

## M-ary FSK Demodulating Comparator

### Description

The CXA1994AM/BM is a comparator which allows the M-ary (4-level) FSK data to be demodulated in combination with an FM IF amplifier for pagers.

### Features

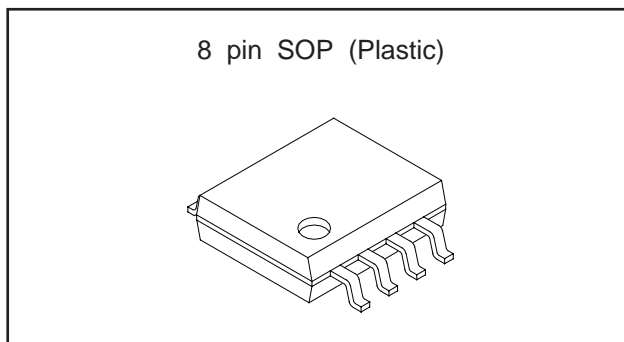
- Low power consumption  
70 $\mu$ A (at  $V_{CC} = 1.4V$ , including the current on battery saving control pin)
- Low voltage operation  
 $V_{CC} = 1.0$  to  $4.0V$

### Applications

M-ary FSK pagers

### Function

- Window comparator for MSB detection
- Battery saving control pin
- Threshold level adjustment pin



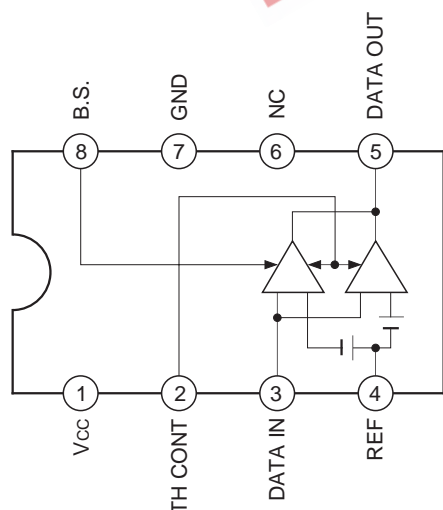
### Absolute Maximum Ratings ( $T_a = 25^{\circ}C$ )

• Supply voltage	$V_{CC}$	7.0	V
• Operating temperature	$T_{opr}$	-20 to +75	$^{\circ}C$
• Storage temperature	$T_{stg}$	-65 to +150	$^{\circ}C$

### Operating Conditions

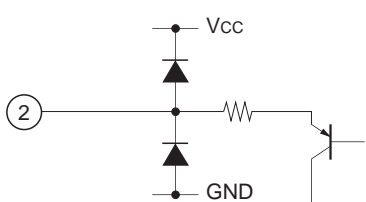
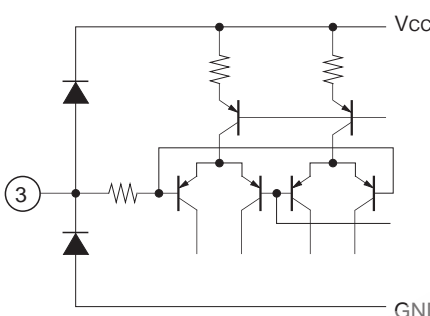
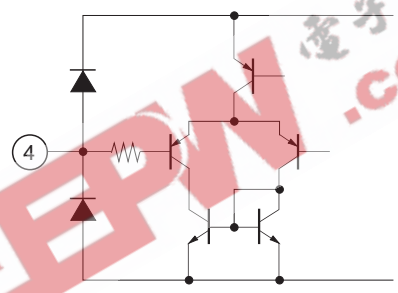
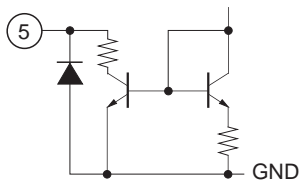
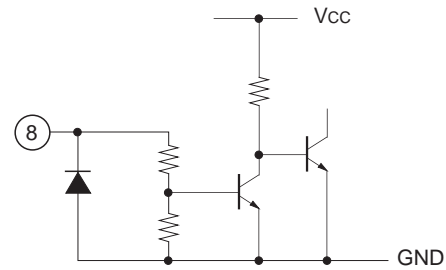
• Supply voltage	$V_{CC}$	1.0 to 4.0	V
------------------	----------	------------	---

### Block Diagram



Sony reserves the right to change products and specifications without prior notice. This information does not convey any license by any implication or otherwise under any patents or other right. Application circuits shown, if any, are typical examples illustrating the operation of the devices. Sony cannot assume responsibility for any problems arising out of the use of these circuits.

