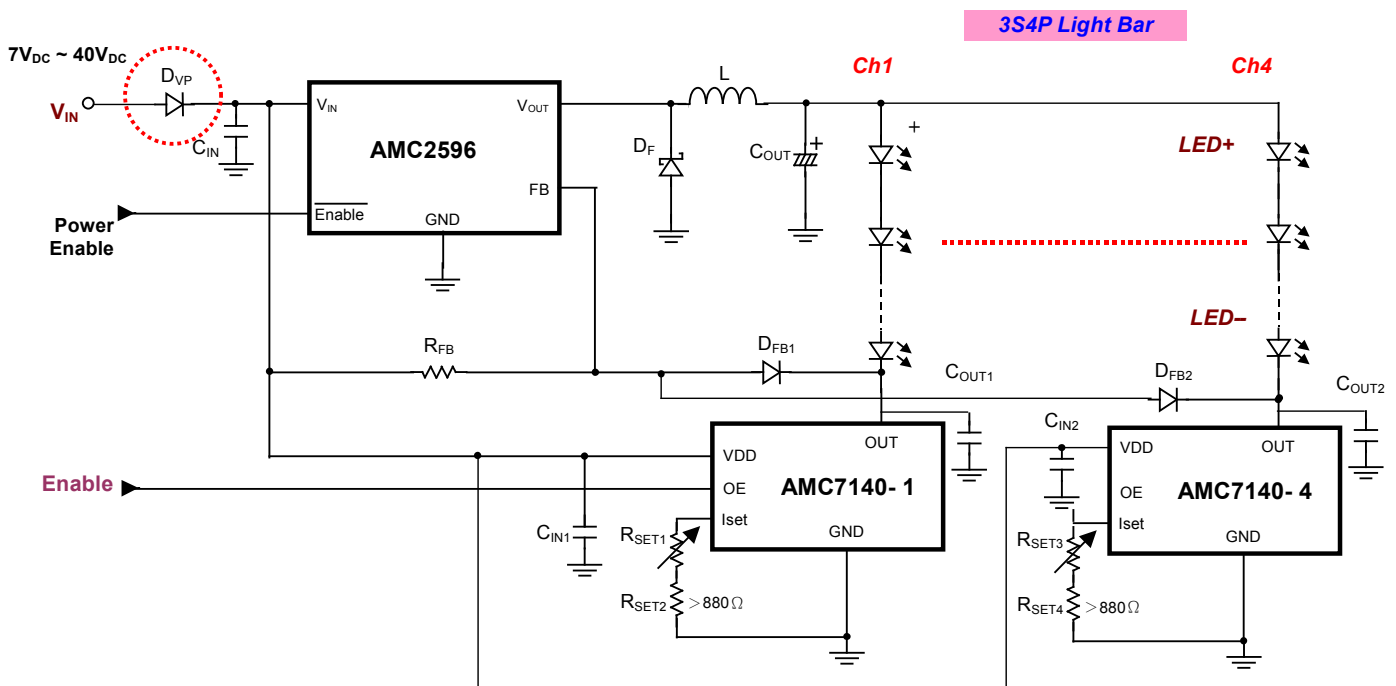# AMC2596 + AMC7140 for LCD BLU using Power LED

♦ **Features –**

- ✓ Wide Input Range: 9V to 40V.
- ✓ Pure DC Constant Current.
- ✓ OE pin for PWM brightness Control.

♦ **Driving scheme –**

♦ **Description –**

1. <u>LED string must be connected before power ON the system</u> such that the feedback loop can be established.

2. The input voltage range of AMC2576 and AMC7140 are very wide. Note that, for LCD backlight applications, input voltage should be larger than the total forward voltage drop of the LED string since the system of AMC2576 is Buck scheme.

3. R_{SET1} and R_{SET2} are used to set the LED driving current. The linear dimming function can be accomplished by variable resistor R_{SET1}. R_{SET2} is used to set the allowable maximum LED driving current when linear dimming function is adopted through R_{SET1}.

4. PWM dimming control can be accomplished through Enable Pin of AMC7140. A TTL high voltage (or 5V) will turn on the AMC7140 and a low voltage (or 0V) will shutdown the AMC7140.

5. The enable pin of AMC2576 is negative logic. Pull the voltage to ground can power ON the regulator.

6. D_{FB} is used to feed the dropout voltage of AMC7140 back to AMC2596 and the general diode (1N4148) is appropriate because the reference voltage of AMC2596 is about 1.23V. In addition, R_{FB}

is the pull-high resistor for D_{FB}.

7. <u>The system has highest efficiency because of the feedback path composed of R_{FB} and D_{FB} between AMC2576 and AMC7140.</u> It is totally different from the system that simply connects a Buck regulator to the anode end of LED string and a current regulator to the cathode end of the LED string.

♦ **Component List**

C.R. NO	Q'TY	Description	Package
IC	1	AMC2596	TO-220/TO-263
IC	2	AMC7140	TO-252-5L
C_{IN}	1	300uF / 50V	E.C. Cap
C_{IN1}	1	1uF / 50V	SMD 0603
C_{OUT}	1	220uF / 50V	E.C. Cap
$C_{OUT1~2}$	2	1uF	SMD 0603
R_{FB}	1	5.6KΩ~42KΩ *NOTE 1	SMD 0805
$R_{SET1~3}$	2	Variable Resistor / 30kΩ	VR
$R_{SET2~4}$	2	1.7KΩ (for $I_{LED,MAX}$=350mA) *NOTE 2	SMD 0603
L	1	33uH 【Forward Current=1A】	SMD
D_F	1	Schottky Diode (1N5824) 【Reverse Voltage=40V, Forward Current=1A】	DO-214AC
$D_{FB1~2}$	2	1N4148	SOD-80 (GQM)
D_{VP}	1	Schottky Diode	1W package

NOTE 1: R_{FB} is the pull-high resistor for D_{FB} in order to supply appropriate current to drive D_{FB}. The value of R_{FB} should take input voltage and the characteristics of D_{FB} into consideration. It can be estimated according to the formula:

$$R_{FB} = \frac{V_{IN,MIN} - 1.23V}{1mA}$$

NOTE 2: The resistor R_{SET2} is used to set the maximum allowable LED driving current. The value of R_{SET2} is calculated by the following formula:

$$I_{SET} = \frac{I_{OUT,MAX}}{500}, \quad R_{SET2} = \frac{V_{SET}}{I_{SET}} = \frac{1.2V}{I_{SET}}$$