

# SN65555, SN65556, SN75555, SN75556 ELECTROLUMINESCENT COLUMN DRIVERS

SLDS031A – APRIL 1985 – REVISED APRIL 1993

- Each Device Drives 32 Electrodes
- 90-V Output Voltage Swing Capability Using Ramped Supply
- 15-mA Output Source and Sink Current Capability
- High-Speed Serially-Shifted Data Input
- Totem-Pole Outputs
- Latches on All Driver Outputs

## description

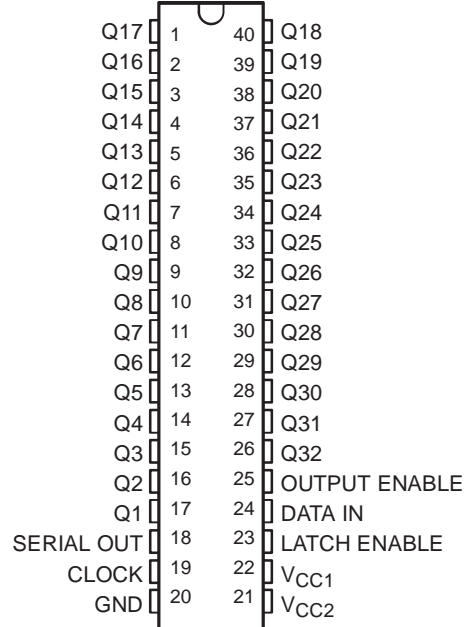
The SN65555, SN75555, SN65556, and SN75556 are monolithic BIDFET† integrated circuits designed to drive the column electrodes of an electroluminescent display. The SN65556 and SN75556 output sequence is reversed from the SN65555 and SN75555 for ease in printed-circuit-board layout.

The devices consist of a 32-bit shift register, 32 latches, and 32 output AND gates. Serial data is entered into the shift register on the low-to-high transition of CLOCK. When high, LATCH ENABLE transfers the shift register contents to the outputs of the 32 latches. When OUTPUT ENABLE is high, all Q outputs are enabled. Data must be loaded into the latches and OUTPUT ENABLE must be high before supply voltage  $V_{CC2}$  is ramped up.

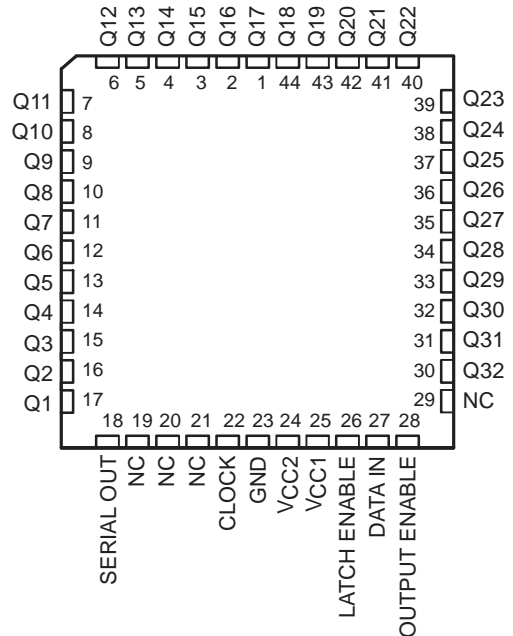
Serial data output from the shift register can be used to cascade shift registers. This output is not affected by LATCH ENABLE or OUTPUT ENABLE.

The SN65555 and SN65556 are characterized for operation from  $-40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$ . The SN75555 and SN75556 are characterized for operation from  $0^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ .

SN75555 . . . N PACKAGE  
(TOP VIEW)



SN65555, SN75555 . . . FN PACKAGE  
(TOP VIEW)



NC – No internal connection

† BIDFET – Bipolar, double-diffused, N-channel and P-channel MOS transistors on same chip. This is a patented process.

PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

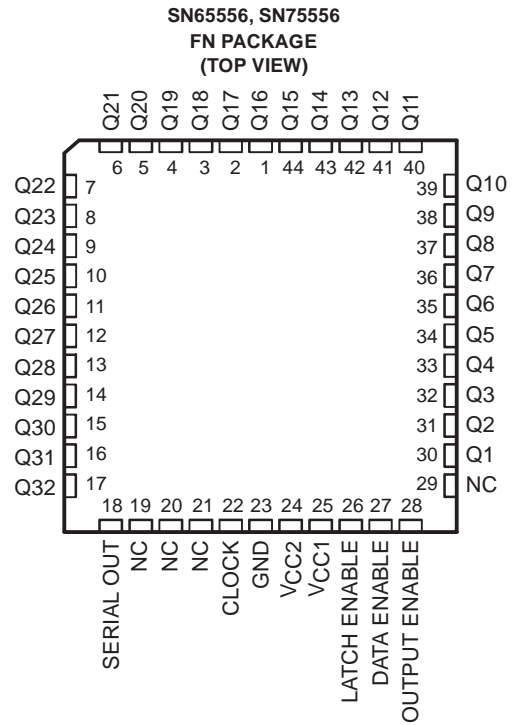
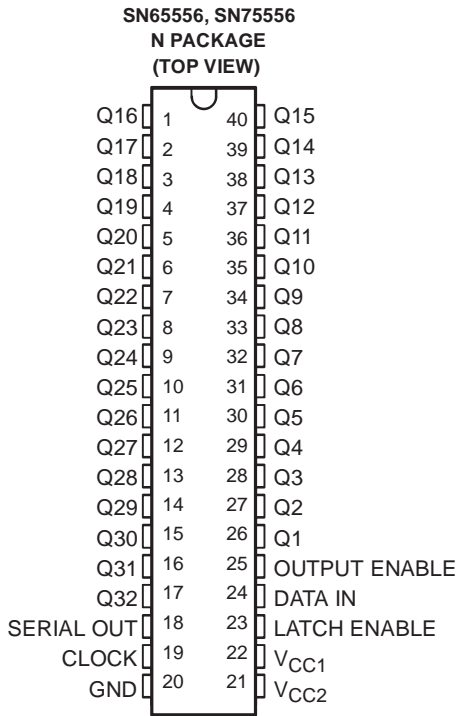
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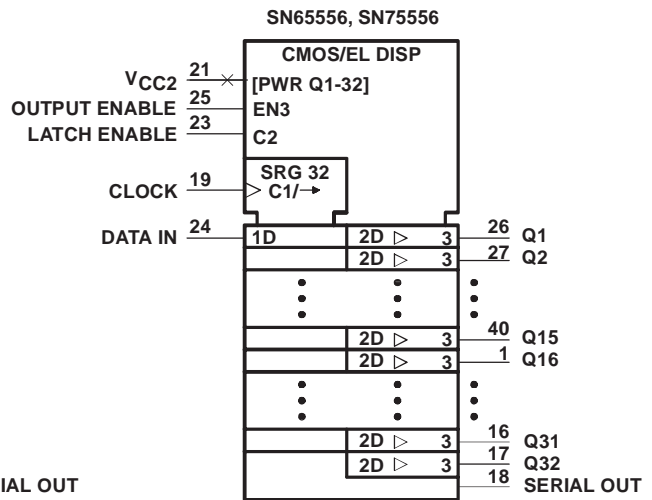
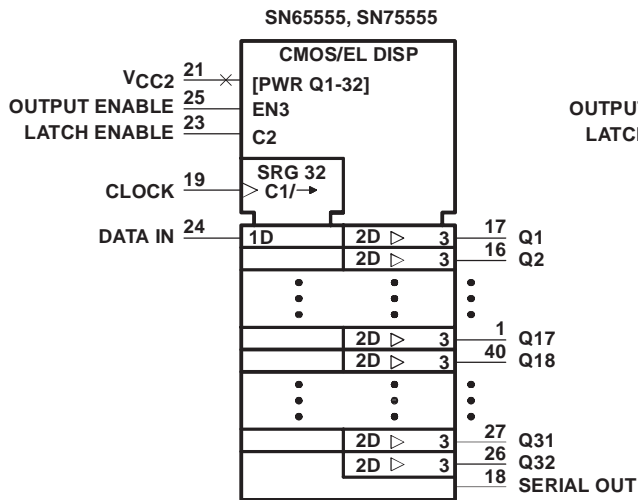
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NC – No internal connection

