

MN54AC373-X REV 1B0

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Octal Transparent Latch with TRI-STATE Outputs

General Description

The AC373 consists of eight latches with 3-state outputs for bus organized system applications. The flip-flops appear transparent to the data when Latch Enable (LE) is HIGH. When LE is LOW, the data that meets the setup times is latched. Data appears on the bus when the Output Enable (OE) is LOW. When (OE) is HIGH the bus output is in the high impedance state.

Industry Part Number

54AC373

Prime Die

Z373

NS Part Numbers

 54AC373DMQB
 54AC373FMQB
 54AC373LMQB

Processing

MIL-STD-883, Method 5004

Quality Conformance Inspection

MIL-STD-883, Method 5005

Subgrp	Description	Temp (°C)
1	Static tests at	+25
2	Static tests at	+125
3	Static tests at	-55
4	Dynamic tests at	+25
5	Dynamic tests at	+125
6	Dynamic tests at	-55
7	Functional tests at	+25
8A	Functional tests at	+125
8B	Functional tests at	-55
9	Switching tests at	+25
10	Switching tests at	+125
11	Switching tests at	-55

Features

- I_{cc} and I_{oz} reduced by 50%
- Eight latches in a single package
- TRI-STATE outputs for bus interfacing
- Outputs source/sink 24 mA
- Standard Military Drawing (SMD)
- AC373: 5962-87555

(Absolute Maximum Ratings)

(Note 1)

Supply Voltage (Vcc)	-0.5V to +7.0V
DC Input Diode Current (Iik)	
Vi = -0.5V	-20 mA
Vi = Vcc + 0.5V	+20 mA
DC Input Voltage (Vi)	-0.5V to Vcc +0.5V
DC Output Diode Current (Iok)	
Vo = -0.5V	-20 mA
Vo = Vcc +0.5V	+20 mA
DC Output Voltage (Vo)	-0.5V to Vcc + 0.5V
DC Output Source or Sink Current (Io)	±50 mA
DC Vcc or Ground Current Per Output Pin (Icc or Ignd)	±50 mA
Storage Temperature (Tstg)	-65 C to 150 C
Junction Temperature (Tj)	
CDIP	175 C

Note 1: Absolute maximum ratings are those values beyond which damage to the device may occur. The databook specification should be met, without exception, to ensure that the system design is reliable over its power supply, temperature, and output/input loading variables. National does not recommend operation of FACT TM circuits outside databook specifications.

Recommended Operating Conditions

Supply Voltage (Vcc)	2.0V to 6.0V
Input Voltage (Vi)	0V to Vcc
Output Voltage (Vo)	0V to Vcc
Operating Temperature (Ta)	-55 C to +125 C
Minimum Input Edge Rate (Delta V/Delta t)	
AC Devices	
Vin from 30% to 70% of Vcc	
Vcc @ 3.0V, 4.5V, 5.5V	125 mV/ns

Electrical Characteristics

DC PARAMETERS

(The following conditions apply to all the following parameters, unless otherwise specified.)

DC: VCC 3.0V to 5.5V, Temperature Range: -55C to 125C. NOTE: -55C TEMPERATURE, SUBGROUP 3 IS GUARANTEED BUT NOT TESTED.

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
IIH	High Level Input Current	VCC=5.5V, VM=5.5V	1, 2	INPUTS		0.1	uA	1
			1, 2	INPUTS		1.0	uA	2, 3
IIL	Low Level Input Current	VCC=5.5V, VM=0.0V	1, 2	INPUTS		-0.1	uA	1
			1, 2	INPUTS		-1.0	uA	2, 3
VOL	Low level output voltage	VCC=3.0V, VIH=2.1V, VIL=0.9V, IOL=12.0mA	1, 2	OUTPUTS		.36	V	1
			1, 2	OUTPUTS		.50	V	2, 3
		VCC=3.0V, VIH=2.1V, VIL=0.9V, IOL=50.0uA	1, 2	OUTPUTS		.10	V	1, 2, 3
			1, 2	OUTPUTS		.10	V	1, 2, 3
		VCC=4.5V, VIH=3.15V, VIL=1.35V, IOL=50.0uA	1, 2	OUTPUTS		.10	V	1, 2, 3
			1, 2	OUTPUTS		.36	V	1
		VCC=5.5V, VIH=3.85V, VIL=1.65V, IOL=24.0mA	1, 2	OUTPUTS		.36	V	1
			1, 2	OUTPUTS		.50	V	2, 3
VIOL	Dynamic output current LOW	VCC=5.5V, VIH=3.85V, VIL=1.65V, IOL=50.0mA	1, 2	OUTPUTS		1.65	V	1, 2, 3
			2, 5	OUTPUTS		1.65	V	1, 2, 3
VOH	High level output voltage	VCC=3.0V, VIH=2.1V, VIL=0.9V, IOH=-50.0uA	1, 2	OUTPUTS	2.90		V	1, 2, 3
			1, 2	OUTPUTS	2.56		V	1
		VCC=3.0V, VIH=2.1V, VIL=0.9V, IOH=-12.0mA	1, 2	OUTPUTS	2.40		V	2, 3
			1, 2	OUTPUTS	4.86		V	1
		VCC=5.5V, VIH=3.85V, VIL=1.65V, IOH=-24.0mA	1, 2	OUTPUTS	4.70		V	2, 3
			1, 2	OUTPUTS	4.86		V	1
		VCC=4.5V, VIH=3.15V, VIL=1.35V, IOH=-24.0mA	1, 2	OUTPUTS	3.86		V	1
			1, 2	OUTPUTS	3.70		V	2, 3
VIOH	Dynamic output current HIGH	VCC=5.5V, VIH=5.5V, VIL=1.65V, IOH = -50mA	1, 2	OUTPUTS	3.85		V	1, 2, 3
			2, 5	OUTPUTS	3.85		V	1, 2, 3

