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Evaluates: MAX25262/MAX25263

MAX25262/MAX25263 Evaluation Kit

General Description

The MAX25262/MAX25263 evaluation kits (EV kits) come fully assembled and tested. The EV kits demonstrate the MAX25262/MAX25263 synchronous buck converters. The EV kits operate over a wide 3.5V to 65V input range. The MAX25262EVKIT is populated with the MAX25262AFOA/VY+, and the MAX25263EVKIT is populated with the MAX25263AFOC/VY+. The EV kit output voltage is fixed and easily configured with minimum component changes. Other converters in the family can be tested on the same EV kit; however, changing the IC or the output voltage may also require changing other components. Consult the IC data sheet for guidance on selecting the proper ICs and external components. Output voltage quality can be monitored by observing the PGOOD signal.

Benefits and Features

- Input Supply Range from 3.5V to 65V
- Output Voltage: 3.3V/5V Fixed and Adjustable from 1V to 20V
- 2A/3A Output-Current Capability
- Frequency - Synchronization Input
- Spread Spectrum Available
- Voltage Monitoring PGOOD Output Available
- Proven PCB Layout
- Fully Assembled and Tested

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

Quick Start

Required Equipment

- MAX25262EVKIT/MAX25263EVKIT
- 65V, 3A power supply
- Appropriate resistive load, or an electronic load that can sink 3A
- Digital multimeter (DMM)
- Oscilloscope

Procedure

The EV kit is fully assembled and tested. Follow the steps below to verify board operation:

1) Verify that all jumpers are in their default positions, as shown in Table 1.
2) Connect the positive and negative terminals of the power supply to the SUP and GND1 test pads, respectively.
3) Set the power supply voltage to 24V and current limit to 3A.
4) Turn on the power supply.
5) Using the DMM, verify that OUT is as requested.
6) Verify that the switching frequency is 2.1MHz/400kHz (approximately) by monitoring the inductor switching voltage with the oscilloscope.
7) Connect the positive and negative terminals of the electronic load to OUT and GND, respectively.
8) Set the electronic load to the desired current at or below 3A, or use an equivalent resistive load with an appropriate power rating.
9) Adjust current limit on the power supply as necessary.
10) Turn on the power supply and electronic load.
11) Verify that voltage across the V_{OUT} and GND is as requested.

319-100605; Rev 1; 12/21

Detailed Description of Hardware

The MAX25262 and MAX25263 EV kits provide a proven layout for the MAX25262 and MAX25263 synchronous buck regulator ICs, respectively. The input voltages range from 3.5V to 65V and deliver up to 3A. The EV kits can handle an input supply transient up to 70V. Various test points are included for evaluation.

External Synchronization

The IC can operate in two modes: forced-PWM (FPWM) mode or skip mode. Skip mode has better efficiency for light-load conditions. When SYNC is pulled low, the IC operates in skip mode for light loads and PWM mode for larger loads. When SYNC is pulled high, the IC is forced to operate in PWM mode across all load conditions. SYNC can be used to synchronize with other supplies if a clock source is present. The IC is forced to operate in FPWM mode when SYNC is connected to a clock source.

Buck Output Monitoring (PGOOD)

The EV kit provides a power-good output test point (PGOOD) to monitor the status of the buck output (OUT). PGOOD is high impedance when the output is in regulation. PGOOD goes low when the corresponding regulator output voltage drops below 93.5% (typ) of its nominal regulation voltage or goes above 108% (typ) of its nominal regulation voltage.

Programming Buck Output Voltage

The IC can provide a fixed 3.3V/5V output voltage or an adjustable 1V to 20V output voltage. To program V_{OUT} voltage, place appropriate resistors in positions R5 and R6 according to the following equation:

$$R5 = R6 (V_{OUT}/V_{FB} - 1)$$

where typically V_{FB} = 1V (typ) and R6 = 100kΩ.

Spread Spectrum Option

The spread spectrum is pin selectable using the SPS pin. Pull the pin high to enable spread spectrum. When spread spectrum is enabled, the operating frequency is varied ±6%, centered at switching frequency.

The internal spread spectrum is disabled if the devices are synchronized to an external clock. However, the devices do not filter the input clock on the FSYNC pin and pass any modulation (including spread spectrum) present on the driving external clock.

EXTVCC Switchover

The internal linear regulator can be bypassed by connecting an external supply, or the MAX25262/MAX25263 output to EXTVCC. With valid supply applied to EXTVCC, it will be the supply for the internal gate driver. The R_{DSON} of the FET will increase if the EXTVCC drops below 5V, which will reduce the efficiency, therefore approximately 5V for EXTVCC is recommended for higher efficiency.