## Pin Description

Pin No.	Symbol	Pin voltage	Equivalent circuit	Description
1	Vcc	1.5V		Vcc.
2	TH CONT	—		Adjusts the threshold level for comparator.
3	DATA IN	0.2V		Signal input. Connected to the COMP IN pin of the CXA1484A.
4	REF	0.2V		Reference input. Connected to the SENSE pin of the CXA1484A.
5	DATA OUT	—		Comparator output.
6	NC	—		
7	GND	0		Ground.
8	B.S.	—		Battery saving control.

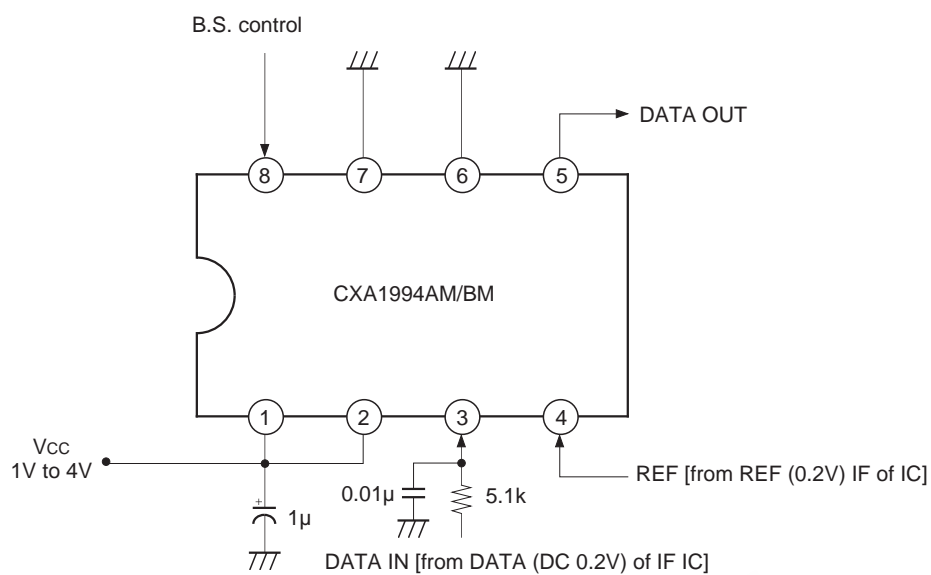
**Electrical Characteristics**(V<sub>CC</sub> = 1.4V, T<sub>a</sub> = 25°C)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Current consumption	I <sub>CC</sub>			70	100	μA
Current consumption	I <sub>CCS</sub>				6	μA
Comparator input voltage high level	V <sub>COMP</sub> H	V <sub>REF</sub> as a reference		50		mV
Comparator input voltage low level	V <sub>COMP</sub> L	V <sub>REF</sub> as a reference		−50		mV
Comparator output saturation voltage	V <sub>SAT</sub>				0.4	V
Logic input voltage high level	V <sub>THH</sub>		0.9			V
Logic input voltage low level	V <sub>THL</sub>				0.35	V

