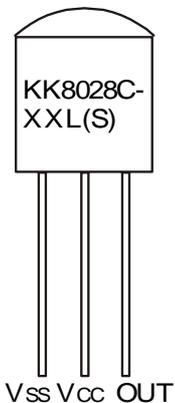


SIMPLE MELODY GENERATOR

KK8028-XX

| FEATURES | FUNCTIONS | |
|--|---|---|
| <ul style="list-style-type: none"> • 127-note ROM memory • 1.3V to 3.3V power supply and low power consumption • RC oscillator on chip • One shot or level hold mode • Sound range: 4 octaves, 2 series • Tempo: 16 kinds (presto-largo) • Direct piezo drive | <ul style="list-style-type: none"> • Solution of automatic stop or repeat of the melody • Dynamic speaker can be driven with external NPN transistor • Two or three times repeat of melody (mask option) • Each note can be individually programmed to be staccato or legato (mask option) • Changing the contents of melody is possible by reprogramming the maskable ROM • Power on reset; melody begins from the first note • Start from the head of melody • Bare chip or TO-92 are available |  <p>Diagram of the KK8028C-XXL(S) chip showing three pins labeled VSS, VCC, and OUT.</p> |

DESCRIPTION

The KK8028 is a CMOS LSI chip which electronically plays a prearranged melody. Selection of melody start signal is possible by mask option: orders specification suffix "L" indicate Level Hold Mode, and suffix "S" indicate One Shot Mode. The Universal version (as One Shot or Level Hold Mode) is possible also (suffix "U").

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

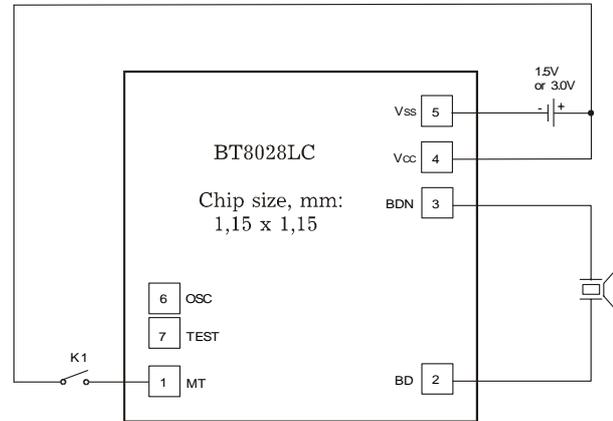
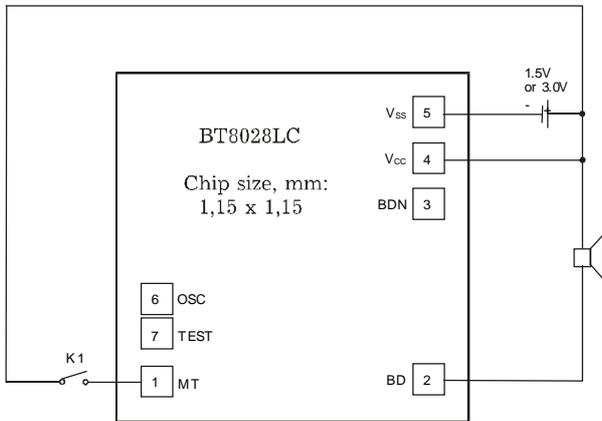
| Characteristic | Symbol | Value | Unit |
|-----------------------|-------------------|----------------------------------|------|
| DC Supply Voltage | $V_{CC} - V_{SS}$ | -0.3 ~ 3.5 | V |
| Input Voltage | V_{IN} | $V_{SS} - 0.3 \sim V_{CC} - 0.3$ | V |
| Operating Temperature | T_{opr} | -20 ~ +65 | °C |
| Storage Temperature | T_{stg} | -55 ~ +125 | °C |

ELECTRICAL CHARACTERISTICS (Ta = 25°C, VCC = 1.5V; unless otherwise specified)

