

BA3518F BA3519F BA3519FS

3 V dual pre- and power amplifier

The BA3518F, BA3519F, and BA3519FS ICs are dual channel preamplifier and power amplifiers. The BA3519F and BA3519FS ICs contain all basic signal circuits necessary for a tape player (including auto-reverse).

The preamplifiers are direct coupled and the power amplifiers have a built-in fixed-gain NF circuit, making an output coupling capacitor unnecessary.

Features

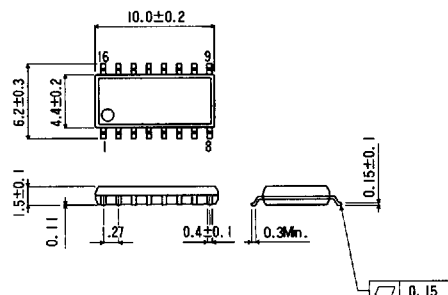
- available in SOP16, SOP22, and SOP-A24 packages
- low voltage operation (1.8 ~ 4.0Vdc)
- preamplifier has high voltage gain (75 dB), low noise ($1.0 \mu V_{rms}$) and low distortion (0.05%).
- power amplifier has high output (31 mW x 2), low noise ($50 \mu V_{rms}$) and low distortion (0.1%)
- preamplifier configured to allow for auto-reverse of tape cassette for BA3519F and BA3519FS
- transistor switches for metal-tape muting are included
- no oscillation protector required for power amplifier

Applications

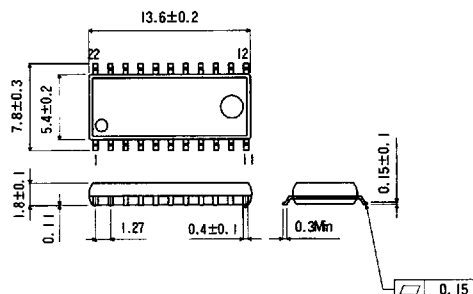
- 3 V tape player
- 3 V radio cassette player

Dimensions (Units : mm)

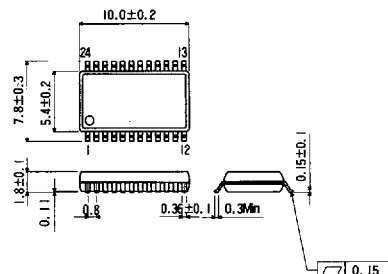
BA3518F (SOP16)



BA3519F (SOP22)



BA3519FS (SSOP-A24)



Block diagram

[illegible]

Absolute maximum ratings ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Limits	Unit	Conditions
Power supply voltage	V_{CC}	6.0	V	
Power dissipation	BA3518F	500	mW	Reduce power by 5.0 mW for each degree above 25°C . Mounted on $50 \times 50 \times 1.6$ mm glass epoxy PCB.
	BA3519F	550		Reduce power by 5.5 mW for each degree above 25°C . Mounted on $50 \times 50 \times 1.6$ mm glass epoxy PCB.
	BA3519FS	800		Reduce power by 8.0 mW for each degree above 25°C . Mounted on $90 \times 50 \times 1.6$ mm glass epoxy PCB.
Operating temperature	T_{opr}	$-25 \sim +75$	$^\circ\text{C}$	
Storage temperature	T_{stg}	$-55 \sim +125$	$^\circ\text{C}$	

Recommended operating conditions ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Min	Typical	Max	Unit	Conditions
Power supply voltage	V_{CC}	1.8	3.0	4.0	V	
Load resistance	R_L	16			Ω	$V_{CC} = 3$ V

**Electrical characteristics (unless otherwise noted, $T_a = 25^\circ\text{C}$, $V_{CC} = 3$ V, $f = 1$ kHz)
(Sheet 1 of 2)**