## logic symbols†

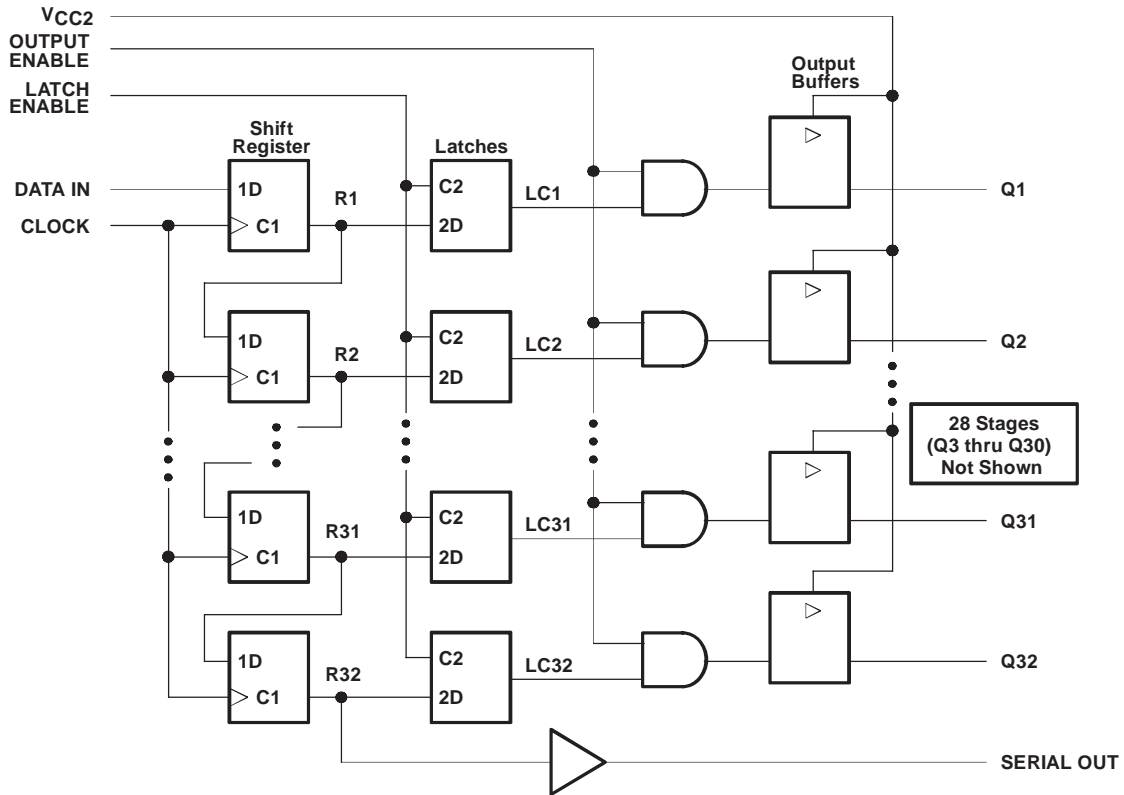


† These symbols are in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12. Pin numbers shown are for N packages.

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## logic diagram (positive logic)



FUNCTION TABLE

FUNCTION	CONTROL INPUTS			SHIFT REGISTER R1 THRU R32	LATCHES LC1 THRU LC32	OUTPUTS	
	CLOCK	LATCH ENABLE	OUTPUT ENABLE			SERIAL	Q1 THRU Q32
Load	↑	X	X	Load and shift†	Determined by LATCH ENABLE‡	R32	Determined by OUTPUT ENABLE
	No↑	X	X	No change		R32	
Latch	X	L	X	As determined above	Stored data New data	R32	Determined by OUTPUT ENABLE
	X	H	X			R32	
Output Enable	X	X	L	As determined above	Determined by LATCH ENABLE‡	R32	All L LC1 thru LC21, respectively

H = high level, L = low level, X = irrelevant, ↑ = low-to-high-level transition.

