GENERAL DESCRIPTION

The DL1001 series product is a poly gate CMOS integrated circuit which is designed to drive an electroluminescence Lamp (EL) to light. It supplies three pins for trigger input: one is active at low (ALM) and other two are active at high (TG&FLSH). 3 seconds display delay function is implemented by internal divider. Only ALM and TG will generate 3seconds delay but FLSH not. The switching and EL driving frequency is decided by an intimae RC oscillator. The driving capability for IND output and frequency for EL output are different options, the detail information shown in the OPTION LIST.

DL1001 series product can be widely used in the back light of digital watch, analogy watch, calculator etc.

FUNCTIONS

- Single 3V or 1.5V battery operation.
- DC to AC conversion.
- Built-in RC oscillator.
- Built-in delay function.
- Three independent trigger inputs: ALM (L) makes EL display for 3 second delay.
  TG (H) makes EL display for 3 second delay.
  FLSH (H) makes EL flash companied with the pluse from FLSH without any delay.
  (See Tining Diagram)

FEATURES

- Economical solution for EL display.
- CMOS process and low power consumption.
- No external component needed for delay function.
- Min. external components application.

COIL OPTION LIST FOR DL1001

VDD (V)	COIL		EL AREA (cm squ.)	EL VOLTAGE (V)	COLOUR
	MIN	OHM			
3.0	3	37	1.5×2.5	140	Blue
	2	14	1.5×2.5	165	Blue
	2	14	2.5×2.5	130	Blue
	1	11	2.5×2.5	160	Blue
	1	11	3.5×6.0	110	Green
1.5	2	14	1.5×2.5	105	Blue
	1	11	1.5×2.5	120	Blue
	1	11	1.1×2.3	160	Green- Blue
	1	11	2.5×2.5	100	Green

ABSOLUTE MAXIMUM RATINGS (Ta=25℃)

Parameter	Symbol	Limits
Power supply voltage range	VDD-VSS	-0.3V to +5.0V
Input voltage range	Vin	Vss-0.3 to V_{DD}+0.3
Operating temperature range	T_A	0 to +60℃
Storage temperature range	Tstg	-40 to +70℃

DC ELECTRICAL CHARACTERISTICS

Unless otherwise specified, Ta=25℃, V_{DD}=3.0V, Vss=0V

Characteristics	Symbol	Min	Typ	Max	Unit	Test conditions
Operating voltage range	V_{DD}	1.3	3.0	4.5	V	-
Standard current	I_{DD}	-	0.1	1	uA	*on load
IND output source current	I_{OH1}	1.3	2.6	-	mA	V_{OH}=0.8V
EL output source current	I_{OH2}	1.0	2.2	-	mA	V_{OH}=0.8V
IND output sink current	I_{OL1}	10	20	-	mA	V_{OH}=0.8V
EL output sink current	I_{OL2}	2.0	4.0	-	mA	V_{OH}=0.8V
Oscillator stating voltage	V_{STP}	1.3	-	-	V	-
Oscillator frequency	***F_{OSC}	400	500	670	KHz	V_{DD}=3.0V

Unless otherwise specified, Ta=25℃, V_{DD}=1.5V, Vss=0V

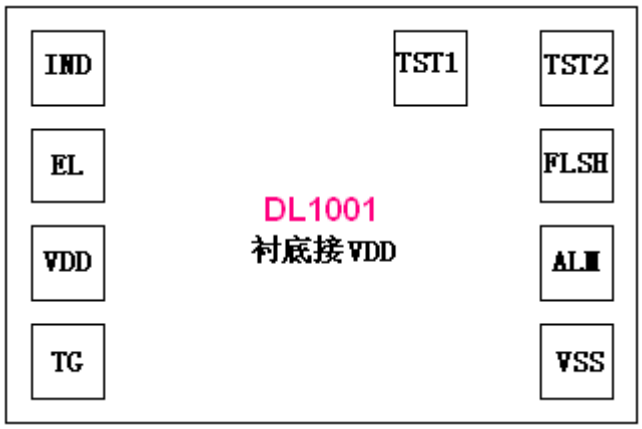
Characteristics	Symbol	Min	Typ	Max	Unit	Test conditions
Operating voltage range	V_{DD}	1.3	1.5	4.5	V	-
Standard current	I_{DD}	-	0.1	1	uA	*on load
IND output source current	I_{OH1}	0.3	0.5	-	mA	V_{OH}=0.8V
EL output source current	I_{OH2}	0.2	0.4	-	mA	V_{OH}=0.8V
IND output sink current	I_{OL1}	3.0	10	-	mA	V_{OH}=0.8V
EL output sink current	I_{OL2}	0.3	0.8	-	mA	V_{OH}=0.8V
Oscillator stating voltage	V_{STP}	1.3	-	-	V	-
Oscillator frequency	***F_{OSC}	400	500	670	KHz	V_{DD}=1.5V

