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[**L293**](http://www.ti.com/product/l293?qgpn=l293)**,** [**L293D**](http://www.ti.com/product/l293d?qgpn=l293d)



SLRS008D – SEPTEMBER 1986 – REVISED JANUARY 2016

L293x Quadruple Half-H Drivers

## Features 3 Description

* Wide Supply-Voltage Range: 4.5 V to 36 V
* Separate Input-Logic Supply

The L293 and L293D devices are quadruple high- current half-H drivers. The L293 is designed to provide bidirectional drive currents of up to 1 A at

* Internal ESD Protection voltages from 4.5 V to 36 V. The L293D is designed
* High-Noise-Immunity Inputs
* Output Current 1 A Per Channel (600 mA for L293D)

to provide bidirectional drive currents of up to 600-mA at voltages from 4.5 V to 36 V. Both devices are designed to drive inductive loads such as relays, solenoids, DC and bipolar stepping motors, as well as

* Peak Output Current 2 A Per Channel (1.2 A for other high-current/high-voltage loads in positive- L293D) supply applications.
* Output Clamp Diodes for Inductive Transient Each output is a complete totem-pole drive circuit, Suppression (L293D) with a Darlington transistor sink and a pseudo- Darlington source. Drivers are enabled in pairs, with

1. **Applications** drivers 1 and 2 enabled by 1,2EN and drivers 3 and 4

* Stepper Motor Drivers
* DC Motor Drivers
* Latching Relay Drivers

**1A**

**1,2EN**

**2A**

**3A**

**3,4EN**

**4A**

enabled by 3,4EN.

The L293 and L293D are characterized for operation from 0°C to 70°C.

**Device Information**[**(1)**](#_bookmark4)

|  |  |  |
| --- | --- | --- |
| **PART NUMBER** | **PACKAGE** | **BODY SIZE (NOM)** |
| L293NE | PDIP (16) | 19.80 mm × 6.35 mm |
| L293DNE | PDIP (16) | 19.80 mm × 6.35 mm |

* 1. For all available packages, see the orderable addendum at the end of the data sheet.

**Logic Diagram**

**1Y**



**2**

**3**

**1**

**7**

**6**

**2Y**

**3Y**



**10**

**11**

**9**

**15**

**14**

**4Y**

An IMPORTANT NOTICE at the end of this data sheet addresses availability, warranty, changes, use in safety-critical applications, intellectual property matters and other important disclaimers. PRODUCTION DATA.

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## Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

**Changes from Revision C (November 2004) to Revision D Page**

* Removed *Ordering Information* table [1](#_bookmark2)
* Added *ESD Ratings* and *Thermal Information* tables, *Feature Description* section, *Device Functional Modes*, *Application and Implementation* section, *Power Supply Recommendations* section, *Layout* section, *Device and*

*Documentation Support* section, and *Mechanical, Packaging, and Orderable Information* section. [1](#_bookmark3)

## Pin Configuration and Functions

**NE Package 16-Pin PDIP**

**Top View**

1,2EN

1A

1Y

HEAT SINK AND

GROUND

2Y

2A VCC2

VCC1 4A

4Y

1

2

3

4

5

6

7

8

16

15

14

13

12

11

10

9

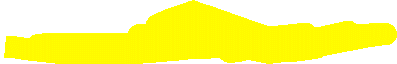
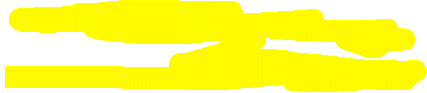
HEAT SINK AND GROUND

3Y

3A

3,4EN

**Pin Functions**



|  |  |  |  |
| --- | --- | --- | --- |
| **PIN** | | **TYPE** | **DESCRIPTION** |
| **NAME** | **NO.** |
| 1,2EN | 1 | I | Enable driver channels 1 and 2 (active high input) |
| <1:4>A | 2, 7, 10, 15 | I | Driver inputs, noninverting |
| <1:4>Y | 3, 6, 11, 14 | O | Driver outputs |
| 3,4EN | 9 | I | Enable driver channels 3 and 4 (active high input) |
| GROUND | 4, 5, 12, 13 | — | Device ground and heat sink pin. Connect to printed-circuit-board ground plane with multiple solid vias |
| VCC1 | 16 | — | 5-V supply for internal logic translation |
| VCC2 | 8 | — | Power VCC for drivers 4.5 V to 36 V |

