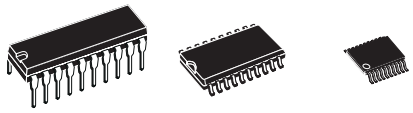
74ACT373

OCTAL D-TYPE LATCH WITH 3 STATE OUTPUTS (NON INVERTED)

- HIGH SPEED: t_{PD} = 6ns (TYP.) at V_{CC} = 5V
- LOW POWER DISSIPATION: I_{CC} = 4µA(MAX.) at T_A=25°C
- COMPATIBLE WITH TTL OUTPUTS V_{IH} = 2V (MIN.), V_{IL} = 0.8V (MAX.)
- 50Ω TRANSMISSION LINE DRIVING CAPABILITY
- SYMMETRICAL OUTPUT IMPEDANCE: $|I_{OH}| = I_{OL}$ = 24mA (MIN)
- BALANCED PROPAGATION DELAYS: $t_{PLH} \cong t_{PHL}$
- OPERATING VOLTAGE RANGE: V_{CC} (OPR) = 4.5V to 5.5V
- PIN AND FUNCTION COMPATIBLE WITH 74 SERIES 373
- IMPROVED LATCH-UP IMMUNITY



DIP SOP TSSOP

ORDER CODES

PACKAGE	TUBE	T & R
DIP	74ACT373B	
SOP	74ACT373M	74ACT373MTR
TSSOP		74ACT373TTR

DESCRIPTION

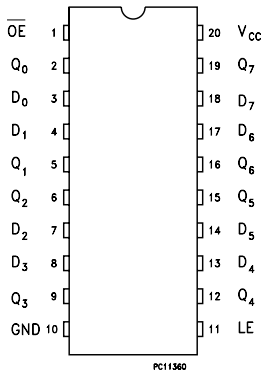
The 74ACT373 is a high-speed CMOS OCTAL D-TYPE LATCH with 3 STATE OUTPUT NON INVERTING fabricated with sub-micron silicon gate and double-layer metal wiring C^2MOS technology.

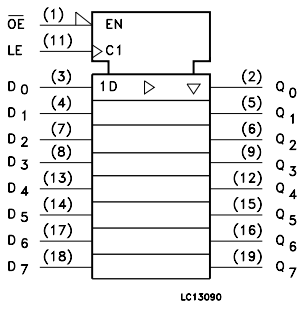
These 8 bit D-Type latch are controlled by a latch enable input (LE) and an output enable input ($\overline{OE}$). When the (LE) input is high , the Q outputs follow the data (D) inputs . When the (LE) is taken low, the Q outputs will be latched at the logic levels set up at the D inputs. When the ($\overline{OE}$) input is low, the 8 outputs will be in a normal logic state (high or low logic level); when the ($\overline{OE}$) input is high, the outputs will be in a high impedance state.

This device is designed to interface directly High Speed CMOS systems with TTL and NMOS components.

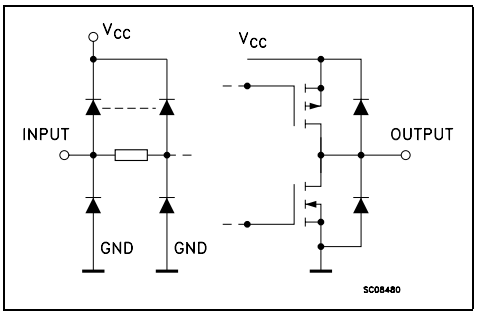
All inputs and outputs are equipped with protection circuits against static discharge, giving them 2KV ESD immunity and transient excess voltage.

