

# OKI Semiconductor

**FEDL6585-03**

Issue Date: Aug. 25, 2004

## MSM6585

ADPCM Voice Synthesis IC

### GENERAL DESCRIPTION

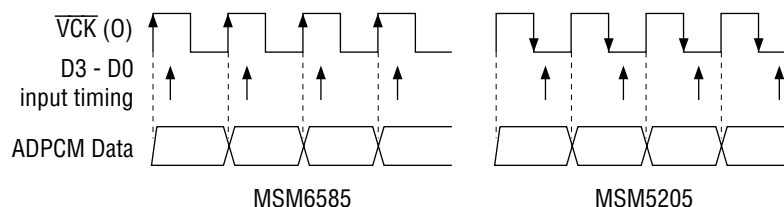
The MSM6585 is an version-up product of the MSM5205 voice synthesis IC. Mainly improved points are improvement for the precision of an internal DA converter, a built-in low-pass filter, and expansion on the sampling frequency. The MSM6585 does not include a control circuit to drive an external memory similar to the MSM5205. Therefore, the MSM6585 can be connected with not only semiconductor memories, but other memory media (CD-ROM, etc.) by the control of CPU.

### FEATURES

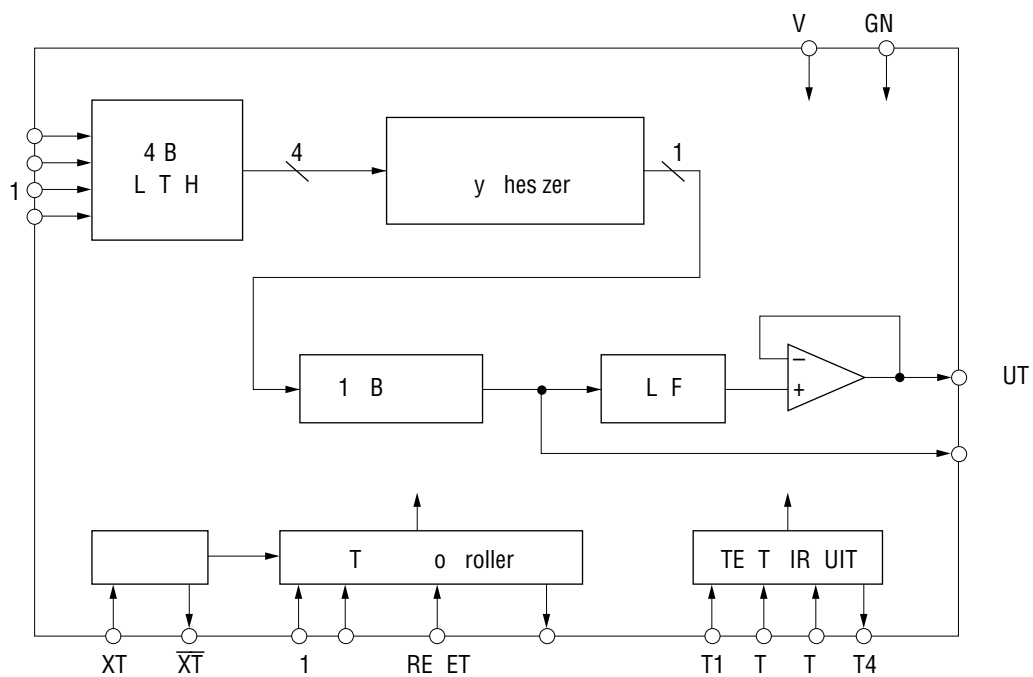
- 4-bit ADPCM method
- Built-in 12-bit DA converter
- Built-in low-pass filter (LPF) (−40dB/oct)
- Sampling frequencies: 4k/8k/16k/32kHz
- Master clock frequency (ceramic oscillator) : 640kHz
- Voice data synthesis: Supported by voice analysis editing tool AR207
- Package options:  
18-pin plastic DIP (DIP18-P-300-2.54) (MSM6585RS)  
24-pin plastic SOP (SOP24-P-430-1.27-K) (MSM6585MAZXXX)  
30-pin plastic SSOP (SSOP30-P-56-0.65-K) (MSM6585MBZXXX)

