

MM210**FINGER-TOUCH TRIGGER LED DRIVER (RESISTANCE SENSE)****DATA SHEET****Available in Die Form, TO94 and SOT23-5 Package****FEATURES**

- drive LED light triggered by finger touch.
- bonding option for three different LED driving current levels, max 28mA.
- bonding option for two LED output modes, 100% on or 50% 2Hz modulation.
- 2-battery operation, low standby current below 1.5 μ A.
- one resistor for setting finger-touch sensitivity.

TECHNICAL ADVANTAGES

- simple triggering method by sensing the change to a lower resistance level at input.
- stable sensing resistance level in aid of the build-in hysteresis system.
- built-in trigger activation delay to cope with any input de-bounce.
- built-in current-limiting resistor for LED.

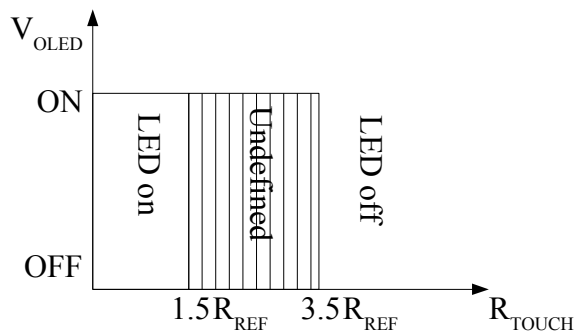
GENERAL DESCRIPTION

AMOS MM210 Finger-touch Trigger LED Driver offers a simple single chip solution for those applications which are to turn on a LED by a touch on fingers, or by other conductive means. MM210 measures the resistance change between the input KEY and the ground VSS. When it becomes lower, the LED output turns on; when it goes higher again, the output turns off.

Thanks to the built-in input de-bounce system and the input level hysteresis system, the triggering method is simple, reliable and user-friendly. On touching KEY and VSS by fingers in the same time, MM210 lights the LED. An external resistor is taken to set up and adjust the touch sensitivity.

MM210 can adapt any other means with conductive media, such as water. It also provide two LED output modes - 100% on or 50% 2Hz modulation.

RESISTANCE SENSE METHOD

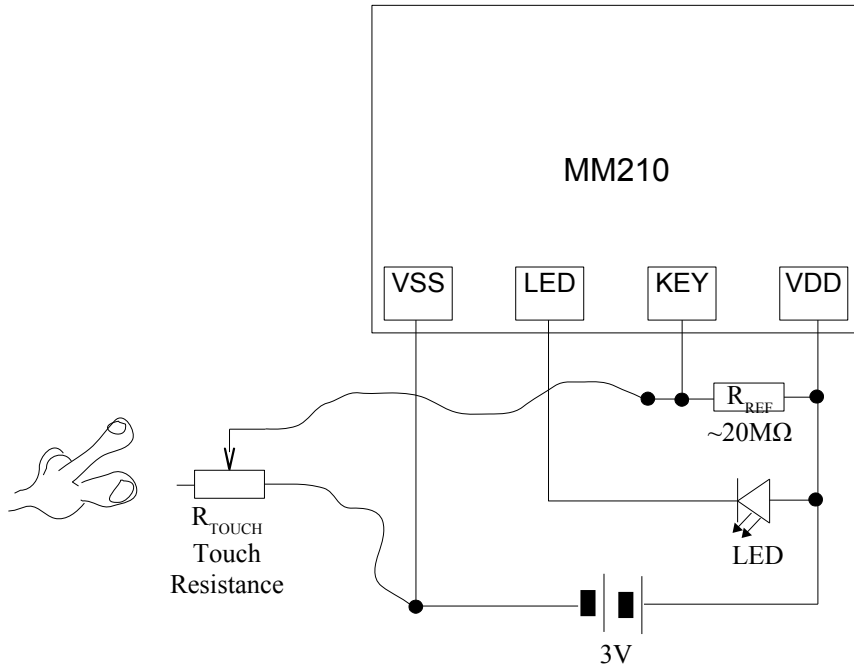


- R_{TOUCH} is the touch resistance between KEY and VSS
- R_{REF} is the external resistor between KEY and VSS
- $1.5R_{REF}$ and $3.5R_{REF}$ are an internal threshold reference levels
- V_{OLED} is the output level of the LED1 and LED2

