General Description

The MAX14588 evaluation kit (EV kit) is a fully assembled and tested circuit board that demonstrates the MAX14588 adjustable overcurrent and overvoltage protector. The EV kit features TVS diode on input and Schottky diode on output. Input power to the EV kit uses a 4.5V to 36V input supply.

The EV kit circuit can be configured to demonstrate the device's different current-limit types, adjustable overvoltage, undervoltage, and current-limit threshold.

Benefits and Features

- 4.5V to 36V Operating Voltage Range
- Features TVS Diode and Schottky Diode
- Evaluates Three Current-Limit Types, Current-Limit Threshold, OVLO, and UVLO
- Proven PCB Layout
- Fully Assembled and Tested

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

Component List

DESIGNATION	QTY	DESCRIPTION
C1	1	1µF ±10%, 25V X5R ceramic capacitor (0603) Murata GRM188R61E105KA12D
C2	1	0.1µF ±10%, 25V X7R ceramic capacitor (0603) Murata GRM188R71E104KA01D
C3	1	0.47µF ±10%, 50V X5R ceramic capacitor (0603) TDK C1608X5R1H474K080AB
C4	1	1µF ±10%, 50V X7R ceramic capacitor (1206) Murata GRM31MR71H105KA61L
C7	1	330µF ±20%, 50V radial capacitor Panasonic EEU-EB1H331
C8	0	Not installed, capacitor Panasonic EEU-EB1H331
D1	1	36V TVS diode STMicro SM6T36CA
D2	1	60V, 1A Schottky diode STMicro STPS1L60A
J1	1	USB type-B connector FCI 61729-0010BLF

DESIGNATION	QTY	DESCRIPTION
J2, J3	2	Power terminals Phoenix Contact 1729018
JU1	1	8-pin (2 x 4) header
JU3–JU5, JU8, JU9, JU13	6	2-pin headers
JU6, JU12, JU14, JU15	4	3-pin headers
LED1	1	Green LED Lumex SML-LX1206GW-TR
LED2	1	Red LED Lite-On LTST-C150CKT
R1, R3	2	1kΩ ±1% resistors (0805)
R2	1	10kΩ ±1% resistor (0805)
R4, R13, R14, R17	4	100kΩ ±1% resistors (0805)
R5, R10, R12	0	Not installed, resistors (0805)
R6	1	40.2kΩ ±1% resistor (0805)
R7	1	12.1kΩ ±1% resistor (0805)
R8	1	6.2kΩ ±1% resistor (0805)
R9, R11	2	2.2MΩ ±5% resistors (0805)

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Component List (continued)

DESIGNATION	QTY	DESCRIPTION
R15	1	4.7kΩ ±1% resistor (0805)
R16	1	50kΩ potentiometer Bourns 3296W-1-503LF
TP1	1	White test point
TP2, TP4, TP5, TP7	4	Black test points
TP3, TP6, TP8	3	Red test points
TP9	1	Purple test point
TP10	1	Green test point
TP11	1	Grey test point

DESIGNATION	QTY	DESCRIPTION
U1	1	Overcurrent and overvoltage protector (16 TQFN-EP*) Maxim MAX14588ETE+ (Top Mark: AJZ)
U2	1	Dual buffer (SC70 6L) Fairchild NC7WZ07P6X
—	11	Shunts
—	1	PCB: MAX14588 EVKIT

**EP = Exposed pad.*

Component Suppliers

SUPPLIER	PHONE	WEBSITE
Bourns, Inc.	951-781-5500	www.bourns.com
Fairchild Semiconductor	888-522-5372	www.fairchildsemi.com
FCI Electronics Interconnection Solutions	800-237-2374	www.fciconnect.com
Lite-On, Inc.	408-946-4873	www.us.liteon.com
Lumex Inc.	800-278-5666	www.lumex.com
Murata Americas	800-241-6574	www.murataamericas.com
Panasonic Corp.	800-344-2112	www.panasonic.com
Phoenix Contact, Inc.	800-888-7388	www.phoenixcontact.com
STMicroelectronics	408-452-8585	www.us.st.com
TDK Corp.	847-803-6100	www.component.tdk.com

Note: *Indicate that you are using the MAX14588 when contacting these component suppliers.*

Quick Start

Required Equipment

- MAX14588 EV kit
- 36V DC power supply
- Multimeter
- USB-A male to USB-B male cable or 5V DC power supply

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.
2) Connect the USB cable to J1 from a computer or connect a 5V DC power supply to TP3.
3) Verify that LED1 is on.
4) Connect a 20V DC power supply to IN. Verify that OUT is 20V.
5) Increase voltage on the DC power supply and verify that the OUT voltage goes down and LED2 is on when input reaches approximately 33V.
6) Decrease voltage on the DC power supply and verify that OUT goes back and LED2 is off when the input reaches approximately 32V.