Parameter	Symbol	Min	Typical	Max	Unit	Conditions
Quiescent current	I_Q		14	23	mA	$V_{IN} = 0$ V _{rms}
Channel separation	CS	30	40		dB	$R_g = 2.2$ k Ω , $R_L = 32$ Ω
Preamplifier ($R_L = 10$ kΩ)						
Voltage gain (open circuit)	G_{VO}	68	75		dB	$V_O = 200$ V _{rms}
Voltage gain (close circuit)	G_{VC1}	36	39	42	dB	$V_O = 100$ V _{rms}
Output voltage	V_{OM}	300	400		mV _{rms}	THD = 1%
Total harmonic distortion	THD ₁		0.05	0.20	%	$V_O = 0.2$ V _{rms}
Input bias current	I_{B1}		200	500	nA	$V_{IN} = 0$ V _{rms}
Input conversion noise voltage	V_{NIN}		1.0	1.8	μV_{rms}	$R_g = 2.2$ k Ω , BPF = 20 Hz ~ 20 kHz
Ripple rejection	RR ₁	40	50		dB	$V_{RR} = -20$ dBm, $f = 100$ Hz
Forward-reverse crosstalk (BA3519F & BA3519FS)	CT _{F-R}	65	75		dB	Single channel, $V_O = -10$ dBm, $R_g = 2.2$ k Ω , IHF A
Power amplifier ($R_L = 32\Omega$) (except P_{OUT2})						
Rated output 1	P_{OUT1}	25	31		mW/ch	$R_L = 16$ Ω , THD = 10%
Rated output 2	P_{OUT2}	15	18		mW/ch	$R_L = 32$ Ω , THD = 10%

BA3518F, BA3519F, BA3519FS Pre- and power amplifiers for headphone stereos

Electrical characteristics (unless otherwise noted, $T_a = 25^\circ\text{C}$, $V_{CC} = 3\text{ V}$, $f = 1\text{ kHz}$)
(Sheet 2 of 2)

Parameter	Symbol	Min	Typical	Max	Unit	Conditions
Voltage gain (close circuit)	G_{VC2}	27.0	30.0	33.0	dB	$V_O = 300\text{ mV}_{\text{rms}}$
Total harmonic distortion	THD_2		0.1	0.9	%	$P_O = 1\text{ mW}$
Output noise voltage	V_{NO}		50	100	μV_{rms}	$R_g = 0\ \Omega$, $\text{BPF} = 20\text{ Hz} \sim 20\text{ kHz}$
Ripple rejection	RR_2	53	63		dB	$V_{RR} = -20\text{ dBm}$, $f = 100\text{ Hz}$,
Input resistance	R_{IN}	14	18.5	23	$\text{k}\Omega$	

Figure 1 Test circuit (BA3519F, for BA3519FS, refer to block diagram)

