

Flat-Clamp Mini TVS for High Voltage Surge & ESD Protection

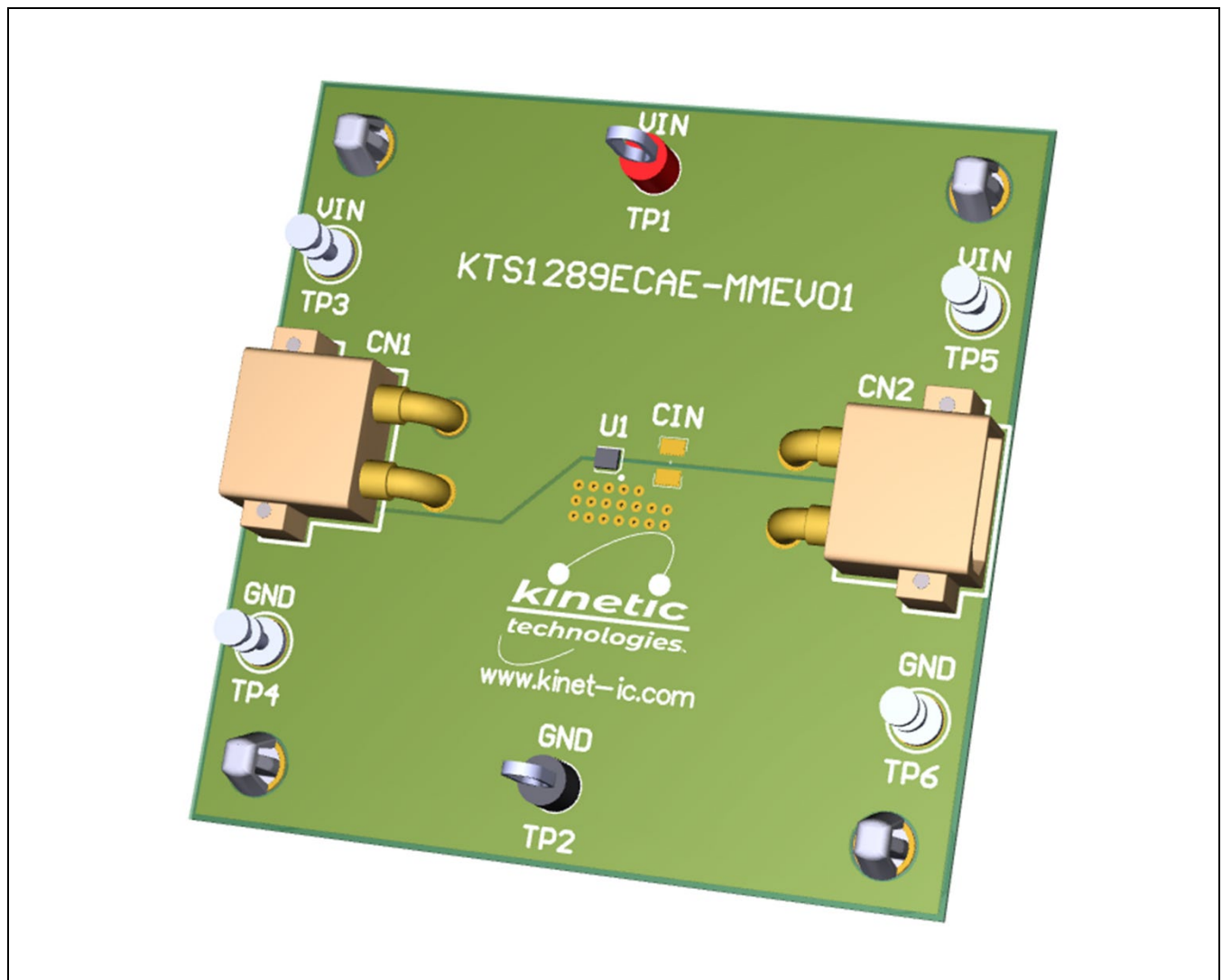
Brief Description

The KTS1289 Evaluation (EVAL) Kit is used to demonstrate and evaluate the KTS1289 functionality, performance, and PCB layout. The kit includes a fully assembled and tested PCB with the KTS1289 IC installed, two pairs of high-current XT30-to-Banana power cables, and a printed copy of the Quick Start Guide.

