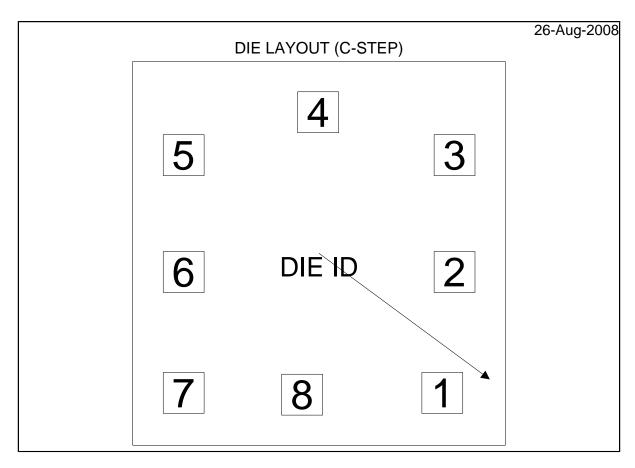


LM193 MDR MCD2930A LOW POWER LOW OFFSET VOLTAGE DUAL COMPARATORS



DIE/WAFER CHARACTERISTICS

| DIE/WAFER CHARA | CTERISTICS | | | | |
|----------------------------|---------------------------|-------------------------|-------------------|--|--|
| Fabrication Attributes | | General Die Information | | | |
| Physical Die | LM193 | Bond Pad Opening | 92.00µm x 92.00µm | | |
| Identification | | Size (min) | | | |
| Die Step | С | Bond Pad Metalization | AL 0.5%CU | | |
| Physical Attributes | | Passivation | VOM ONLY | | |
| Wafer Diameter | 150mm | Back Side Metal | BAREBACK | | |
| Die Size (Drawn) | 838.2µm x 863.6µm | Back Side Connection | Floating | | |
| | 33.0mils x 34.0mils | | | | |
| Thickness | 330µm Nominal | | | | |
| Min Pitch | 263µm | | | | |
| Note: All values are round | ded to the nearest micron | • | | | |
| Special Assembly Requir | ements: | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |



LM193 MDR MCD2930A LOW POWER LOW OFFSET VOLTAGE DUAL COMPARATORS

| Signal Name | Pad Number | X/Y Coordinates | | Pad Size | | |
|-------------|------------|-----------------|------|----------|---|----|
| | | X | Υ | Χ | | Υ |
| Output A | 1 | 277 | -314 | 92 | Х | 92 |
| Input A - | 2 | 305 | -42 | 92 | Х | 92 |
| Input A + | 3 | 305 | 221 | 92 | Х | 92 |
| Gnd | 4 | -2 | 317 | 92 | Х | 92 |
| Input B + | 5 | -304 | 221 | 92 | Х | 92 |
| Input B - | 6 | -304 | -42 | 92 | Х | 92 |
| Output B | 7 | -304 | -314 | 92 | Х | 92 |
| V + | 8 | -38 | -318 | 92 | Х | 92 |



LM193 MDR MCD2930A LOW POWER LOW OFFSET VOLTAGE DUAL COMPARATORS

| Notes |
|--|
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| THE CONTENTS OF THIS DOCUMENT ARE PROVIDED IN CONNECTION WITH NATIONAL SEMICONDUCTOR CORPORATION ("NATIONAL") PRODUCTS. NATIONAL MAKES NO REPRESENTATIONS OR WARRANTIES WITH RESPECT TO THE ACCURACY OR COMPLETENESS OF THE CONTENTS OF THIS PUBLICATION AND RESERVES THE RIGHT TO MAKE CHANGES TO SPECIFICATIONS AND PRODUCT DESCRIPTIONS AT ANY TIME WITHOUT NOTICE. NO LICENSE, WHETHER EXPRESS, IMPLIED, ARISING BY ESTOPPEL OR OTHERWISE, TO ANY INTELLECTUAL PROPERTY RIGHTS IS GRANTED BY THIS DOCUMENT. |
| TESTING AND OTHER QUALITY CONTROLS ARE USED TO THE EXTENT NATIONAL DEEMS NECESSARY TO SUPPORT NATIONAL'S PRODUCT WARRANTY. EXCEPT WHERE MANDATED BY GOVERNMENT REQUIREMENTS, TESTING OF ALL PARAMETERS OF EACH PRODUCT IS NOT NECESSARILY PERFORMED. NATIONAL ASSUMES NO LIABILITY FOR APPLICATIONS ASSISTANCE OR BUYER PRODUCT DESIGN. BUYERS ARE RESPONSIBLE FOR THEIR PRODUCTS AND APPLICATIONS USING NATIONAL COMPONENTS. PRIOR TO USING OR DISTRIBUTING ANY PRODUCTS THAT INCLUDE NATIONAL COMPONENTS, BUYERS SHOULD PROVIDE ADEQUATE DESIGN, TESTING AND OPERATING SAFEGUARDS. |
| EXCEPT AS PROVIDED IN NATIONAL'S TERMS AND CONDITIONS OF SALE FOR SUCH PRODUCTS, NATIONAL ASSUMES NO LIABILITY WHATSOEVER, AND NATIONAL DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY RELATING TO THE SALE AND/OR USE OF NATIONAL PRODUCTS INCLUDING LIABILITY OR WARRANTIES RELATING TO FITNESS FOR A PARTICULAR PURPOSE, MERCHANTABILITY, OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT. |
| LIFE SUPPORT POLICY |
| NATIONAL'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS PRIOR WRITTEN APPROVAL OF THE CHIEF EXECUTIVE OFFICER AND GENERAL COUNSEL OF NATIONAL SEMICONDUCTOR CORPORATION. |
| As used herein: Life support devices or systems are devices which (a) are intended for surgical implant into the body, or (b) support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in a significant injury to the user. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system or to affect its safety or effectiveness. |
| National Semiconductor and the National Semiconductor logo are registered trademarks of National Semiconductor Corporation. All other brand or product names may be trademarks or registered trademarks of their respective holders. |
| Copyright© 2007 National Semiconductor Corporation |
| For the most current product information visit us at www.national.com |
| IN U.S.A. IN EUROPE IN ASIA PACIFIC IN JAPAN Tel: 1 800 962 0673 / 18760 Tel: 49 (0) 8141 35 1370 Tel: (852) 2737 1826 Tel: 81 3 5639 7560 Fax: 1 207 541 6140 Fax: 49 (0) 8141 35 1666 |

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 which meet ISO/TS16949 requirements, mainly for automotive use. Components which have not been so designated are neither designed nor intended for automotive use; and TI will not be responsible for any failure of such components to meet such requirements.

Products Applications

Audio Automotive and Transportation www.ti.com/automotive www.ti.com/audio **Amplifiers** amplifier.ti.com Communications and Telecom www.ti.com/communications **Data Converters** dataconverter.ti.com Computers and Peripherals www.ti.com/computers DI P® Products Consumer Electronics www.dlp.com www.ti.com/consumer-apps

DSP dsp.ti.com **Energy and Lighting** www.ti.com/energy Clocks and Timers www.ti.com/clocks Industrial www.ti.com/industrial Interface Medical www.ti.com/medical interface.ti.com Logic logic.ti.com Security www.ti.com/security

Power Mgmt <u>power.ti.com</u> Space, Avionics and Defense <u>www.ti.com/space-avionics-defense</u>

Microcontrollers microcontroller.ti.com Video and Imaging www.ti.com/video

RFID www.ti-rfid.com

OMAP Applications Processors www.ti.com/omap TI E2E Community e2e.ti.com

Wireless Connectivity <u>www.ti.com/wirelessconnectivity</u>