MAX17541G 3.3V Output Evaluation Kit

MAX17541G in 3.3V Output-Voltage Application

General Description

The MAX17541G 3.3V EV kit provides a proven design to evaluate the MAX17541G 3.3V high-efficiency, high-voltage, synchronous step-down DC-DC converter. The EV kit generates 3.3V at load currents up to 500mA from a 5V to 42V input supply. The EV kit features a 600kHz fixed switching frequency for optimum efficiency and component size. The EV kit features a forced-PWM control scheme that provides constant switching-frequency operation at all load and line conditions.

Features

- Operates from a 5V to 42V Input Supply
- 3.3V Output Voltage
- 500mA Output Current
- 600kHz Switching Frequency
- Enable/UVLO Input
- Resistor-Programmable UVLO Threshold
- Open-Drain $\overline{\text{RESET}}$ Output
- Overcurrent and Overtemperature Protection
- Proven PCB Layout
- Fully Assembled and Tested

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

Quick Start

Recommended Equipment

- MAX17541G 3.3V EV kit
- 5V to 42V, 2A DC input power supply
- Load capable of sinking 500mA
- Digital voltmeter (DVM)
- Function generator

Procedure

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

1) Set the power supply at a voltage between 5V and 42V. Disable the power supply.
2) Connect the positive terminal of the power supply to the VIN PCB pad and the negative terminal to the nearest PGND PCB pad. Connect the positive terminal of the 500mA load to the VOUT PCB pad and the negative terminal to the nearest PGND PCB pad.
3) Connect the DVM across the VOUT PCB pad and the nearest PGND PCB pad.
4) Turn on the DC power supply.
5) Enable the load.
6) Verify that the DVM displays 3.3V.

To turn-on/off the part from EN/UVLO, follow the steps below:

1) Connect the power supply to the EV kit and turn on the power supply. Set the power supply at a voltage between 5V and 42V.
2) Connect the function generator output to the EN/UVLO test loop.
3) EN/UVLO rising threshold is 1.24V and falling threshold is 1.11V. Make sure that the voltage-high and voltage-low levels of the function generator output are greater than 1.24V and less than 1.11V, respectively.
4) While powering down the EV kit, first disconnect the function generator output from the EN/UVLO test loop and then turn off the DC power supply.

19-7722; Rev 0; 7/15

maxim integrated™

Detailed Description of Hardware

The MAX17541G 3.3V EV kit provides a proven design to evaluate the MAX17541G 3.3V high-efficiency, high-voltage, synchronous step-down DC-DC converter. The EV kit generates 3.3V at load currents up to 500mA from a 5V to 42V input supply. The EV kit features a 600kHz fixed switching frequency for optimum efficiency and component size. The EV kit features a forced-PWM control scheme that provides constant switching-frequency operation at all load and line conditions.

The EV kit includes an EN/UVLO PCB pad to enable control of the converter output. An additional $\overline{\text{RESET}}$ PCB pad is available for monitoring the open-drain logic output. The VCC PCB pad helps measure the internal LDO voltage.

Soft-Start Input (SS)

The device utilizes an adjustable soft-start function to limit inrush current during startup. The soft-start time is adjusted by the value of C3, the external capacitor from SS to GND. To adjust the soft-start time, determine C3 using the following formula:

$$C3 = 5.55 \times t_{SS}$$

where t_{SS} is the required soft-start time in milliseconds and C3 is in nanofarads.

Regulator Enable/Undervoltage-Lockout Level (EN/UVLO)

The device features an EN/UVLO input. For normal operation, no shunts should be installed across pins 1-2 or 2-3 on jumper JU1. To disable the output, install a shunt across pins 2-3 on JU1 and the EN/UVLO pin is pulled to GND. See Table 1 for JU1 settings.

Setting the Undervoltage-Lockout Level

The device offers an adjustable input undervoltage-lockout level. Set the voltage at which the device turns on with a resistive voltage-divider connected from VIN to GND (see Figure 1). Connect the center node of the divider to EN/UVLO.

Choose R1 to be 3.3MΩ and then calculate R2 as follows:

$$R2 = \frac{R1 \times 1.218}{(V_{INU} - 1.218)}$$

where V_{INU} is the voltage at which the device is required to turn on. Ensure that V_{INU} is higher than 0.8 x V_{OUT}.

Adjusting the Output Voltage

The device offers an adjustable output voltage. Set the output voltage with a resistive voltage-divider connected from the positive terminal of the output capacitor (V_{OUT}) to GND (see schematic attached to PDF). Connect the center node of the voltage-divider to FB.

