Dear Mike,

I have confirmed with our software engineer. Your guess is absolutely right and he didn't program the TPS92661 for PWM mode. That's the reason short fault cannot be detected.

Our target is that TPS9266 controls each LED ON and OFF or a group of LEDs ON and OFF in order to realize different shadows.

According to the function, His controlling logics and flows are as below.

1. Only setup the LEDxONH and LEDxONL registers to be 0x3FF (11,1111,1111), LEDxOFFH and LEDxOFFL registers were left to be default value 0x000 (00,0000,0000).
2. ENONL = 0xFF, ENONH = 0x0F; ENOFFL = 0x00, ENOFFH = 0x000; ALL LEDs are turned on.
3. If any LED or a group of LEDs which were on need to be turned off, setup the corresponding bits of ENOFFL and ENOFFH registers to be 1.
4. If any LED or a group of LEDs which were off need to be returned on, clear the corresponding bits.

Q: Do you think it is reasonable? Or are there some risks if ignore the SHORT detection?

We also program the LEDxONH & LEDxONL with 0x000 (00,0000,0000) and LEDxOFFH and LEDxOFFL with different value 0x3AA, 0x3BB, 0x3CC and 0x3EE. Take the pictures of 8 LEDs series voltage trace with corresponding configuration.

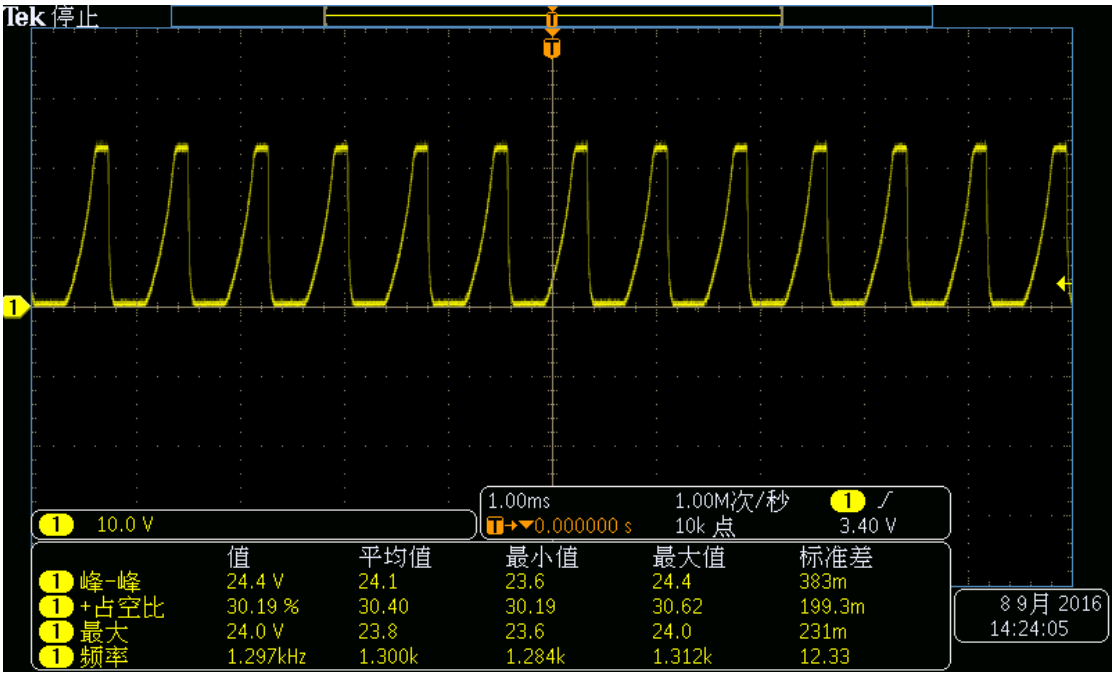


Figure 1. LEDxOFFH=0x03, LEDxOFFL=0xAA

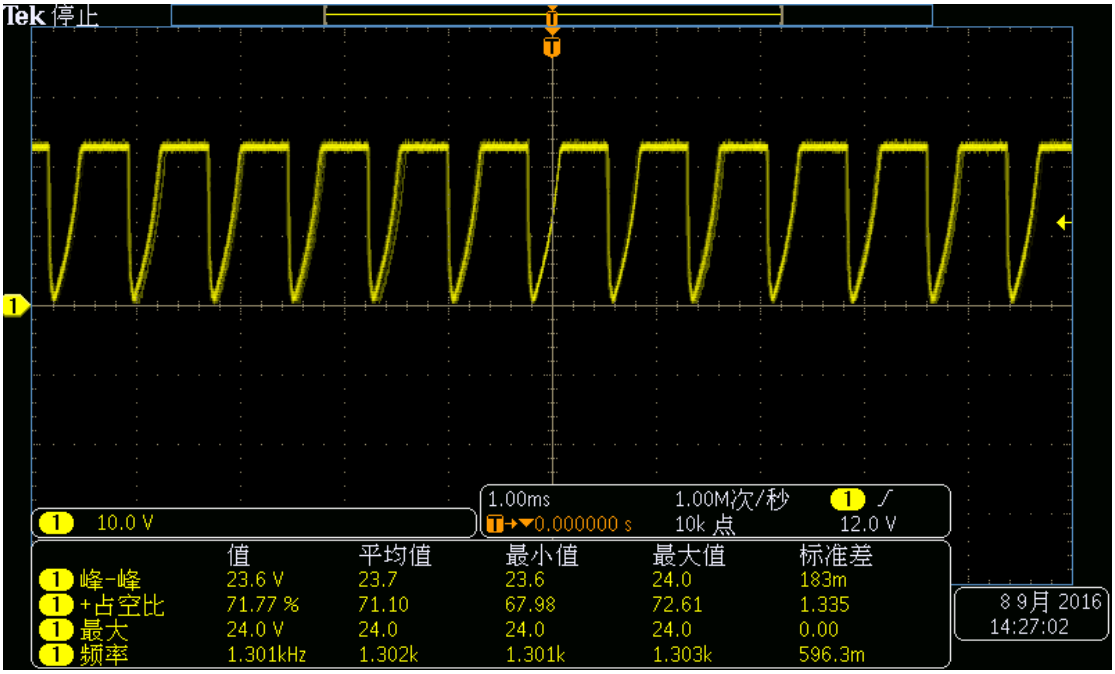


Figure 2. LEDxOFFH=0x03, LEDxOFFL=0xBB

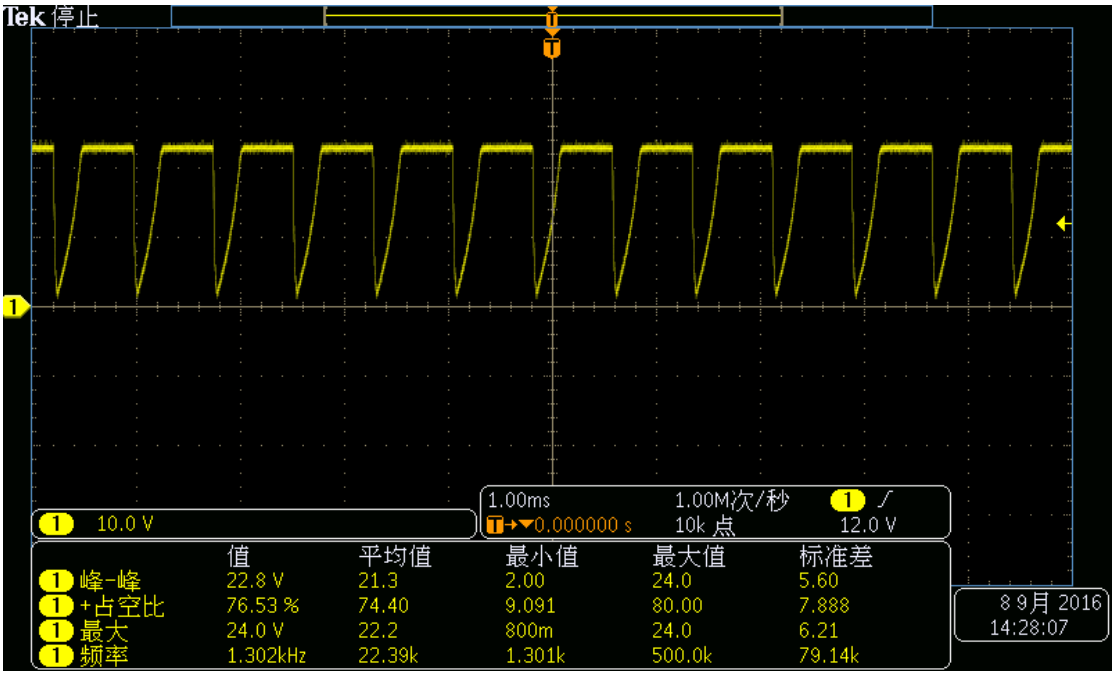


