

AN-1757 LP38693SD-ADJ Evaluation Board

1 Introduction

The LP38693SD-ADJ is a 500mA low-dropout linear regulator whose output voltage can be externally set to any value between 1.25V and 9V using two resistors. The output voltage on this evaluation board is pre-set to 3.30V. This application note gives information about the evaluation board supplied to demonstrate the function of this part.

2 Basic Application Circuit

The basic application circuit shown below provides the component designators used on the evaluation board.

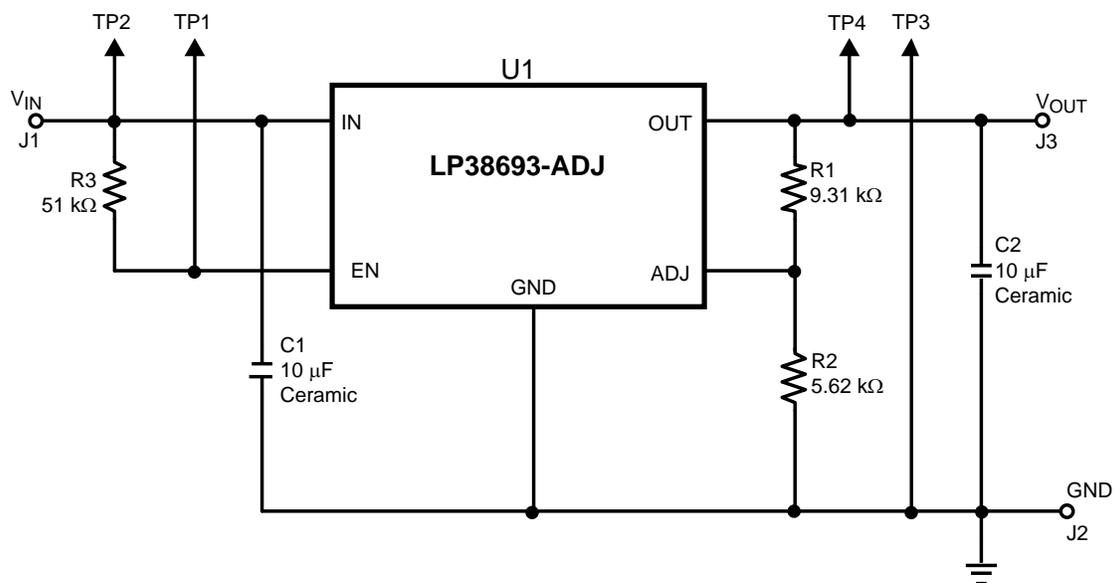


Figure 1. Evaluation Board Basic Application Circuit

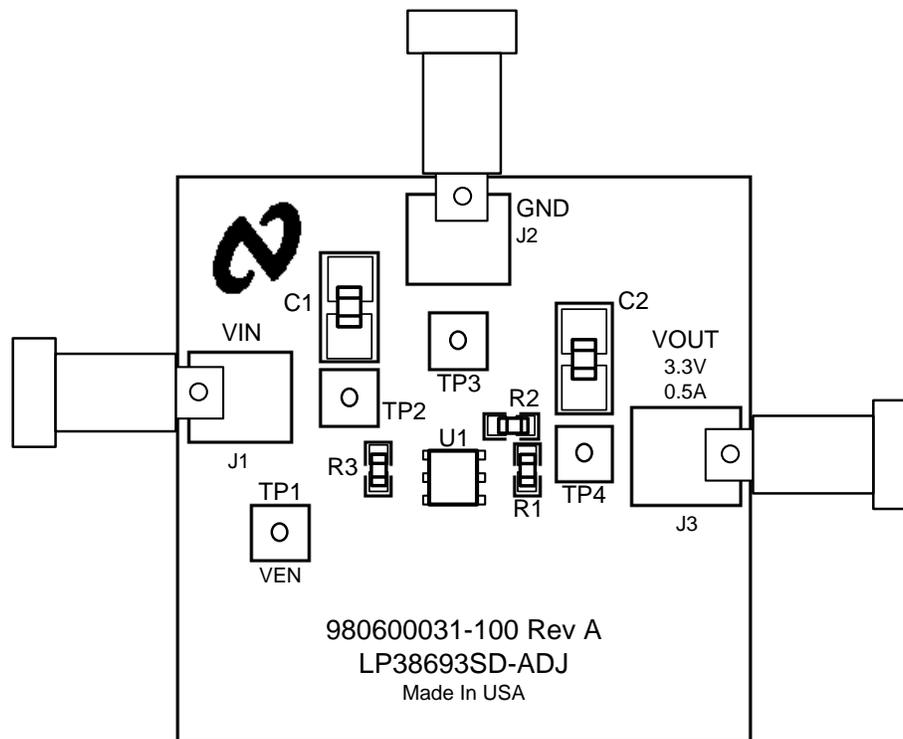


Figure 2. Evaluation Board Component Layout (Top View)

3 Setting the Output Voltage

The output voltage is set using the two external resistors R1 and R2:

$$V_{OUT} = V_{ADJ} \times (1 + (R1/R2)) \quad (1)$$

It can be assumed that $V_{ADJ} = 1.25V$.

