MAX17523 Evaluation Kit

Evaluates: MAX17523

General Description

The MAX17523 evaluation kit (EV kit) is a fully assembled and tested circuit board that demonstrates the MAX17523 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.

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.**

Quick Start

Required Equipment

- MAX17523 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 $\overline{\text{FLAG}}$ goes low when input reaches approximately 33V.
6) Decrease voltage on the DC power supply and verify that OUT goes back and $\overline{\text{FLAG}}$ goes high when the input reaches approximately 32V.

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Detailed Description of Hardware

The MAX17523 EV kit is a fully assembled and tested circuit board that demonstrates the MAX17523 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 an LED to indicate the power for logic pins.

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.

Switch Control

The EV kit features two jumpers (JU6, JU8) to enable or disable the switch. See Table 4 for jumper settings and Table 5 for switch status.

Table 1. LED Indicator

LED	NAME	DESCRIPTION
LED1	POWER	LED1 is on when the V_{BUS}/5V supply for the logic pins is powered

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.*

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

Reverse-Current Block Enable

Use jumper JU9 to enable or disable the reverse-current flow protection. The reverse-current block is enabled when $\overline{RIEN}$ is logic-low. 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 6. Reverse-Current Block Enable (JU9)

JUMPER	SHUNT POSITION	DESCRIPTION
JU9	Installed	$\overline{RIEN}$ connected to VBUS.
	Not installed*	$\overline{RIEN}$ 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.*

Component Suppliers

SUPPLIER	WEBSITE
Bourns, Inc.	www.bourns.com
Fairchild Semiconductor	www.fairchildsemi.com
FCI Electronics Interconnection Solutions	www.fciconnect.com
Lite-On, Inc.	www.us.liteon.com
Lumex Inc.	www.lumex.com
Murata Americas	www.murata.com
Panasonic Corp.	www.panasonic.com
Phoenix Contact, Inc.	www.phoenixcontact.com
STMicroelectronics	www.us.st.com
TDK Corp.	www.component.tdk.com

Note: Indicate that you are using the MAX17523EV when contacting these component suppliers.

