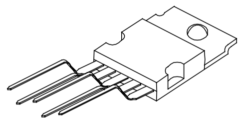
10W CAR RADIO AUDIO AMPLIFIER



TO-220B

DESCRIPTION

The TDA2003A has improved performance with the same pin configuration as theTDA2002. The additional features of TDA2002, very low number of external components, easeof assembly, space and cost saving, are maintained.

The device provides a high output current capacity(up to 3.5A) very low harmonic and crossover distortion.Completely safe operation is guaranteed due to protection against DC and AC short circuit between all pins and ground.

ABSOLUTE MAXIMUM RATINGS(Ta=25°C)

CHARACTERISTICS	SYMBOL	VALUE	UNITS
DC supply Voltage	Vs	28	V
Operating supply voltage	Vs	18	V
Power dissipation at Tcase=90°C	Ptot	20	W
Storage temperature	Tstg	-40~+150	°C
junction temperature	Tj	-40~+150	°C

PIN CONNECTION

1 Non inverting input

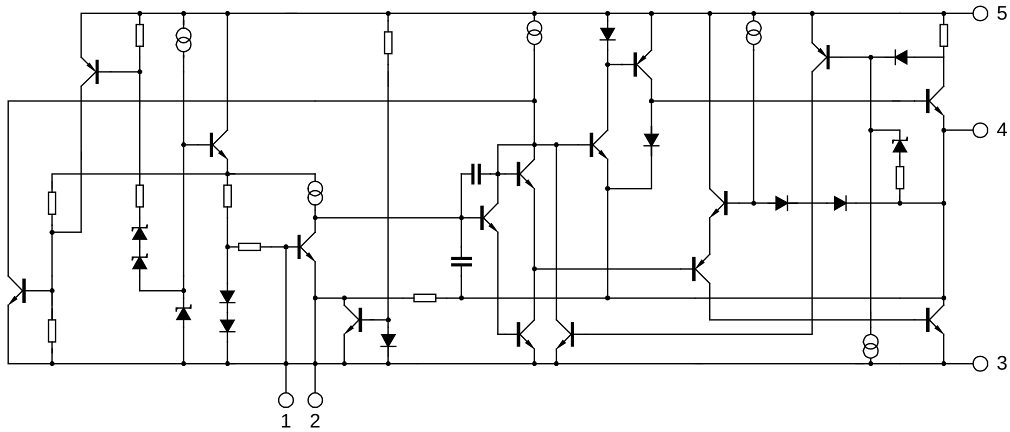
2 Inverting input

3 Ground

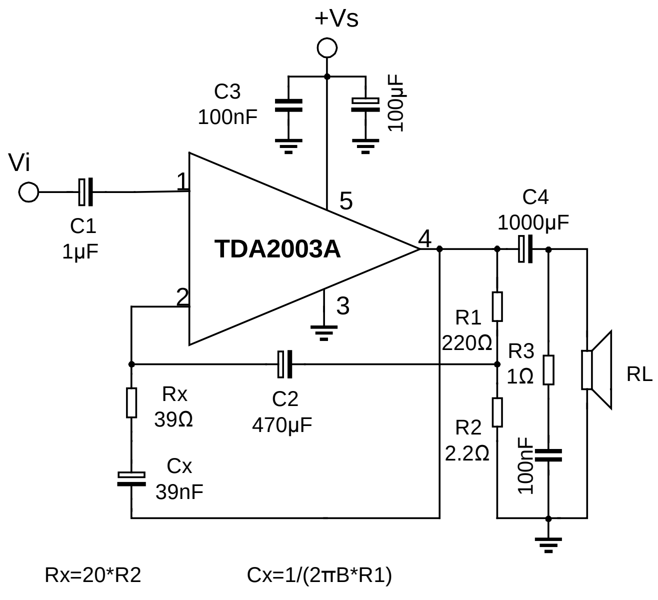
4 Output

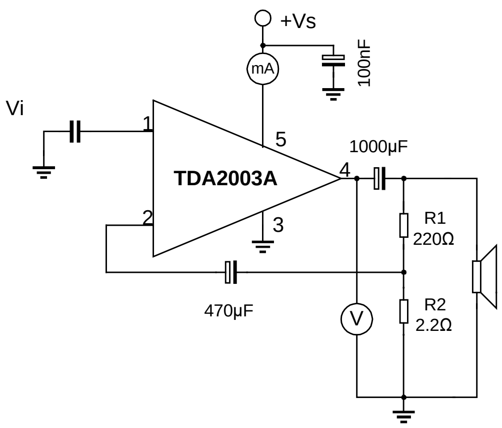
5 Supply Voltage

SCHEMATIC DIAGRAM

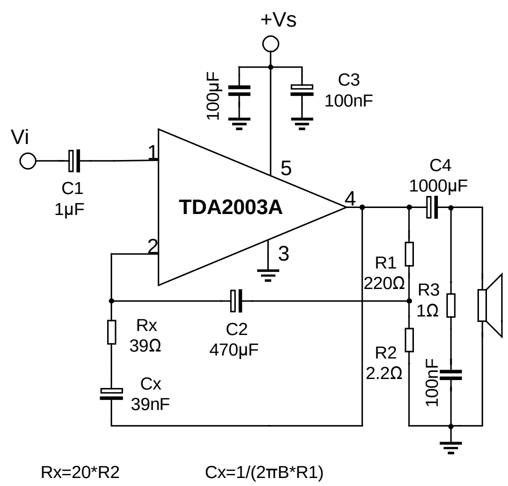


TEST CIRCUIT





DC Test Circuit



AC Test Circuit

