

DATA SHEET

74F841/842/843/845/846

Bus interface latches

Product specification

Replaces datasheet 74F841/842/843/844/845/846 of 1999 Jan 08

IC15 Data Handbook

1999 Jun 23

Bus interface latches

74F841/74F842/74F843/ 74F845/74F846

74F841/74F842 10-bit bus interface latches, non-inverting/inverting (3-State)

74F843 9-bit bus interface latch, non-inverting (3-State)

74F845/74F846 8-bit bus interface latches, non-inverting/inverting (3-State)

FEATURES

- High speed parallel latches
- Extra data width for wide address/data paths or buses carrying parity
- High impedance NPN base input structure minimizes bus loading
- IIL is 20 μ A vs 1000A for AM29841 series
- Buffered control inputs to reduce AC effects
- Ideal where high speed, light loading, or increased fan-in are required as with MOS microprocessors
- Positive and negative over-shoots are clamped to ground
- 3-State outputs glitch free during power-up and power-down
- 48mA sink current
- Slim dual in-line 300 mil package
- Broadside pinout
- Pin-for-pin and function compatible with AMD AM29841-846 series

DESCRIPTION

The 74F841–74F846 bus interface latch series are designed to provide extra data width for wider address/data paths of buses carrying parity.

The 74F841–74F846 series are functionally an pin compatible to the AMD AM29841–AM29846 series.

The 74F841 consists of ten D-type latches with 3-State outputs. The flip-flops appear transparent to the data when Latch Enable (LE) is High. This allows asynchronous operation, as the output transition follows the data in transition. On the LE High-to-Low transition, the data that meets the setup and hold time is latched.

Data appears on the bus when the Output Enable ($\overline{OE}$) is Low. When $\overline{OE}$ is High the output is in the High-impedance state.

The 74F842 is the inverted output version of the 74F841.

The 74F843 consists of nine D-type latches with 3-State outputs. In addition to the LE and $\overline{OE}$ pins, the 74F843 has a Master Reset ($\overline{MR}$) pin and Preset ($\overline{PRE}$) pin. These pins are ideal for parity bus interfacing in high performance systems. When $\overline{MR}$ is Low, the outputs are Low if $\overline{OE}$ is Low. When $\overline{MR}$ is High, data can be entered into the latch. When $\overline{PRE}$ is Low, the outputs are High, if $\overline{OE}$ is Low, $\overline{PRE}$ overrides $\overline{MR}$.

The 74F845 consists of eight D-type latches with 3-State outputs. In addition to the LE, $\overline{OE}$, $\overline{MR}$ and $\overline{PRE}$ pins, the 74F845 has two additional $\overline{OE}$ pins making a total of three Output Enables ($\overline{OE0}$, $\overline{OE1}$, $\overline{OE2}$) pins.

The multiple Output Enables ($\overline{OE0}$, $\overline{OE1}$, $\overline{OE2}$) allow multi-user control of the interface, e.g., $\overline{CS}$, DMA, and RD/ $\overline{WR}$.

The 74F846 is the inverted output version of the 74F845.

TYPE	TYPICAL PROPAGATION DELAY	TYPICAL SUPPLY CURRENT (TOTAL)
74F841, 74F842	5.5ns	60mA
74F843, 74F845	5.5ns	75mA
74F846	6.2ns	60mA

ORDERING INFORMATION

PACKAGES	COMMERCIAL RANGE $V_{CC} = 5V \pm 10\%$; $T_{amb} = 0^{\circ}C$ to $+70^{\circ}C$	PACKAGE DRAWING NUMBER
24-pin plastic Slim DIP (300 mil)	N74F841N, N74F842N, N74F843N, N74F845N, N74F846N	SOT222-1
24-pin plastic SOL	N74F841D, N74F842D, N74F843D, N74F845D, N74F846D	SOT137-1

INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

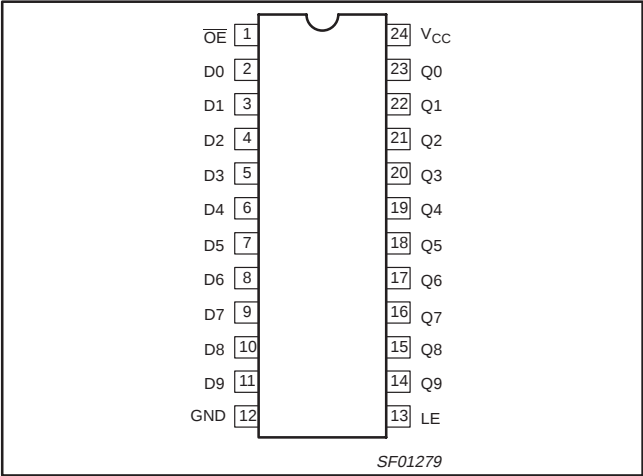
PINS	DESCRIPTION	74F(U.L.) HIGH/LOW	LOAD VALUE HIGH/LOW
Dn	Data inputs	1.0/0.033	20 μ A/20 μ A
LE	Latch Enable input	1.0/0.033	20 μ A/20 μ A
$\overline{OE}$, $\overline{OEn}$	Output Enable input (active Low)	1.0/0.033	20 μ A/20 μ A
$\overline{MR}$	Master Reset input (active Low)	1.0/0.033	20 μ A/20 μ A
$\overline{PRE}$	Preset input (active Low)	1.0/0.033	20 μ A/20 μ A
Qn	Data outputs	1200/80	24mA/48mA
$\overline{Qn}$	Data outputs	1200/80	24mA/48mA

NOTE: One (1.0) FAST Unit Load is defined as: 20 μ A in the High state and 0.6mA in the Low state.

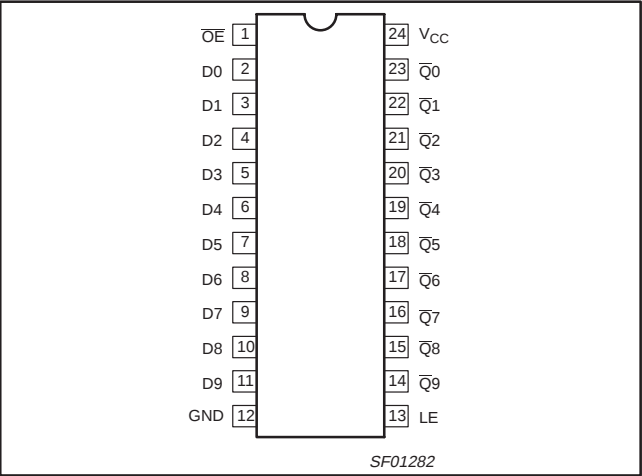
Bus interface latches

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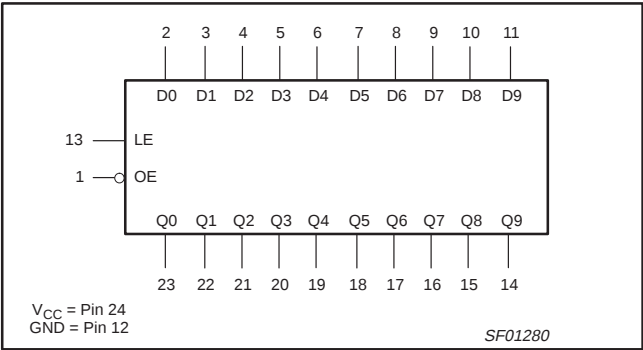
PIN CONFIGURATION for 74F841



