Front end for CD players

BA6354BFS

The BA6354BFS is an analog front end LSI developed for CD players and CD-ROMs.
With a shared equalizer for normal and multiple speeds, and an input stage that supports hologram picks, the need for external components is minimized and the package size is greatly reduced.

●Applications

CD players, car navigation CD-ROMs

●Features

1) Supports hologram picks.
2) Internal APC circuit for laser control.
3) DC control enables balance adjustment for focus error and tracking error.
4) Maintains the output amplitude at a constant value with an RF AGC circuit.
5) Switchable equalizer (internal normal speed and multiple speed equalizer).

●Absolute maximum ratings (Ta = 25°C)

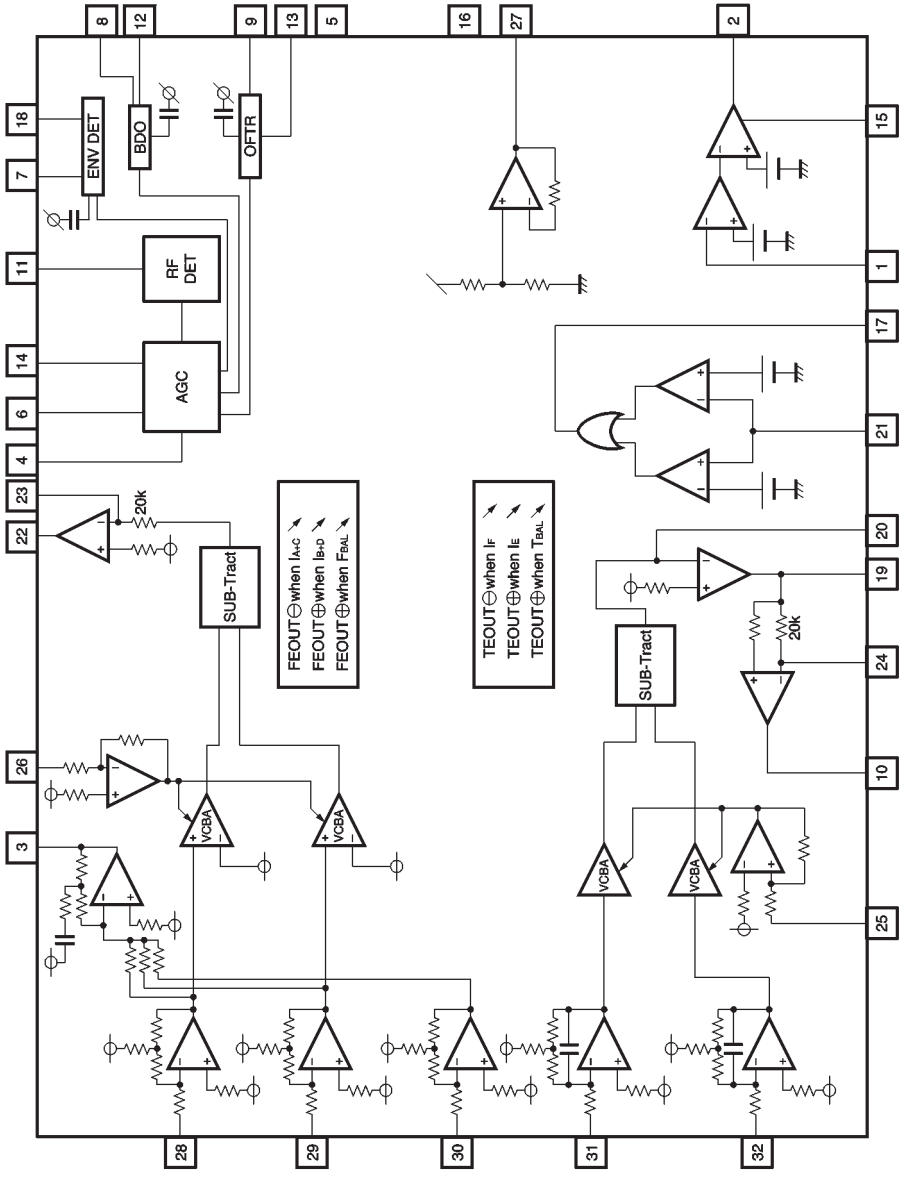
Parameter	Symbol	Limits	Unit
Power supply voltage	V_{CC}	6	V
Power dissipation	Pd	850	mW
Operating temperature	Topr	−30～+85	℃
Storage temperature	Tstg	−55～+125	℃

