

February 1995

# DS75491 MOS-to-LED Quad Segment Driver DS75492 MOS-to-LED Hex Digit Driver

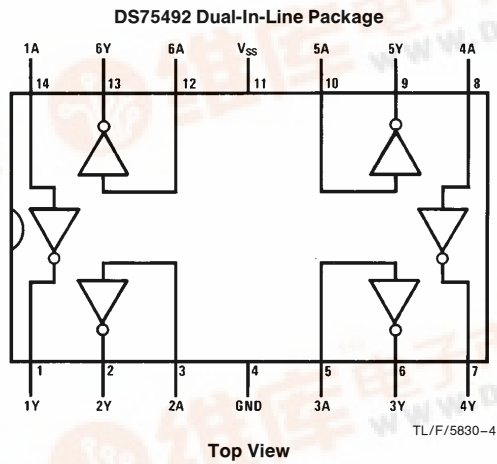
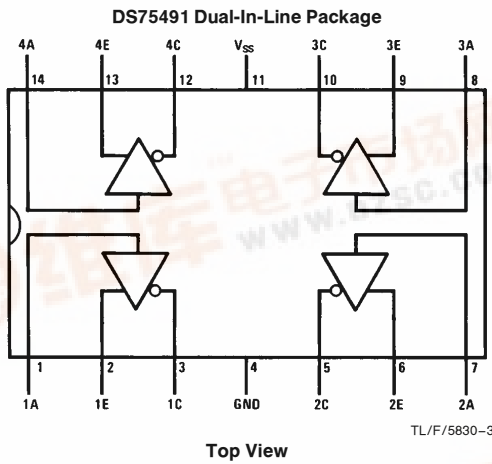
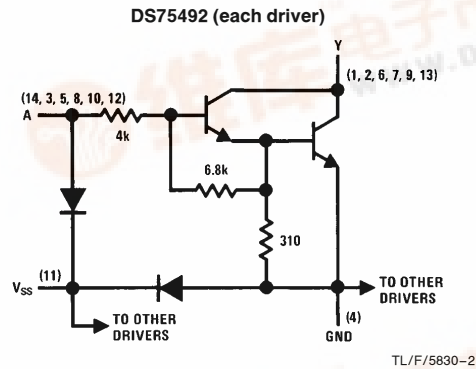
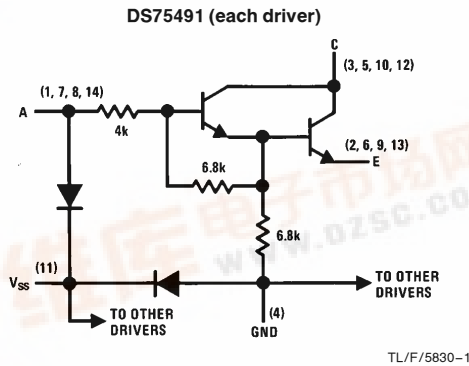
## General Description

The DS75491 and DS75492 are interface circuits designed to be used in conjunction with MOS integrated circuits and common-cathode LEDs in serially addressed multi-digit displays. The number of drivers required for this time-multiplexed system is minimized as a result of the segment-address-and-digit-scan method of LED drive.

## Features

- 50 mA source or sink capability per driver (DS75491)
- 250 mA sink capability per driver (DS75492)
- MOS compatibility (low input current)
- Low standby power
- High-gain Darlington circuits

## Schematic and Connection Diagrams



Order Number DS75491N, DS75492M or DS75492N  
See NS Package Number M14A or N14A

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## Absolute Maximum Ratings (Note 1)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

	DS75491	DS75492
Input Voltage Range (Note 4)	-5V to V <sub>SS</sub>	
Collector Output Voltage (Note 5)	10V	10V
Collector Output to Input Voltage	10V	10V
Emitter to Ground Voltage (V <sub>I</sub> ≥ 5V)	10V	
Emitter to Input Voltage	5V	
Voltage at V <sub>SS</sub> Terminal with Respect to any Other Device Terminal	10V	10V
Collector Output Current		
Each Collector Output	50 mA	250 mA
All Collector Outputs	200 mA	600 mA

	DS75491	DS75492
Continuous Total Dissipation	600 mW	600 mW
Operating Temperature Range	0°C to +70°C	
Storage Temperature Range	-65°C to +150°C	
Lead Temp. (Soldering, 10 sec)	300°C	300°C
Maximum Power Dissipation at 25°C		
Molded Package	1207 mW*	1280 mW†

\*Derate molded package 9.66 mW/°C above 25°C.

