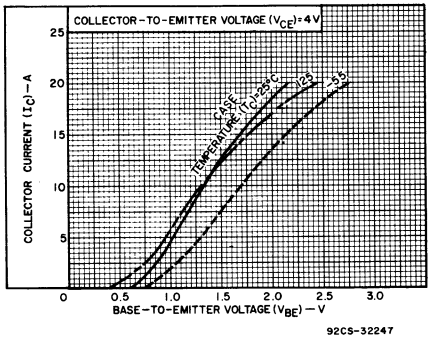


Fig. 3 - Typical transfer characteristics for both types.

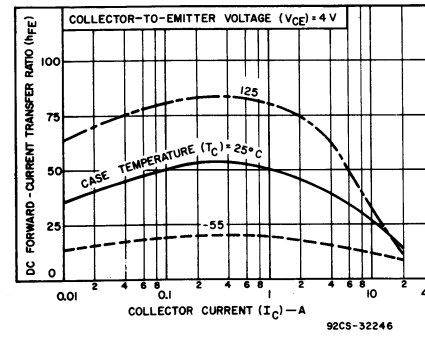


Fig. 4 - Typical dc beta characteristics for both types.

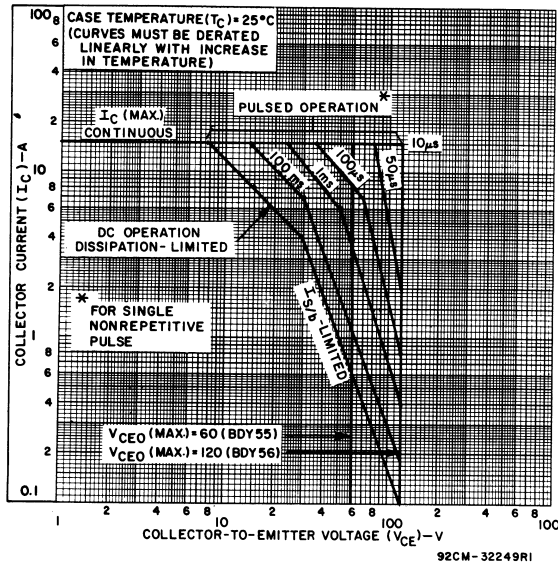


Fig. 5 - Maximum operating areas for both types.

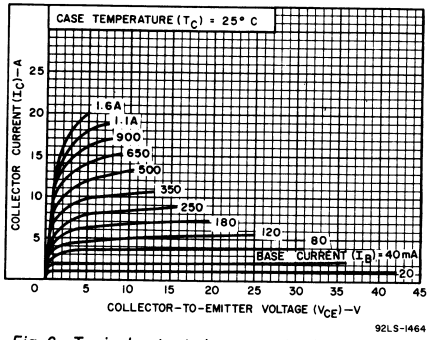


Fig. 6 - Typical output characterstics for both types.

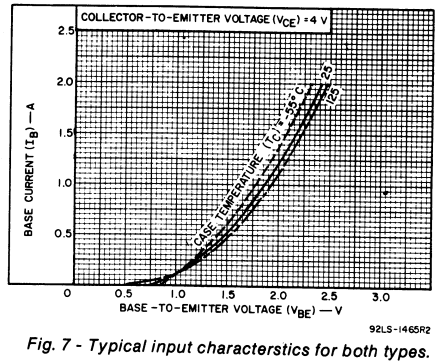


Fig. 7 - Typical input characterstics for both types.

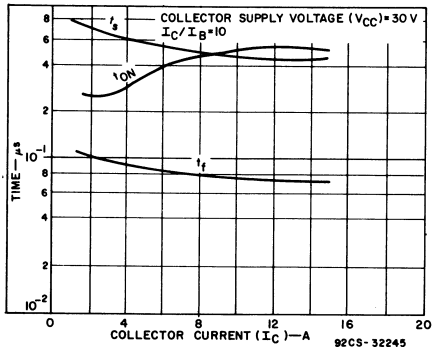


Fig. 8 - Switching-time characterstics as a function of collector current for both types.

BDY58R File Number **1206**

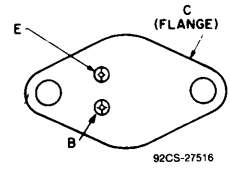
Silicon N-P-N Switching Transistors

For Switching Applications in Industrial and Commercial Equipment

Features:

- V_{CEO} — *160V*
- I_C — *25 A*
- P_T — *175 W*

TERMINAL DESIGNATIONS



JEDEC TO-204AA

The RCA-BDY58R is a silicon n-p-n power transistor featuring fast switching speeds, low saturation voltage, and high safe-operating (SOA) ratings. It is specially designed for converters, inverters, pulse-width-modulated regulators, and a variety of power switching circuits.

