

2A Slew Rate Controlled Load Switch with Reverse Blocking

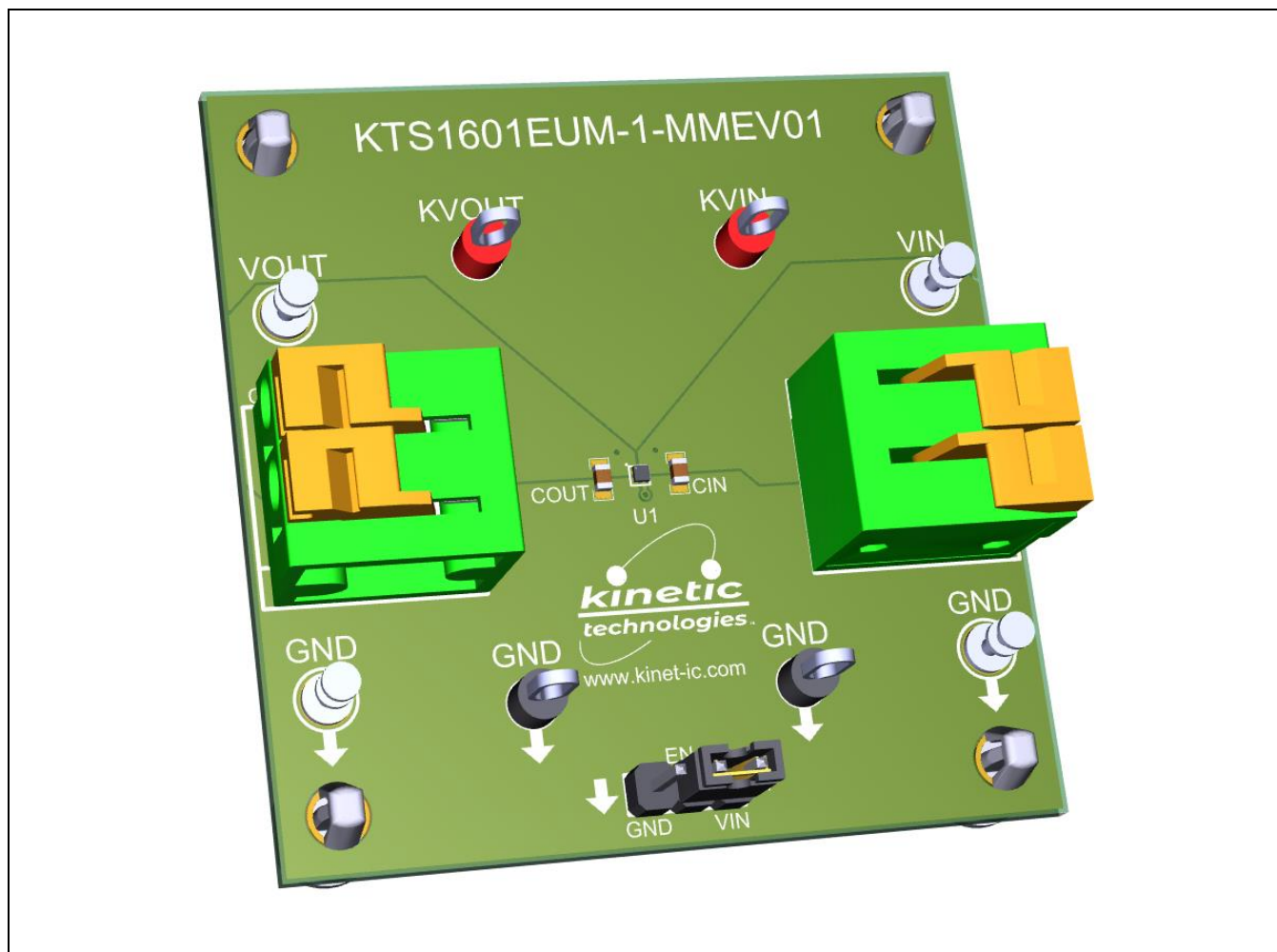
Brief Description

The KTS1601 Evaluation (EVAL) Kit is used to demonstrate and evaluate the KTS1601 functionality, performance, and PCB layout. The kit includes a fully assembled and tested PCB with the KTS1601 IC installed, and a printed copy of the Quick Start Guide (also contained within this document).

