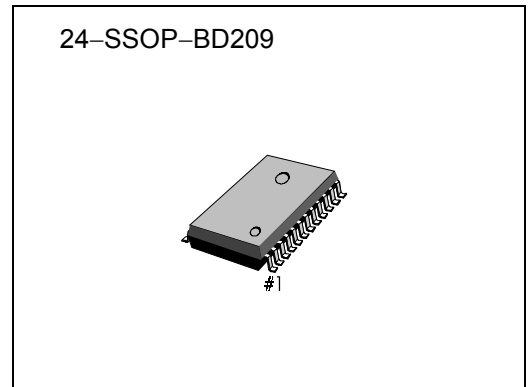


INTRODUCTION

The KA8516 is a designed for FM IF detection on the FLEX pager set. It includes a wide dynamic range audio output, which is easy to connect to an A/D converter. Also it includes a 2-level FSK comparator.

FEATURES

- FM IF detector for 4 level FSK
- High transmission rate: 6400bps (Max.)
- Operating voltage range: $V_{CC1} = 1.1 \sim 4.0V$
- Typical supply current: 1.5mA at 1.4V
- Low battery detection circuit (alarm function): 1.05V
- Voltage regulator: $V_{reg} = 1.0V$ (Typ.)
- Mixer operating frequency: 10 ~ 50MHz
- Package type: 24-SSOP (0.65mm)

