

BD750, BD751 Series

Silicon Transistors for 80- and 100-Watt Full-Complementary- Symmetry Audio Amplifiers

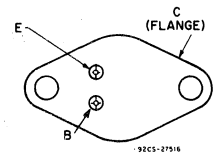
The RCA-BD750 Series and BD751 Series types are p-n-p and n-p-n ballasted epitaxial-base silicon transistors, respectively. The corresponding types in these series form complementary p-n-p/

n-p-n pairs that are especially suited for audio-output applications.

These transistors are supplied in the JEDEC TO-204MA steel hermetic package.

Features:

- High-dissipation capability
- Low saturation voltages
- Maximum safe-area-of-operation curves
- $f_T = 4$ MHz min.
- High gain at high current

TERMINAL DESIGNATIONS**JEDEC TO-204MA**

(See dimensional outline "A".)

Typical Performance Data for 100-W Audio Amplifiers (4 Ohms and 8 Ohms)

Measured at a line voltage of 220 V,
 $T_A = 25^\circ\text{C}$, and a frequency of 1 kHz,
unless otherwise specified.

Rated Power	100 W	100 W
Load Impedance	4 Ω	8 Ω
Sensitivity	530 mV	750 mV
Input Impedance	10 K Ω	10 K Ω
Slew Rate	25 V/ μ s	25 V/ μ s
Frequency Response	See Fig. 3	
Square Wave Response	See Fig. 5	
Total Harmonic Distortion	See Fig. 4	

MAXIMUM RATINGS, Absolute-Maximum Values:

	•BD750	•BD750A	•BD750B	•BD750C	P-N-P
	BD751	BD751A	BD751B	BD751C	N-P-N
V_{CB0}	100	130	110	140	V
V_{CE0}	90	120	100	130	V
V_{CER} ($R_{BE} = 100 \Omega$)	100	130	110	140	V
V_{EB0}			5		V
I_C			20		A
I_B			5		A
P_T :					
At $T_C \leq 25^\circ\text{C}$	200	200	250	250	W
At $T_C > 25^\circ\text{C}$	See Figs. 1 and 2				
T_{stg}, T_J		-65 to +200			$^\circ\text{C}$
T_L :					
At distances $\geq 1/32$ in. (0.8 mm) from case for 10 s max.		230			$^\circ\text{C}$

•For p-n-p devices, voltage and current values are negative.

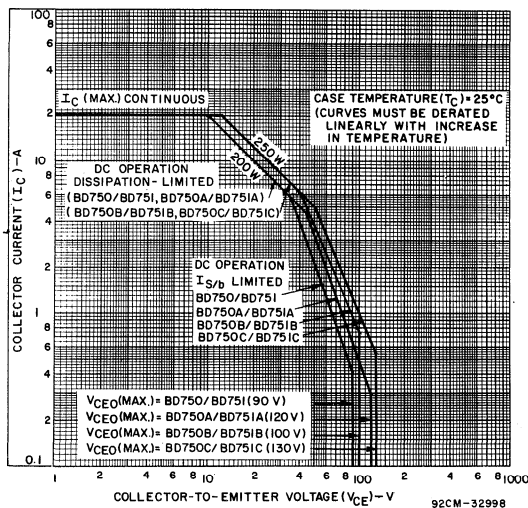


Fig. 1 — Maximum operating areas for all types.

Table I - Main Modifications
For an 80-W Amplifier

	4 Ω	8 Ω	Units
V_S	70	94	V
Q10	BD751	BD751A	
Q11	BD750	BD750B	
R26-R27	56	75	Ω
Q8, Q9, Q10, Q11	1.5	1.5	$^\circ\text{C}/\text{W}$
Heatsink			
T_{cutout}	95	95	$^\circ\text{C}$

Load and Power Output vs. Types

Load	$P_{out} = 80$ W	$P_{out} = 100$ W
4 Ω	BD750/751	BD750B/751B
8 Ω	BD750A/751A	BD750C/751C

