

**MN54AC245-X REV 2B1**

 Original Creation Date: 06/28/96  
 Last Update Date: 03/18/02  
 Last Major Revision Date: 03/26/97

## Octal Bidirectional Transceiver With TRI- State Inputs/Outputs

### General Description

The AC245 contains eight non-inverting bidirectional buffers with 3-state outputs and is intended for bus-oriented applications. Current sinking capability is 24 mA at the A and B ports. The Transmit/Receiver (T/R) input determines the direction of data flow through the bidirectional transceiver. Transmit (active HIGH) enables data from A ports to B ports; Receive (active LOW) enables data from B ports to A ports. The Output Enable input when HIGH, disables both A and B ports by placing them in a HIGH Z condition.

### Industry Part Number

54AC245

### Prime Die

Z245

### NS Part Numbers

 54AC245DMQB  
 54AC245FMQB  
 54AC245LMQB  
 54AC245WG-QML

### Controlling Document

SEE FEATURES SECTION

### 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<sub>cc</sub> and I<sub>oz</sub> reduced by 50%
- Non-inverting buffers
- Bidirectional data path
- A and B Outputs source/sink 24 mA

Standard Military Drawing (SMD)

54AC245DMQB	5962-8775801RA
54AC245FMQB	5962-8775801SA
54AC245LMQB	5962-87758012A
54AC245WG-QML	5962-8775801ZA

**(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
Junction Temperature (Tj)	175 C
Storage Temperature (Tstg)	-65 C to +150 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™ 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 PARAMETER

(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, VINL=0.0V	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=0.9V, 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
			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
			1, 2	OUTPUT		.36	V	1
VCC=4.5V, VIH=3.15V, VIL=1.35V, IOL=24.0mA	1, 2	OUTPUT		.50	V	2, 3		
	1, 2	OUTPUT		.50	V	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, VIH=2.1V, VIL=0.9V, IOH=-50.0uA	1, 2	OUTPUT	2.90		V	1, 2, 3
			1, 2	OUTPUT	2.56		V	1
		VCC=3.0V, VIH=2.1V, VIL=0.9V, IOH=-12.0mA	1, 2	OUTPUT	2.40		V	2, 3
			1, 2	OUTPUT	4.86		V	1
		VCC=5.5V, VIH=3.85V, VIL=1.65V, IOH=-24.0mA	1, 2	OUTPUT	4.70		V	2, 3
			1, 2	OUTPUT	3.86		V	1
		VCC=4.5V, VIH=3.15V, VIL=1.35V, IOH=-24.0mA	1, 2	OUTPUT	3.70		V	2, 3
			1, 2	OUTPUT	4.40		V	1, 2, 3
VCC=4.5V, VIH=3.15V, VIL=1.35V, IOH=-50.0uA	1, 2	OUTPUT	4.40		V	1, 2, 3		
	1, 2	OUTPUT	5.40		V	1, 2, 3		
VIOH	Dynamic Output Current HIGH	VCC=5.5V, VIH=3.85V, VIL=1.65V, IOH=-50.0mA	1, 2, 5	OUTPUT	3.85		V	1, 2, 3

## Electrical Characteristics

### DC PARAMETER (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=0.0V, VINL=0.0V, VIH=2.1V	1, 2	OUTPUT		.3	uA	1
			1, 2	OUTPUT		5.5	uA	2, 3
		VCC=4.5V, VM=4.5V, VINH=4.5V, VINL=0.0V, VIH=3.15V	1, 2	OUTPUT		.3	uA	1
			1, 2	OUTPUT		5.5	uA	2, 3
		VCC=5.5V, VM=5.5V, VINH=5.5V, VINL=0.0V, VIH=3.85V	1, 2	OUTPUT		.3	uA	1
			1, 2	OUTPUT		5.5	uA	2, 3
IOZL	Maximum TRI-STATE Leakage Current Low	VCC=3.0V, VM=0.0V, VINH=3.0V, VINL=0.0V, VIH=2.1V	1, 2	OUTPUT		-.3	uA	1
			1, 2	OUTPUT		-5.5	uA	2, 3
		VCC=4.5V, VM=0.0V, VINH=4.5V, VINL=0.0V, VIH=3.15V	1, 2	OUTPUT		-.3	uA	1
			1, 2	OUTPUT		-5.5	uA	2, 3
		VCC=5.5V, VM=0.0V, VINH=5.5V, VINL=0.0V, VIH=3.85V	1, 2	OUTPUT		-.3	uA	1
			1, 2	OUTPUT		-5.5	uA	2, 3
ICCH	Supply Current	VCC=5.5V, VINH=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
IC CZ	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 PARAMETER

