National Semiconductor

April 1990

DS55493/DS75493 Quad LED Segment Driver

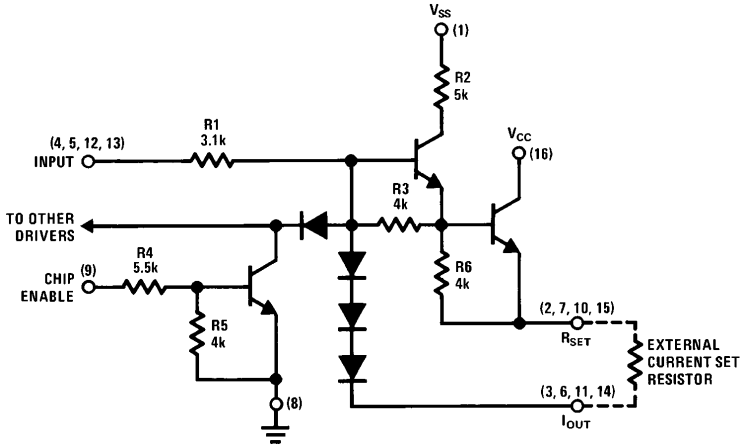
General Description

The DS55493/DS75493 is a quad LED segment driver. It is designed to interface between MOS IC's and LED's. An external resistor is required for each segment to drive the output current which is approximately equal to $0.7V/R_L$ and is relatively constant, independent of supply variations. Blanking can be achieved by taking the chip enable (CE) to a logical "1" level.

Features

- Low voltage operation
- Low input current for MOS compatibility
- Low standby power
- Display blanking capability
- Output current regulation
- Quad high gain circuits

Schematic and Connection Diagrams



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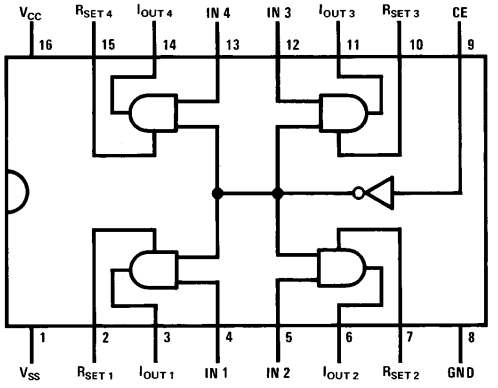
Dual-In-Line Package



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Order Number DS55493J, DS75493J or DS75493N
See NS Package Number J16A or N16A

Truth Table

CE	V_{IN}	I_{OUT}
0	1	ON
0	0	OFF
1	X	OFF

X = Don't care

RRD-B30M105/Printed in U. S. A.

Absolute Maximum Ratings (Note 1)

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

Supply Voltage	10V
Input Voltage	10V
Output Voltage	V_{CC}
Storage Temperature Range	−65°C to +150°C
Output Current (I_{OUT})	−25 mA
Maximum Power Dissipation* at 25°C	
Cavity Package	1371 mW
Molded Package	1280 mW
Lead Temperature (Soldering, 4 seconds)	260°C

*Derate cavity package 9.14 mW/°C above 25°C; derate molded package 10.24 mW/°C above 25°C.

Operating Conditions

	Min	Max	Units
Supply Voltage			
V_{CC}	3.2	8.8	V
V_{SS}	6.5	8.8	V
Temperature T_A			
DS75493	0	+70	°C
DS55493	−55	+125	°C

Electrical Characteristics ($V_{SS} \geq V_{CC}$) (Notes 2 and 3)

Symbol	Parameter	Conditions		Min	Typ	Max	Units
I_{IN}	Input Current	V_{SS} = Max, V_{IN} = 8.8V, V_{CC} = Open, V_{CE} = 0V				3.2	mA
		I_{OUT} = R_{SET} @ 0V, V_{CE} = 8.8V				3.6	mA
I_{CE}	Chip Enable Input Current	V_{CC} = Max, V_{SS} = Max, V_{CE} = 8.8V, All Other Pins to GND				2.1	mA
I_{OUT}	Output Current	I_{OUT} @ 2.15V, R_L = 50Ω	V_{CC} = Min, V_{SS} = 6.5V, I_{CE} = 80 μA, V_{IN} = 6.5V Through 1.0 kΩ	−8	−13		mA
			V_{CE} = 0V, V_{IN} = 8.8V		−16	−20	mA
I_{OL}	Output Leakage Current	I_{OUT} = R_{SET} @ 0V, Measure Current to Gnd, V_{SS} = 8.8V	V_{CC} = Min, V_{CE} = 0V V_{IN} = 8.8V Through 100 kΩ			−200	μA
			V_{CE} = 6.5V Though 1.0 kΩ, V_{IN} = 8.8V			−100	μA
I_{CC}	Supply Current, V_{CC}	V_{CC} = Max, V_{SS} = Max, All Other Pins to Gnd				40	μA
I_{SS}	Supply Current	V_{CC} = 0V, All Other Pins to Gnd				40	μA
		V_{CC} = Min, V_{SS} = 8.8V	I_{OUT} @ 2.15V, V_{CE} = 8.8V Through 100 kΩ, R_L = 50Ω		0.5	1.5	mA
			I_{OUT} = Open, R_{SET} = Open, V_{CE} = 0V			1.4	mA

Switching Characteristics T_A = 25°C, nominal power supplies unless otherwise noted

