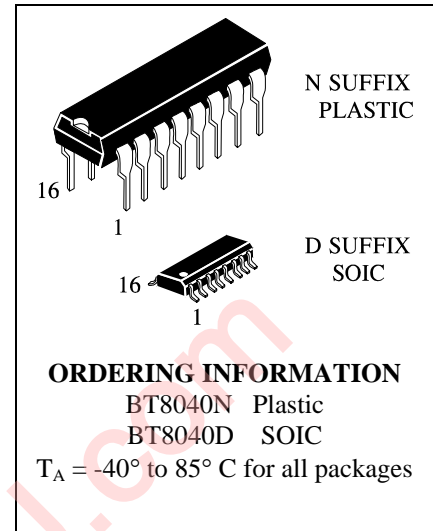# Melody Generator with Accompaniment

**BT8040**

## FEATURES

- Two Sound Sources with Envelope (CR Envelope)
- Melody is inserted up to four.
- According to customer's request, the inserted melody is flexible.
- 3.0V to 5.0V Operating Voltage
- DC or AC Triggered Performance Start Mode (Mask Selected)
- Can Drive an 8 Ohm Dynamic Loudspeaker if Provided Externally with a Transistor
- Bare chip or 16-pin DIP (Plastic) Package available

N SUFFIX
PLASTIC

16
1

D SUFFIX
SOIC

16
1

**ORDERING INFORMATION**
BT8040N Plastic
BT8040D SOIC
$T_A$ = -40° to 85° C for all packages

## DESCRIPTION

The BT8040 is a CMOS LSI chip, which plays a prearranged melodies.

## ABSOLUTE MAXIMUM RATINGS ( $T_a$ = 25$^o$C )

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Power Supply Voltage | $V_{DD}$ | - 0.3 to + 7.0 | V |
| Input Terminal Voltage | $V_{10}$ | - 0.2 to $V_{DD}$ + 0.2 | V |
| Operating Temperature | $T_a$ | -40 to + 85 ($V_{SS}$ = 1.5V) | $^o$C |
| Storage Temperature | $T_{stg}$ | - 65 to + 150 | $^o$C |
| Soldering Temperature and Time | $T_{sol}$ | 260$^o$C, 10s (at lead) | |

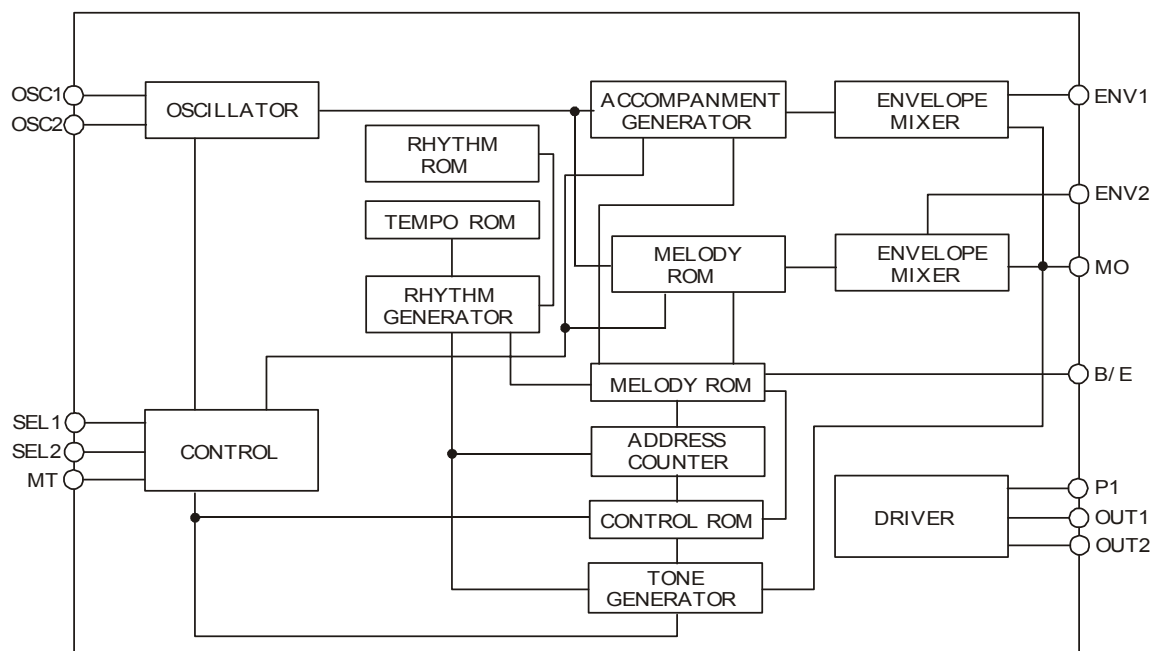## ELECTRICAL CHARACTERISTICS ($V_{DD}$ = 5V, $T_a$ = 25$^o$C; unless otherwise specified)

