

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)

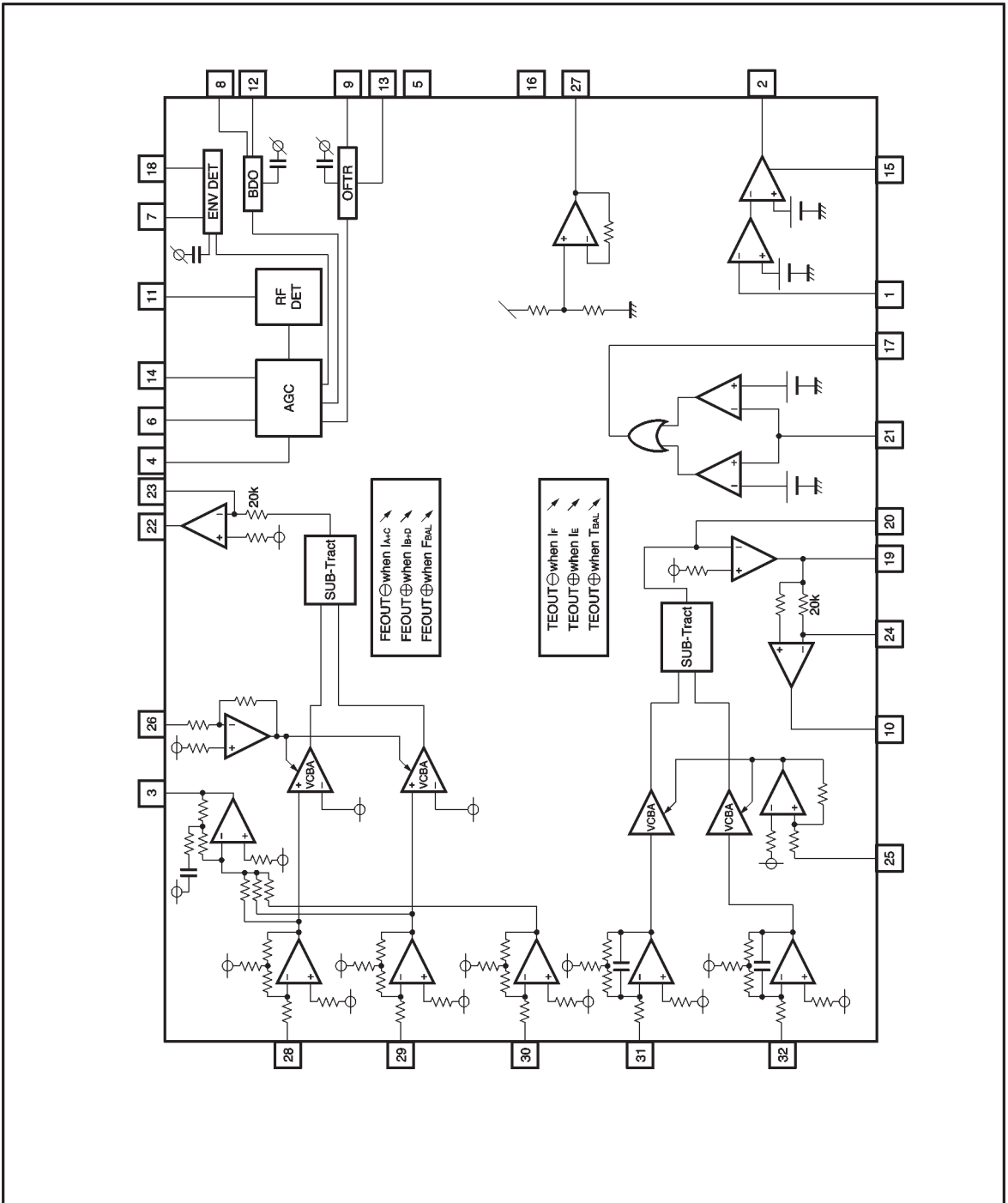
| Parameter | Symbol | Limits | Unit |
|-----------------------|------------------|----------|------|
| Power supply voltage | V _{CC} | 6 | V |
| Power dissipation | P _d | 850 | mW |
| Operating temperature | T _{opr} | -30~+85 | °C |
| Storage temperature | T _{stg} | -55~+125 | °C |

* Reduced by 8.5mW for each increase in Ta of 1°C over 25°C.

