



15600

CMOS IC

MELODY IC

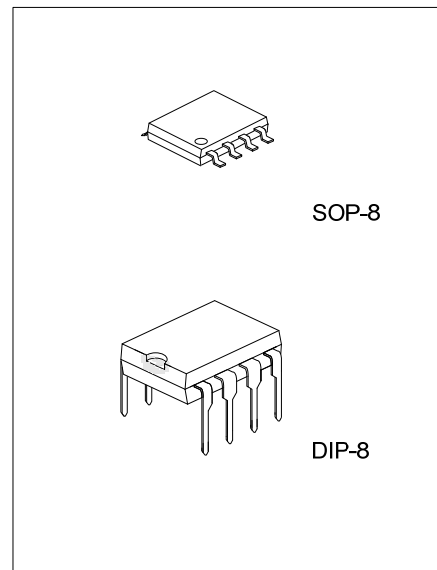
DESCRIPTION

UTC **15600** Series is a CMOS IC circuits which contain a programmed mask ROM to generate chord music. The capacity of the ROM being used for storage of such music information is of 128 words and up to two numbers of music melodies under two different sound sources can be optioned for storage into it. Also, the total integration (for mask option) of the RC oscillation circuit is built in. Moreover, a small-sized package can be suitable for space –saving applications.

FEATURES

- * Range of operating voltage: 0.9~5.5V
- * Reference signal source frequency: 32.768KHZ,47.520KHZ(mask option selection)
- * Options :
 1. changing the melody midway during performance: Possible or not possible (mask option selection)
 2. selection of the reference sound frequency: when selecting the signal source frequency of 32.768kHz, A4=440Hz(standard) or C4=256Hz when selecting the signal source frequency of 47.520kHz: A4=440Hz
 3. Selection of performance sound range: when selecting the signal source frequency of
 - 32.768kHz, A4=440Hz: G6~C4 or G5~C3
 - 32.768kHz, A4=256Hz: C7~C4 or C6~C3
 - 47.520kHz, A4=440Hz: C7~C4 or C6~F3
 4. Choices of the reference signal source: External clock input or integrated RC oscillator (using both of the integrated C and R) or integrated RC oscillation (using the integrated C only but the R is for external installation)

- 5. performance method choice :
 - Level hold
 - one shot C
 - one shot A
- * Attenuation of sound: integrated envelope adding circuit
- * Loudspeaker drive: not equipping an amplifier(an extremely installed amplifier should be used)
- * Output Impedance :
 - Max: 222k
 - Min :68k

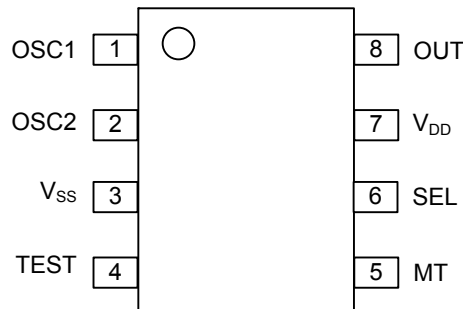


ORDERING INFORMATION

| Ordering Number | | Package | Packing |
|-----------------|--------------|---------|-----------|
| Lead Free | Halogen Free | | |
| 15600L-D08-T | 15600G-D08-T | DIP-8 | Tube |
| 15600L-S08-R | 15600G-S08-R | SOP-8 | Tape Reel |
| 15600L-S08-T | 15600G-S08-T | SOP-8 | Tube |

| | |
|---|---|
| <p>15600L-D08-T</p> <p>(1)Packing Type (2)Package Type (3)Lead Free</p> | <p>(1) R: Tape Reel, T: Tube (2) D08: DIP-8, S08: SOP-8 (3) G: Halogen Free, L: Lead Free</p> |
|---|---|