To choose the values of R4 and R5, select the parallel combination of R4 and R5, with R_P less than 15kΩ. Once R_P is selected, calculate R4 as follows:

$$R4 = \frac{R_P \times V_{OUT}}{0.9}$$

Calculate R5 as follows:

$$R5 = \frac{R4 \times 0.9}{(V_{OUT} - 0.9)}$$

Table 1. Regulator Enable (EN/UVLO) Jumper JU1 Settings

SHUNT POSITION	EV/UVLO PIN	MAX17541G 3.3V OUTPUT
Not installed*	Connected to the center node of resistor-divider R1 and R2	Enabled, UVLO level set through the R1 and R2 resistor-divider
2-3	Connected to GND	Disabled

**Default position.*

EV Kit Performance Report

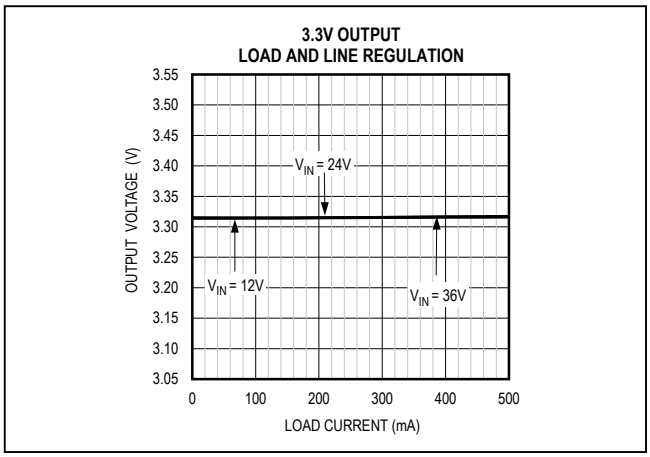


Figure 1. MAX17541G 3.3V Output Load and Line Regulation

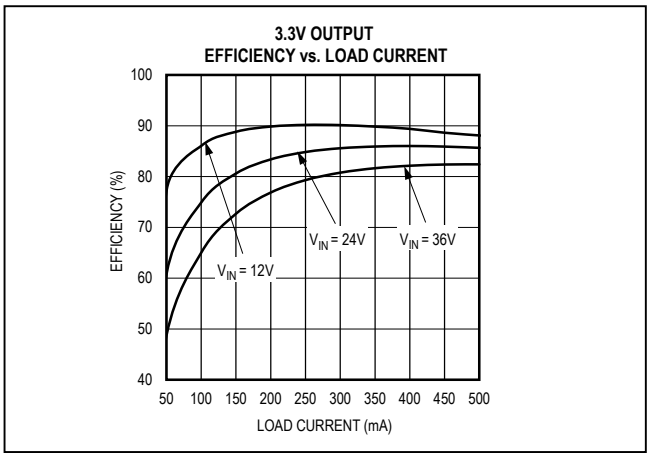


Figure 2. MAX17541G 3.3V Output Efficiency