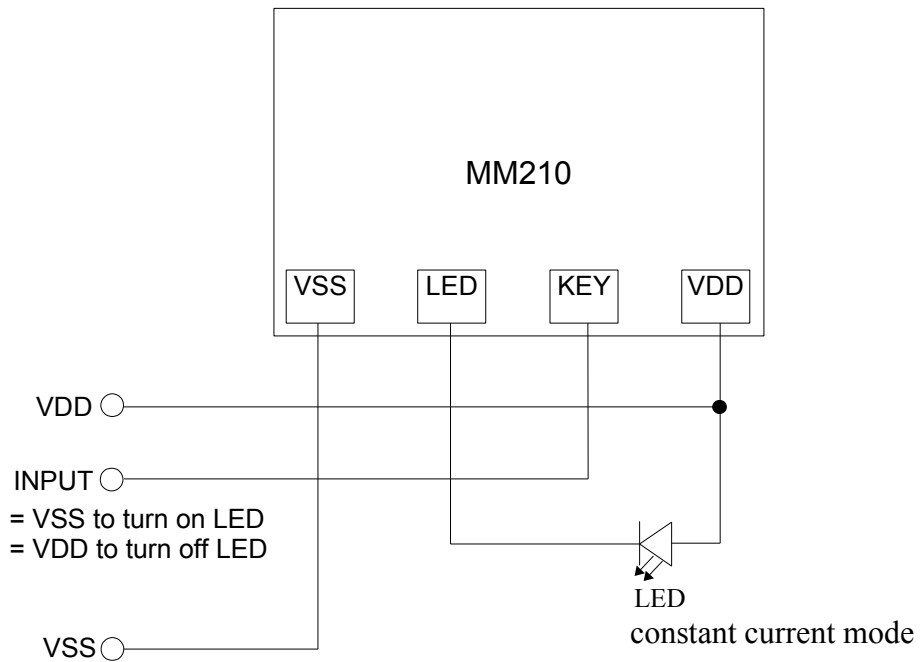
Output $V_{OLED} = ON$ when $R_{TOUCH} \leq 1.5 \times R_{REF}$
 Output $V_{OLED} = OFF$ when $R_{TOUCH} \geq 3.5 \times R_{REF}$
 It is undefined when when $1.5 \times R_{REF} < R_{TOUCH} < 3.5 \times R_{REF}$

APPLICATION

a battery-operated toy and premium with the touch and light function



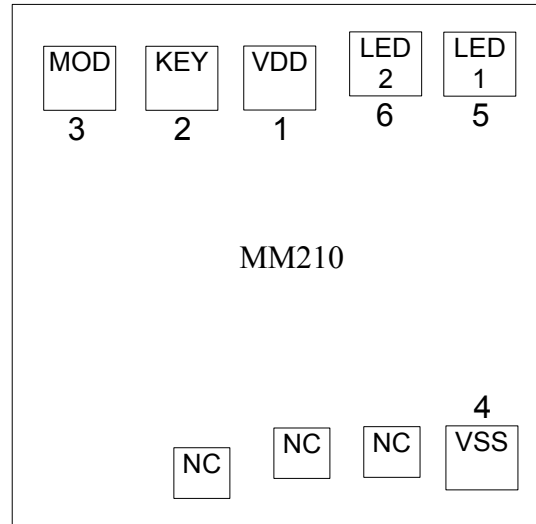
a LED driver in the constant current mode



DIE FORM & PIN DIAGRAM

chip size = 880µm × 880µm

Pin	Pin Name	X/µm	Y/µm
1	VDD	440	730
2	KEY	290	730
3	MOD	130	730
4	VSS	750	140
5	LED1	740	750
6	LED2	590	750