## Specifications

### Absolute Maximum Ratings

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

|  |  |  |  |
| --- | --- | --- | --- |
|  | **MIN** | **MAX** | **UNIT** |
| Supply voltage, VCC1(2) | 36 | | V |
| Output supply voltage, VCC2 | 36 | | V |
| Input voltage, VI | 7 | | V |
| Output voltage, VO | –3 | VCC2 + 3 | V |
| Peak output current, IO (nonrepetitive, t ≤ 5 ms): L293 | –2 | 2 | A |
| Peak output current, IO (nonrepetitive, t ≤ 100 µs): L293D | –1.2 | 1.2 | A |
| Continuous output current, IO: L293 | –1 | 1 | A |
| Continuous output current, IO: L293D | –600 | 600 | mA |
| Maximum junction temperature, TJ | 150 | | °C |
| Storage temperature, Tstg | –65 | 150 | °C |

1. Stresses beyond those listed under *Absolute Maximum Ratings* may cause permanent damage to the device. These are stress ratings only, which do not imply functional operation of the device at these or any other conditions beyond those indicated under *Recommended Operating Conditions*. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.
2. All voltage values are with respect to the network ground terminal.

### ESD Ratings

|  |  |  |  |
| --- | --- | --- | --- |
|  | | **VALUE** | **UNIT** |
| V(ESD) Electrostatic discharge | Human-body model (HBM), per ANSI/ESDA/JEDEC JS-001(1) | ±2000 | V |
| Charged-device model (CDM), per JEDEC specification JESD22-C101(2) | ±1000 |

1. JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process.
2. JEDEC document JEP157 states that 250-V CDM allows safe manufacturing with a standard ESD control process.

### Recommended Operating Conditions

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

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | | | **MIN** | **NOM** | **MAX** | **UNIT** |
| Supply voltage | | VCC1 | 4.5 7 | | | V |
| VCC2 | VCC1 | 36 | |
| VIH | High-level input voltage | VCC1 ≤ 7 V | 2.3 VCC1 | | | V |
| VCC1 ≥ 7 V | 2.3 7 | | | V |
| VIL | Low-level output voltage |  | –0.3(1) | 1.5 | | V |
| TA | Operating free-air temperature |  | 0 | 70 | | °C |

(1) The algebraic convention, in which the least positive (most negative) designated minimum, is used in this data sheet for logic voltage levels.

### Thermal Information

|  |  |  |  |
| --- | --- | --- | --- |
| **THERMAL METRIC(1)** | | **L293, L293D** | **UNIT** |
| **NE (PDIP)** |
| **16 PINS** |
| RθJA | Junction-to-ambient thermal resistance (2) | 36.4 | °C/W |
| RθJC(top) | Junction-to-case (top) thermal resistance | 22.5 | °C/W |
| RθJB | Junction-to-board thermal resistance | 16.5 | °C/W |
| ψJT | Junction-to-top characterization parameter | 7.1 | °C/W |
| ψJB | Junction-to-board characterization parameter | 16.3 | °C/W |

1. For more information about traditional and new thermal metrics, see the *Semiconductor and IC Package Thermal Metrics* application report, [SPRA953](http://www.ti.com/lit/pdf/spra953).
2. The package thermal impedance is calculated in accordance with JESD 51-7.

### Electrical Characteristics

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

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PARAMETER** | | | **TEST CONDITIONS** | | **MIN** | **TYP** | **MAX** | **UNIT** |
| VOH | High-level output voltage | | L293: IOH = −1 A | | VCC2 – 1.8 | VCC2 – 1.4 |  | V |
| L293D: IOH = − 0.6 A | |
| VOL | Low-level output voltage | | L293: IOL = 1 A | |  | 1.2 | 1.8 | V |
| L293D: IOL = 0.6 A | |
| VOKH | High-level output clamp voltage | | L293D: IOK = –0.6 A | | VCC2 + 1.3 | | | V |
| VOKL | Low-level output clamp voltage | | L293D: IOK = 0.6 A | | 1.3 | | | V |
| IIH | High-level input current | A | VI = 7 V | |  | 0.2 | 100 | µA |
| EN |  | 0.2 | 10 |
| IIL | Low-level input current | A | VI = 0 | |  | –3 | –10 | µA |
| EN |  | –2 | –100 |
| ICC1 | Logic supply current | | IO = 0 | All outputs at high level |  | 13 | 22 | mA |
| All outputs at low level |  | 35 | 60 |
| All outputs at high impedance |  | 8 | 24 |
| ICC2 | Output supply current | | IO = 0 | All outputs at high level |  | 14 | 24 | mA |
| All outputs at low level |  | 2 | 6 |
| All outputs at high impedance |  | 2 | 4 |