### DIFFERENCES BETWEEN MSM6585 AND MSM5205

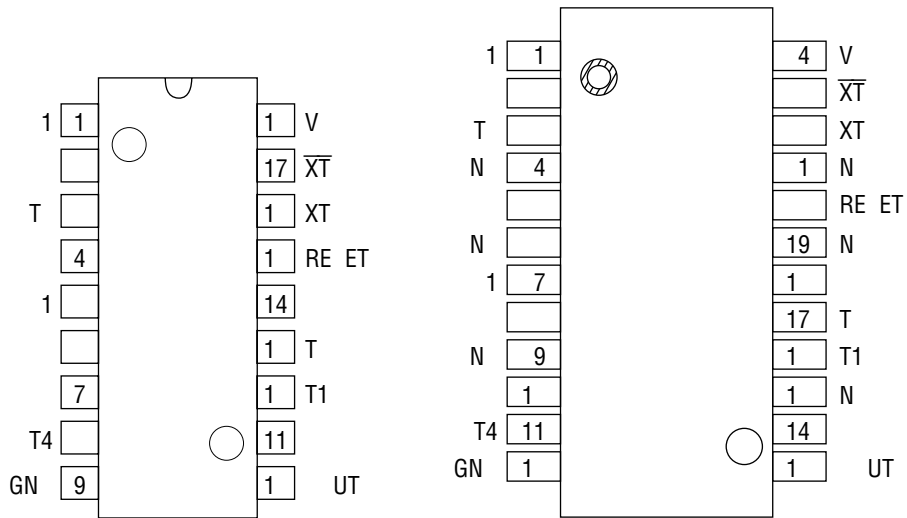
|                                  | MSM6585              | MSM5205      |
|----------------------------------|----------------------|--------------|
| • Master clock frequency:        | 640kHz               | 384kHz       |
| • Sampling frequency:            | 4k/8k/16k/32kHz      | 4k/6k/8kHz   |
| • ADPCM bit length:              | 4-bit                | 3-bit/4-bit  |
| • DA Converter:                  | 12-bit               | 10-bit       |
| • Low-pass filter:               | Included (−40dB/oct) | Not included |
| • Overflow preventing circuit:   | Included             | Not included |
| • Power supply voltage:          | 4.5 to 5.5V          | 3.0 to 6.0V  |
| • Operating current consumption: | 10mA                 | 4mA          |
| • Operating temperature:         | −40 to +85°C         | −30 to +70°C |
| • D3 to D0 input timing          |                      |              |



**K**



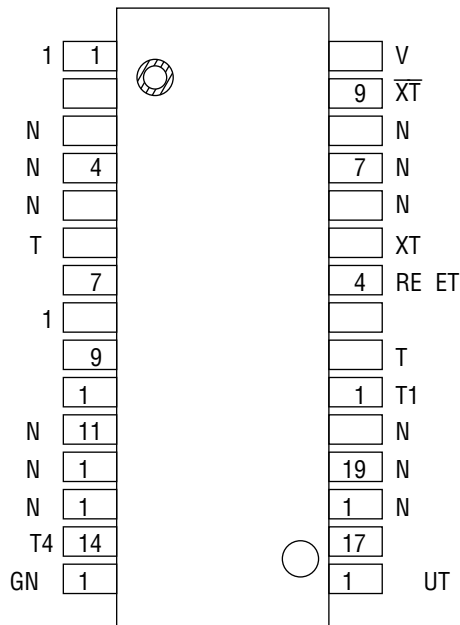
( V )



N : No connection

1 - in lastic

4- in lastic



N : No connection

3 - in lastic

| in  |             |     | symbol          | type | description                                                                                                                                                                             |
|-----|-------------|-----|-----------------|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     |             |     |                 |      |                                                                                                                                                                                         |
| 1   | 1           | 1   | 1               | I    | <p>so de er e he s l freq e cy.</p> <p>The s l freq e ces of k, 1 k, k, d 4kHz c be selec ed by co b o s. ee he s l freq e ces FUN TI N L</p> <p>E RI TI No he selec o of co b o s.</p> |
|     |             |     |                 |      |                                                                                                                                                                                         |
|     |             |     | T               | I    | <p>o es he er l cr c . e h s o h h level or ke o e</p> <p>bec se h s b l ll res s or.</p>                                                                                               |
| 4 7 | , 7,<br>, 1 | 7 1 |                 | I    | <p>l s for d .</p> <p>o es he er l cr c . ke h s o e .</p>                                                                                                                              |
|     | 11          | 14  | T4              |      | <p>o es he er l cr c . ke h s o e .</p>                                                                                                                                                 |
| 9   | 1           | 1   | GN              | —    | Gro d                                                                                                                                                                                   |
| 1   | 1           | 1   | UT              |      | <p>o o he lo vo ce fro he low ss fl er. o ec . 1 μF</p> <p>c c or o h s . ee he UT co ec c rc FUN TI N L</p> <p>E RI TI No he co ec c rc .</p>                                          |
| 11  | 14          | 17  |                 |      | <p>o o he lo vo ce fro he co ver er.</p>                                                                                                                                                |
| 1   | 1           | 1   | T1              | I    | <p>s o es he er l cr c . e hese s o low level or ke he</p>                                                                                                                              |
| 1   | 17          |     | T               |      | <p>o e bec se ll dow res s ors re cl ded.</p>                                                                                                                                           |
| 14  | 1           |     |                 |      | <p>This o s he s l freq e cy selec ed by he co b o s of 1 d .</p> <p>The vo ce sy hes s s r s or s o s by sy chro z w h .</p>                                                           |
| 1   |             | 4   | RE ET           | I    | <p>Rese . The vo ce sy hes s c rc s l zed by sy chro z w h .</p> <p>If h s s se o h h level, he o d s red s bled by sy chro z w h . The UT d s o 1/ V d beco e he s e of o vo ce.</p>   |
| 1   |             |     | XT              | I    | <p>o co ec osc ll or. Whe he ex er l clock s sed, fro h s .</p>                                                                                                                         |
| 17  |             | 9   | $\overline{XT}$ |      | <p>o co ec osc ll or.</p> <p>Whe he ex er l clock s sed, ke h s o e .</p>                                                                                                               |
| 1   | 4           |     | V               | —    | <p>ower s ly . l ser by ss c c or of .1 μF or ore be wee h s d he GN .</p>                                                                                                              |