Ordering Information

Part Number	Description	IC Package
KTS1289ECAE-MMEV01	KTS1289 EVAL Kit	WLCSP-6

3D CAD Image



EVAL Kit Physical Contents

Item #	Description	Quantity
1	KTS1289 EVAL fully assembled PCB	1
2	XT30-to-Banana power cables, red/black pair	2 pairs
3	Anti-static bag	1
4	Quick Start Guide, printed 1 page (A4 or US Letter)	1
5	EVAL Kit box	1

QR Links for Documents

IC Landing Page	EVAL Kit Landing Page
 https://www.kinet-ic.com/kts1289/	 https://www.kinet-ic.com/kts1289ecae-mmeev01/

User-Supplied Equipment

Required Equipment

- Digital Multimeter - one or more, used to measure IN – GND Diode.
- Surge Tester - Test the TVS surge capability

Optional Equipment

- Oscilloscope – for dynamic testing of clamping voltages (and surge currents with a current probe, if available).

Recommended Operating Conditions

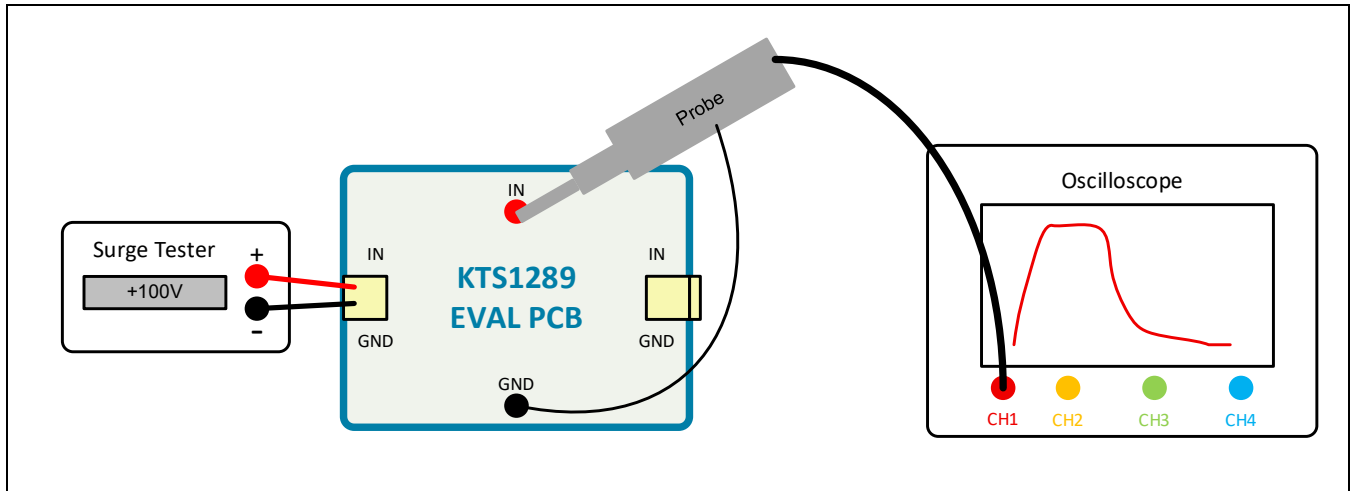
Symbol	Description	Value	Units
V _{IN}	Nominal Input Voltage Range	0 to 33	V
V _{BR}	Reverse Breakdown Voltage (I _{IN} = 1mA)	33.6 to 37.5	V
V _F	Forward Voltage (I _{IN} = -1mA)	-0.8 to -0.4	A