Table 1. Default Jumper Settings

JUMPER	DEFAULT SHUNT POSITION	FUNCTIONS
ENABLE	1-2	Buck enabled
PGOOD	Installed	PGOOD TP pulled up to bias
SPS	1-2	Spread Spectrum ON
SYNC	1-2	FPWM mode
EXTVCC	1-2	EXTVCC connect to OUT

***Note**: If the output voltage is configured above 5V, please ensure the EXTVCC jumper is at position 2-3 to avoid damage to the part.*

Ordering Information

PART	TYPE
MAX25262EVKIT#	EV Kit
MAX25263EVKIT#	EV Kit

#Denotes RoHS compliant.

MAX25262/MAX25263 EV Kit Bill of Materials

REF DES	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION
R1	CRCW060320K0JN	VISHAY DALE	20K	RESISTOR; 0603; 20KΩ; 5%; 200PPM; 0.10W; METAL FILM
R2, R3	MC0603SAF0000T5E	MULTICOMP	0	RES; SMT (0603);0;1%; ±400PPM/DEGC;0.1W
R4, R5, R6			DNI	RES 0603
L1	FBMH3225HM102N	TAIYO YUDEN	1000	INDUCTOR; SMT (1210); FERRITE-BEAD; 1000 IMPEDANCE AT 100MHZ; TOL = ±30%; 2A
L2			Install short	
C1, C7, C9, C12, C22	GCJ188R72A104KA01	MURATA	0.1µF	CAP; SMT (0603); 0.1µF; 10%; 100V; X7R; CERAMIC CHIP
C2, C3, C5, C6, C10, C11	08051C105K4Z2A	AVX	1µF	CAP; SMT (0805); 1µF; 10%; 100V; X7R; CERAMIC CHIP
C4	EEH-ZC1K470P	PANASONIC	47µF	CAP; SMT (CASE_G); 47µF; 20%; 80V; ALUMINUM-ELECTROLYTIC
C8	GRM188R71A225KE15	MURATA	2.2µF	CAP; SMT (0603); CERAMIC CHIP; 2.2µF; 10V; TOL = 10%; TG = -55°C TO +125°C; TC = X7R
C21			DNI	
GND, GND2, VSUP, VOUT	575-4	KEYSTONE		RECEPTACLE; JACK; BANANA
BIAS, FBR, GNDS, GNDS1, GNDS2, GNDS3, PGOOD, VOUTS, VSUPS	5012	KEYSTONE		TEST POINT
VSUP_FILTER	9020 BUSS	WEICO WIRE		
ENABLE, SPS, EXTVCC, SYNC	PEC03SAAN	SULLINS ELECTRONICS CORP.		3PINS
PGOOD	PBC02SAAN	SULLINS ELECTRONICS CORP.		2PINS