**X**

$$GN = V$$

| parameter            | symbol   | condition       | rating         | unit       |
|----------------------|----------|-----------------|----------------|------------|
| power supply Voltage | V        | $T = 0^{\circ}$ | $-0.07$        | V          |
| load Voltage         | $V_{IN}$ | $T = 0^{\circ}$ | $-0.07 + 0.01$ | V          |
| temperature          | $T_{TG}$ | —               | $-0.01$        | $^{\circ}$ |

$$GN = V$$

| parameter                 | symbol         | condition          | range | unit |
|---------------------------|----------------|--------------------|-------|------|
| Power Supply Voltage      | V              | —                  | 4.00  | V    |
| Temperature               | T <sub>0</sub> | —                  | -400  | °    |
| Series Resonant Frequency | f              | oscillator circuit | 4     | kHz  |

## H

## characteristics

$$V = 4.0 \text{ V, } G_N = V, T = -4.0 + \text{ }^\circ$$

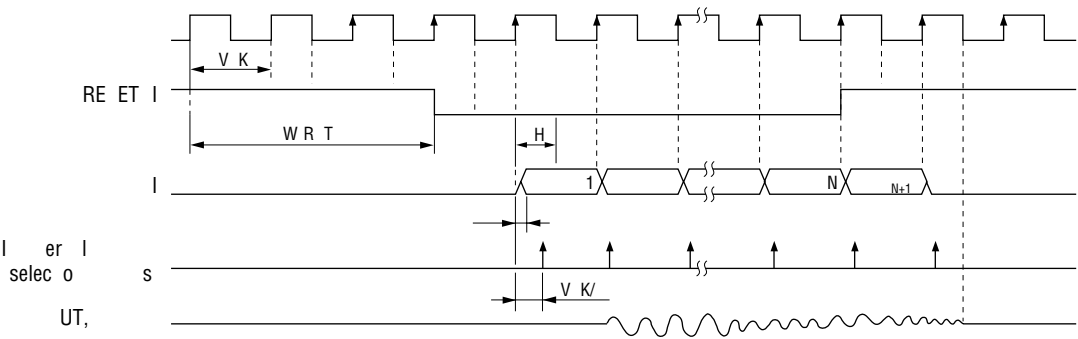
| Parameter         | Symbol    | Condition                             | in.        | yp. | ax.        | unit      |
|-------------------|-----------|---------------------------------------|------------|-----|------------|-----------|
| "H" I Vol e       | $V_{IH}$  | —                                     | $\times V$ | —   | $V + .1$   | V         |
| "L" I Vol e       | $V_{IL}$  | —                                     | $- .1$     | —   | $\times V$ | V         |
| "H" Vol e         | $V_H$     | V K: I H = $-4 \mu$                   | $V - .4$   | —   | —          | V         |
| "L" Vol e         | $V_L$     | V K: I L = $4 \mu$                    | —          | —   | $.4$       | V         |
| "H" I rre         | $I_{IH1}$ | T1, T , RE ET: $V_{IH} = V$           |            | 1   | 4          | $\mu$     |
| "H" I rre         | $I_{IH}$  | 1, , , T : $V_{IH} = V$               | —          | —   | 1          | $\mu$     |
| "H" I rre         | $I_{IH}$  | XT: $V_{IH} = V$                      | —          | —   |            | $\mu$     |
| "L" I rre         | $I_{IL1}$ | T : $V_{IL} = V$                      | -4         | -1  | -          | $\mu$     |
| "L" I rre         | $I_{IL}$  | 1, , , T1, T ,<br>RE ET: $V_{IL} = V$ | -1         | —   | —          | $\mu$     |
| "L" I rre         | $I_{IL}$  | XT= $V_{IL} = V$                      | -          | —   | —          | $\mu$     |
| rre o s o         | I         | $f_{osc} = 4 \text{ kHz}$ , No lo d   | —          |     | 1          |           |
| Rel ve Error      | $ V_E $   | No lo d                               | —          | —   | 4          | V         |
| I ed ce           | R         | —                                     | 1          | —   | 4          | $k\Omega$ |
| L F Lo d Res s ce | $R_{UT}$  | —                                     |            | —   | —          | $k\Omega$ |

haracteristics

| arameter              | ymbol    | ondition                                                                                           | in.          | yp. | ax. | nit           |
|-----------------------|----------|----------------------------------------------------------------------------------------------------|--------------|-----|-----|---------------|
| r l sc ll o<br>y ycle | $f_{dy}$ | —                                                                                                  | 4            |     |     | %             |
| RE ET I lse W d h     | W R T    | $f = 4\text{kHz} \dots$<br>$= \text{kHz} \dots$<br>$= 1 \text{ kHz} \dots$<br>$= \text{kHz} \dots$ | $\times V_K$ | —   | —   | $\mu\text{s}$ |
| e T e                 |          |                                                                                                    | —            | —   |     | $\mu\text{s}$ |
| Hold T e              | H        |                                                                                                    | $V_K/$       | —   | —   | $\mu\text{s}$ |
|                       |          |                                                                                                    |              |     |     |               |

