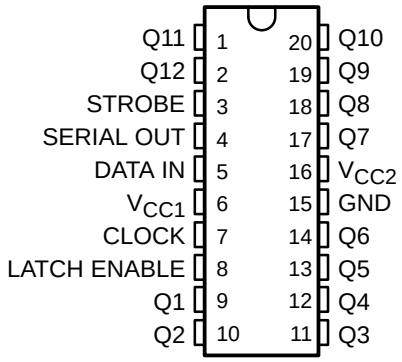
SLDS054 – D3516, MAY 1990

- **Each Device Drives 12 Lines**
- **60-V Output Voltage Swing Capability**
- **25-mA Output Source Current Capability**
- **High-Speed Serially-Shifted Data Input**
- **TTL-Compatible Inputs**
- **Latches on All Driver Outputs**

DW OR N PACKAGE
(TOP VIEW)



description

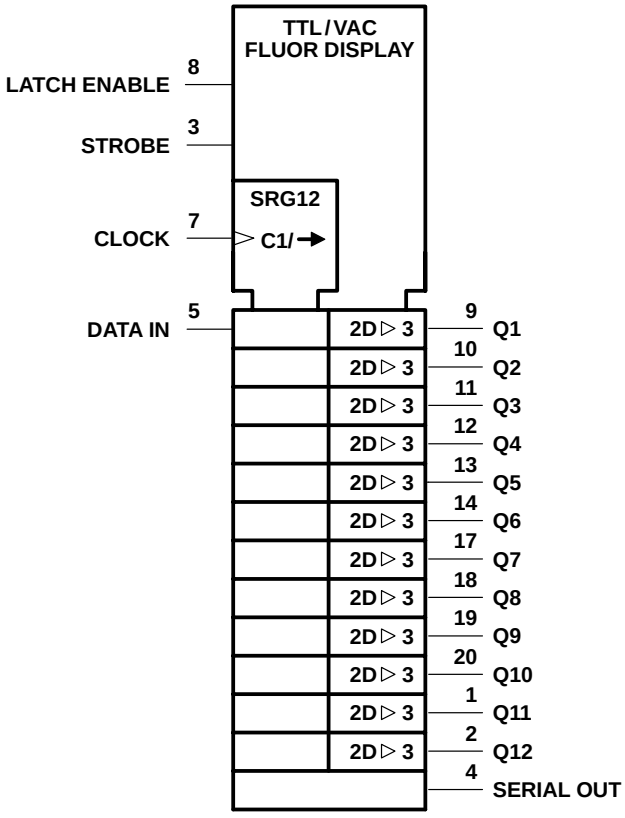
The SN65512C and SN75512C are monolithic BIDFET† integrated circuits designed to drive a dot matrix or segmented vacuum fluorescent display.

All device inputs are diode-clamped pnp inputs and assume a high logic level when open circuited. The nominal input threshold is 1.5 V. Outputs are totem-pole structures formed by an npn emitter follower and double-diffused MOS (DMOS) transistors.

The device consists of a 12-bit shift register, 12 latches, and 12 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 12 latches. The active-low STROBE input enables all Q outputs. Serial data output from the shift register can be used to cascade shift registers. This output is not affected by LATCH ENABLE or STROBE.

The SN65512C is characterized for operation from –40°C to 85°C. The SN75512C is characterized for operation from 0°C to 70°C.