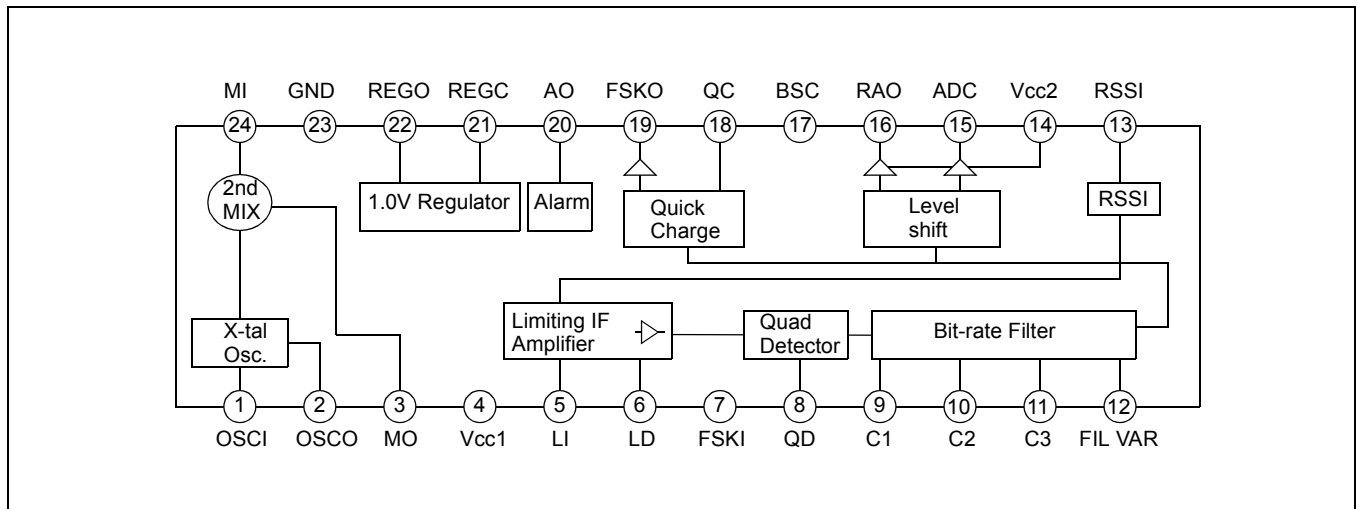


ORDERING INFORMATION

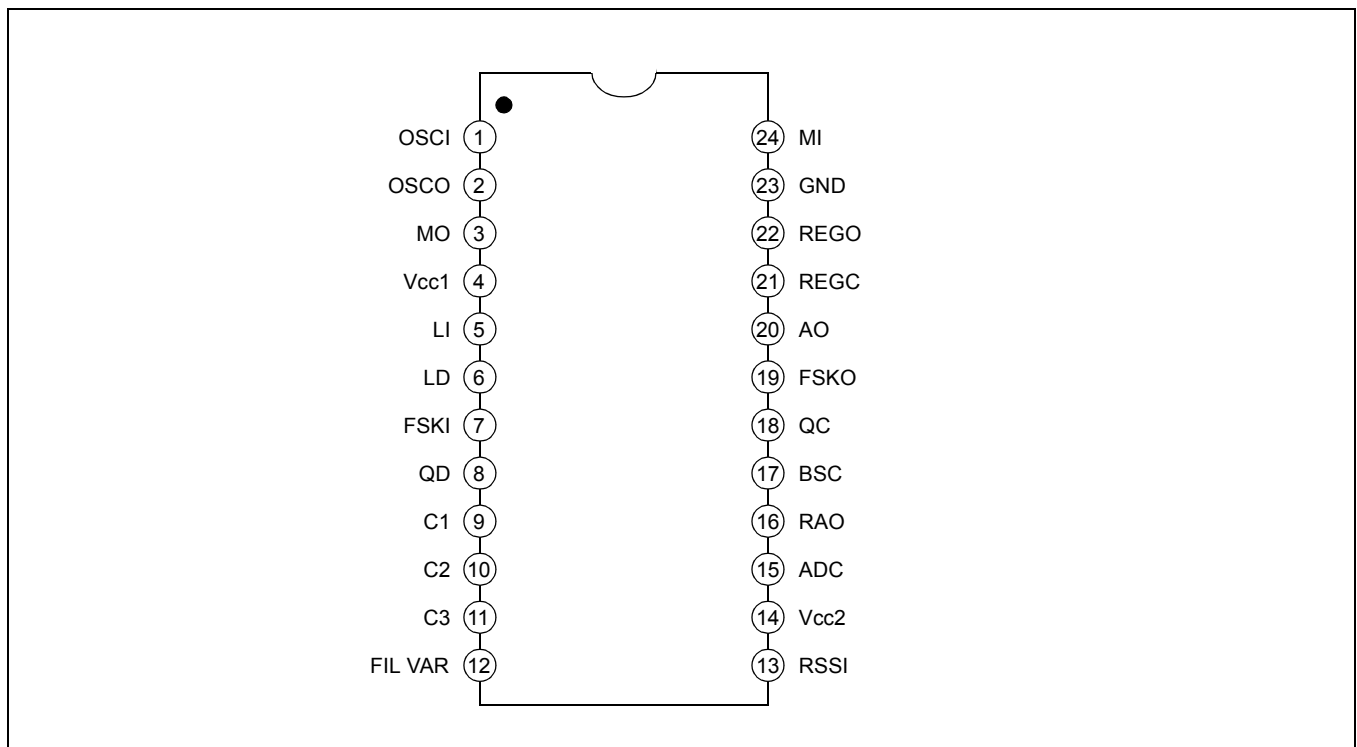
| Device | Package | Operating Temperature |
|---------|--------------|-----------------------|
| +KA8516 | 24-SSOP-BD20 | -20°C to +70°C |

+: New product

BLOCK DIAGRAM



PIN CONFIGURATION



PIN DESCRIPTION

| Pin No | Symbol | Description |
|--------|-----------|--|
| 1 | OSCI | Oscillator input (Base). The oscillator is an internally-biased colpitts type. |
| 2 | OSCO | Oscillator output (Emitter). |
| 3 | MO | Mixer output. Output impedance $\approx 1.2k\Omega$. Connect a 455kHz filter between this pin and the LI. |
| 4 | V_{CC1} | Power supply voltage (Main power). |
| 5 | LI | IF limiter amplifier input. Input impedance $\approx 1.2k\Omega$ |
| 6 | LD | Bypass capacitor connect pin for the IF limiter amp. |
| 7 | FSKR1 | Differential Amp Reference input on the FSK comparator. |
| 8 | QD | Quadrature detection, phase shifter pin. |
| 9 | C1 | Capacitors for bit-rate filter. |
| 10 | C2 | |
| 11 | C3 | |
| 12 | FIL VAR | Bit-rate filter selection. High: Internal cut-off frequency will be set to Low. Low : Internal cut- off frequency will be set to High. |
| 13 | RSSI | RSSI output The power of received RF signal can be detected by monitoring the limiter amplifier. |
| 14 | V_{CC2} | Power supply voltage. This power supply to the Level shift circuitry. |
| 15, | ADC | This pin shows DC level of recovered audio signal output. |
| 16 | RAO | Recovered audio signal output. |
| 17 | BSC | Battery saving control. High: Battery saving off, normal mode operation. Low : Battery saving on, battery save mode operation. |
| 18 | QC | Quick charge control. High: Quick charge-discharge on. Low : Quick charge-discharge off. |
| 19 | FSKO | FSK signal output. |
| 20 | AO | Alarm output. This pin becomes High when V_{CC1} drops below 1.05V. |
| 21 | REGC | KA8516 has an internal PNP transistor. But, it also can support an external PNP transistor to control the power. |
| 22 | REGO | Regulated voltage output. |
| 23 | GND | Ground. |
| 24 | MI | Mixer input. Input impedance $\approx 5k\Omega$ |