W

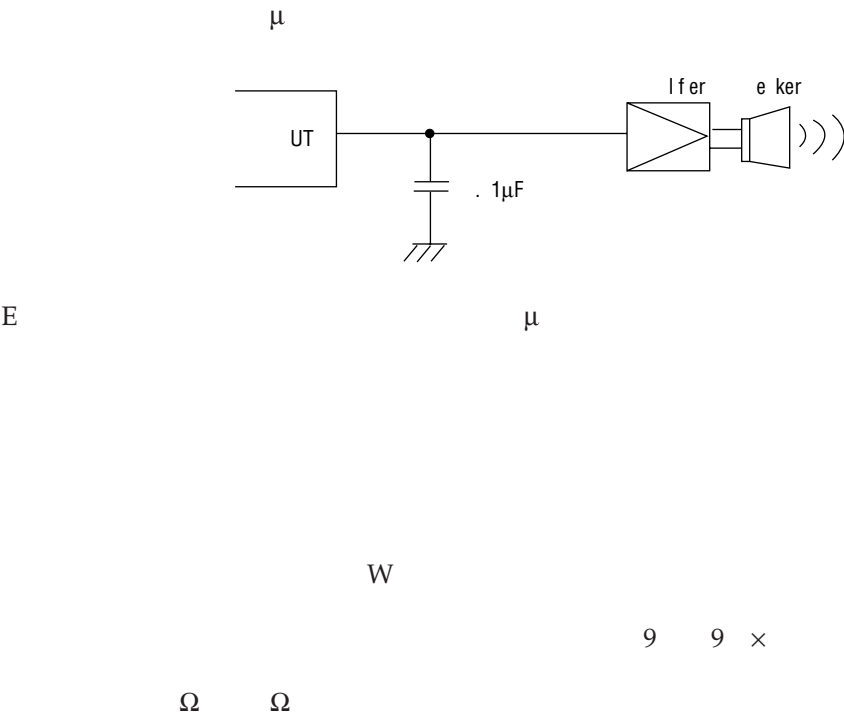
E E E E WEE

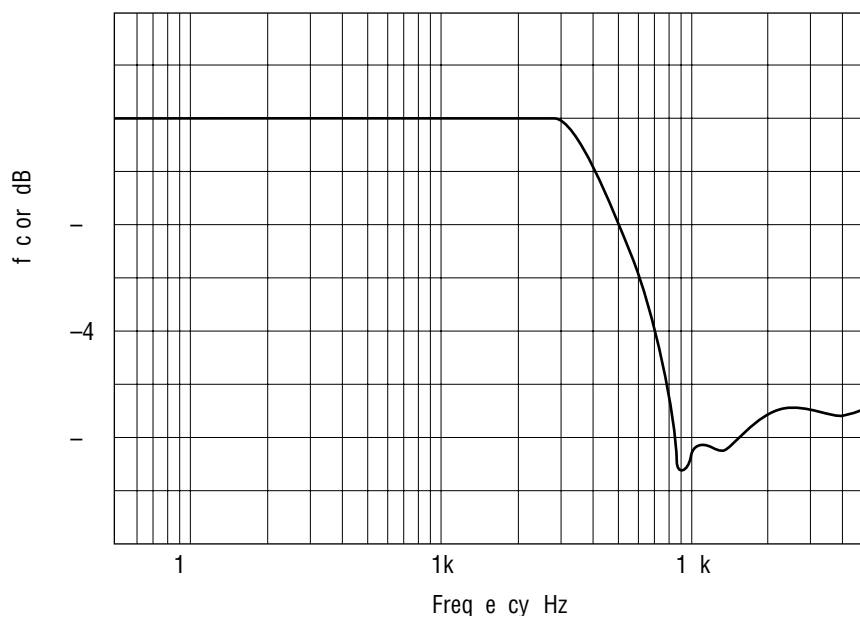


$\overline{VCK}$

E E E E WEE

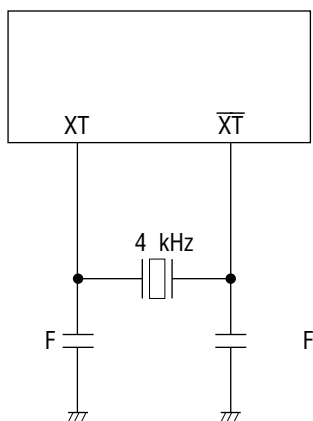
| 1 |   | ampling frequency (f ) | utoff frequency (f ) |
|---|---|------------------------|----------------------|
| L | L | 4 kHz                  | 1. kHz               |
| H | L | kHz                    | . kHz                |
| L | H | 1 kHz                  | .4 kHz               |
| H | H | kHz                    | 1 . kHz              |





