MAX25612 Evaluation Kit

Evaluates: MAX25612

General Description

The MAX25612 evaluation kit (EV kit) provides a proven design to evaluate the MAX25612 automotive high-voltage, high-brightness LED (HB LED) synchronous controller. The EV kit is set up for boost and buck-boost configurations and operates from a 6V-to-18V DC supply voltage. The EV kit is configured to deliver up to 2A to one string of LEDs. The total voltage of the string can vary from 3V to 48V.

Features

- Configured for Boost or Buck-Boost Mode
- Synchronous Controller and Power Stage
- Analog Dimming Control
- Analog or Digital PWM Dimming

***Ordering Information** appears at end of data sheet.*

Quick Start

Required Equipment

- MAX25612 EV kit
- 12V, 5A DC power supply
- A series-connected LED string rated at 2A
- Oscilloscope with a current probe

Procedure

The EV kit is fully assembled and tested. Follow the steps below to verify board operation. **Caution: Do not turn on the power supply until all connections are made.**

1) Verify that all jumpers (J1-J2) are in their default positions, as shown in Table 1.
2) Connect the positive terminal of the 12V supply to the IN PCB pad or the red banana plug receptacle.
3) Connect the negative terminal of the 12V supply to the GND PCB pad or the black banana plug receptacle.
4) Connect the LED string across the LED+ and LED- PCB pads on the EV kit for buck-boost configuration. For boost configuration, connect the LED string across the LED+ and GND PCB pads on the EV kit. The LED string voltage should be higher than the input voltage in this configuration.
5) Clip the current probe on the wire connected to the LED string.
6) Turn on the DC power supply.
7) Verify that the LEDs turn on.
8) Verify that the oscilloscope displays approximately 2A.

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Detailed Description

The MAX25612 EV kit provides a proven design to evaluate the MAX25612 synchronous high-voltage HB LED driver with integrated high-side current sense. The EV kit is set up for boost and buck-boost configurations and operates from a 6V-to-18V DC supply voltage. The EV kit is configured to deliver up to 2A to a series LED string. The string forward voltage can vary from 3V to 48V.

Analog Dimming Control (ICTRL)

When a shunt is installed across pins 1-2 of J2, the LED current is set by the R1/R2 resistor-divider. The LED current is linearly proportional to the voltage on the ICTRL input. An ICTRL voltage of 200mV or less corresponds to I_{LED} = 0A. An ICTRL voltage of 1.3V or more corresponds to I_{LED} = 2.2A. Between 200mV and 1.3V, the LED current is linearly adjusted between 0A and 2.2A, respectively.

To set the LED current with an external reference, remove the shunt installed across J2, and apply a voltage across the ICTRL test point and the SGND pad.

Pulse-Dimming Input (PWMDIM)

When a shunt is installed across pins 1-2 of J1, the PWM duty cycle is set by the R13/R18 resistor-divider. In this mode of operation, an analog voltage between 0.2V and 3V generates an LED pulse duty cycle between 0% and 100%, respectively. The frequency of this LED pulse modulation is 200Hz, which is generated internally from the MAX25612 device. When a shunt is installed across pins 2-3 of J1, the PWMDIM input of the device is grounded and the LEDs are off.

Alternatively, an external signal (either analog or digital PWM) can be applied directly across the PWMDIM test point and the SGND pad to control the LEDs. The J1 jumper should be left open when using an external source attached to the PWMDIM test point.

Table 1. Table Title here

JUMPER	SHUNT POSITION	DESCRIPTION
J1	1-2*	Analog voltage on the PWMDIM input of the device is controlled by the voltage divider of R13 and R18. Adjust R18 to vary the analog voltage on PWMDIM, which varies the LED pulse width using the internal 200Hz dimming signal.
	2-3	PWMDIM input of the device is connected to ground. LEDs are off.
	Open	PWMDIM input of the device is disconnected from the voltage divider. Apply a digital PWM signal across the PWMDIM test point and the SGND pad to control the LEDs.
J2	1-2*	ICTRL pin is now connected to a voltage-divider from V_{CC} to ground. Adjusting R2 allows programming the LED current from 0 to 2.2A.
	Open	Disconnects the ICTRL pin of the device from the external voltage divider on the V_{CC} pin. Allows the user to apply an external voltage across the ICTRL test point and the SGND pad to set the LED current level.