BD750, BD751 Series

ELECTRICAL CHARACTERISTICS, At Case Temperature (*T*_C)=25°C

CHARACTERISTIC	TEST CONDITIONS	LIMITS‡								UNITS
		BD750* BD751		BD750A* BD751A		BD750B* BD751B		BD750C* BD751C		
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
I _{CER}	V _{CE} =V _{CEO} max., R _{BE} =100Ω	—	1	—	1	—	1	—	1	mA
I _{CEO}	V _{CE} =V _{CEO} max., -20 V	—	1	—	1	—	1	—	1	
I _{EBO}	V _{EB} =5 V	—	1	—	1	—	1	—	1	
V _{CEO}	I _C =0.2 A	90	—	120	—	100	—	130	—	V
V _{CER}	I _C =0.2 A; R _{BE} =100 Ω	100	—	130	—	110	—	140	—	
f _T	I _C =1 A; V _{CE} =10 V	4	—	4	—	4	—	4	—	MHz
h _{FE}	I _C =5 A; V _{CE} =2 V	—	—	25	100	—	—	25	100	
	I _C =7.5 A; V _{CE} =2 V	15	60	—	—	15	60	—	—	
V _{CE(sat)}	I _C =5 A; I _B =0.5 A	—	—	—	1	—	—	—	1	V
V _{BE(sat)}	I _C =7.5 A; I _B =0.75 A	—	1.5	—	—	—	1.5	—	—	
	I _C =5 A; I _B =0.5 A	—	—	—	2	—	—	—	2	
I _S /b t=1 sec.	I _C =7.5 A; I _B =0.75 A	—	2.5	—	—	—	2.5	—	—	
	V _{CE} =35 V	5.71	—	—	—	—	—	—	—	A
	V _{CE} =40 V	—	—	—	—	6.25	—	—	—	
	V _{CE} =45 V	—	—	4.44	—	—	—	—	—	
V _{CE} =50 V	—	—	—	—	—	—	5	—		

‡For characteristic curves and test conditions, refer to published data for prototypes (RCA Data Bulletin File Nos. 1060 and 1061): RCA 8638 series for BD751 series and RCA 9116 series for BD750 series.
*For p-n-p devices, voltage and current values are negative.

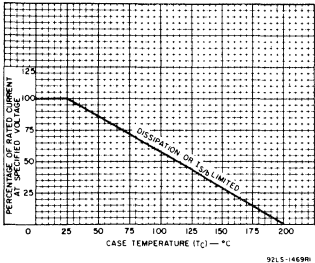


Fig. 2 — Current derating curve for all types.

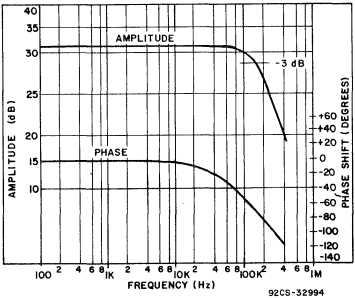


Fig. 3 — Complete amplifier typical frequency response.

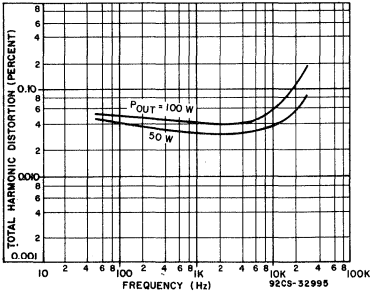


Fig. 4 — Total harmonic distortion as a function of frequency.

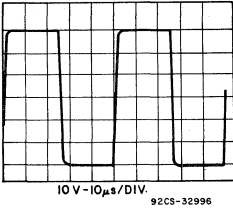
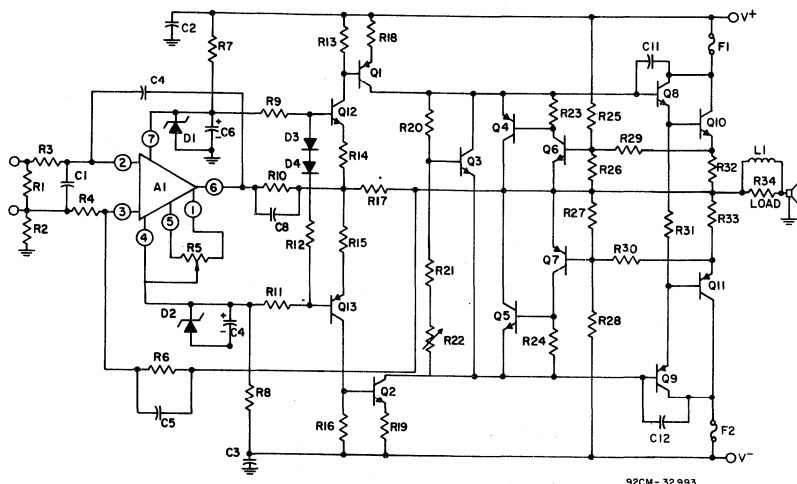