●Recommended operating conditions (Ta = 25°C)

| Parameter | Symbol | Limits | Unit |
|----------------------|-----------------|---------|------|
| Power supply voltage | V _{CC} | 3.4~5.5 | V |

● Block diagram



●Electrical characteristics (unless otherwise noted, $T_a = 25^\circ\text{C}$, $V_{CC} = 5\text{V}$)

| 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 | $V_{FB} = V_{ref} \pm 1\text{V}$ applied |
| I-V conversion gain | R_{FO} | 63 | 90 | 117 | $k\Omega$ | $V_{FB} = V_{ref}$ |
| 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 | — | $V_{FB} = V_{ref} + 1\text{V}$ |
| Low level variable range 1 | B_{F1L} | 1.19 | 1.70 | 2.21 | — | $V_{FB} = V_{ref} - 1\text{V}$ |
| High level variable range 2 | B_{F2H} | 1.19 | 1.70 | 2.21 | — | $V_{FB} = V_{ref} + 1\text{V}$ |
| Low level variable range 2 | B_{F2L} | 0.21 | 0.35 | 0.49 | — | $V_{FB} = V_{ref} - 1\text{V}$ |
| Frequency characteristics | G_{FO} | -5.0 | -3 | -1.0 | dB | $f = 1\text{kHz}, 30\text{kHz}$ |
| 〈Tracking error amplifier〉 | | | | | | |
| Output offset voltage | V_{TROF} | -63 | 0 | 63 | mV | |
| Balance crosstalk amount | V_{TRBC} | -200 | — | 200 | mV | $V_{TB} = V_{ref} \pm 1\text{V}$ applied |
| I-V conversion gain | R_{TR} | 420 | 600 | 780 | $k\Omega$ | $V_{TB} = V_{ref}$ |
| 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 | — | $V_{TB} = V_{ref} + 1\text{V}$ |
| Low level variable range 1 | B_{T1L} | 1.20 | 1.75 | 2.30 | — | $V_{TB} = V_{ref} - 1\text{V}$ |
| High level variable range 2 | B_{T2H} | 1.20 | 1.75 | 2.30 | — | $V_{TB} = V_{ref} + 1\text{V}$ |
| Low level variable range 2 | B_{T2L} | 0.21 | 0.35 | 0.49 | — | $V_{TB} = V_{ref} - 1\text{V}$ |
| Frequency characteristics | G_{TR} | -5.0 | -3 | -1.0 | dB | $f = 1\text{kHz}, 40\text{kHz}$ |
| 〈CROSS detector〉 | | | | | | |
| CROSS output high level | V_{CRH} | 4.2 | — | — | V | $V_{TB} = V_{ref}$, $f = 2\text{kHz}$ |
| CROSS output low level | V_{CRL} | — | — | 0.8 | V | $V_{TB} = V_{ref}$, $f = 2\text{kHz}$ |
| 〈RF-AMP〉 | | | | | | |
| Offset voltage | V_{RFOF} | -75 | 0 | 75 | mV | |
| I-V conversion gain | R_{RF} | 42.8 | 53.5 | 69.6 | $k\Omega$ | |
| 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 | $f = 500\text{kHz}, 3\text{MHz}$ |
| EQ characteristics | ΔG_{EQ} | -0.8 | 1.7 | 4.2 | dB | $f = 1\text{MHz}, 1.5\text{MHz}$ |

| 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 _{IAGC} | -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 _{BDO L} | — | — | 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