K

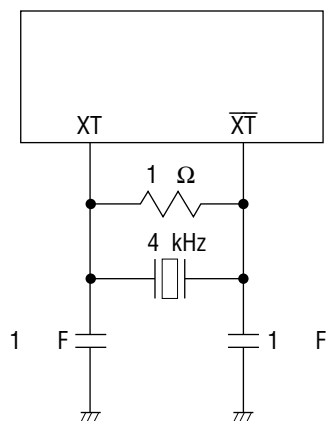
Kyocer or .  
KBR 4 B sed



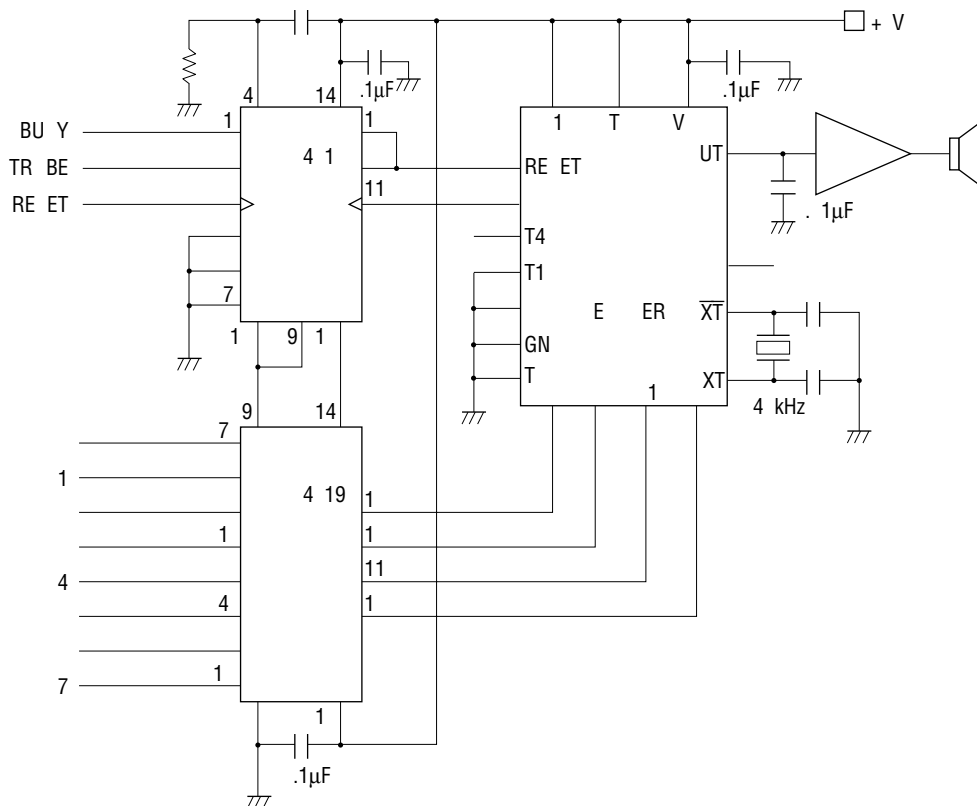
G

K

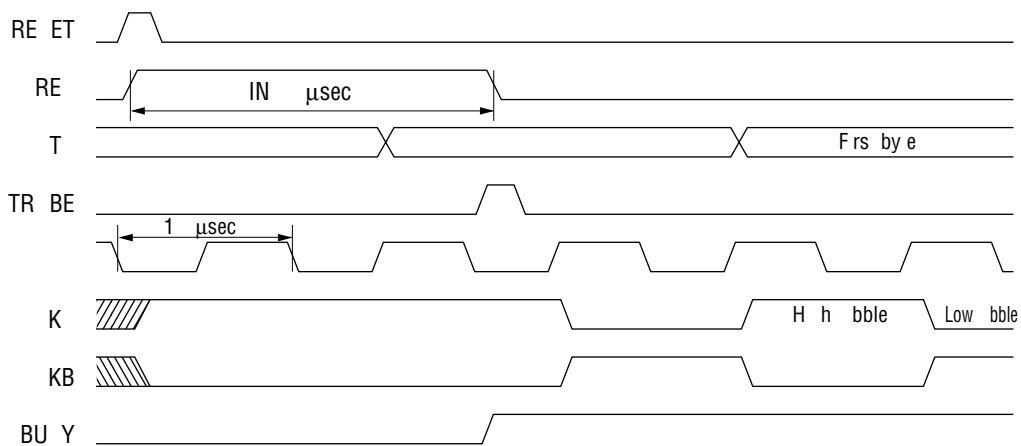
r FG. or .  
B 4 sed



# electronics nterface ircuit (sampling frequency : kHz)

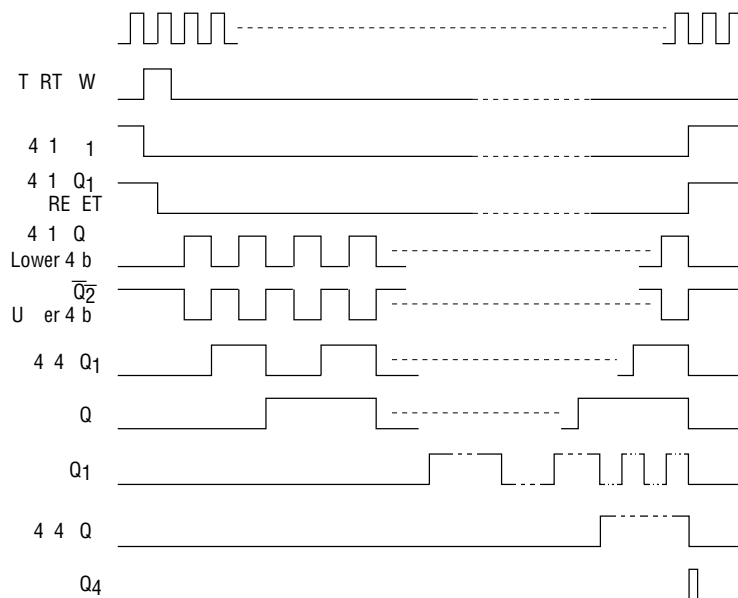
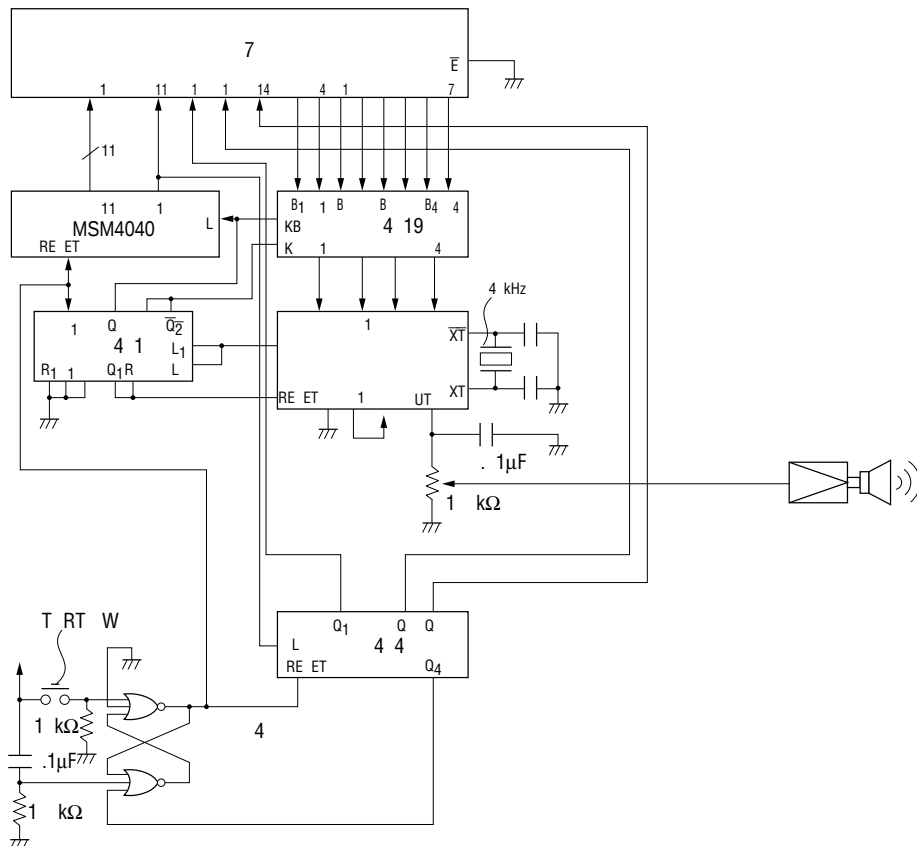