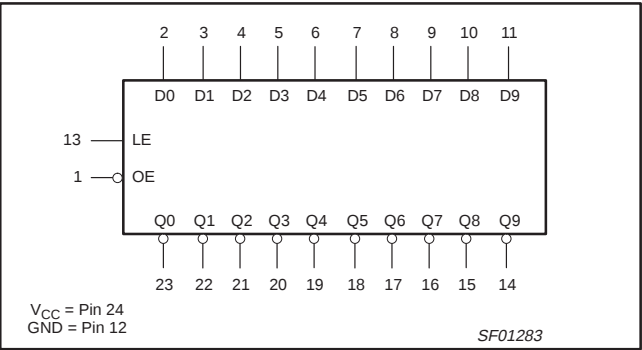
PIN CONFIGURATION for 74F842



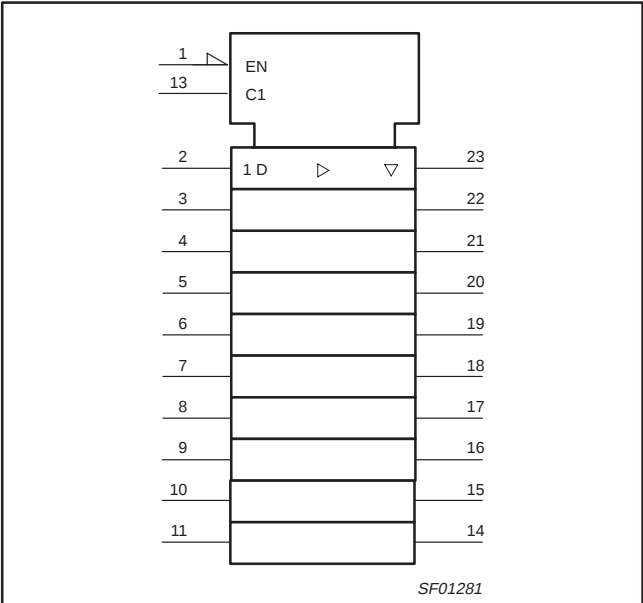
LOGIC SYMBOL for 74F841



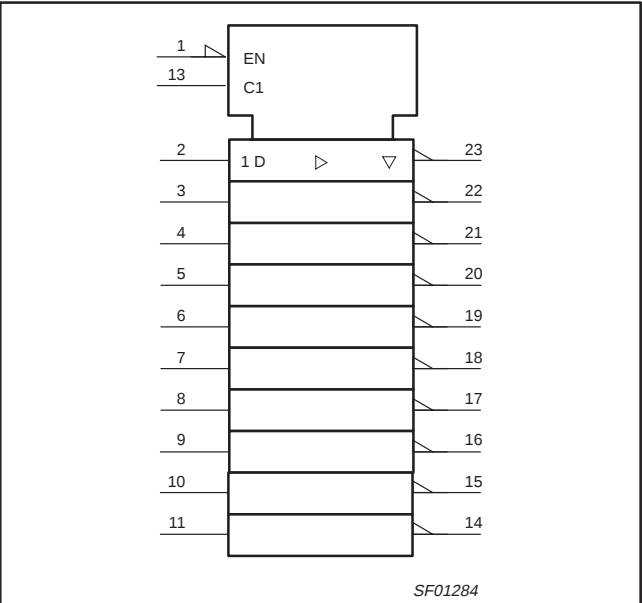
LOGIC SYMBOL for 74F842



LOGIC SYMBOL (IEEE/IEC) for 74F841



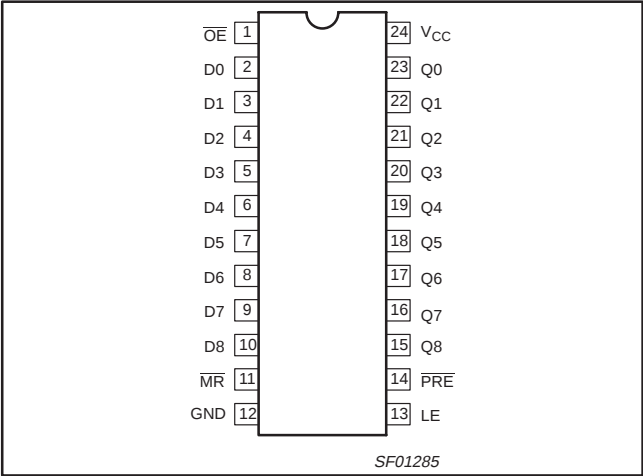
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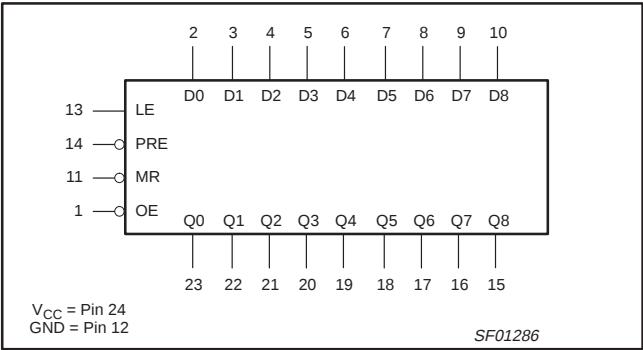
Bus interface latches

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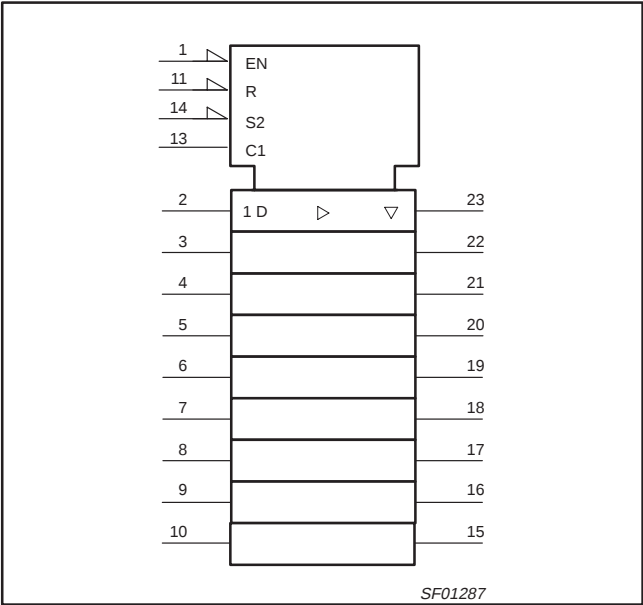
PIN CONFIGURATION for 74F843