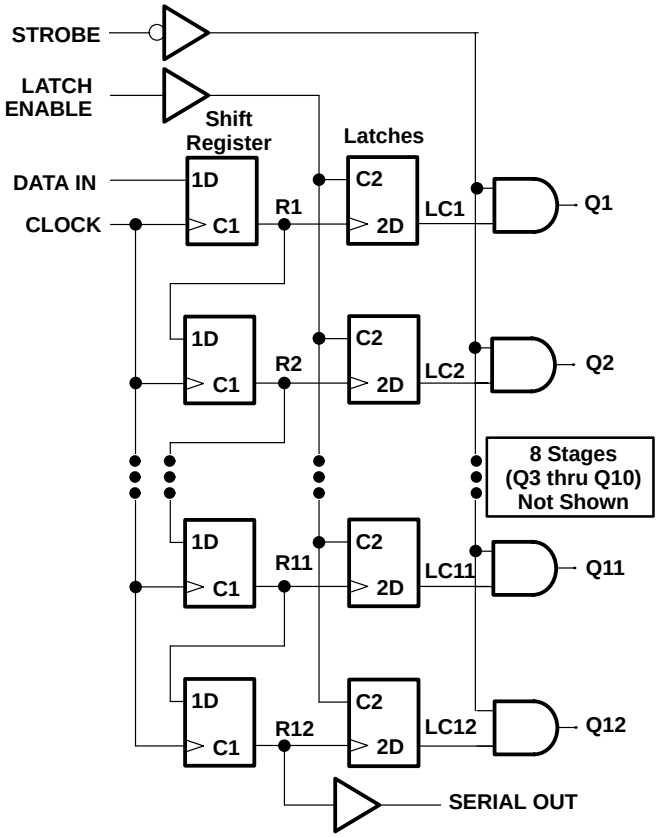
logic symbol‡



‡ This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

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

logic diagram (positive logic)



FUNCTION TABLE

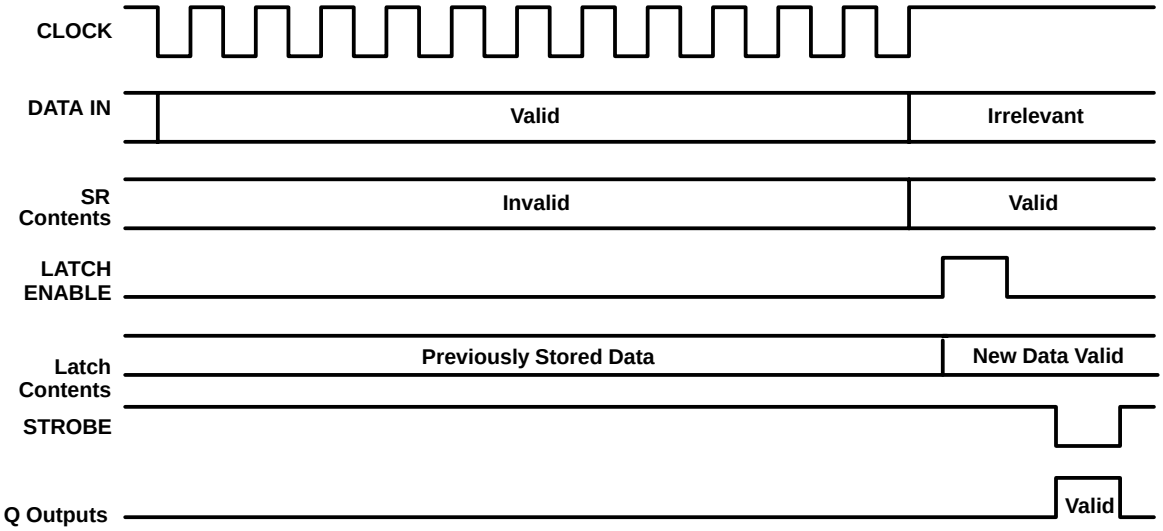
FUNCTION	CONTROL INPUTS			SHIFT REGISTER R1 THRU R12	LATCHES LC1 THRU LC12	OUTPUTS	
	CLOCK	LATCH ENABLE	STROBE			SERIAL	Q1 THRU Q12
Load	↑ No ↑	X	X	Load and shift† No change	Determined by LATCH ENABLE‡	R12	Determined by STROBE
Latch	X	L H	X	As determined above	Stored data New data	R12	Determined by STROBE
Strobe	X	X	H L	As determined above	Determined by LATCH ENABLE‡	R12	All L LC1 thru LC12, respectively