✻ Reduced by 8.5mW for each increase inTa of 1℃ over 25℃.

●Recommended operating conditions (Ta = 25°C)

Paramerter	Symbol	Limits	Unit
Power supply voltage	V_{CC}	3.4～5.5	V

●Block diagram



●Electrical characteristics (unless otherwise noted, Ta = 25°C, V_{CC} = 5V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Quiescent current	I_Q	8	13	18	mA	
V_{ref} output voltage	V_{ref}	2.2	2.5	2.8	V	
〈Focus error amplifier〉						
Output offset voltage	V_{FEOF}	−63	0	63	mV	
Balance crosstalk amount	V_{FEBC}	−300	−	100	mV	V_{FB}=V_{ref}±1V applied
I-V conversion gain	R_{FO}	63	90	117	kΩ	V_{FB}=V_{ref}
I-V conversion relative gain	ΔR_{FO}	−15	0	15	%	V_{FB}=V_{ref}
High level variable range 1	B_{F1H}	0.21	0.35	0.49	−	V_{FB}=V_{ref}+1V
Low level variable range 1	B_{F1L}	1.19	1.70	2.21	−	V_{FB}=V_{ref}−1V
High level variable range 2	B_{F2H}	1.19	1.70	2.21	−	V_{FB}=V_{ref}+1V
Low level variable range 2	B_{F2L}	0.21	0.35	0.49	−	V_{FB}=V_{ref}−1V
Frequency characteristics	G_{FO}	−5.0	−3	−1.0	dB	f=1kHz, 30kHz
〈Tracking error amplifier〉						
Output offset voltage	V_{TROF}	−63	0	63	mV	
Balance crosstalk amount	V_{TRBC}	−200	−	200	mV	V_{TB}=V_{ref}±1V applied
I-V conversion gain	R_{TR}	420	600	780	kΩ	V_{TB}=V_{ref}
I-V conversion relative gain	ΔR_{TR}	−15	0	15	%	V_{TB}=V_{ref}
High level variable range 1	B_{T1H}	0.21	0.35	0.49	−	V_{TB}=V_{ref}+1V
Low level variable range 1	B_{T1L}	1.20	1.75	2.30	−	V_{TB}=V_{ref}−1V
High level variable range 2	B_{T2H}	1.20	1.75	2.30	−	V_{TB}=V_{ref}+1V
Low level variable range 2	B_{T2L}	0.21	0.35	0.49	−	V_{TB}=V_{ref}−1V
Frequency characteristics	G_{TR}	−5.0	−3	−1.0	dB	f=1kHz, 40kHz
〈CROSS detector〉						
CROSS output high level	V_{CRH}	4.2	−	−	V	V_{TB}=V_{ref}, f=2kHz
CROSS output low level	V_{CRL}	−	−	0.8	V	V_{TB}=V_{ref}, f=2kHz
〈RF-AMP〉						
Offset voltage	V_{RFOF}	−75	0	75	mV	
I-V conversion gain	R_{RF}	42.8	53.5	69.6	kΩ	
I-V conversion relative gain 1	ΔR_{RF1}	−10	0	10	%	
I-V conversion relative gain 2	ΔR_{RF2}	−10	0	10	%	
Frequency characteristics	G_{RF}	−6.8	−2.8	0.2	dB	f=500kHz, 3MHz
EQ characteristics	ΔG_{EQ}	−0.8	1.7	4.2	dB	f=1MHz, 1.5MHz