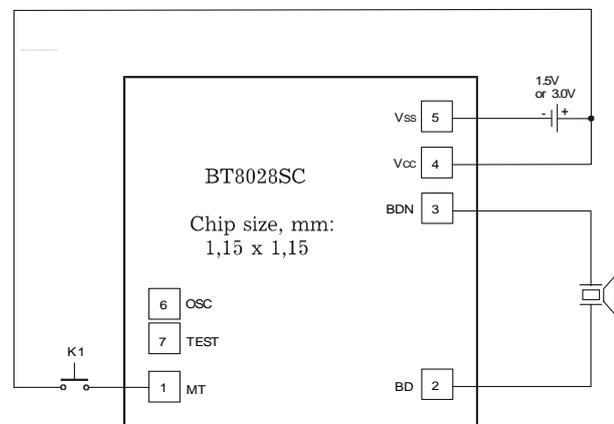
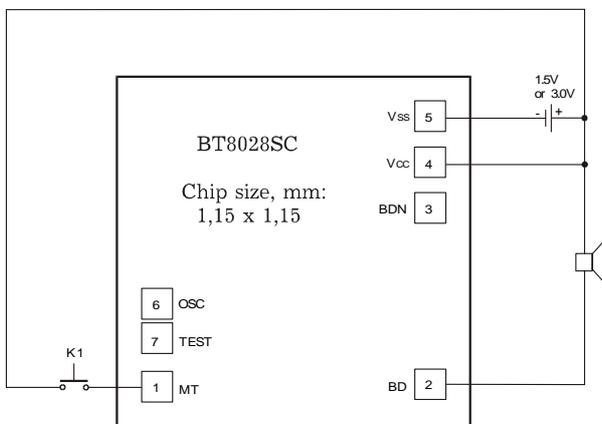
| Characteristic | Symbol | Test Condition | Min | Typ | Max | Unit |
|----------------------|--------------|---------------------------------|-----|-----|-----|------|
| Operating Voltage | V_{CC} | | 1.3 | 1.5 | 3.3 | V |
| Supply Current | Stand-by | I_S | | 0.1 | 1 | μA |
| | | | | | | |
| Output Drive Current | I_{OH} | $V_{CC} = 1.3V, V_O = 0.8V$ | 0.6 | 1.5 | | mA |
| Output Sink Current | I_{OL} | $V_{CC} = 1.3V, V_O = 0.5V$ | 0.6 | 1.5 | | mA |
| Frequency Stability | $\Delta F/F$ | $F_{osc}(1.6V) - F_{osc}(1.3V)$ | | | 12 | % |
| | | $F_{osc}(1.3V)$ | | | | |