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

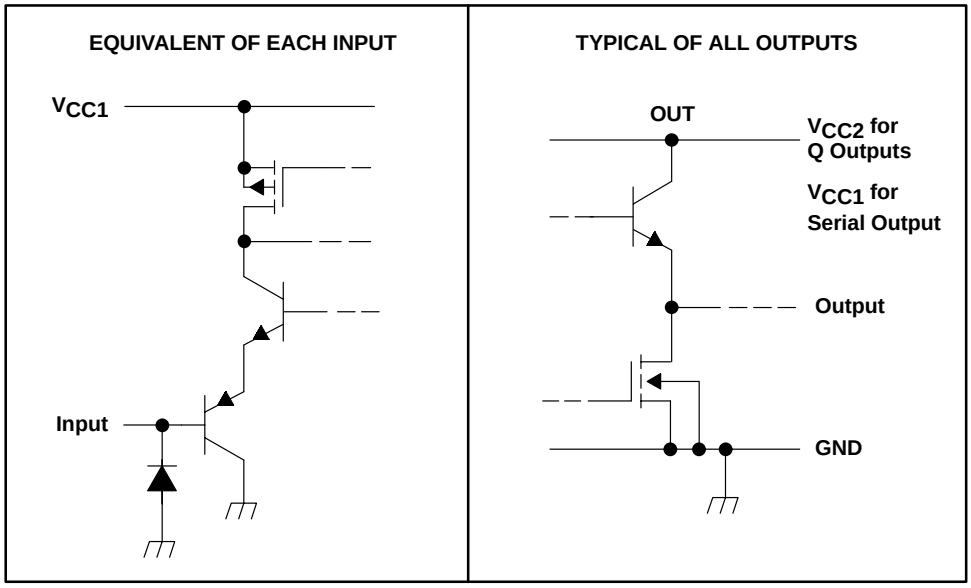
† R12 takes on the state of R11, R11 takes on the state of R10, . . . R2 takes on the state of R1, and R1 takes on the state of the data input.

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

typical operating sequence



schematics of inputs and outputs



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

Supply voltage, V_{CC1} (see Note 1) . . . . . 15 V
Supply voltage, V_{CC2} . . . . . 70 V
Input voltage, V_I . . . . . V_{CC1}
Continuous total power dissipation . . . . . See Dissipation Rating Table
Operating free-air temperature range: SN65512C . . . . . –40°C to 85°C
SN75512C . . . . . 0°C to 70°C
Storage temperature range . . . . . –65°C to 150°C
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds . . . . . 260°C

NOTES: 1. Voltage values are with respect to network GND.

DISSIPATION RATING TABLE

PACKAGE	$T_A \le 25°C$ POWER RATING	DERATING FACTOR ABOVE $T_A = 25°C$	$T_A = 70°C$ POWER RATING	$T_A = 85°C$ POWER RATING
DW	1125 mW	9.0 mW/°C	720 mW	585 mW
N	1150 mW	9.2 mW/°C	736 mW	598 mW

recommended operating conditions

		SN65512C		SN75512C		UNIT
		MIN	MAX	MIN	MAX	
Supply voltage, V_{CC1}		5	15	5	15	V
Supply voltage, V_{CC2}		0	60	0	60	V
High-level input voltage, V_{IH}		2		2		V
Low-level input voltage, V_{IL}			0.8		0.8	V
High-level output current, I_{OH}			–25		–25	mA
Low-level output current, I_{OL}	V_{CC1} = 5 V		5		5	mA
Clock frequency, f_{clock}	V_{CC1} = 15 V, T_A = 25°C	0	4	0	4	MHz
	V_{CC1} = 5 V, T_A = 25°C	0	1	0	1	MHz
Pulse duration, CLOCK high or low, t_w	V_{CC1} = 15 V, T_A = 25°C	100		100		ns
	V_{CC1} = 5 V, T_A = 25°C	500		500		ns
Setup time, DATA IN before CLOCK ↑, t_{su} (see Figure 1)	V_{CC1} = 15 V, T_A = 25°C	100		100		ns
	V_{CC1} = 5 V, T_A = 25°C	250		250		ns
Hold time, DATA IN after CLOCK ↑, t_h (see Figure 1)	V_{CC1} = 15 V, T_A = 25°C	50		50		ns
	V_{CC1} = 5 V, T_A = 25°C	250		250		ns
Operating free-air temperature, T_A		–40	85	0	70	°C

electrical characteristics over recommended operating free-air temperature range, V_{CC2} = 60 V