Quick Start Procedures

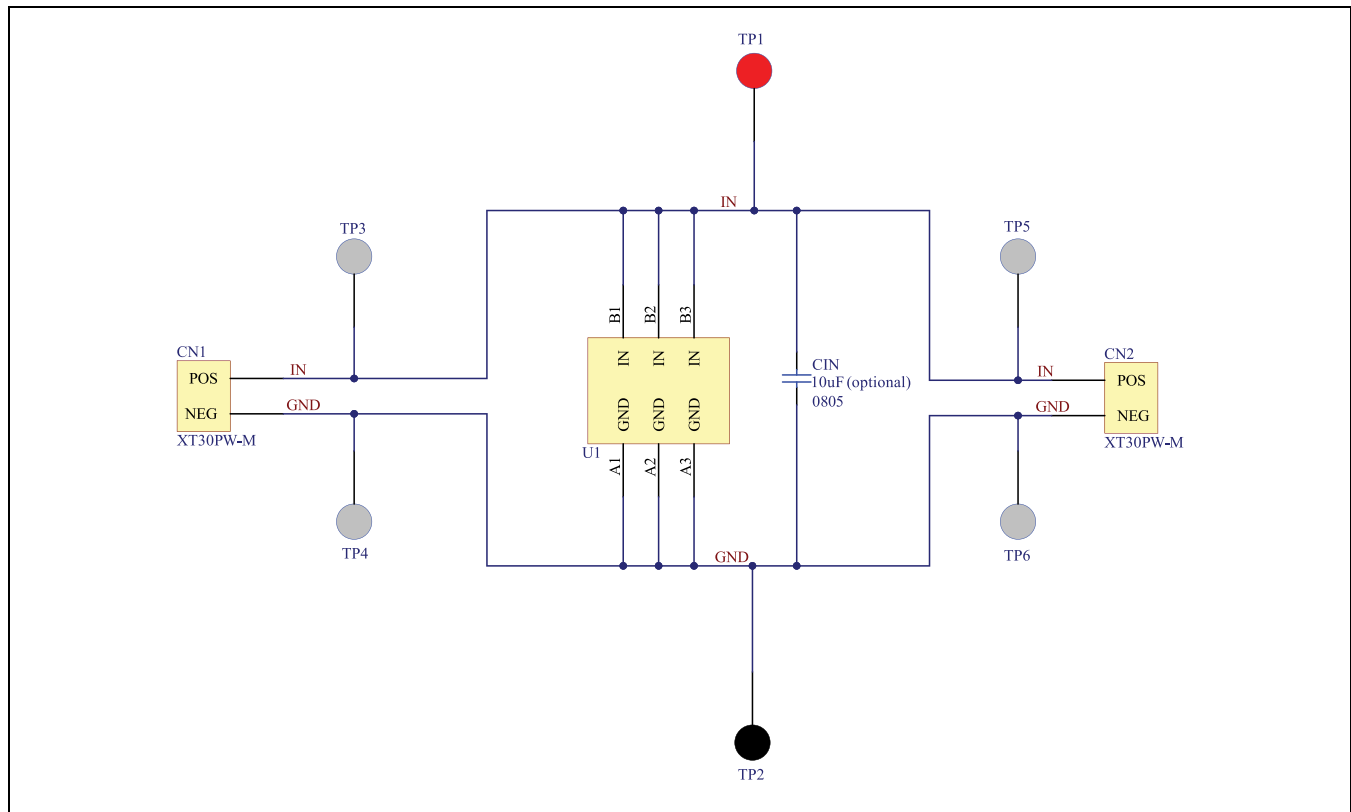
- Use a digital multimeter to check the TVS diode value. it should be close to 0.7V.
- Use the oscilloscope to capture the surge clamping voltage waveform during surge event.

Typical Test Setup Diagram

As an example, use the following test setup to test KTS1289 surge capability.