PIN CONNECTION AND IEC LOGIC SYMBOLS





INPUT AND OUTPUT EQUIVALENT CIRCUIT



PIN DESCRIPTION

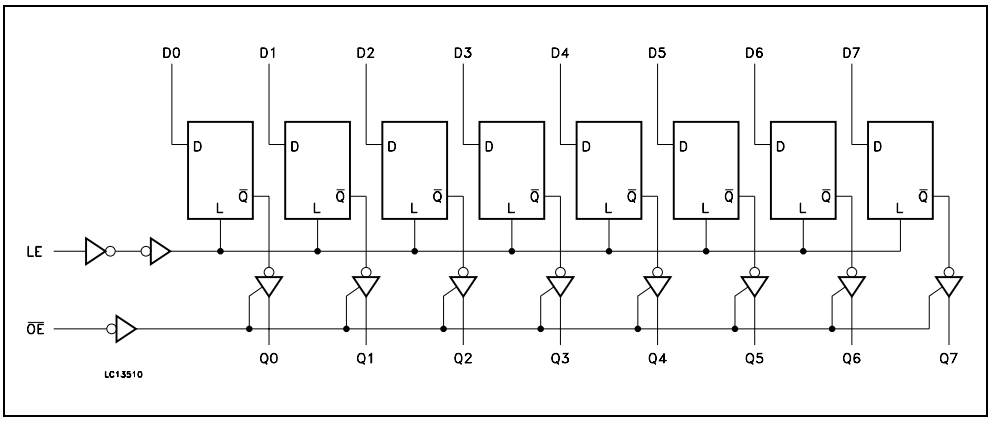
PIN No	SYMBOL	NAME AND FUNCTION
1	$\overline{OE}$	3 state Output Enable Input (Active LOW)
2, 5, 6, 9, 12, 15, 16,19	Q0 to Q7	3-State Outputs
3, 4, 7, 8, 13, 14, 17, 18	D0 to D7	Data Inputs
11	LE	Latch Enable Input
10	GND	Ground (0V)
20	V_{CC}	Positive Supply Voltage

TRUTH TABLE

INPUTS			OUTPUT
$\overline{OE}$	LE	D	Q
H	X	X	Z
L	L	X	NO CHANGE
L	H	L	L
L	H	H	H

X : Don't care
Z : High Impedance
NOTE: Outputs are latched at the time when the input is taken LOW logic level

LOGIC DIAGRAM



This logic diagram has not be used to estimate propagation delays

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	-0.5 to +7	V
V_I	DC Input Voltage	-0.5 to V_{CC} + 0.5	V
V_O	DC Output Voltage	-0.5 to V_{CC} + 0.5	V
I_{IK}	DC Input Diode Current	± 20	mA
I_{OK}	DC Output Diode Current	± 20	mA
I_O	DC Output Current	± 50	mA
I_{CC} or I_{GND}	DC V_{CC} or Ground Current	± 400	mA
T_{stg}	Storage Temperature	-65 to +150	°C
T_L	Lead Temperature (10 sec)	300	°C

Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these conditions is not implied.

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	4.5 to 5.5	V
V_I	Input Voltage	0 to V_{CC}	V
V_O	Output Voltage	0 to V_{CC}	V
T_{op}	Operating Temperature	-55 to 125	°C
dt/dv	Input Rise and Fall Time V_{CC} = 4.5 to 5.5V (note 1)	8	ns/V