(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	A to B or B to A	1.5	6.5	ns	9
			3, 4, 6	A to B or B to A	1.5	8.5	ns	10, 11
tpHL(1)	Propagation Delay	VCC=4.5V	3, 4, 6	A to B or B to A	1.5	6.0	ns	9
			3, 4, 6	A to B or B to A	1.5	7.5	ns	10, 11

## Electrical Characteristics

### AC PARAMETER(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
tpZL(1)	Output Enable Time	VCC=4.5V	3, 4, 6	$\overline{OE}$ to An or Bn	1.5	9.0	ns	9
			3, 4, 6	$\overline{OE}$ to An or Bn	1.5	10.5	ns	10, 11
tpZH(1)	Output Enable Time	VCC=4.5V	3, 4, 6	$\overline{OE}$ to An or Bn	1.5	8.5	ns	9
			3, 4, 6	$\overline{OE}$ to An or Bn	1.5	10.0	ns	10, 11
tpHZ(1)	Output Disable Time	VCC=4.5V	3, 4, 6	$\overline{OE}$ to An or Bn	1.5	9.0	ns	9
			3, 4, 6	$\overline{OE}$ to An or Bn	1.5	10.5	ns	10, 11
tpLZ(1)	Output Disable Time	VCC=4.5V	3, 4, 6	$\overline{OE}$ to An or Bn	1.5	9.0	ns	9
			3, 4, 6	$\overline{OE}$ to An or Bn	1.5	10.5	ns	10, 11
tpLH(2)	Propagation Delay	VCC=3.0V	3, 4	A to B or B to A	1.0	8.5	ns	9
			3, 4	A to B or B to A	1.0	11.5	ns	10, 11
tpHL(2)	Propagation Delay	VCC=3.0V	3, 4	A to B or B to A	1.0	8.5	ns	9
			3, 4	A to B or B to A	1.0	10.0	ns	10, 11
tpZL(2)	Output Enable Time	VCC=3.0V	3, 4	$\overline{OE}$ to An or Bn	1.0	12.0	ns	9
			3, 4	$\overline{OE}$ to An or Bn	1.0	14.5	ns	10, 11

## Electrical Characteristics

### AC PARAMETER (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
tpZH(2)	Output Enable Time	VCC=3.0V	3, 4	$\overline{OE}$ to An or Bn	1.0	11.5	ns	9
			3, 4	$\overline{OE}$ to An or Bn	1.0	13.5	ns	10, 11
tpHZ(2)	Output Disable Time	VCC=3.0V	3, 4	$\overline{OE}$ to An or Bn	1.0	12.0	ns	9
			3, 4	$\overline{OE}$ to An or Bn	1.0	13.5	ns	10, 11
tpLZ(2)	Output Disable Time	VCC=3.0V	3, 4	$\overline{OE}$ to An or Bn	1.0	11.5	ns	9
			3, 4	$\overline{OE}$ to An or Bn	1.0	14.0	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, 2 MSEC DURATION MAX.

