



LOW-VOLTAGE DIFFERENTIAL SCSI (LVD) 27-LINE REGULATOR SET

FEATURES

- SCSI SPI-2, SPI-3 and SPI-4 LVD SCSI 27-Line, Low-Voltage Differential Regulator
- 2.7-V to 5.25-V Operation
- Integrated Regulator Set for LVD SCSI
- Differential Failsafe Bias

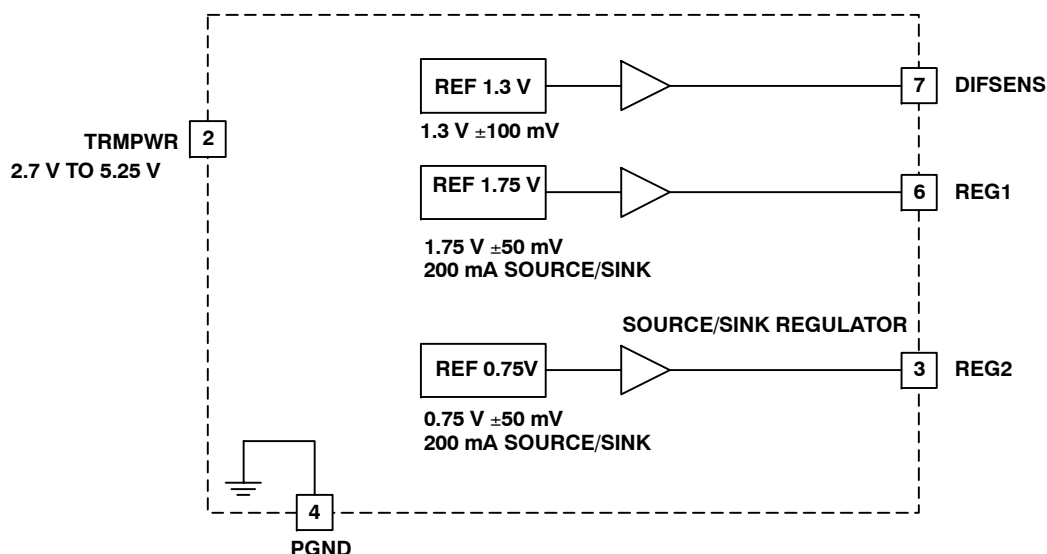
APPLICATIONS

- Servers
- Workstations
- RAID Boxes

DESCRIPTION

The UCC561 low-voltage differential (LVD) regulator set is designed to provide the correct reference voltages and bias currents for LVD termination resistor networks (475 Ω , 121 Ω , and 475 Ω). The device also provides a 1.3-V output for "diff sense" signaling. With the proper resistor network, the UCC561 solution meets the common mode bias impedance, differential bias, and termination impedance requirements of SPI-2 (Ultra2), SPI-3 (Ultra3/Ultra160) and SPI-4 (Ultra320). The UCC561 is not intended for SPI-5 applications.

This device incorporates into a single monolith, two sink/source reference voltage regulators, a 1.3-V buffered output and protection features. The protection features include thermal shutdown and active current-limiting circuitry. The UCC561 is offered in 16-pin SOIC (DP) package.



UDG-98093



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.



This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

ORDERING INFORMATION

PRODUCT	PACKAGE-LEAD	PACKAGE DESIGNATOR	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	TRANSPORT MEDIA, QUANTITY
UCC561	SOIC-16	DP	0°C to 70°C	UCC561DP	Rail, 70

(1) For the most current specification and package information, refer to our web site at www.ti.com.

ABSOLUTE MAXIMUM RATINGS

over operating free-air temperature range unless otherwise noted⁽¹⁾⁽²⁾

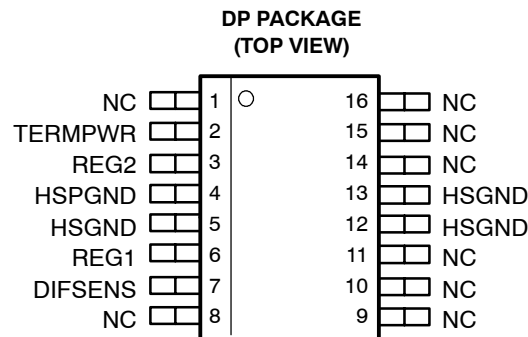
	UCC561	UNIT
TERMPWR	6	V
Package dissipation	1.2	W
Junction temperature, T_J	-55 to 150	°C
Storage temperature, T_{stg}	-65 to 150	°C

(1) Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

(2) Currents are positive into and negative out of the specified terminals.

