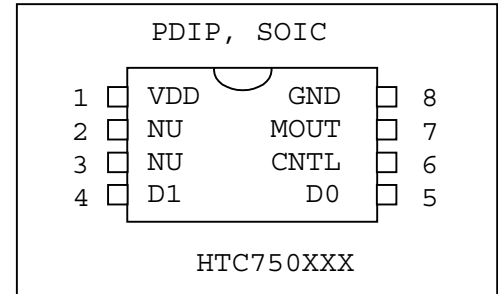


Melody Generator

1.0 General description.

This circuit is designed to work as melody generator. HTC750 will play selected melody (selection is done by driving D0 and D1 inputs to low or high value) and once melody is finished it will enter power saving mode which we call Sleep mode. In Sleep mode HTC750 consumes less than few microamps of current. One of possible uses of HTC750 is designing it in doorbell. This device was designed using our proprietary melody storing scheme to optimize internal memory usage. HTC750 can play up to four melodies. It can directly drive piezo-electrical sound source or with use of external amplifier can drive speakers. Control output is provided to control external relay or power switch. This output goes high for duration of melody and could be used to control the power to HTC750 and amplifier for duration of melody.



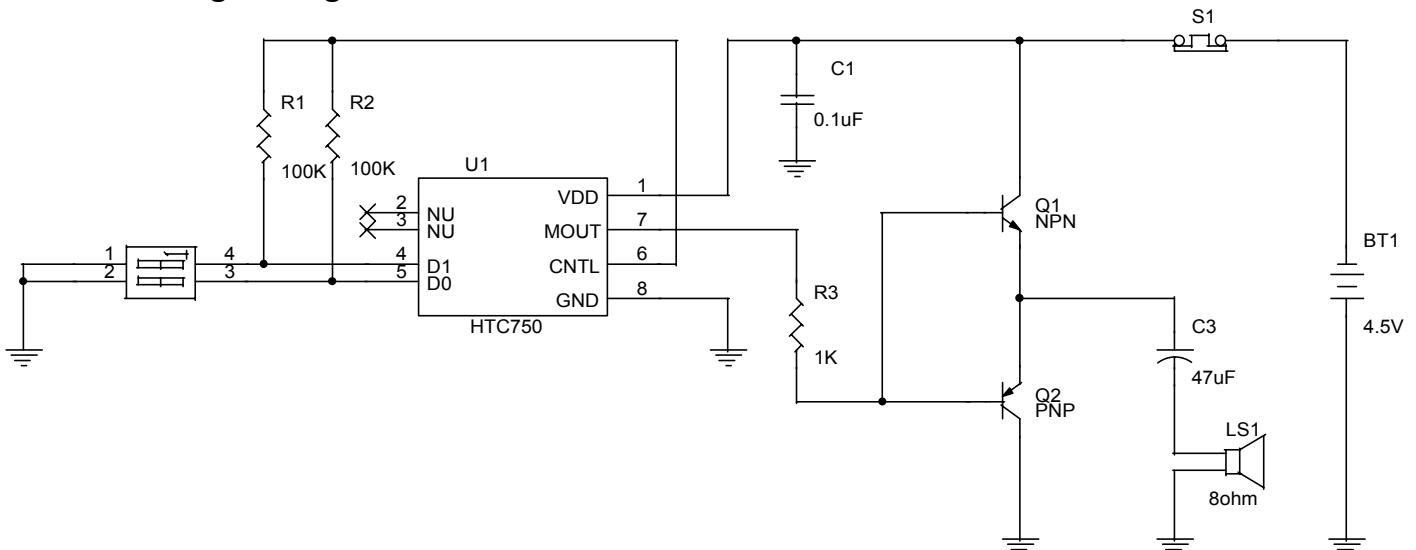
Possible uses are:

- Musical doorbell.
- Melody generator for alarm clock.
- Musical toys.
- Musical boxes for gifts, accessories or jewelry.

Features:

- Single chip solution.
- Minimum external components.
- Four selectable melodies.
- Minimum power consumption while in SLEEP mode.