Figure 2. LEDxOFFH=0x03, LEDxOFFL=0xCC

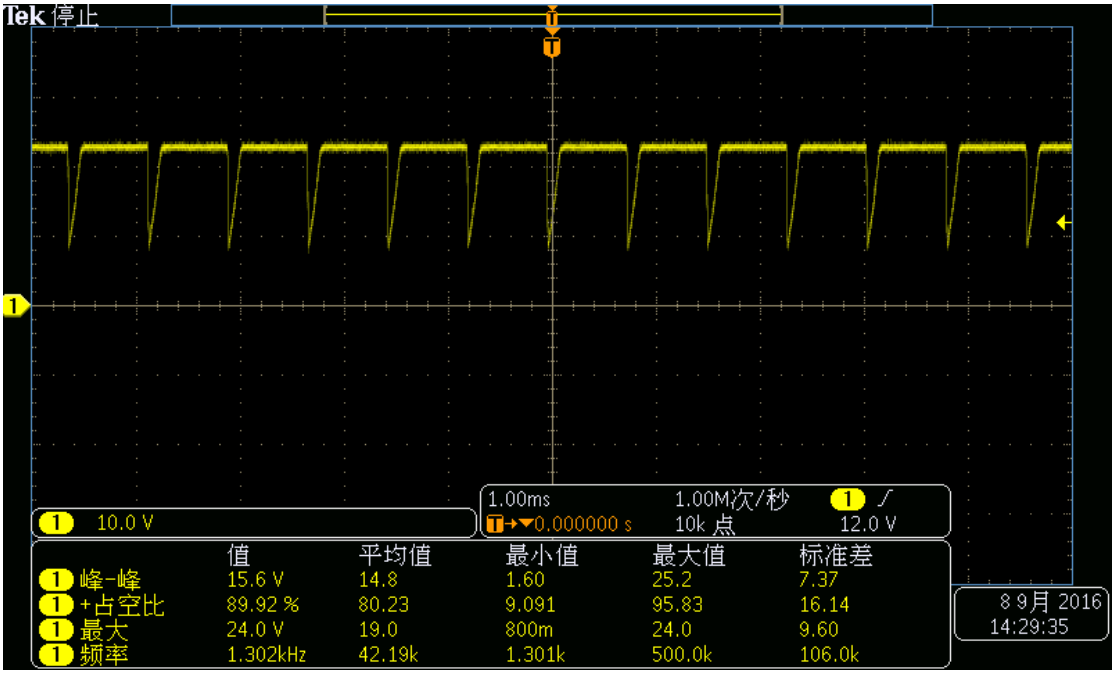
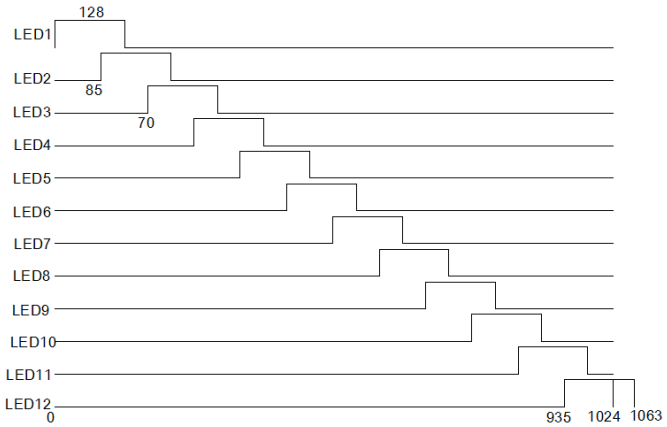


Figure 2. LEDxOFFH=0x03, LEDxOFFL=0xEE

Q: PWM trace was worse with duty cycle rising. Is the reason switches are N MOSFETs or the operating frequency 1.3 kHz is too fast?

I make a controlling waveform of LED1~12 and I calculated that the LED12 overflew 39 counts with 85 interval steps.

Q: Is it OK?



The example of datasheet is showing the LEDs working frequency is 368Hz, duty cycle is 128/1024 and step is 85 counts. My question is how to choose the working frequency and when the duty cycle is changed and how to vary the interval step.

Q: Are there some limit conditions and design formulas?