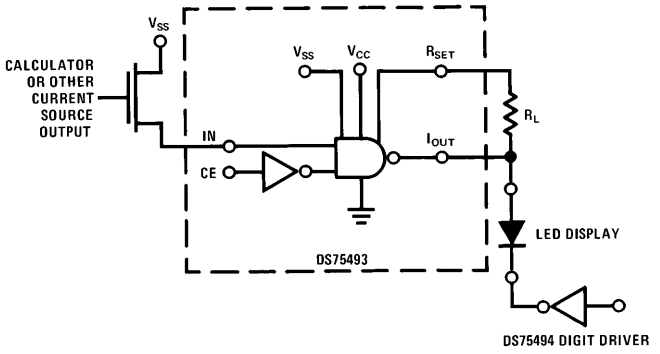
Symbol	Parameter	Conditions	Min	Typ	Max	Units
$t_{pd(OFF)}$	Propagation Delay to a Logical "0" From Input to Output	(See AC Test Circuit		170	300	ns
$t_{pd(ON)}$	Propagation Delay to a Logical "1" From Input to Output	(See AC Test Circuit)		11	100	ns

Note 1: "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. 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 range for the DS75493 and across the −55°C to +125°C range for the DS55493.

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.

Typical Applications



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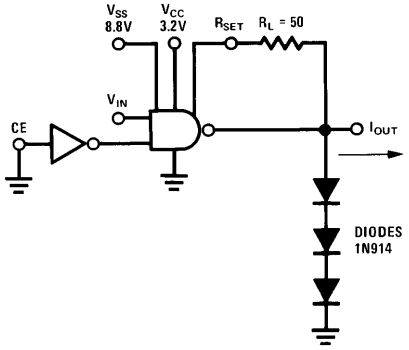
AC Test Circuit



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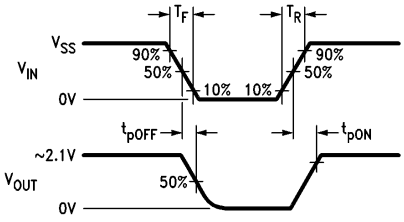
Switching Time Waveforms



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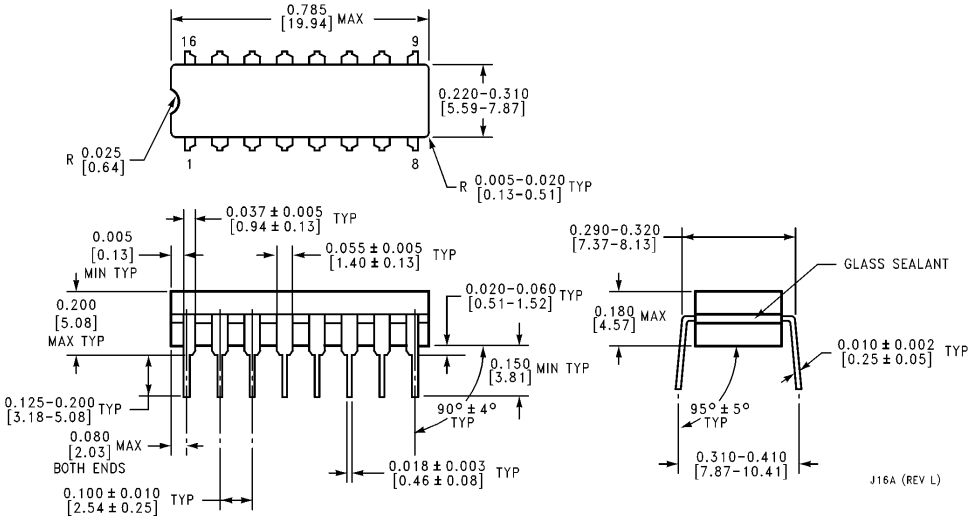
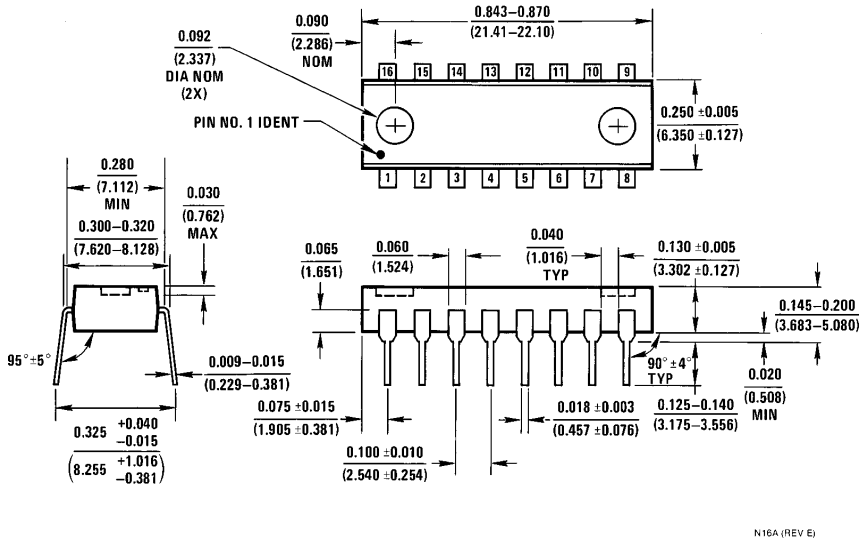
Physical Dimensions inches (millimeters)



Order Number DS55493J, DS75493J
NS Package Number J16A

Physical Dimensions inches (millimeters) (Continued)



Order Number DS75493N
See NS Package Number N16A

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2. A critical component is any component of 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.

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