

MN54F648-X REV 1A0

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OCTAL TRANSCEIVER/REGISTER WITH TRI-STATE OUTPUTS

General Description

This device consist of bus transceiver circuits with TRI-STATE, D-type flip-flops, and control circuitry arranged for multiplexed transmission of data directly from the input bus or from the internal registers. Data on the A or B bus will be clocked into the registers as the appropriate clock pin goes to a high logic level. Control $\bar{G}$ and direction pins are provided to control the transceiver function. In the transceiver mode, data present at the high impedance port may be stored in either the A or the B register or in both. The select controls can multiplex stored and real-time (transparent mode) data. The direction control determines which bus will receive data when the enable control $\bar{G}$ is Active LOW. In the isolation mode (control $\bar{G}$ HIGH), A data may be stored in the B register and/or B data may be stored in the A register.

Industry Part Number

54F648

NS Part Numbers

 54F648DMQB
 54F648FMQB
 54F648LMQB

Prime Die

M648

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

- Independent Registers for A and B Buses
- Multiplexed Real-Time and Stored Data
- Choice of True and inverting Data Paths
- 3-State Outputs
- 300 mil Slim Package

(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 +5.0 mA
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 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 PARAMETERS

(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	1, 3	INPUTS		20	uA	1, 2, 3
IBVI	Input HIGH Current	VCC=5.5V, VM=7.0V	1, 3	INPUTS		100	uA	1, 2, 3
IBVIT	Input HIGH Current	VCC=5.5V, VM=5.5V	1, 3	I/O PINS		1.0	mA	1, 2, 3
IIL	Input LOW Current	VCC=5.5V, VM=0.5V	1, 3	INPUTS		-600	uA	1, 2, 3
VOLB	Output LOW Voltage	VCC=4.5V, VIL=0.8V, IOLB=48mA, VIH=2.0V	1, 3	OUTPUTS		.55	V	1, 2, 3
VOH3	Output HIGH Voltage	VCC=4.5V, VIL=0.8V, VIH=2.0V, IOH3=-3.0mA	1, 3	OUTPUTS	2.4		V	1, 2, 3
VOHB	Output HIGH Voltage	VCC=4.5V, VIL=0.8V, IOHB=-12.0mA, VIH=2.0V	1, 3	OUTPUTS	2.0		V	1, 2, 3
IOSB	Short-Circuit Current	VCC=5.5V, VOUT=0.0V	1, 3	OUTPUTS	-100	-225	mA	1, 2, 3
VCD	Input Clamp Diode Voltage	VCC=4.5V, IM=-18mA	1, 3	INPUTS		-1.2	V	1, 2, 3
ICCH	Supply Current	VCC=5.5V	1, 3	VCC		135	mA	1, 2, 3
ICCL	Supply Current	VCC=5.5V	1, 3	VCC		150	mA	1, 2, 3
ICCZ	Supply Current	VCC=5.5V	1, 3	VCC		150	mA	1, 2, 3
ICEX	Output HIGH Leakage Current	VCC=5.5V, VINL=0.0V, VINH=5.5V, VM=5.5V	1, 3	OUTPUTS		250	uA	1, 2, 3
IOZH	Output Leakage Current	VCC=5.5V, VIH=2.0V, VM=2.7V	1, 3	OUTPUTS		70	uA	1, 2, 3
IOZL	Output Leakage Current	VCC=5.5V, VIH=2.0V, VM=0.5V	1, 3	OUTPUTS		-650	uA	1, 2, 3

AC PARAMETERS

(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(1)	Propagation Delay CPBA or CPAB to An or Bn	VCC=5.0V @ 25C, VCC=4.5V & 5.5V @ -55/125C	2, 4		2.0	7.0	ns	9
tpLH(1)	Propagation Delay CPBA or CPAB to An or Bn	VCC=5.0V @ 25C, VCC=4.5V & 5.5V @ -55/125C	2, 4		2.0	8.5	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=2.5ns, TF=2.5ns SEE AC FIGS