Electrical Characteristics

DC PARAMETERS(Continued)

(The following conditions apply to all the following parameters, unless otherwise specified.)

DC: VCC 3.0V to 5.5V, Temperature Range: -55C to 125C. NOTE: -55C TEMPERATURE, SUBGROUP 3 IS GUARANTEED BUT NOT TESTED.

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
IOZH	Maximum TRI-STATE Leakage Current High	VCC=3.0V, VM=3.0V, VINL=0.0V, VIH=2.1V, VINH=3.0V	1, 2	OUTPUTS		0.25	uA	1
			1, 2	OUTPUTS		5.00	uA	2, 3
		VCC=4.5V, VM=4.5V, VINL=0.0V, VIH=3.15V, VINH=4.5V	1, 2	OUTPUTS		0.25	uA	1
			1, 2	OUTPUTS		5.00	uA	2, 3
		VCC=5.5V, VM=5.5V, VINL=0.0V, VIH=3.85V, VINH=5.5V	1, 2	OUTPUTS		0.25	uA	1
			1, 2	OUTPUTS		5.00	uA	2, 3
IOZL	Maximum TRI-STATE Leakage Current Low	VCC=3.0V, VM=0.0V, VINH=3.0V, VIH=2.1V, VINL=0.0V	1, 2	OUTPUTS		-0.25	uA	1
			1, 2	OUTPUTS		-5.00	uA	2, 3
		VCC=4.5V, VM=0.0V, VINH=4.5V, VIH=3.15V, VINL=0.0V	1, 2	OUTPUTS		-0.25	uA	1
			1, 2	OUTPUTS		-5.00	uA	2, 3
		VCC=5.5V, VM=0.0V, VINH=5.5V, VIH=3.85V, VINL=0.0V	1, 2	OUTPUTS		-0.25	uA	1
			1, 2	OUTPUTS		-5.00	uA	2, 3
ICCH	Supply Current Outputs HIGH	VCC=5.5V, VINH=5.5V, VINL=0.0V	1, 2	VCC		4.0	uA	1
			1, 2	VCC		80	uA	2, 3
ICCL	Supply Current Outputs LOW	VCC=5.5V, VINL=0.0V, VINH=5.5V	1, 2	VCC		4.0	uA	1
			1, 2	VCC		80	uA	2, 3
ICCZ	Supply Current Outputs Tri-State	VCC=5.5V, VINH=5.5V, VINL=0.0V	1, 2	VCC		4.0	uA	1
			1, 2	VCC		80	uA	2, 3

AC PARAMETERS

(The following conditions apply to all the following parameters, unless otherwise specified.)

AC: CL=50pf, RL=500 OHMS, TRISE=3.0ns, TFALL=3.0ns, Temp Range: -55C to 125C. NOTE: -55C TEMPERATURE, SUBGROUP 11 IS GUARANTEED BUT NOT TESTED.

tpLH(1)	Propagation Delay	VCC=4.5V	3, 4, 6	Dn to On	1.5	9.50	ns	9
			3, 4, 6	Dn to On	1.5	11.5	ns	10, 11
tpHL(1)	Propagation Delay	VCC=4.5V	3, 4, 6	Dn to On	1.5	9.50	ns	9
			3, 4, 6	Dn to On	1.5	11.5	ns	10, 11

Electrical Characteristics

AC PARAMETERS(Continued)

(The following conditions apply to all the following parameters, unless otherwise specified.)

AC: CL=50pf, RL=500 OHMS, TRISE=3.0ns, TFALL=3.0ns, Temp Range: -55C to 125C. NOTE: -55C TEMPERATURE, SUBGROUP 11 IS GUARANTEED BUT NOT TESTED.