ABSOLUTE MAXIMUM RATINGS

| Characteristic | Symbol | Value | Unit |
|-----------------------|-----------------|------------|------|
| Supply Voltage | $V_{CC1 (MAX)}$ | 4 | V |
| | V_{CC2} | 6 | V |
| Power Dissipation | P_D | 760 | mW |
| Operating Temperature | T_{OPR} | -20 ~ +70 | °C |
| Storage Temperature | T_{STG} | -55 ~ +125 | °C |

ELECTRICAL CHARACTERISTICS

($V_{CC} = 1.4V \pm 5\%$, $f_{IN} (2MIX) = 21.4MHz$, $f_{DEV} = \pm 4.8kHz$, $f_{MOD} = 800Hz$, $T_a = 25^\circ C$, $FIL_VAR = "H"$, unless otherwise specified)

| Characteristic | Symbol | Test Conditions | Min. | Typ. | Max. | Unit |
|----------------------------------|------------------|--|------|------|------|-------------------|
| Operating current | I_{CCN} | No Input Signal | - | 1.5 | 1.75 | mA |
| | I_{CCS} | Battery Saving | - | 0 | 10 | μA |
| Alarm detection voltage | V_{AD} | - | 1.0 | 1.05 | 1.1 | V |
| Alarm low level output voltage | $V_{O (AL)}$ | $I = 100\mu A$ | - | - | 0.4 | V |
| Alarm high level leakage current | $I_{LKG (AL)}$ | - | - | - | 2 | μA |
| FSK low level output voltage | $V_L (FSK)$ | $I = 100\mu A$ | - | - | 0.4 | V |
| FSK high level leakage current | $I_{LKG (FSK)}$ | - | - | - | 2 | μA |
| Regulator output voltage | V_{OREG} | - | 0.95 | 1.0 | 1.05 | V |
| Quick charge current | I_C | - | 50 | 70 | - | μA |
| Input for -3dB sensitivity | V_{LIM} | Mixer Input | - | 2.5 | 7.5 | μV_{rms} |
| Recovered audio output voltage | $V_{O (RAO)}$ | $V_{IN (2MIX)} = 500\mu V_{rms}$ | 40 | 60 | 82 | mV _{rms} |
| Mixer conversion gain | $\Delta G_V (M)$ | Ceramic Filter loss = -1dB | 8 | 12 | 16 | dB |
| Signal to noise ratio | S/N | $V_{IN (MIX1N)} = 500\mu V_{rms}$ | 38 | 55 | - | dB |
| Total Harmonic Distortion | THD | $V_{IN (MIX1N)} = 500\mu V_{rms}$ | - | 2.0 | 3.5 | % |
| Mixer 3rd order intercept point | 3RD | - | - | -10 | - | dBm |
| Mixer input resistance | $R_I (MIX)$ | - | 3.5 | 5 | 6.5 | k Ω |
| Limiting amp input resistance | $R_I (LA)$ | - | 0.6 | 1.2 | 1.8 | k Ω |
| AM rejection ratio | AMR | $V_{IN (2MIX)} = 500\mu V_{rms}$ (AM = 30%) | 25 | 40 | - | dB |

ELECTRICAL CHARACTERISTICS

($V_{CC} = 1.4V \pm 5\%$, $f_{IN} (2MIX) = 21.4MHz$, $f_{DEV} = \pm 4.8kHz$, $f_{MOD} = 800Hz$, $T_a = 25^\circ C$, $FIL_VAR = "H"$, unless otherwise specified)

| Characteristic | Symbol | Test Conditions | Min. | Typ. | Max. | Unit |
|---------------------------|-------------|-------------------------------|------|------|------|-----------|
| Data shaping output duty | DR | $V_{IN} (2MIX) = 500\mu Vrms$ | 40 | 50 | 60 | % |
| RSSI output voltage | V_{RSSI} | $V_{IN} (2MIX) = 1mVrms$ | 0.49 | 0.7 | 0.91 | V |
| RSSI output resistance | R_{RSSI} | – | 90 | 100 | 110 | $k\Omega$ |
| V_{CC2} operating range | V_{CC2} | $V_{IN} (IF) = 630\mu Vrms$ | 2 | – | 6 | V |
| Audio Output Level | V_{AUDIO} | $V_{IN} (LIM) = 500\mu Vrms$ | 0.9 | 1.25 | 1.5 | V |
| DC Output voltage | V_{DC} | $V_{IN} (LIM) = 500\mu Vrms$ | 0.9 | 1.1 | 1.3 | V |

APPLICATION CIRCUIT