### Switching Characteristics

over operating free-air temperature range (unless otherwise noted) VCC1 = 5 V, VCC2 = 24 V, TA = 25°C

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **PARAMETER** | |  | **TEST CONDITIONS** | **MIN TYP MAX** | **UNIT** |
| tPLH | Propagation delay time, low-to- high-level output from A input | L293NE, L293DNE | CL = 30 pF,  See [Figure 2](#_bookmark16) | 800 | ns |
| L293DWP, L293N L293DN | 750 |
| tPHL | Propagation delay time, high-to- low-level output from A input | L293NE, L293DNE | 400 | ns |
| L293DWP, L293N L293DN | 200 |
| tTLH | Transition time, low-to-high-level output | L293NE, L293DNE | 300 | ns |
| L293DWP, L293N L293DN | 100 |
| tTHL | Transition time, high-to-low-level output | L293NE, L293DNE | 300 | ns |
| L293DWP, L293N L293DN | 350 |

### Typical Characteristics

**5**

**With Infinite Heat Sink**

**Heat Sink With** θ**JA = 25**°**C/W**

**Free Air**

**4**

**P TOT − Power Dissipation − W**

**3**

**2**

**1**

**0**

**−50 0 50**

**100**

**150**

**TA − Ambient Temperature −** °**C**

**Figure 1. Maximum Power Dissipation vs Ambient Temperature**

## Parameter Measurement Information

**Input**

**5 V 24 V**

**Input**

**VCC1 VCC2**

**A**

**Output**

**Y**

**Pulse Generator (see Note B)**

**CL = 30 pF**

**EN**

**3 V (see Note A)**

**Output**

**TEST CIRCUIT**



**tf**

**tr**

**90%**

**3 V**

**90%**

**50%**

**50%**

**10% 10%**

**0**

**tw**

**tPHL**

**tPLH**

**90%**

**VOH**

**90%**

**50% 50%**

**10%**

**10%**

**VOL**

**tTHL**

**tTLH**

NOTES: A. CL includes probe and jig capacitance.

**VOLTAGE WAVEFORMS**

B. The pulse generator has the following characteristics: tr ≤ 10 ns, tf ≤ 10 ns, tw = 10 µs, PRR = 5 kHz, ZO = 50 Ω.

**Figure 2. Test Circuit and Voltage Waveforms**

## Detailed Description

### Overview

The L293 and L293D are quadruple high-current half-H drivers. These devices are designed to drive a wide array of inductive loads such as relays, solenoids, DC and bipolar stepping motors, as well as other high-current and high-voltage loads. All inputs are TTL compatible and tolerant up to 7 V.

Each output is a complete totem-pole drive circuit, with a Darlington transistor sink and a pseudo-Darlington source. Drivers are enabled in pairs, with drivers 1 and 2 enabled by 1,2EN and drivers 3 and 4 enabled by 3,4EN. When an enable input is high, the associated drivers are enabled, and their outputs are active and in phase with their inputs. When the enable input is low, those drivers are disabled, and their outputs are off and in the high-impedance state. With the proper data inputs, each pair of drivers forms a full-H (or bridge) reversible drive suitable for solenoid or motor applications.

On the L293, external high-speed output clamp diodes should be used for inductive transient suppression. On the L293D, these diodes are integrated to reduce system complexity and overall system size. A VCC1 terminal, separate from VCC2, is provided for the logic inputs to minimize device power dissipation. The L293 and L293D are characterized for operation from 0°C to 70°C.

### Functional Block Diagram

**VCC1**



**1**

**0**

**1**

**16**

**1**

**0**

**2**

**15**

**1**

**0**

**M**

**1**

**4**

**3**

**14**

**4**

**13**

**M**

**5**

**12**

**6**

**11**

**2**

**3**

**1**

**0**

**7**

**8**

**10**

**9**

**1**

**0**

**1**

**0**

**M**

**VCC2**

Output diodes are internal in L293D.