1) V_{IN} from 0.8V to 2.0V

DC SPECIFICATIONS

Symbol	Parameter	Test Condition		Value							Unit
		V_{CC} (V)		T_A = 25°C			-40 to 85°C		-55 to 125°C		
				Min.	Typ.	Max.	Min.	Max.	Min.	Max.	
V_{IH}	High Level Input Voltage	4.5	V_O = 0.1 V or V_{CC}-0.1V	2.0	1.5		2.0		2.0		V
		5.5		2.0	1.5		2.0		2.0		
V_{IL}	Low Level Input Voltage	4.5	V_O = 0.1 V or V_{CC}-0.1V		1.5	0.8		0.8		0.8	V
		5.5			1.5	0.8		0.8		0.8	
V_{OH}	High Level Output Voltage	4.5	I_O=-50 µA	4.4	4.49		4.4		4.4		V
		5.5	I_O=-50 µA	5.4	5.49		5.4		5.4		
		4.5	I_O=-24 mA	3.86			3.76		3.7		V
		5.5	I_O=-24 mA	4.86			4.76		4.7		
V_{OL}	Low Level Output Voltage	4.5	I_O=50 µA		0.001	0.1		0.1		0.1	
		5.5	I_O=50 µA		0.001	0.1		0.1		0.1	
		4.5	I_O=24 mA			0.36		0.44		0.5	
		5.5	I_O=24 mA			0.36		0.44		0.5	
I_I	Input Leakage Current	5.5	V_I = V_{CC} or GND			± 0.1		± 1		± 1	µA
I_{OZ}	High Impedance Output Leakege Current	5.5	V_I = V_{IH} or V_{IL} V_O = V_{CC} or GND			± 0.5		± 5		± 5	µA
I_{CCT}	Max I_{CC}/Input	5.5	V_I = V_{CC} - 2.1V		0.6			1.5		1.6	mA
I_{CC}	Quiescent Supply Current	5.5	V_I = V_{CC} or GND			4		40		80	µA
I_{OLD}	Dynamic Output Current (note 1, 2)	5.5	V_{OLD} = 1.65 V max					75		50	mA
I_{OHD}			V_{OHD} = 3.85 V min					-75		-50	mA

1) Maximum test duration 2ms, one output loaded at time

2) Incident wave switching is guaranteed on trasmission lines with impedances as low as 50Ω

AC ELECTRICAL CHARACTERISTICS (C_L = 50 pF, R_L = 500 Ω, Input t_r = t_f = 3ns)

Symbol	Parameter	Test Condition		Value							Unit
		V_{CC} (V)		T_A = 25°C			-40 to 85°C		-55 to 125°C		
				Min.	Typ.	Max.	Min.	Max.	Min.	Max.	
t_{PLH} t_{PHL}	Propagation Delay Time LE to Q	5.0(*)			5.5	10.0		11.5		11.5	ns
t_{PLH} t_{PHL}	Propagation Delay Time D to Q	5.0(*)			6.0	10.0		11.5		11.5	ns
t_{PZL} t_{PZH}	Output Enable Time	5.0(*)			6.0	9.5		10.5		10.5	ns
t_{PLZ} t_{PHZ}	Output Disable Time	5.0(*)			7.0	11.0		12.5		12.5	ns
t_W	LE Minimum Pulse Width, HIGH	5.0(*)			1.3	7.0		8.0		8.0	ns
t_s	Setup Time D to LE, HIGH or LOW	5.0(*)			-0.5	7.0		8.0		8.0	ns
t_h	Hold Time D to LE, HIGH or LOW	5.0(*)			0.5	0.0		1.0		1.0	ns

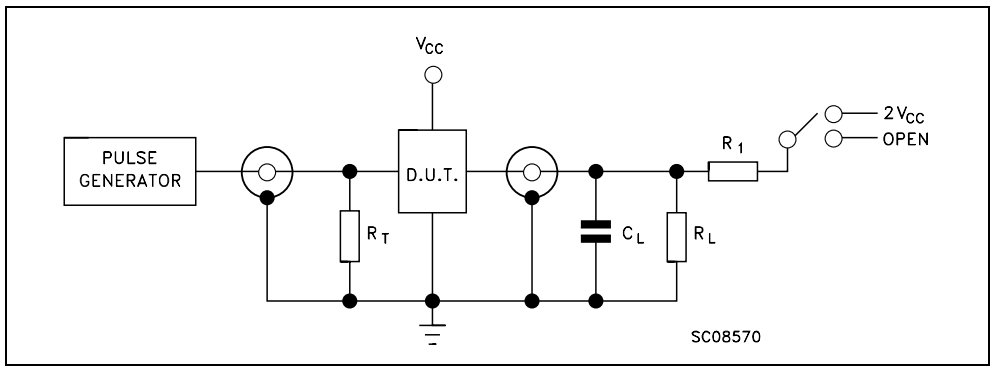
(*) Voltage range is 5.0V ± 0.5V

CAPACITIVE CHARACTERISTICS

Symbol	Parameter	Test Condition		Value							Unit
		V_{CC} (V)		T_A = 25°C			-40 to 85°C		-55 to 125°C		
				Min.	Typ.	Max.	Min.	Max.	Min.	Max.	
C_{IN}	Input Capacitance	5.0			4						pF
C_{OUT}	Output Capacitance	5.0			8						pF
C_{PD}	Power Dissipation Capacitance (note 1)	5.0	f_{IN} = 10MHz		25						pF