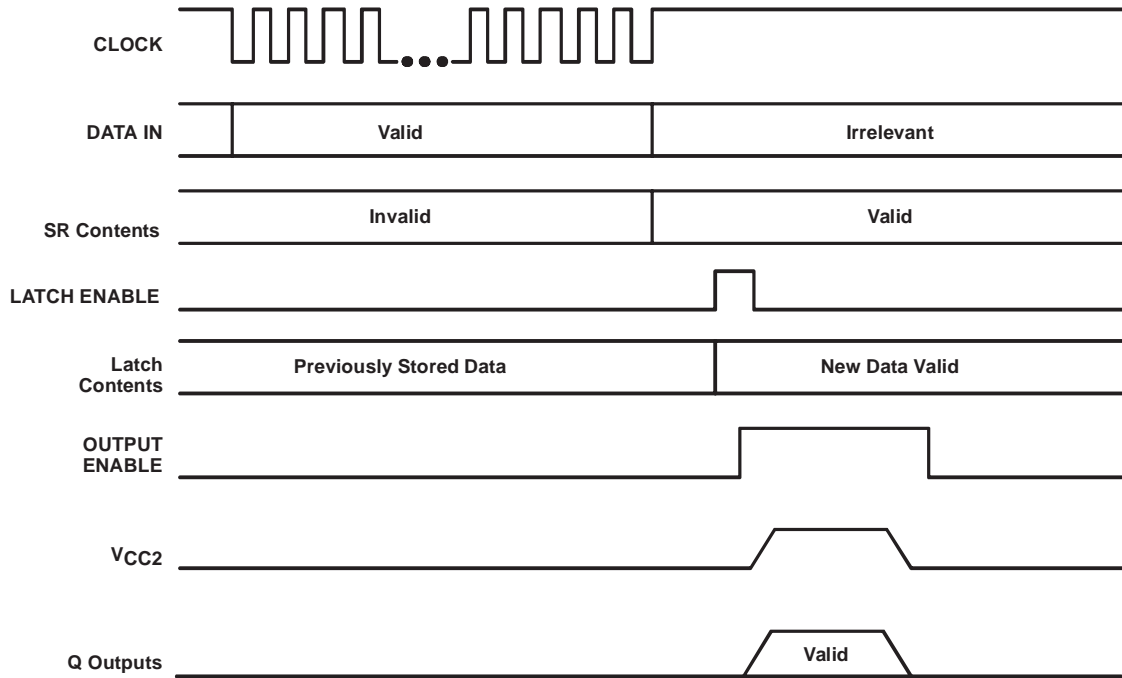
† R32 and the serial output take on the state of R31, R31 takes on the state of R30, . . . R2 takes on the state of R1, and R1 takes on the state of the data input.

‡ New data enter the latches while LATCH ENABLE is high. These data are stored while LATCH ENABLE is low.

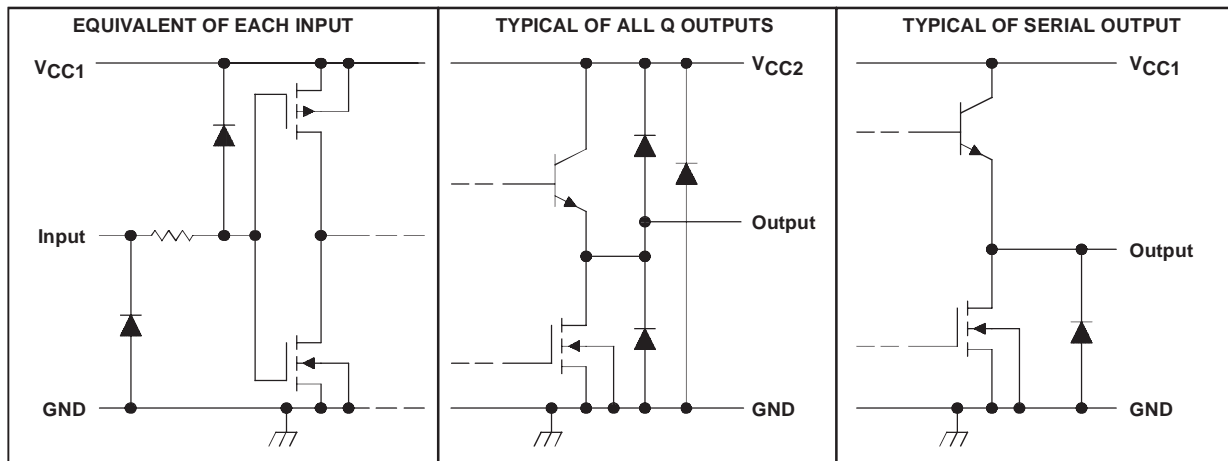
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## typical operating sequence



## schematic of inputs and outputs



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## absolute maximum ratings over operating free-air temperature range (unless otherwise noted)

Supply voltage, $V_{CC1}$ (see Note 1)	18 V
Supply voltage, $V_{CC2}$ (see Note 2)	90 V
Input voltage, $V_I$	$V_{CC1} + 0.3$ V
Ground current	700 mA
Continuous total power dissipation	See Dissipation Rating Table
Operating free-air temperature range, $T_A$ : SN65555, SN65556	-40°C to 85°C
SN75555, SN75556	0°C to 70°C
Storage temperature range, $T_{stg}$	-65°C to 150°C
Case temperature for 10 seconds: FN package	260°C
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds: N package	260°C

- NOTES: 1. Voltage values are with respect to network GND.  
 2. These devices have been designed to be used in applications in which the high-voltage supply,  $V_{CC2}$ , is switched to GND before changing the state of the outputs.