RECOMMENDED OPERATING CONDITIONS

	MIN	NOM	MAX	UNIT
$V_{TERMPWR}$, TermPower voltage	2.70		5.25	V



NC = No connection

ELECTRICAL CHARACTERISTICS

 $T_J = 0^{\circ}\text{C}$ to 70°C , $V_{\text{TEMPWR}} = 3.3\text{ V}$ unless otherwise noted⁽¹⁾

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
TERMPWR Supply Current					
TERMPWR supply current	No load			40	mA
TERMPWR voltage		2.70		5.25	V
Regulator					
1.75-V regulator	REG1 ($\pm 125\text{ mA}$)	1.70	1.75	1.80	V
1.3-V regulator	$-5\text{ mA} \leq I_{\text{DIFSENS}} \leq 50\text{ }\mu\text{A}$	1.2	1.3	1.4	
0.75-V regulator	REG2 ($\pm 125\text{ mA}$)	0.70	0.75	0.80	
1.75-V regulator source current	$V_O = 1.25\text{ V}$	-200			mA
1.75-V regulator sink current	$V_O = 2.25\text{ V}$	200			
1.75-V regulator source current limit ⁽¹⁾		-200		-700	
1.75-V regulator sink current limit ⁽¹⁾		200		700	
1.3-V regulator source current	$V_{\text{DIFSENS}} = 0\text{ V}$	-5		-15	μA
1.3-V regulator sink current	$V_{\text{DIFSENS}} = 2.4\text{ V}$	50		200	
0.75-V regulator source current	$V_O = 0.25\text{ V}$	-200			mA
0.75-V regulator sink current	$V_O = 1.25\text{ V}$	200			
0.75-V regulator source current limit ⁽¹⁾		-200		-700	
0.75-V regulator sink current limit ⁽¹⁾		200		700	

⁽¹⁾ Ensured by design. Not production tested.

TERMINAL FUNCTIONS

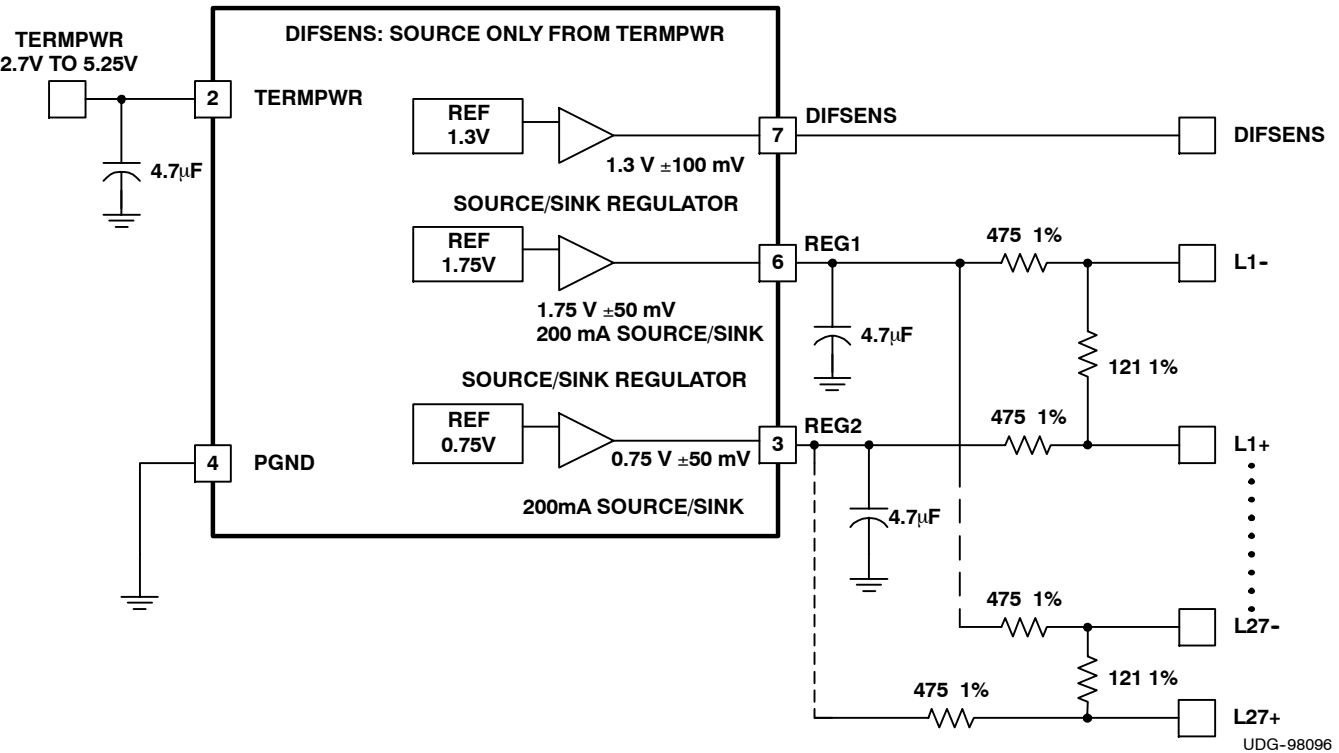
TERMINAL		I/O	DESCRIPTION
NAME	NO.		
HSPGND	4	-	Heat sink power ground pin.
HSGND	5, 12, 13	-	Heat sink ground pin which should be attached to the ground plane on a multilayer board or large copper area on a 2 layer board.
REG1	6	O	1.75-V source/sink regulated output voltage pin. The part is internally current limited for both sinking and sourcing current to prevent damage. For best performance, a 4.7- μF low-ESR capacitor is recommended. Lead lengths should be kept to a minimum.
REG2	3	O	0.75-V source/sink regulated output voltage pin. The part is internally current limited for both sinking and sourcing current to prevent damage. For best performance, a 4.7- μF low-ESR capacitor is recommended. Lead lengths should be kept to a minimum.
DIFSENS	7	O	1.3-V source/sink regulated output voltage pin. The part is internally current limited to the SCSI SPI-2 through SPI-4 standards for both sinking and sourcing current to prevent damage.
TERMPWR	2	I	Supply voltage pin. The pin should be decoupled with at least a 2.2- μF low-ESR capacitor. For best performance, a 4.7- μF low-ESR capacitor is recommended. Lead lengths should be kept to a minimum.