### Feature Description

The L293x has TTL-compatible inputs and high voltage outputs for inductive load driving. Current outputs can get up to 2 A using the L293.

### Device Functional Modes

[Table 1](#_bookmark22) lists the fuctional modes of the L293x.

**Table 1. Function Table (Each Driver)(1)**

|  |  |  |
| --- | --- | --- |
| **INPUTS (2)** | | **OUTPUT (Y)** |
| **A** | **EN** |
| H | H | H |
| L | H | L |
| X | L | Z |

* + 1. H = high level, L = low level, X = irrelevant, Z = high impedance (off)
    2. In the thermal shutdown mode, the output is in the high-impedance state, regardless of the input levels.

**VCC1**



**Current Source**

**Input**

**GND**

**Figure 3. Schematic of Inputs for the L293x**

**VCC2**



**Output**

**GND**

**VCC2**

**Output**

**GND**

**Figure 4. Schematic of Outputs for the L293 Figure 5. Schematic of Outputs for the L293D**

## Application and Implementation

**NOTE**

Information in the following applications sections is not part of the TI component specification, and TI does not warrant its accuracy or completeness. TI’s customers are responsible for determining suitability of components for their purposes. Customers should validate and test their design implementation to confirm system functionality.

### Application Information

A typical application for the L293 device is driving a two-phase motor. Below is an example schematic displaying how to properly connect a two-phase motor to the L293 device.

Provide a 5-V supply to VCC1 and valid logic input levels to data and enable inputs. VCC2 must be connected to a power supply capable of supplying the needed current and voltage demand for the loads connected to the outputs.

### Typical Application

**5 V 24 V**

**Control A**



**VCC2**

**VCC1**

**16**

**8**

**10 k**Ω

**1,2EN**

**1**

**1A**

**2**

**1Y**

**3**

**Motor**

**2A**

**7**

**2Y**

**6**

**3,4EN**

**9**

**3A**

**10**

**3Y**

**11**

**4A**

**15**

**4Y**

**14**

**4, 5, 12, 13**

**Thermal Shutdown**

**Control B**

**GND**

**Figure 6. Two-Phase Motor Driver (L293)**

* + 1. **Design Requirements**

The design techniques in the application above as well as the applications below should fall within the following design requirements.

1. VCC1 should fall within the limits described in the [*Recommended Operating Conditions*](#_bookmark10).
2. VCC2 should fall within the limits described in the [*Recommended Operating Conditions*](#_bookmark10).
3. The current per channel should not exceed 1 A for the L293 (600mA for the L293D).
   * 1. **Detailed Design Procedure**

When designing with the L293 or L293D, careful consideration should be made to ensure the device does not exceed the operating temperature of the device. Proper heatsinking will allow for operation over a larger range of current per channel. Refer to the [*Power Supply Recommendations*](#_bookmark32) as well as the [*Layout Example*](#_bookmark36).

### Typical Application (continued)

* + 1. **Application Curve**

Refer to [*Power Supply Recommendations*](#_bookmark32)for additional information with regards to appropriate power dissipation. [Figure 7](#_bookmark26) describes thermal dissipation based on [Figure 14](#_bookmark37).

**4 80**

θ**JA**

**PTOT (TA = 70**°**C)**

**3 60**

**P TOT − Power Dissipation − W**

θ**JA − Thermal Resistance −** °**C/W**

**2 40**

**1 20**

**0**

**0 10**

**20**

**Side**

**0**

**30 40 50**

**− mm**

**Figure 7. Maximum Power and Junction vs Thermal Resistance**

### System Examples

* + 1. **L293D as a Two-Phase Motor Driver**

[Figure 8](#_bookmark28) below depicts a typical setup for using the L293D as a two-phase motor driver. Refer to the [*Recommended Operating Conditions*](#_bookmark10) when considering the appropriate input high and input low voltage levels to enable each channel of the device.

**5 V 24 V**

**Control A**



**VCC1**

**10 k**Ω

**16**

**VCC2**

**8**

**1,2EN**

**1**

**1A**

**2**

**1Y**

**3**

**Motor**

**2A**

**7**

**2Y**

**6**

**3,4EN**

**9**

**3A**

**10**

**3Y**

**11**

**4A**

**15**

**4Y**

**14**

**4, 5, 12, 13**

**GND**

**Thermal Shutdown**

**Control B**

**Figure 8. Two-Phase Motor Driver (L293D)**

### System Examples (continued)

* + 1. **DC Motor Controls**

[Figure 9](#_bookmark29) and [Figure 10](#_bookmark30) below depict a typical setup for using the L293 device as a controller for DC motors. Note that the L293 device can be used as a simple driver for a motor to turn on and off in one direction, and can also be used to drive a motor in both directions. Refer to the function tables below to understand unidirectional vs bidirectional motor control. Refer to the [*Recommended Operating Conditions*](#_bookmark10) when considering the appropriate input high and input low voltage levels to enable each channel of the device.

