

**MM235****LIGHT-SENSE WITH LED DRIVER  
(by external photo transistor)****DATA SHEET****FEATURES**

- Wide battery operating voltage range : 2.4V to 3.6V.
- Typical operating current : 200uA,  $V_{DD} = 3.0V$ .
- High sensitivity (adjustable with external component)
- Adaptive to environmental background illumination
- Built in filter for rejecting power line frequencies (50/60Hz)
- Built in Voltage Regulator for stable operation
- Programmable simple sound effect SFX option
- MASK option for length of sound effect.
- Direct drive piezoelectric buzzer or small speaker

**GENERAL DESCRIPTION**

Light-Sense with built-in melody generator MM235 offers high sensitivity, simplicity and flexibility for applications on detecting small signal changes. The chip is a cost effective solution and enhances system performance with its stability and consistency characteristics.

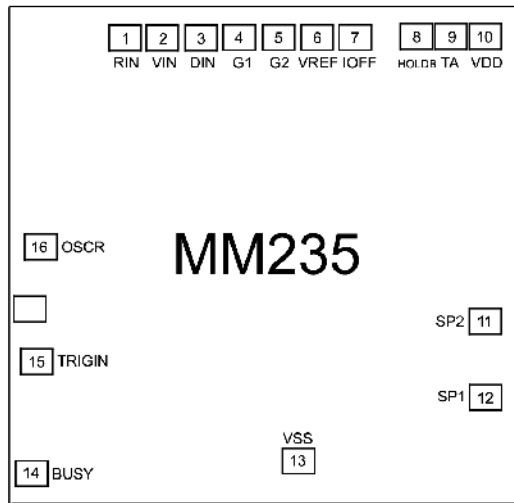
Typical application is that by connecting an appropriate photo transistor as the input sensor to the pin RIN, MM235 will detect for small light intensity changes caused by moving objects in the detection range, melody will be played upon valid detection, the sound effect is mask option. The chip can drive a piezoelectric buzzer or a small speaker directly.

The sound outputs are disabled for a period of about 4 seconds straight after power-up.

## PIN DEFINITION

Pin #	Pin Name	Description
1	RIN	analog input connect to the emitter of photo transistor
2	VIN	analog input connect to capacitor CIN
3	DIN	analog input connect to capacitor CIN
4	G1	gain control connect to capacitor CG
5	G2	gain control connect to capacitor CG
6	VREG	regulated power supply output connect to resistor ROFF
7	IOFF	current input connect to resistor ROFF for dark level adjustment the suggested value is 360Kohm (# check the application note for implementation)
8	HOLDB	connect to VSS to disable SP1, SP2 and BUSY connect to VDD to enable SP1, SP2 and BUSY
9	TA	connect to VSS
10	VDD	positive power supply
11	SP2	melody output connect to buzzer or speaker
12	SP1	melody output connect to buzzer or speaker
13	VSS	negative power supply
14	BUSY	signal output assert when it is playing a melody
15	TRIGIN	signal input force trigger to active the playback
16	OSCR	oscillator input connect to resistor ROsc

**PAD DIAGRAM**



Substrate connects to VDD  
Die size = 1800 x 1700 um

**ELECTRICAL CHARACTERISTICS**

**Absolute Maximum Ratings**

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

PARAMETER	SYMBOL	TEST CONDITIONS	LIMITS	UNIT
Supply Voltage	$V_{DD}$	-	4.5	V
Input Voltage	$V_{IN}$	-	-0.3 to $V_{DD}+0.3$	V
Operation Temperature	$T_{OP}$	-	0 to 55	°C
Storage Temperature	$T_{ST}$	-	-25 to 125	°C

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

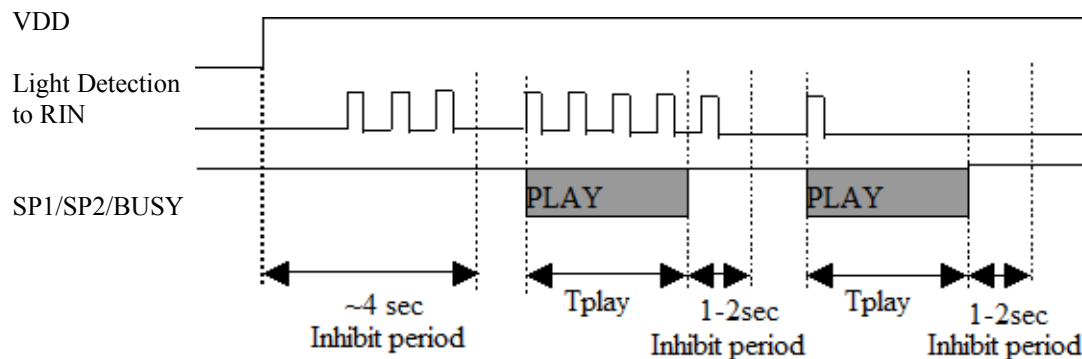
**DC & Operating Characteristics**

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

PARAMETER	SYMBOL	TEST CONDITIONS	LIMITS			UNIT
			MIN	TYP	MAX	
Operating Voltage	$V_{DD} - V_{SS}$	-	2.4	3.0	3.6	V
Operating Current	$I_{DD}$	No Load	-	200	-	μA
Oscillation Frequency	$F_{OSC}$	$R_{OSC} = 1M\Omega$	-	128	-	KHz
Input High Voltage	$V_{IH}$	-	$V_{DD} - 0.3$	-	$V_{DD}$	V
Input Low Voltage	$V_{IL}$	-	$V_{SS}$	-	$V_{SS} + 0.3$	V
Output High Current	$I_{OH}$	$V_{OH} = V_{DD} - 1$	-	30	-	mA
Output Low Current	$I_{OL}$	$V_{OL} = V_{SS} + 0.5$	-	30	-	mA



TIMING DIAGRAM



\* not to scale , and the figures represent the typical values only

On detection, SP1/SP2/BUSY is active for about 4 sec. Following, the device deactivates itself for about 500ms and does not respond to detection within this inhibit period.

After power up, SP1/SP2/BUSY is automatically disabled for about 4 seconds in order to avoid mis-triggering.

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.