LOGIC SYMBOL for 74F843



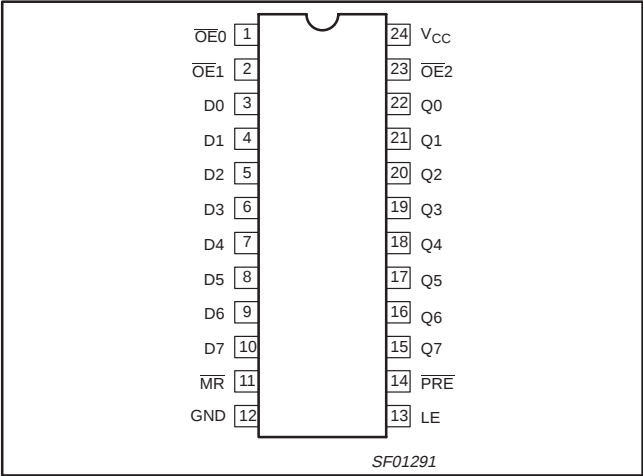
LOGIC SYMBOL (IEEE/IEC) for 74F843



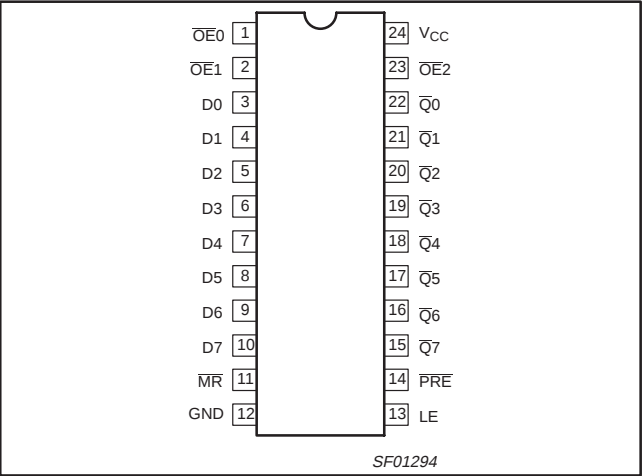
Bus interface latches

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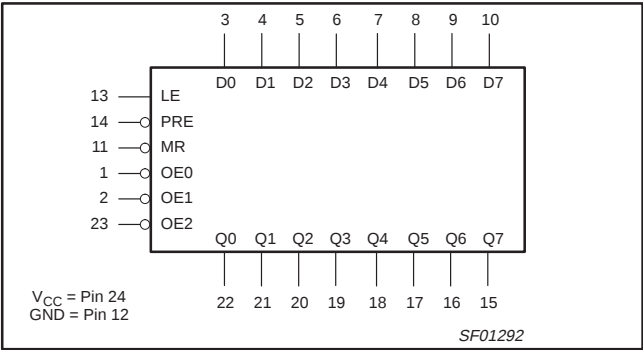
PIN CONFIGURATION for 74F845