The value of R2 is required to be no more than 12 k Ω to ensure that the minimum output load of 100 μA is established. On the LP38693SD-ADJ evaluation board, R2 is 5.62 k Ω and R1 is 9.31 k Ω .

$$V_{OUT} = 1.25V \times (1 + (9310\Omega/5620\Omega)) \quad (2)$$

$$V_{OUT} = 1.25V \times (2.656) = 3.3V \quad (3)$$

4 Component List

The following table shows the component list. Higher voltage rated capacitors may be substituted, but only X5R or X7R dielectric types may be used.

Table 1. Component List

ID	Description	Mfgr Part Number
PCB	PC Board	551600031-001
U1	Low DropOut Voltage Regulator	Texas Instruments LP38693
TP1, TP2, TP3, TP4	Turret Terminal Mounting Hole Dia :0.072in	KEystone 1573-2 NEWARK 97H6311
J1	Banana jack, V _{IN} - RED	Emerson Network Power 108-0902-001 Digi-Key J151-ND
J2	Banana jack, GND - BLACK	Emerson Network Power 108-0903-001 Digi-Key J152-ND
J3	Banana jack, V _{OUT} - BLUE	Emerson Network Power 108-0910-001 Digi-Key J155-ND
R1	Resistor, 0805, 9.31 k Ω , \pm 1%	Yageo 9C08052A9311FKHFT Digi-Key 311-9.31KCCT-ND
R2	Resistor, 0805, 5.62 k Ω , \pm 1%	Yageo 9C08052A5621FKHFT Digi-Key 311-5.62KCCT-ND
R3	Resistor, 0805, 51 k Ω , \pm 5%	Yageo 9C08052A5102JLHFT Digi-Key 311-51KACT-ND
C1, C2	Capacitor, Ceramic, 1210, 10 uF, 10V, X7R	Taiyo-Yuden #LMK325BJ106MN Digi-Key 587-1469-1-ND

IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, enhancements, improvements and other changes to its semiconductor products and services per JESD46, latest issue, and to discontinue any product or service per JESD48, latest issue. Buyers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All semiconductor products (also referred to herein as "components") are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its components to the specifications applicable at the time of sale, in accordance with the warranty in TI's terms and conditions of sale of semiconductor products. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by applicable law, testing of all parameters of each component is not necessarily performed.

TI assumes no liability for applications assistance or the design of Buyers' products. Buyers are responsible for their products and applications using TI components. To minimize the risks associated with Buyers' products and applications, Buyers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right relating to any combination, machine, or process in which TI components or services are used. Information published by TI regarding third-party products or services does not constitute a license to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of significant portions of TI information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Resale of TI components or services with statements different from or beyond the parameters stated by TI for that component or service voids all express and any implied warranties for the associated TI component or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

Buyer acknowledges and agrees that it is solely responsible for compliance with all legal, regulatory and safety-related requirements concerning its products, and any use of TI components in its applications, notwithstanding any applications-related information or support that may be provided by TI. Buyer represents and agrees that it has all the necessary expertise to create and implement safeguards which anticipate dangerous consequences of failures, monitor failures and their consequences, lessen the likelihood of failures that might cause harm and take appropriate remedial actions. Buyer will fully indemnify TI and its representatives against any damages arising out of the use of any TI components in safety-critical applications.

In some cases, TI components may be promoted specifically to facilitate safety-related applications. With such components, TI's goal is to help enable customers to design and create their own end-product solutions that meet applicable functional safety standards and requirements. Nonetheless, such components are subject to these terms.

No TI components are authorized for use in FDA Class III (or similar life-critical medical equipment) unless authorized officers of the parties have executed a special agreement specifically governing such use.

Only those TI components which TI has specifically designated as military grade or "enhanced plastic" are designed and intended for use in military/aerospace applications or environments. Buyer acknowledges and agrees that any military or aerospace use of TI components which have **not** been so designated is solely at the Buyer's risk, and that Buyer is solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI has specifically designated certain components as meeting ISO/TS16949 requirements, mainly for automotive use. In any case of use of non-designated products, TI will not be responsible for any failure to meet ISO/TS16949.

Products

Audio	www.ti.com/audio
Amplifiers	amplifier.ti.com
Data Converters	dataconverter.ti.com
DLP® Products	www.dlp.com
DSP	dsp.ti.com
Clocks and Timers	www.ti.com/clocks
Interface	interface.ti.com
Logic	logic.ti.com
Power Mgmt	power.ti.com
Microcontrollers	microcontroller.ti.com
RFID	www.ti-rfid.com
OMAP Applications Processors	www.ti.com/omap
Wireless Connectivity	www.ti.com/wirelessconnectivity

Applications

Automotive and Transportation	www.ti.com/automotive
Communications and Telecom	www.ti.com/communications
Computers and Peripherals	www.ti.com/computers
Consumer Electronics	www.ti.com/consumer-apps
Energy and Lighting	www.ti.com/energy
Industrial	www.ti.com/industrial
Medical	www.ti.com/medical
Security	www.ti.com/security
Space, Avionics and Defense	www.ti.com/space-avionics-defense
Video and Imaging	www.ti.com/video

TI E2E Community

e2e.ti.com