**Default position.*

Ordering Information

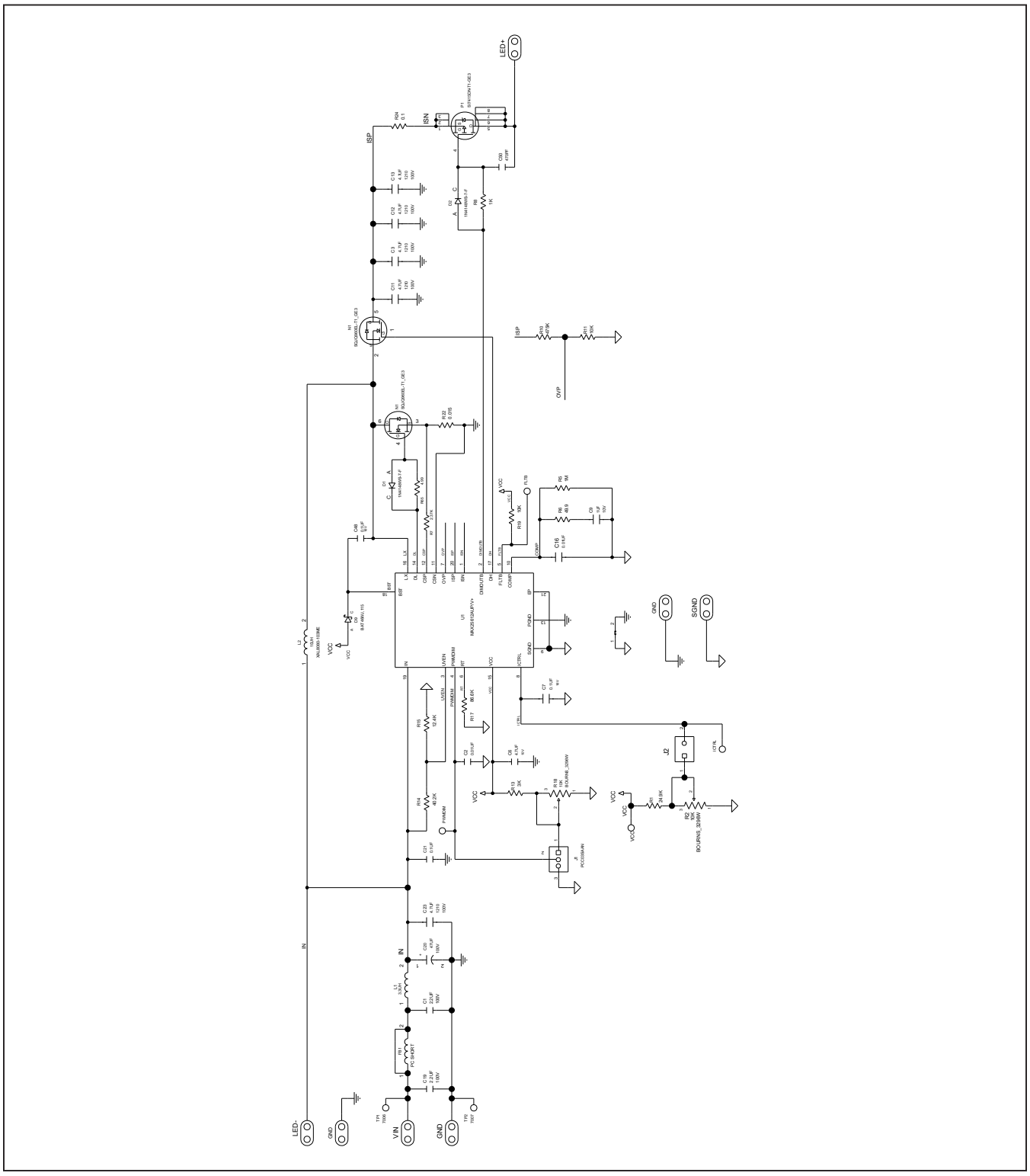
PART	TYPE
MAX25612EVKIT#	EV Kit

#Denotes RoHS compliant.

