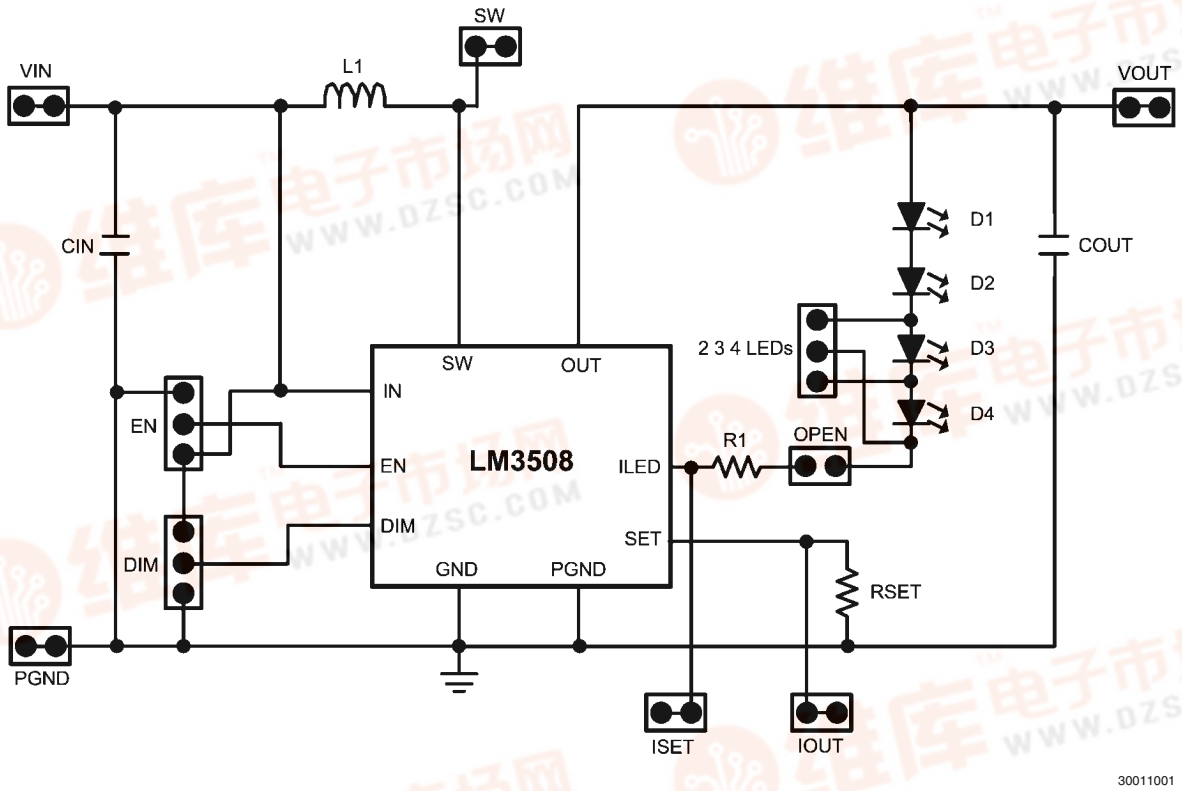
LM3508 Evaluation Board

National Semiconductor
Application Note 1593
Travis Eichhorn
June 2007

Introduction

The LM3508 is a synchronous step-up DC/DC converter designed for white LED applications. The evaluation board is set up to drive 4 standard V_F white LEDs from a 2.7V to 5.5V input supply. A fifth LED can be placed across the R1 pad for testing up to 5 low VF LEDs. The LED current is set using the RSET resistor via the equation I_{LED} = 0.2V/RSET. The evaluation board comes with RSET = 10Ω for approximately 20 mA LED current. LED dimming is achieved by applying a PWM waveform of up to 100kHz to the DIM pin.

Schematic



Bill of Materials

Designator	Component	Part Number	Manufacturer
U1	LM3508TL, µSMD 9-bump	LM3508	National Semiconductor
L	22 µH, ISAT = 330mA	VLF3010AT-220MR33	TDK
CIN	1 µF, 10V Ceramic	C1608JB1A105M	TDK
COUT	1 µF, 25V Ceramic C3216X7R1E105K	C1608JB1E105M	TDK
D1–D3	White LED	LW M67C	Osram
R1	0Ω Resistor	CRCW0603	Vishay
R1	10Ω Resistor	CRCW060310R0F	Vishay