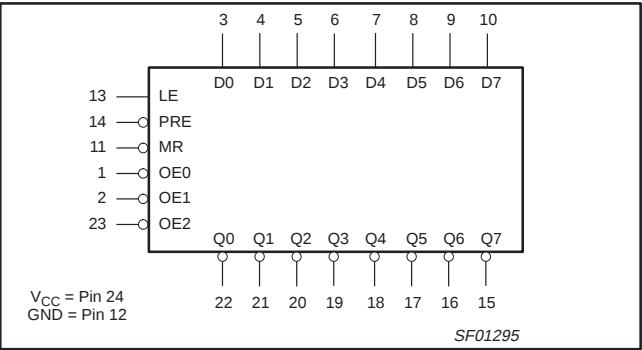
PIN CONFIGURATION for 74F846



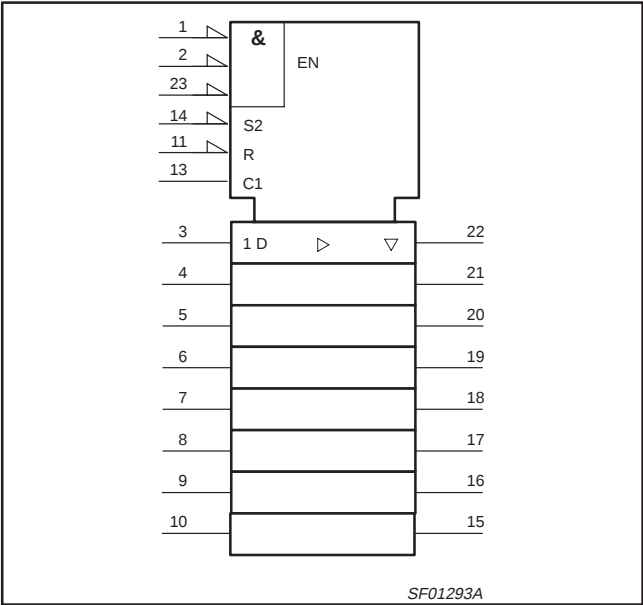
LOGIC SYMBOL for 74F845



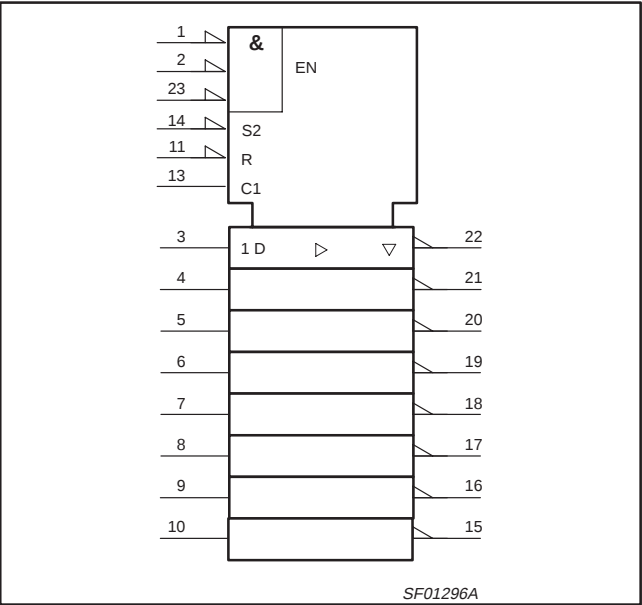
LOGIC SYMBOL for 74F846



LOGIC SYMBOL (IEEE/IEC) for 74F845



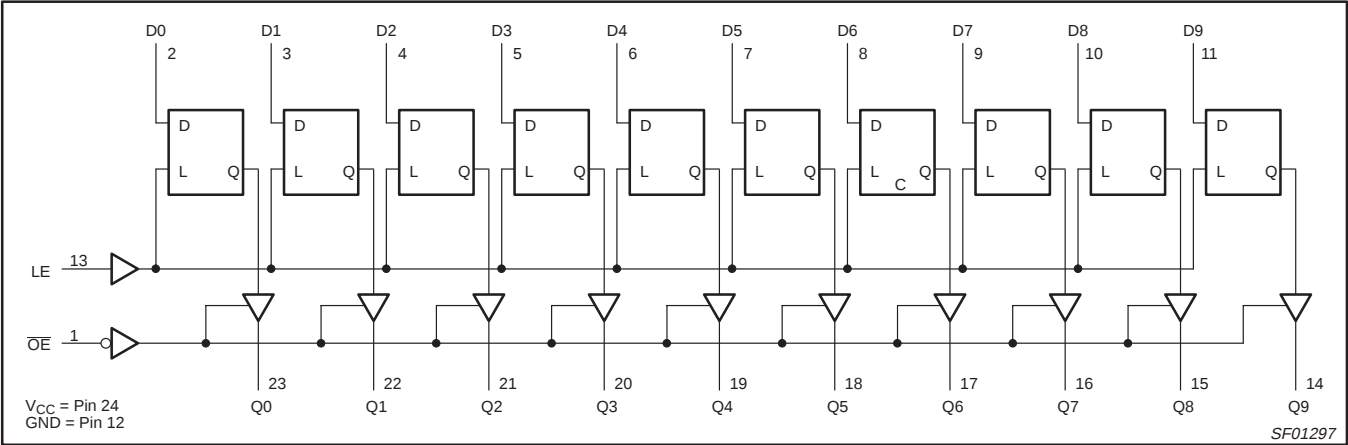
LOGIC SYMBOL (IEEE/IEC) for 74F846



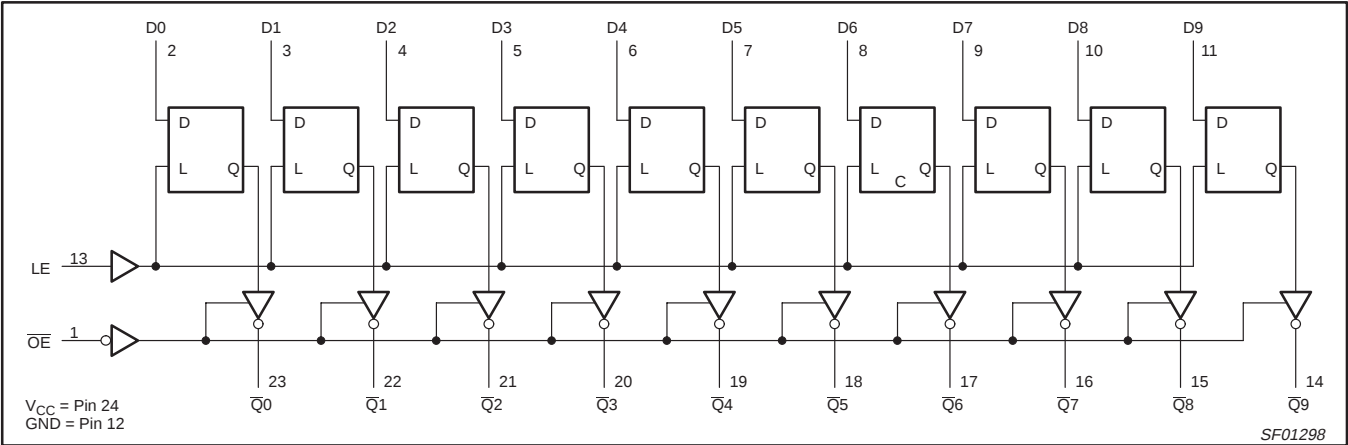
Bus interface latches

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LOGIC DIAGRAM for 74F841



LOGIC DIAGRAM for 74F842



FUNCTION TABLE for 74F841 and 74F842

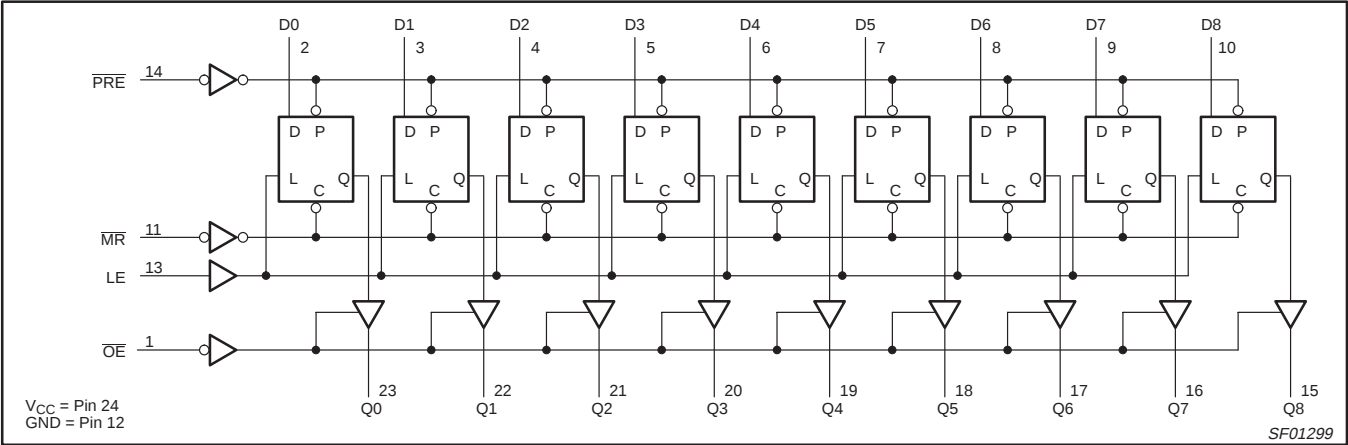
INPUTS			OUTPUTS		OPERATING MODE
			74F841	74F842	
$\overline{OE}$	LE	D _n	Q _n	$\overline{Q}_n$	
L	H	L	L	H	Transparent
L	H	H	H	L	
L	↓	l	L	H	Latched
L	↓	h	H	L	
H	X	X	Z	Z	High Impedance
L	L	X	NC	NC	Hold

H = High voltage level
L = Low voltage level
h = High state one setup time before the High-to-Low LE transition
l = Low state one setup time before the High-to-Low LE transition
↓ = High-to-Low transition
X = Don't care
NC= No change
Z = High impedance "off" state

Bus interface latches

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LOGIC DIAGRAM for 74F843



FUNCTION TABLE for 74F843

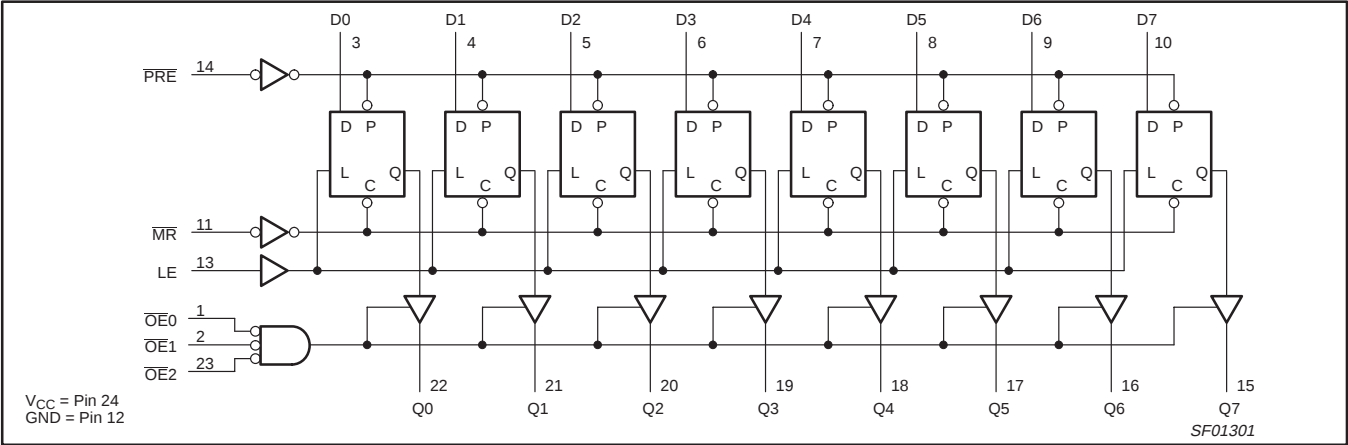
INPUTS					OUTPUTS	OPERATING MODE
					74F843	
OE	PRE	MR	LE	Dn	Qn	
L	L	X	X	X	H	Preset
L	H	L	X	X	L	Clear
L	H	H	H	L	L	Transparent
L	H	H	H	H	H	
L	H	H	↓	l	L	Latched
L	H	H	↓	h	H	
H	X	X	X	X	Z	High Impedance
L	H	H	L	X	NC	Hold

H = High voltage level
L = Low voltage level
h = High state one setup time before the High-to-Low LE transition
l = Low state one setup time before the High-to-Low LE transition
↓ = High-to-Low transition
X = Don't care
NC= No change
Z = High impedance "off" state