## electronics iming hart

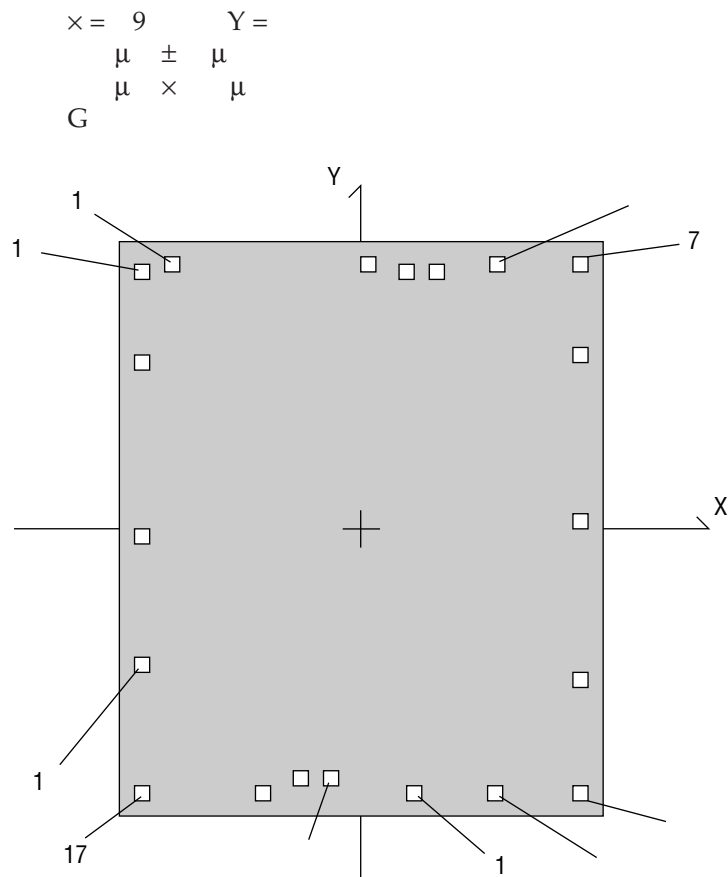


# Example of interface circuit with K-bit

K E



ad ayout



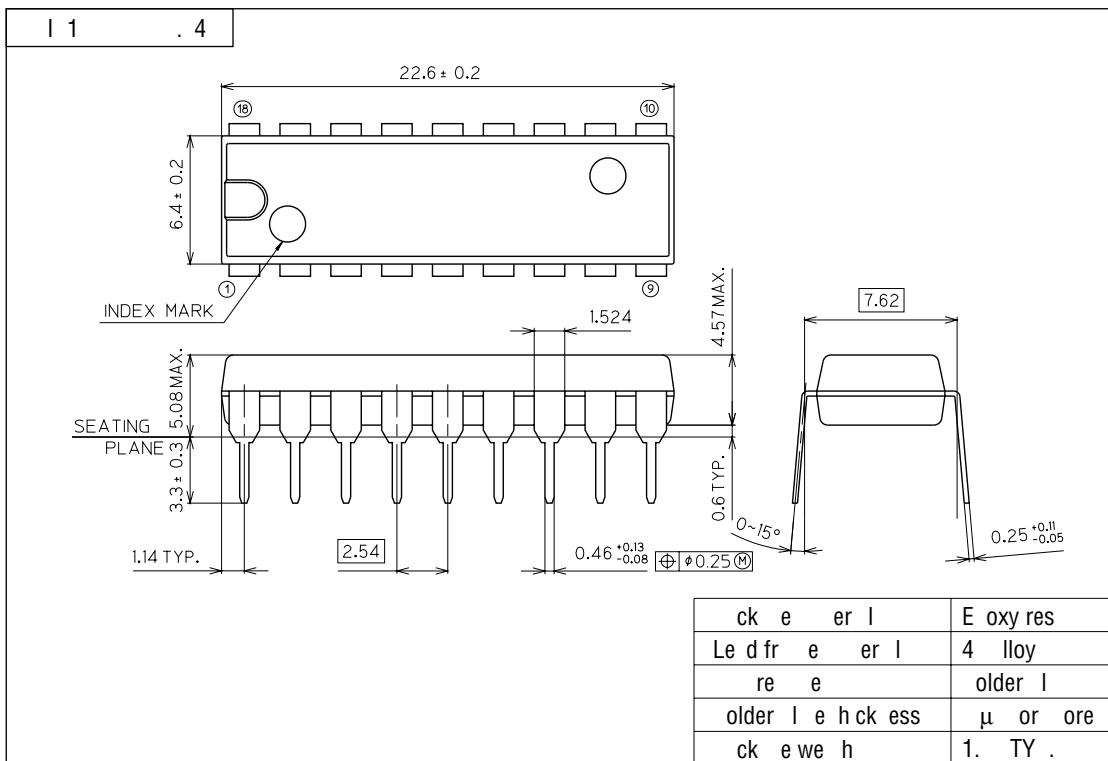
ad oordiantes

X= Y=

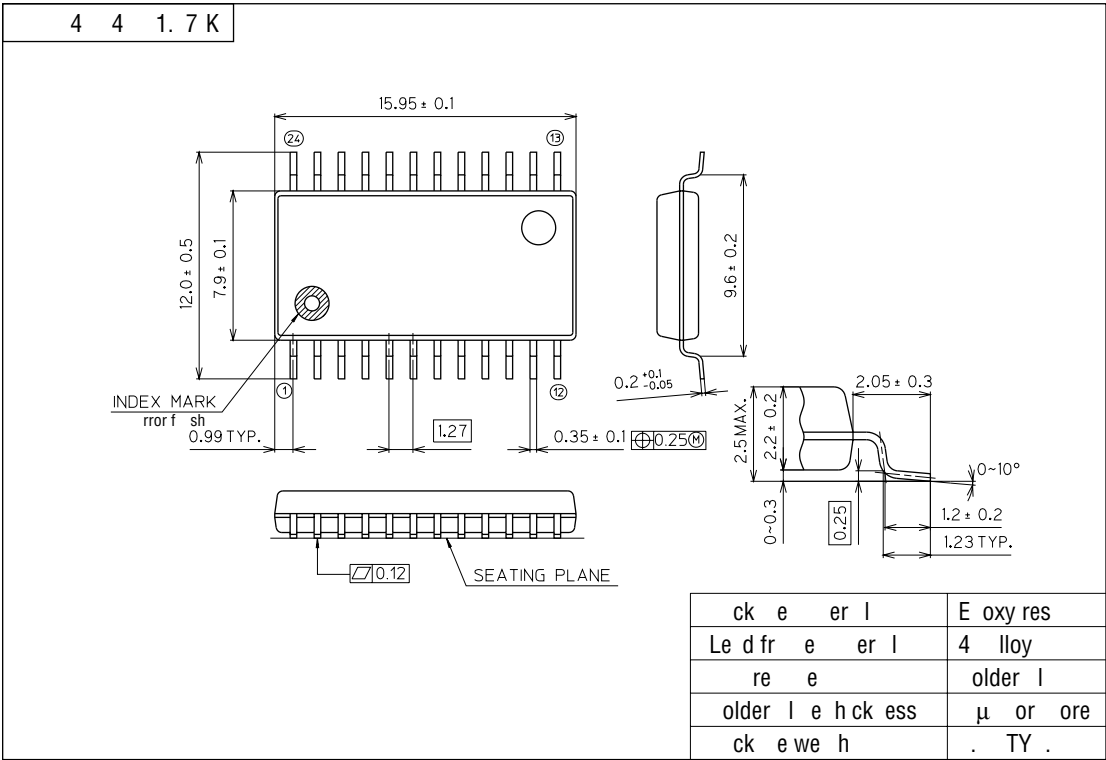
|    |     |        |        | U : $\mu$ |                 |        |        |
|----|-----|--------|--------|-----------|-----------------|--------|--------|
| o. | ame | X-axis | Y-axis | o.        | ame             | X-axis | Y-axis |
| 1  | 1   | 77     | -1     | 11        | UT              |        | 1      |
|    |     | 19     | -1     | 1         |                 | -11    | 1      |
|    | T   | 1      | -1     | 1         | T1              | -1     | 1 79   |
| 4  |     | 1      | -94    | 14        | T               | -1     | 1 9    |
|    | 1   | 1      | 44     | 1         |                 | -1     | -      |
|    |     | 1      | 1 9    | 1         | RE ET           | -1     | - 1    |
| 7  |     | 1      | 1      | 17        | XT              | -1 1   | -1     |
|    | T4  |        | 1      | 1         | $\overline{XT}$ | - 9    | -1     |
| 9  | V   | 447    | 1      | 19        | V               | - 99   | -1 49  |
| 1  | V   | 7      | 1      |           | V               | -119   | -1 49  |