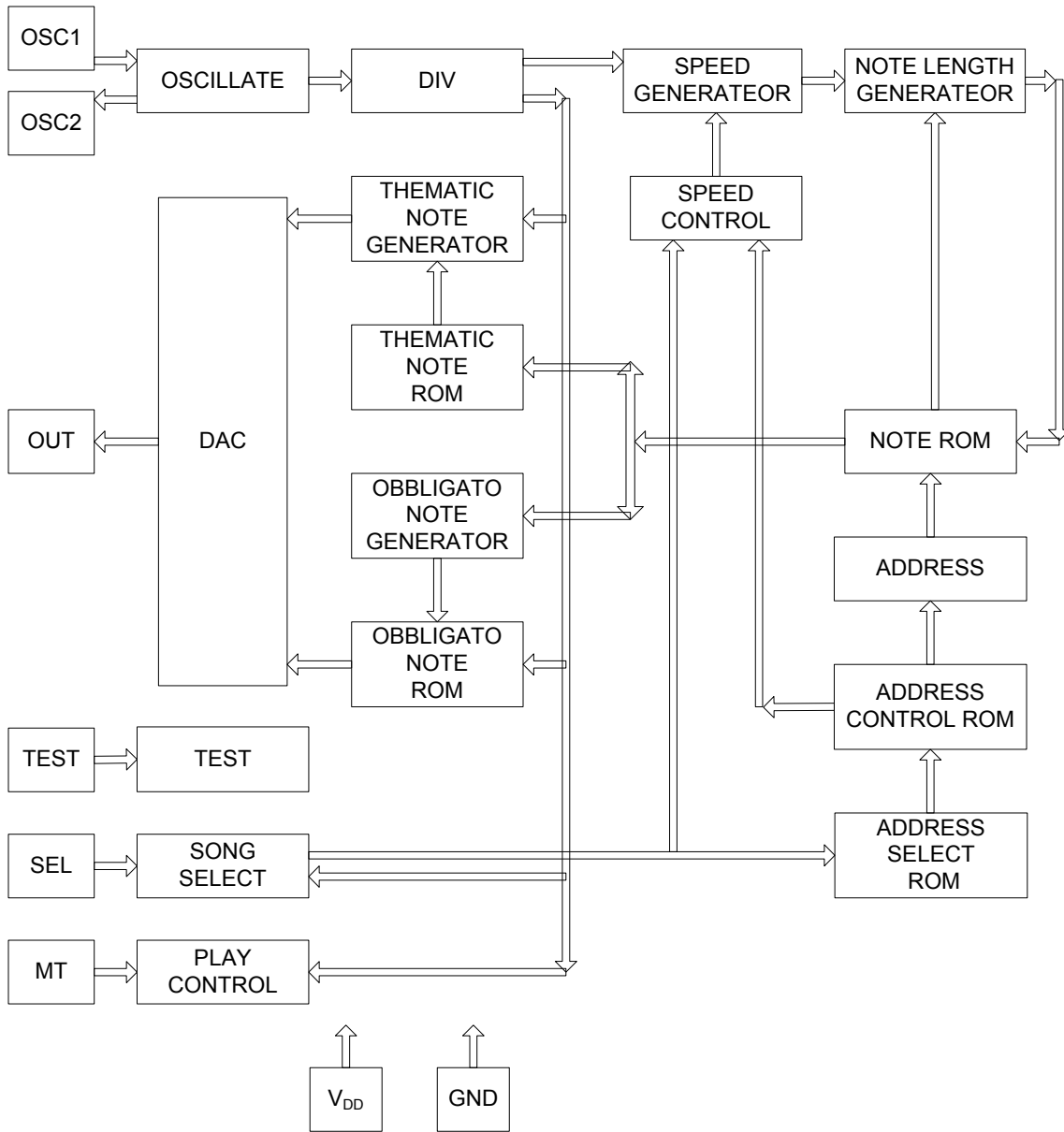
■ PIN CONFIGURATION



■ PIN DESCRIPTION

| PIN NO | PIN NAME | I/O | DESCRIPTION |
|--------|-----------------|------|--|
| 1 | OSC1 | I/NC | 1. When the external clock mode is selected by mask option: Enter square waves of 32.768kHz or 47.520kHz to the OSC1 pin as the reference signal source. 2. When the integrated RC oscillation is selected by mask option: When using an external "R", insert a resistor between the OSC1 and OSC2 to adjust the oscillation frequency by the resistance of the resistor. When using integrated RC, keep the OSC1 and OSC2 open. |
| 2 | OSC2 | O | |
| 3 | V _{SS} | | Negative supply pin or grounding pin |
| 4 | TEST | I | Integrated pull down. when TEST is "high" and MT pin is "high, the device goes into test mode .when IC goes into working, test should be tied to V _{SS} . |
| 5 | MT | I | Integrated pull down . When "high" level is input, the device goes into working mode to control starting and stopping of the performance in accordance with the performance method being designated by the mask option, and that the device has the debnounce circuitry inside, it is of no effect that the pulse is short of 32ms or 47ms. |
| 6 | SEL | I | Integrated pull down. Melody 1 and melody 2 can be selected in the binary code by entering "0"or "1" into this pin. "Changing the melody midway during performance –not possible or possible" is selected by mask option. |
| 7 | V _{DD} | | Power supply |
| 8 | OUT | O | With the audio signals, the key melody and accompaniment, respectively, are attenuated under a certain time constant and respective output s of the key melody and accompaniment are mixed by the mixing resistor before being output. This pin should therefore be connected to input pin of a pre-amp via a variable resistor for volume control , coupling-capacitor, etc |