ELECTRICAL CHARACTERISTICS(Refer to the test circuit, Vs= 15V,Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
DC CHARACTERISTICS						
Supply Voltage	Vs		8		18	V
Quiescent Output Voltage	Vo		6.1	6.9	7.7	V
Quiescent drain current	Id			44	50	mA
AC CHARACTERISTICS						
Output power	Po	d=10%,f=1kHz				W
		R_L=8Ω	5.5	6		
		R_L=2Ω	9	10		
		R_L=3.2Ω		7.5		
		R_L=1.6Ω		12		
Input sensitivity	Vi	f=1kHz				
		Po=0.5W,R_L=4Ω		14		mV
		Po=6W,R_L=4Ω		55		mV
		Po=0.5W,R_L=2Ω		10		mV
		Po=10W,R_L=2Ω		50		mV
Input saturation voltage	Vi(rms)			300		mV
Frequency response(-3dB)	B	Po=1W,R_L=4Ω	40		15000	Hz
Distortion	D	f=1kHz				%
		Po=0.05 to 4.5W ,R_L=4Ω		0.15		
		Po=0.05 to 7.5W ,R_L=2Ω		0.15		

(continued)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Resistance(pin 1)	Ri	open loop,f=1kHz	70	150		kΩ
Input noise current	e_N			60	200	pA
Input noise voltage	I_N			1	5	µV
open loop voltage gain	Gvo	f=1kHz		80		dB
		f=10kHz		60		dB
closed loop voltage gain	Gvc	f=1kHz,R_L=4Ω	39.3	40	40.3	dB
Efficiency	η	f=1kHz				
		Po=6W,R_L=4Ω		69		%
		Po=10W,R_L=2Ω		65		%
Supply voltage rejection	SVR	f=100Hz,Vripple=0.5V Rg=10kΩ, R_L=4Ω	30	36		dB