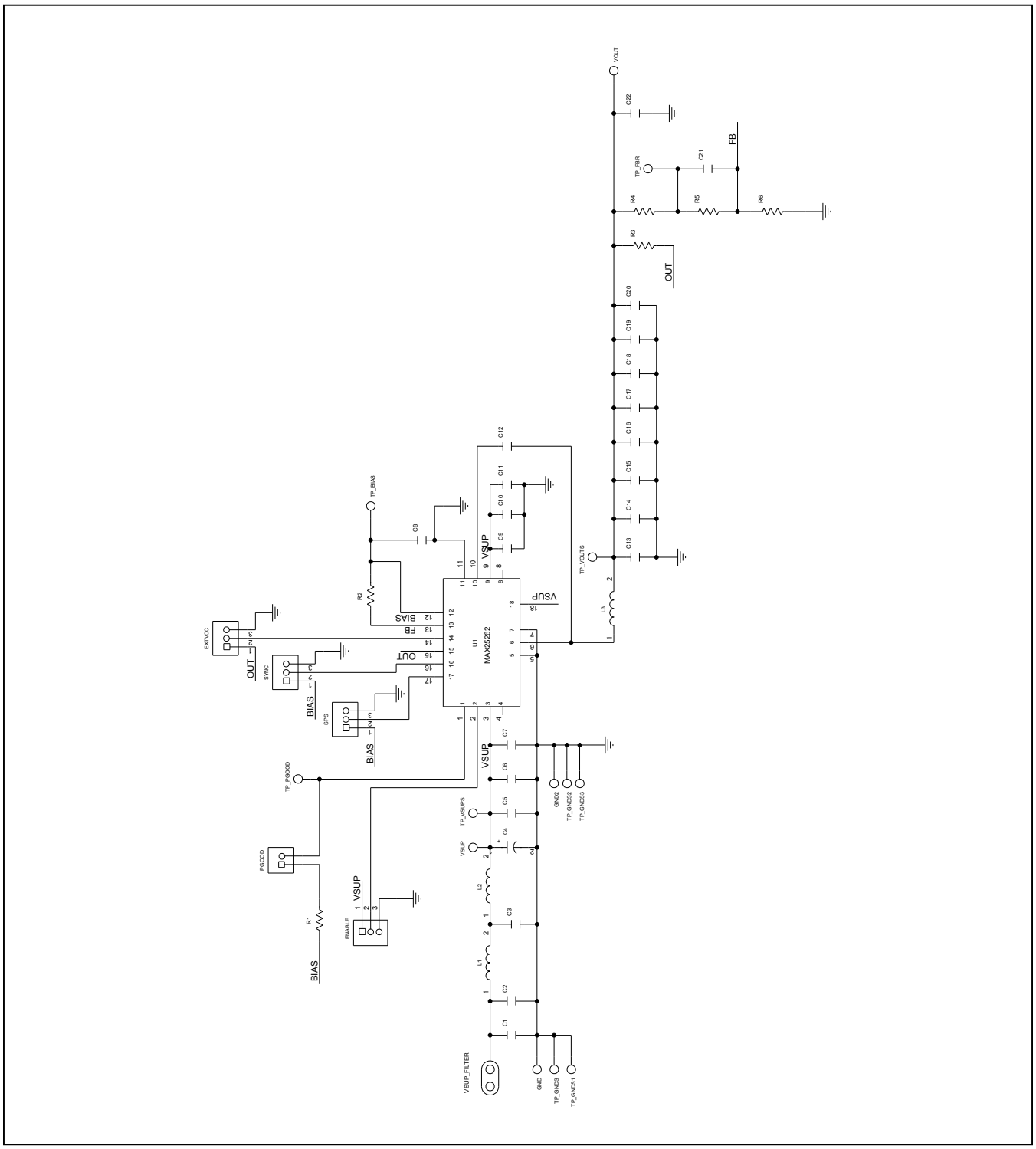
MAX25262/MAX25263 EV Kit Bill of Materials (continued)

MAX25262EVKIT# Variant (2.1MHz, 5V)				
REF DES	**MFG PART #**	**MANUFACTURER**	**VALUE**	**DESCRIPTION**
U1	MAX25262AFOA/VY+	Analog Devices		Buck converter IC
L3	XAL5030-332ME	Coilcraft	3.3µH	
C13, C14, C16, C18	CGA4J1X7S1E106K125AC	TDK	10µF	CAP CER 10µF 25V X7S 0805
C15, C17, C19, C20			DO NOT INSTALL	

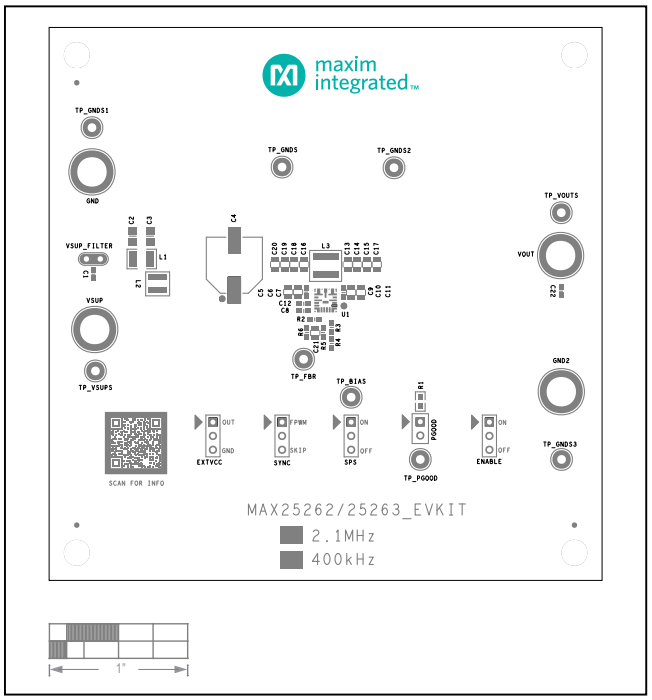
MAX25263EVKIT# Variant (400kHz, 5V)				
REF DES	**MFG PART #**	**MANUFACTURER**	**VALUE**	**DESCRIPTION**
U1	MAX25263AFOC/VY+	Analog Devices		Buck converter IC
L3	XAL5050-103ME	Coilcraft	10µH	
C13, C14, C15, C16, C17, C18, C19, C20	CGA4J1X7S1E106K125AC	TDK	10µF	CAP CER 10UF 25V X7S 0805