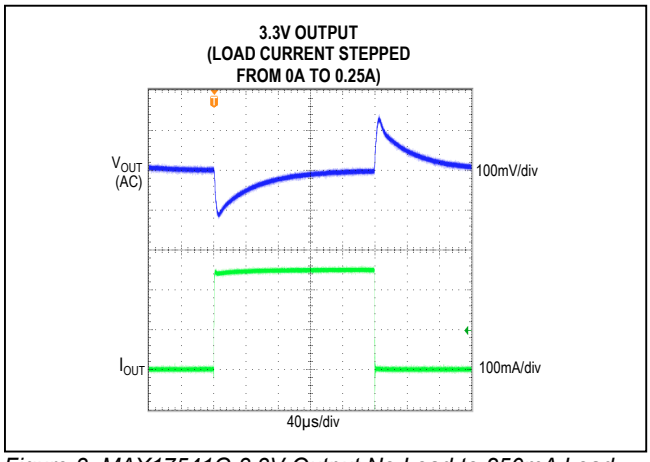


Figure 3. MAX17541G 3.3V Output No Load to 250mA Load Transient

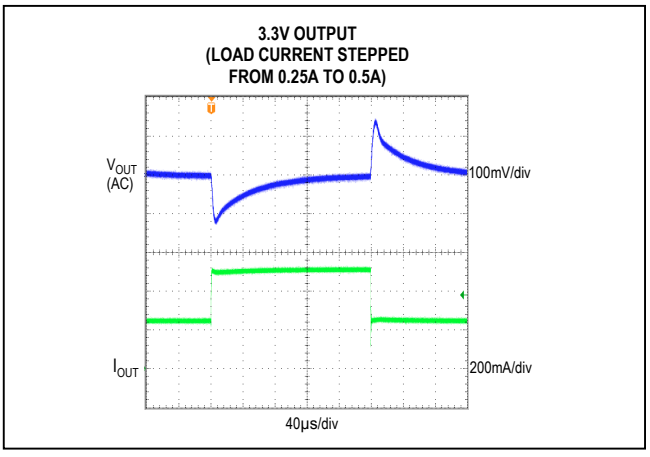


Figure 4. MAX17541G 3.3V Output 250mA to 500mA Load Transient

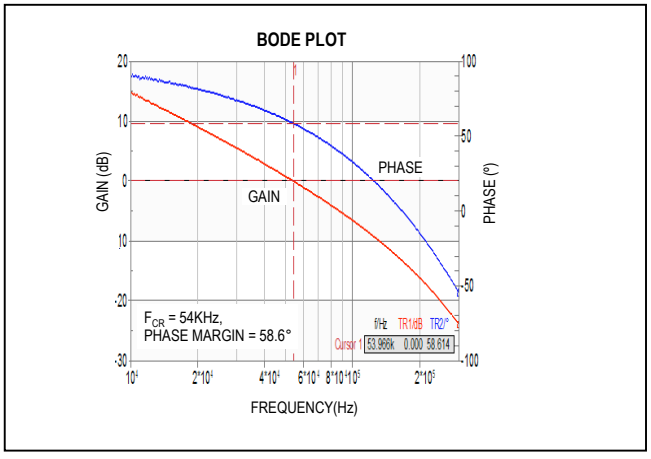


Figure 5. MAX17541G 3.3V Output Full-Load Bode Plot (V_{IN} = 24V)

Component Suppliers

SUPPLIER	WEBSITE
Murata Americas	www.murata.com
Panasonic Corp.	www.panasonic.com
Wurth Group	www.we-online.com

Note: *Indicate that you are using the MAX17541G when contacting these component suppliers.*

Component Information, PCB Layout, and Schematic

See the following links for component information, PCB layout, and schematic:

- **MAX17541G 3.3V EV BOM**
- **MAX17541G 3.3V EV PCB Layout**
- **MAX17541G 3.3V EV Schematic**

