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IS31FL3737B vs. IS31FL3737A_3737

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History

Version	Date	Author	Description
Rev.A	2019.12.11		Initial

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Introduction

General Description

IS31FL3737B & IS31FL3737A are the advanced version of IS31FL3737, below table shows the different items:

<table>
<tr><th>ITEM</th><th>IS31FL3737</th><th>IS31FL3737A</th><th>IS31FL3737B</th></tr>
<tr><td>PWM Frequency</td><td>7.5kHz</td><td>7.5kHz (default)
25khz (PFS='1')</td><td>8.4kHz(default)
26.7kHz (PFS='010 ')
4.2kHz(PFS='001')
2.1kHz(PFS='011')
1.05kHz(PFS='100 ')</td></tr>
<tr><td>Auto Breath related Time</td><td>
<table>
<tr><th>T1</th><th>T1 Setting</th></tr>
<tr><td>000</td><td>0.21s</td></tr>
<tr><td>001</td><td>0.42s</td></tr>
<tr><td>010</td><td>0.84s</td></tr>
<tr><td>011</td><td>1.68s</td></tr>
<tr><td>100</td><td>3.36s</td></tr>
<tr><td>101</td><td>6.72s</td></tr>
<tr><td>110</td><td>13.44s</td></tr>
<tr><td>111</td><td>26.88s</td></tr>
</table>
</td><td>
<table>
<tr><th>T1</th><th>T1 Setting</th><th></th></tr>
<tr><td>T1</td><td>PFS='0'</td><td>PFS='1'</td></tr>
<tr><td>000</td><td>0.21s</td><td>0.07s</td></tr>
<tr><td>001</td><td>0.42s</td><td>0.14s</td></tr>
<tr><td>010</td><td>0.84s</td><td>0.28s</td></tr>
<tr><td>011</td><td>1.68s</td><td>0.56s</td></tr>
<tr><td>100</td><td>3.36s</td><td>1.12s</td></tr>
<tr><td>101</td><td>6.72s</td><td>2.24s</td></tr>
<tr><td>110</td><td>13.44s</td><td>4.48s</td></tr>
<tr><td>111</td><td>26.88s</td><td>8.96s</td></tr>
</table>
</td><td>
<table>
<tr><th>T1</th><th>T1 Setting</th></tr>
<tr><td>PFS / T1</td><td>000(s)</td><td>010(s)</td><td>001(s)</td><td>011(s)</td><td>100(s)</td></tr>
<tr><td>000</td><td>0.21</td><td>0.07</td><td>0.42</td><td>0.84</td><td>1.68</td></tr>
<tr><td>001</td><td>0.42</td><td>0.14</td><td>0.84</td><td>1.68</td><td>3.36</td></tr>
<tr><td>010</td><td>0.84</td><td>0.28</td><td>1.68</td><td>3.36</td><td>6.72</td></tr>
<tr><td>011</td><td>1.68</td><td>0.56</td><td>3.36</td><td>6.72</td><td>13.44</td></tr>
<tr><td>100</td><td>3.36</td><td>1.12</td><td>6.72</td><td>13.44</td><td>26.88</td></tr>
<tr><td>101</td><td>6.72</td><td>2.24</td><td>13.44</td><td>26.88</td><td>53.76</td></tr>
<tr><td>110</td><td>13.44</td><td>4.48</td><td>26.88</td><td>53.76</td><td>107.52</td></tr>
<tr><td>111</td><td>26.88</td><td>8.96</td><td>53.76</td><td>107.52</td><td>215.04</td></tr>
</table>
</td></tr>
<tr><td>De-Ghost</td><td>PUR SWy Pull-up Resistor Selection Bit
000 No pull-up resistor
001 0.5kΩ pull-up in tNOL
010 1.0kΩ pull-up in tNOL
011 2.0kΩ pull-up in tNOL
100 4.0kΩ pull-up in tNOL
101 8.0kΩ pull-up in tNOL
110 16kΩ pull-up in tNOL
111 32kΩ pull-up in tNOL
PDR CSx Pull-down Resistor Selection Bit
000 No pull-down resistor
001 0.5kΩ pull-down in tNOL
010 1.0kΩ pull-down in tNOL
011 2.0kΩ pull-down in tNOL
100 4.0kΩ pull-down in tNOL
101 8.0kΩ pull-down in tNOL
110 16kΩ pull-down in tNOL
111 32kΩ pull-down in tNOL</td><td>PUR SWy Pull-up Resistor Selection Bit
000 No pull-up resistor
001 No pull-up resistor
010 No pull-up resistor
011 3.0kΩ pull-up all the time
100 4.0kΩ pull-up all the time
101 8.0kΩ pull-up all the time
110 16kΩ pull-up all the time
111 32kΩ pull-up in tNOL

PDR CSx Pull-down Resistor Selection Bit
000 No pull-down resistor
001 0.5kΩ pull-down in tNOL
010 0.5kΩ pull-down in tNOL
011 3.0kΩ pull-down all the time
100 4.0kΩ pull-down all the time
101 8.0kΩ pull-down all the time</td><td>PUR SWy Pull-up Resistor Selection Bit
000 No pull-up resistor
001 0.5kΩ pull-down in tNOL
010 0.5kΩ pull-down in tNOL
011 3.0kΩ pull-up all the time
100 4.0kΩ pull-up all the time
101 8.0kΩ pull-up all the time
110 16kΩ pull-up all the time
111 32kΩ pull-up in tNOL