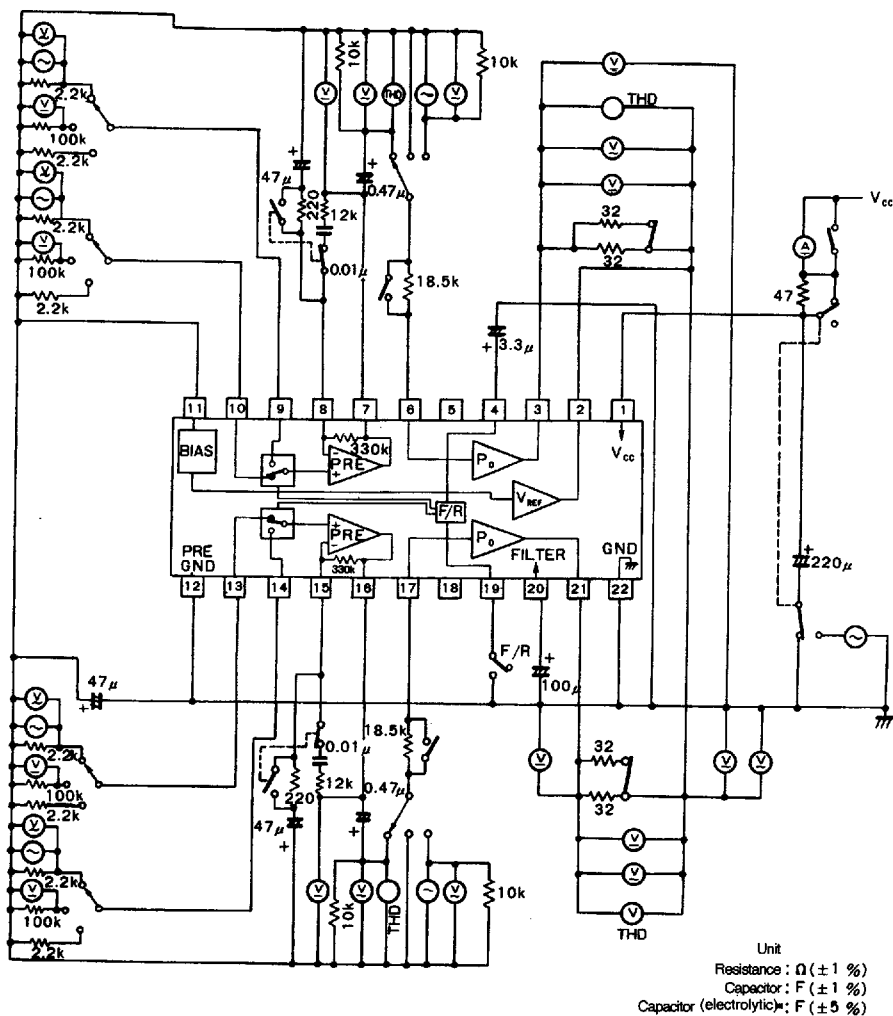


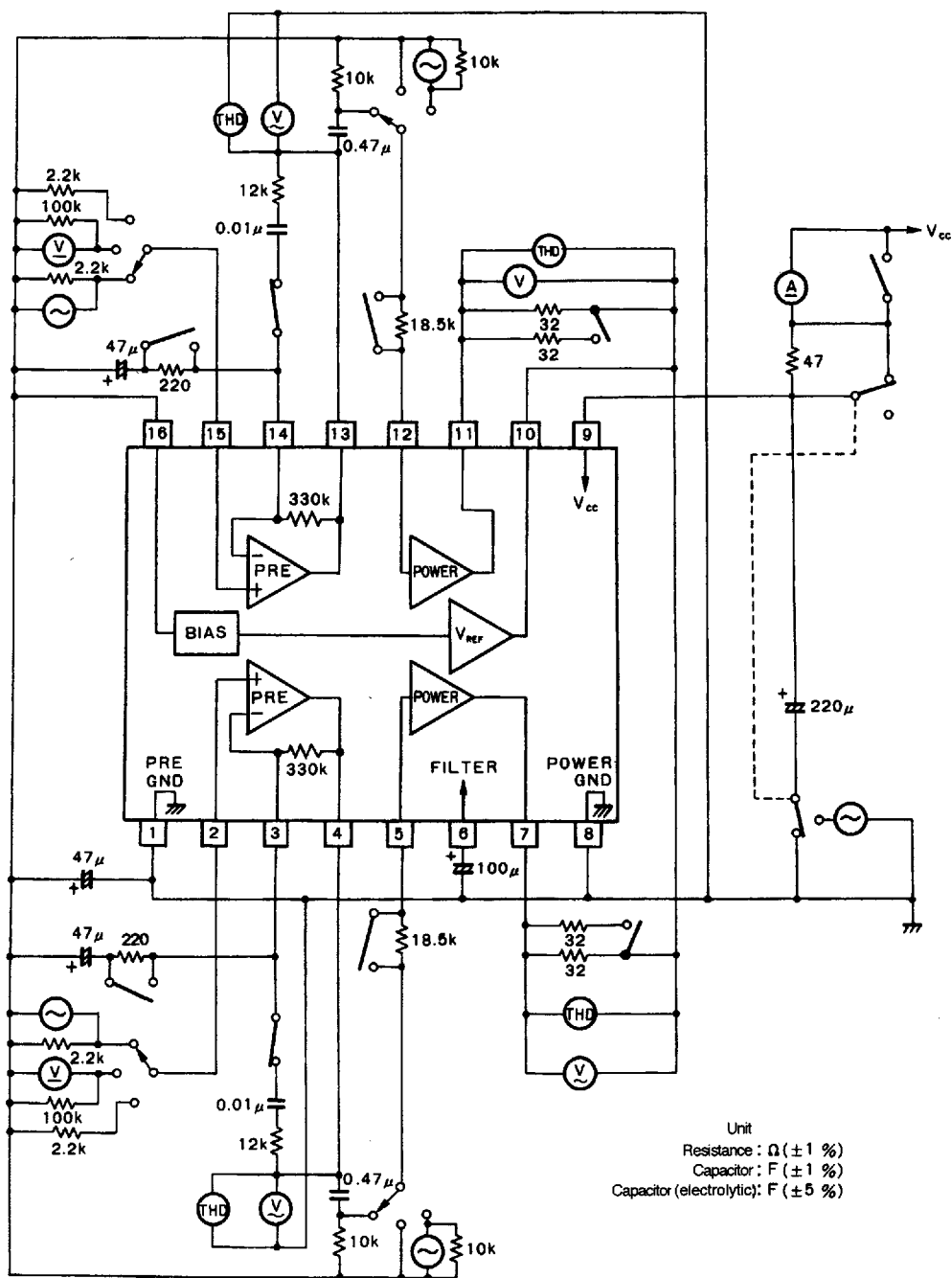
Figure 2 Test circuit (BA3518F)

