DS2401
Silicon Serial Number

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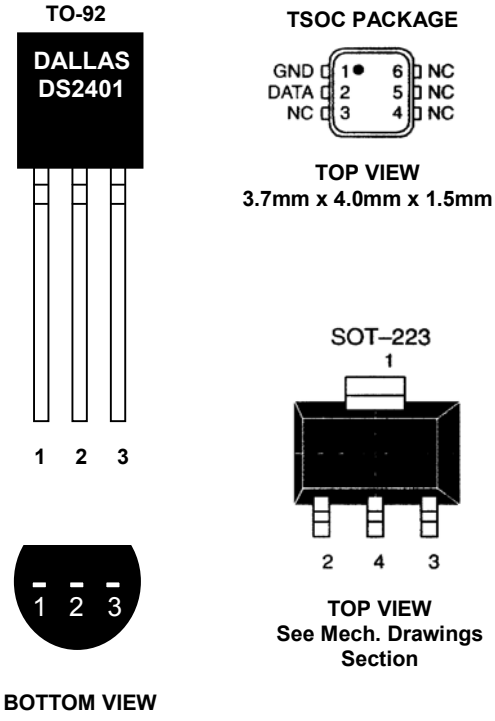
FEATURES

- Upgrade and drop-in replacement for DS2400
  - — Extended 2.8 to 6.0 voltage range
  - — Multiple DS2401s can reside on a common 1-Wire® Net
- Unique, factory-lasered and tested 64-bit registration number (8-bit family code + 48-bit serial number + 8-bit CRC tester); guaranteed no two parts alike
- Built-in multidrop controller ensures compatibility with other 1-Wire Net products
- 8-bit family code specifies DS2401 communications requirements to reader
- Presence Pulse acknowledges when the reader first applies voltage
- Low-cost TO-92, SOT-223, and TSOC surface mount packages
- Reduces control, address, data, and power to a single pin
- Zero standby power required
- Directly connects to a single port pin of a microprocessor and communicates at up to 16.3kbits/s
- TO-92 Tape & Reel version with leads bent to 100mil spacing (default) or with straight leads (DS2401T-SL)
- Applications
  - — PCB Identification
  - — Network Node ID
  - — Equipment Registration
- Operates over industrial temperature range of -40°C to +85°C

PIN ASSIGNMENT



PIN DESCRIPTION

	TO-92/SOT-223	TSOC
Pin 1	Ground	Ground
Pin 2	Data (DQ)	Data (DQ)
Pin 3	No Connect	No Connect
Pin 4	Ground	No Connect
Pin 5-6	–	No Connect

ORDERING INFORMATION

DS2401	TO-92 Package
DS2401Z	SOT-223 Surface Mount Package
DS2401/T&R	Tape & Reel of DS2401
DS2401T-SL	Like DS2401T but Straight Leads
DS2401Z/T&R	Tape & Reel of DS2401Z
DS2401P	TSOC Surface Mount Package
DS2401P/T&R	Tape & Reel of DS2401P
DS2401X1	Chip Scale Pkg., Tape & Reel

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DESCRIPTION

The DS2401 enhanced Silicon Serial Number is a low-cost, electronic registration number that provides an absolutely unique identity which can be determined with a minimal electronic interface (typically, a single port pin of a microcontroller). The DS2401 consists of a factory-lasered, 64-bit ROM that includes a unique 48-bit serial number, an 8-bit CRC, and an 8-bit Family Code (01h). Data is transferred serially via the 1-Wire protocol that requires only a single data lead and a ground return. Power for reading and writing the device is derived from the data line itself with no need for an external power source. The DS2401 is an upgrade to the DS2400. The DS2401 is fully reverse-compatible with the DS2400 but provides the additional multi-rop capability that enables many devices to reside on a single data line. The familiar TO-92, SOT-223 or TSOC package provides a compact enclosure that allows standard assembly equipment to handle the device easily.

OPERATION

The DS2401's internal ROM is accessed via a single data line. The 48-bit serial number, 8-bit family code and 8-bit CRC are retrieved using the Dallas 1-Wire protocol. This protocol defines bus transactions in terms of the bus state during specified time slots that are initiated on the falling edge of sync pulses from the bus master. All data is read and written least significant bit first.

1-WIRE BUS SYSTEM

The 1-Wire bus is a system which has a single bus master system and one or more slaves. In all instances, the DS2401 is a slave device. The bus master is typically a microcontroller. The discussion of this bus system is broken down into three topics: hardware configuration, transaction sequence, and 1-Wire signaling (signal type and timing). For a more detailed protocol description, refer to Chapter 4 of the *Book of DS19xx iButton® Standards*.

Hardware Configuration

The 1-Wire bus has only a single line by definition; it is important that each device on the bus be able to drive it at the appropriate time. To facilitate this, each device attached to the 1-Wire bus must have an open-drain connection or 3-state outputs. The DS2401 is an open-drain part with an internal circuit equivalent to that shown in Figure 2. The bus master can be the same equivalent circuit. If a bidirectional pin is not available, separate output and input pins can be tied together. The bus master requires a pullup resistor at the master end of the bus, with the bus master circuit equivalent to the one shown in Figure 3. The value of the pullup resistor should be approximately 5kΩ for short line lengths. A multidrop bus consists of a 1-Wire bus with multiple slaves attached. The 1-Wire bus has a maximum data rate of 16.3kbits per second.

The idle state for the 1-Wire bus is high. If, for any reason, a transaction needs to be suspended, the bus MUST be left in the idle state if the transaction is to resume. If this does not occur and the bus is left low for more than 120µs, one or more of the devices on the bus may be reset.

DS2401 MEMORY MAP Figure 1

8-Bit CRC Code		48-Bit Serial Number		8-Bit Family Code (01h)	
MSB	LSB	MSB	LSB	MSB	LSB

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