MAX25262/MAX25263 EV Kit Schematic Diagram

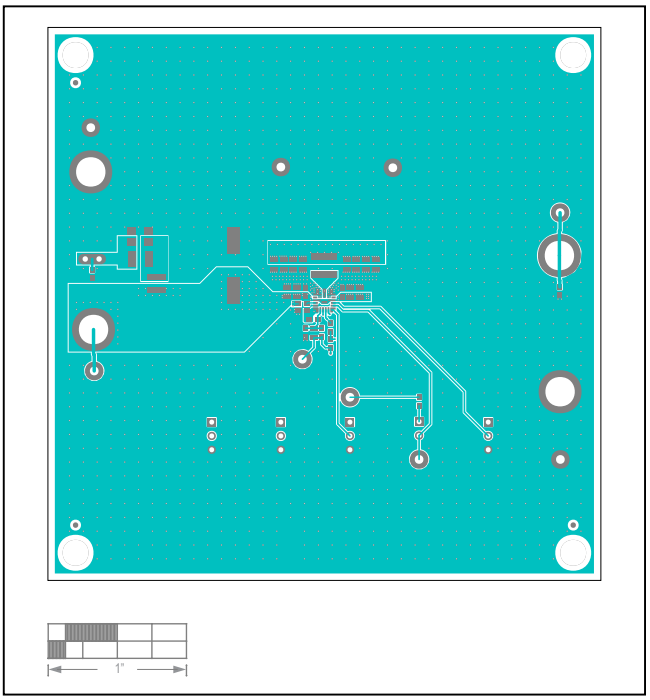
See the BOM for precise component values.



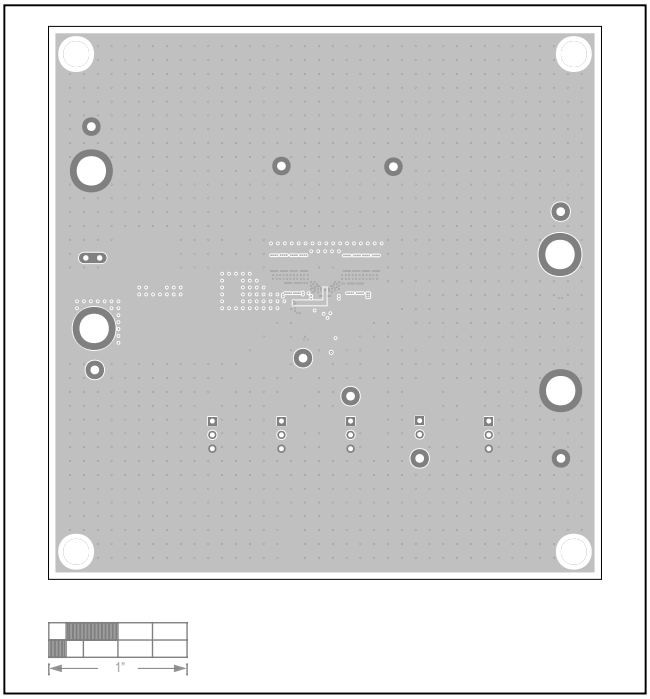
MAX25262/MAX25263 EV Kit PCB Layout Diagrams



