



MILITARY DATA SHEET

MN100304-X REV 1A0

Original Creation Date: 10/30/95
Last Update Date: 08/28/96
Last Major Revision Date: 08/21/96

LOW POWER QUINT AND/NAND GATE

General Description

The 100304 is a monolithic quint AND/NAND gate. The Function output is the wire-NOR of all five AND gate outputs. All inputs have 50K ohm pull-down resistors.

Industry Part Number

100304

Prime Die

F304

NS Part Numbers

100304DMQB
100304FMQB
100304J-QMLV
100304W-QMLV

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

- Low Power Operation
- 2000V ESD protection
- Pin/function compatible with 100104
- Voltage compensated operating range = -4.2V to -5.7V
- Available to industrial grade temperature range
- Available to MIL-STD-883

(Absolute Maximum Ratings)

(Note 1)

Storage Temperature (Tstg)	-65 C to +150 C
Maximum Junction Temperature (Tj)	
Ceramic	+175 C
Plastic	+150 C
Vee Pin Potential to Ground Pin	-7.0V to +0.5V
Input Voltage (DC)	Vee to +0.5V
Output Current (DC Output HIGH)	-50mA
ESD (Note 2)	≥ 2000V

Note 1: Absolute maximum ratings are those values beyond which the device may be damaged or have its useful life impaired. Functional operation under these conditions is not implied.

Note 2: ESD testing conforms to MIL-STD-883, Method 3015.

Recommended Operating Conditions

Case Temperature (Tc)	
Commercial	0 C to +85 C
Military	-55 C to +125 C
Industrial	-40 C to +85 C
Supply Voltage (Vee)	-5.7V to -4.2V

Electrical Characteristics

DC PARAMETERS

(The following conditions apply to all the following parameters, unless otherwise specified.)
DC: Vee Range: -4.2V to -5.7V, TC= -55c to +125c, VCC=VCCA=GND

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
IIH(1)	Input HIGH Current	Vee= -5.7V, VM= -0.87V	1, 3	D2n		250	uA	1, 2
			1, 3	D2n		350	uA	3
IIH(2)	Input HIGH Current	Vee= -5.7V, VM= -0.87V	1, 3	D1n		350	uA	1, 2
			1, 3	D1n		500	uA	3
IIL	Input LOW Current	Vee= -4.2V, VM= -1.83V	1, 3	INPUTS	0.5		uA	1, 2, 3
VOH	Output HIGH Voltage	Vee=-4.2V/-5.7V, VIH=-0.87V, VIL=-1.83V, LOADING: 50 Ohms To -2.0V	1, 3	OUTPUTS	-1025	-870	mV	1, 2
			1, 3	OUTPUTS	-1085	-870	mV	3
VOL	Output LOW Voltage	Vee=-4.2V/-5.7V, VIH=-0.87V, VIL=-1.83V, LOADING: 50 Ohms to -2.0V	1, 3	OUTPUTS	-1830	-1620	mV	1, 2
			1, 3	OUTPUTS	-1830	-1555	mV	3
VOHC	Output HIGH Voltage	Vee=-4.2V/-5.7V, VIH=-1.165V, VIL=-1.475V, LOADING: 50 Ohms to -2.0V	1, 3	OUTPUTS	-1035		mV	1, 2
			1, 3	OUTPUTS	-1085		mV	3
VOLC	Output LOW Voltage	Vee=-4.2V/-5.7V, VIH=-1.165V, VIL=-1.475V, LOADING:50 Ohms to -2.0V	1, 3	OUTPUTS		-1610	mV	1, 2
			1, 3	OUTPUTS		-1555	mV	3
VIH	Input HIGH Voltage		1, 3, 7	INPUTS	-1165	-870	mV	1, 2, 3
VIL	Input LOW Voltage		1, 3, 7	INPUTS	-1830	-1475	mV	1, 2, 3
IEE	Power Supply Current	Vee= -4.2/-5.7V	1, 3	VEE	-75	-25	mA	1, 2, 3

Electrical Characteristics

AC PARAMETERS

(The following conditions apply to all the following parameters, unless otherwise specified.)
 AC: Vee Range: -4.2V to -5.7V, VCC=VCCA=GND, LOADING: 50 Ohms To -2.0V

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
tPLH/tPHL(1)	Propagation Delay	Vee= -4.2/-5.7V	2, 4	Dn to On/On	0.4	1.8	ns	9
			2, 4	Dn to On/On	0.3	2.3	ns	10
			2, 4	Dn to On/On	0.3	1.9	ns	11
tPLH/tPHL(2)	Propagation Delay	Vee= -4.2/-5.7V	2, 4	Dn to F	0.9	2.8	ns	9
			2, 4	Dn to F	0.9	3.4	ns	10
			2, 4	Dn to F	0.8	2.9	ns	11
tTLH/tTHL	Transition Time	Vee= -4.2/-5.7V	6	On/On	0.3	1.6	ns	9
			6	On/On	0.2	2.0	ns	10
			6	On/On	0.2	1.8	ns	11