PARAMETER			TEST CONDITIONS		MIN	TYP†	MAX	UNIT
V_{IK}	Input clamp voltage		I_I = –12 mA				–1.5	V
V_{OH}	High-level output voltage	Q outputs	I_{OH} = –25 mA,	V_{CC1} = 5 V	57.5	58		V
		SERIAL OUT	I_{OH} = –200 µA,	V_{CC1} = 5 V	4.5	4.7		
V_{OL}	Low-level output voltage	Q outputs	I_{OL} = 1 mA,	V_{CC1} = 5 V		2.8	5	V
		SERIAL OUT	I_{OL} = 200 µA,	V_{CC1} = 5 V		0.05	0.2	
I_{IH}	High-level input current		V_{CC1} = 15 V,	V_I = 5 V		0.01	10	µA
I_{IL}	Low-level input current		V_{CC1} = 15 V,	V_I = 0.8 V		–25	–150	µA
I_{CC1}	Supply current from V_{CC1}		V_{CC1} = 15 V	V_I = 5 V		500	800	µA
				V_I = 0.8 V		2	6	mA
I_{CC2}	Supply current from V_{CC2}		V_{CC1} = 15 V	All outputs high		6	12	mA
				STROBE at 2 V		100	500	µA

† All typical values are at V_{CC1} = 5 V, T_A = 25°C.

switching characteristics, V_{CC1} = 5 V, V_{CC2} = 60 V, T_A = 25°C

PARAMETER		TEST CONDITIONS	MIN	MAX	UNIT
t_{DHL}	Delay time, high-to-low level output	C_L = 30 pF, See Figure 2		300	ns
t_{DLH}	Delay time, low-to-high level output			300	ns
t_{THL}	Transition time, high-to-low level output			500	ns
t_{TLH}	Transition time, low-to-high level output			500	ns

PARAMETER MEASUREMENT INFORMATION

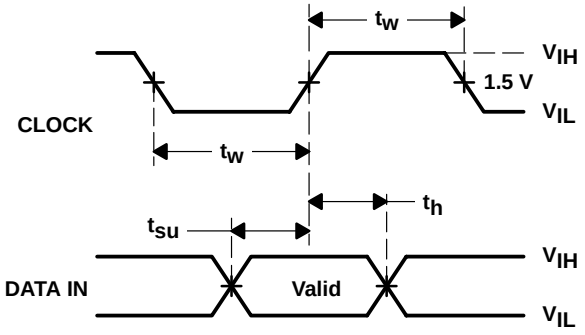


Figure 1. Input Timing Voltage Waveforms

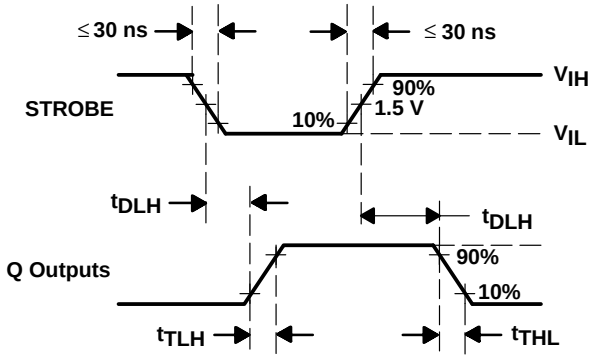


Figure 2. Switching Time Voltage Waveforms

IMPORTANT NOTICE

Texas Instruments (TI) reserves the right to make changes to its products or to discontinue any semiconductor product or service without notice, and advises its customers to obtain the latest version of relevant information to verify, before placing orders, that the information being relied on is current.

TI warrants performance of its semiconductor products and related software to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are utilized to the extent TI deems necessary to support this warranty. Specific testing of all parameters of each device is not necessarily performed, except those mandated by government requirements.

Certain applications using semiconductor products may involve potential risks of death, personal injury, or severe property or environmental damage ("Critical Applications").

TI SEMICONDUCTOR PRODUCTS ARE NOT DESIGNED, INTENDED, AUTHORIZED, OR WARRANTED TO BE SUITABLE FOR USE IN LIFE-SUPPORT APPLICATIONS, DEVICES OR SYSTEMS OR OTHER CRITICAL APPLICATIONS.

Inclusion of TI products in such applications is understood to be fully at the risk of the customer. Use of TI products in such applications requires the written approval of an appropriate TI officer. Questions concerning potential risk applications should be directed to TI through a local SC sales office.

In order to minimize risks associated with the customer's applications, adequate design and operating safeguards should be provided by the customer to minimize inherent or procedural hazards.

TI assumes no liability for applications assistance, customer product design, software performance, or infringement of patents or services described herein. Nor does TI warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right of TI covering or relating to any combination, machine, or process in which such semiconductor products or services might be or are used.