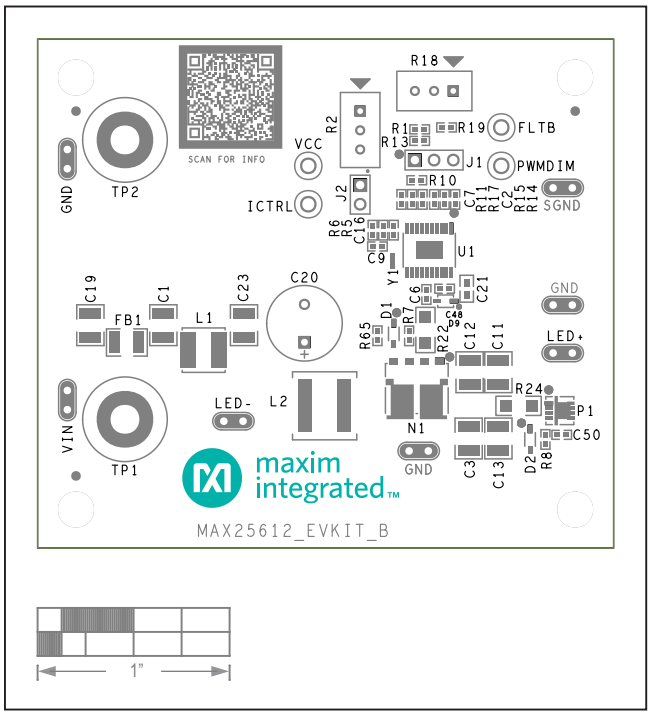
MAX25612 EV Kit Bill of Materials

REF_DES	QTY	DESCRIPTION
C1, C19	2	CAPACITOR; SMT (1210); CERAMIC CHIP; 2.2UF; 100V; TOL=10%; MODEL=GRM SERIES; TG=-55 DEGC to +125 DEGC; TC=X7R
C2, C16	2	CAPACITOR; SMT (0402); CERAMIC CHIP; 0.01UF; 50V; TOL=10%; TG=-55 DEGC TO +125 DEGC; TC=X7R
C3, C11-C13, C23	5	CAPACITOR; SMT (1210); CERAMIC CHIP; 4.7UF; 100V; TOL=10%; TG=-55 DEGC TO +125 DEGC; TC=X7S; AUTO
C6	1	CAPACITOR; SMT (0402); CERAMIC CHIP; 4.7UF; 10V; TOL=10%; TG=-55 DEGC TO +85 DEGC; TC=X5R
C7, C48	2	CAPACITOR; SMT (0402); CERAMIC CHIP; 0.1UF; 16V; TOL=5%; MODEL=; TG=-55 DEGC TO +125 DEGC; TC=X7R
C9	1	CAPACITOR; SMT (0402); CERAMIC CHIP; 1UF; 10V; TOL=10%; MODEL=; TG=-55 DEGC TO +85 DEGC; TC=X5R
C20	1	CAPACITOR; THROUGH HOLE-RADIAL LEAD; ALUMINUM-ELECTROLYTIC; 47UF; 100V; TOL=20%; MODEL=KZE SERIES
C21	1	CAPACITOR; SMT (0603); CERAMIC CHIP; 0.1UF; 100V; TOL=10%; TG=-55 DEGC TO +125 DEGC; TC=X7S
C50	1	CAPACITOR; SMT (0402); CERAMIC CHIP; 470PF; 50V; TOL=10%; TG=-55 DEGC TO +125 DEGC; TC=X7R
D1, D2	2	DIODE; SWT; SMT (SOD-323); PIV=75V; IF=0.3A
D9	1	DIODE; SCH; SMT (SOD-323F); PIV=100V; IF=0.25A
FB1	1	INDUCTOR; SMT (1210); FERRITE-BEAD; 1000 IMPEDANCE AT 100MHZ; TOL=+/-30%; 2A
FLTB, ICTRL, PWMDIM, VCC	4	TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.35IN; BOARD HOLE=0.063IN; WHITE; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH;
GND, J3, J4, J6, LED+, LED-, VIN	7	EVK KIT PARTS; MAXIM PAD; WIRE; NATURAL; SOLID; WEICO WIRE; SOFT DRAWN BUS TYPE-S; 20AWG
J1	1	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT THROUGH; 3PINS; -65 DEGC TO +125 DEGC
J2	1	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT THROUGH; 2PINS; -65 DEGC TO +125 DEGC
L1	1	INDUCTOR; SMT; CORE MATERIAL= COMPOSITE; 3.3UH; TOL=+/-20%; 5.9A
