TPS717xxEVM-134

This user's guide describes the characteristics, operation, and use of the TPS71728EVM-134 evaluation module (EVM). The Texas Instruments TPS71728 low quiescent current, wide bandwidth, low dropout linear regulator is capable of supplying up to 150 mA of output current. This user's guide includes setup instructions, a schematic diagram, a bill of materials (BOM), and PCB layout drawings for the evaluation module.

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1 Introduction

The Texas Instruments TPS71728EVM-134 evaluation module (EVM) helps designers evaluate the operation and performance of the TPS717xx family of linear regulators. These are low quiescent current, wide bandwidth, low dropout linear regulators in a SC70 package.

This EVM demonstrates the TPS71728, which is a 2.8-V fixed version of the TPS717xx family. Other fixed output voltage versions of the device can be evaluated by replacing the TPS71728 with the appropriate part from the TPS717xx family. If an adjustable version is desired, the TPS71728 can be replaced with the TPS71701 and two feedback resistors. See the TPS717xx data sheet (SBVS068) for the various fixed output voltage options available as well as for more information on adjusting the output voltage.

2 Setup

This section describes the jumpers and connectors on the EVM as well as how to properly connect, set up, and use the TPS717xxEVM-134.

2.1 Input/Output Connector Descriptions

2.1.1 J1 –VIN

This is the positive input connection to the linear regulator. The leads to the input supply should be twisted and kept as short as possible to minimize EMI transmission.

2.1.2 J2 – GND

This is the input return connection for the input power supply.

2.1.3 J3 – VOUT

This is the positive connection from the output of the linear regulator. Connect this pin to the positive input of the load.

2.1.4 J4– GND

This is the return connection from the output of the linear regulator. Connect this pin to the negative input of the load.

2.1.5 JP1– EN

This jumper enables or disables the linear regulator. Connect the shorting jumper from the center EN pin to either the ON or OFF position. This pin should never be left floating.

2.2 Setup

The TPS717XXEVM-134 features the SC70 package. The thermal performance of this package style and ambient temperature may limit the power dissipation, computed as Pd=(Vin-Vout) × Iout. Because the EVM's regulator output voltage, Vout, is fixed at 2.8 V, the regulator's input voltage, output current, and ambient temperature are the only variables that can be adjusted to manage power dissipation.

Table 1 shows the maximum input voltage at room temperature and full-rated load current of 150 mA. Above this voltage, the output current must be reduced to keep the power dissipation of the package below the maximums stated in the data sheet. Changes in output voltage or ambient temperature affect these values. Table 1 also shows the minimum input voltage required to produce an output for the linear regulator. The minimum input voltage is the output voltage plus the necessary dropout voltage at 150-mA output current.

Table 1. Minimum and Maximum Input Voltage

Linear Regulator #	Output Voltage	Minimum Input Voltage	Maximum Input Voltage Before Current Derate (T = 25°C, Io = 150 mA)
1	2.8	3.1	6.5

When using fixed versions of the TPS717xx family, it is important that C4 is installed as a 0.01-µF ceramic, noise-reduction capacitor and that R1 is left open. When using the adjustable version, the C4 noise-reduction capacitor should be removed, and R1 and C4 should be populated with the appropriate feedback resistors as outlined in the TPS717xx data sheet (SBVS068).

2.3 Operation

JP1 is the enable for the linear regulator and must be configured for proper operation. Use a shorting block to set JP1 to the desired configuration.

3 Board Layout

This section provides the TPS717xxEVM-134 board layout and illustrations.

3.1 Layout

Figure 1, Figure 2, and Figure 3 show the board layout for the TPS717xxEVM-134 printed-wiring board.