Doorbell design using HTC750



2.0 Functional Description.

We will use schematics above to describe HTC750 operation. At power up HTC750 plays melody set by dip-switch. After finishing melody it goes into sleep mode and drives all outputs to GND. In prototypes we build using above schematics current consumption was less than 10uA. This current is negligible enough to leave circuit constantly powered on. When device is in Sleep mode only way of waking up the circuit is to recycle power. This is done using S1 pushbutton. Note that we are using pushbutton with normal closed contacts. When this pushbutton is activated power to HTC750 is cut down and when this pushbutton is released then part will play the melody. One can use pushbutton with normal open contacts but it could result partial reproduction of melody.

Note the way CNTL output is used to save energy during Sleep mode. Energy saving is achieved by cutting power to R1 and R2 resistors when part enters into Sleep mode and preventing battery discharge through those resistors when associated dip-switch is on. T1 and T2 form simple current amplifier to drive 8-ohm speaker. Almost any small signal transistor could be used in this amplifier. Note that this amplifier will introduce additional distortions to amplified signal, because transistors are not biased. This is done intentionally to simplify amplifier circuit and add one distinct character. This amplifier does not use any current when its input is driven low. Any other amplifier circuit could be used as long as care is taken to shut down the amplifier with CNTL output of HTC750 to save battery. This could be done by external relay. Quality of sound could be further enhanced if low pass filter is added to output of HTC750. Please see Application note for HTC750.

Pin out description.

Abbreviations used: O - output, I - input, P - power.

Pin	Name	I / O	Description	Notes
1	VDD	P	Power	+2.5V to +5.5V
2	NU	I	Not Used	Tie it to GND or VDD.
3	NU	I	Not Used	Tie it to GND or VDD.
4	D1	I	Melody selection input.	Tie it to GND or VDD.
5	D0	I	Melody selection input.	Tie it to GND or VDD.
6	CNTL	O	Control output	This output is driven high when part plays melody. Can deliver up to 25mA current.
7	MOUT	O	Melody output	Signal on this output is square wave.
8	GND	P	Ground	Connect to ground.

3.0 Melody selection with D[0:1]

D1	D0	MELODY
GND	GND	Number 1
GND	VDD	Number 2
VDD	GND	Number 3
VDD	VDD	Number 4

This table shows melody played when D0 and D1 are tied to ground or power. Note that this part comes with different sets of melodies and those melody samples will be made available for download.

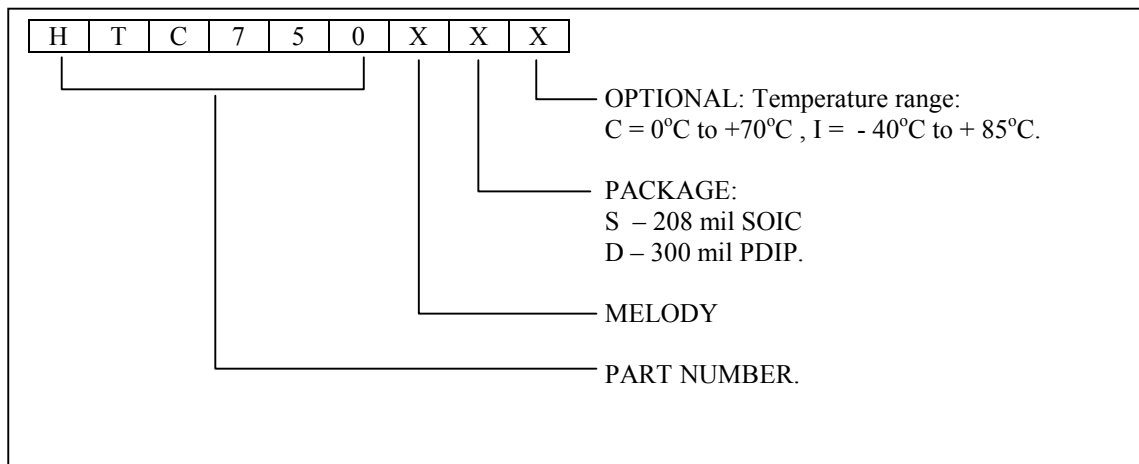
4.0 Electrical characteristics.