**DISSIPATION RATING TABLE**

PACKAGE	$T_A = 25^\circ\text{C}$ POWER RATING	DERATING FACTOR ABOVE $T_A = 25^\circ\text{C}$	$T_A = 70^\circ\text{C}$ POWER RATING	$T_A = 85^\circ\text{C}$ POWER RATING
FN	1700 mW	13.6 mW/°C	1088 mW	884 mW
N	1250 mW	10.0 mW/°C	800 mW	650 mW

## recommended operating conditions

		MIN	NOM	MAX	UNIT
Supply voltage, $V_{CC1}$		10.8	12	15	V
Supply voltage, $V_{CC2}$		0		80	V
High-level input voltage, $V_{IH}$ (see Figure 1)	$V_{CC1} = 10.8$ V	8.1		11.1	V
	$V_{CC1} = 15$ V	11.25		15.3	
Low-level input voltage, $V_{IL}$ (see Figure 1)	$V_{CC1} = 10.8$ V	-0.3†		2.7	V
	$V_{CC1} = 15$ V	-0.3†		3.75	
High-level output current, $I_{OH}$				-15	mA
Low-level output current, $I_{OL}$				15	mA
Output clamp current, $I_{OK}$				20	mA
Clock frequency, $f_{clock}$		0		6.25	MHz
Pulse duration, CLOCK high or low, $t_w(\text{CLK})$ (see Figure 2)		80			ns
Pulse duration, LATCH ENABLE, $t_w(\text{LE})$		80			ns
Setup time, $t_{su}$	DATA IN before CLOCK ↑ (see Figure 2)	20			ns
	OUTPUT ENABLE before $V_{CC2}$ ↑ (see Figure 4)	500			
Hold time, $t_h$	DATA IN after CLOCK ↑ (see Figure 2)	80			ns
	OUTPUT ENABLE after $V_{CC2}$ ↑ (see Figure 4)	100			
Rate of rise for $V_{CC2}$ , $dv/dt$				80	V/μs
Operating free-air temperature, $T_A$	SN65555, SN65556	-40		85	°C
	SN75555, SN75556	0		85	

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



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electrical characteristics over recommended operating free-air temperature range,  $V_{CC1} = 12\text{ V}$ ,  $V_{CC2} = 80\text{ V}$

PARAMETER		TEST CONDITIONS	MIN	MAX	UNIT
$V_{OH}$	High-level output voltage	Q outputs		77	V
		SERIAL OUT	$I_O = -15\text{ mA}$	10.5	
$V_{OL}$	Low-level output voltage	Q outputs	$I_{OL} = 15\text{ mA}$	8	V
		SERIAL OUT	$I_{OL} = 100\text{ }\mu\text{A}$	1	
$I_{IH}$	High-level input current	$V_I = 12\text{ V}$		1	$\mu\text{A}$
$I_{IL}$	Low-level input current	$V_I = 0$		-1	$\mu\text{A}$
$I_{CC1}$	Supply current from $V_{CC1}$			2	mA
$I_{CC2}$	Supply current from $V_{CC2}$			5	mA

switching characteristics,  $V_{CC1} = 12\text{ V}$ ,  $T_A = 25^\circ\text{C}$

PARAMETER		TEST CONDITIONS	MIN	MAX	UNIT
$t_{PHL}$	Propagation delay time, high-to-low-level, SERIAL OUT from CLOCK	$C_L = 20\text{ pF}$ to GND, $V_{CC2} = 0$ , See Figure 3		140	ns
$t_{PLH}$	Propagation delay time, low-to-high level, SERIAL OUT from CLOCK			140	ns
$t_d$	Delay time, $V_{CC2}$ to Q outputs	$dv/dt = 80\text{ V}/\mu\text{s}$ , See Figure 4		100	ns