APPLICATION CIRCUITS

LEVEL HOLD



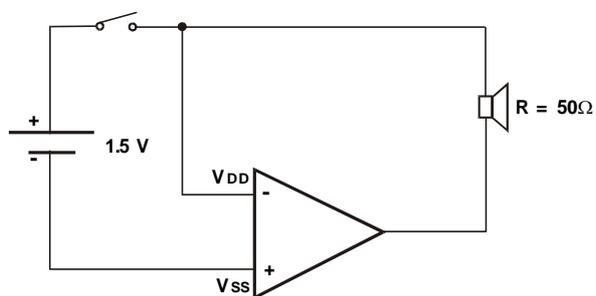
ONE SHOT



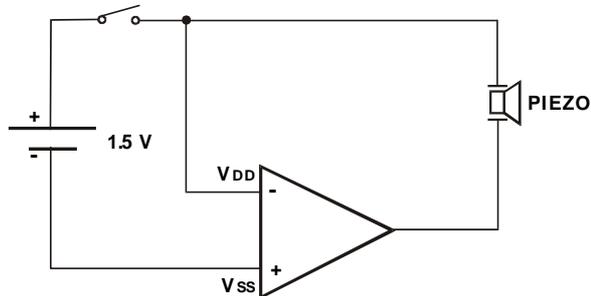
TO-92 ONE SHOT OR LEVEL HOLD MODE

CHIP FORM

FOR SPEAKER



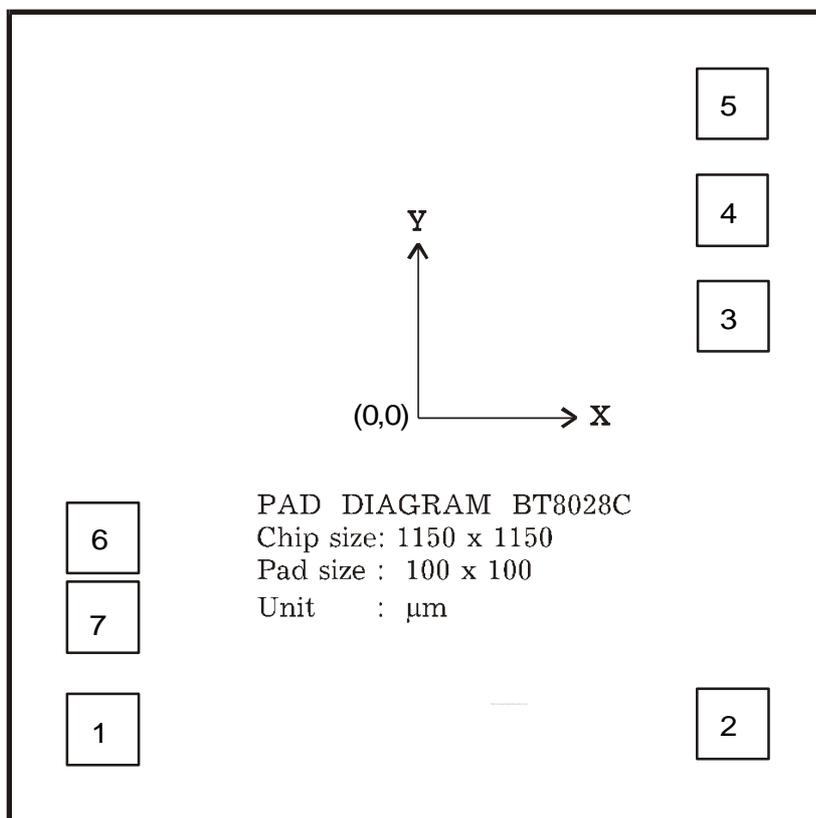
FOR PIEZO



AVAILABLE SONG LIST

| NEW EXT No. | SONG LIST | SEC |
|-------------|---|-----|
| KK8028C-001 | For Elise | 13 |
| KK8028C-002 | Staff WRK | |
| KK8028C-003 | Happy Birthday | 13 |
| KK8028C-004 | Jingle Bell | 12 |
| KK8028C-005 | It's Small World | 21 |
| KK8028C-006 | 3 Children Song | 13 |
| KK8028C-007 | Cuocoo Waltz | 10 |
| KK8028C-008 | London Bridge is Falling Down | 16 |
| KK8028C-009 | Trainis Running Fast | 11 |
| KK8028C-010 | Love Me Tender Love Me True | 38 |
| KK8028C-011 | Love Story | 23 |
| KK8028C-012 | Old McDonald Had a Farm | 25 |
| KK8028C-013 | Jingle Bell/Santa Claus Is Coming to Town/ We Wish You a Merry X'mas | 28 |
| KK8028C-014 | You are My Sunshine | 12 |
| KK8028C-015 | Santa Claus is Coming To Town | 20 |
| KK8028C-016 | Silent Night | 26 |
| KK8028C-017 | Twinkle Twinkle Little Star | 14 |
| KK8028C-053 | Car Alarm | |