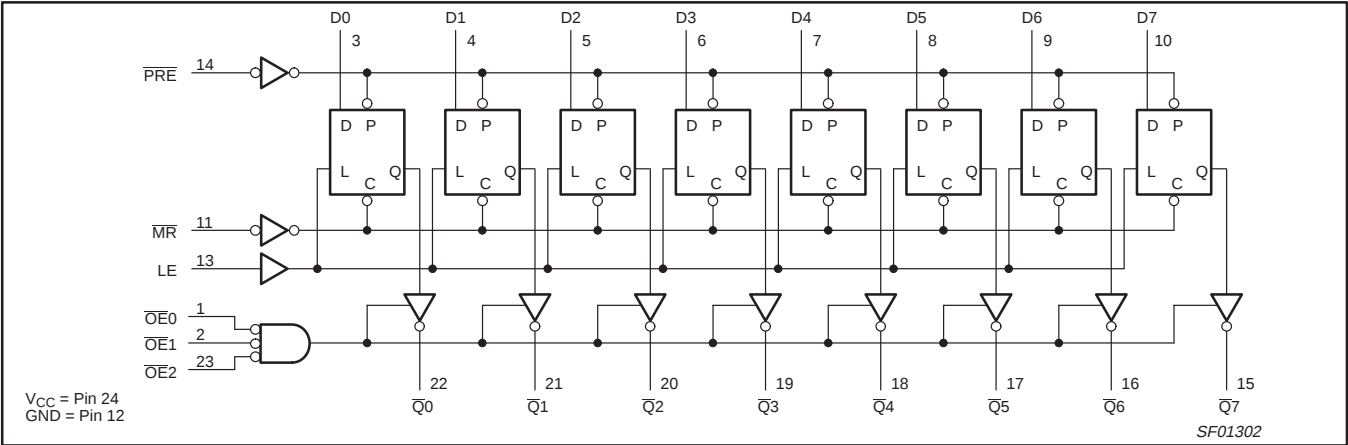
Bus interface latches

74F841/74F842/74F843/
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LOGIC DIAGRAM for 74F845



LOGIC DIAGRAM for 74F846



FUNCTION TABLE for 74F845 and 74F846

INPUTS					OUTPUTS		OPERATING MODE
					74F845	74F846	
OE	PRE	MR	LE	Dn	Qn	Qn	
L	L	X	X	X	H	H	Preset
L	H	L	X	X	L	L	Clear
L	H	H	H	L	L	H	Transparent
L	H	H	H	H	H	L	
L	H	H	↓	l	L	H	Latched
L	H	H	↓	h	H	L	
H	X	X	X	X	Z	Z	High Impedance
L	H	H	L	X	NC	NC	Hold

H = High voltage level
L = Low voltage level
h = High state one setup time before the High-to-Low LE transition
l = Low state one setup time before the High-to-Low LE transition
↓ = High-to-Low transition
X = Don't care
NC= No change
Z = High impedance "off" state

Bus interface latches

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74F845/74F846

ABSOLUTE MAXIMUM RATINGS

Operation beyond the limits set forth in this table may impair the useful life of the device.
Unless otherwise noted these limits are over the operating free-air temperature range.

SYMBOL	PARAMETER	RATING	UNIT
V _{CC}	Supply voltage	−0.5 to +7.0	V
V _{IN}	Input voltage	−0.5 to +7.0	V
I _{IN}	Input current	−30 to +5	mA
V _{OUT}	Voltage applied to output in High output state	−0.5 to V _{CC}	V
I _{OUT}	Current applied to output in Low output state	84	mA
T _{amb}	Operating free-air temperature range	0 to +70	°C
T _{stg}	Storage temperature range	−65 to +150	°C

RECOMMENDED OPERATING CONDITIONS

SYMBOL	PARAMETER	LIMITS			UNIT
		MIN	NOM	MAX	
V _{CC}	Supply voltage	4.5	5.0	5.5	V
V _{IH}	High-level input voltage	2.0			V
V _{IL}	Low-level input voltage			0.8	V
I _{IK}	Input clamp current			−18	mA
I _{OH}	High-level output current			−24	mA
I _{OL}	Low-level output current			48	mA
T _{amb}	Operating free-air temperature range	0		+70	°C

Bus interface latches

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DC ELECTRICAL CHARACTERISTICS

Over recommended operating free-air temperature range unless otherwise noted.

SYMBOL	PARAMETER		TEST CONDITIONS ¹			LIMITS			UNIT
						MIN	TYP ²	MAX	
V _{OH}	High-level output voltage		V _{CC} = MIN, V _{IL} = MAX, V _{IH} = MIN	I _{OH} = −15mA	±10%V _{CC}	2.2			V
					±5%V _{CC}	2.2	3.3		V
				I _{OH} = −24mA	±10%V _{CC}	2.0			V
					±5%V _{CC}	2.0			V
V _{OL}	Low-level output voltage		V _{CC} = MIN, V _{IL} = MAX, V _{IH} = MIN	I _{OL} = 32mA	±10%V _{CC}		0.38	0.55	V
				I _{OL} = 48mA	±5%V _{CC}		0.38	0.55	V
V _{IK}	Input clamp voltage		V _{CC} = MIN, I _I = I _{IK}				−0.73	−1.2	V
I _I	Input current at maximum input voltage		V _{CC} = 0.0V, V _I = 7.0V					100	μA
I _{IH}	High-level input current		V _{CC} = MAX, V _I = 2.7V					20	μA
I _{IL}	Low-level input current		V _{CC} = MAX, V _I = 0.5V					−20	μA
I _{OZH}	Off-state output current, High-level voltage applied		V _{CC} = MAX, V _O = 2.7V					50	μA
I _{OZL}	Off-state output current, Low-level voltage applied		V _{CC} = MAX, V _O = 0.5V					−50	μA
I _{OS}	Short-circuit output current ³		V _{CC} = MAX			−100		−225	mA
I _{CC}	Supply current (total)	74F841	I _{CCH}	V _{CC} = MAX			50	65	mA
			I _{CCL}				60	80	mA
			I _{CCZ}				70	92	mA
		74F842	I _{CCH}	V _{CC} = MAX			40	60	mA
			I _{CCL}				65	90	mA
			I _{CCZ}				60	90	mA
		74F843 74F845	I _{CCH}	V _{CC} = MAX			65	90	mA
			I _{CCL}				75	100	mA
			I _{CCZ}				85	115	mA
		74F846	I _{CCH}	V _{CC} = MAX			50	70	mA
			I _{CCL}				70	95	mA
			I _{CCZ}				70	95	mA

NOTES:

- For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions for the applicable type.
- All typical values are at $V_{CC} = 5\text{V}$, $T_{\text{amb}} = 25^\circ\text{C}$.
- Not more than one output should be shorted at a time. For testing I_{OS} , the use of high-speed test apparatus and/or sample-and-hold techniques are preferable in order to minimize internal heating and more accurately reflect operational values. Otherwise, prolonged shorting of a High output may raise the chip temperature well above normal and thereby cause invalid readings in other parameter tests. In any sequence of parameter test, I_{OS} tests should be performed last.

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AC ELECTRICAL CHARACTERISTICS for 74F841/74F842

SYMBOL	PARAMETER		TEST CONDITION	LIMITS					UNIT
				T _{amb} = +25°C V _{CC} = +5.0V C _L = 50pF, R _L = 500Ω			T _{amb} = 0°C to +70°C V _{CC} = +5.0V ± 10% C _L = 50pF, R _L = 500Ω		
				MIN	TYP	MAX	MIN	MAX	
t _{PLH} t _{PHL}	Propagation delay Dn to Qn	74F841	Waveform 1, 2	2.0 2.5	4.0 4.5	7.5 7.5	2.0 2.5	8.0 8.0	ns
t _{PLH} t _{PHL}	Propagation delay LE to Qn		Waveform 1, 2	4.5 4.0	6.5 6.0	9.5 9.0	4.0 3.5	10.0 9.5	ns
t _{PLH} t _{PHL}	Propagation delay Dn to Q̄n	74F842	Waveform 1, 2	3.5 3.0	5.5 5.0	8.5 8.0	4.5 4.0	9.0 8.5	ns
t _{PLH} t _{PHL}	Propagation delay LE to Q̄n		Waveform 1, 2	5.0 4.5	7.0 6.5	10.0 9.0	3.0 3.0	10.5 9.5	ns
t _{PZH} t _{PZL}	Output enable time High or Low-level $\overline{O}E$ n to Qn or Q̄n		Waveform 5 Waveform 6	2.5 4.0	4.5 6.0	8.0 9.5	2.0 3.0	8.5 10.5	ns
t _{PHZ} t _{PLZ}	Output disable time High or Low-level $\overline{O}E$ n to Qn or Q̄n		Waveform 5 Waveform 6	1.0 1.0	4.5 5.0	8.0 8.0	1.0 1.0	8.5 8.5	ns