APPLICATION INFORMATION

The resistor stack with the 1.75-V and 0.75-V reference gives the correct differential impedance, bias voltage, common mode differential impedance, and common mode voltage as show in Table 1.

Table 1. UCC561 Resistor Stack vs. Standard (SPI-2 through SPI-4)

PARAMETER	UCC561	STANDARD	UNITS
Differential Impedance	107.3	100 to 110	Ω
Differential bias voltage	112.9	100 to 125	mV
Common-mode differential impedance	237	100 to 300	Ω
Common-mode voltage	1.25	1.2 to 1.3	V



PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
UCC561DP	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
UCC561DPG4	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
UCC561DPTR	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
UCC561DPTRG4	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
UCC561TD	OBSOLETE	TO-220	KC	5		TBD	Call TI	Call TI

⁽¹⁾ The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBSOLETE: TI has discontinued the production of the device.

⁽²⁾ Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS) or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

TBD: The Pb-Free/Green conversion plan has not been defined.

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

⁽³⁾ MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

Important Information and Disclaimer: The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. TI has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. TI and TI suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

D (R-PDSO-G16)

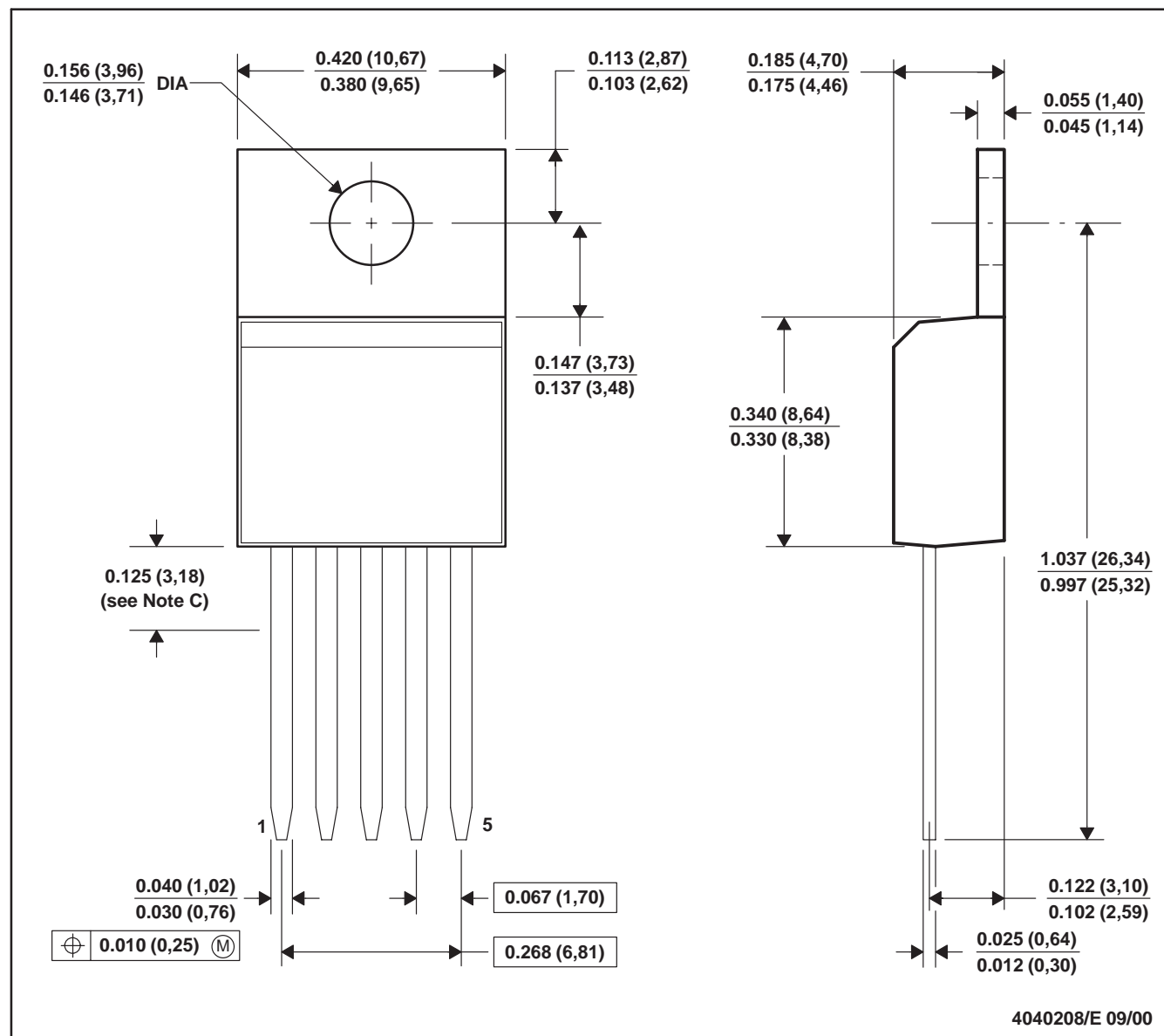
PLASTIC SMALL-OUTLINE PACKAGE



4040047-4/F 07/2004

KC (R-PSFM-T5)

PLASTIC FLANGE-MOUNT



- NOTES: A. All linear dimensions are in inches (millimeters).
 B. This drawing is subject to change without notice.
