National Semiconductor

MICROCIRCUIT DATA SHEET

MN54AC240-X REV 1B1

Original Creation Date: 06/28/96
Last Update Date: 03/12/02
Last Major Revision Date: 06/28/96

Octal Buffers/Line Drivers With 3 - State Outputs

General Description

The AC240 is an octal buffer and line driver designed to be employed as a memory address driver, clock driver and bus-oriented transmitter receiver which provides improved PC board density.

Industry Part Number

54AC240

Prime Die

Z240

Controlling Document

SEE FEATURES SECTION

NS Part Numbers

54AC240DMQB
54AC240FMQB
54AC240LMQB
54AC240WG-QML

Processing

MIL-STD-883, Method 5004

Quality Conformance Inspection

MIL-STD-883, Method 5005

Subgrp	Description	Temp (^{O}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

- Icc and Ioz reduced by 50%
- Inverting TRI-STATE outputs drive bus lines or buffer memory address registers
- Outputs source/sink 24 mA

Standard Military Drawing (SMD)

54AC240DMQB	5962-8755001RA
54AC240FMQB	5962-8755001SA
54AC240LMQB	5962-87550012A
54AC240WG-QML	5962-8755001ZA

(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

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, VINH=5.5V	1, 2	INPUT		0.1	uA	1
			1, 2	INPUT		1.0	uA	2, 3
IIL	Low Level Input Current	VCC=5.5V, VM=0.0V, VINL=0.0V	1, 2	INPUT		-0.1	uA	1
			1, 2	INPUT		-1.0	uA	2, 3
VOL	Low Level Output Voltage	VCC=3.0V, VIH=2.1V, VIL=.90V, IOL=12.0mA	1, 2	OUTPUT		.36	V	1
			1, 2	OUTPUT		.50	V	2, 3
		VCC=3.0V, VIH=2.1V, VIL=0.9V, IOL=50.0uA	1, 2	OUTPUT		.10	V	1, 2, 3
		VCC=4.5V, VIH=3.15V, VIL=1.35V, IOL=24.0mA	1, 2	OUTPUT		.36	V	1
			1, 2	OUTPUT		.50	V	2, 3
		VCC=4.5V, VIH=3.15V, VIL=1.35V, IOL=50.0uA	1, 2	OUTPUT		.10	V	1, 2, 3
		VCC=5.5V, VIH=3.85V, VIL=1.65V, IOL=24.0mA	1, 2	OUTPUT		.36	V	1
			1, 2	OUTPUT		.50	V	2, 3
		VCC=5.5V, VIH=3.85V, VIL=1.65V, IOL=50.0uA	1, 2	OUTPUT		.10	V	1, 2, 3
VIOL	Dynamic Output Current LOW	VCC=5.5V, VIH=3.85V, VIL=1.65V, IOL=50.0mA	1, 2, 5	OUTPUT		1.65	V	1, 2, 3
VOH	High Level Output Voltage	VCC=3.0V, VIL=.90V, IOH=-12.0mA	1, 2	OUTPUT	2.56		V	1
			1, 2	OUTPUT	2.40		V	2, 3
		VCC=3.0V, VIL=0.9V, IOH=-50.0uA	1, 2	OUTPUT	2.90		V	1, 2, 3
		VCC=4.5V, VIL=1.35V, IOH=-24.0mA	1, 2	OUTPUT	3.86		V	1
			1, 2	OUTPUT	3.70		V	2, 3
		VCC=4.5V, VIL=1.35V, IOH=-50.0uA	1, 2	OUTPUT	4.40		V	1, 2, 3
		VCC=5.5V, VIL=1.65V, IOH=-24.0mA	1, 2	OUTPUT	4.86		V	1
			1, 2	OUTPUT	4.70		V	2, 3
		VCC=5.5V, VIL=1.65V, IOH=-50.0uA	1, 2	OUTPUT	5.40		V	1, 2, 3
VIOH	Dynamic Output Current HIGH	VCC=5.5V, VIL=1.65V, IOH=-50.0mA	1, 2, 5	OUTPUT	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, VINH=3.0V, VIH=2.1V	1, 2	OUTPUT		.25	uA	1
			1, 2	OUTPUT		5	uA	2, 3
		VCC=4.5V, VM=4.5V, VINH=4.5V, VIH=3.15V	1, 2	OUTPUT		.25	uA	1
			1, 2	OUTPUT		5	uA	2, 3
		VCC=5.5V, VM=5.5V, VINH=5.5V, VIH=3.85V	1, 2	OUTPUT		.25	uA	1
			1, 2	OUTPUT		5	uA	2, 3
IOZL	Maximum TRI-STATE Leakage Current Low	VCC=3.0V, VM=0.0V, VINL=0.0V, VIH=2.1V	1, 2	OUTPUT		-.25	uA	1
			1, 2	OUTPUT		-5.0	uA	2, 3
		VCC=4.5V, VM=0.0V, VINL=0.0V, VIH=3.15V	1, 2	OUTPUT		-.25	uA	1
			1, 2	OUTPUT		-5	uA	2, 3
		VCC=5.5V, VM=0.0V, VINL=0.0V, VIH=3.85V	1, 2	OUTPUT		-.25	uA	1
			1, 2	OUTPUT		-5	uA	2, 3
ICCH	Supply Current	VCC=5.5V, VINL=0.0V	1, 2	VCC		4	uA	1
			1, 2	VCC		80	uA	2, 3
ICCL	Supply Current	VCC=5.5V, VINH=5.5V, VINL=0.0V	1, 2	VCC		4	uA	1
			1, 2	VCC		80	uA	2, 3
ICCZ	Supply Current	VCC=5.5V, VINH=5.5V, VINL=0.0V	1, 2	VCC		4	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, TR=3.0ns, TF=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	In to $\overline{On}$	1.5	7.5	ns	9
			3, 4, 6	In to $\overline{On}$	1.5	8.5	ns	10, 11
tpHL(1)	Propagation Delay	VCC=4.5V	3, 4, 6	In to $\overline{On}$	1.5	7.0	ns	9
			3, 4, 6	In to $\overline{On}$	1.5	8.0	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, 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
tpZH(1)	Output Enable Time	VCC=4.5V	3, 4, 6	$\overline{OE}$ to $\overline{On}$	1.5	7.5	ns	9
			3, 4, 6	$\overline{OE}$ to $\overline{On}$	1.5	9.0	ns	10, 11
tpZL(1)	Output Enable Time	VCC=4.5V	3, 4, 6	$\overline{OE}$ to $\overline{On}$	1.5	8.5	ns	9
			3, 4, 6	$\overline{OE}$ to $\overline{On}$	1.5	10.5	ns	10, 11
tpHZ(1)	Output Disable Time	VCC=4.5V	3, 4, 6	$\overline{OE}$ to $\overline{On}$	1.5	8.5	ns	9
			3, 4, 6	$\overline{OE}$ to $\overline{On}$	1.5	10.5	ns	10, 11
tpLZ(1)	Output Disable Time	VCC=4.5V	3, 4, 6	$\overline{OE}$ to $\overline{On}$	1.5	9.0	ns	9
			3, 4, 6	$\overline{OE}$ to $\overline{On}$	1.5	11.0	ns	10, 11
tpLH(2)	Propagation Delay	VCC=3.0V	3, 4	In to $\overline{On}$	1.0	9.5	ns	9
			3, 4	In to $\overline{On}$	1.0	11.0	ns	10, 11
tpHL(2)	Propagation Delay	VCC=3.0V	3, 4	In to $\overline{On}$	1.0	9.0	ns	9
			3, 4	In to $\overline{On}$	1.0	10.5	ns	10, 11
tpZH(2)	Output Enable Time	VCC=3.0V	3, 4	$\overline{OE}$ to $\overline{On}$	1.0	9.5	ns	9
			3, 4	$\overline{OE}$ to $\overline{On}$	1.0	11.5	ns	10, 11
tpZL(2)	Output Enable Time	VCC=3.0V	3, 4	$\overline{OE}$ to $\overline{On}$	1.0	11.0	ns	9
			3, 4	$\overline{OE}$ to $\overline{On}$	1.0	13.0	ns	10, 11
tpHZ(2)	Output Disable Time	VCC=3.0V	3, 4	$\overline{OE}$ to $\overline{On}$	1.0	10.0	ns	9
			3, 4	$\overline{OE}$ to $\overline{On}$	1.0	12.5	ns	10, 11
tpLZ(2)	Output Disable Time	VCC=3.0V	3, 4	$\overline{OE}$ to $\overline{On}$	1.0	11.0	ns	9
			3, 4	$\overline{OE}$ to $\overline{On}$	1.0	13.5	ns	10, 11