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
〈AGC〉						
AGC maximum gain	G_{AGC}	10.0	14.5	19.0	dB	f=500kHz
AGC operating gain	G_{OPAGC}	2.0	5.0	8.0	dB	f=500kHz, V_{IN}=500mV_{P-P}
AGC compression	G_{CmAGC}	1.5	4.5	7.5	dB	f=500kHz, V_{IN}=100mV_{P-P}
AGC frequency characteristics	G_{fAGC}	−3.0	0	3.0	dB	f=3MHz, V_{IN}=500mV_{P-P}
〈RFDET〉						
RFDET detection level	V_{RFDET}	0.091	0.130	0.175	V_{P-P}	f=500kHz (RFIN level)
RFDET high level	V_{RFH}	4.2	—	—	V	f=500kHz (RFIN level)
RFDET low level	V_{RFL}	—	—	0.8	V	f=500kHz (RFIN level)
〈BDO〉						
BDO detection current	I_{BDO}	0.6	1.0	1.4	μA	
BDO high level	V_{BDOH}	4.2	—	—	V	f=2kHz, rectangular wave
BDO low level	V_{BDOL}	—	—	0.8	V	f=2kHz, rectangular wave
〈OFTR〉						
OFTR detection current	I_{OFTR}	0.6	1.0	1.4	μA	
OFTR high level	V_{OFTRH}	4.2	—	—	V	f=2kHz, rectangular wave
OFTR low level	V_{OFTRL}	—	—	0.8	V	f=2kHz, rectangular wave
〈LD-APC〉						
LD ON high level input	V_{LDH}	3.5	—	—	V	
LD OFF low level input	V_{LDL}	—	—	1.5	V	
LD ON operating voltage	V_{LD}	145	180	215	mV	DC sweep
〈VDET detector〉						
VDET detection level 1	V_{DET1}	56	80	104	mV	DC sweep
VDET detection level 2	V_{DET2}	−104	−80	−56	mV	DC sweep
VDET high level	V_{DETH}	4.2	—	—	V	DC sweep
VDET low level	V_{DETL}	—	—	0.8	V	DC sweep
〈3T ENV〉						
CEA-ENV propagation characteristics	G_{ENV}	21	23	25	dB	
CEA input impedance	R_{CEA}	6.4	8.0	9.6	kΩ	
ENV output impedance	R_{ENV}	6.0	7.5	9.0	kΩ	
ENV-AMP offset voltage	V_{ENVOF}	−150	0	150	mV	
CEA-AMP operating voltage	V_{OPCEA}	90	150	210	mV	