 C. Lead dimensions are not controlled within this area.
 D. All lead dimensions apply before solder dip.
 E. The center lead is in electrical contact with the mounting tab.

IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

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

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

TI does not warrant or represent that any license, either express or implied, is granted under any TI patent right, copyright, mask work right, or other TI intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information published by TI regarding third-party products or services does not constitute a license from TI 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 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. Reproduction of this information with alteration is an unfair and deceptive business practice. TI is not responsible or liable for such altered documentation.

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

Following are URLs where you can obtain information on other Texas Instruments products and application solutions:

Products		Applications	
Amplifiers	amplifier.ti.com	Audio	www.ti.com/audio
Data Converters	dataconverter.ti.com	Automotive	www.ti.com/automotive
DSP	dsp.ti.com	Broadband	www.ti.com/broadband
Interface	interface.ti.com	Digital Control	www.ti.com/digitalcontrol
Logic	logic.ti.com	Military	www.ti.com/military
Power Mgmt	power.ti.com	Optical Networking	www.ti.com/opticalnetwork
Microcontrollers	microcontroller.ti.com	Security	www.ti.com/security
		Telephony	www.ti.com/telephony
		Video & Imaging	www.ti.com/video
		Wireless	www.ti.com/wireless

Mailing Address: Texas Instruments
Post Office Box 655303 Dallas, Texas 75265

Copyright © 2005, Texas Instruments Incorporated