



FORWARD INTERNATIONAL ELECTRONICS LTD.

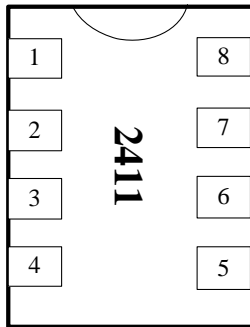
SEMICONDUCTOR
TECHNICAL DATA**K2411**

TELEPHONE TONE RINGER

The 2411 is a bipolar integrated circuit designed for telephone tone ringer.

Features

- * Designed for telephone bell replacement
- * Adjustable 2-tone frequency
- * Hysteresis circuit prevents false triggering and rotary dial "Chirps"
- * Adjustable for reduced supply initiation current

Package: DIP-8

Pin No	Name	Function
1	VCC	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	Signal output

ABSOLUTE MAXIMUM RATING

Parameter	Symbol	Rating	Unit
DC Supply Voltage	V _{cc}	36	V
Power Dissipation	P _d	450	mW
Operating Temperature	T _{opr}	-25~+75	
Storage Temperature	T _{stg}	-55~+125	

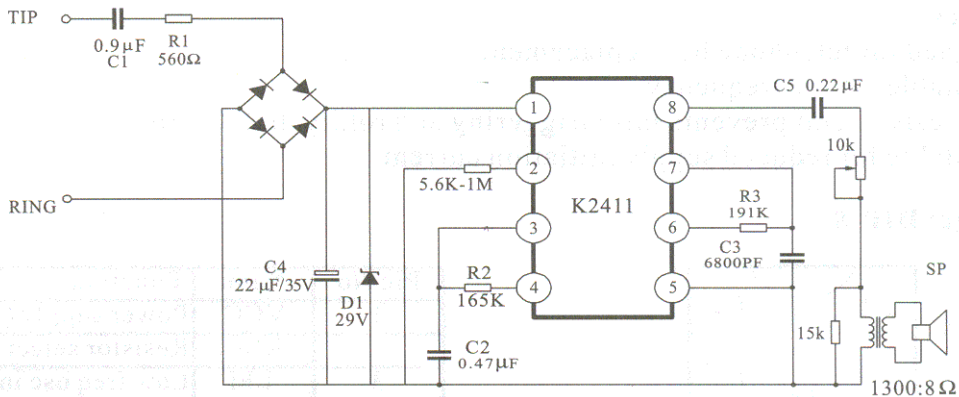
ELECTRICAL CHARACTERISTICS V_{CC}=24V, T_a=25 (Unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Operating Supply Voltage	V _{cc}				36	V
Initiation Supply Voltage (note 1)	V _{si}		17	19	21	V
Initiation Supply Current	I _{si}	V _{cc} =V _{si} , No Load, R _{sl} =6.8k	1.4	3.5	4.2	mA
Sustaining Voltage (note 2)	V _{sus}		9.7	11	13	V
Sustaining Current	I _{sus}	V _{cc} =V _{sus} , No Load	0.2	1.4	2.5	mA
Output High Voltage	V _{OH}	V _{cc} =21V, I _{OH} =15mA	17	19	21	V
Output Low Voltage	V _{OL}	V _{cc} =21V, I _{OL} =15mA			1.6	V
High Frequency 1	F _{H1}	R3=191K, C3=6800pF	461	512	563	Hz
High Frequency 2	F _{H2}	R3=191K, C3=6800pF	576	640	703	Hz
Low Frequency	F _L	R2=165K, C2=0.47uF	9	10	11	Hz

Note:

1. initiation supply voltage (V_{si}) is the supply voltage required to start the tone ringer oscillating.
2. sustaining voltage (V_{sus}) is the supply voltage required to maintain oscillation.

APPLICATION CIRCUIT



$$F_L = 1/1.289R2C2$$

$$F_{H1} = 1/1.504R3C3$$

$$F_{H2} = 1/1.203R3C3$$