●Measurement circuit

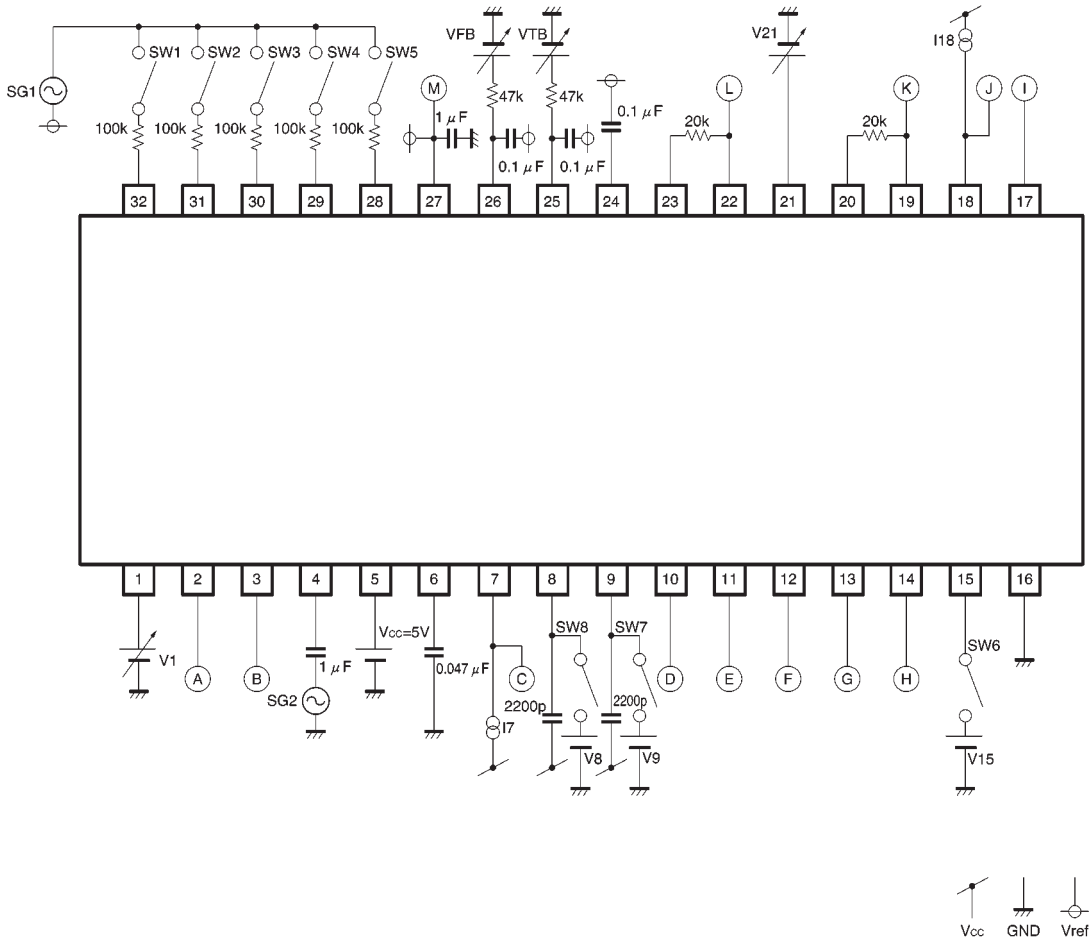


Fig.1

●Application example

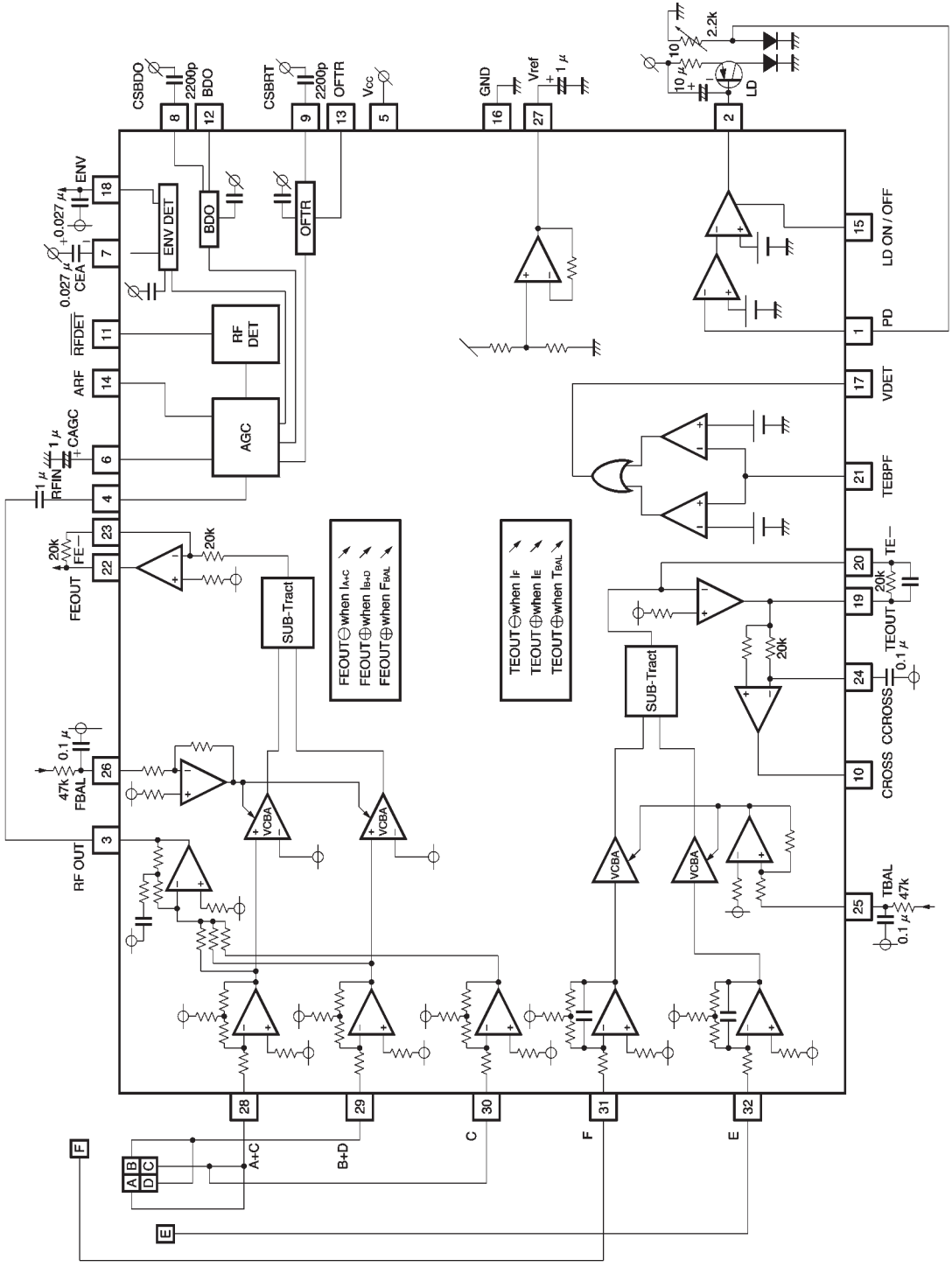


Fig.2

●Electrical characteristics curve