## RECOMMENDED OPERATING CONDITIONS

### INPUT VOLTAGE LOGIC-LEVEL LIMITS vs SUPPLY VOLTAGE $V_{CC1}$

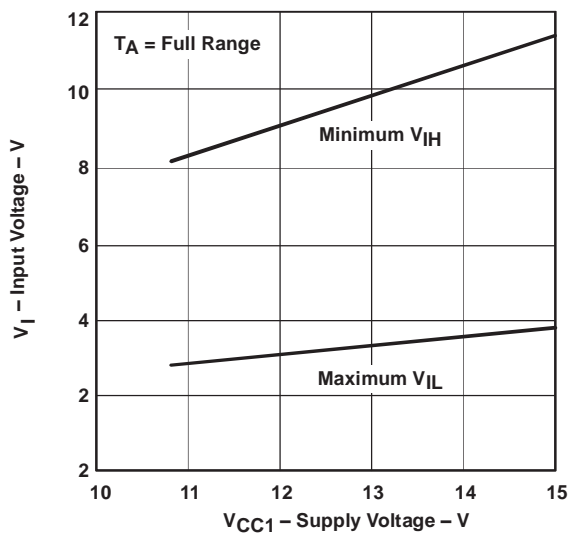


Figure 1

# SN65555, SN65556, SN75555, SN75556 ELECTROLUMINESCENT COLUMN DRIVERS

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## PARAMETER MEASUREMENT INFORMATION

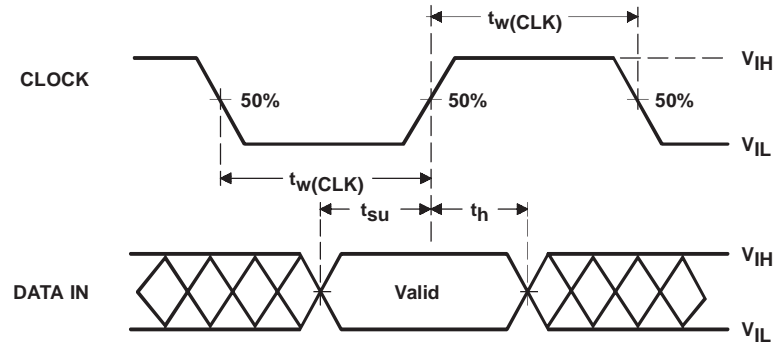


Figure 2. Input Timing Voltage Waveforms

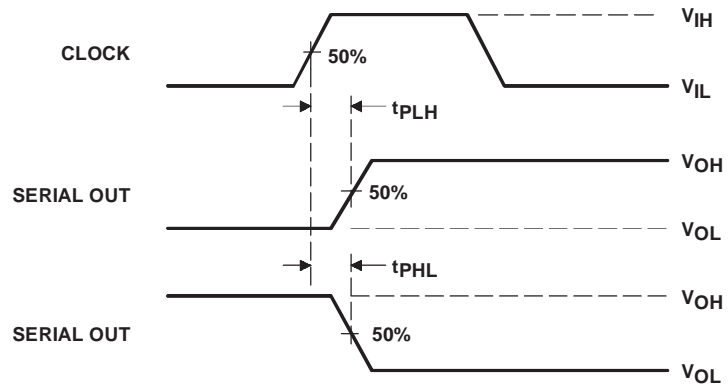


Figure 3. Voltage Waveforms for Propagation Delay Time, CLOCK to SERIAL OUT

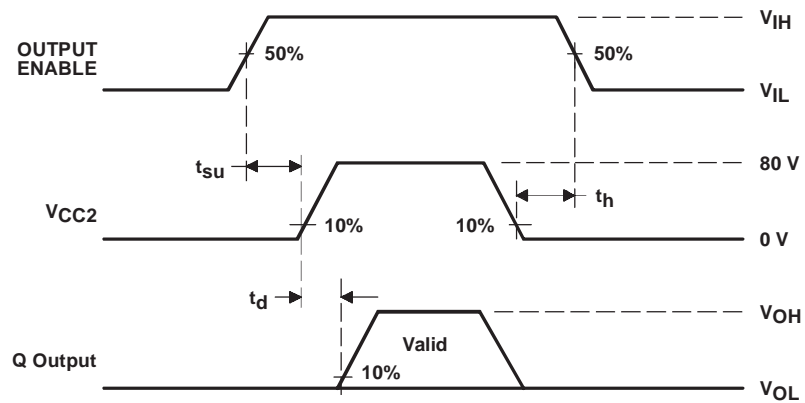


Figure 4. Voltage Waveforms for Delay Times,  $V_{CC2}$  to Q Outputs







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