| Characteristic | | Symbol | Test Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| Operating Voltage | | $V_{DD}$ | | 3.0 | 5.0 | 5.5 | V |
| Input Voltage | "1" | $V_{IH}$ | | $V_{DD}$ - 0.3 | - | $V_{DD}$ | V |
| | "0" | $V_{IL}$ | | $V_{SS}$ | - | $V_{SS}$ + 0.3 | |
| MT Power Supply Time | | | | 150 | | | ms |
| Response Time | | | | | | 600 | ms |

**MO OUTPUT PIN EQUIVALENT CIRCUIT**



Main Melody ——▷— 130k$\Omega$

Accompaniment ——▷— 150k$\Omega$

MO Pin

**Inside of BT8040**

**IK Semiconductor**
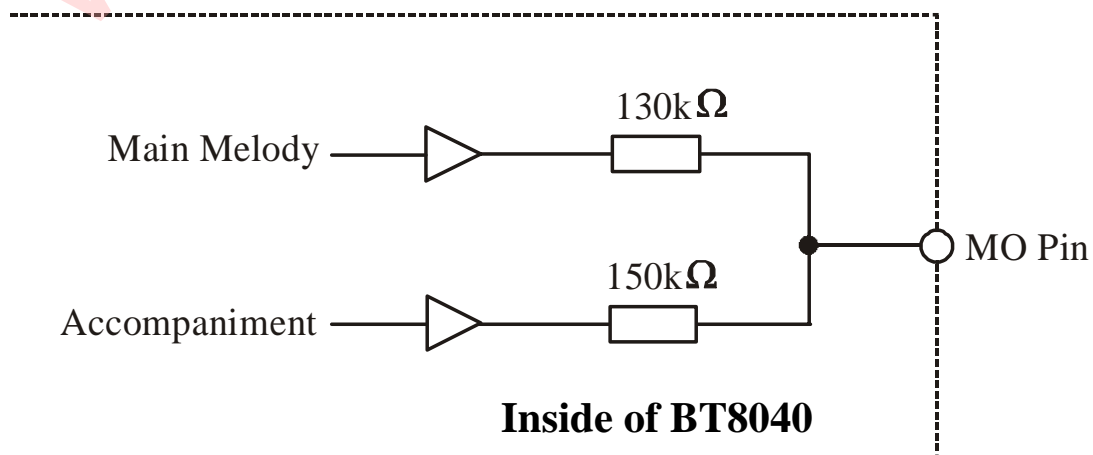
## BLOCK DIAGRAM



## PIN DESCRIPTION

| Pin. No. | Pin Name | Pull-Down Resistor | Functions |
|----------|----------|--------------------|-----------|
| 1 | OSC1 | - | A resistor is connected between both terminals to from a ring |
| 2 | OSC2 | - | oscillator, or external reference signals are applied to OSC1. |
| 3 | TST2 | Provided | LSI Test Input/Output. |
| 4 | MT | Provided | For binary selection: Controls Start and Stop of Performance. For direct selection: Selects Melody 1 and Controls Start and Stop of it's Performance. |
| 5 | SEL2 | Provided | For binary selection: this Terminal in Conjunction with SEL1, selects a Melody. For direct selection: Selects Melody 3 and Controls Start and Stop of it's Performance. |
| 6 | SEL1 | Provided | For binary selection: this Terminal in Conjunction with SEL1, selects a Melody. For direct selection: Selects Melody 2 and Controls Start and Stop of it's Performance. |
| 7 | B/E | - | BUSY or END Signal Output Terminal. |
| 8 | $V_{SS}$ | - | Power Supply Terminal (0V). |
| 9 | TST1 | Provided | LSI Test Input. |
| 10 | ENV1 | - | Connects Resistor and Capacitor to add Envelope to Main Melody. |
| 11 | ENV2 | - | Connects Resistor and Capacitor to add Envelope to Accompaniment. |
| 12 | MO | - | Output Terminal or Acoustic Signals that have not been Amplified. |
| 13 | P1 | | Connects PNP/NPN Transistors, resistors and Capacitors to form |
| 14 | OUT1 | Provided | a Low-Frequency Linear Amplifier Circuit. |
| 15 | OUT2 | | |
| 16 | $V_{DD}$ | - | 3.0V to 5.0V Operating Voltage |