Note: * refers to EL & IND open, all trigger input open.

**The Max. IND source current IOH1 cal be enlarged to 4 ma by mask option. The value in the above table refers to DL10013 OPTION. Others can be found in the OPTION LIST.

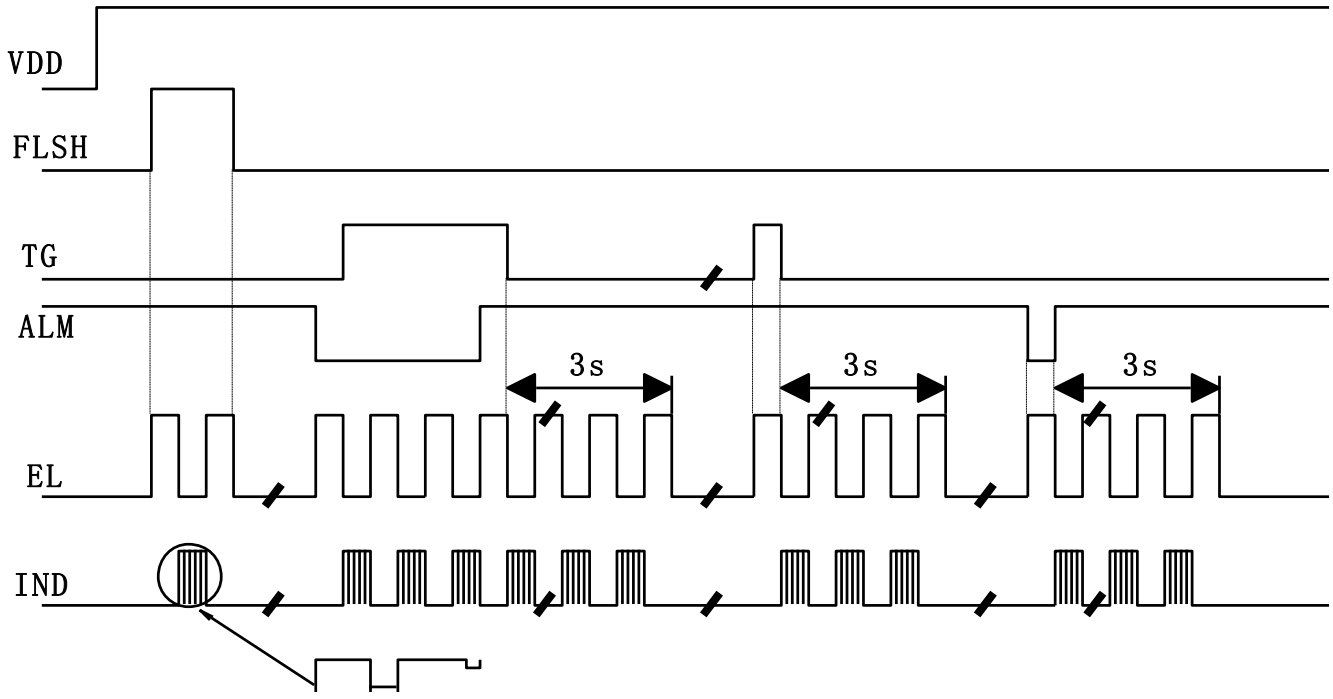
***The parameter Fosc in the above table refers to option DL10013. others can be found in the OPTION LIST.