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
tpHL(1)	Propagation Delay CPBA or CPAB to An or Bn	VCC=5.0V @ 25C, VCC=4.5V & 5.5V @ -55/125C	2, 4		2.0	8.0	ns	9
tpHL(1)	Propagation Delay CPBA or CPAB to An or Bn	VCC=5.0V @ 25C, VCC=4.5V & 5.5V @ -55/125C	2, 4		2.0	9.5	ns	10, 11
tpLH(2)	Propagation Delay An or Bn to Bn or An	VCC=5.0V @ 25C, VCC=4.5V & 5.5V @ -55/125C	2, 4		1.0	7.0	ns	9
tpLH(2)	Propagation Delay An or Bn to Bn or An	VCC=5.0V @ 25C, VCC=4.5V & 5.5V @ -55/125C	2, 4		1.0	9.0	ns	10, 11
tpHL(2)	Propagation Delay An or Bn to Bn or An	VCC=5.0V @ 25C, VCC=4.5V & 5.5V @ -55/125C	2, 4		1.0	6.5	ns	9
tpHL(2)	Propagation Delay An or Bn to Bn or An	VCC=5.0V @ 25C, VCC=4.5V & 5.5V @ -55/125C	2, 4		1.0	8.0	ns	10, 11
tpLH(3)	Propagation Delay SBA or SAB to An or Bn	VCC=5.0V @ 25C, VCC=4.5V & 5.5V @ -55/125C	2, 4		2.0	8.5	ns	9
tpLH(3)	Propagation Delay SBA or SAB to An or Bn	VCC=5.0V @ 25C, VCC=4.5V & 5.5V @ -55/125C	2, 4		2.0	11.0	ns	10, 11
tpHL(3)	Propagation Delay SBA or SAB to An or Bn	VCC=5.0V @ 25C, VCC=4.5V & 5.5V @ -55/125C	2, 4		2.0	8.0	ns	9
tpHL(3)	Propagation Delay SBA or SAB to An or Bn	VCC=5.0V @ 25C, VCC=4.5V & 5.5V @ -55/125C	2, 4		2.0	10.0	ns	10, 11
tpZH(1)	Enable Time OE to An or Bn	VCC=5.0V @ 25C, VCC=4.5V & 5.5V @ -55/125C	2, 4		2.0	8.5	ns	9
tpZH(1)	Enable Time OE to An or Bn	VCC=5.0V @ 25C, VCC=4.5V & 5.5V @ -55/125C	2, 4		2.0	10.0	ns	10, 11
tpHZ(1)	Disable Time OE to An or Bn	VCC=5.0V @ 25C, VCC=4.5V & 5.5V @ -55/125C	2, 4		1.0	7.5	ns	9
tpHZ(1)	Disable Time OE to An or Bn	VCC=5.0V @ 25C, VCC=4.5V & 5.5V @ -55/125C	2, 4		1.0	9.0	ns	10, 11
tpZL(1)	Enable Time OE to An or Bn	VCC=5.0V @ 25C, VCC=4.5V & 5.5V @ -55/125C	2, 4		2.0	8.5	ns	9
tpZL(1)	Enable Time OE to An or Bn	VCC=5.0V @ 25C, VCC=4.5V & 5.5V @ -55/125C	2, 4		2.0	10.0	ns	10, 11
tpLZ(1)	Enable Time OE to An or Bn	VCC=5.0V @ 25C, VCC=4.5V & 5.5V @ -55/125C	2, 4		1.0	7.5	ns	9

Electrical Characteristics

AC PARAMETERS(Continued)

(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

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
tpLZ(1)	Enable Time OE to $\bar{A}n$ or $\bar{B}n$	VCC=5.0V @ 25C, VCC=4.5V & 5.5V @ -55/125C	2, 4		1.0	9.0	ns	10, 11
tpZH(2)	Enable Time DIR to $\bar{A}n$ or $\bar{B}n$	VCC=5.0V @ 25C, VCC=4.5V & 5.5V @ -55/125C	2, 4		1.0	7.5	ns	9
tpZH(2)	Enable Time DIR to $\bar{A}n$ or $\bar{B}n$	VCC=5.0V @ 25C, VCC=4.5V & 5.5V @ -55/125C	2, 4		1.0	9.0	ns	10, 11
tpHZ(2)	Disable Time DIR to $\bar{A}n$ or $\bar{B}n$	VCC=5.0V @ 25C, VCC=4.5V & 5.5V @ -55/125C	2, 4		1.0	7.5	ns	9
tpHZ(2)	Disable Time DIR to $\bar{A}n$ or $\bar{B}n$	VCC=5.0V @ 25C, VCC=4.5V & 5.5V @ -55/125C	2, 4		1.0	9.0	ns	10, 11
tpZL(2)	Enable Time DIR to $\bar{A}n$ or $\bar{B}n$	VCC=5.0V @ 25C, VCC=4.5V & 5.5V @ -55/125C	2, 4		2.0	10.0	ns	9
tpZL(2)	Enable Time DIR to $\bar{A}n$ or $\bar{B}n$	VCC=5.0V @ 25C, VCC=4.5V & 5.5V @ -55/125C	2, 4		2.0	12.0	ns	10, 11
tpLZ(2)	Disable Time DIR to $\bar{A}n$ or $\bar{B}n$	VCC=5.0V @ 25C, VCC=4.5V & 5.5V @ -55/125C	2, 4		1.0	10.0	ns	9
tpLZ(2)	Disable Time DIR to $\bar{A}n$ or $\bar{B}n$	VCC=5.0V @ 25C, VCC=4.5V & 5.5V @ -55/125C	2, 4		1.0	12.0	ns	10, 11
ts(H/L)	Setup Time $\bar{A}n$ or $\bar{B}n$ to CPAB or CPBA	VCC=5.0V @ 25C, VCC=4.5V & 5.5V @ -55/125C	5		5.0		ns	9, 10, 11
th(H/L)	Hold Time $\bar{A}n$ or $\bar{B}n$ to CPAB or CPBA	VCC=5.0V @ 25C, VCC=4.5V & 5.5V @ -55/125C	5		1.5		ns	9
th(H/L)	Hold Time $\bar{A}n$ or $\bar{B}n$ to CPAB or CPBA	VCC=5.0V @ 25C, VCC=4.5V & 5.5V @ -55/125C	5		2.5		ns	10, 11
tw(H/L)	Pulse Width CPAB or CPBA	VCC=5.0V @ 25C, VCC=4.5V & 5.5V @ -55/125C	5		5.0		ns	9, 10, 11
fMAX	Maximum Clock Frequency	VCC=5.0V @ 25C, VCC=4.5V & 5.5V @ -55/125C	5		90		ns	9
			5		75		ns	10, 11

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

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

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, & at +125 C & -55 C temp., Subgroups 10 & 11.

Note 5: Not tested at +25 C, +125 C & -55 C Temperature. (DESIGN CHARACTERIZATION DATA)