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TPS92518: detection_prptection_ for LED Open/Short

Resolved

Kanji Shibatani

Part Number: TPS92518

Hello

My customer chosen TPS92518HV for their new 2019 LED lighting because of its 1:1000 diming feature.

So, they will start their engineering sample board (30 pcs) design from end of June.

Now they have several questions below.

Would you please advise?

LED open mode failure

In case LED are open-mode failure , VLEDx had rose up. (test result using EVM as simulation: see attached ppt)

Q1

The waveform at LED open (attached ppt) is due to TPS92518 enters to BOOT_UV Error and retry switching in data sheet p32 .. correct?

Q2

Are there are idea to reduce this voltage rise up by setting the register of TPS92518?

The voltage rose up is due to inductors back e.m.f and can not be avoided ..?

LED short-mode failure

Q3 Although in case LEDs are broken in short-mode, TPS92518 continues to supply constant current ?

Q4

TPS92518 can NOT detect Vf of LEDs ..right?

VLEDx can be detected on ADC in d/s 8.2 Block diagram, but it is for us x V operation, And Not useful for detecting LED short... right?

Q5

Do you have sample- reference design circuit including LED short-mode/ LED open-mode detection-protection ?

Customer hope that in order to start the design of their board now.

Q6

Do you have any calc. tool(excel tool) for design ? Customer has only data sheet page43 ~45?

Thank you for your cooperation

Best Regards

LED_fail_TPS92518.pptx

Kanji Shibatani

Irwin Nederbragt

Hello Kanji,

Per the PPT, if you are going to open the LED string when enabled (from the datasheet):

8.3.3.1 Output Ringing and TPS92518 Protection
During shunt dimming, ringing may occur at the channel output due to PCB and device parasitic capacitances and inductances. This should be checked as part of the design process. If the ringing approaches the absolute maximum of any pin, a clamping diode must be added to the design. Connect the diode anode to the output at VLEDx and the cathode to the input voltage. This protection must also be used if the LED load is ever to be connected or removed while the output is enabled.

1) I would say yes
2) See statement above, 8.3.3.1, the inductor energy has to go somewhere so a diode back to the input clamps it.
3) Yes
4) Yes it can detect LED stack voltage but you have to read the registers for LED voltage
5) This is done with the external micro by reading the LED stack voltages and enabling/disabling via the micro
6) There is a simple calc tool but I believe it needs to be requested on TI.com and go through approval.

Also, Toffmax needs to be set correct if they plan on running this with the output shorted. The current can creep up if Toffmax is too small a value when the output is shorted.

Best Regards,

Kanji Shibatani

In reply to Irwin Nederbragt:

Dear Irwin san

Thank you for your answer!

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