**VCC2 SES5001**



**M1 SES5001**

**M2**

**3A 4A**

**10 11 15**

**8**

**14**

**16**

**VCC1**

Connections to ground and to supply voltage

**1/2 L293**

**GND**

**9**

**EN**

**4, 5, 12, 13**

**Figure 9. DC Motor Controls**

**Table 2. Unidirectional DC Motor Control**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **EN** | **3A** | **M1(1)** | **4A** | **M2** |
| H | H | Fast motor stop | H | Run |
| H | L | run | L | Fast motor stop |
| L | X | Free-running motor stop | X | Free-running motor stop |

(1) L = low, H = high, X = don’t care

**VCC2**

**2** × **SES5001**



**M**

**2** × **SES5001**

**2A 1A**

**7 6 3**

**8**

**2**

**16**

**VCC1**

**1/2 L293 1**

**EN**

**4, 5, 12, 13**

**GND**

**Figure 10. Bidirectional DC Motor Control**

**Table 3. Bidrectional DC Motor Control**

|  |  |  |  |
| --- | --- | --- | --- |
| **EN** | **1A** | **2A** | **FUNCTION (1)** |
| H | L | H | Turn right |
| H | H | L | Turn left |

(1) L = low, H = high, X = don’t care

**Table 3. Bidrectional DC Motor Control (continued)**

|  |  |  |  |
| --- | --- | --- | --- |
| **EN** | **1A** | **2A** | **FUNCTION (1)** |
| H | L | L | Fast motor stop |
| H | H | H | Fast motor stop |
| L | X | X | Free-running motor stop |

* + 1. **Bipolar Stepping-Motor Control**

[Figure 11](#_bookmark31) below depicts a typical setup for using the L293D as a two-phase motor driver. Refer to the [*Recommended Operating Conditions*](#_bookmark10) when considering the appropriate input high and input low voltage levels to enable each channel of the device.

**IL1/IL2 = 300 mA**

**C1**



**0.22** µ**F**

**1 L293**

**2**

**16 VCC1**

**15**

**VCC2**

**D5 D1 +**

**3**

**4**

**L1 IL1 5**

**6**

**+**

**7**

**8**

**D6 D2**

**+ D8**

**14**

**13**

**12 L2**

**11**

**+**

**10**

**9 D7**

**D4**

**IL2**

**D3**

D1−D8 = SES5001

**Figure 11. Bipolar Stepping-Motor Control**

## Power Supply Recommendations

VCC1 is 5 V ± 0.5 V and VCC2 can be same supply as VCC1 or a higher voltage supply with peak voltage up to 36

V. Bypass capacitors of 0.1 uF or greater should be used at VCC1 and VCC2 pins. There are no power up or power down supply sequence order requirements.

Properly heatsinking the L293 when driving high-current is critical to design. The Rthj-amp of the L293 can be reduced by soldering the GND pins to a suitable copper area of the printed circuit board or to an external heat sink.

[Figure 14](#_bookmark37) shows the maximum package power PTOT and the θJA as a function of the side of two equal square copper areas having a thickness of 35 μm (see [Figure 14](#_bookmark37)). In addition, an external heat sink can be used (see [Figure 12](#_bookmark33)).

During soldering, the pin temperature must not exceed 260°C, and the soldering time must not exceed 12 seconds.

The external heatsink or printed circuit copper area must be connected to electrical ground.



**17.0 mm**

**11.9 mm**

**38.0 mm**

**Figure 12. External Heat Sink Mounting Example (θJA = 25°C/W)**

## Layout

### Layout Guidelines

Place the device near the load to keep output traces short to reduce EMI. Use solid vias to transfer heat from ground pins to ground plane of the printed-circuit-board.

