

Different shades of ringing

DESCRIPTION

THE HT2410/2411 IS A BIPOLAR INTEGRATED CIRCUIT DESIGNED FOR TELEPHONE TONE RINGER.THESE DEVICES CONSISTS OF AN OUTPUT AMPLIFIER, TWO OSCILLATORS, AND POWER SUPPLY CONTROL CIRCUIT.

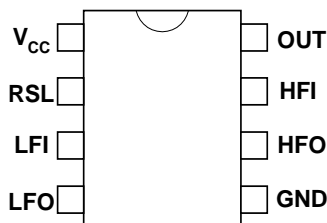
FEATURES

- ◆ Low current drain
- ◆ Adjustable 2 tone frequency
- ◆ Hysteresis circuit prevents false triggering and rotary dial "CHIRPS"
- ◆ 8 pin DIP plastic package
- ◆ External triggering or ringer disables (HT2410)
- ◆ Adjustable for reduced supply initiation current (HT2411)

APPLICATIONS

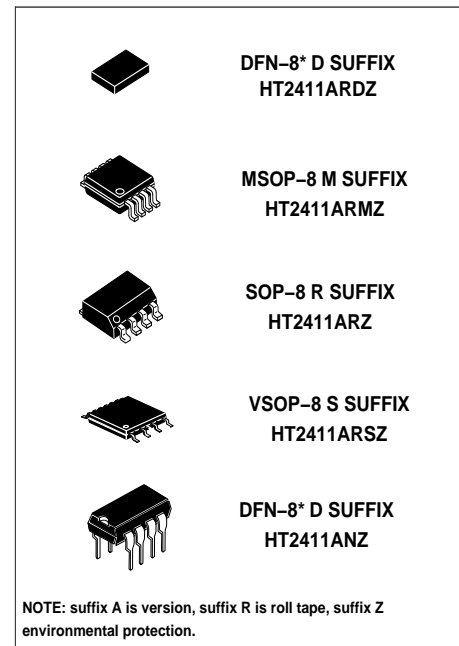
- ◆ Telephone bell replacement
- ◆ Extension tone ringer modules
- ◆ Alarms or other alerting devices

PIN CONFIGURATION (TOP VIEW)



PIN ASSIGNMENT

PIN	NAME	FUNCTION
1	V _{CC}	Power Supply
2	RSL	Resistor Select
3	LFI	Low freq. osc. Input
4	LFO	Low freq. osc. Output
5	GND	Ground
6	HFO	High freq. osc. Output
7	HFI	High freq. osc. Input
8	OUT	Output



ABSOLUTE MAXIMUM RATINGS

Voltage values are with respect to the anode terminal unless otherwise noted

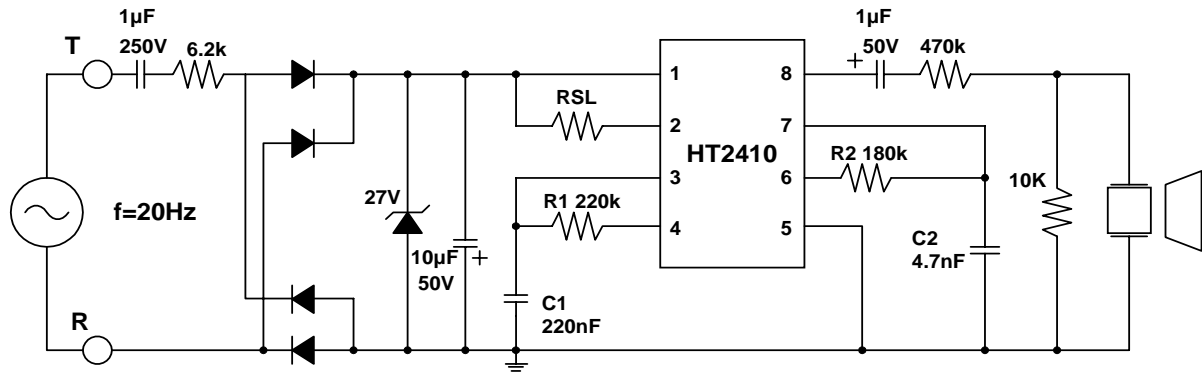
PARAMETER	SYMBOL	RATING	UNITS
DC Supply Voltage	V_{CC}	36	V
Power Dissipation	P_D	450	mW
Operating Ambient Temperature Range	T_A	-25~+75	°C
Storage Temperature Range	T_{STG}	-65~+150	

ELECTRICAL CHARACTERISTICS ($V_{CC}=24V$, $T_A=25^\circ C$, UNLESS OTHERWISE NOTED)