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## APPLICATION CIRCUIT (basic external connection)

Rx1 = Buzzer(1MΩ), Speaker(2.2k)
Rx2,Rx3 = VR (Rx2 = 20k~50k, Rx3 = 5k~10k)
Rx4 = Speed VR (500k~1.5MΩ)
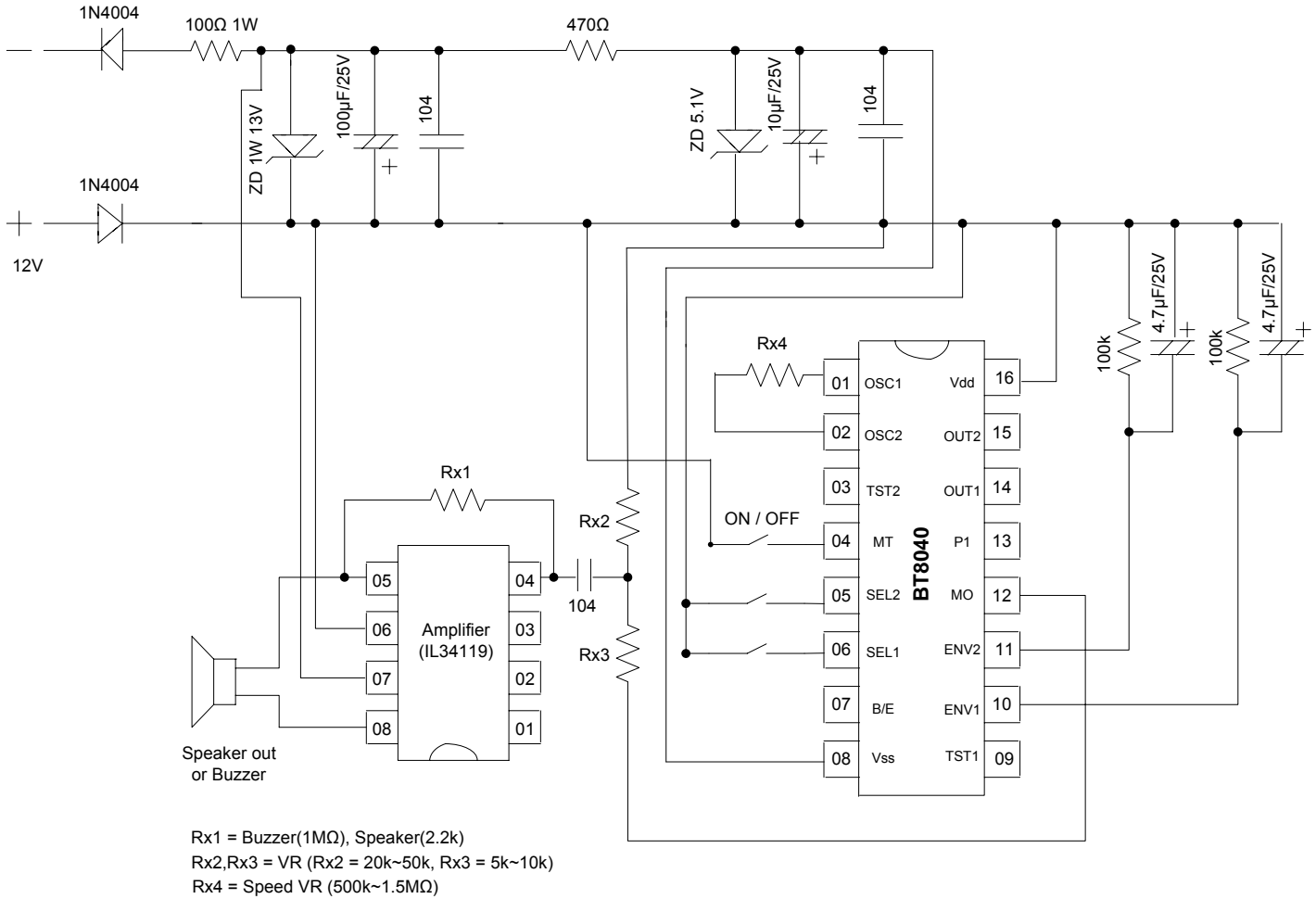
## RECOMMENDED CONDITIONS FOR EXTERNAL DEVICES

| Symbol | Ratings | Unit | Symbol | Ratings | Unit |
|--------|---------|------|--------|---------|------|
| VR1 | 1 - 2 | MΩ | C1 | 4.7 | μF |
| VR2 | 50 | kΩ | C2 | 4.7 | μF |
| R1 | 100 | kΩ | C3 | 0.1 | μF |
| R2 | 100 | kΩ | - | - | - |