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING

| PARAMETER | SYMBOL | RATINGS | UNIT |
|-----------------------|-----------|---------------------|------|
| Supply Voltage | V_{DD} | -0.3~+7.0 | V |
| Terminal Voltage | V_{IO} | -0.2 ~ $V_{DD}+0.2$ | V |
| Operating Temperature | T_{OPR} | -20 ~ +85 | °C |
| Storage Temperature | T_{STG} | -65 ~ +150 | °C |

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ DC CHARACTERISTICS ($V_{DD}=0.9\sim 5.5V$, $V_{SS}=0V$, $T_A=25^\circ C$)

| PARAMETER | SYMBOL | PIN | TEST CONDITIONS | MIN | TYP | MAX | UNIT | |
|----------------------------------|-------------|------|--|------------------|-------------|--------------|------------|---------|
| Working Voltage | V_{DD} | 7 | OSC1=32.768 or 47.520kHz Note 1. | 0.9 | 3.0 | 5.5 | V | |
| RC Oscillation Start Voltage | V_{STA} | 7 | RC built-in | | | 0.9 | V | |
| RC Oscillation Stop Voltage | V_{STP} | 7 | RC built-in | | | 0.9 | V | |
| High Level Input Voltage | V_{IH1} | 5, 6 | $V_{DD}=1.5V \sim 5.5V$ | V_{DD} -0.3 | | V_{DD} | V | |
| | | 1 | $V_{DD}=1.5V \sim 5.5V$, External clock signal input | | | | | |
| High Level Input Voltage | V_{IH2} | 5, 6 | $V_{DD}=0.9V \sim 1.5V$ | V_{DD} -0.2 | | V_{DD} | V | |
| | | 1 | $V_{DD}=0.9V \sim 1.5V$, External clock signal input | | | | | |
| Low Level Input Voltage | V_{IL1} | 5, 6 | $V_{DD}=1.5V \sim 5.5V$ | 0 | | 0.3 | V | |
| | | 1 | $V_{DD}=1.5V \sim 5.5V$, External clock signal input | | | | | |
| Low Level Input Voltage | V_{IL2} | 5, 6 | $V_{DD}=0.9V \sim 1.5V$ | 0 | | 0.3 | V | |
| | | 1 | $V_{DD}=0.9V \sim 1.5V$, External clock signal input | | | | | |
| High Level Input Current(1) | I_{IH1} | 6 | $V_{IH1}=V_{DD}$, standby mode | | | -0.3 | μA | |
| | | 1 | $V_{IH1}=V_{DD}$, External clock signal input | | | | | |
| High Level Input Current(2) | I_{IH2} | 5 | Working mode $V_{IH2}=V_{DD}$ | $V_{DD}=1.5V$ | 0.4 | 1.8 | 4.0 | μA |
| | | | | $V_{DD}=3.0V$ | 3.0 | 10.0 | 30.0 | |
| | | | | $V_{DD}=5.0V$ | 12.5 | 32.0 | 80.0 | |
| Low Level Input Current | I_{IL} | 5, 6 | $V_{IL}=0V$ | -0.3 | | | μA | |
| | | 1 | $V_{IL}=0V$, External clock signal input | | | | | |
| Output Impedance | Z_{OUT} | 8 | When attacking both of the key melody and accompaniment at the same time and when determining the timing of respective DAC levels for them | | 222 (68) | 440 (150) | k Ω | |
| Internal Rating Voltage | $ V_{REG} $ | | $V_{DD}=1.5\sim 5.5V$ | | 1.05 | 1.2 | V | |
| Standby Mode Current Consumption | I_{DDS} | 7 | All input terminals =0V Out =No load, Standby mode | | 0.1 | 1.0 | μA | |

■ DC CHARACTERISTICS(Cont.)

| PARAMETER | SYMBOL | PIN | TEST CONDITIONS | MIN | TYP | MAX | UNIT | |
|---|------------------|-----|---|-----------------------|-----|-------------------|--------------------|----|
| Working mode average current consumption(1) | I _{DDO} | 7 | MT=V _{DD} , SEL=TEST=0V When RC oscillation is selected: F _{CK} =32.768kHz or 47.520kHz OUT=No load Working mode | V _{DD} =1.5V | | 20 | 50~80 | μA |
| | | | | V _{DD} =3.0V | | 30~5 (Note2) | 70~100 (Note2) | μA |
| | | | | V _{DD} =5.0V | | 80~100 (Note2) | 150~200 (Note2) | μA |
| | | | MT=V _{DD} , SEL=TEST=0V When external clock signal input OSC2=No load OSC1=32.768kHz or 47.520kHz, OUT=No load Working mode | V _{DD} =1.5V | | 20 (Note2) | 50~80 (Note2) | μA |
| | | | | V _{DD} =3.0V | | 30~50 (Note2) | 70~100 (Note2) | μA |
| | | | | V _{DD} =5.0V | | 80~100 (Note2) | 150~200 (Note2) | μA |
| Working mode average current consumption(2) | I _{DD} | 7 | MT= V _{DD} , SEL=TEST=0V When RC oscillation is selected: F _{CK} =32.768kHz or 47.520kHz OUT=No load Working mode After one-shot performance stops. | V _{DD} =1.5V | | 20 | 60 | μA |
| | | | | V _{DD} =3.0V | | 30 | 90 | μA |
| | | | | V _{DD} =5.0V | | 60 | 180 | μA |
| | | | MT= V _{DD} SEL=TEST=0V When external clock signal input OSC2=No load OSC1=32.768kHz or 47.520kHz OUT=No load Working mode After one-shot performance stops. | V _{DD} =1.5V | | 10 | 40 | μA |
| | | | | V _{DD} =3.0V | | 20 | 70 | μA |
| | | | | V _{DD} =5.0V | | 45 | 160 | μA |