Ordering Information

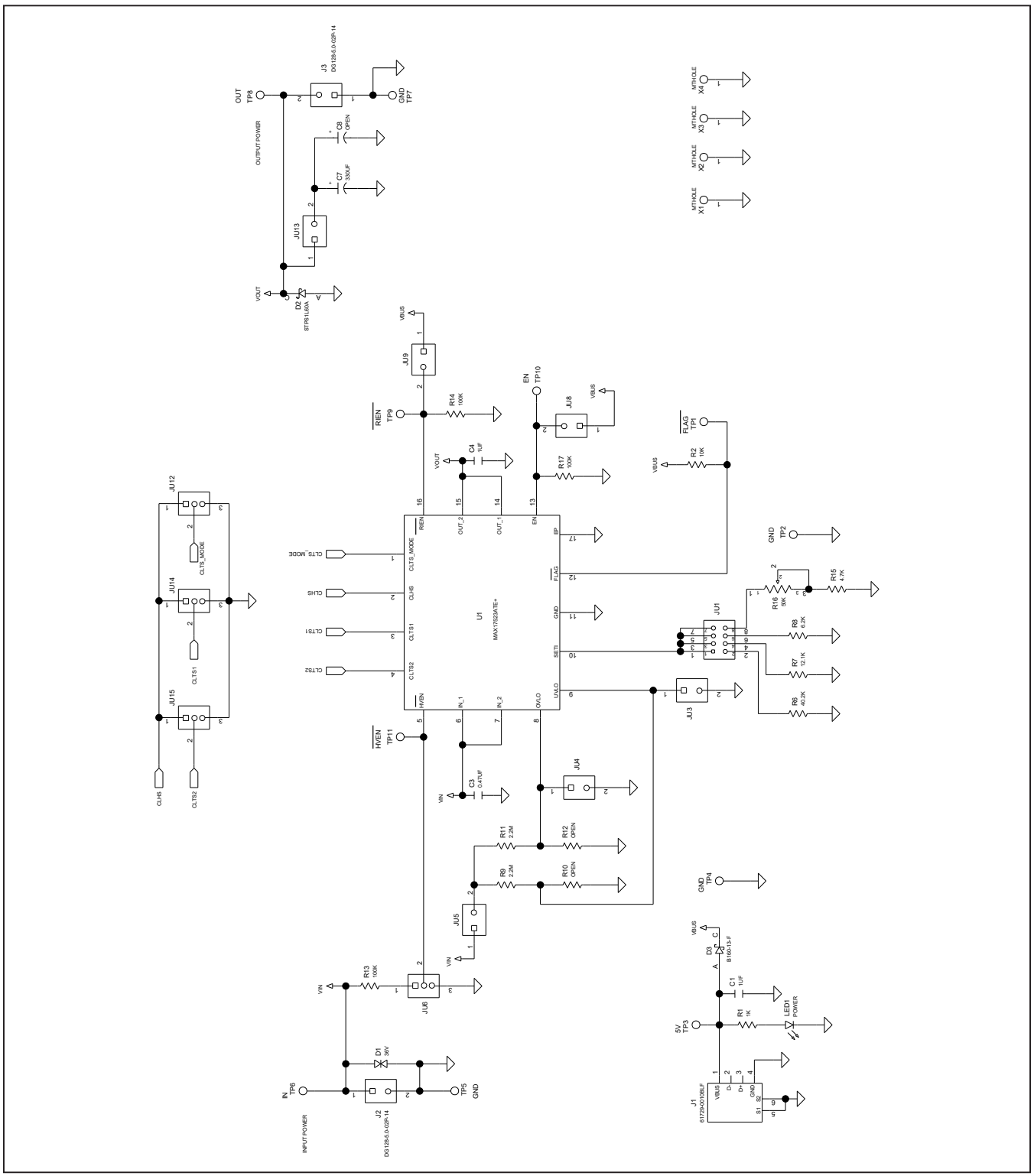
PART	TYPE
MAX17523EVKIT#	EV Kit

#Denotes RoHS compliant.

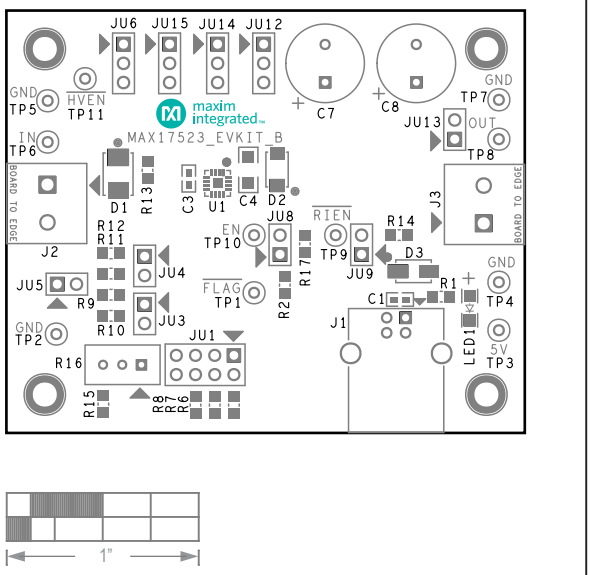
MAX17523 EV Kit Bill of Materials

PART REFERENCE	QTY	DESCRIPTION	MANUFACTURER PART NUMBER
C1	1	1µF 10% 25V X7R Ceramic Capacitors (0603)	MURATA GRM188R71E105KA12, TDK CGA3E1X7R1E105K
C3	1	0.47µF 10% 50V X5R Ceramic Capacitors (0603)	TDK C1608X5R1H474K080AB
C4	1	1µF 10% 50V X7R Ceramic Capacitors (1206)	MURATA GRM31CR71H105KA61, TDK CGA5L3X7R1H105K160AB
C7	1	330µF 20% 50V Aluminium Electrolytic Capacitor (10mm)	PANASONIC EEU-EB1H331
D1	1	TVS Diode, 600W (SMB)	ST MICROELECTRONICS SM6T36CA
D2	1	Power Schottky Diode, 60V, 1A (SMA)	ST MICROELECTRONICS STPS1L60A
D3	1	Power Schottky Diode, 60V, 1A (SMA)	DIODES INCORPORATED B160-13-F
J1	1	USB B-Type Connector	FCI CONNECT 61729-0010BLF
J2, J3	2	2-Pin Green PC Terminal Block	DEGSON ELECTRONICS DG128-5.0-02P-14
JU1	1	2x4 Dual-Row Header, 0.1in centers, cut to fit	SULLINS ELECTRONICS PBC04DAAN
JU3-JU5, JU8, JU9, JU13	6	2-Pin Single-Row Header, 0.1in centers, cut to fit	MOLEX 22-28-4023
JU6, JU12, JU14, JU15	4	3-Pin Single-Row Header, 0.1in centers, cut to fit	MOLEX 22-28-4033
LED1	1	Green LED (1206)	KINGBRIGHT APT3216SGC
R1	1	1K OHM 1% resistors (0805)	-
R2	1	10K OHM 1% resistors (0805)	-
R6	1	40.2K OHM 1% resistors (0805)	-
R7	1	12.1K OHM 1% resistors (0805)	-
R8	1	6.2K OHM 1% resistors (0805)	-
R9, R11	2	2.2M OHM 5% resistors (0805)	-
R13, R14, R17	3	100K OHM 1% resistors (0805)	-
R15	1	4.7K OHM 1% resistors (0805)	-
R16	1	50K OHM Trimmer Potentiometers	BOURNS 3296W-1-503LF
TP1	1	White Test Point	KEYSTONE 5002
TP2, TP4, TP5, TP7	4	Black Test Point	KEYSTONE 5001
TP3, TP6, TP8	3	Red Test Point	KEYSTONE 5000
TP9	1	Purple Test Point	KEYSTONE 5119
TP10	1	Green Test Point	KEYSTONE 5116
TP11	1	Grey Test Point	KEYSTONE 5118
U1	1	1A Adjustable Overcurrent and Overvoltage Protector with High Accuracy (16 Pin TQFN 3mm X 3mm)	MAX17523ATE+
C8	0	Not Installed; 330µF 20% 50V Aluminium Electrolytic Capacitor (10mm)	PANASONIC EEU-EB1H331
R10, R12	0	Not Installed; 1% resistors (0805)	-
PCB	1	PCB: MAX17523 Evaluation Kit	-