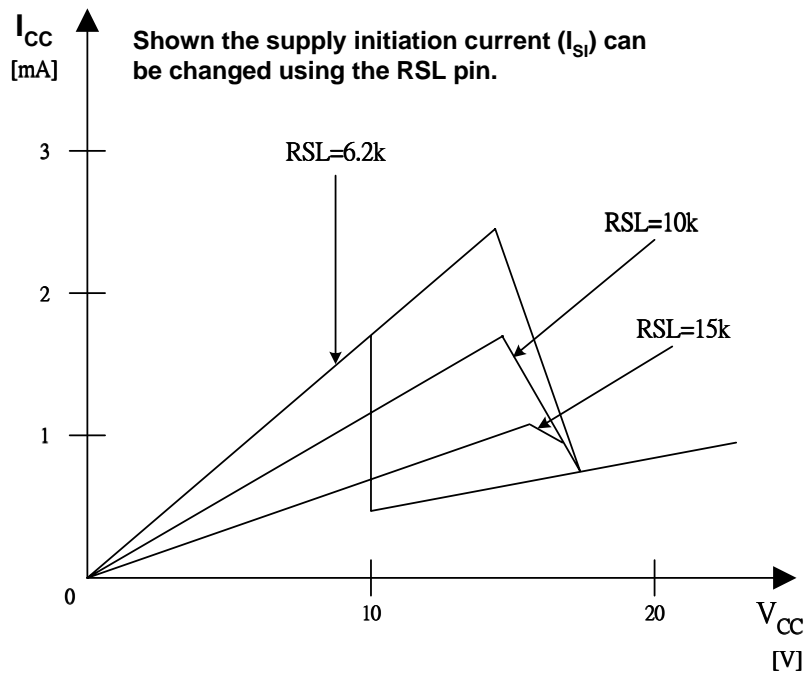
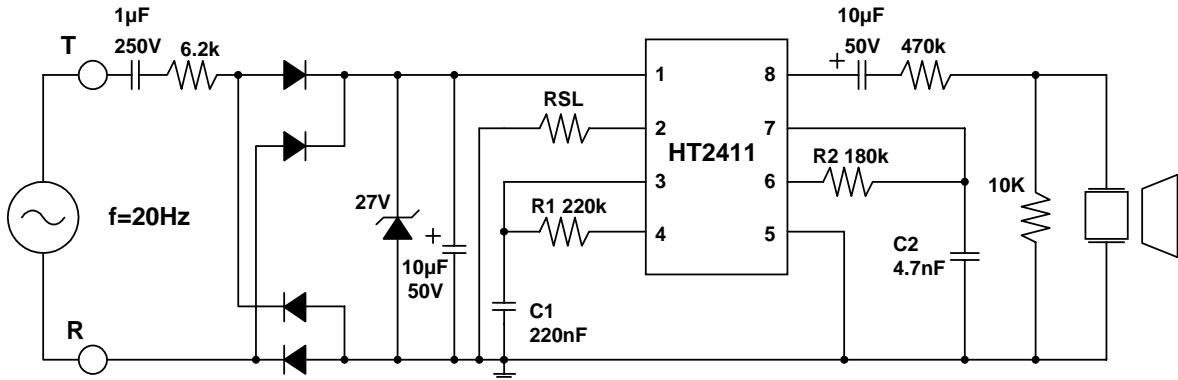
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Operating Voltage	V_{CC}				36	V
Supply Initiation Voltage	V_{SI}		17	19	21	
Supply Initiation Current	I_{SI}	$V_{CC}=V_{SI}$, No load #1	1.4	2.5	4.2	mA
Sustaining Voltage	V_{SUS}		9.7	10.5	12	V
Sustaining Current	I_{SUS}	$V_{CC}=V_{SUS}$, No load #2	0.2	0.9	2.5	mA
Oscillator Freq. #3	f_L	R1=165k Ω , C1=0.47 μ f	9	10	11	Hz
Oscillator Freq. #3	f_{H1}	R2=191k Ω , C2=6800pF	461	512	563	Hz
Oscillator Freq. #3	f_{H2}	R2=191k Ω , C2=6800pF	576	640	703	Hz
Output High Voltage	V_{OH}	$V_{CC}=21V$ $I_{OH}=15mA$	17.7	19	21.5	V
Output Low Voltage	V_{OL}	$I_{OL}=15mA$			1.6	
Trigger Voltage #4	V_{TRG}	$V_{CC}=15V$	8.5		10.5	V
Trigger Current #5	I_{TRG}	HT2410 Only (2 pin)		20	1000	
Disable Voltage	V_{DIS}			0.4	0.8	V
Disable Current #6	I_{DIS}	HT2410 Only (2 pin)	-40	-20		