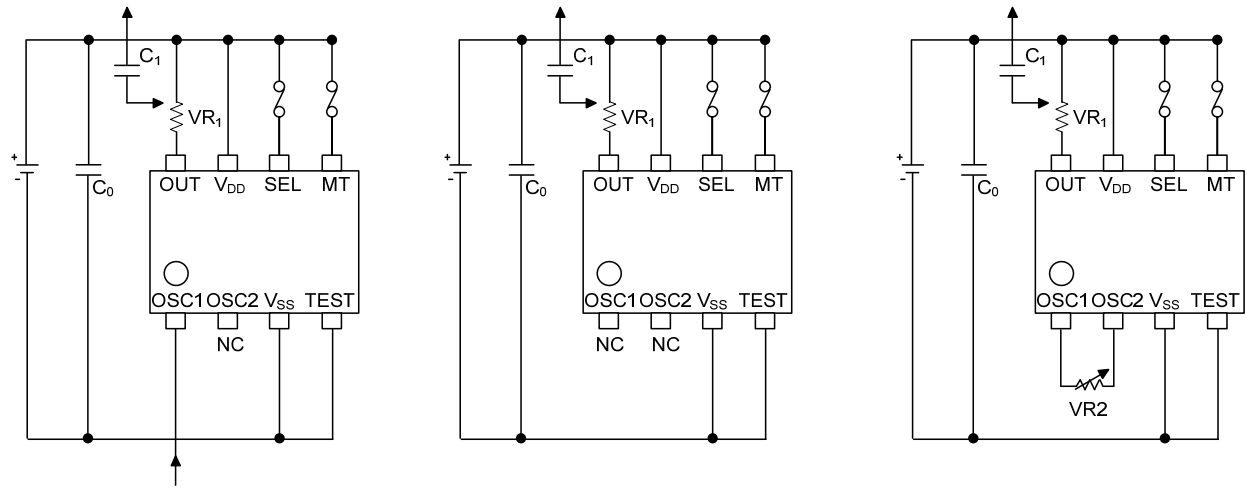
Note: 1. Under the RC oscillation mode. When the supply voltage drops below the voltage being generated the internal constant voltage circuit, the RC oscillation frequency goes down below the prescribed level to reduce the tempo and to bring down the pitch corresponding to the downward deviation of the oscillation frequency. Other circuits function normally under the prescribed specifications.

2. This value is a reference value. Because current consumption varies depending on the programmed pitch, tempo, used notes and address location with each ROM.

■ DC CHARACTERISTICS (5.5V≥V_{DD}≥V_{DD}-V_{REG}, T_A=25°C)

| PARAMETER | SYMBOL | CONDITION | SPEC | | | UNIT |
|---|------------------|-------------------------------|--------|--------|--------|------|
| | | | MIN | TYP | MAX | |
| When the External Clock Mode is Selected by Mask Option: Enter Square Waves to the OSC1 Pin as the Reference Signal Source. | f _{EXC} | External signal clock input | -15 | | +15 | % |
| | | | 27.853 | 32.768 | 37.683 | KHZ |
| | | | 40.392 | 47.520 | 54.648 | KHZ |
| RC Oscillation Frequency Times | f _{OSC} | The integrated RC oscillation | -15 | | +15 | % |
| | | | 27.853 | 32.768 | 37.683 | KHZ |
| | | | 40.392 | 47.520 | 54.648 | KHZ |

■ BASIC EXTERNAL CONNECTION DIAGRAM



■ REFERENCE CIRCUIT CONSTANTS

| REMARKS | SYMBOL | REFERENCE VALUES | UNIT |
|---|-----------------|------------------|------|
| Volume Controlling Variable Resistor | VR ₁ | 100 ~ 500 | KΩ |
| External Resistor of the RC Oscillation | VR ₂ | 0 ~ 1 | MΩ |
| Power Stabilizing Capacitor | C ₀ | 1 ~ 100 | μF |
| Audio Output Coupling Capacitor | C ₁ | 0.1 | μF |

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