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
tpLH(2)	Propagation Delay	VCC=4.5V	3, 4, 6	Le to On	1.5	10.0	ns	9
			3, 4, 6	Le to On	1.5	12.0	ns	10, 11
tpHL(2)	Propagation Delay	VCC=4.5V	3, 4, 6	Le to On	1.5	9.5	ns	9
			3, 4, 6	Le to On	1.5	11.0	ns	10, 11
tpZH(1)	Output Enable Time	VCC=4.5V	3, 4, 6	OE to On	1.5	9.00	ns	9
			3, 4, 6	OE to On	1.5	10.5	ns	10, 11
tpZL(1)	Output Enable Time	VCC=4.5V	3, 4, 6	OE to On	1.5	8.5	ns	9
			3, 4, 6	OE to On	1.5	10.0	ns	10, 11
tpHZ(1)	Output Disable Time	VCC=4.5V	3, 4, 6	OE to On	1.5	11.50	ns	9
			3, 4, 6	OE to On	1.5	13.50	ns	10, 11
tpLZ(1)	Output Disable Time	VCC=4.5V	3, 4, 6	OE to On	1.5	9.5	ns	9
			3, 4, 6	OE to On	1.5	10.5	ns	10, 11
ts(H/L)(1)	Set-up Time HIGH or LOW	VCC=4.5V	7	Dn to LE	4.0		ns	9
			7	Dn to LE	5.0		ns	10, 11
th(H/L)(1)	Hold Time HIGH or LOW	VCC=4.5V	7	Dn to LE	0		ns	9
			7	Dn to LE	1.0		ns	10, 11
tw(H)(1)	LE Pulse Width HIGH	VCC=4.5V	7	LE Pulse Width	4.5		ns	9
			7	LE Pulse Width	5.0		ns	10, 11

Electrical Characteristics

AC PARAMETERS(Continued)

(The following conditions apply to all the following parameters, unless otherwise specified.)

AC: CL=50pf, RL=500 OHMS, TRISE=3.0ns, TFALL=3.0ns, Temp Range: -55C to 125C. NOTE: -55C TEMPERATURE, SUBGROUP 11 IS GUARANTEED BUT NOT TESTED.

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
tpLH(3)	Propagation Delay	VCC=3.0V	3, 4	Dn to On	1.0	13.5	ns	9
			3, 4	Dn to On	1.0	16.5	ns	10, 11
tpHL(3)	Propagation Delay	VCC=3.0V	3, 4	Dn to On	1.0	13.0	ns	9
			3, 4	Dn to On	1.0	16.0	ns	10, 11
tpLH(4)	Propagation Delay	VCC=3.0V	3, 4	LE to On	1.0	13.5	ns	9
			3, 4	LE to On	1.0	16.5	ns	10, 11
tpHL(4)	Propagation Delay	VCC=3.0V	3, 4	LE to On	1.0	12.5	ns	9
			3, 4	LE to On	1.0	15.0	ns	10, 11
tpZH(2)	Output Enable Time	VCC=3.0V	3, 4	OE to On	1.0	12.00	ns	9
			3, 4	OE to On	1.0	14.0	ns	10, 11
tpZL(2)	Output Enable Time	VCC=3.0V	3, 4	OE to On	1.0	11.5	ns	9
			3, 4	OE to On	1.0	13.5	ns	10, 11
tpHZ(2)	Output Disable Time	VCC=3.0V	3, 4	OE to On	1.0	13.0	ns	9
			3, 4	OE to On	1.0	16.0	ns	10, 11
tpLZ(2)	Output Disable Time	VCC=3.0V	3, 4	OE to On	1.0	11.5	ns	9
			3, 4	OE to On	1.0	13.0	ns	10, 11
ts(H/L)(2)	Setup Time HIGH or LOW	VCC=3.0V	7	Dn to LE	5.5		ns	9
			7	Dn to LE	6.5		ns	10, 11
th(H/L)(2)	Hold Time HIGH or LOW	VCC=3.0V	7	Dn to LE	0.0		ns	9
			7	Dn to LE	1.0		ns	10, 11

Electrical Characteristics

AC PARAMETERS(Continued)

(The following conditions apply to all the following parameters, unless otherwise specified.)

AC: CL=50pf, RL=500 OHMS, TRISE=3.0ns, TFALL=3.0ns, Temp Range: -55C to 125C. NOTE: -55C TEMPERATURE, SUBGROUP 11 IS GUARANTEED BUT NOT TESTED.

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
tw(H)(2)	LE Pulse Width HIGH	VCC=3.0V	7	LE Pulse Width	5.5		ns	9
			7	LE Pulse Width	6.5		ns	10, 11

Note 1: SCREEN TESTED 100% ON EACH DEVICE AT +25C & +125C TEMPERATURE, SUBGROUPS 1, 2, 7, & 8.

Note 2: SAMPLE TESTED (METHOD 5005, TABLE 1) ON EACH MFG. LOT AT +25C & +125C TEMPERATURE, SUBGROUPS A1, 2, 7, & 8.

Note 3: SCREEN TESTED 100% ON EACH DEVICE AT +25C TEMPERATURE ONLY, SUBGROUP A9.

Note 4: SAMPLE TESTED (METHOD 5005, TABLE 1) ON EACH MFG. LOT AT +25C & +125C TEMPERATURE, SUBGROUPS A9 & 10.

Note 5: TRANSMISSION LINE DRIVING TEST, GUARDBAND LIMITS SET FOR +25C, 2MSEC DURATION MAX.

Note 6: +25C & +125C MIN LIMITS GUARANTEED FOR 5.5V BY GUARDBANDING 4.5V MIN. LIMITS.

Note 7: GUARANTEED BUT NOT TESTED. (DESIGN CHARACTERIZATION DATA)