Fig. 5 — 20-kHz square wave output waveform.

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92CM-32.993

PARTS LIST

(4-ohm and 8-ohm loads)

Parts	4-Ohm Load	8-Ohm Load	Parts	4-Ohm Load	8-Ohm Load
R1	10 K	10 K	R34	4.7 - 1W	10 - 1W
R2	1	1	C1	100 pF	100 pF
R3	1 K	1 K	C2	0.47 μ F - 50V	0.47 μ F - 50V
R4	220	220	C3	0.47 μ F - 50V	0.47 μ F - 50V
R5 (note 6)	Potentiometer, 10 K	Potentiometer, 10 K	C4	12 pF	12 pF
R6	8 K 2	8 K 2	C5	100 pF	100 pF
R7	1 K - 1W	1 K 8 - 1W	C6	22 μ F - 25V	22 μ F - 25V
R8	1 K - 1W	1 K 8 - 1W	C7	22 μ F - 25V	22 μ F - 25V
R9	1 K 8	1 K 8	C8	10 nF	10 nF
R10	2 K 2	2 K 2	C11	3.9 nF	3.9 nF
R11	1 K 8	1 K 8	C12	3.9 nF	3.9 nF
R12	220	220	D1	Zener 15V	Zener 15V
R13	4 K 7	1 K 8	D2	Zener 15V	Zener 15V
R14	820	820	D3	1N4148	1N4148
R15	820	820	D4	1N4148	1N4148
R16	4 K 7	1 K 8	Q1 (note 2)	RCA1A10	RCA1A10
R17	39 K	39 K	Q2 (note 2)	RCA1A11	RCA1A11
R18	47	47	Q3 (note 3)	RCA1A18	RCA1A18
R19	47	47	Q4	2N5323	2N5323
R20	390	1 K	Q5	2N5321	2N5321
R21	56	56	Q6	RCA1A18	RCA1A18
R22 (note 5)	Potentiometer, 1 K	Potentiometer, 1 K	Q7	RCA1A19	RCA1A19
R23	100	100	Q8 (note 4)	RCA1C03	RCA1C12
R24	100	100	Q9 (note 4)	RCA1C04	RCA1C13
R25	3 K 9 - 1W	8 K 2 - 1W	Q10 (note 4)	BD751B	BD751C
R26	50	68	Q11 (note 4)	BD750B	BD750C
R27	50	68	Q12 (note 2)	RCA1A11	RCA1A11
R28	3 K 9 - 1W	8 K 2 - 1W	Q13 (note 2)	RCA1A10	RCA1A10
R29	180	470	A1	CA3100	CA3100
R30	180	470	F1	4 A	3 A
R31	100	100	F2	4 A	3 A
R32	0.27 - 7W	0.68 - 7W	L1	2 μ H	4 μ H
R33	0.27 - 7W	0.68 - 7W	V	39 V	52 V

NOTES:

1. All resistors are non-inductive.
2. Mount each device on heat sink of 30 cm² min. area.
3. Mount on same heat sink as driver and output devices Q8, Q9, Q10, and Q11.
4. Provide heat sink of approx. 1.2°C/W per output device with a contact thermal resistance of 0.4°C/W and T_A=45°C max. 95°C thermal cutout attached to heat sink of output devices.
5. Adjust to get a quiescent current of 200 mA.
6. Adjust to get 0-V output with 0-V input signal.

Fig. 6 — 100-W audio amplifier (dc coupled).