Figure 3 Application examples (BA3518F)

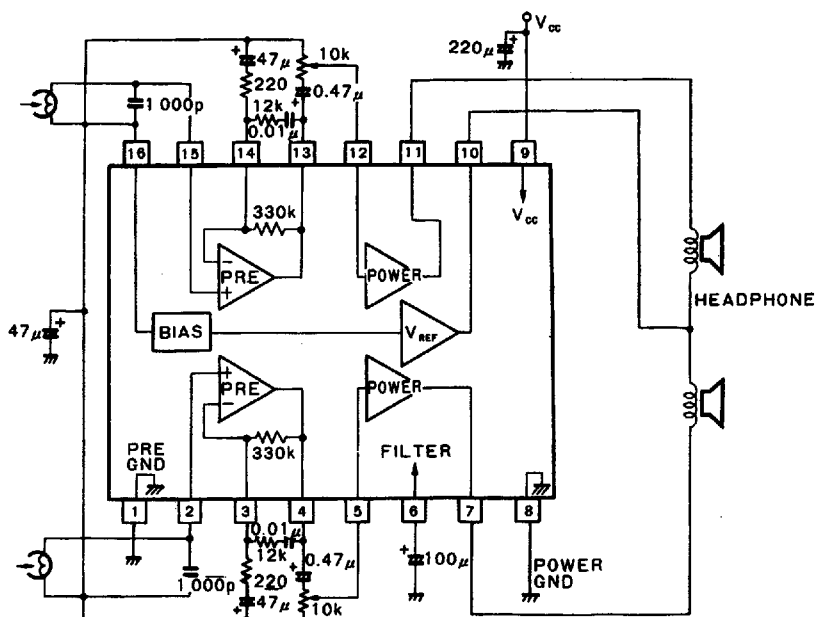


Figure 4 Application examples (BA3519F, for BA3519FS, refer to block diagram)