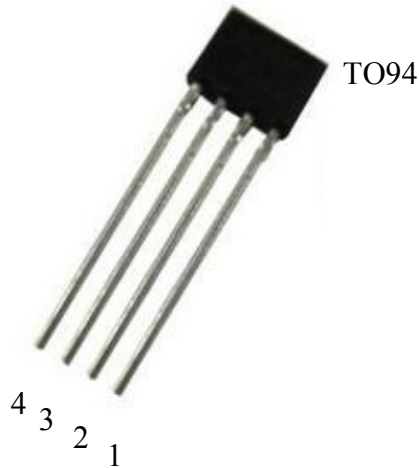
Substrate to VDD

DIE FORM & PIN DEFINITION

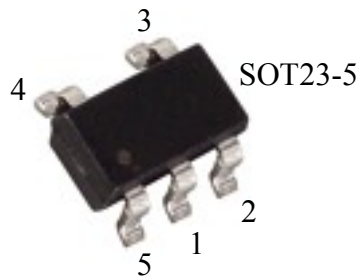
Pin	Pin Name	Description
1	VDD	positive power supply
2	KEY	key input, with de-bounce and hysteresis
3	MOD	option pin connect to VDD to enable 50% 25Hz modulation on LED no connection for 100% full on LED
4	VSS	ground
5	LED1	LED output, 20mA sink current
6	LED2	LED output, 8mA sink current
	LED1+2	connected LED, output 28mA sink current

PACKAGE & PIN ASSIGNMENT

TO94	
Pin	Pin Name
1	VDD
2	KEY
3	LED1+2
4	VSS



SOT23-5	
Pin	Pin Name
1	VDD
2	KEY
3	MOD
4	VSS
5	KED1+2



PACKAGE & PIN DEFINITION

Pin Name	Description
VDD	positive power supply
KEY	key input, with de-bounce and hysteresis connect R_{REF} between KEY and VDD detect touch resistance between KEY and VSS
LED	connected LED output, 28mA sink current 100% full on output
VSS	ground
MOD	option pin connect to VDD to enable 50% 25Hz modulation on LED no connection for 100% full on LED

ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings

$V_{SS} = 0V$, Ambient Temperature = 25°C

PARAMETER	SYMBOL	LIMITS	UNIT
Supply Voltage	V_{DD}	5.1	V
Operating Humidity	R.H.	25 to 80	%
Operating Temperature	T_{OP}	0 to 55	°C
Operating Temperature	T_{ST}	-25 to 125	°C

Absolute maximum ratings are the values beyond which the safety of the device cannot be guaranteed

DC & Operating Characteristics

$V_{DD} = 3.0V$, $V_{SS} = 0V$, Ambient Temperature = 25°C (unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES			UNIT
			MIN	TYP	MAX	
Operating Voltage	$V_{DD} - V_{SS}$		2.5	3.0	5.0	V
Standby Current	$I_{STANDBY}$	KEY = V_{DD}		0.5	1.5	μA
Oscillation Frequency	F_{OSC}		103	128	153	kHz
Reference Resistance	R_{REF}		5	20	22	MΩ
Activation Resistance	R_{ACT}				1.5 ×	R_{REF}
De-activation Resistance	R_{DE}		3.5 ×			R_{REF}
LED1 Sink Current	I_{OLED1}	$V_{OLED1} = 1.4V$		20		mA
LED2 Sink Current	I_{OLED2}	$V_{OLED2} = 1.4V$		8		mA
Trigger Activation Delay	T_{ACT}		60	125	250	msec

ORDER INFORMATION

Order Part Number	Package	Option
MM210X	Die	
MM210-TO94-21	TO94	LED output 28mA & 100% full on
MM210-TO94-25	TO94	LED output 28mA & 50% 2Hz modulation
MM210-TO94-81	TO94	LED output 8mA & 100% full on
MM210-TO94-85	TO94	LED output 8mA & 50% 2Hz modulation
MM210-SOT23-28	SOT23-5	LED output 28mA
MM210-SOT23-08	SOT23-5	LED output 8mA

IMPORTANT NOTICE

AMOS Technology Limited reserves the right to make changes in the circuitry and the specification of this chip without prior notice. Customers are advised to check AMOS for the latest information.