MAX25262/MAX25263 EV Kit PCB Layout — Top Silkscreen

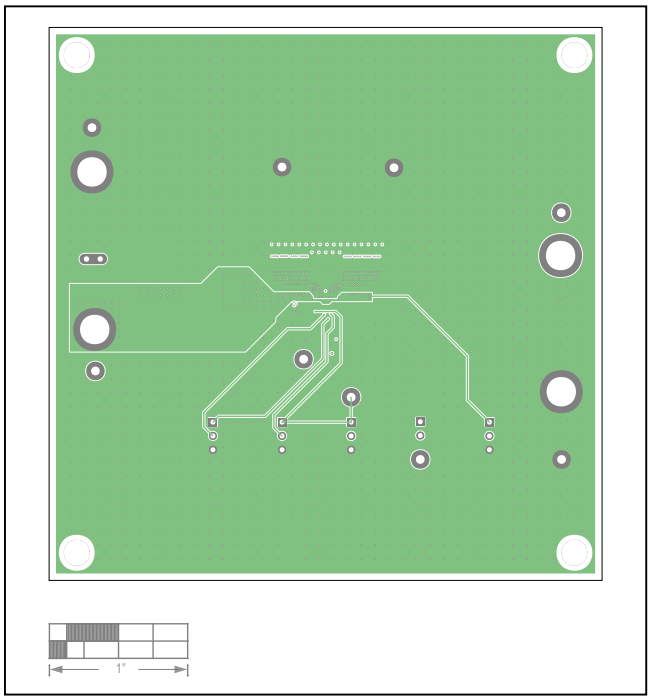


MAX25262/MAX25263 EV Kit PCB Layout — Top Layer

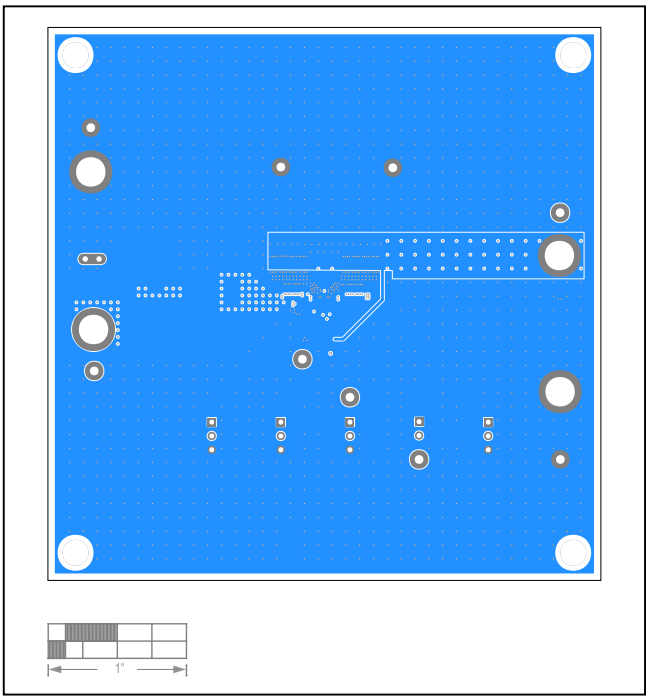


MAX25262/MAX25263 EV Kit PCB Layout — Internal Layer 2

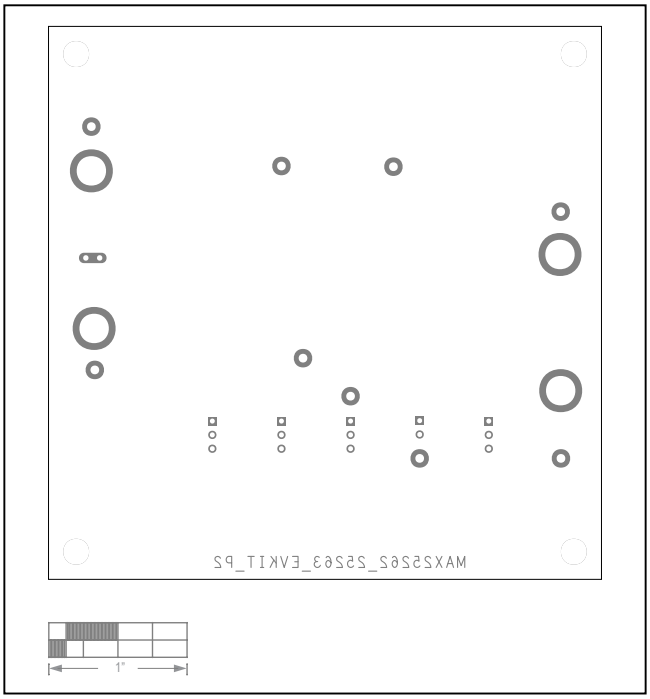
MAX25262/MAX25263 EV Kit PCB Layout Diagrams (continued)



MAX25262/MAX25263 EV Kit PCB Layout — Internal Layer 3



MAX25262/MAX25263 EV Kit PCB Layout — Bottom Layer



MAX25262/MAX25263 EV Kit PCB Layout — Bottom Silkscreen

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	9/20	Initial release	—
1	12/21	Updated the Detailed Description of Hardware, Bill of Materials, Schematic, and PCB Layout	2, 4–7