**Pin Description**

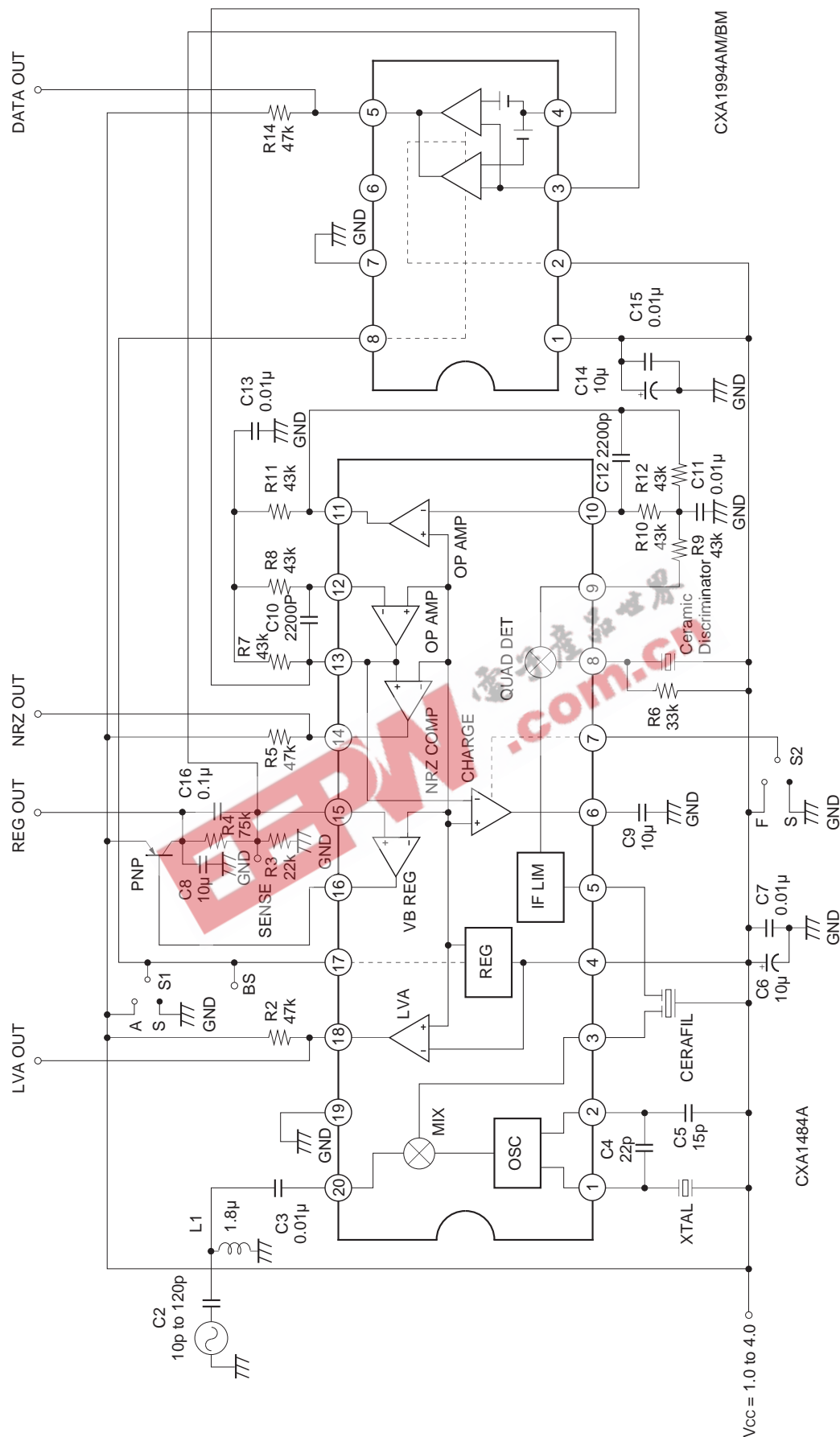
1. V<sub>CC</sub> Power supply pin of 1V or more
2. TH CONT This pin adjusts the threshold level and the default is approximately ±50mV from the reference voltage. The threshold level can be set lower by inserting a resistor between V<sub>CC</sub> and this pin. (The level cannot be set higher.)
3. DATA IN The signal after passing through the data filter of the IF IC (CXA1484A) is input.
4. REF Connects to the reference voltage pin of the IF IC. (Pin 15 of the CXA1484A)
5. DATA OUT Comparator output.
6. NC Not connected.
7. GND Ground.
8. B.S. Battery saving control pin. Battery saving state for low; normal operation for high.

## Electrical Characteristics Measurement Circuit



\* The comparator level can be set lower by inserting a resistor between Pin 1 (Vcc) and Pin 2.

