

**MN54F04-X REV 1A0**

Original Creation Date: 03/06/96  
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**HEX INVERTER**

**General Description**

This device contains four independent gates, each of which performs the logic INVERT function.

**Industry Part Number**

54F04

**NS Part Numbers**

54F04DMQB  
 54F04FMQB  
 54F04LMQB

**Prime Die**

M004

**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**

- Guaranteed 4000V minimum ESD protection

**(Absolute Maximum Ratings)**

(Note 1)

Storage Temperature	-65 C to +150 C
Ambient Temperature under Bias	-55 C to +125 C
Junction Temperature under Bias	-55 C to +175 C
Vcc Pin Potential to Ground Pin	-0.5V to +7.0V
Input Voltage (Note 2)	-0.5V to +7.0V
Input Current (Note 2)	-30 mA to +5.0mA
Voltage Applied to Output in HIGH State (with Vcc=0V)	
Standard Output	-0.5V to Vcc
TRI-STATE Output	-0.5V to +5.5V
Current Applied to Output in LOW State (Max)	twice the rated Iol(mA)
ESD Last Passing Voltage (Min)	4000V

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: Either voltage limit or current limit is sufficient to protect inputs.

**Recommended Operating Conditions**

Free Air Ambient Temperature	
Commercial	0 C to +70 C
Military	-55 C to +125 C
Supply Voltage	
Military	+4.5V to +5.5V
Commercial	+4.5V to +5.5V

## Electrical Characteristics

### DC PARAMETER

(The following conditions apply to all the following parameters, unless otherwise specified.)  
DC: VCC 4.5V to 5.5V, Temp range: -55C to 125C

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
IIH	Input High Current	VCC=5.5V, VM=2.7V, VINH=5.5V	1, 3	INPUTS		20	uA	1, 2, 3
IBVI	Input High Current	VCC=5.5V, VM=7.0V, VINH=5.5V	1, 3	INPUTS		100	uA	1, 2, 3
IIL	Input LOW Current	VCC=5.5V, VM=0.5V, VINH=5.5V	1, 3	INPUTS		-0.6	mA	1, 2, 3
VOL	Output LOW Voltage	VCC=4.5V, VIH=2.0V, IOL=20mA, VINH=5.5V	1, 3	OUTPUTS		0.5	V	1, 2, 3
VOH	Output HIGH Voltage	VCC=4.5V, VIL=0.8V, IOH=-1.0mA, VINH=5.5V	1, 3	OUTPUTS	2.5		V	1, 2, 3
IOS	Short-Circuit Current	VCC=5.5V, VINH=5.5V, VM=0.0V	1, 3	OUTPUTS	-60	-150	mA	1, 2, 3
VCD	Input Clamp Diode Voltage	VCC=4.5V, IM=-18mA, VINH=5.5V	1, 3	INPUTS		-1.2	V	1, 2, 3
ICCH	Supply Current	VCC=5.5V, VINL=0.0V	1, 3	VCC		4.2	mA	1, 2, 3
ICCL	Supply Current	VCC=5.5V, VINH=5.5V	1, 3	VCC		15.3	mA	1, 2, 3
ICEX	Output HIGH Leakage Current	VCC=5.5V, VINH=5.5V, VM=5.5V, VINL=0.0V	1, 3	OUTPUTS		250	uA	1, 2, 3

### AC PARAMETER

(The following conditions apply to all the following parameters, unless otherwise specified.)  
AC: CL=50pf, RL=500 OHMS, TR=2.5ns, TF=2.5ns SEE AC FIGS

tpLH	Propagation Delay	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C	2, 4	An to On	2.4	5.0	ns	9
			2, 4	An to On	2.0	7.0	ns	10, 11
tpHL	Propagation Delay	VCC=5.0V @25C VCC=4.5V & 5.5V @-55/125C	2, 4	An to On	1.5	4.3	ns	9
			2, 4	An to On	1.5	6.5	ns	10, 11

Note 1: Screen tested 100% on each device at -55C, +25C & +125C temperature, subgroups A1, 2, 3, 7 & 8.

Note 2: Screen tested 100% on each device at +25C temperature only, subgroup A9.

Note 3: Sample tested (Method 5005, Table 1) on each MFG. lot at +25C, +125C & -55C temperature, subgroup A1, 2, 3, 7 & 8.

Note 4: Sample tested (Method 5005, Table 1) on each MFG. lot at +25C subgroup A9, & periodically at +125C & -55C temperature subgroups 10 & 11.