## K

(Unit : mm)

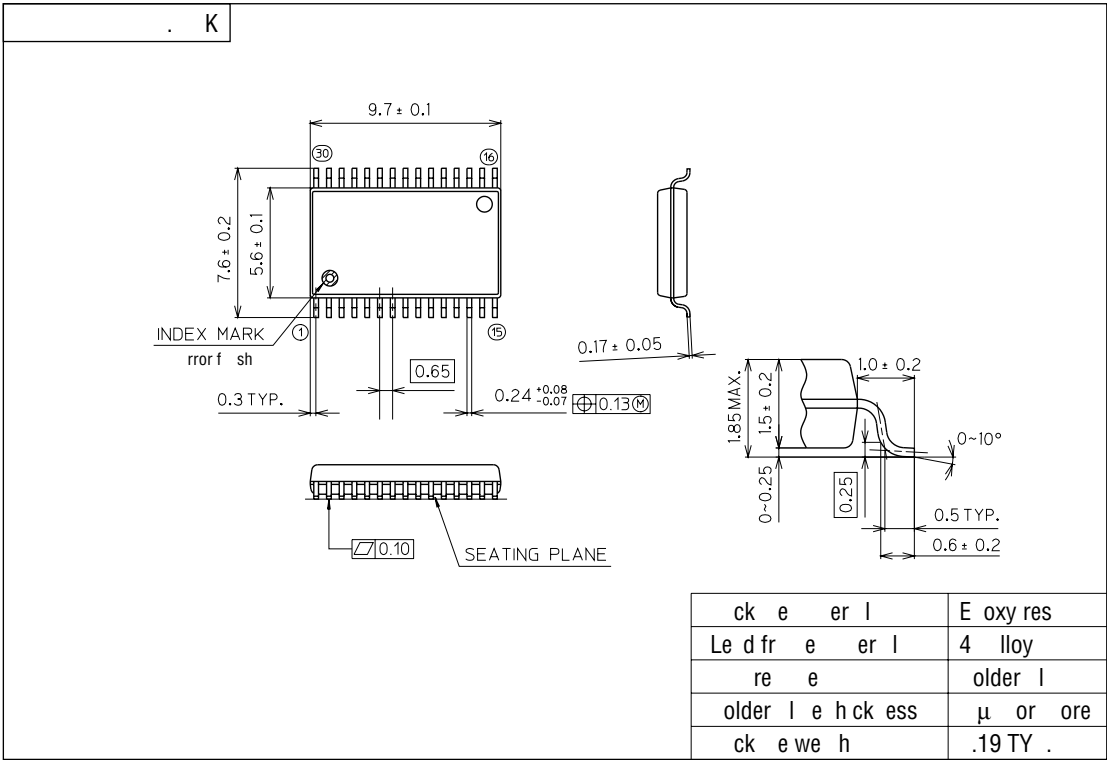


(Unit : mm)



Q Q Q J Q J G ,

(Unit : mm)



Q

Q

Q

J Q J

G

,

**REVISION HISTORY**

| Document No.  | Date          | Page             |                 | Description                                                                                                           |
|---------------|---------------|------------------|-----------------|-----------------------------------------------------------------------------------------------------------------------|
|               |               | Previous Edition | Current Edition |                                                                                                                       |
| E2D0011-39-91 | Sep. 1999     | —                | —               | Final edition 1                                                                                                       |
| FEDL6585-02   | Jun. 30, 2004 | —                | —               | Final edition 2                                                                                                       |
|               |               | 1                | 1               | Changed the voice analysis editing tools from AR203 and AR204 to AR207.                                               |
|               |               | 1                | 1               | Changed the package product names from MSM6585GS-K and MSM6585GS-AK to MSM6585MAZXXX and MSM6585MBZXXX, respectively. |
| FEDL6585-03   | Aug. 25, 2004 | 10               | 10              | Changed the product name of the circuit block in the upper-left portion of the block diagram from MSM4013 to MSM4040. |

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