Ordering Information

| Part Number | Description | IC Package |
|---------------------|------------------|------------|
| KTS1601EUM-1-MMEV01 | KTS1601 EVAL Kit | WLCSP-4 |

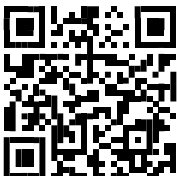

3D CAD Image



EVAL Kit Physical Contents

| Item # | Description | Quantity |
|--------|--|----------|
| 1 | KTS1601 EVAL Kit fully assembled PCB | 1 |
| 2 | Anti-static bag | 1 |
| 3 | KTS1601 EVAL Kit Quick Start Guide -- printed 1-page (A4 or US Letter) | 1 |
| 4 | EVAL Kit box | 1 |

QR Links for Documents

| IC Datasheet | EVAL Kit Landing Page |
|--|--|
|  https://www.kinet-ic.com/KTS1601/ |  https://www.kinet-ic.com/kts1601eaum-mmev01/ |

User-Supplied Equipment

Required Equipment

1. Bench Power Supply for VIN – 5V and 0.5A/2A, as needed for the intended application.
2. Digital Multimeter – one or more, used to measure input/output voltages and currents.

Optional Equipment

1. Oscilloscope – for dynamic testing of voltages (and currents with a current probe, if available).
2. Load – either an eLoad, power resistors, or an actual system load.
3. Additional Digital Multimeters

Recommended Operating Conditions

| Symbol | Description | Value | Units |
|-------------|--|--------------|-------|
| IN, OUT, EN | Input voltage, Enable Input Voltage, Output Voltage to GND | -0.3 to +6.0 | V |
| ISW | Maximum Continuous Switch Current (I_{MAX}) | 2.0 | A |

Jumper Descriptions

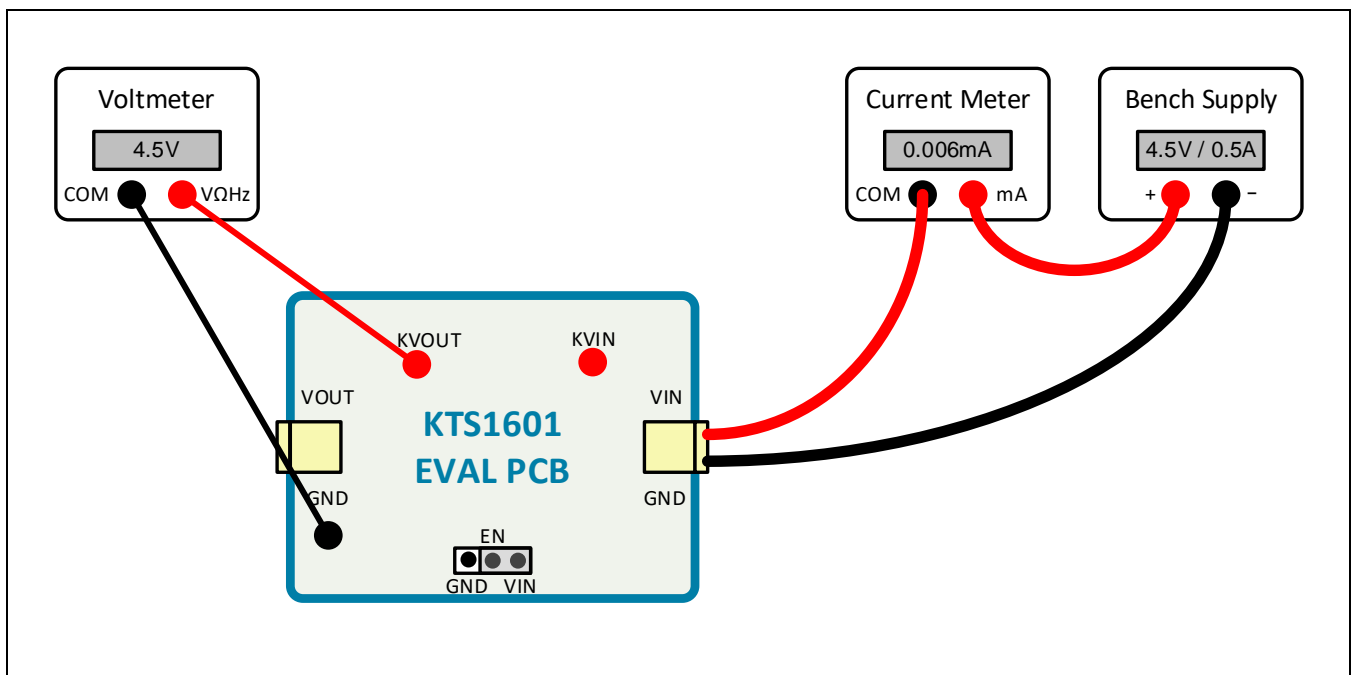
| Designator | Name | Description | Default |
|------------|------|--|---------|
| P1 | EN | Active-High Enable Input GND: Shutdown Mode – switch disabled VIN: Enable Mode – normal switch operation | VIN |