# Application Circuit



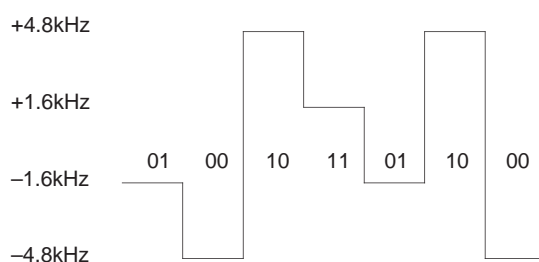
Application circuits shown are typical examples illustrating the operation of the devices. Sony cannot assume responsibility for any problems arising out of the use of these circuits or for any infringement of third party patent and other right due to same.

## Description of Operation

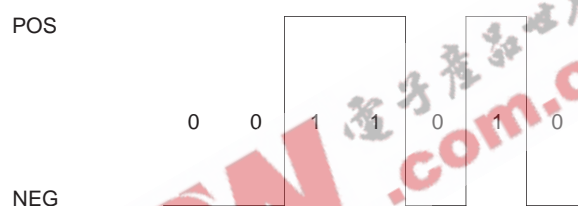
### M-ary (M = 2- or 4-level) FSK emodulation system

Polarity discrimination output and MSB comparator output are used to demodulate the 4-level waveform shown below.

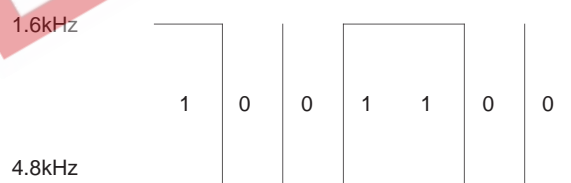
### 4-level FSK demodulating waveform



### Polarity discrimination output



### MSB comparator output

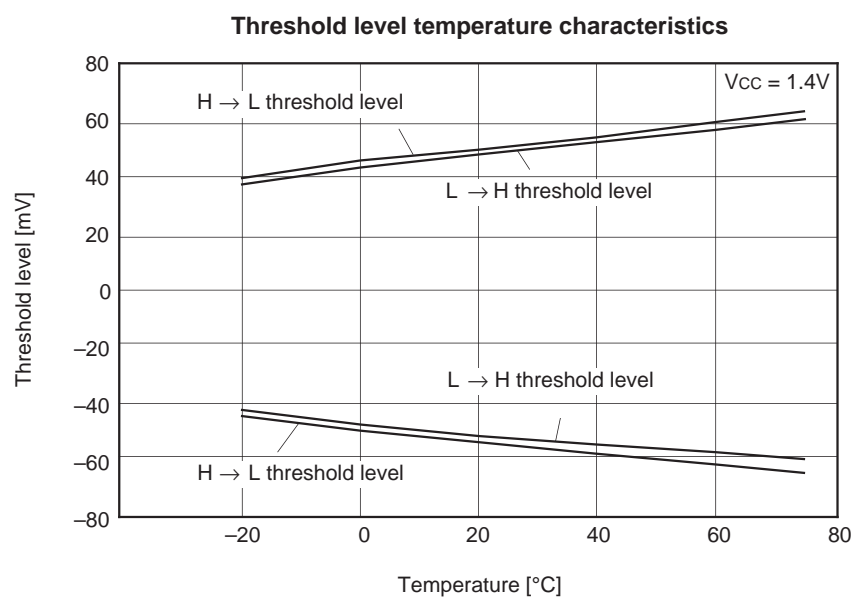
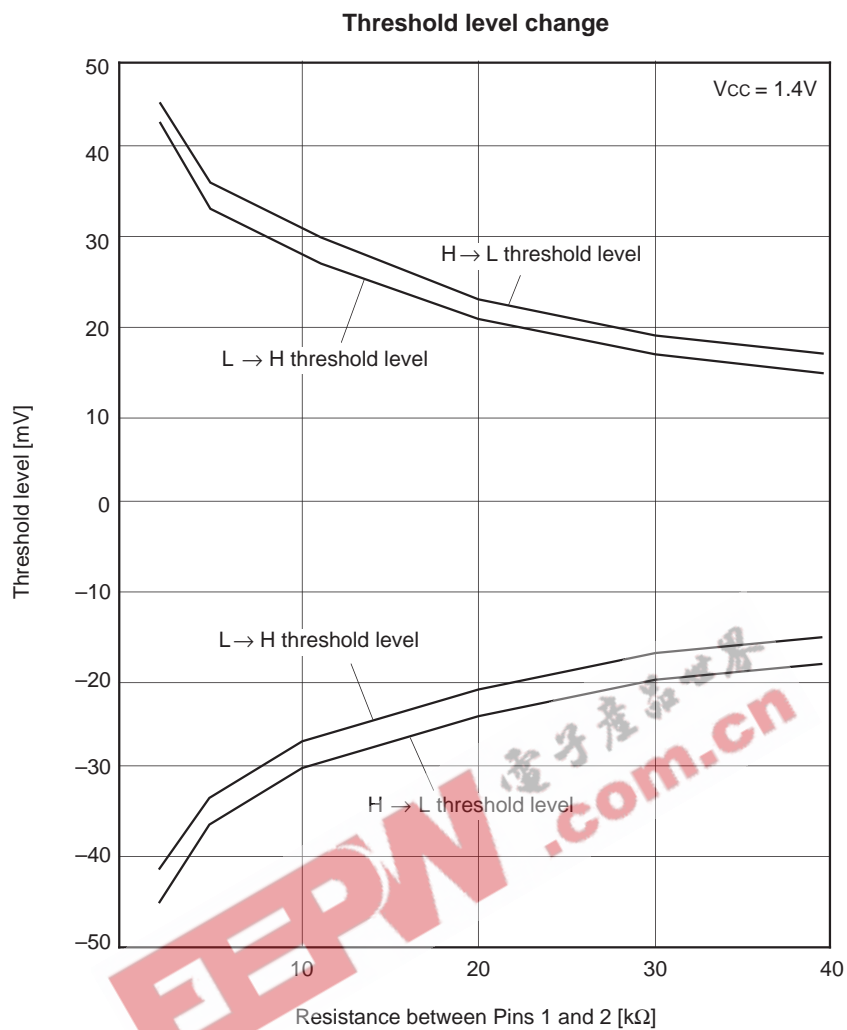