## SELECTION CONDITION FOR MELODY

| Condition | | Melody |
|-----------|-----------|--------|
| **#5** | **#6** | |
| High | High | *Test melody |
| High | Low | *Ding – Dong |
| Low | High | *Do – Mi – Sol – Do |
| Low | Low | *Do- Sol – Mi - Do |

* Revision & Injection of Melody is possible according to customer's request.
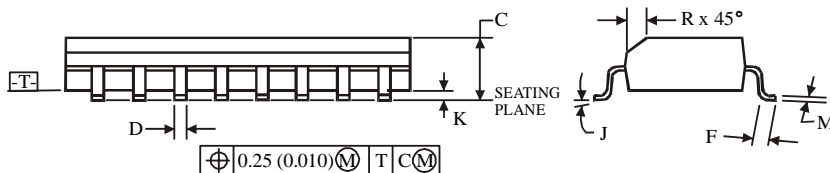
## N SUFFIX PLASTIC DIP
## (MS - 001BB)

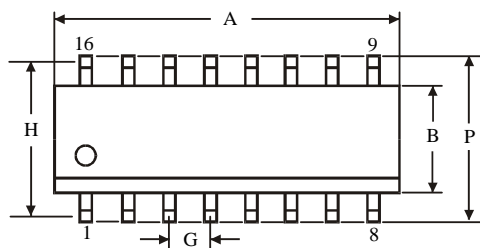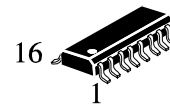| | Dimension, mm | |
|---|---|---|
| **Symbol** | **MIN** | **MAX** |
| **A** | 18.67 | 19.69 |
| **B** | 6.10 | 7.11 |
| **C** | | 5.33 |
| **D** | 0.36 | 0.56 |
| **F** | 1.14 | 1.78 |
| **G** | 2.54 | |
| **H** | 7.62 | |
| **J** | 0° | 10° |
| **K** | 2.92 | 3.81 |
| **L** | 7.62 | 8.26 |
| **M** | 0.20 | 0.36 |
| **N** | 0.38 | |
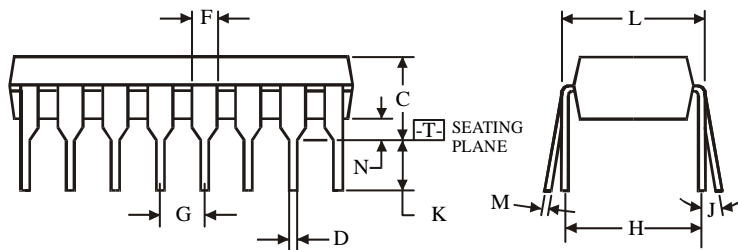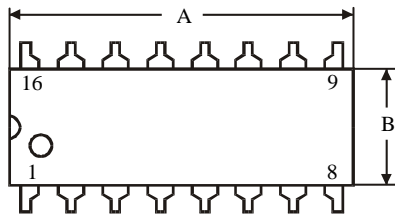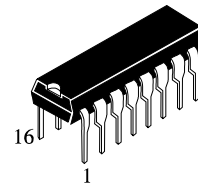
$\bigoplus$ 0.25 (0.010) Ⓜ T

**NOTES:**

1. Dimensions "A", "B" do not include mold flash or protrusions.

   Maximum mold flash or protrusions 0.25 mm (0.010) per side.

## D SUFFIX SOIC
## (MS - 012AC)

| | Dimension, mm | |
|---|---|---|
| **Symbol** | **MIN** | **MAX** |
| **A** | 9.80 | 10.00 |
| **B** | 3.80 | 4.00 |
| **C** | 1.35 | 1.75 |
| **D** | 0.33 | 0.51 |
| **F** | 0.40 | 1.27 |
| **G** | 1.27 | |
| **H** | 5.72 | |
| **J** | 0° | 8° |
| **K** | 0.10 | 0.25 |
| **M** | 0.19 | 0.25 |
| **P** | 5.80 | 6.20 |
| **R** | 0.25 | 0.50 |

$\bigoplus$ 0.25 (0.010) Ⓜ T CⓂ

**NOTES:**

1. Dimensions A and B do not include mold flash or protrusion.

2. Maximum mold flash or protrusion 0.15 mm (0.006) per side for A; for B – 0.25 mm (0.010) per side.

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