National Semiconductor

MILITARY DATA SHEET

MN54F378-X REV 1A0

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PARALLEL D REGISTER WITH ENABLE

General Description

The F378 is a 6-bit register with a buffered common Enable. This device is similar to the F174, but with common Enable rather than common Master Reset.

Industry Part Number

54F378

Prime Die

M378

NS Part Numbers

54F378DM
54F378DMQB
54F378FMQB
54F378LMQB

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

- 6-Bit High-Speed Parallel Register
- Positive Edge-Triggered D-Type Inputs
- Fully Buffered Common Clock and Enable Inputs
- Input Clamp Diodes Limit High-Speed Termination Effects
- Full TTL and CMOS Compatible

(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)	-30mA 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)

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 PARAMETERS

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

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
IIL	Input LOW Current	VCC=5.5V, VM=0.5V, VINH=5.5V, VINL=0.0V	1, 3	INPUTS		-0.6	mA	1, 2, 3
VOL	Output LOW Voltage	VCC=4.5V, VIL=0.8V, IOL=20mA, VIH=2.0V, VINL=0.0V	1, 3	OUTPUTS		0.5	V	1, 2, 3
VOH	Output HIGH Voltage	VCC= 4.5V, VIH=2.0V, 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, VINL=0.0V, VM=0.0V	1, 3	OUTPUTS	-60	-150	mA	1, 2, 3
VCD	Input Clamp Diode Voltage	VCC=4.5V, IM=-18mA	1, 3	INPUTS		-1.2	V	1, 2, 3
ICC	Supply Current	VCC=5.5V, VINH=5.5V, VINL=0.0V	1, 3	VCC		45	mA	1, 2, 3
ICEX	Output HIGH Leakage Current	VCC=5.5V, VINH=5.5V, VINL=0.0V, VM=5.5V	1, 3	OUTPUTS		250	uA	1, 2, 3

Electrical Characteristics

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

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
tpLH	Propagation Delay	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C	2, 5	CP to Qn	3.0	7.5	ns	9
			2, 5	CP to Qn	3.0	10.5	ns	10, 11
tpHL	Propagation Delay	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C	2, 5	CP to Qn	3.5	8.5	ns	9
			2, 5	CP to Qn	3.5	10.5	ns	10, 11
ts(H/L)(1)	Setup Time	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C	6	Dn to CP	4.0		ns	9
			6	Dn to CP	5.0		ns	10, 11
th(H/L)(1)	Hold Time	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C	6	Dn to CP	0		ns	9
			6	Dn to CP	2.0		ns	10, 11
ts(H)(2)	Setup Time	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C	6	$\overline{E}$ to CP	4.0		ns	9
			6	$\overline{E}$ to CP	4.5		ns	10, 11
ts(L)(2)	Setup Time	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C	6	$\overline{E}$ to CP	10.0		ns	9
			6	$\overline{E}$ to CP	13.0		ns	10, 11
th(H/L)(2)	Hold Time	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C	6	$\overline{E}$ to CP	0		ns	9, 10, 11
tw(H)	Pulse Width	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C TR/TF=1.0ns	6	CP	4.0		ns	9
			6	CP	5.0		ns	10, 11
tw(L)	Pulse Width	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C TR/TF=1.0ns	6	CP	6.0		ns	9
			6	CP	7.5		ns	10, 11
fMAX	Maximum Clock Frequency	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C TR/TF=1.0ns	6		80		MHZ	9
			6		70		MHZ	10, 11

Note 1: Screen tested 100% on each device at +25C, +125C & -55C 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, subgroups A1, 2, 3, 7 & 8.
Note 4: Sample tested (Method 5005, Table 1) on each MFG. lot at +25C subgroup A9, and at +125C & -55C temperature, subgroups 10 & 11.
Note 5: Sample tested (Method 5005, Table 1) on each MFG.lot at +125C, +25C & -55C temperature, subgroups A9, 10 & 11.
Note 6: GUARANTEED BUT NOT TESTED. (Design Characterization Data)