AC SETUP REQUIREMENTS for 74F841/74F842

SYMBOL	PARAMETER		TEST CONDITION	LIMITS				UNIT
				T _{amb} = +25°C V _{CC} = +5.0V C _L = 50pF, R _L = 500Ω		T _{amb} = 0°C to +70°C V _{CC} = +5.0V ± 10% C _L = 50pF, R _L = 500Ω		
				MIN	TYP	MIN	MAX	
t _S (H) t _S (L)	Setup time, High or Low Dn to LE		Waveform 4	0.0 0.0		1.0 1.0		ns
t _H (H) t _H (L)	Hold time, High or Low Dn to LE	74F841	Waveform 4	2.5 3.0		3.0 4.0		ns
t _W (H)	LE pulse width, High		Waveform 4	3.5		4.0		ns
t _H (H) t _H (L)	Hold time, High or Low Dn to LE	74F842	Waveform 4	3.0 3.5		3.5 4.5		ns
t _W (H)	LE pulse width, High		Waveform 4	3.0		3.0		ns

Bus interface latches

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AC ELECTRICAL CHARACTERISTICS for 74F843/74F845

SYMBOL	PARAMETER	TEST CONDITION	LIMITS					UNIT
			T _{amb} = +25°C V _{CC} = +5.0V C _L = 50pF, R _L = 500Ω			T _{amb} = 0°C to +70°C V _{CC} = +5.0V ± 10% C _L = 50pF, R _L = 500Ω		
			MIN	TYP	MAX	MIN	MAX	
t _{PLH} t _{PHL}	Propagation delay Dn to Qn	Waveform 1, 2	2.0 2.5	4.5 4.5	7.5 8.0	2.0 2.5	8.5 8.5	ns
t _{PLH} t _{PHL}	Propagation delay LE to Qn	Waveform 1, 2	4.5 4.0	6.5 6.0	9.5 8.5	4.5 4.0	10.0 8.5	ns
t _{PLH}	Propagation delay PRE to Qn	Waveform 3	3.5	5.5	8.5	3.0	9.0	ns
t _{PHL}	Propagation delay MR to Qn	Waveform 3	2.0	4.5	7.5	2.0	8.0	ns
t _{PZH} t _{PZL}	Output enable time High or Low-level $\overline{\text{OE}}$ n to Qn	Waveform 5 Waveform 6	2.5 4.0	4.5 6.0	7.5 9.5	2.0 3.0	8.0 10.5	ns
t _{PHZ} t _{PLZ}	Output disable time High or Low-level $\overline{\text{OE}}$ n to Qn	Waveform 5 Waveform 6	1.0 1.0	4.5 5.0	8.0 8.0	1.0 1.0	8.5 8.5	ns

AC SETUP REQUIREMENTS for 74F843/74F845

SYMBOL	PARAMETER	TEST CONDITION	LIMITS				UNIT
			T _{amb} = +25°C V _{CC} = +5.0V C _L = 50pF, R _L = 500Ω		T _{amb} = 0°C to +70°C V _{CC} = +5.0V ± 10% C _L = 50pF, R _L = 500Ω		
			MIN	TYP	MIN	MAX	
t _s (H) t _s (L)	Setup time, High or Low Dn to LE	Waveform 4	1.0 1.0		0.0 0.0		ns
t _h (H) t _h (L)	Hold time, High or Low Dn to LE	Waveform 4	3.0 4.0		3.0 4.0		ns
t _w (H)	LE pulse width, High	Waveform 4	3.0		3.0		ns
t _w (L)	$\overline{\text{PRE}}$ pulse width, Low	Waveform 3	4.0		5.0		ns
t _w (H)	$\overline{\text{MR}}$ pulse width, Low	Waveform 3	4.0		5.0		ns
t _{REC}	$\overline{\text{PRE}}$ recovery time	Waveform 3	0.0		0.0		ns
t _{REC}	$\overline{\text{MR}}$ recovery time	Waveform 3	3.5		4.5		ns

Bus interface latches

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AC ELECTRICAL CHARACTERISTICS for 74F846

SYMBOL	PARAMETER	TEST CONDITION	LIMITS					UNIT
			T _{amb} = +25°C V _{CC} = +5.0V C _L = 50pF, R _L = 500Ω			T _{amb} = 0°C to +70°C V _{CC} = +5.0V ± 10% C _L = 50pF, R _L = 500Ω		
			MIN	TYP	MAX	MIN	MAX	
t _{PLH} t _{PHL}	Propagation delay Dn to Qn	Waveform 1, 2	3.5 3.0	5.5 5.0	8.5 8.0	3.0 3.0	9.5 8.5	ns
t _{PLH} t _{PHL}	Propagation delay LE to Qn	Waveform 1, 2	5.0 4.5	7.0 6.5	10.0 9.0	5.0 4.5	10.5 9.5	ns
t _{PLH}	Propagation delay PRE to Qn	Waveform 3	3.5	5.5	8.5	3.0	9.5	ns
t _{PHL}	Propagation delay MR to Qn	Waveform 3	5.0	7.0	10.0	4.5	10.5	ns
t _{PZH} t _{PZL}	Output enable time High or Low-level $\overline{O}E_n$ to $\overline{Q}_n$	Waveform 5 Waveform 6	2.5 4.0	5.0 6.0	7.5 9.5	2.0 3.0	8.0 10.5	ns
t _{PHZ} t _{PLZ}	Output disable time High or Low-level $\overline{O}E_n$ to $\overline{Q}_n$	Waveform 5 Waveform 6	1.0 1.0	4.5 5.0	8.0 8.0	1.0 1.0	8.5 8.5	ns

AC SETUP REQUIREMENTS for 74F846

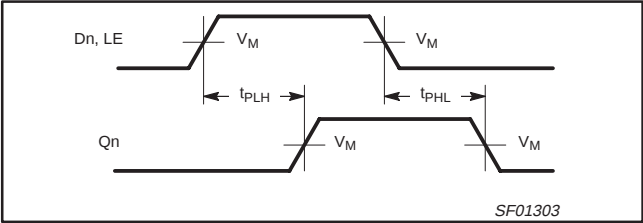
SYMBOL	PARAMETER	TEST CONDITION	LIMITS				UNIT
			T _{amb} = +25°C V _{CC} = +5.0V C _L = 50pF, R _L = 500Ω		T _{amb} = 0°C to +70°C V _{CC} = +5.0V ± 10% C _L = 50pF, R _L = 500Ω		
			MIN	TYP	MIN	MAX	
t _s (H) t _s (L)	Setup time, High or Low Dn to LE	Waveform 4	0.0 0.0		0.0 0.0		ns
t _h (H) t _h (L)	Hold time, High or Low Dn to LE	Waveform 4	3.0 4.0		3.0 4.0		ns
t _w (H)	LE pulse width, High	Waveform 4	3.0		3.0		ns
t _w (L)	$\overline{\text{PRE}}$ pulse width, Low	Waveform 3	4.0		5.0		ns
t _w (H)	$\overline{\text{MR}}$ pulse width, Low	Waveform 3	4.0		5.0		ns
t _{REC}	$\overline{\text{PRE}}$ recovery time	Waveform 3	0.0		0.0		ns
t _{REC}	$\overline{\text{MR}}$ recovery time	Waveform 3	3.5		4.5		ns