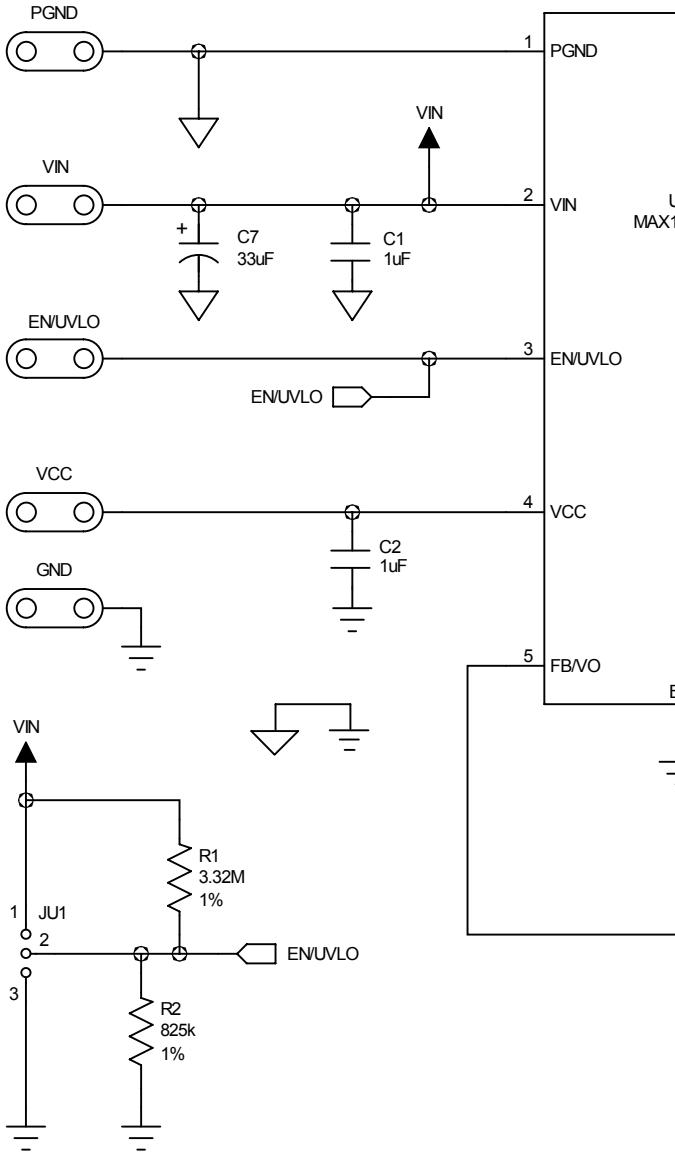
Ordering Information

PART	TYPE
MAX17541GTAEVKIT#	EV Kit

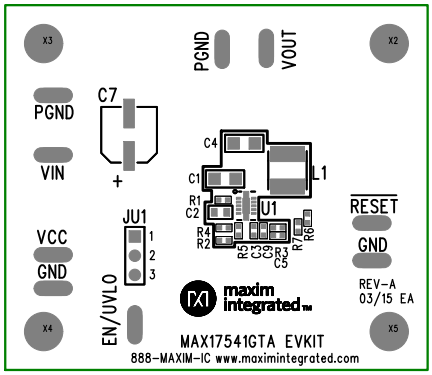
#Denotes RoHS compliant.

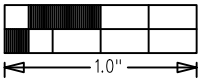
Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	7/15	Initial release	—

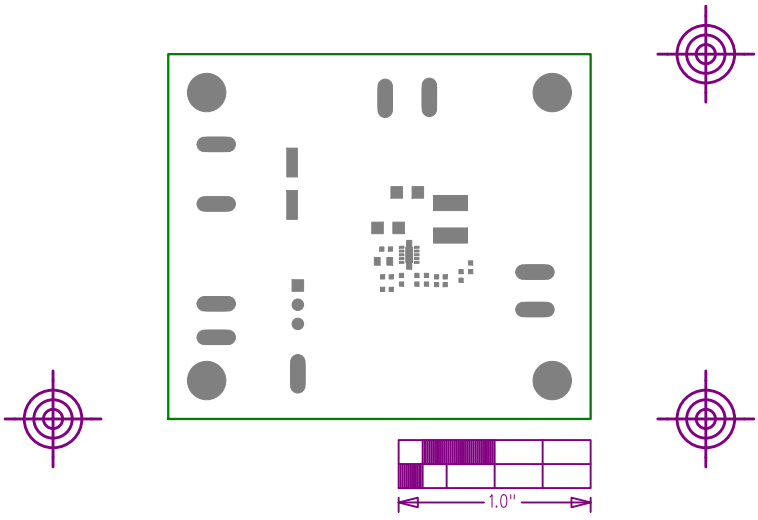

PGND
1
PGND
VIN
VIN
2
VIN
C7
33uF
C1
1uF
EN/UVLO
3
EN/UVLO
EN/UVLO
VCC
4
VCC
C2
1uF
GND
5
FB/VO
VIN
R1
3.32M
1%
1
JU1
2
EN/UVLO
3
R2
825k
1%

MAX17541GTA EVKIT	
	REV A
PROPERTY OF maxim integrated™	
LAYER TOP SILKSCREEN	
DATE:	ALL UNITS ARE IN 0.001"

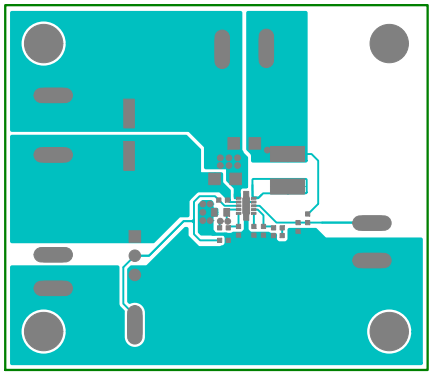


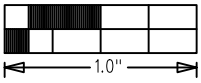


MAX17541GTA EVKIT	REV A
PROPERTY OF maxim integrated™	
LAYER TOP SOLDERMASK	
DATE:	ALL UNITS ARE IN 0.001"

