

MN54AC378-X REV 2A0

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Parallel D Register With Enable

General Description

The AC378 is a 6-bit register with a buffered common Enable. This is similar to the AC174, but with common Enable rather than the common Master Reset.

Industry Part Number

54AC378

NS Part Numbers

54AC378DMQB
 54AC378FMQB
 54AC378LMQB

Prime Die

Z378

Processing

MIL-STD-883, Method 5004

Quality Conformance Inspection

MIL-STD-883 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

- 6-bit high-speed parallel register
- Positive edge-triggered D-type inputs
- Fully buffered common clock and enable inputs
- Input clamp diodes limit high-speed termination effects
- Standard Military Drawing (SMD)
- AC378:5962-91605

(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)	175 C
CDIP	

Note 1: Absolute maximum ratings are those values beyond which damage to the device may occur. The databook specifications 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™ 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, Temp. 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, VINH=3.0V, VIL=0.9V, IOL=50.0uA	1, 2	OUTPUTS		.10	V	1, 2, 3
		VCC=4.5V, VINH=4.5V, VIL=1.35V, IOL=50.0uA	1, 2	OUTPUTS		.10	V	1, 2, 3
		VCC=5.5V, VINH=5.5V, VIL=1.65V, IOL=50.0uA	1, 2	OUTPUTS		.10	V	1, 2, 3
		VCC=3.0V, VINH=3.0V, VIL=0.9V, IOL=12.0mA	1, 2	OUTPUTS		.32	V	1
			1, 2	OUTPUTS		.40	V	2, 3
		VCC=4.5V, VINH=4.5V, VIL=1.35V, IOL=24.0mA	1, 2	OUTPUTS		.36	V	1
			1, 2	OUTPUTS		.50	V	2, 3
		VCC=5.5V, VINH=5.5V, VIL=1.65V, IOL=24.0mA	1, 2	OUTPUTS		.36	V	1
	1, 2	OUTPUTS		.50	V	2, 3		
VIOLOW	Dynamic Output Current LOW	VCC=5.5V, VINH=5.5V, VIH=3.85V, VIL=1.65V, IOL=50.0mA	1, 2, 5	OUTPUTS		1.65	V	1, 2, 3
VOH	High Level Output Voltage	VCC=3.0V, VIH=2.1V, VINL=0.0V, IOH=-50.0uA	1, 2	OUTPUTS	2.90		V	1, 2, 3
		VCC=4.5V, VIH=3.15V, VINL=0.0V, IOH=-50.0uA	1, 2	OUTPUTS	4.40		V	1, 2, 3
		VCC=5.5V, VIH=3.85V, VINL=0.0V, IOH=-50.0uA	1, 2	OUTPUTS	5.40		V	1, 2, 3
		VCC=3.0V, VIH=2.1V, IOH=-12.0mA	1, 2	OUTPUTS	2.56		V	1
			1, 2	OUTPUTS	2.40		V	2, 3
		VCC=4.5V, VIH=3.15V, IOH=-24.0mA	1, 2	OUTPUTS	3.86		V	1
			1, 2	OUTPUTS	3.70		V	2, 3
		VCC=5.5V, VIH=3.85V, IOH=-24.0mA	1, 2	OUTPUTS	4.86		V	1
	1, 2	OUTPUTS	4.70		V	2, 3		
VIOHIGH	Dynamic Output Current HIGH	VCC=5.5V, VIH=3.85V, VINH=5.5V, IOH=-50.0mA	1, 2, 5	OUTPUTS	3.85		V	1, 2, 3
ICCH	Supply Current Outputs HIGH	VCC=5.5V, VINH=5.5V	1, 2	VCC		4.0	uA	1
			1, 2	VCC		80	uA	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, Temp. 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
ICCL	Supply Current Outputs LOW	VCC=5.5V, VINH=5.5V, VINL=0.0V	1, 2	VCC		4.0	uA	1
			1, 2	VCC		80	UA	2, 3

Electrical Characteristics

AC PARAMETERS

(The following conditions apply to all the following parameters, unless otherwise specified.)
 AC: CL=50pf, RL=500 OHMS, TR=3.0ns, TF=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(1)	Propagation Delay	VCC=4.5V	3, 4, 7	CP to Qn	1.5	7.5	ns	9
			3, 4, 7	CP to Qn	1.5	9.0	ns	10, 11
tpHL(1)	Propagation Delay	VCC=4.5V	3, 4, 7	CP to Qn	1.5	7.5	ns	9
			3, 4, 7	CP to Qn	1.5	9.0	ns	10, 11
ts(H/L)(1)	Setup Time HIGH or LOW	VCC=4.5V	6	Dn to CP	4.0		ns	9, 10, 11
th(H/L)(1)	Hold Time HIGH or LOW	VCC=4.5V	6	Dn to CP	4.0		ns	9, 10, 11
ts(H/L)(2)	Setup Time HIGH or LOW	VCC=4.5V	6	\bar{E} to CP	2.5		ns	9, 10, 11
th(H/L)(2)	Hold Time HIGH or LOW	VCC=4.5V	6	\bar{E} to CP	4.0		ns	9, 10, 11
tw(H/L)(1)	CP Pulse Width	VCC=4.5V	6	CP	5.0		ns	9
			6	CP	6.5		ns	10, 11
FMAX(1)	Maximum Clock Frequency	VCC=4.5V	6		95		MHZ	9, 10, 11
tpLH(2)	Propagation Delay	VCC=3.0V	3, 4, 7	CP to Qn	1.5	10.0	ns	9
			3, 4, 7	CP to Qn	1.5	12.0	ns	10, 11
tpHL(2)	Propagation Delay	VCC=3.0V	3, 4, 7	CP to Qn	1.5	10.0	ns	9
			3, 4, 7	CP to Qn	1.5	12.0	ns	10, 11
ts(H/L)(3)	Setup Time HIGH or LOW	VCC=3.0V	3, 4, 7	Dn to CP	4.0		ns	9, 10, 11
th(H/L)(3)	Hold Time HIGH or LOW	VCC=3.0V	3, 4, 7	Dn to CP	4.0		ns	9, 10, 11
ts(H/L)(4)	Setup Time HIGH or LOW	VCC=3.0V	3, 4, 7	\bar{E} to CP	2.5		ns	9, 10, 11
th(H/L)(4)	Hold Time HIGH or LOW	VCC=3.0V	3, 4, 7	\bar{E} to CP	4.0		ns	9, 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, TR=3.0ns, TF=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/L)(2)	CP Pulse Width	VCC=3.0V	3, 4, 7	CP	5.0		ns	9
			3, 4, 7	CP	6.5		ns	10, 11
FMAX(2)	Maximum Clock Frequency	VCC=3.0V	3, 4, 7		95		MHz	9, 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, 2 MSEC DURATION MAX.
- Note 6: GUARANTEED BUT NOT TESTED. (DESIGN CHARACTERIZATION DATA)
- Note 7: +25C & +125C MIN LIMITS GUARANTEED FOR 5.5V BY GUARDBANDING 4.5V MIN. LIMITS.