Bus interface latches

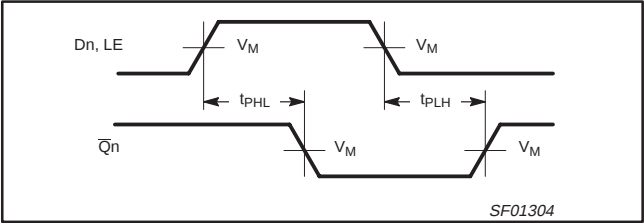
74F841/74F842/74F843/
74F845/74F846

AC WAVEFORMS

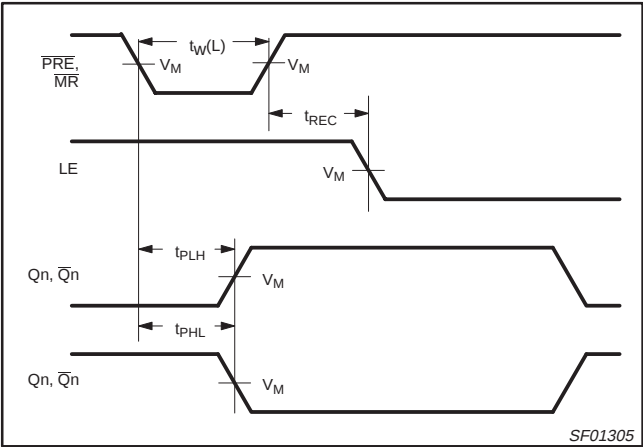
For all waveforms, $V_M = 1.5V$.
The shaded areas indicate when the input is permitted to change for predictable output performance.



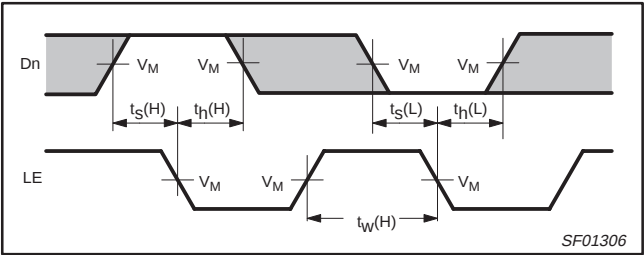
Waveform 1. Propagation Delay, Non-Inverting Path



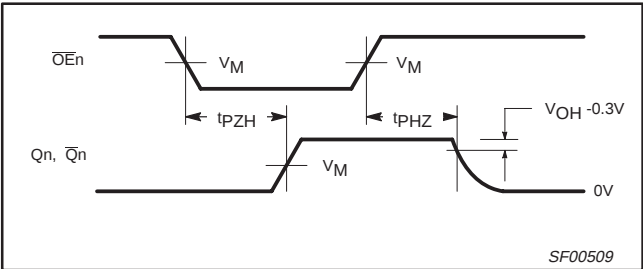
Waveform 2. Propagation Delay, Inverting Path



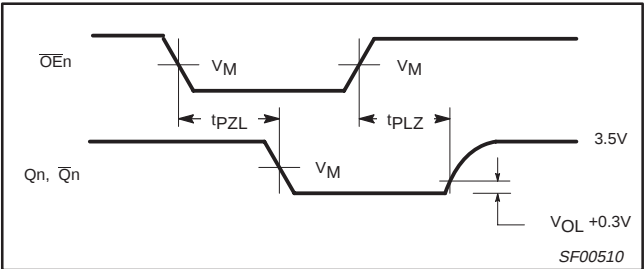
Waveform 3. Master Reset and Preset Pulse Width, Master Reset and Preset to Output Delay, and Master Reset and Preset to Latch Enable Recovery Time



Waveform 4. Data Setup and Hold Times



Waveform 5. 3-State Output Enable Time to High Level and Output Disable Time from High Level

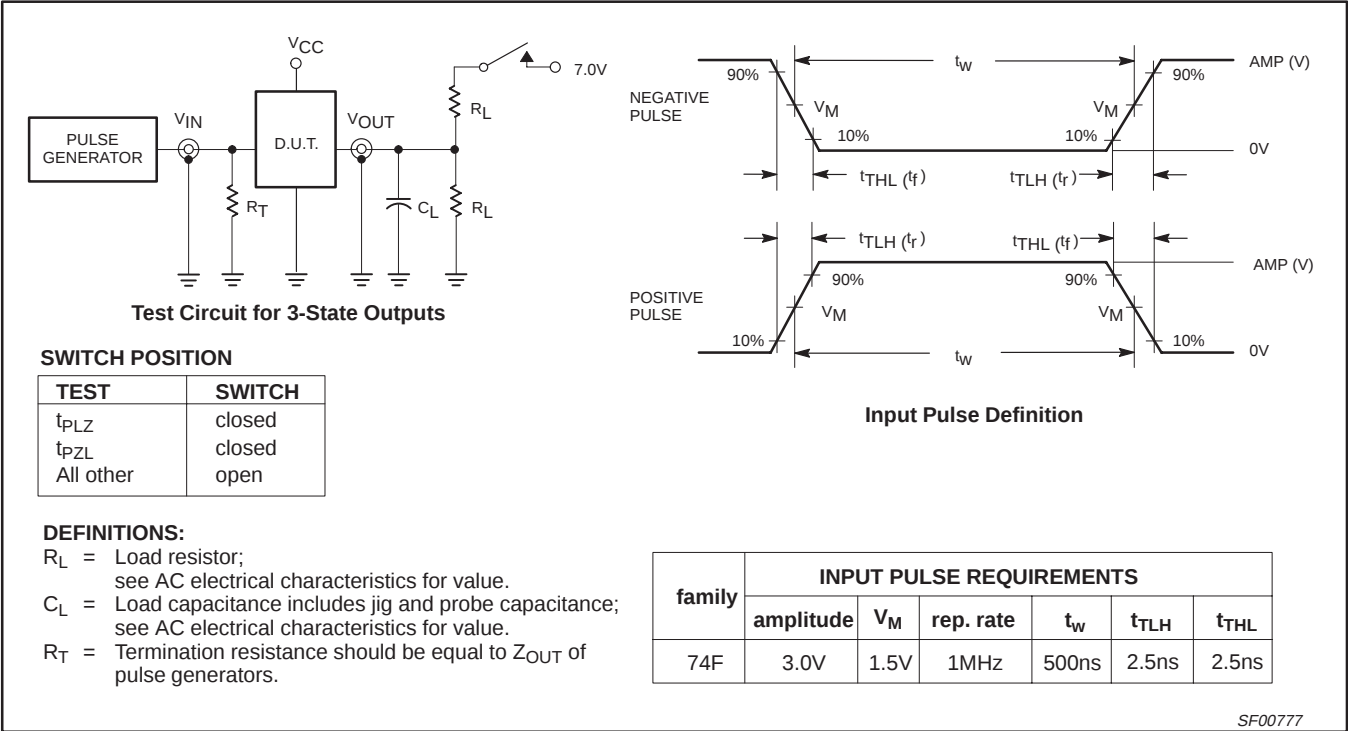


Waveform 6. 3-State Output Enable Time to Low Level and Output Disable Time from Low Level