Fig.1 Quiescent output voltage vs.Supply voltage

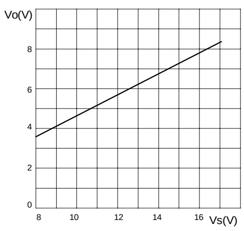


Fig.2 Quiescent drain current vs.Supply voltage

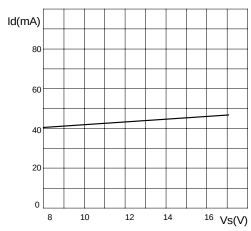


Fig.3 Output power vs.Supply voltage

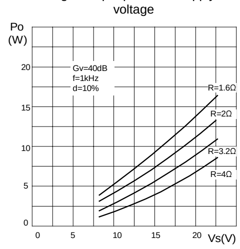


Fig.4 output power vs.load resistance

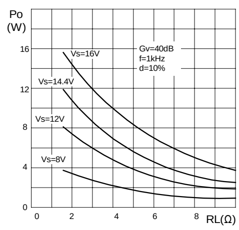


Fig.5 Gain vs. Input sensitivity

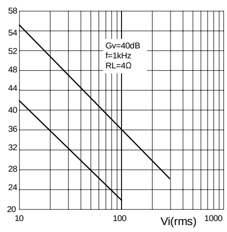


Fig.6 Gain vs. Input sensitivity

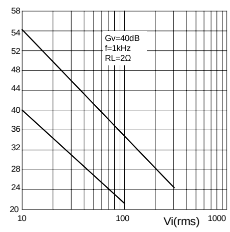


Fig.7 Distortion vs. output power

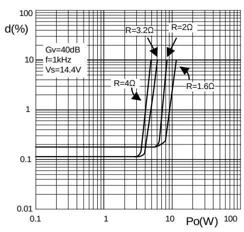


Fig.8 Distortion vs. frequency

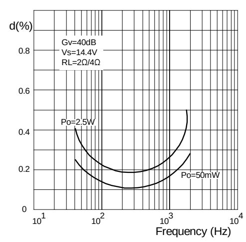


Fig.9 Supply voltage rejection vs. voltage gain

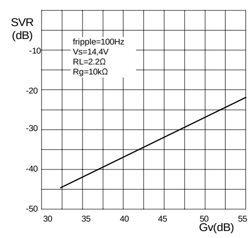


Fig. 10 Supply voltage rejection vs.frequency

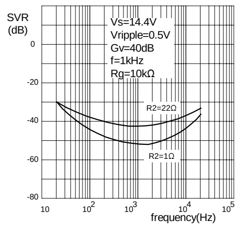


Fig. 11 Power dissipation and efficiency vs. output power(Rl=4Ω)

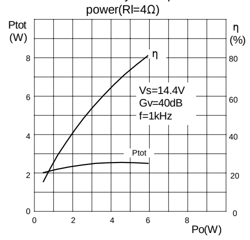


Fig. 12 Power dissipation and efficiency vs. output power(Rl=2Ω)

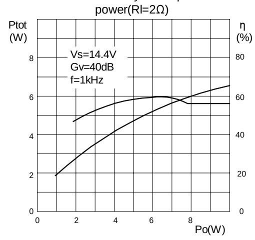


Fig. 13 Maximum Power dissipation and supply voltage(sine wave operation)

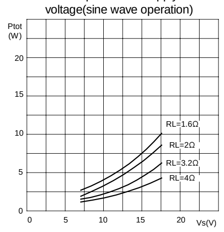


Fig. 14 Maximum allowable dissipation and ambient temperature

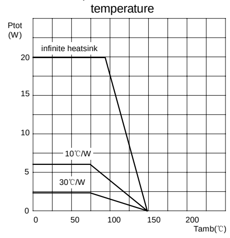
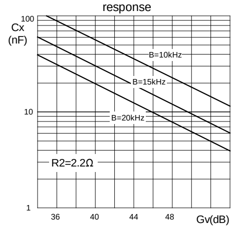
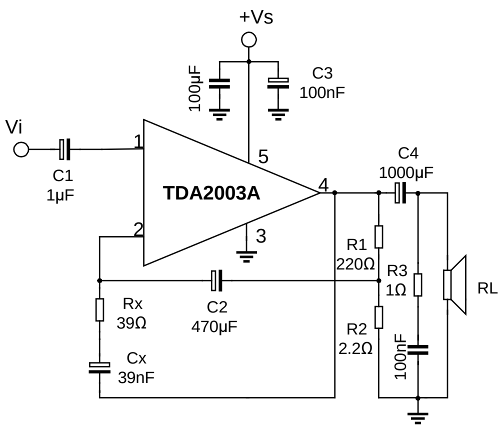


Fig. 15 Typical values of capacitor(Cx) for different values of frequency response