PAD DIAGRAM



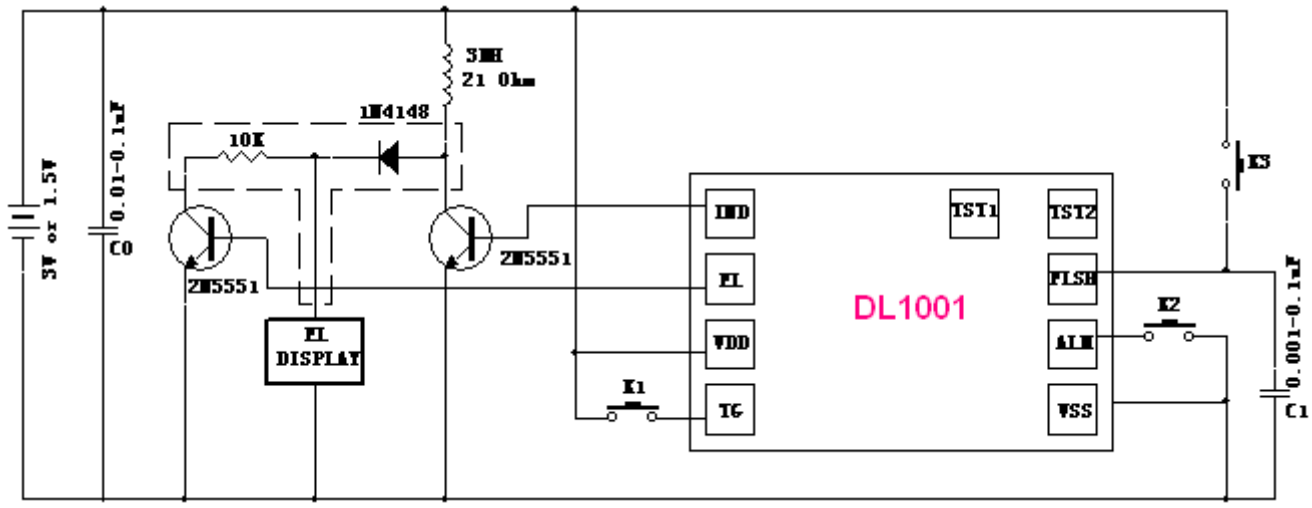
PAD No	PAD Name	X	Y
1	IND	-315.50	183.50
2	EL	-315.50	53.50
3	VDD	-315.50	-76.50
4	TG	-315.50	-206.50
5	VSS	315.45	-206.50
6	ALM	315.45	-76.50
7	FLSH	315.45	55.60
8	TST2	315.45	185.60
9	TST1	156.45	204.85

TIMING DIAGRAM



TYPICAL APPLICATION CIRCUIT

(Selection of K1, K2 AND K3 for different applications)



Note: 1. Substrate is connector to VDD.

2. The wires connected to TG and ALM cannot across the lines lnside the black dote line box. Furthermore, these wlres should be separated from the lines lnside the black dote line box by Vss or Vdd.

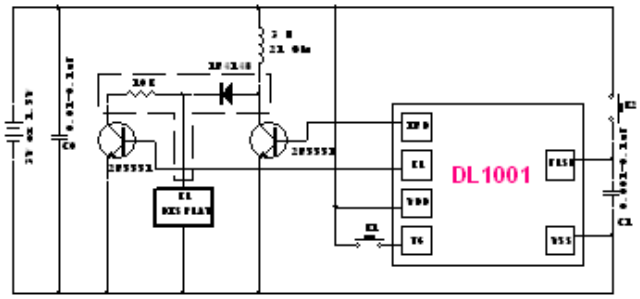
3. The capacltor C1 can be connected to Vss or Vdd.

4.During the watch application, the two wires connected to crystal are better to be surrounded by Vss or Vdd, and they are the farer the better away from the wlre connected to EL.