The 4-level FSK demodulating data is divided into a polarity discrimination output and a MSB comparator output shown above. Here, the polarity discrimination output corresponds to a conventional NRZ comparator output. The MSB comparator output is made comparing to the optional level setting between MSB and LSB levels as reference.

For the 2-level FSK demodulation, it corresponds to a conventional NRZ comparator output.

Take care that the polarity of NRZ output is inverted in CXA1484A.

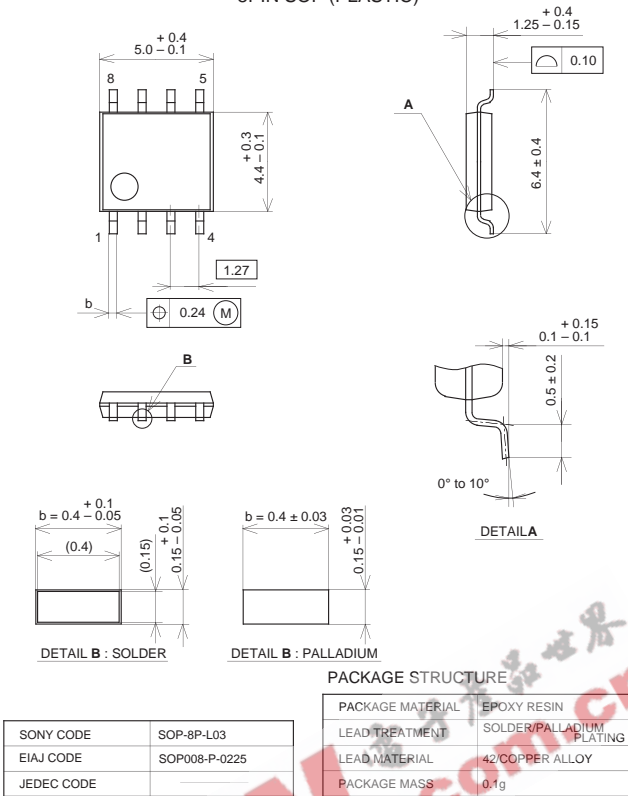
## Example of Representative Characteristics



Package Outline    Unit : mm

CXA1994AM

8PIN SOP (PLASTIC)



NOTE : PALLADIUM PLATING  
This product uses S-PdPPF (Sony Spec.-Palladium Pre-Plated Lead Frame).

CXA1994BM

8PIN SOP (PLASTIC) 300mil