APPLICATION INFORMATION



Rx=20*R2 Cx=1/(2πB*R1)

Fig 16 Typical application circuit

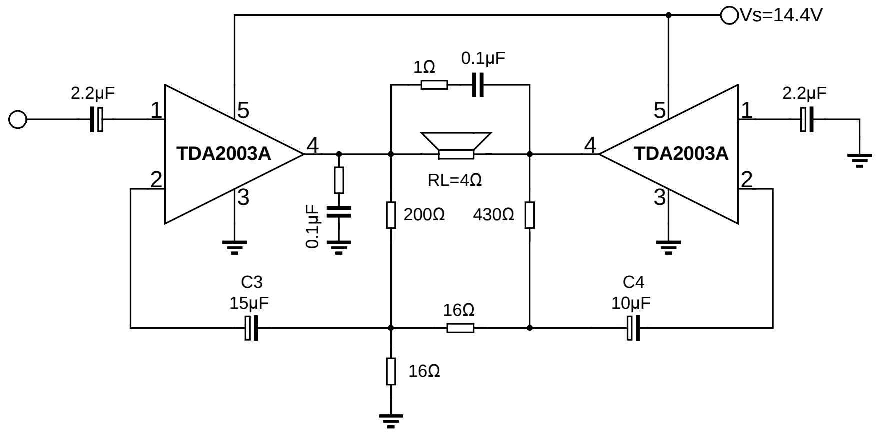


Fig.18 20W Bridge configuration application

The Values of the capacitors C3 and C4 are different to optimize the SVR(Typ. 40dB)

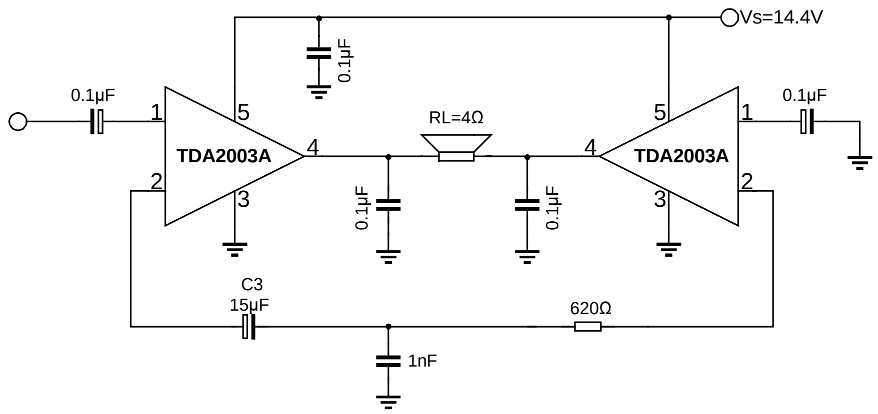


Fig.20 Low cost bridge configuration application circuit(Po=18W)

BUILT-IN PROTECTION SYSTEMS

Load dump voltage surge

The TDA2003A has a circui twhich enables it to with stand a voltage pulse train, on pin5, of the type shownin Fig.23.

APPLICATION SUGGESTION

The recommended values of the components are those shown on application circuit of Fig.16. Different values can be used. The following table can help the designer.

Component	Recommended value	Purpose	Large than recommended value	Large than recommended value
R1	(Gv-1)*R2	gain setting.		increase of Gain
R2	2.2Ω	gain and SVR setting.	Decrease of SVR	
R3	1Ω	Frequency stacility	Danger of oscillation at high frequencies with inductive loads.	
Rx	≈20*R2	Upper frequency cutoff	Poor high frequencies attenuation	Dange of oscillation
C1	2.2µF	Input DC decoupling		Noise at switch-on switch-off
C2	470µF	Ripple rejection		Decrease of SVR
C3	0.1µF	Supply voltage bypass		Dange of oscillation
C4	100µF	Supply voltage bypass		Higher low frequency cutoff
C5	0.1µF	Frequency stability		Danger of oscillation at high frequencies with inductive loads.
Cx	≈/(2 π*B*R1)	Upper frequency cutoff	smaller bandwidth	Larger bandwidth