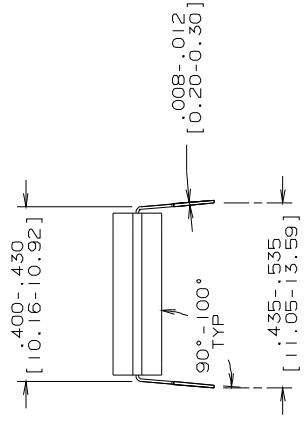
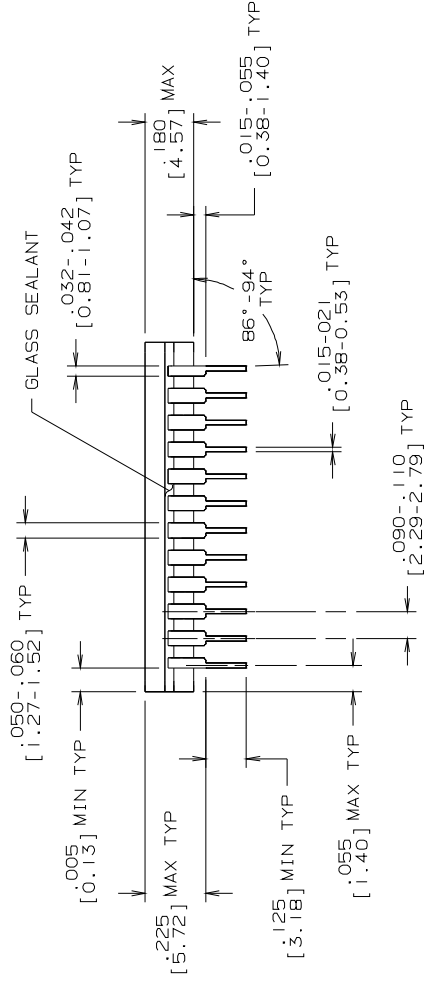
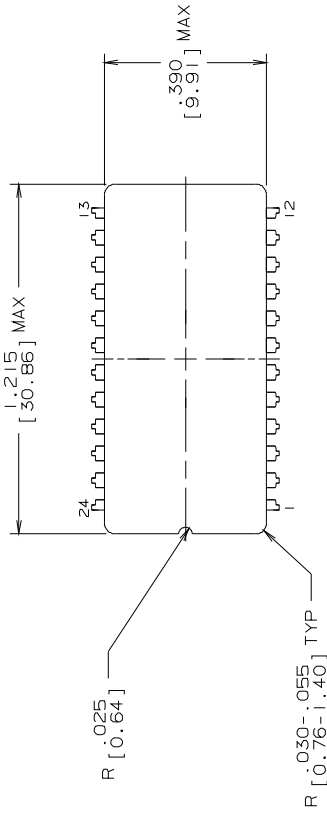
- Note 1: Screen tested 100% on each device at -55 C, +25 C and +125 C temp., subgroups 1, 2, 3, 7 & 8.
- Note 2: For QB devices, screen tested 100% on each device at +25C temperature only, subgroup A9. For QMLV devices, screen tested 100% on each device at +25C, +125C & -55C temperature, subgroups A9, 10 & 11.
- Note 3: Sample tested (Method 5005, Table 1) on each MFG. lot at +25 C, +125 C & -55 C temp., subgroups A1, 2, 3, 7 & 8.
- Note 4: Sample tested (Method 5005, Table 1) on each MFG. lot at +25 C, subgroup A9, and at +125 C & -55 C temp., subgroups A10 & 11.
- Note 5: Sample tested (Method 5005, Table 1) on each MFG. lot at +25 C temp. only, subgroup A9.
- Note 6: Not tested at +25 C, +125 C & -55 C temp. (DESIGN CHARACTERIZATION DATA).
- Note 7: Guaranteed by applying specified input condition and testing VOH/VOL.

Graphics and Diagrams

GRAPHICS#	DESCRIPTION
J24ERJ	CERDIP(J), 24LD .400 CENTERS (P/P DWG)
P000037A	CERDIP (J), 24LD .400 CENTERS (PIN OUT)
P000038A	CERPAC, QUAD, 24 LEAD (PIN OUT)
W24BRE	CERPAC, QUAD, 24 LEAD (P/P DWG)

See attached graphics following this page.

REVISIONS			
LTR	DESCRIPTION	E.C.N.	DATE
J	REVISE AND REDRAW	09044	03/05/92 DEG/



MIL/AERO MIL-M-38510 CONFIGURATION CONTROL CONFIGURATION CONTROL

CONTROLLING DIMENSION: INCH	
APPROVALS	DATE
DRAWN D.E. GRADY	03/05/92
DTG: CHK.	
ENGR. CHK.	
APPROVAL	
SCALE N/A	DRAWING NUMBER C
FORMERLY: N/A	MKT-J24E
SHEET 1	OF 1

NOTES: UNLESS OTHERWISE SPECIFIED

- LEAD FINISH: SOLDER DIPPED WITH Sn60 OR Sn63 SOLDER CONFORMING TO MIL-M-38510 TO A MINIMUM THICKNESS OF 200 MICRONS/5.08 MICROMETERS. SOLDER MAY BE APPLIED OVER LEAD BASIS METAL OR Sn PLATE.
- LEAD THICKNESS MAY BE INCREASED BY .003 [0.08] MAXIMUM AFTER LEAD FINISH APPLIED.
- BUMPERS ARE AVAILABLE ON CERTAIN PRODUCTS. BUMPERS WILL ADD .040 [1.02] MAX TO THE LENGTH OF THE PACKAGE.
- NO JEDEC REGISTRATION AS OF 2/17/92.

NATIONAL SEMICONDUCTOR CORPORATION
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 CERDIP (J),
 24 LEAD,
 .400 CENTERS