Detailed Description of Hardware

The MAX14588 EV kit is a fully assembled and tested circuit board that demonstrates the MAX14588 1A adjustable overcurrent and overvoltage protector IC in a 16-pin surface-mount TQFN-EP package.

Using jumper JU1, the EV kit circuit can be configured to evaluate different current-limit thresholds with a different resistor on SETI. Using jumpers JU3–JU5, the EV kit circuit can be configured to evaluate the internal OVLO/UVLO threshold or external threshold using a resistor-divider. Using jumpers JU14 and JU15, the EV kit circuit can be configured to evaluate different current-limit types (autoretry, latchoff, and continuous). The EV kit also features LEDs to indicate the power for logic pins and FLAG status.

Current-Limit Threshold

The EV kit features a jumper (JU1) to select current-limit threshold. Install a jumper as shown in Table 2 to change the current-limit threshold.

Use the following equation to calculate the current limit:

$$R_{SETI}\,(k\Omega) = \frac{6100}{I_{LIM}\,(mA)}$$

UVLO/OVLO Threshold

Use jumpers JU3–JU5 to select UVLO and OVLO threshold. See Table 3 for jumper settings.

Table 1. LED Indicator

LED	NAME	DESCRIPTION
LED1	POWER	LED1 is on when the VBUS/5V supply for the logic pins is powered.
LED2	FLAG	LED2 is on when $\overline{FLAG}$ is asserted.

Table 2. Current-Limit Threshold (JU1)

JUMPER	SHUNT POSITION	DESCRIPTION
JU1	1-2*	Current limit 0.15A
	3-4	Current limit 0.5A
	5-6	Current limit 0.98A
	7-8	Current limit adjustable

**Default position.*

Table 3. UVLO/OVLO Threshold (JU3–JU5)

JUMPER	SHUNT POSITION	DESCRIPTION
JU3	Installed*	UVLO connected to ground. Internal UVLO threshold is selected.
	Not installed	UVLO not connected to ground. Install JU5 to use external resistors to set UVLO threshold.
JU4	Installed*	OVLO connected to ground. Internal OVLO threshold is selected.
	Not installed	OVLO not connected to ground. Install JU5 to use external resistors to set OVLO threshold.
JU5	Installed	Use external resistors to set the OVLO/UVLO threshold.
	Not installed*	Not using external resistors to set the OVLO/UVLO threshold.

**Default position.*

Switch Control

The EV kit features two jumpers (JU6, JU8) to enable or disable the switch. See Table 4 for jumper settings.

Reverse-Current Block Enable

Use jumper JU9 to enable or disable the reverse-current flow protection. The reverse-current block is enabled when RIEN is logic-high. See Table 6 for jumper settings.

Current-Limit Type Select

The EV kit features jumpers JU12, JU14, JU15 to select different current-limit type and sampled time. See Table 7 for jumper settings.

Output Load Capacitor

Use jumper JU13 to connect output to 330µF capacitor. See Table 9 for jumper settings.

Table 4. Switch Control (JU6, JU8)

JUMPER	SHUNT POSITION	DESCRIPTION
JU6	1-2	$\overline{HVEN}$ connected to IN through 100kΩ.
	2-3*	$\overline{HVEN}$ connected to ground.
JU8	Installed*	EN connected to VBUS.
	Not installed	EN connected to ground through 100kΩ.

**Default position.*

Table 5. Enable Inputs

$\overline{HVEN}$	EN	SWITCH STATUS
0	0	On
0	1	On
1	0	Off
1	1	On

Table 6. Reverse-Current Block Enable (JU9)

JUMPER	SHUNT POSITION	DESCRIPTION
JU9	Installed*	RIEN connected to VBUS.
	Not installed	RIEN connected to ground through 100kΩ.

**Default position.*

Table 7. Current-Limit Type Select (JU12, JU14, JU15)

JUMPER	SHUNT POSITION	DESCRIPTION
JU12	1-2*	CLTS_MODE high. CLTS1 and CLTS2 are sampled continuously.
	2-3	CLTS_MODE low. CLTS1 and CLTS2 are sampled only when V_{IN} - V_{OUT} < 0.6V.
JU14	1-2*	CLTS1 high.
	2-3	CLTS1 low.
JU15	1-2	CLTS2 high.
	2-3*	CLTS2 low.