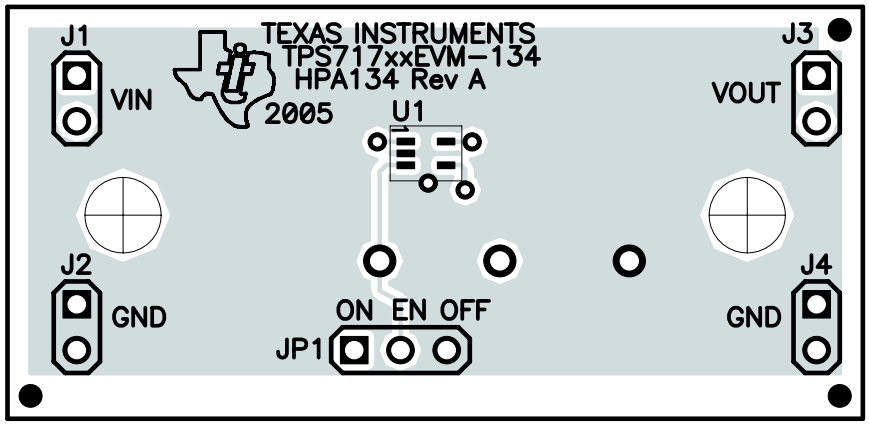

Figure 1. Assembly Layer

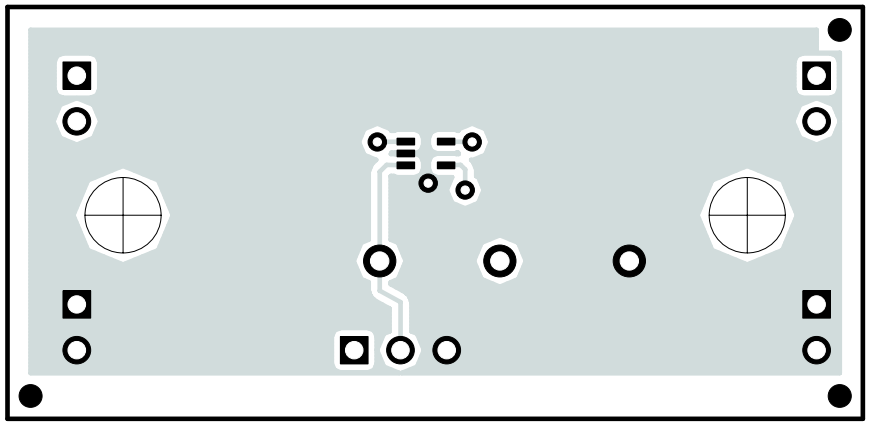

Figure 2. Top Layer Routing

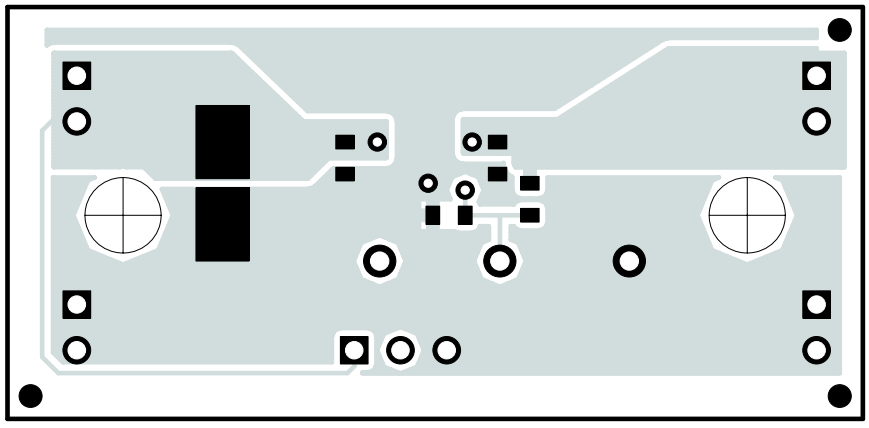

Figure 3. Bottom Layer Routing

4 Schematic and Bill of Materials

This section provides the TPS717xxEVM-134 schematic and bill of materials.