- #1. Supply initiation voltage is the value of DC supply voltage required to start the tone ringer oscillating.
- #2. Sustaining voltage is the value of DC supply voltage required to maintain the oscillation.
- #3. Oscillator frequency is determined by the following equations:
 $f_L = 1/(1.359XR1XC1)(Hz)$
 $f_{H1} = 1/(1.518XR2XC2)(Hz)$
 $f_{H2} = 1.214Xf_{H1} (Hz)$
- #4. V_{TR} and I_{TR} the conditions applied to trigger input to start oscillation for $V_{SUS} \leq V_{CC} \leq V_{SI}$.
- #5. Trigger current must be limited to this value externally.
- #6. V_{DIS} and I_{DIS} are the conditions applied to trigger input to inhibit oscillation for $V_{SI} \leq V_{CC}$.

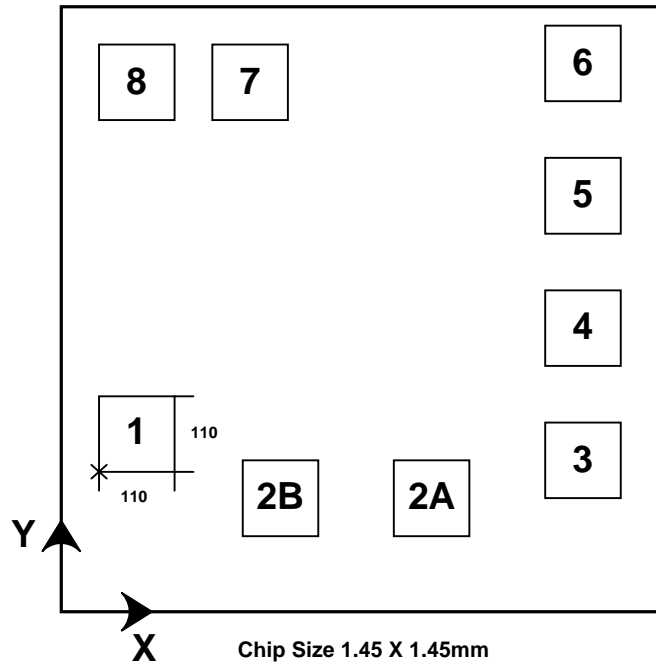
APPLICATION CIRCUIT FOR HT2410



APPLICATION CIRCUIT FOR HT2411

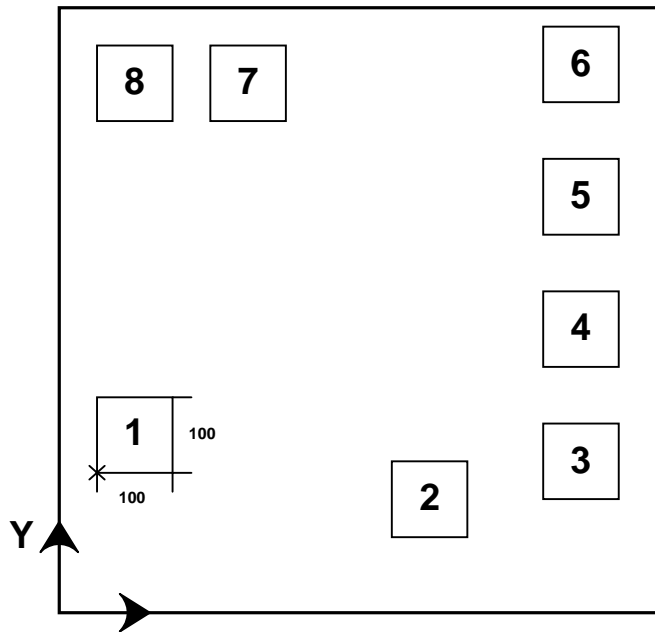


Use of RSL pin (for HT2411 only)

Pad Location HT2410 / HT2411


For HT2410 2A pad to be used, 2B pad not connected;
 For HT2411 2B pad to be used, 2A pad not connected.

Pad N	Pad Name	Coordinates	
		X (μm)	Y (μm)
1	V _{CC}	95	270
2A	RSL	925	90
2B		690	90
3	LFI	1245	90
4	LFO	1245	490
5	GND	1245	765
6	HFO	1245	1185
7	HFI	460	1185
8	OUT	95	1185

Pad Location HT2410 / HT2411 (new design)


Chip Size 1.25 X 1.25mm

Pad N	Pad Name	Coordinates	
		X (μm)	Y (μm)
1	V _{CC}	75	250
2	RSL	640	81
3	LFI	1095	81
4	LFO	1095	469
5	GND	1095	731
6	HFO	1095	1037
7	HFI	447	1037
8	OUT	75	1037