Voltage on VDD pin in respect to GND	+2.5 to +5.5V
Operational current with no external load	3 mA ¹
Current used in SLEEP mode	4uA ¹
MOUT output low voltage max (5mA load)	0.4V ¹
MOUT output high voltage min (5mA source)	VDD-0.7V ¹
MOUT maximum sink current	25mA ¹
MOUT maximum source current	25mA ¹
CNTL output low voltage max (5mA load)	0.4V ¹
CNTL output high voltage min (5mA source)	VDD-0.7V ¹
CNTL maximum sink current	25mA ¹
CNTL maximum source current	25mA ¹

NOTES:

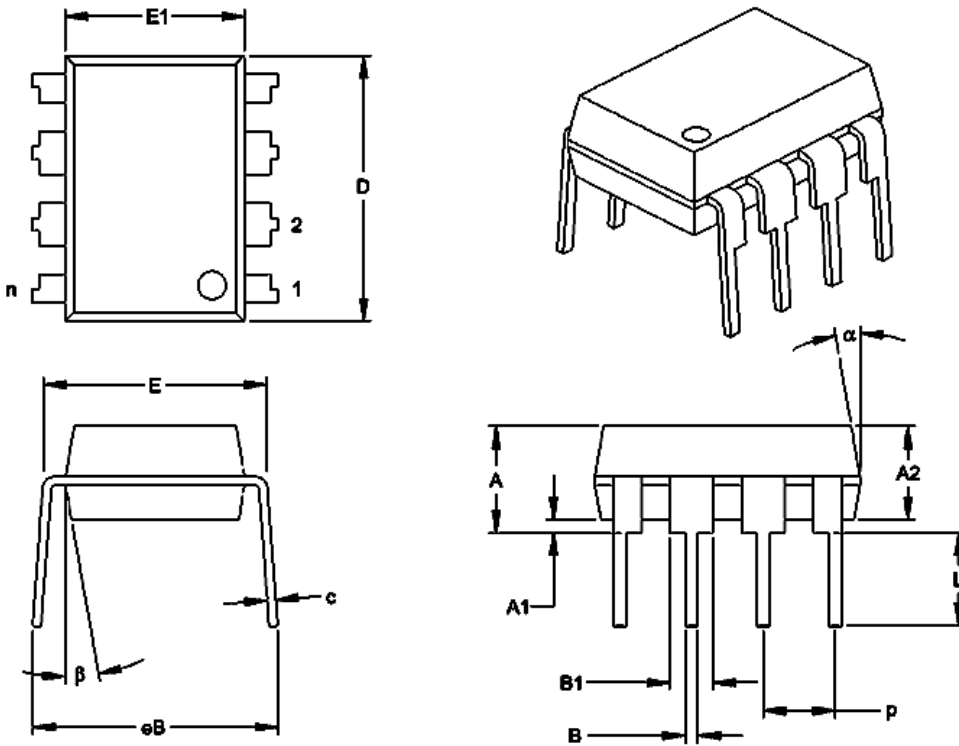
1. Those values are characterized but not tested.

5.0 Ordering information.



6.0 Mechanical information.

8-Lead Plastic Dual In-line (P) – 300 mil (PDIP)



Units		INCHES*			MILLIMETERS		
Dimension Limits		MIN	NOM	MAX	MIN	NOM	MAX
Number of Pins	n		8			8	
Pitch	p		.100			2.54	
Top to Seating Plane	A	.140	.155	.170	3.56	3.94	4.32
Molded Package Thickness	A2	.115	.130	.145	2.92	3.30	3.68
Base to Seating Plane	A1	.015			0.38		
Shoulder to Shoulder Width	E	.300	.313	.325	7.62	7.94	8.26
Molded Package Width	E1	.240	.250	.260	6.10	6.35	6.60
Overall Length	D	.360	.373	.385	9.14	9.46	9.78
Tip to Seating Plane	L	.125	.130	.135	3.18	3.30	3.43
Lead Thickness	c	.008	.012	.015	0.20	0.29	0.38
Upper Lead Width	B1	.045	.058	.070	1.14	1.46	1.78
Lower Lead Width	B	.014	.018	.022	0.36	0.46	0.56
Overall Row Spacing	eB	.310	.370	.430	7.87	9.40	10.92
Mold Draft Angle Top	α	5	10	15	5	10	15
Mold Draft Angle Bottom	β	5	10	15	5	10	15