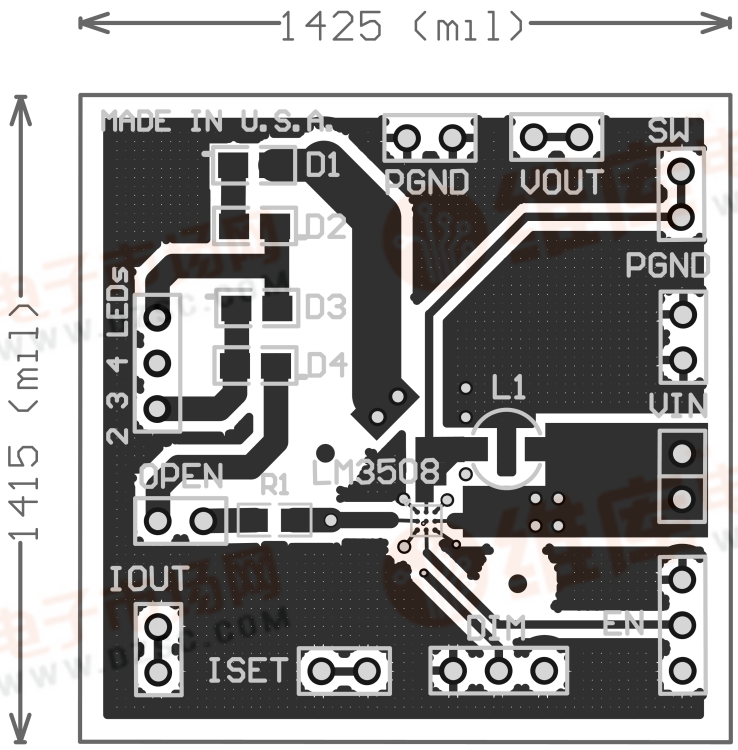


FIGURE 1. LM3508 Evaluation Board Layout Topside

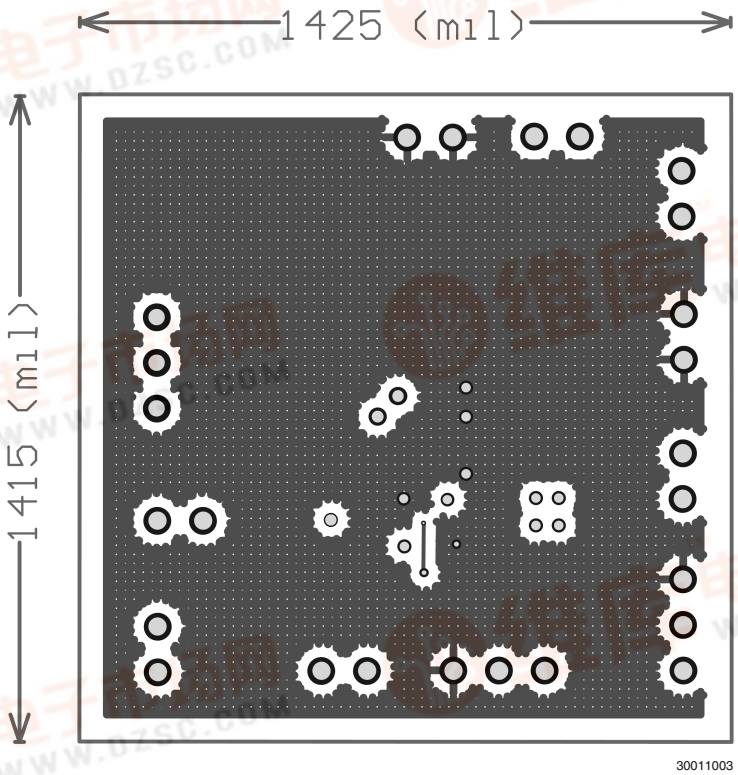


FIGURE 2. LM3508 Evaluation Board Layout Mid Layer 1

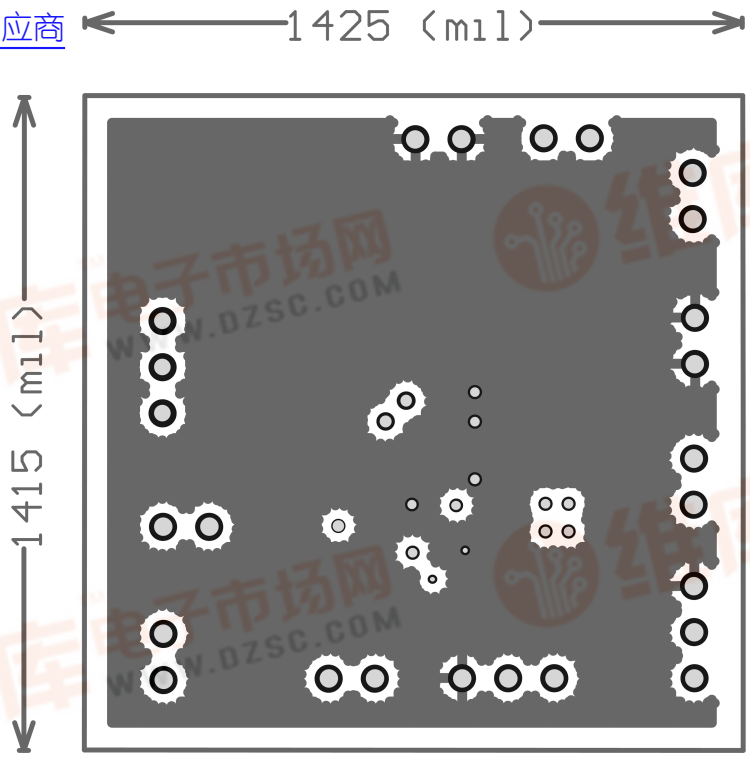


FIGURE 3. LM3508 Evaluation Board Layout Mid Layer 2

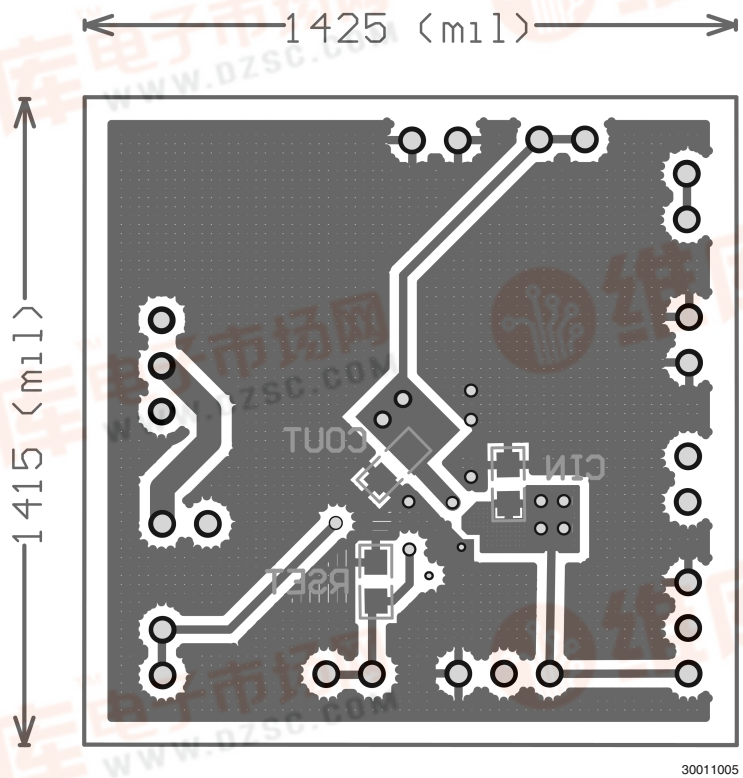


FIGURE 4. LM3508 Evaluation Board Layout Bottom Side

Board Operation

To operate the LM3508 evaluation board, connect a 2.7V to 5.5V supply between the VIN header and PGND.

Jumper Connections

• EN is a 3-position jumper (see bottom right jumper in figure 2). The middle pin connects to EN of the device. The top pin of the EN header connects to PGND (device disabled) and the bottom pin connects to VIN (device enabled).

• DIM is a 3-position header (see figure 2). The middle pin connects to DIM of the LM3508. The left pin of the DIM header connects to PGND (current source off). The right pin connects to VIN (current source on with max LED current of 20mA). Drive DIM with aPWM waveform (V_H > 1.1V, V_L < 0.5V) at up to 100kHz to adjust the LED brightness.

• 2 3 4 LEDs is a 3-position header (see figure 2). Leave open to configure the board for 4 series LEDs. Place a jumper across the top and middle pin to short D3 and D4 (2 LED solution). Place a jumper across the bottom and middle pin to short only D4 (3 LED solution).

• The OPEN header opens the current path from the cathode of D4 and the input to the current source. Normally this is shorted. This is for demonstrating OVP and/or disconnecting the LEDs.

R1 is a short (0Ω) this can be replaced with a sense resistor for measuring the LED current or replaced with a 5th LED for evaluation of low VF LEDs. EN has an internal 383kΩ pull-down resistor placing the part in shutdown by default. DIM also has an internal 383kΩ pull-down resistor turning off the current source by default. For more information regarding the operation of the LM3508 please refer to the LM3508 datasheet.

Notes

Notes

National Semiconductor Americas Customer Support Center
Email: new.feedback@nsc.com
Tel: 1-800-272-9959

National Semiconductor Europe Customer Support Center
Fax: +49 (0) 180-530-85-86
Email: europe.support@nsc.com
Deutsch Tel: +49 (0) 69 9508 6208
English Tel: +49 (0) 870 24 0 2171
Français Tel: +33 (0) 1 41 91 8790

National Semiconductor Asia Pacific Customer Support Center
Email: ap.support@nsc.com

National Semiconductor Japan Customer Support Center
Fax: 81-3-5639-7507
Email: jpn.feedback@nsc.com
Tel: 81-3-5639-7560