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

### Graphics and Diagrams

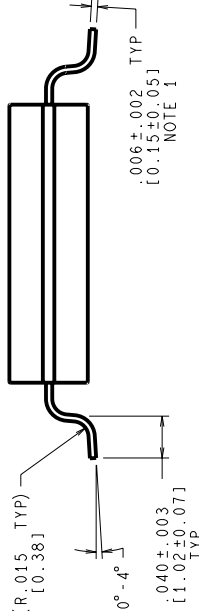
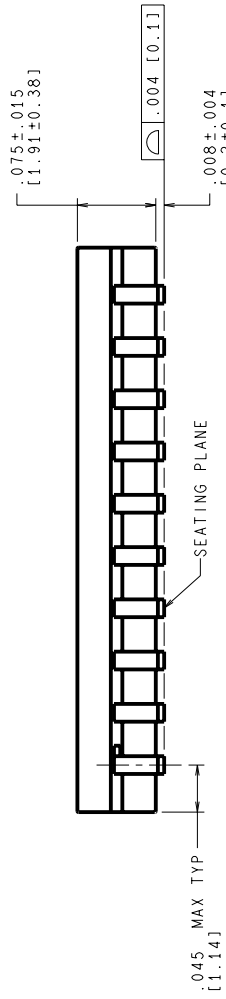
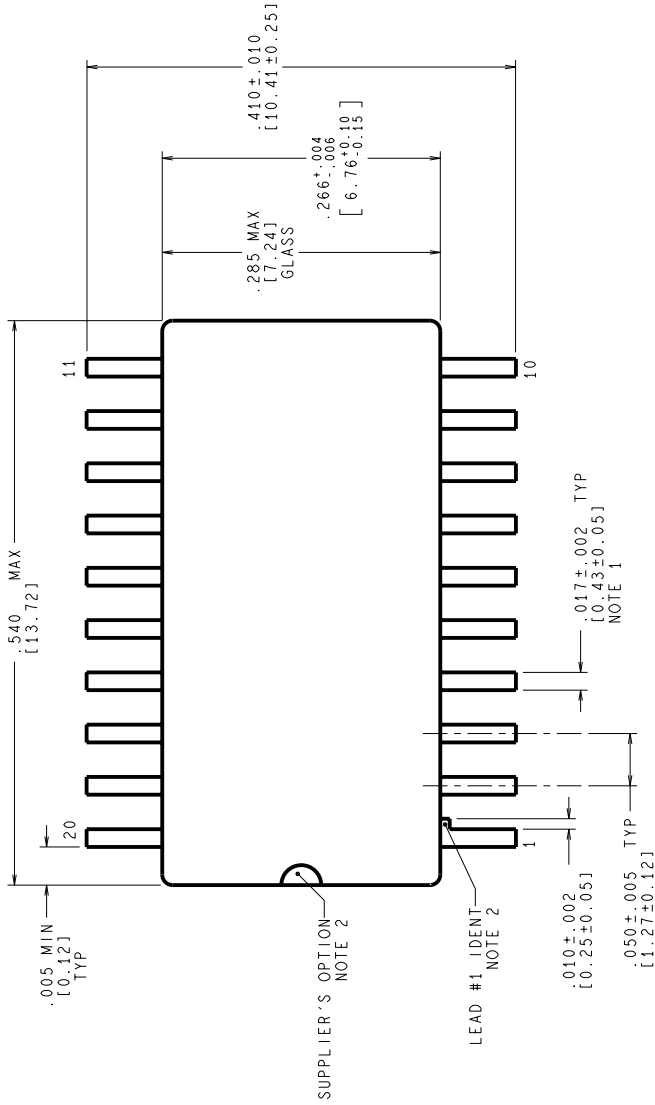
GRAPHICS#	DESCRIPTION
WG20ARB	CERPACK, 20 LEAD GULL WING (P/P DWG)

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/



MIL-PRF-38535  
CONFIGURATION CONTROL

CONTROLLING DIMENSION IS INCH  
VALUES IN ( ) ARE MILLIMETERS

- NOTES: UNLESS OTHERWISE SPECIFIED
- LEAD FINISH: SOLDER DIPPED WITH Sn60 OR Sn63 SOLDER CONFORMING TO MIL-PRF-38535 TO A MINIMUM THICKNESS OF 200 MICRONS/ 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.
  - LEAD IDENTIFICATION SHALL BE:
    - a) A NOTCH OR OTHER MARK WITHIN THIS AREA
    - b) A TAB ON LEAD 1, EITHER SIDE
  - NO JEDEC REGISTRATION AS OF JUNE 1998.

APPROVALS	DATE
DESIGN	10/13/1997
TESTING	
PRODUCTION	
ENGR. CHK.	
DATE	
SCALE	N/A
SIZE	C
DRAWING NUMBER	(SC)MKT-WG20A
REV	B

DO NOT SCALE DRAWING SHEET 1 of 1

**National Semiconductor**  
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**CERPACK,  
20 LEAD,  
GULL WING**

**Revision History**

<b>Rev</b>	<b>ECN #</b>	<b>Rel Date</b>	<b>Originator</b>	<b>Changes</b>
2B1	M0003970	03/18/02	Rose Malone	Update MDS: MN54AC245-X, Rev. 2A0 to MN54AC245-X, Rev. 2B1. Added SMD Numbers and WG pkg to Main Table and Features Section, also added WG Mkt Dwg to Graphics Section.