1) C_{PD} is defined as the value of the IC's internal equivalent capacitance which is calculated from the operating current consumption without load. (Refer to Test Circuit). Average operating current can be obtained by the following equation. $I_{CC(opr)} = C_{PD} \times V_{CC} \times f_{IN} + I_{CC}/n$ (per circuit)

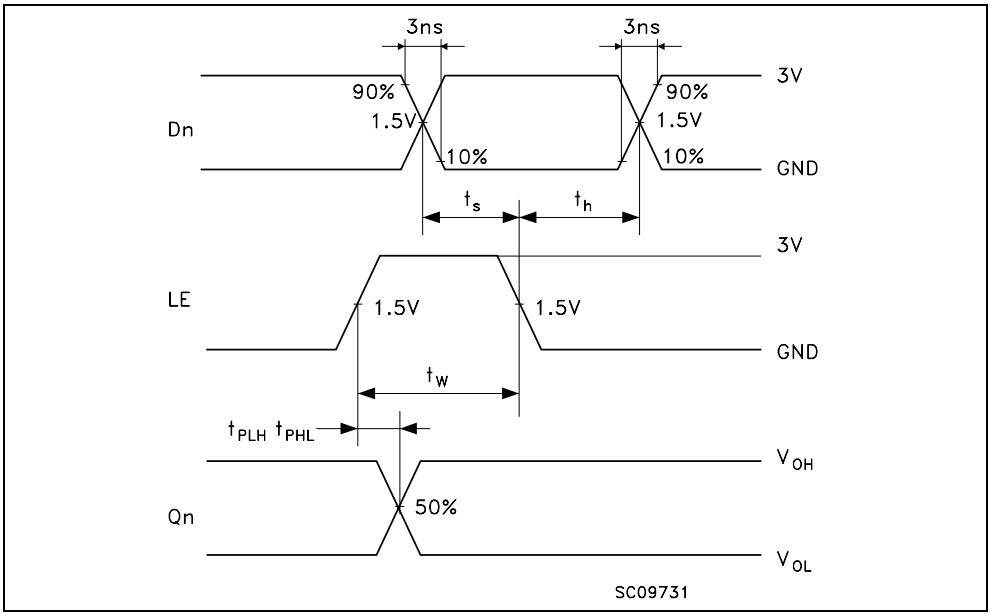
TEST CIRCUIT



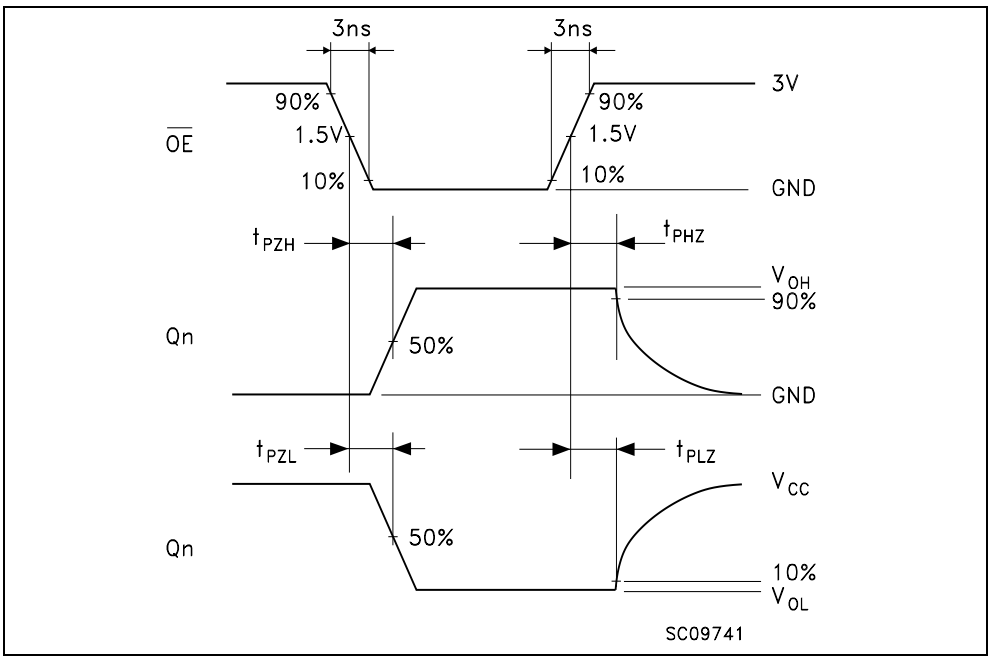
TEST	SWITCH
t_{PLH}, t_{PHL}	Open
t_{PZL}, t_{PLZ}	$2V_{CC}$
t_{PZH}, t_{PHZ}	Open