L2	1	INDUCTOR; SMT; COMPOSITE CORE; 10UH; TOL=+/-20%; 8.7A
MH1-MH4	4	MACHINE FABRICATED; ROUND-THRU HOLE SPACER; NO THREAD; M3.5; 5/8IN; NYLON
N1	1	TRAN; NCH; POWERPAK8X8L; PD-(71W); I-(63A); V-(60V)
P1	1	TRAN; P-CHANNEL 60-V (D-S) MOSFET; PCH; POWERPAK1212-8; PD-(3.8W); I-(-5.7A); V-(-60V)
R1	1	RESISTOR; 0402; 24.9K OHM; 1%; 100PPM; 0.10W; THICK FILM
R2, R18	2	RESISTOR; THROUGH-HOLE-RADIAL LEAD; 3296 SERIES; 10K OHM; 10%; 100PPM; 0.5W; SQUARE TRIMMING POTENTIOMETER; 25 TURNS; MOLDER CERAMIC OVER METAL FILM
R5	1	RESISTOR; 0402; 1M; 1%; 100PPM; 0.0625W; THICK FILM
R6	1	RESISTOR; 0402; 49.9 OHM; 1%; 100PPM; 0.1W; THICK FILM
R7	1	RESISTOR; 0402; 2.37K OHM; 1%; 100PPM; 0.1W; THICK FILM
R8	1	RESISTOR; 0402; 1K; 1%; 100PPM; 0.0625W; THICK FILM
R10	1	RES; SMT (0402); 475K; 1%; +/-100PPM/DEGC; 0.1W
R11, R19	2	RESISTOR; 0402; 10K OHM; 1%; 100PPM; 0.10W; THICK FILM
R13	1	RESISTOR; 0402; 3K OHM; 1%; 100PPM; 0.0625W; THICK FILM
R14	1	RESISTOR; 0402; 40.2K OHM; 1%; 100PPM; 0.063W; THICK FILM
R15	1	RESISTOR; 0402; 12.4K OHM; 1%; 100PPM; 0.1W; THICK FILM
R17	1	RESISTOR; 0402; 86.6K OHM; 1%; 100PPM; 0.1W; THICK FILM
R22	1	RESISTOR; 1206; 0.015 OHM; 1%; 75PPM; 1W; THICK FILM
R24	1	RESISTOR; 1206; 0.1 OHM; 1%; 100PPM; 1W; THICK FILM
R65	1	RESISTOR, 0402, 4.99 OHM, 1%, 100PPM, 0.0625W, THICK FILM
SU1, SU2	2	TEST POINT; SHUNT AND JUMPER; STR; TOTAL LENGTH=6.10MM; BLACK; INSULATION=GLASS FILLED POLYESTER; CONTACT=PHOSPHOR BRONZE
TP1	1	CONNECTOR; PANELMOUNT; BINDING POST; STRAIGHT THROUGH; 1PIN; RED
TP2	1	CONNECTOR; PANELMOUNT; BINDING POST; STRAIGHT THROUGH; 1PIN; BLACK
U1	1	Maxim MAX25612AUP/V+; AUTOMOTIVE SYNCHRONOUS HIGH VOLTAGE LED CONTROLLER; TSSOP20-EP; PACKAGE OUTLINE DRAWING: 21-100132; LAND PATTERN: 90-100049; PACKAGE CODE: U20E+3C
PCB	1	PCB:MAX25612