Quick Start Procedures

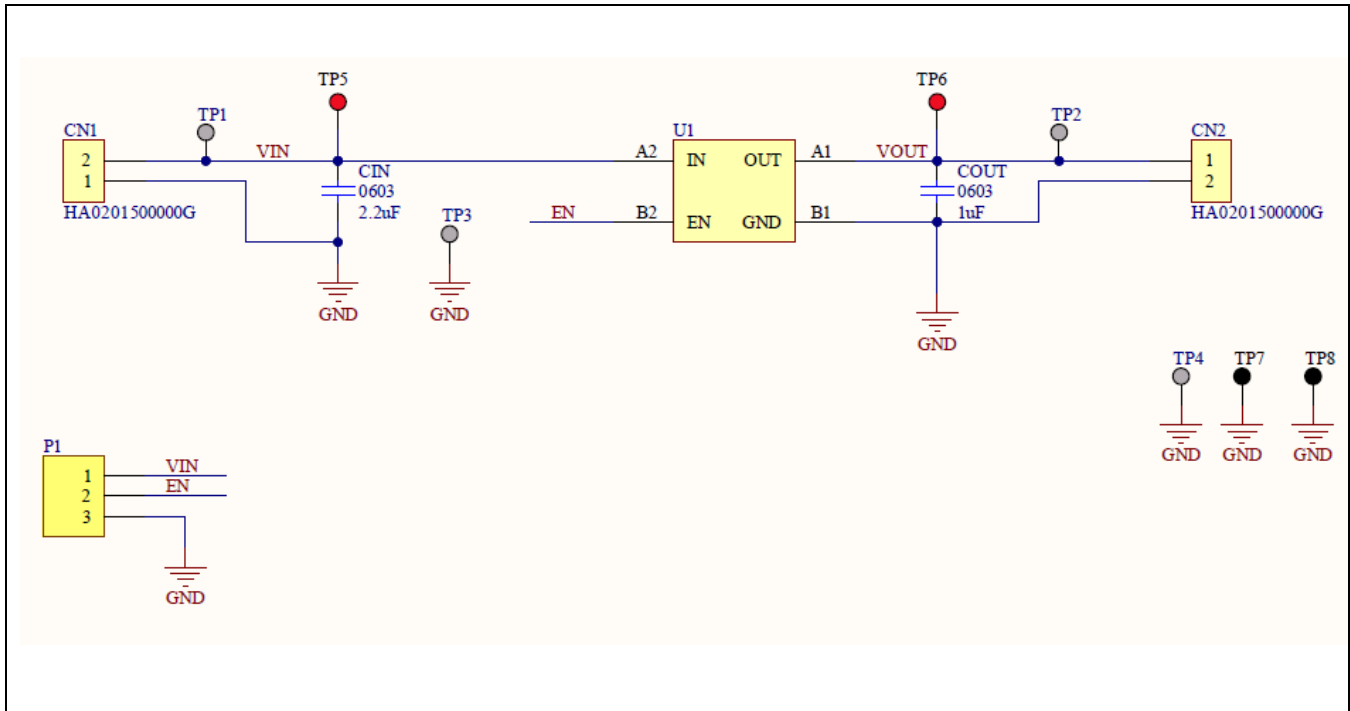
1. Set Jumper to default: EN = VIN (High)
2. Connect one pair of Banana-to-clip power cables to the test points at VIN and GND (right edge of EVAL Kit).
3. Before connecting the EVAL Kit to the VIN bench supply, turn on the supply and adjust the voltage as close to 0V as possible. Then turn off the supply. While off, connect the banana ends of the Banana-to-clip power cables to the VIN bench supply.
4. Turn on the VIN bench supply and very slowly ramp its voltage to an appropriate voltage of 4.5V. While ramping VIN slowly, use the bench supply's output current indication (or a digital multimeter) to monitor the VIN current. If the current becomes high, reduce the VIN voltage quickly to prevent damage. Then inspect the setup for any wiring errors.
5. With valid VIN voltage, use a digital multimeter to check the output voltage between the KVOUT and GND terminals on the EVAL Kit. It should be nearly the same as the input voltage.
6. Use a digital multimeter to check the no-load supply current at VIN. Consult the KTS1601 datasheet for the expected current range at the VIN voltage condition in use. For conditions of VIN = 4.5V, EN = VIN, and no-load, it should be close to 6 μ A.