**Default position.*

Table 8. Logic Inputs

CLTS2	CLTS1	CURRENT-LIMIT TYPE
0	0	Latchoff
0	1	Autoretry
1	0	Continuous
1	1	Continuous

Table 9. Output Load Capacitor (JU13)

JUMPER	SHUNT POSITION	DESCRIPTION
JU13	Installed	OUT connected to C7 and C8.
	Not installed*	OUT not connected to C7 and C8.

**Default position.*

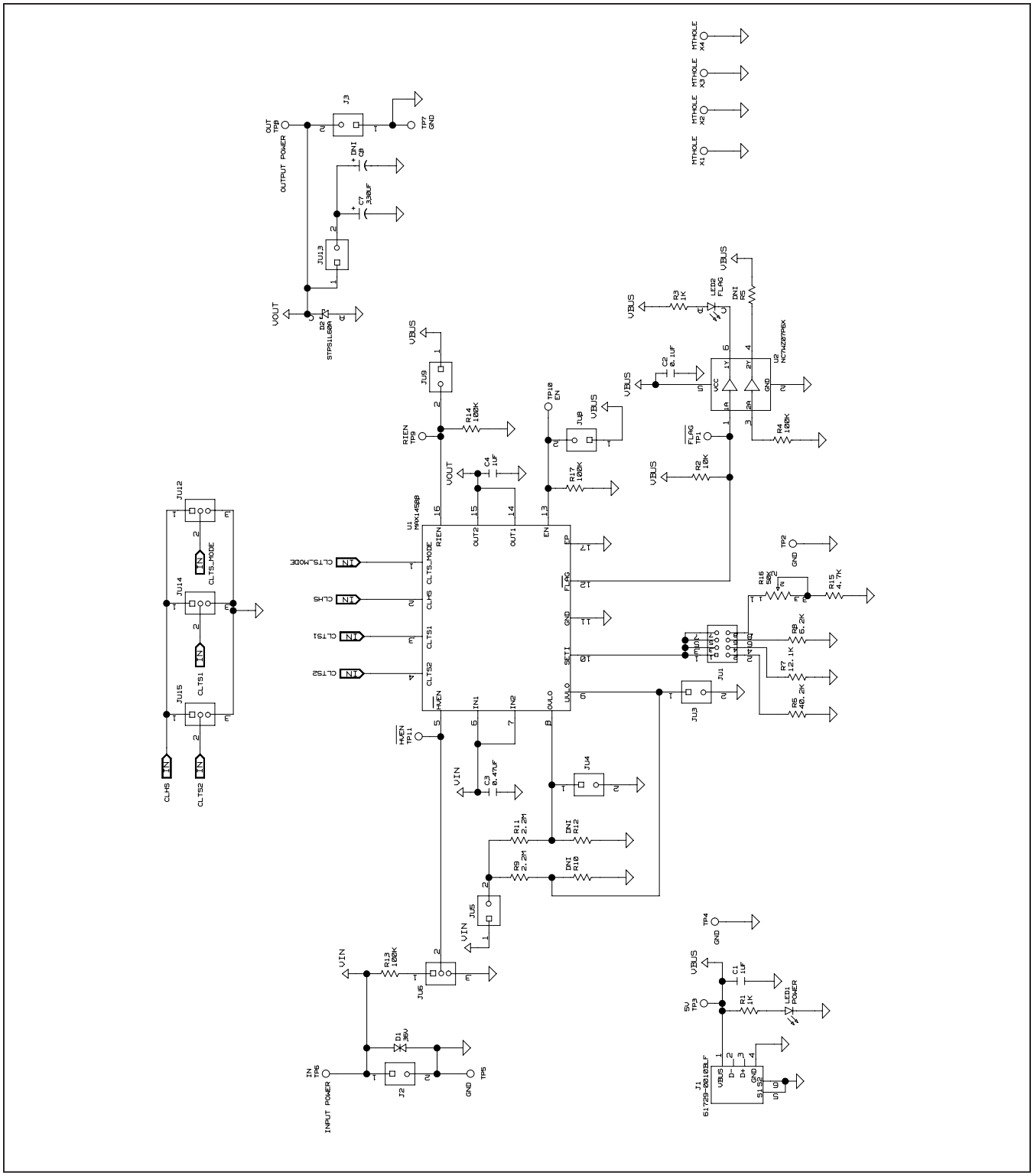


Figure 1. MAX14588 EV Kit Schematic

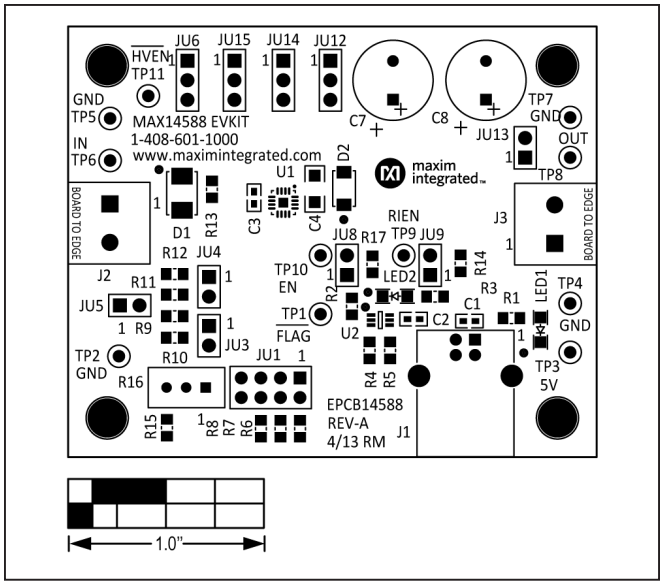