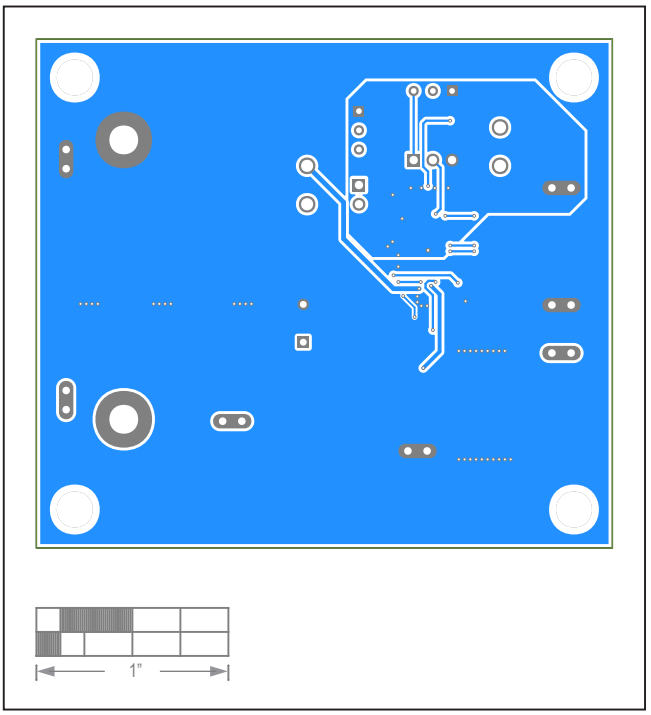
MAX25612 EV Kit Schematics



MAX25612 EV Kit PCB Layouts



Silk Top



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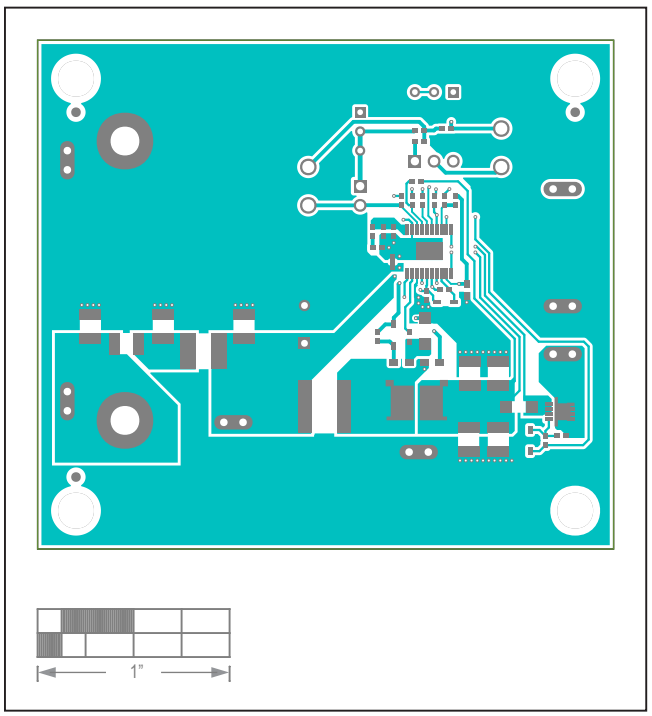

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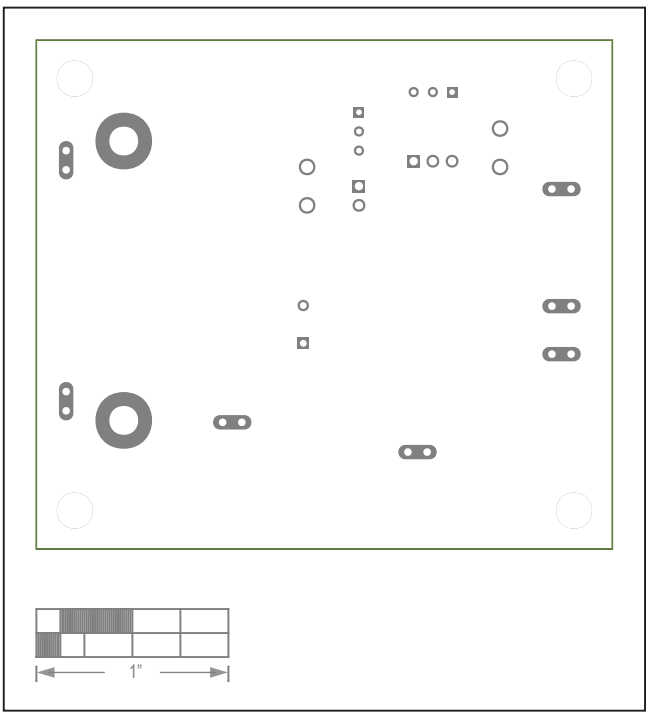

Silk Bottom

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	9/19	Initial release	—

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