Typical Test Setup Diagram

As an example, use the following test setup to measure items 5 and 6 in the Quick Start Procedures.



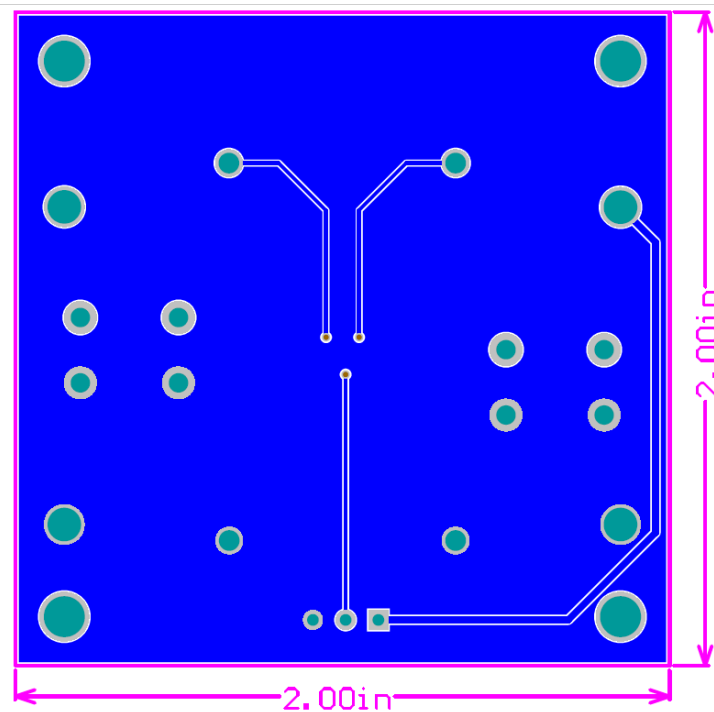
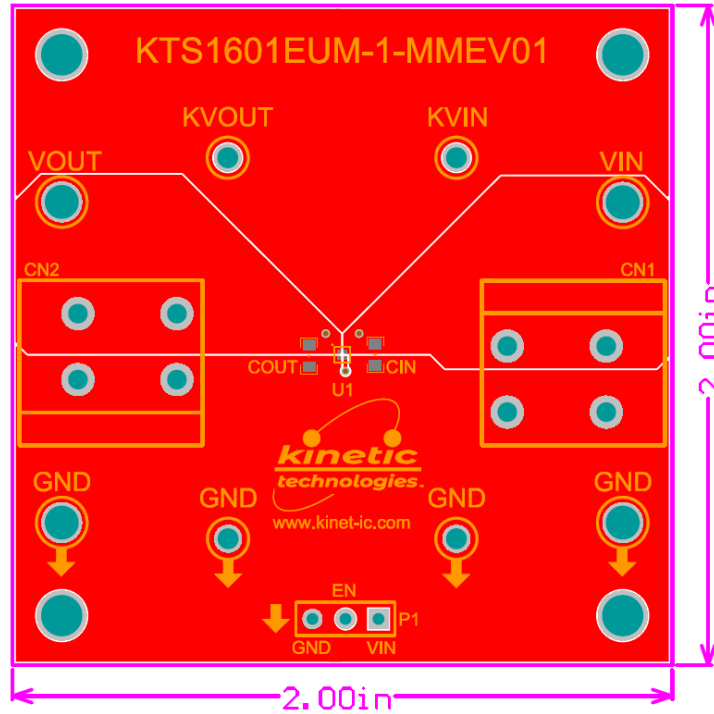
Electrical Schematic