The RCA-BDY58R transistor is supplied in a steel JEDEC TO-204AA hermetic package.

MAXIMUM RATINGS, *Absolute-Maximum Values:*

	BDY58R
V_{CBO}	250 V
V_{CEO}	160 V
V_{CEX}	
V_{BE} = —1.5 V	250 V
V_{EBO}	8 V
I_C	25 A
I_{CM}	50 A
I_B	8 A
P_T:	
At T_C up 25°	175 W
T_J, T_{stg}	-65 to + 200°C
T_L:	
At distances ≥ 1/16 in. (1.58 mm) from case for 10 s max.	235°C

BDY58R

ELECTRICAL CHARACTERISTICS, *at Case Temperature (T_C) = 25°C unless otherwise specified*

CHARACTERISTIC	TEST CONDITIONS				LIMITS			UNITS
	VOLTAGE V dc		CURRENT A dc		BDY58R			
	V_{CE}	V_{BE}	I_C	I_B	Min.	Typ.	Max.	
I_{CBO}	V_{CB} = 200	—	—	0	—	0.1	1	mA
I_{CER} R_{BE} = 10 Ω, T_C = 100°C	180	—	—	—	—	—	10	
I_{EBO}	—	−5	0	—	—	0.1	0.5	
V_{CEO}(sus)[b]	—	—	0.2[a]	—	160[a]	—	—	V
$V_{(BR)EBO}$ I_E = 0.05 A	—	—	0	—	8	—	—	
V_{BE}(sat)	—	—	10[a]	1	—	0.9	2	
V_{CE}(sat)	—	—	10[a]	1	—	0.2	1.4	
h_{FE}	4	—	10[a]	—	20	—	60	
	4	—	20[a]	—	—	20	—	
T_C = −30°C	4	—	10[a]	—	10	—	—	
f_T	15	—	1	—	10	48	—	MHz
t_{on}	V_{CC} = 75 V	—	15	1.5	—	0.3	1	μs
t_{off} (I_{B1} = I_{B2})		—	15	1.5	—	1.2	2	
$R_{\theta JC}$	—	—	—	—	—	—	1	°C/W

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

[b] **CAUTION:** Sustaining Voltage V_{CEO}(sus) *MUST NOT* be measured on a curve tracer.

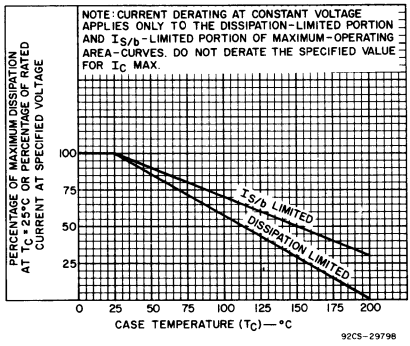


Fig. 1 — Dissipation and $I_{S/b}$ derating curve.

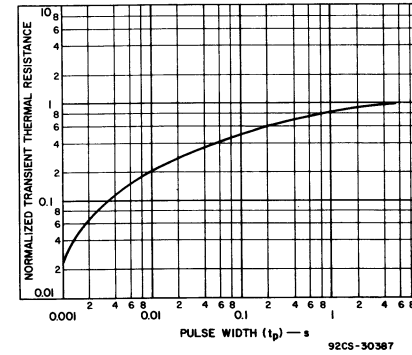


Fig. 2 — Typical thermal-response characteristic.

BDY58R

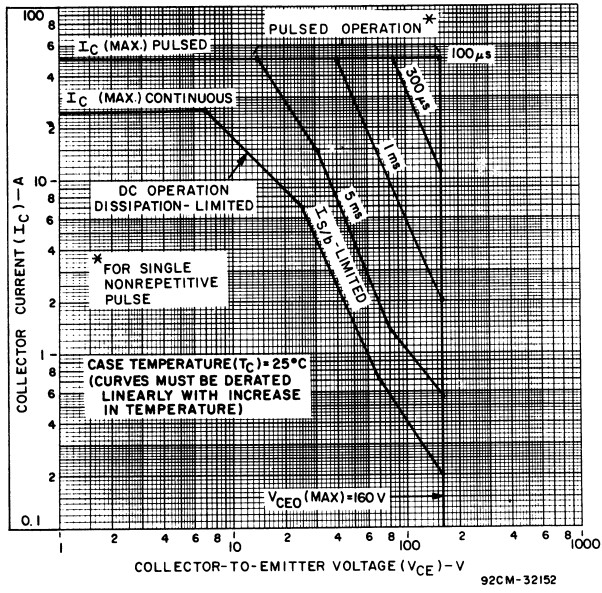


Fig. 3 — Maximum safe-operating areas (T_C = 25°C).