†Derate molded package 10.24 mW/°C above 25°C.

## Electrical Characteristics V<sub>SS</sub> = 10V (Notes 2 and 3)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>DS75491</b>						
V <sub>CE ON</sub>	“ON” State Collector Emitter Voltage	Input = 8.5V through 1 kΩ, V <sub>E</sub> = 5V, I <sub>C</sub> = 50 mA		0.9	1.2	V
					1.5	V
I <sub>C OFF</sub>	“OFF” State Collector Current	V <sub>C</sub> = 10V, V <sub>E</sub> = 0V			100	μA
		I <sub>IN</sub> = 40 μA			100	μA
		V <sub>IN</sub> = 0.7V				
I <sub>I</sub>	Input Current at Maximum Input Voltage	V <sub>IN</sub> = 10V, V <sub>E</sub> = 0V, I <sub>C</sub> = 20 mA		2.2	3.3	mA
I <sub>E</sub>	Emitter Reverse Current	V <sub>IN</sub> = 0V, V <sub>E</sub> = 5V, I <sub>C</sub> = 0 mA			100	μA
I <sub>SS</sub>	Current Into V <sub>SS</sub> Terminal				1	mA
<b>DS75492</b>						
V <sub>OL</sub>	Low Level Output Voltage	Input = 6.5V through 1 kΩ, I <sub>OUT</sub> = 250 mA		0.9	1.2	V
					1.5	V
I <sub>OH</sub>	High Level Output Current	V <sub>OH</sub> = 10V			200	μA
		I <sub>IN</sub> = 40 μA			200	μA
		V <sub>IN</sub> = 0.5V				
I <sub>I</sub>	Input Current at Maximum Input Voltage	V <sub>IN</sub> = 10V, I <sub>OL</sub> = 20 mA		2.2	3.3	mA
I <sub>SS</sub>	Current Into V <sub>SS</sub> Terminal				1	mA

## Switching Characteristics V<sub>SS</sub> = 7.5V, T<sub>A</sub> = 25°C

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>DS75491</b>						
t <sub>PLH</sub>	Propagation Delay Time, Low-to-High Level Output (Collector)	V <sub>IH</sub> = 4.5V, V <sub>E</sub> = 0V, R <sub>L</sub> = 200Ω, C <sub>L</sub> = 15 pF		100		ns
t <sub>PHL</sub>	Propagation Delay Time, High-to-Low Level Output (Collector)			20		ns
<b>DS75492</b>						
t <sub>PLH</sub>	Propagation Delay Time, Low-to-High Level Output	V <sub>IH</sub> = 7.5V, R <sub>L</sub> = 39Ω, C <sub>L</sub> = 15 pF		300		ns
t <sub>PHL</sub>	Propagation Delay Time, High-to-Low Level Output			30		ns

**Note 1:** “Absolute Maximum Ratings” are those values beyond which the safety of the device cannot be guaranteed. Except for “Operating Temperature Range” they are not meant to imply that the devices should be operated at these limits. The table of “Electrical Characteristics” provides conditions for actual device operation.

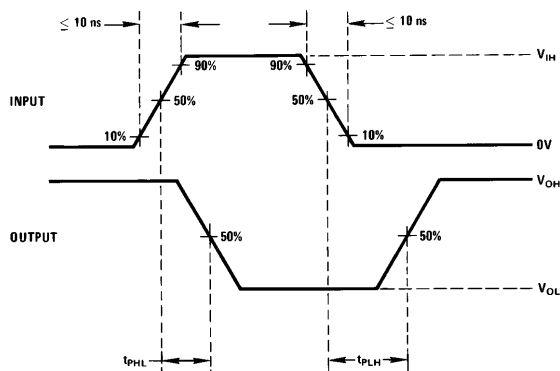
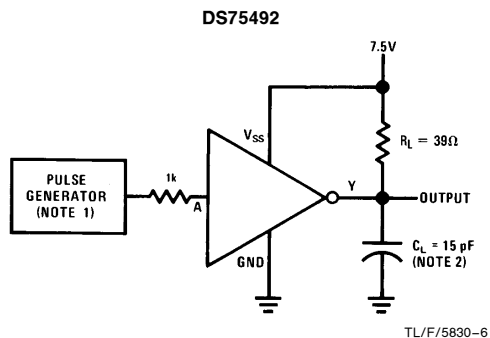
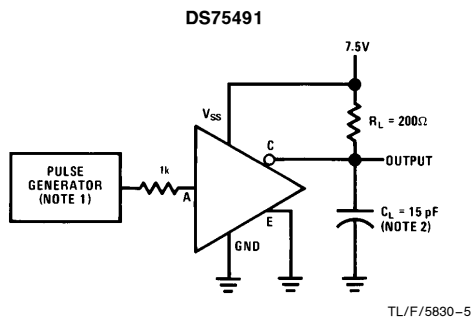
**Note 2:** Unless otherwise specified min/max limits apply across the 0°C to +70°C temperature range for the DS75491 and DS75492.