C_L = 50pF or equivalent (includes jig and probe capacitance)
$R_L = R_1$ = 500Ω or equivalent
$R_T = Z_{OUT}$ of pulse generator (typically 50Ω)

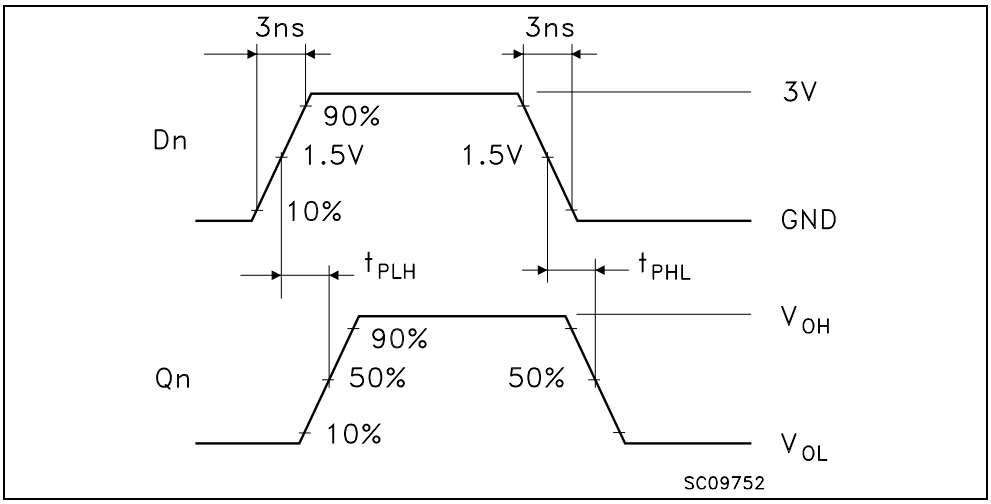
WAVEFORM 1: PROPAGATION DELAYS, LE MINIMUN PULSE WIDTH, Dn TO LE SETUP AND HOLD TIMES (f=1MHz; 50% duty cycle)



WAVEFORM 2: OUTPUT ENABLE AND DISABLE TIMES (f=1MHz; 50% duty cycle)