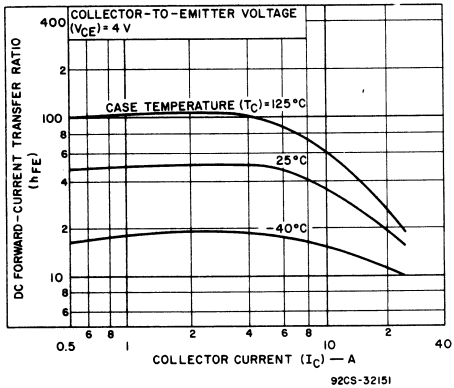


Fig. 4 — Typical dc beta characteristics.

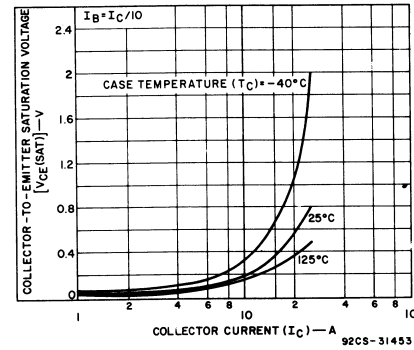


Fig. 5 — Typical collector-to-emitter saturation voltage characteristics.

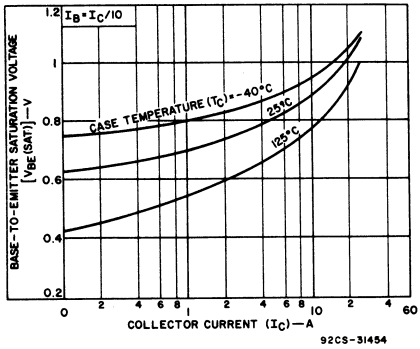


Fig. 6 — Typical base-to-emitter saturation voltage as a function of collector current.

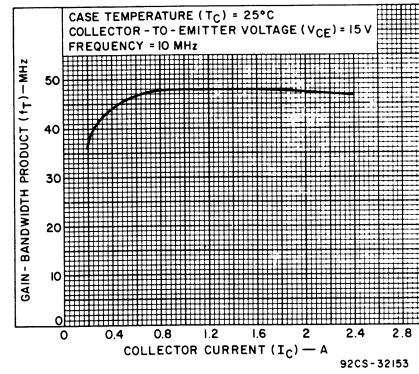


Fig. 7 — Typical gain-bandwidth product.

BDY58R

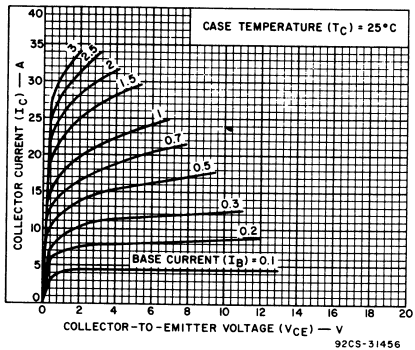


Fig. 8 — Typical output characteristics.

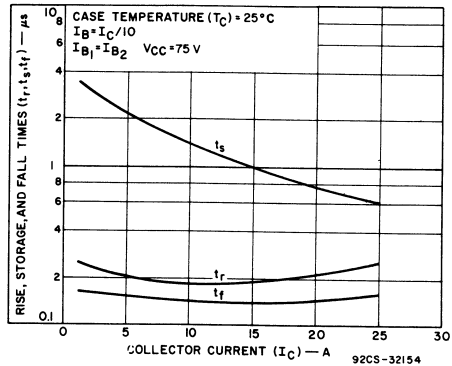


Fig. 9 — Typical saturated-switching-time characteristics as a function of collector current.

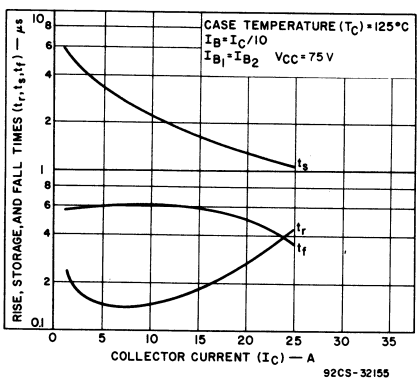


Fig. 10 — Typical switching-time characteristics at T_C = 125°C as a function of collector current.

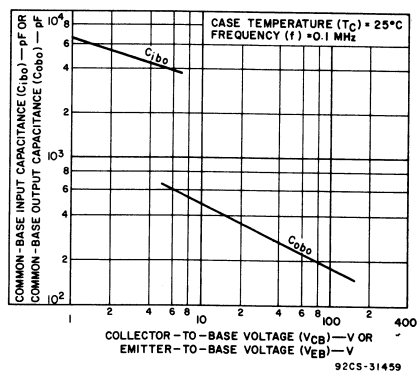


Fig. 11 — Typical common-base input (C_{ibo}) of output (C_{obo}) capacitance characteristics.