Figure 2. MAX14588 EV Kit Component Placement Guide—Component Side

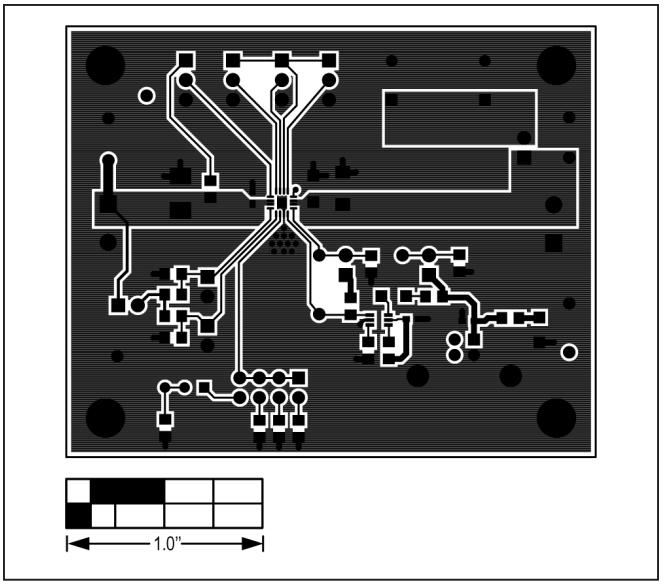


Figure 3. MAX14588 EV Kit PCB Layout—Component Side

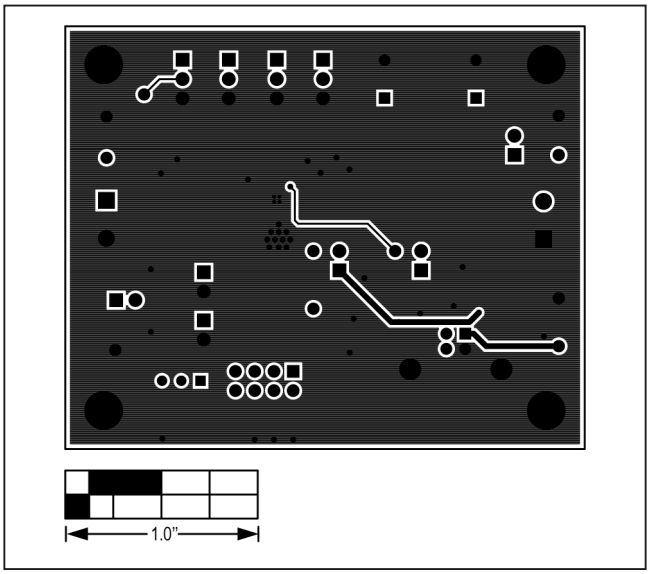


Figure 4. MAX14588 EV Kit PCB Layout—Solder Side

Ordering Information

PART	TYPE
MAX14588EVKIT#	EV Kit

#Denotes RoHS compliant.

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	5/13	Initial release	—

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