PAD LAYOUT

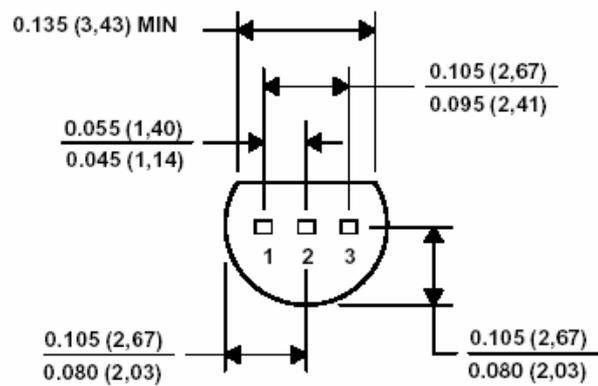
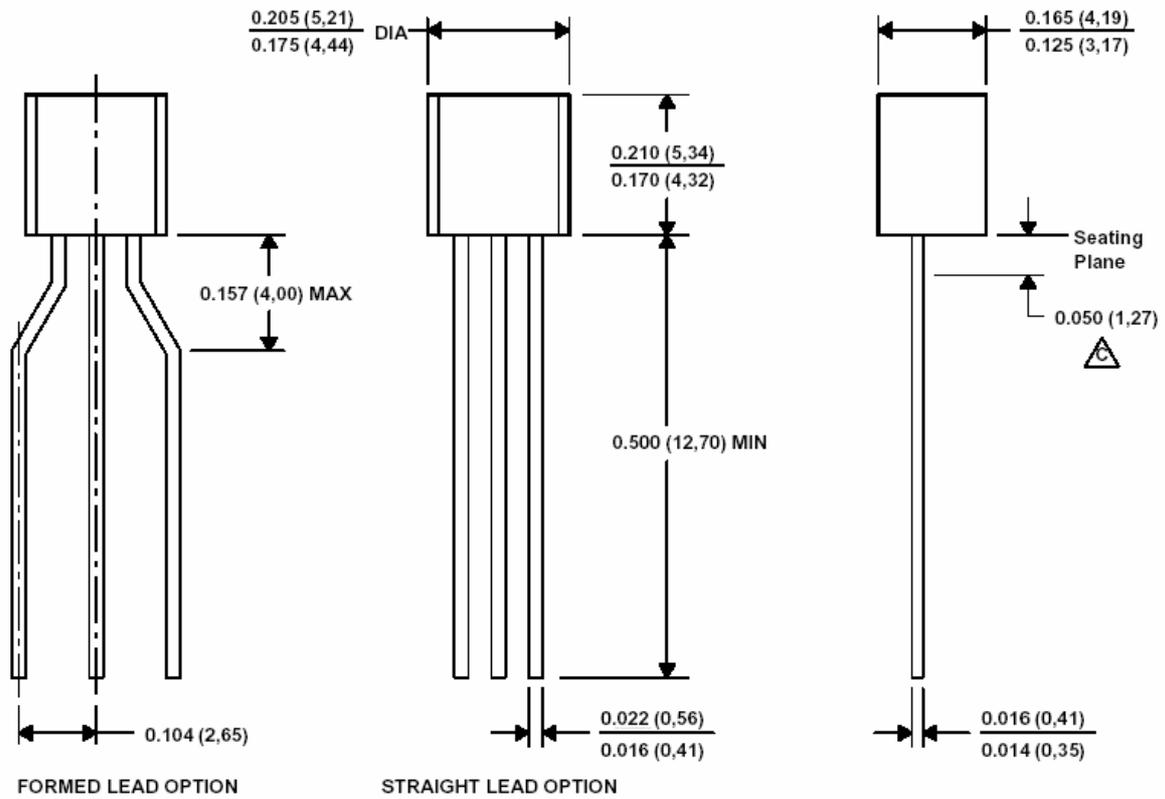


NOTE: Substrate is connected to V_{CC} .

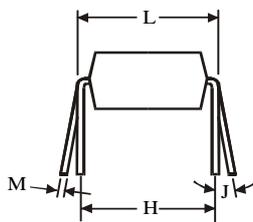
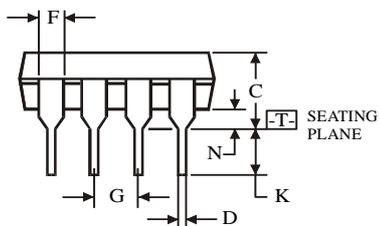
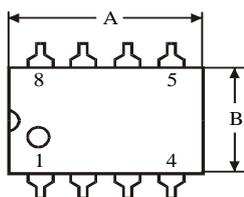
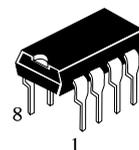
PAD LOCATION

| Pad No. | Designation | X | Y | Description |
|---------|-------------|------|------|-----------------------|
| 1 | MT | -445 | -445 | Melody Start Input |
| 2 | BD | 445 | -435 | Melody Output 1 |
| 3 | BDN | 445 | 145 | Melody Output 2 |
| 4 | V_{CC} | 445 | 295 | Positive Power Supply |
| 5 | V_{SS} | 445 | 445 | Negative Power Supply |
| 6 | OSC | -445 | -282 | Test Pad |
| 7 | TEST | -445 | -169 | Test Pad |

• **TO-92**



N SUFFIX PLASTIC DIP (MS - 001BA)



$\oplus 0.25 (0.010) \text{M} \text{ T}$

| Symbol | Dimension, mm | |
|--------|---------------|-------|
| | MIN | MAX |
| A | 8.51 | 10.16 |
| B | 6.1 | 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 | 0.2 | 0.36 |
| N | 0.38 | |

NOTES:

- Dimensions "A", "B" do not include mold flash or protrusions.
Maximum mold flash or protrusions 0.25 mm (0.010) per side.