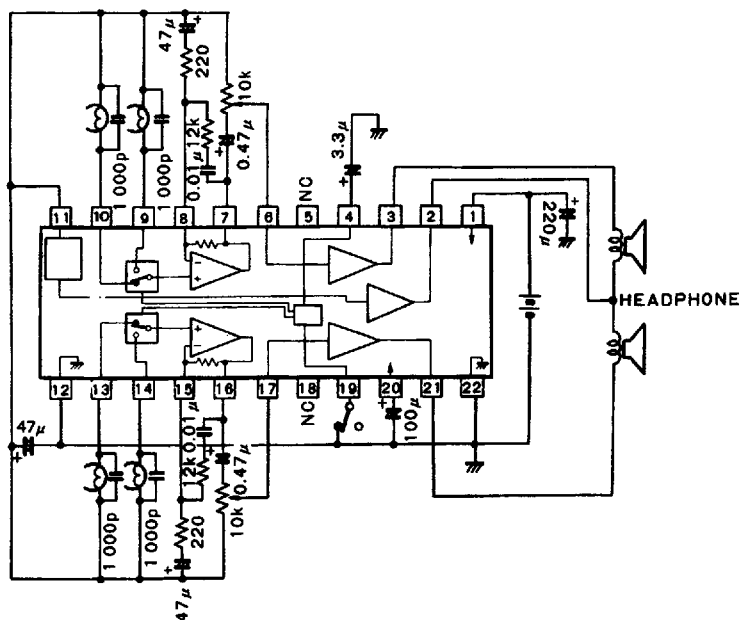
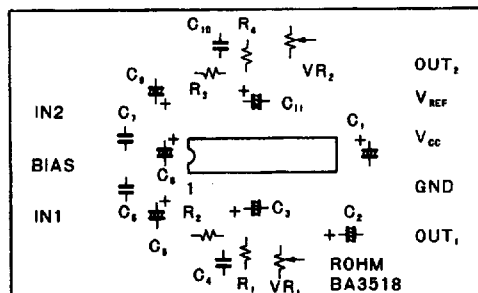
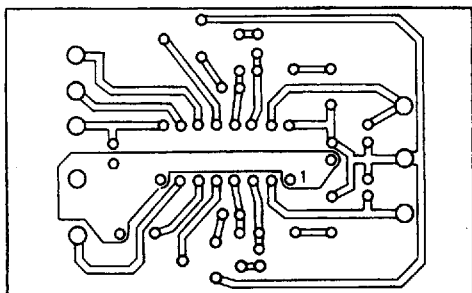
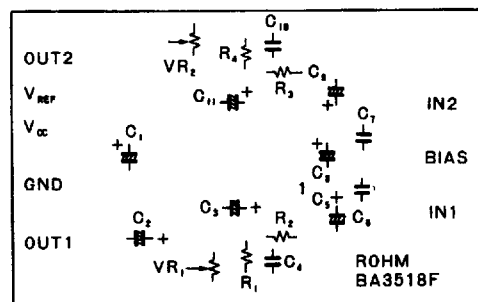
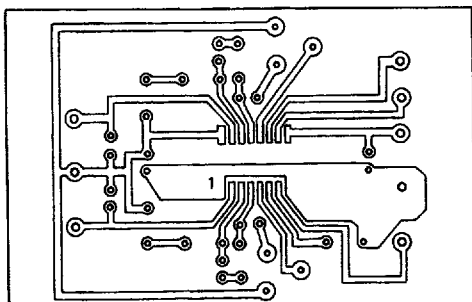


Figure 5 PCB layout for application examples

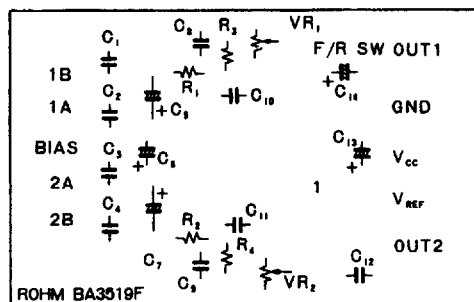
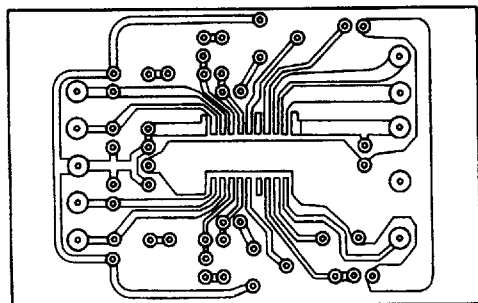
BA3518