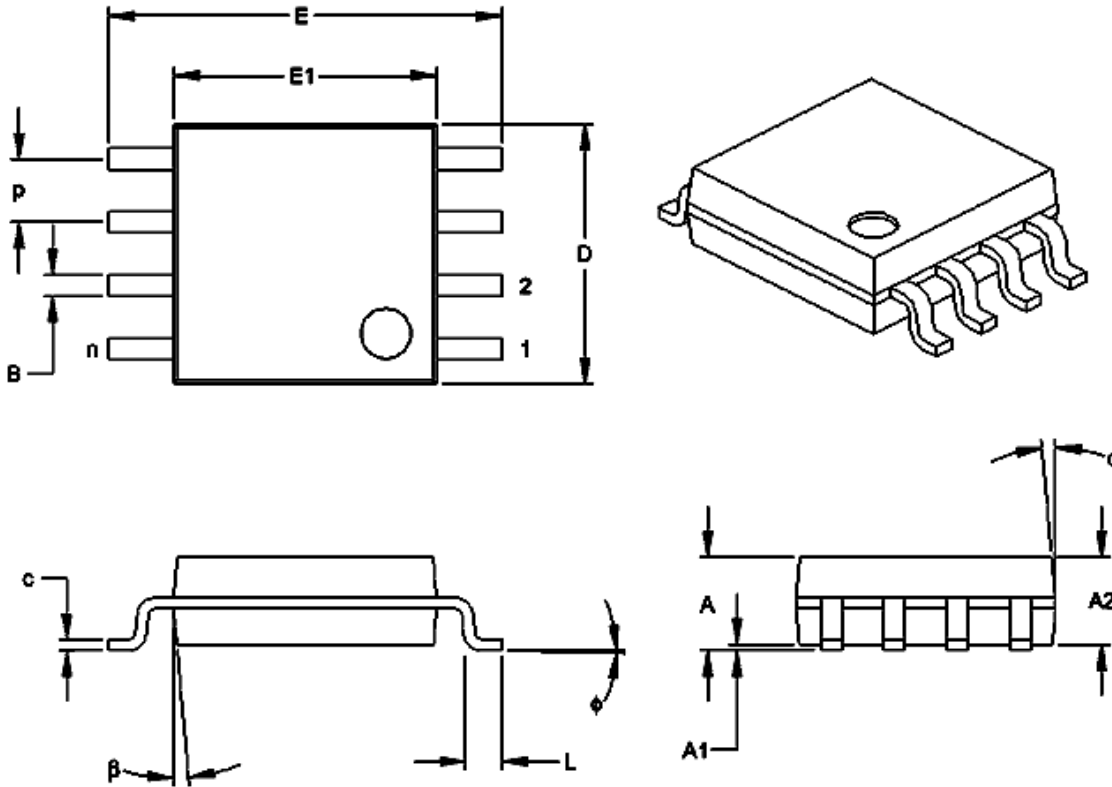
*Controlling Parameter

Notes:

Dimensions D and E1 do not include mold flash protrusions. Mold flash or protrusions shall not exceed .010" (0.254mm) per side.

JEDEC Equivalent:MS-001

8-Lead Plastic Small Outline (SM) – Medium, 208 mil (SOIC)



Dimension Limits	Units	INCHES*			MILLIMETERS		
		MIN	NOM	MAX	MIN	NOM	MAX
Number of Pins	n		8			8	
Pitch	P		.050			1.27	
Overall Height	A	.070	.075	.080	1.78	1.97	2.03
Molded Package Thickness	A2	.069	.074	.078	1.75	1.88	1.98
Standoff	A1	.002	.005	.010	0.05	0.13	0.25
Overall Width	E	.300	.313	.325	7.62	7.95	8.26
Molded Package Width	E1	.201	.208	.212	5.11	5.28	5.38
Overall Length	D	.202	.205	.210	5.13	5.21	5.33
Foot Length	L	.020	.025	.030	0.51	0.64	0.76
Foot Angle	ϕ	0	4	8	0	4	8
Lead Thickness	c	.008	.009	.010	0.20	0.23	0.25
Lead Width	B	.014	.017	.020	0.36	0.43	0.51
Mold Draft Angle Top	α	0	12	15	0	12	15
Mold Draft Angle Bottom	β	0	12	15	0	12	15

*Controlling Parameter

Notes:

Dimensions D and E1 do not include mold flash protrusions. Mold flash or protrusions shall not exceed .010" (0.254mm) per side.



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