PDR CSx Pull-down Resistor Selection Bit
000 No pull-down resistor
001 0.5kΩ pull-down in tNOL
010 0.5kΩ pull-down in tNOL
011 3.0kΩ pull-down all the time
100 68kΩ pull-down all the time
101 8.0kΩ pull-down all the time
110 16kΩ pull-down all the time
111 32kΩ pull-down in tNOL</td></tr>
<tr><td>thermal shutdown function</td><td>None</td><td>None</td><td>TSD_ADJ Thermal shutdown temperature adjust bit
0 T_{SD} = 160°C
1 T_{SD} = 160°C + 16°C
TSD_SD Thermal shutdown function disable bit
0 Thermal shutdown function enable
1 Thermal shutdown function</td></tr>
</table>

Replacing IS31FL3737 with IS31FL3737A/ IS31FL3737B should pay attention to the following points

Hardware

IS31FL3737 and IS31FL3737A/IS31FL3737B is pin to pin compatible,
IS31FL3737A can be fit in IS31FL3737 PCB layout.
IS31FL3737B can be fit in IS31FL3737A/IS31FL3737 PCB layout.

Software

IS31FL3737A keep the 7.5kHz as default (PFS='0'), same as IS31FL3737, but add 25kHz option (PFS='1').

IS31FL3737B keep the 8.4kHz as default (PFS='000'), but add 26.7kHz option (PFS='010') and more options.

Bit	D7:D6	D5:D3	D2	D1	D0
Name	SYNC	-	OSD	B_EN	SSD
Default	00	000	0	0	0

The Configuration Register sets operating mode of IS31FL3737.

Bit	D7:D6	D5	D4	D3	D2	D1	D0
Name	SYNC	-	PFS	-	OSD	B_EN	SSD
Default	00	0	0	0	0	0	0

The Configuration Register sets operating mode of IS31FL3737A.

Bit	D7:D6	D5:D3	D2	D1	D0
Name	SYNC	PFS	OSD	B_EN	SSD
Default	00	000	0	0	0

The Configuration Register sets operating mode o IS31FL3737B.

If PFS='1'(IS31FL3737A) or '010'(IS31FL3737B), all the auto breath related time(T1 T2 T3 T4) in IS31FL3737A/ IS31FL3737B will accelerate about 3.3 times base on time at 7.5kHz, which will affect ABM modes.

A. IS31FL3737A/ IS31FL3737B change some options to enhance pull up or down all the time

If IS31FL3737's setting is both in 32kΩ pull-up/pull-dwon in tNOL, no need to change the firmware.

ITEM	IS31FL3737	IS31FL3737A	IS31FL3737B
Frequency	FEh write 0xC5//unlock FDh write 0x03//write page 3 00h write 0x01//normal operation and default 7.5kHz	FEh write 0xC5//unlock FDh write 0x03//write page 3 00h write 0x11//normal operation and 25kHz	FEh write 0xC5//unlock FDh write 0x03//write page 3 00h write 0x21//normal operation and 26.7kHz
De-Ghost	FEh write 0xC5//unlock FDh write 0x03//write page 3 0Fh write 0x07//SWy 32kΩ pull-up in tNOL 10h write 0x07//CSx 32kΩ pull-down in tNOL	FEh write 0xC5//unlock FDh write 0x03//write page 3 0Fh write 0x07//SWy 32kΩ pull-up in tNOL 10h write 0x07//CSx 32kΩ pull-down in tNOL IS31FL3737A provide more enhanced options for de-ghost, check the PUR/PDR for more information.	FEh write 0xC5//unlock FDh write 0x03//write page 3 0Fh write 0x07//SWy 32kΩ pull-up in tNOL 10h write 0x07//CSx 32kΩ pull-down in tNOL IS31FL3737B provide more enhanced options for de-ghost, check the PUR/PDR for more information.

B. IS31FL3737B has a Test Mode Data Register 4(same page as other Test Mode registers) stores thermal shutdown function bits and can raise the thermal shutdown temperature or shutdown the thermal shutdown function. This register is shown on IS31FL3737B datasheet.

Table 27 12h Test Mode Data Register 4

Bit	D7:D5	D4	D3:D1	D0
Name	-	TSD_ADJ	-	TSD_SD
Default	000	0	000	0

TSD_SD = “0”, thermal shutdown function is enabled,

TSD_SD = “1”, thermal shutdown function is disabled,

When TSD_ADJ = “0”, thermal shutdown temperature is 160°C,

When TSD_ADJ = “1”, thermal shutdown temperature is 160°C + 16°C.

Conclusion

IS31FL3737A is hardware/software compatible with IS31FL3737 but add additional option to speed up the PWM frequency to 25kHz and avoid the audible noise of MLCC.

IS31FL3737B is hardware/software compatible with IS31FL3737 but add additional option to speed up the PWM frequency to 26.7kHz and avoid the audible noise of MLCC, also, IS31FL3737B provide 4kHz, 2kHz and 1kHz PWM frequency options.

IS31FL3737B is hardware/software compatible with IS31FL3737A and provide 4kHz, 2kHz and 1kHz PWM frequency options.

IS31FL3737B can tune up thermal shutdown temperature 16°C, or shutdown the thermal shutdown function.