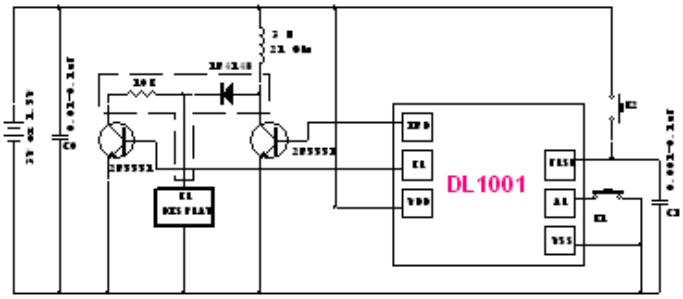
5. The items 2, 3, 4 are very lmportant for PCB layout. The above ltems are also applled to the following applcations (A-H) and will not be rementloned again.

ALL KINDS OF APPLICATION CIRCUIT

A. Application with 3 Second Delay using Vdd Trigger & without Delay using FLSH Trigger

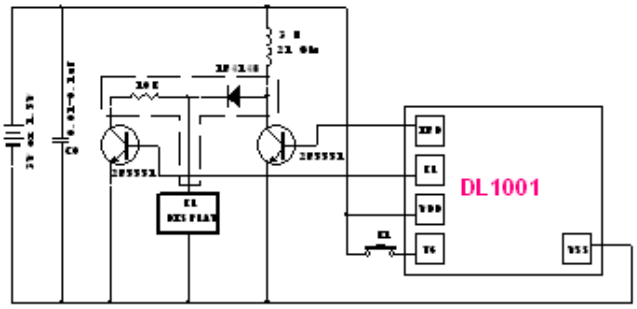


B. Application with 3 Second Delay using Vss Trigger & without Delay using FLSH Trigger

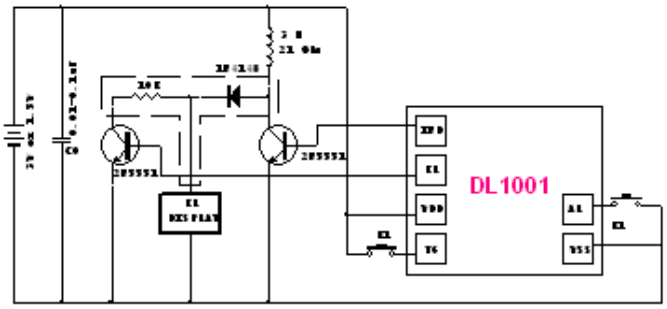


Note: Substrate is connecter to VDD

C. Application with 3 second delay using Vdd trigger

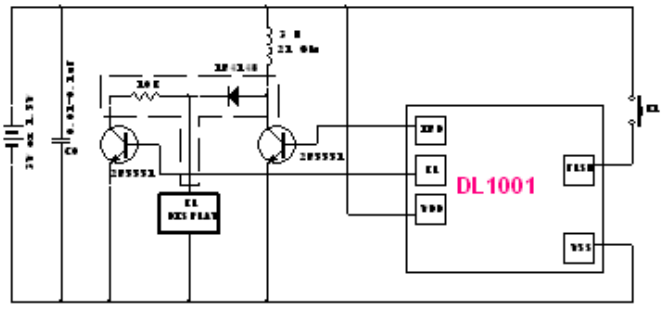


D. Application with 3 second delay using Vss trigger

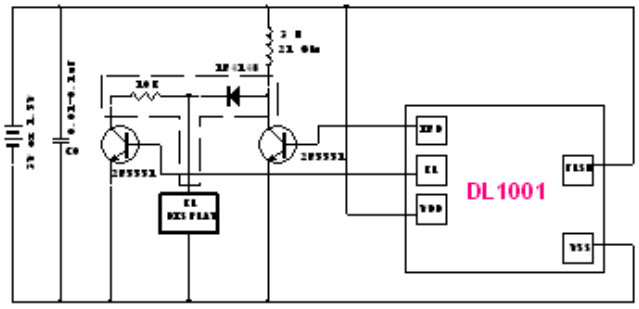


Note: Substrate is connecter to VDD

E. Application without delay using FLSH trigger



F. **Application without delay using Power Button**



Note: Substrate is connecter to VDD

Note: 1. Substrate is connecter to VDD.

2. L* and R* are adjustable to enlarge the driving capability.