### Layout Example

TTL Logic

15

2

TTL Logic

7

TTL Logic

TTL Logic

10

TTL Logic

9



GND

0.1 μF

1,2EN

VCC1

1A

4A

1Y

4Y

2Y

3Y

2A

3A

5V to 36V

VCC2

3,4EN

1 μF

GND

8

1 Ampere

11

6

1 Ampere

12

5

GND

VIAS

13

4

1 Ampere

14

3

1 Ampere

5V

16

1

TTL Logic

**Figure 13. Layout Diagram**



**Copper Area 35-**µ**m Thickness**

**Printed Circuit Board**



**Figure 14. Example of Printed-Circuit-Board Copper Area (Used as Heat Sink)**

## Device and Documentation Support

### Related Links

The table below lists quick access links. Categories include technical documents, support and community resources, tools and software, and quick access to sample or buy.

**Table 4. Related Links**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **PARTS** | **PRODUCT FOLDER** | **SAMPLE & BUY** | **TECHNICAL DOCUMENTS** | **TOOLS & SOFTWARE** | **SUPPORT & COMMUNITY** |
| L293 | [Click here](http://www.ti.com/product/L293?dcmp=dsproject&hqs=pf) | [Click here](http://www.ti.com/product/L293?dcmp=dsproject&hqs=sandbuy&&samplebuy) | [Click here](http://www.ti.com/product/L293?dcmp=dsproject&hqs=td&&doctype2) | [Click here](http://www.ti.com/product/L293?dcmp=dsproject&hqs=sw&&desKit) | [Click here](http://www.ti.com/product/L293?dcmp=dsproject&hqs=support&&community) |
| L293D | [Click here](http://www.ti.com/product/L293D?dcmp=dsproject&hqs=pf) | [Click here](http://www.ti.com/product/L293D?dcmp=dsproject&hqs=sandbuy&&samplebuy) | [Click here](http://www.ti.com/product/L293D?dcmp=dsproject&hqs=td&&doctype2) | [Click here](http://www.ti.com/product/L293D?dcmp=dsproject&hqs=sw&&desKit) | [Click here](http://www.ti.com/product/L293D?dcmp=dsproject&hqs=support&&community) |

### Community Resources

The following links connect to TI community resources. Linked contents are provided "AS IS" by the respective contributors. They do not constitute TI specifications and do not necessarily reflect TI's views; see TI's [Terms of](http://www.ti.com/corp/docs/legal/termsofuse.shtml) [Use](http://www.ti.com/corp/docs/legal/termsofuse.shtml).

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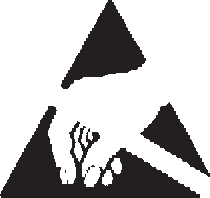
[**Design Support**](http://support.ti.com/) ***TI's Design Support*** Quickly find helpful E2E forums along with design support tools and contact information for technical support.

### Trademarks

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### Electrostatic Discharge Caution

These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

### Glossary

[SLYZ022](http://www.ti.com/lit/pdf/SLYZ022) — *TI Glossary*.

This glossary lists and explains terms, acronyms, and definitions.

## Mechanical, Packaging, and Orderable Information

The following pages include mechanical, packaging, and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.

# PACKAGE OPTION ADDENDUM

[www.ti.com](http://www.ti.com/) 17-Mar-2017

### PACKAGING INFORMATION

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Orderable Device** | **Status**  (1) | **Package Type** | **Package Drawing** | **Pins** | **Package Qty** | **Eco Plan**  (2) | **Lead/Ball Finish**  (6) | **MSL Peak Temp**  (3) | **Op Temp (°C)** | **Device Marking**  (4/5) | **Samples** |
| L293DNE | ACTIVE | PDIP | NE | 16 | 25 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type | 0 to 70 | L293DNE |  |
| L293DNEE4 | ACTIVE | PDIP | NE | 16 | 25 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type | 0 to 70 | L293DNE |  |
| L293NE | ACTIVE | PDIP | NE | 16 | 25 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type | 0 to 70 | L293NE |  |
| L293NEE4 | ACTIVE | PDIP | NE | 16 | 25 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type | 0 to 70 | L293NE |  |

**(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), Pb-Free (RoHS Exempt), 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.

**Pb-Free (RoHS Exempt):** This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

**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.

**(4)** There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

**(5)** Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

**(6)** Lead/Ball Finish - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead/Ball Finish values may wrap to two lines if the finish value exceeds the maximum column width.

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# PACKAGE OPTION ADDENDUM

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