4.1 Schematic

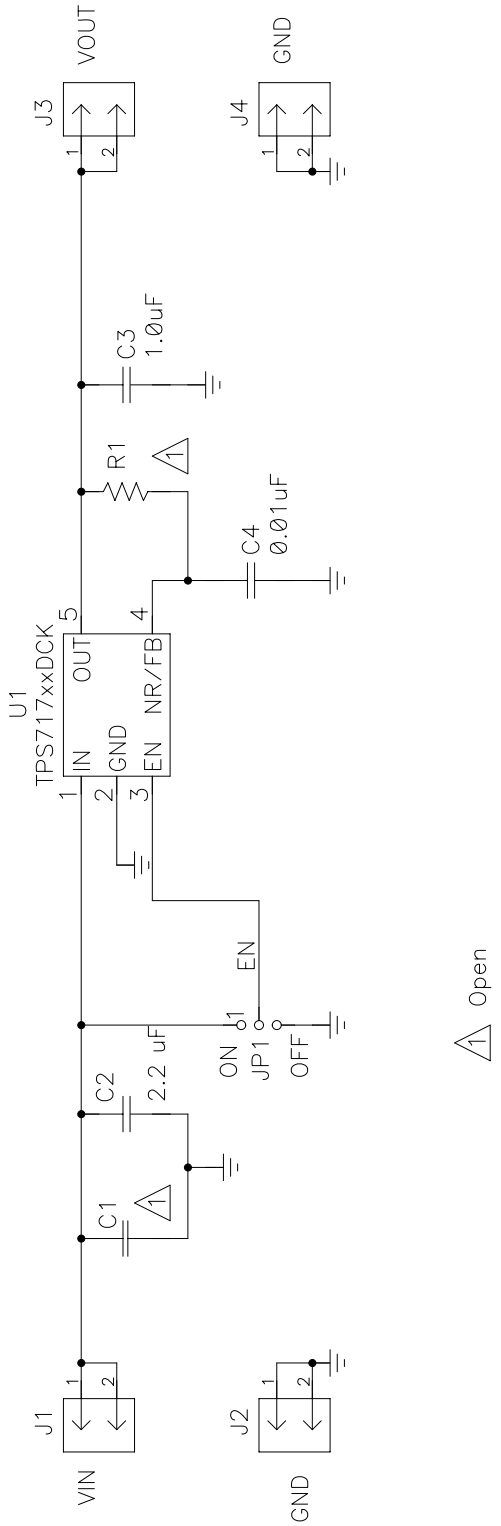

Figure 4. TPS717xxEVM-134 Schematic

4.2 Bill of Materials

Table 2. TPS717xxEVM-134 Bill of Materials

Count	Ref Des	Value	Description	Size	Part Number	MFR
0	C1	Open	Capacitor, Multipattern, 603D case	7343 (D)		
1	C2	2.2 µF	Capacitor, Ceramic, 16V, X5R, 10%	0603	C1608X5R1C225K	TDK
1	C3	1.0 µF	Capacitor, Ceramic, 25V, X5R, 10%	0603	C1608X5R1E105K	TDK
1	C4	0.01 µF	Capacitor, Ceramic, 50V, X7R, 10%	0603	C1608X7R1H103K	TDK
4	J1–J4		Header, 2-pin, 100 mil spacing, (36-pin strip)	0.100 × 2	PTC36SAAN	
1	JP1		Header, 3-pin, 100 mil spacing, (36-pin strip)	0.100 × 3	PTC36SAAN	
0	R1		Open Resistor, Chip, 1/16W	0603	Std	Std
1	U1		IC, 150 mA, Low Iq, Wide Bandwidth, LDO Linear Regulators	SC70	TPS71728DCK	TI
1	—		PCB, 1.85 In × 0.9 In × 0.062 In		HPA134	Any
1	—		Shunt, 100-mil, Black	0.100	929950-00	3M

5 Related Documentation From Texas Instruments

TPS717xx data sheet (SBVS068)

FCC Warnings

This equipment is intended for use in a laboratory test environment only. It generates, uses, and can radiate radio frequency energy and has not been tested for compliance with the limits of computing devices pursuant to subpart J of part 15 of FCC rules, which are designed to provide reasonable protection against radio frequency interference. Operation of this equipment in other environments may cause interference with radio communications, in which case the user at his own expense will be required to take whatever measures may be required to correct this interference.

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User agrees to read the EVM User’s Guide and, specifically, the EVM warnings and Restrictions notice in the EVM User’s Guide prior to handling the EVM and the product. This notice contains important safety information about temperatures and voltages.

It is user’s responsibility to ensure that persons handling the EVM and the product have electronics training and observe good laboratory practice standards.

By providing user with this EVM, product and services, TI is NOT granting user any license in any patent or other intellectual property right.

EVM WARNINGS AND RESTRICTIONS

It is important to operate this EVM within the input voltage range of 3.1 V to 6.5 V.

Exceeding the specified input range may cause unexpected operation and/or irreversible damage to the EVM. If there are questions concerning the input range, please contact a TI field representative prior to connecting the input power.

Applying loads outside of the specified output range may result in unintended operation and/or possible permanent damage to the EVM. Please consult the EVM User's Guide prior to connecting any load to the EVM output. If there is uncertainty as to the load specification, please contact a TI field representative.

EVM WARNINGS AND RESTRICTIONS (continued)

During normal operation, some circuit components may have case temperatures greater than 125°C. The EVM is designed to operate properly with certain components above 125°C as long as the input and output ranges are maintained. These components include but are not limited to linear regulators, switching transistors, pass transistors, and current sense resistors. These types of devices can be identified using the EVM schematic located in the EVM User's Guide. When placing measurement probes near these devices during operation, please be aware that these devices may be very warm to the touch.

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