BA3518F



BA3519F



Solder side

Component side

Electrical characteristics curves

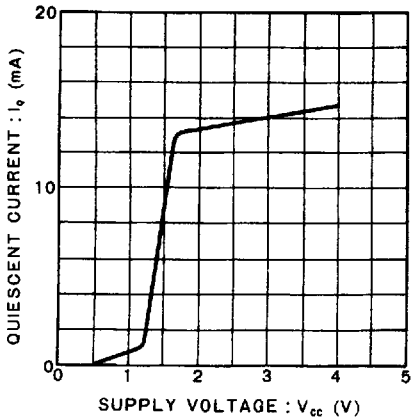


Figure 6

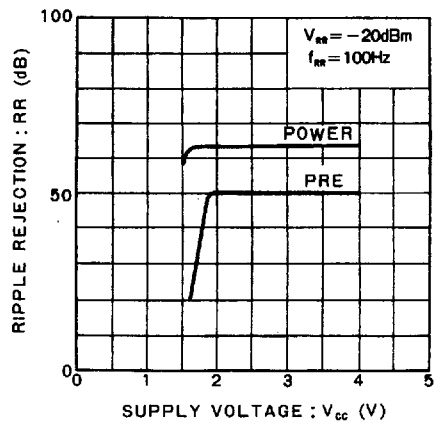


Figure 7

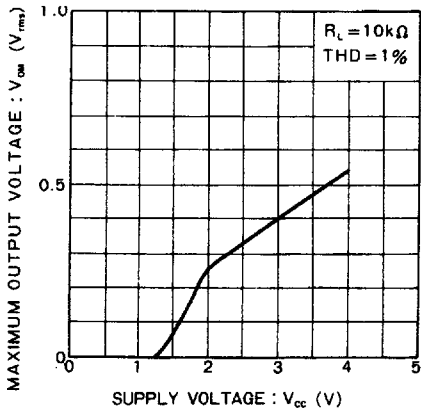


Figure 8

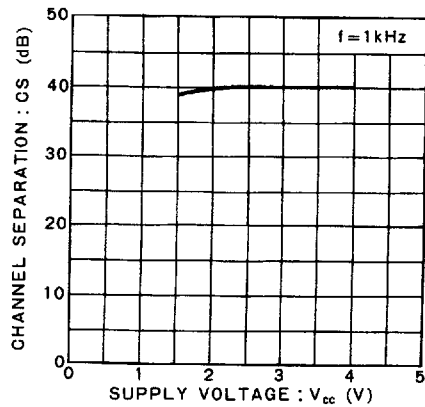


Figure 9

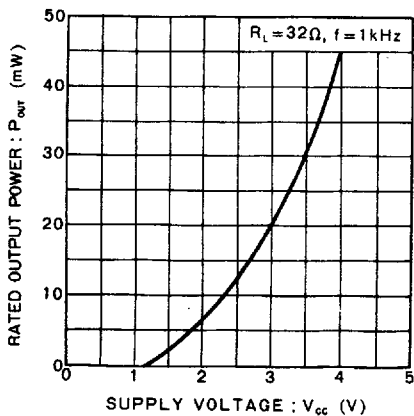


Figure 10

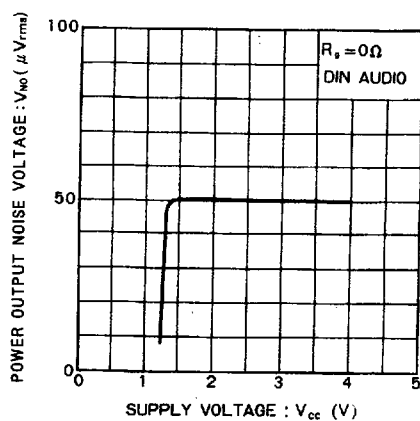


Figure 11

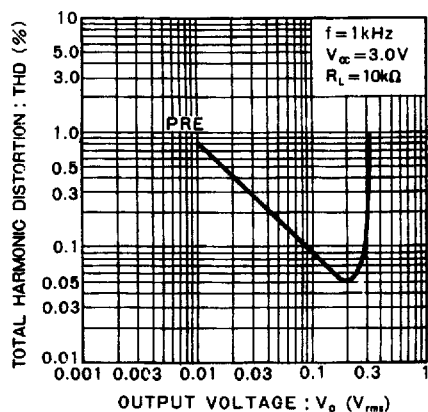


Figure 12

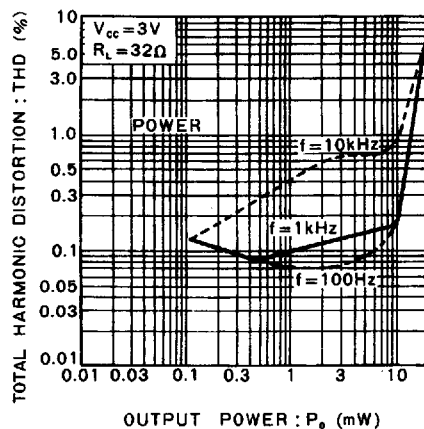


Figure 13