![National Semiconductor logo] **N** *National Semiconductor*

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 compatability (low input current)
■ Low standby power
■ High-gain Darlington circuits

Schematic and Connection Diagrams

DS75491 (each driver)
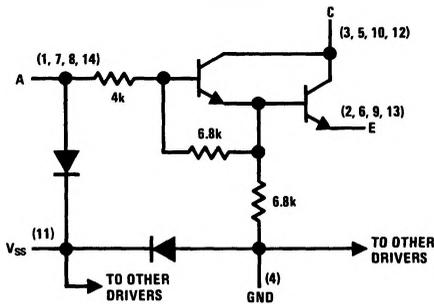
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DS75492 (each driver)
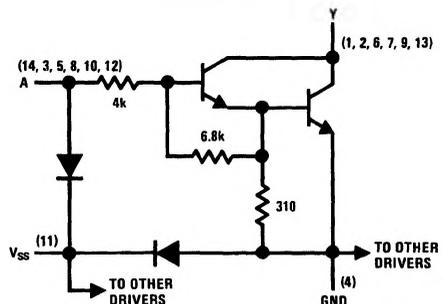
TL/F/5830–2

DS75491 Dual-In-Line Package
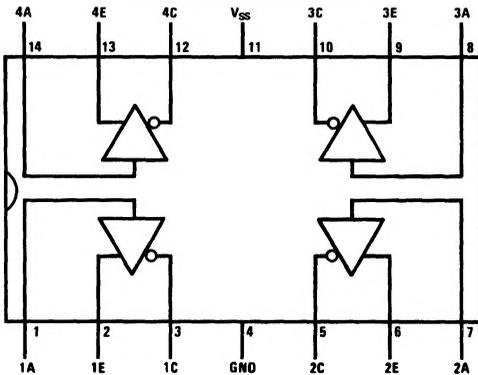
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Top View

DS75492 Dual-In-Line Package
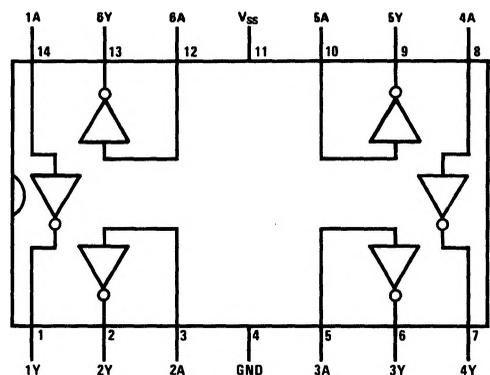
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Top View

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

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_{SS}	
Collector Output Voltage (Note 5)	10V	10V
Collector Output to Input Voltage	10V	10V
Emitter to Ground Voltage ($V_I \geq 5V$)	10V	
Emitter to Input Voltage	5V	
Voltage at V_{SS} 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 $V_{SS} = 10V$ (Notes 2 and 3)

Symbol	Parameter	Conditions		Min	Typ	Max	Units
DS75491							
$V_{CE\ ON}$	"ON" State Collector Emitter Voltage	Input = 8.5V through 1 kΩ, $V_E = 5V$, $I_C = 50$ mA	$T_A = 25°C$		0.9	1.2	V
			$T_A = 0–70°C$			1.5	V
$I_{C\ OFF}$	"OFF" State Collector Current	$V_C = 10V$, $V_E = 0V$	$I_{IN} = 40\ \mu A$			100	μA
			$V_{IN} = 0.7V$			100	μA
I_I	Input Current at Maximum Input Voltage	$V_{IN} = 10V$, $V_E = 0V$, $I_C = 20$ mA			2.2	3.3	mA
I_E	Emitter Reverse Current	$V_{IN} = 0V$, $V_E = 5V$, $I_C = 0$ mA				100	μA
I_{SS}	Current Into V_{SS} Terminal					1	mA
DS75492							
V_{OL}	Low Level Output Voltage	Input = 6.5V through 1 kΩ, $I_{OUT} = 250$ mA	$T_A = 25°C$		0.9	1.2	V
			$T_A = 0–70°C$			1.5	V
I_{OH}	High Level Output Current	$V_{OH} = 10V$	$I_{IN} = 40\ \mu A$			200	μA
			$V_{IN} = 0.5V$			200	μA
I_I	Input Current at Maximum Input Voltage	$V_{IN} = 10V$, $I_{OL} = 20$ mA			2.2	3.3	mA
I_{SS}	Current Into V_{SS} Terminal					1	mA

Switching Characteristics $V_{SS} = 7.5V$, $T_A = 25°C$

| Symbol	Parameter	Conditions	Min	Typ	Max	Units
DS75491						
t_{PLH}	Propagation Delay Time, Low-to-High Level Output (Collector)	$V_{IH} = 4.5V$, $V_E = 0V$, $R_L = 200Ω$, $C_L = 15$ pF		100		ns
t_{PHL}	Propagation Delay Time, High-to-Low Level Output (Collector)			20		ns
DS75492						
t_{PLH}	Propagation Delay Time, Low-to-High Level Output	$V_{IH} = 7.5V$, $R_L = 39Ω$, $C_L = 15$ pF		300		ns
t_{PHL}	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

DS75491

DS75492

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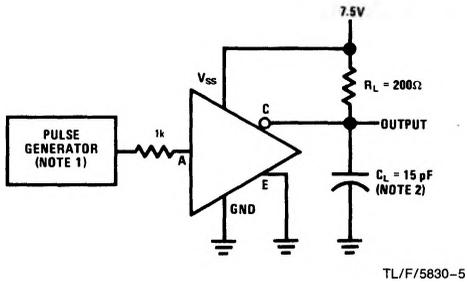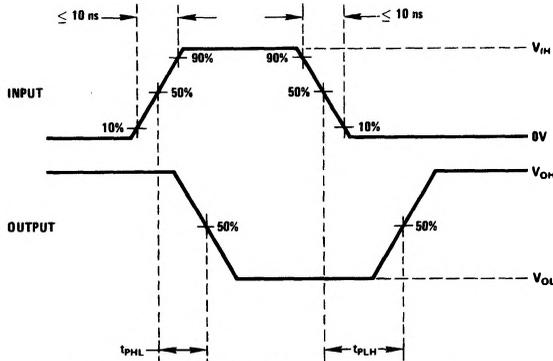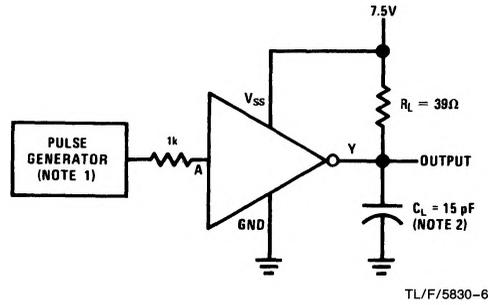
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Note 1: The pulse generator has the following characteristics: $Z_{OUT} = 50\Omega$, PRR = 100 kHz, $t_W = 1\ \mu s$.

Note 2: C_L includes probe and jig capacitance.