Bill of Materials (BOM)

| Quantity | Designator | Description | Value | Package | Manufacturer | Manufacturer Part Number | Digikey Part Number | Mouser Part Number |
|----------|--------------------|---|-------|--------------|----------------------|--------------------------|---------------------|----------------------|
| 1 | CIN | CAP CER 2.2uF 10V X7R 0603 | 2.2uF | 0603 | Murata | GRM188R71A225KE15D | 490-4520-1-ND | 81-GRM188R71A225KE15 |
| 2 | CN1, CN2 | TERM BLK 2P SIDE ENT 5.08MM PCB | | | Amphenol Anytek | HA0201500000G | 609-4543-ND | 649-2020303H021B01LF |
| 1 | COUT | CAP CER 1uF 16V X5R 0603 | 1uF | 0603 | Murata | GRM188R61C105KA12D | 490-10479-1-ND | 81-GRM188R61C105KA2D |
| 1 | P1 | Header with jumper connects pin 1 to pin 2 | | TH | Sullins | PREC003SAAN-RC | S1012EC-03-ND | |
| 4 | TP1, TP2, TP3, TP4 | TERM TURRET SINGLE L=5.56MM TIN | | 1POS | Keystone | 1502-2 | 36-1502-2-ND | 534-1502-2 |
| 2 | TP5, TP6 | PC TEST POINT MULTIPURPOSE RED | | Through Hole | Keystone | 5010 | 36-5010-ND | 534-5010 |
| 2 | TP7, TP8 | PC TEST POINT MULTIPURPOSE BLACK | | | Keystone | 5011 | 36-5011-ND | 534-5011 |
| 1 | U1 | 2.0A Slew Rate Controlled Load Switch with Reverse Blocking | | WLCSP-4 | Kinetic Technologies | KTS1601EUM-1-TR | | |

Printed Circuit Board (PCB)



Additional Test Procedures

1. Testing with load and measure the KTS1601 load switch on-resistance $R_{DS(ON)}$
 - a. Use power cable pair to apply loads, for example 10Ω, from VOUT to GND.
 - b. Use multimeters and an oscilloscope to make DC and transient measurements as desired.
 - c. Measure the output current between the VOUT terminal and the resistive load.
 - d. Measure the voltage between the test points KVIN and KVOU (VIN/VOUT Kelvin connections).
 - e. The switch resistance can be calculated with the formula: $R_{DS(ON)} = (VKVIN - VKVOU) / \text{output current}$.

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