GSM LightMOS

Application Note

GSM/GPRS Module Series

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About the document

History

Revision	Date	Author	Description
1.0	2013-03-28	Alan ZHU	Initial

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1 Introduction

This document describes how to use the LIGHT_MOS pin of Quectel module M12 (R2.0) to output PWM (Pulse-Width Modulation) waveform or current source to drive LED.

2 Hardware Connection

Two connection methods can be used as PWM or adjustable current source for the LIGHT_MOS pin to drive the outside LED.

2.1. Reference Design

When the LIGHT_MOS is used to drive the LED by PWM signal or adjustable current source, refer to the reference circuit in Figure1.
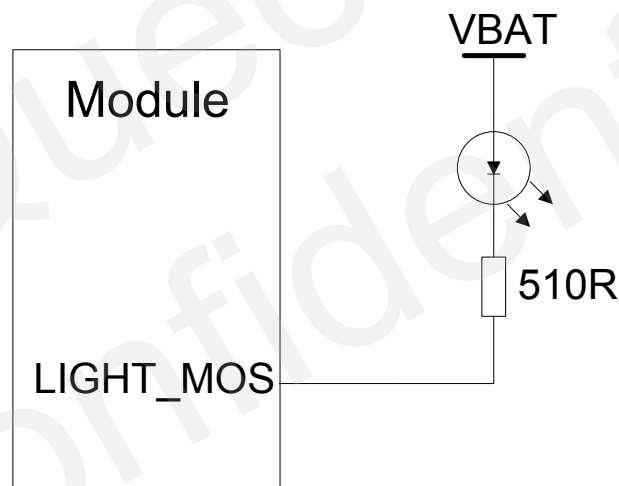

Figure 1: Reference Circuit of LIGHT_MOS Drives LED by PWM/Current Source

When the LIGHT_MOS is used as a GPIO to output PWM signal or adjustable current source, LIGHT_MOS should be pulled up to VDD_EXT. Figure 2 below shows the reference design.
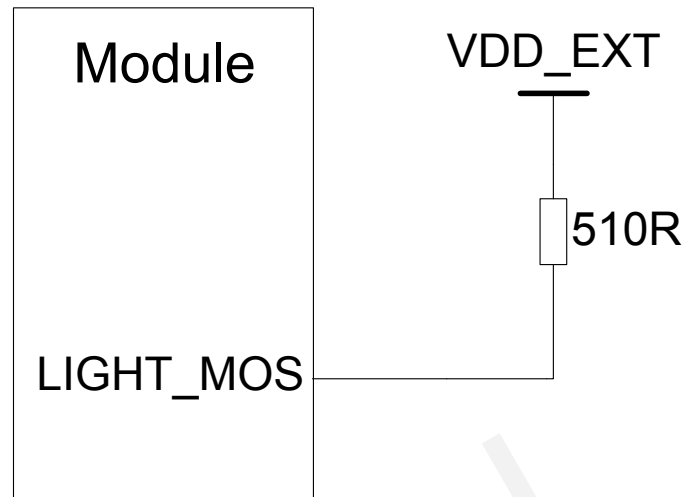
Figure 2: Reference Circuit of LIGHT_MOS Drives LED by GPIO

NOTE

The value range of VDD_EXT is from 2.7V to 2.9V. By default, the value is 2.8V.

2.2. Test Procedure

2.2.1. Commands to be Used during the Test

AT commands maybe used including:

AT+QLMOS=0	// Close PWM/MOS density output
AT+QLMOS=1,2,1800,320	// Select 3.25MHz base clock and adjust PWM output parameter
AT+QLMOS=1,6,5800,1280	// Select 8KHz base clock and adjust PWM output parameter
AT+QLMOS=2,5	// Adjust KPLED current to level 6

3 LightMOS Command Description

3.1. AT+QLMOS Adjust PWM Output or MOS Density Parameters

AT+QLMOS	Adjust PWM Output or MOS Density Parameters
Test Command **AT+QLMOS=?**	Response **+QLMOS:(\<output_format\>),(\<clk_num\>),(\<count\>),** **(\<threshold\>),(\<mos_density\>)** **OK**
Read Command **AT+QLMOS?**	Response **+QLMOS:\<output_format\>,\<clk_num\>,\<count\>,\<threshold\>,** **\<mos_density\>** **OK**
Write Command **AT+QLMOS=\<output_format\>,\<clk** **_num\>,\<count\>,\<threshold\>,\<mos** **_density\>**	Response **OK** **ERROR** Set output format and parameters
Reference	

Parameter

<output_format>	Output Format

        0   Close PWM/MOS density output. When **<output_format>**=0, The other parameters **<clk_num>**, **<count>**, **<threshold>** and **<mos_density>** need not to be set.

        1   Only enable PWM output. When **<output_format>**=1, **<mos_density>** can be ignored. The other four parameters should be set.

        2   Only enable MOS density output. When **<output_format>**=2, **<clk_num>**、 **<count>** and **<threshold>** can be ignored. Only need to set **<mos_density>**.

<clk_num>>   Select PWM Base Clock

        0   13MHz
        1   6.5MHz
        2   3.25MHz
        3   1.625MHz
        4   32KHz
        5   16KHz
        6   8KHz
        7   4KHz

<count>   Set Count for PWM Output

        0 ~ 8191

<threshold>   Set Threshold for PWM Output

        0 ~ 8191

<mos_density> Set Density Level for Light MOS Output

        0   Level 1
        1   Level 2
        2   Level 3
        3   Level 4
        4   Level 5
        5   Level 6
        6   Level 7
        7   Level 8

NOTES

1. The default value of **<output_format>** is 0.
2. This command cannot be saved by AT&W.
3. **<threshold>** should be less than **<count>**. If not, the output pulse of the PWM will be always high.
4. PWM output frequency = CLK / [clk_div*(**<count>**+ 1)], Duty = **<threshold>**/ (**<count>** + 1), CLK and and clk_div values can be got from Table 1 below.

Table 1: CLK and clk_div Value

<clk_num>	clk_div	CLK
0	1	
1	2	
2	4	13000000
3	8	
4	1	
5	2	
6	4	32000
7	8	

Example

AT+QLMOS=0 **OK**	// Close PWM/MOS density output
AT+QLMOS=1,2,1800,320 **OK**	// Select 3.25MHz base clock and adjust PWM output parameter
AT+QLMOS=1,6,5800,1280 **OK**	// Select 8KHz base clock and adjust PWM output parameter
AT+QLMOS=2,5 **OK**	// Adjust KPLED current to level 6
AT+QLMOS? **+QLMOS: 2,5** **OK**	// Read the current setup

4 Appendix A Reference

Table 2: Related Documents

SN	Document name	Remark
[3]	GSM 07.07	Digital cellular telecommunications (Phase 2+); AT command set for GSM Mobile Equipment (ME)
[4]	GSM 07.10	Support GSM 07.10 multiplexing protocol

Table 3: Terms and Abbreviations

Abbreviation	Description
PWM	Pulse Width Modulation
ME	Mobile Equipment
TA	Terminal Adapter
MS	Mobile Station)