Bus interface latches

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TEST CIRCUIT AND WAVEFORMS

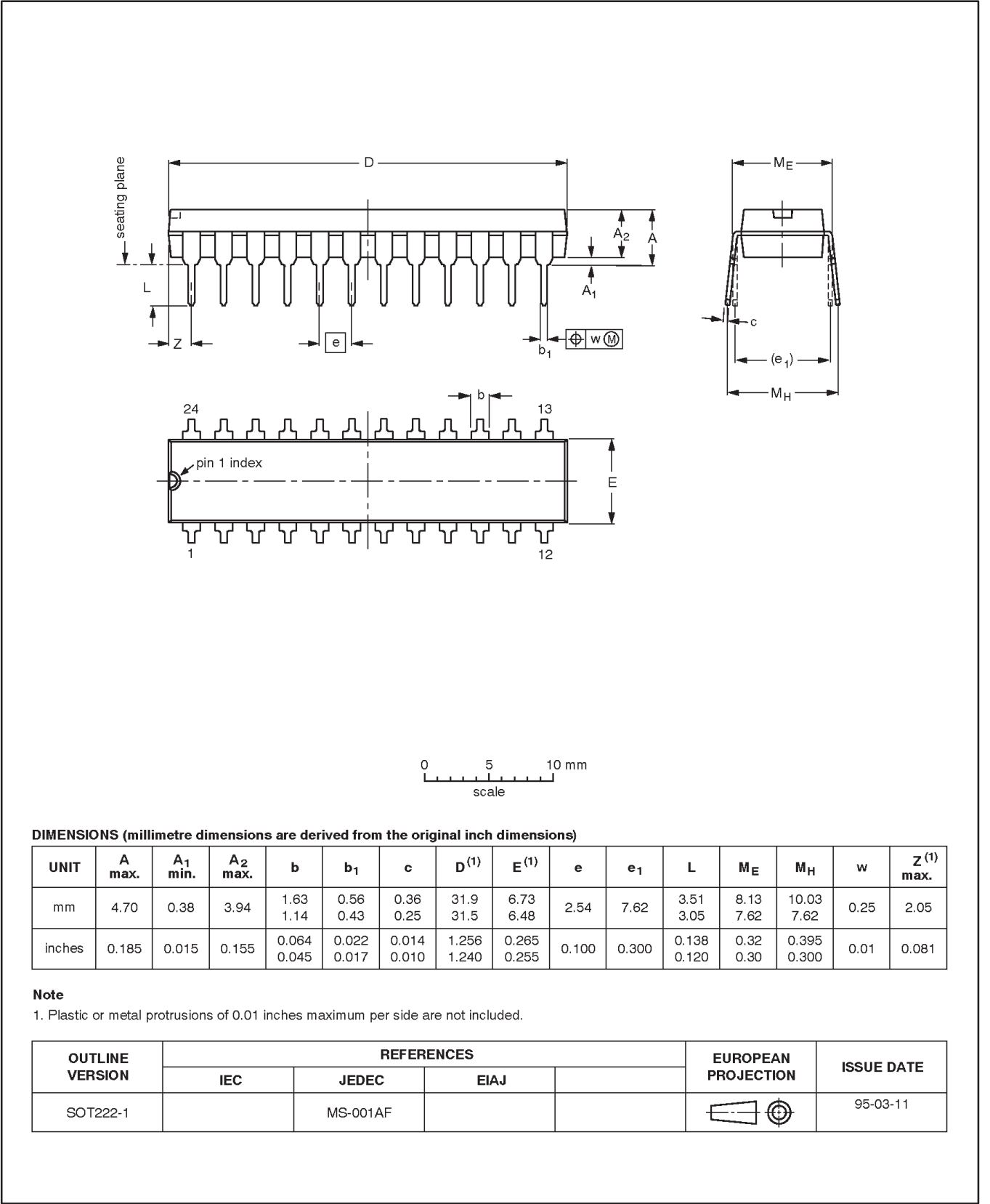


Bus interface latches

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DIP24: plastic dual in-line package; 24 leads (300 mil)

SOT222-1

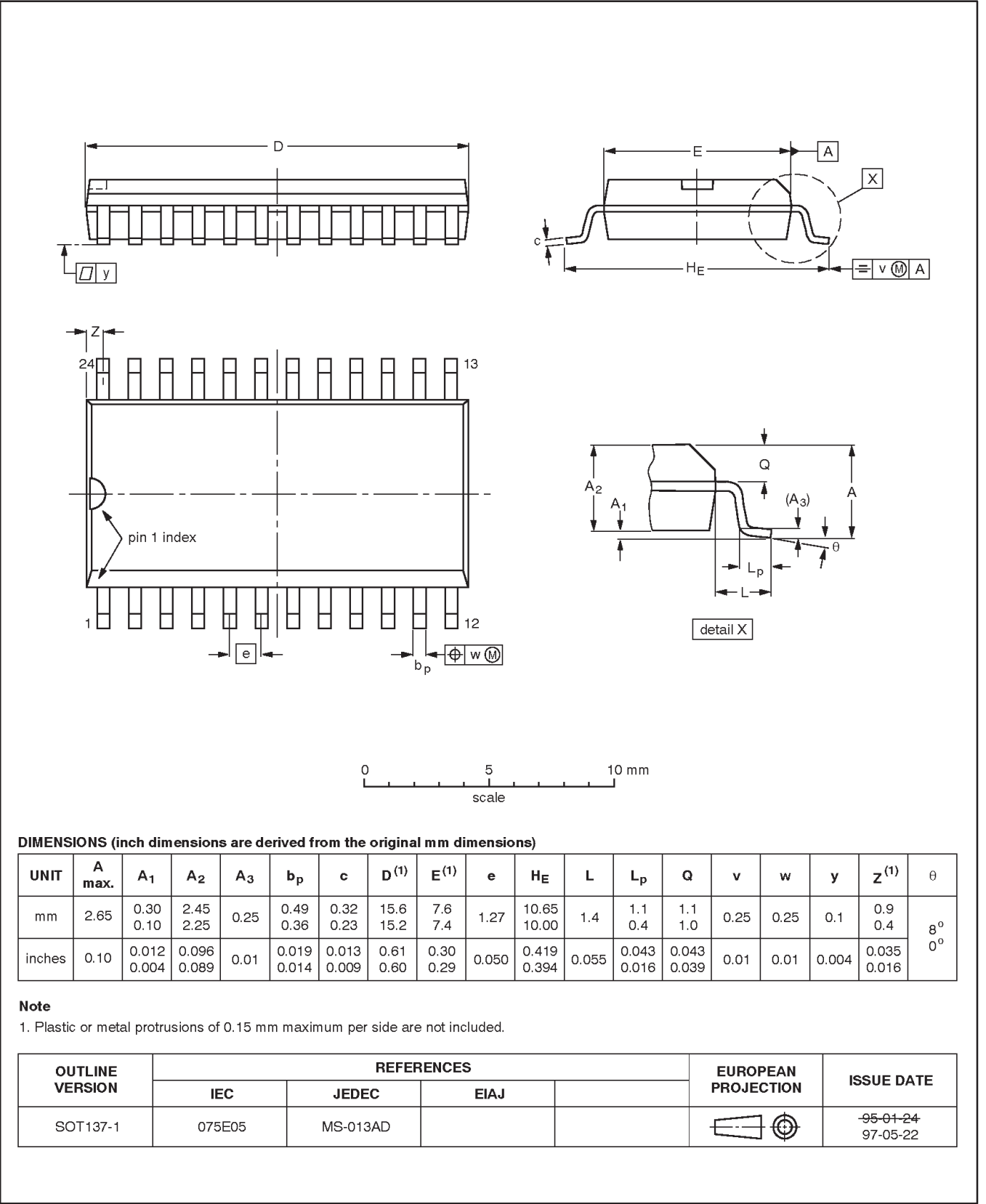


Bus interface latches

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74F845/74F846

SO24: plastic small outline package; 24 leads; body width 7.5 mm

SOT137-1



Bus interface latches

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74F845/74F846

Data sheet status

Data sheet status	Product status	Definition [1]
Objective specification	Development	This data sheet contains the design target or goal specifications for product development. Specification may change in any manner without notice.
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[1] Please consult the most recently issued datasheet before initiating or completing a design.

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