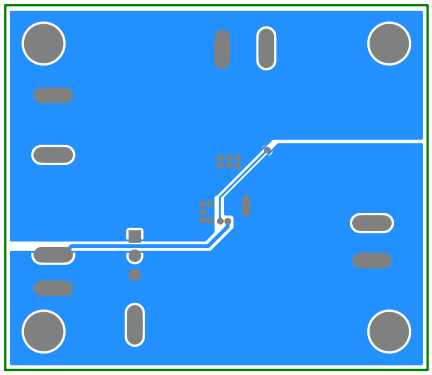


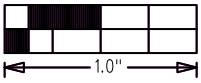
MAX17541GTA EVKIT	REV A
PROPERTY OF maxim integrated™	
LAYER COMPONENT SIDE	
DATE:	ALL UNITS ARE IN 0.001"



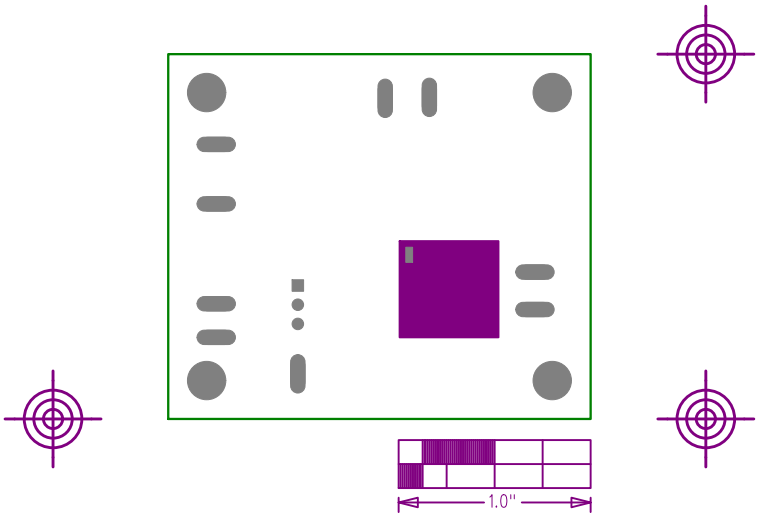


MAX17541GTA EVKIT	
	REV A
PROPERTY OF maxim integrated™	
LAYER SOLDER SIDE	
DATE:	ALL UNITS ARE IN 0.001"





MAX17541GTA EVKIT	
	REV A
PROPERTY OF maxim integrated™	
LAYER BOTTOM SOLDERMASK	
DATE:	ALL UNITS ARE IN 0.001"



15	10k ohm ±1%, resistor (0402)	1	R6	
16	Not installed, resistor (0402)	0	R7	
17	Buck Converter (10TDFN 3mmx2mm) MAX17541GATB+	1	U1	MAX17541GAT
18	Shunt	1	See Jumper Table	SULLINS STC02SY

Jumper Table	
JUMPER	SHUNT POSITIO
JU1	1-2

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for Power Management IC Development Tools ***category:***

Click to view products by Maxim ***manufacturer:***

Other Similar products are found below :

EVAL-ADM1168LQEBZ EVB-EP5348UI MIC23451-AAAYFL EV MIC5281YMME EV DA9063-EVAL ADP122-3.3-EVALZ ADP130-0.8-EVALZ ADP130-1.2-EVALZ ADP130-1.5-EVALZ ADP130-1.8-EVALZ ADP1712-3.3-EVALZ ADP1714-3.3-EVALZ ADP1715-3.3-EVALZ ADP1716-2.5-EVALZ ADP1740-1.5-EVALZ ADP1752-1.5-EVALZ ADP1828LC-EVALZ ADP1870-0.3-EVALZ ADP1871-0.6-EVALZ ADP1873-0.6-EVALZ ADP1874-0.3-EVALZ ADP1882-1.0-EVALZ ADP199CB-EVALZ ADP2102-1.25-EVALZ ADP2102-1.875EVALZ ADP2102-1.8-EVALZ ADP2102-2-EVALZ ADP2102-3-EVALZ ADP2102-4-EVALZ ADP2106-1.8-EVALZ ADP2147CB-110EVALZ AS3606-DB BQ24010EVM BQ24075TEVM BQ24155EVM BQ24157EVM-697 BQ24160EVM-742 BQ24296MEVM-655 BQ25010EVM BQ3055EVM NCV891330PD50GEVB ISLUSBI2CKIT1Z LM2744EVAL LM2854EVAL LM3658SD-AEV/NOPB LM3658SDEV/NOPB LM3691TL-1.8EV/NOPB LM4510SDEV/NOPB LM5033SD-EVAL LP38512TS-1.8EV