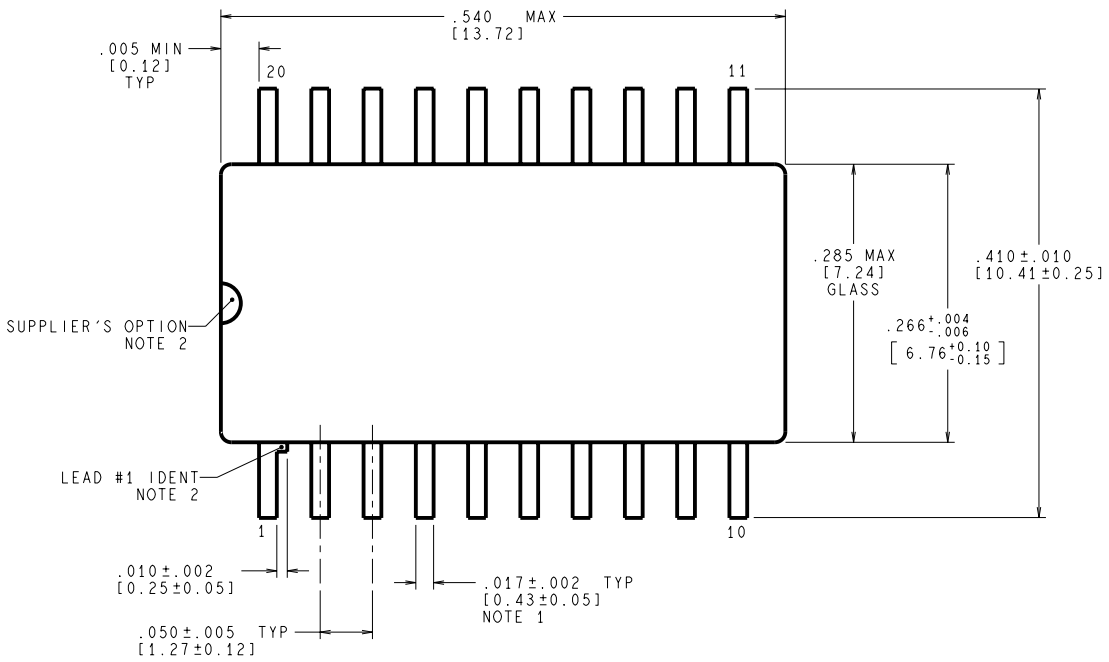
Note 1: SCREEN TESTED 100% ON EACH DEVICE AT +25C & +125C TEMPERATURE, SUBGROUPS 1, 2, 7, & 8.
Note 2: SAMPLE TESTED (METHOD 5005, TABLE 1) ON EACH MFG. LOT AT +25C & +125C TEMPERATURE, SUBGROUPS A1, 2, 7 & 8.
Note 3: SCREEN TESTED 100% ON EACH DEVICE AT +25C TEMPERATURE ONLY, SUBGROUP A9.
Note 4: SAMPLE 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.