**Note 3:** All currents into device pins shown as positive, out of device pins as negative, all voltages referenced to ground unless otherwise noted. All values shown as max or min on absolute value basis.

**Note 4:** The input is the only device terminal which may be negative with respect to ground.

**Note 5:** Voltage values are with respect to network ground terminal unless otherwise noted.

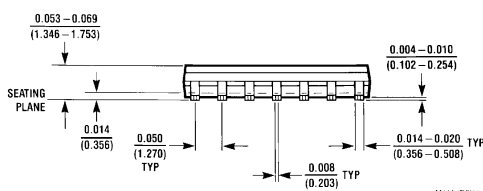
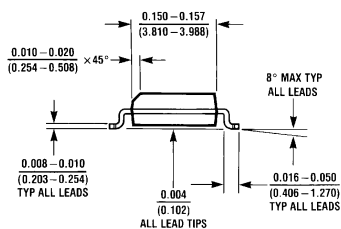
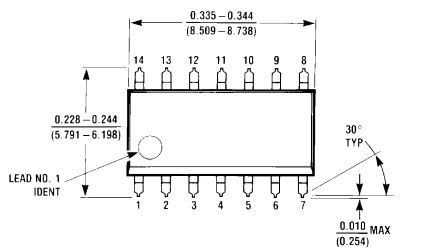
## AC Test Circuits and Switching Time Waveforms



**Note 1:** The pulse generator has the following characteristics:  $Z_{OUT} = 50\Omega$ ,  $PRR = 100\text{ kHz}$ ,  $t_W = 1\ \mu\text{s}$ .

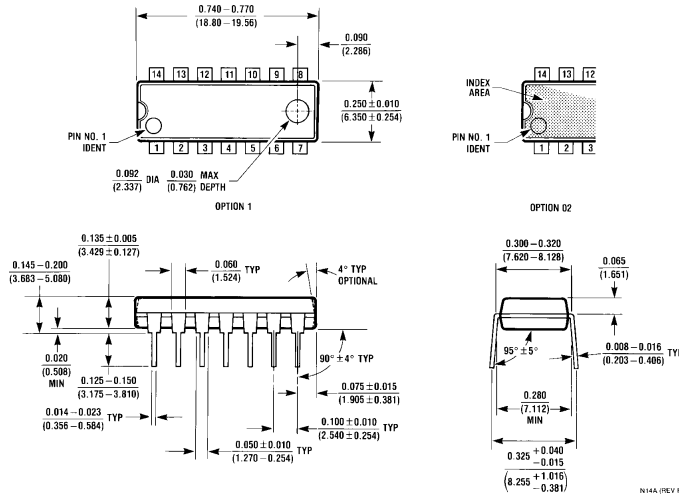
**Note 2:**  $C_L$  includes probe and jig capacitance.

## Physical Dimensions inches (millimeters)



**14-Lead (0.150" Wide) Molded Small Outline Package, JEDEC**  
**Order Number DS75492M**  
**NS Package Number M14A**

**Physical Dimensions** inches (millimeters) (Continued)



**Molded Dual-In-Line Package (N)**  
**Order Number DS75491N or DS75492N**  
**NS Package Number N14A**

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**National Semiconductor Corporation**  
 1111 West Bardin Road  
 Arlington, TX 76017  
 Tel: 1(800) 272-9959  
 Fax: 1(800) 737-7018

**National Semiconductor Europe**  
 Fax: (+49) 0-180-530 85 86  
 Email: cnjwge@tevm2.nsc.com  
 Deutsch Tel: (+49) 0-180-530 85 85  
 English Tel: (+49) 0-180-532 78 32  
 Français Tel: (+49) 0-180-532 93 58  
 Italiano Tel: (+49) 0-180-534 16 80

**National Semiconductor Hong Kong Ltd.**  
 13th Floor, Straight Block,  
 Ocean Centre, 5 Canton Rd.  
 Tsimshatsui, Kowloon  
 Hong Kong  
 Tel: (852) 2737-1600  
 Fax: (852) 2736-9960

**National Semiconductor Japan Ltd.**  
 Tel: 81-043-299-2309  
 Fax: 81-043-299-2408