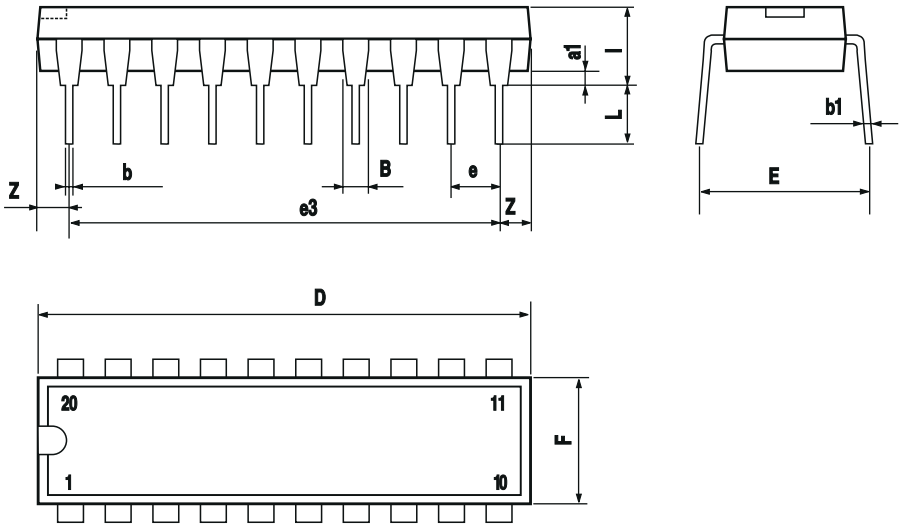


WAVEFORM 3: PROPAGATION DELAYS TIME (f=1MHz; 50% duty cycle)



Plastic DIP-20 (0.25) MECHANICAL DATA

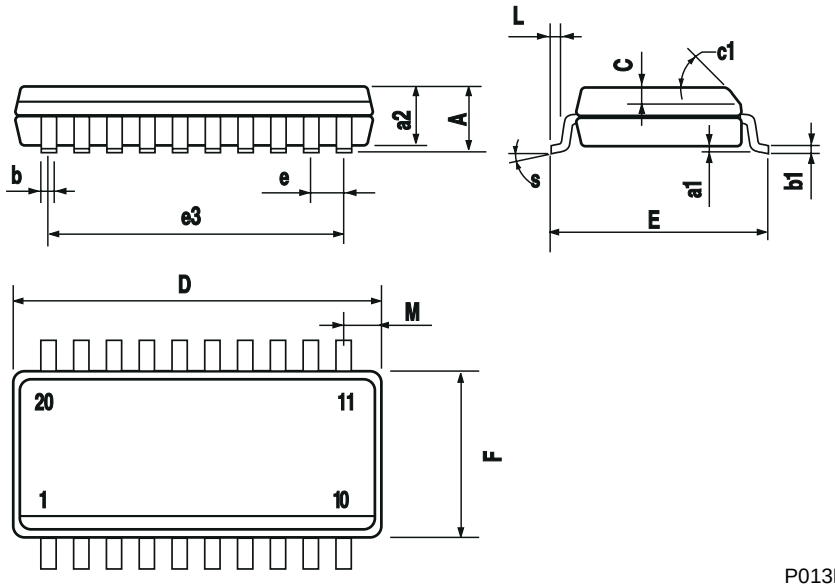
DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
a1	0.254			0.010		
B	1.39		1.65	0.055		0.065
b		0.45			0.018	
b1		0.25			0.010	
D			25.4			1.000
E		8.5			0.335	
e		2.54			0.100	
e3		22.86			0.900	
F			7.1			0.280
I			3.93			0.155
L		3.3			0.130	
Z			1.34			0.053



P001J

SO-20 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			2.65			0.104
a1	0.10		0.20	0.004		0.007
a2			2.45			0.096
b	0.35		0.49	0.013		0.019
b1	0.23		0.32	0.009		0.012
C		0.50			0.020	
c1	45 (typ.)					
D	12.60		13.00	0.496		0.512
E	10.00		10.65	0.393		0.419
e		1.27			0.050	
e3		11.43			0.450	
F	7.40		7.60	0.291		0.299
L	0.50		1.27	0.19		0.050
M			0.75			0.029
S	8 (max.)					



P013L

TSSOP20 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			1.1			0.433
A1	0.05	0.10	0.15	0.002	0.004	0.006
A2	0.85	0.9	0.95	0.335	0.354	0.374
b	0.19		0.30	0.0075		0.0118
c	0.09		0.2	0.0035		0.0079
D	6.4	6.5	6.6	0.252	0.256	0.260
E	6.25	6.4	6.5	0.246	0.252	0.256
E1	4.3	4.4	4.48	0.169	0.173	0.176
e		0.65 BSC			0.0256 BSC	
K	0^o	4^o	8^o	0^o	4^o	8^o
L	0.50	0.60	0.70	0.020	0.024	0.028