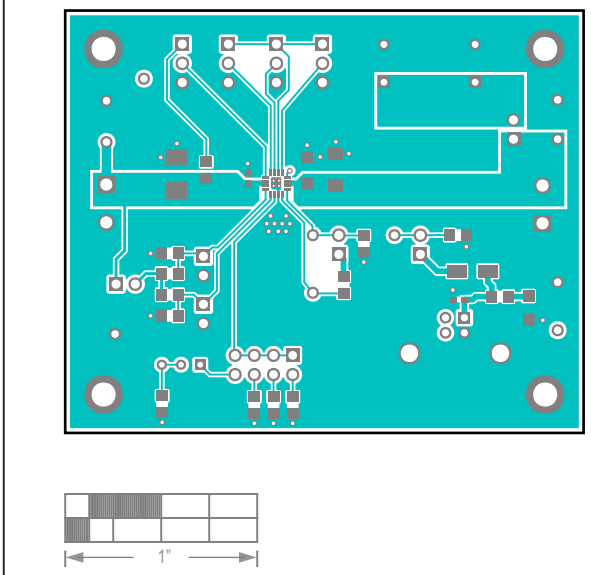
MAX17523 EV Kit Schematics



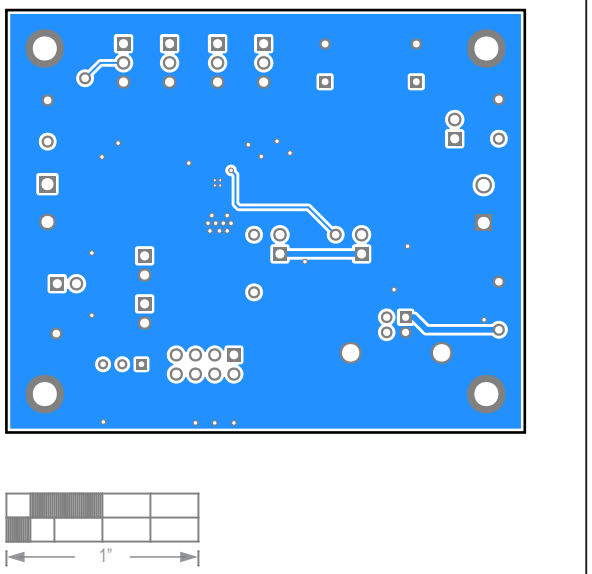
MAX17523 EV Kit PCB Layout



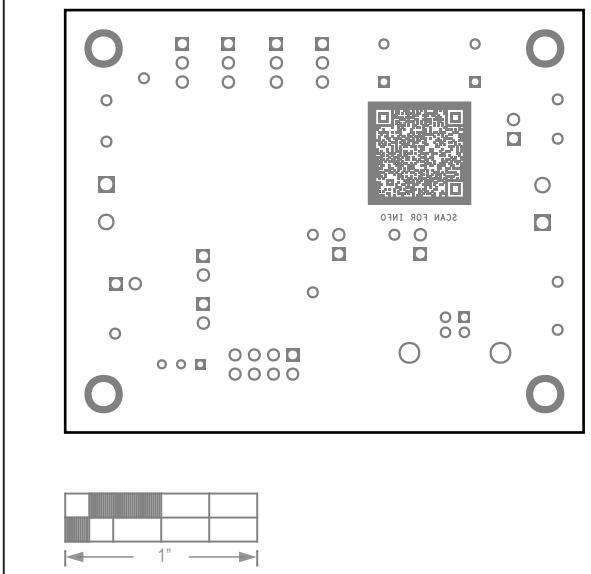
MAX17523 EV Kit—Silkscreen Top



MAX17523 EV Kit—Top Layer



MAX17523 EV Kit—Bottom Layer



MAX17523 EV Kit—Silkscreen Bottom

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	12/16	Initial release	—
1	4/20	Replaced the *Bill of Materials*, *Schematic*, and *PCB Layout*	5–8

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