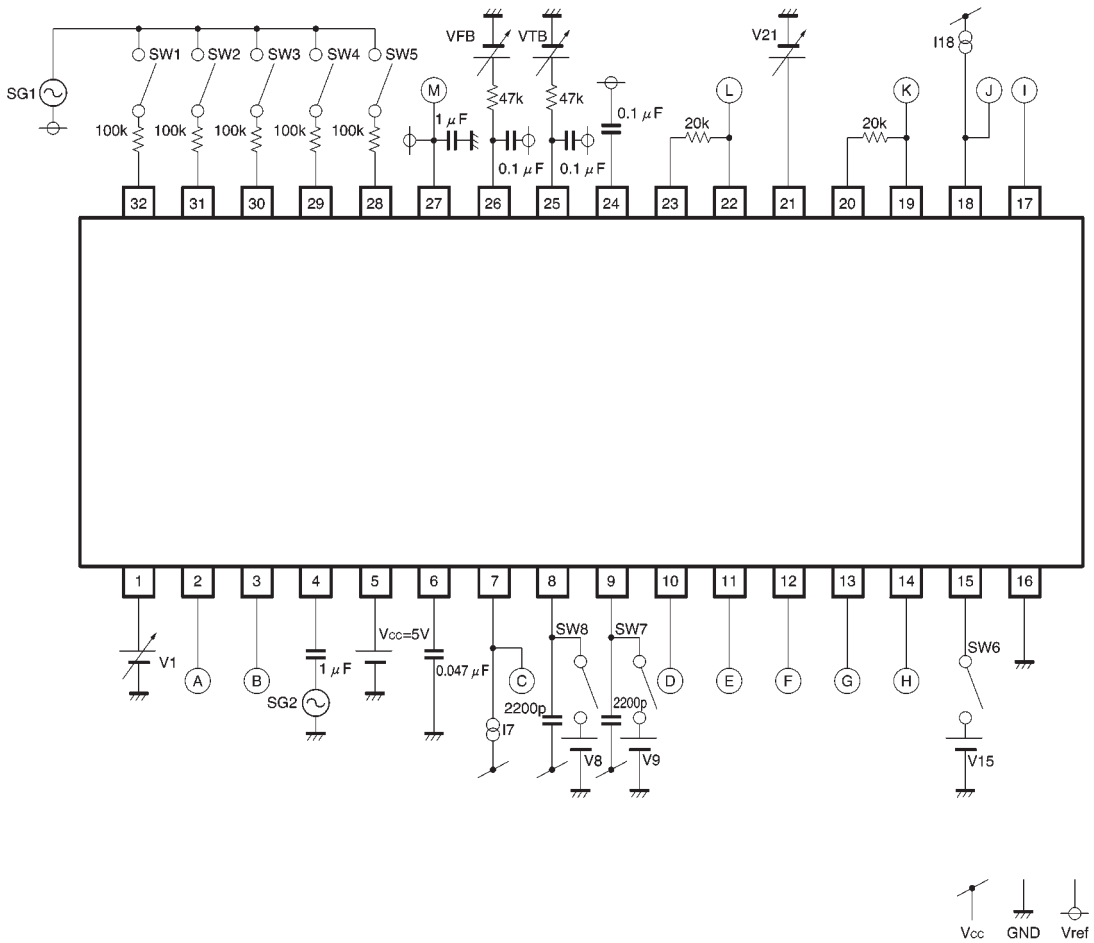


Fig.1

● Application example

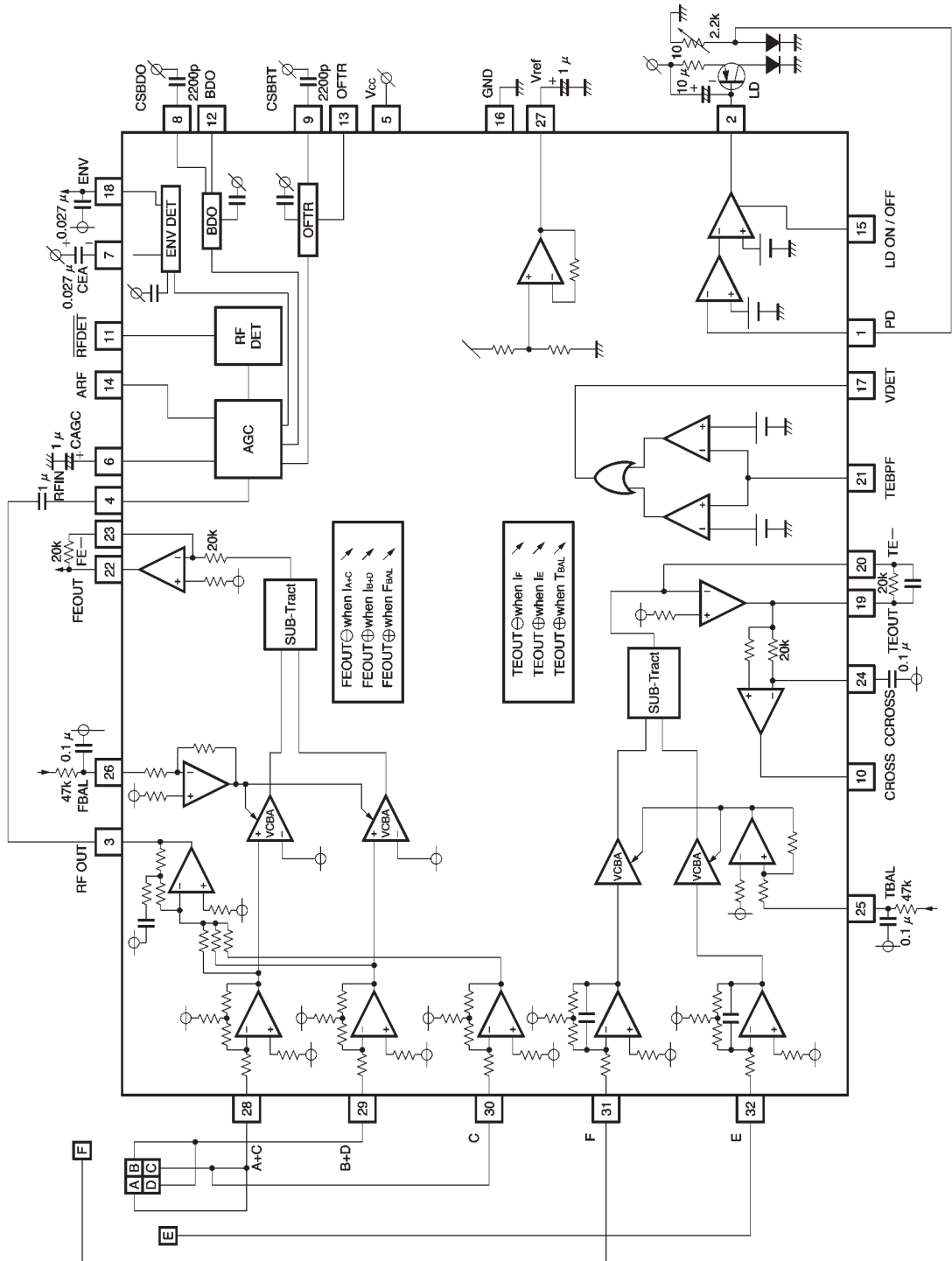


Fig.2

● Electrical characteristics curve

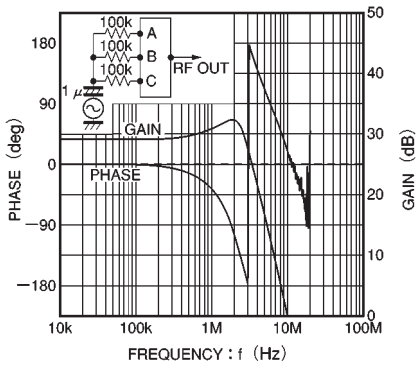


Fig.3 RF amplifier frequency characteristics

● External dimensions (Units: mm)