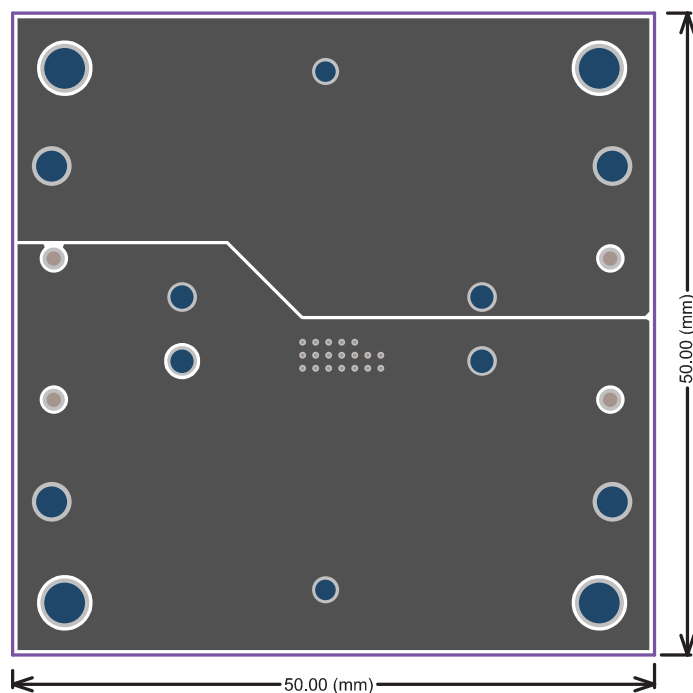
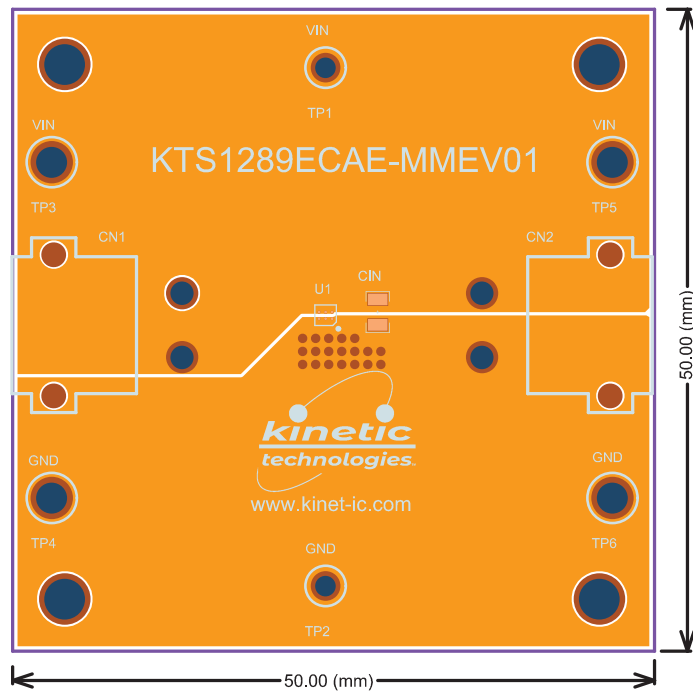
Electrical Schematic



Bill of Materials (BOM)

Designator	Description	Quantity	Value	Manufacturer	Manufacturer Part Number
CIN	CAP CER 10 μ F 50V X5R 0805 (Optional)	1	10 μ F (optional)	Samsung	CL21A106KBYQNNE
CN1, CN2	30A Right Angle Through Hole Power Connectors	2		AMASS	XT30PW-M
H1, H2, H3, H4	BRD SPT SNAP LOCK REST MNT 4MM	4		Essentra Components	PSD-4M-19
U1	Flat-Clamp Mini TVS for High Voltage Surge & ESD Protection	1		Kinetic Technologies	KTS1289ECAE-TA
TP1	PC TEST POINT MULTIPURPOSE RED	1		Keystone	5010
TP2	PC TEST POINT MULTIPURPOSE BLACK	1		Keystone	5011
TP3, TP4, TP5, TP6	TERM TURRET SINGLE L=5.56MM TIN	4		Keystone	1502-2

Printed Circuit Board (PCB)



Adding Additional Input Capacitance

Optional Input Capacitance C_{IN}

The KTS1289 works equally well with or without an input capacitor. However, in most cases, input capacitors are required to support other circuits within the application. The recommended voltage rating of the capacitor depends upon the clamping voltage of the TVS version during a surge event. For maximum surge protection, a 50V rated capacitor or higher is recommended. USB standards limit the total capacitance from VBUS to GND to 10 μ F maximum. Various ICs in the host system may require local bypass capacitance; therefore, the total remaining capacitance available for use at the port may be reduced. If the total system capacitance on VBUS is not easily limited to 10 μ F or less, use a USB protection load-switch with soft-start, such as available from Kinetic Technologies, to isolate large capacitance from the port. These are available with or without integrated TVS, but the integrated solution guarantees that the TVS and load-switch are designed and specified to work together.

Evaluating Other ICs

This EVAL Kit may optionally be used to evaluate the similar KTS1287 series TVS for high voltage surge & ESD protection. Before ordering samples of these devices, please confirm capability to reflow and exchange WLCSP devices.

Troubleshooting

Symptom	Root Cause	Solution
IN pin short to GND	The TVS is damaged or connected in reverse	Replace TVS or check the connect cable

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