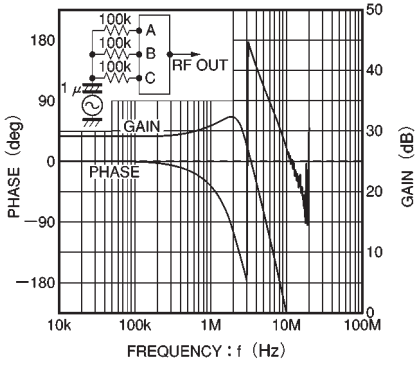
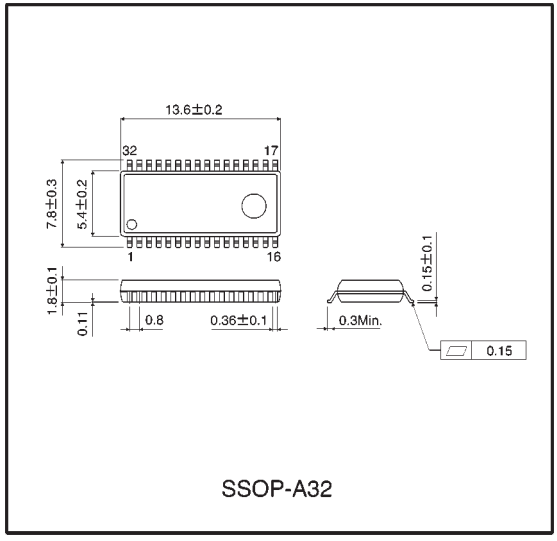


Fig.3 RFamplifier frequency characteristics

●External dimensions (Units: mm)



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