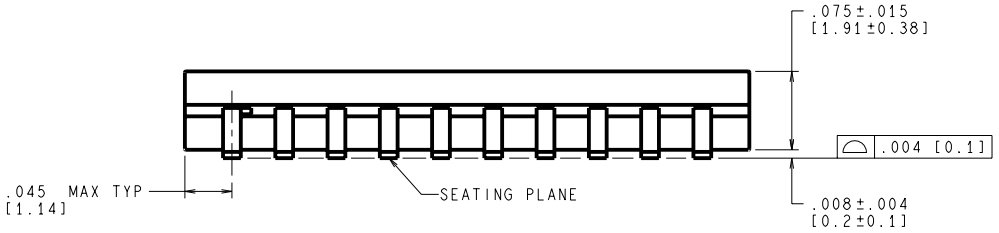
Graphics and Diagrams

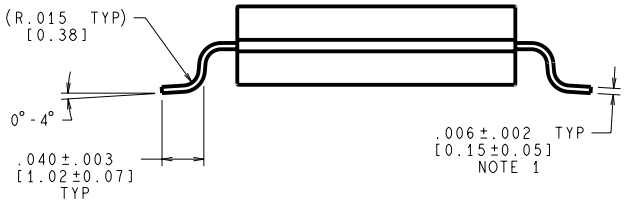
GRAPHICS#	DESCRIPTION
WG20ARB	CERPACK, 20 LEAD GULL WING (P/P DWG)

See attached graphics following this page.

REVISIONS				
LTR	DESCRIPTION	E.C.N.	DATE	BY/APP'D
A	RELEASE TO DOCUMENT CONTROL	11842	10/13/1997	TL/KH
B	DIM .410 WAS .391; UPDATE NOTE 3.	12013	06/15/1998	MS/







NOTES: UNLESS OTHERWISE SPECIFIED

1. LEAD FINISH: SOLDER DIPPED WITH Sn60 OR Sn63 SOLDER CONFORMING TO MIL-PRF-38535 TO A MINIMUM THICKNESS OF 200 MICROINCHES/ 5.08 MICROMETERS. SOLDER MAY BE APPLIED OVER LEAD BASIS METAL OR Sn PLATE. MAXIMUM LIMIT MAY BE INCREASED BY .003 IN/ 0.08mm AFTER LEAD FINISH APPLIED.
2. LEAD 1 IDENTIFICATION SHALL BE:
   a) A NOTCH OR OTHER MARK WITHIN THIS AREA
   b) A TAB ON LEAD 1, EITHER SIDE
3. NO JEDEC REGISTRATION AS OF JUNE 1998.

CONTROLLING DIMENSION IS INCH
VALUES IN [ ] ARE MILLIMETERS

MIL-PRF-38535
CONFIGURATION CONTROL

APPROVALS	DATE
DRAWN T LEQUANG	10/13/1997
DFTG. CHK.	
ENGR. CHK.	

PROJECTION INCH [MM]

National Semiconductor
2900 Semiconductor dr, Santa Clara, CA 95052-8090

CERPACK,
20 LEAD,
GULL WING

SCALE	SIZE	DRAWING NUMBER	REV
N/A	C	(SC)MKT-WG20A	B

DO NOT SCALE DRAWING | SHEET 1 of 1

Revision History

Rev	ECN #	Rel Date	Originator	Changes
1B1	M0003967	03/12/02	Rose Malone	Update MDS: MN54AC240-X, Rev. 1A0 to MN54AC240-X, Rev. 1B1. Added SMD Numbers and WG pkg to Main Table and Features Section, also added WG Mkt Dwg to Graphics Section.