MNMM54C85-X REV 1A0

4-BIT MAGNITUDE COMPARATOR

General Description

The MM54C85 is a four-bit magnitude comparator which will perform comparison of straight binary or BCD codes. The circuit consists of eight comparing inputs (A0, A1, A2, A3, B0, B1, B2, B3), three cascading inputs (A > B, A < B and A = B), and three outputs (A > B, A < B and A = B). This device compares two four-bit words (A and B) and determines whether they are "greater than", "less than", or "equal to" each other by a high level on the appropriate output. For words greater than four-bits, units can be cascaded by connecting the outputs (A > B, A < B and A = B) of the lease significant stage to the cascade inputs (A > B, A < B and A = B) of the next-significant stage. In addition the lease significant stage must have a high level voltage (Vin(1)) applied to the A = B input and low level voltage (Vin(0)) applies to A > B and A < B inputs.

Industry Part Number

MM54C85

Prime Die

MM54C85

NS Part Numbers

MM54C85J/883
MM54C85W/883

Processing

MIL-STD-883, Method 5004

Quality Conformance Inspection

MIL-STD-883, Method 5005

Subgrp	Description	Temp ($^{\circ}$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

- Wide supply voltage range   3.0V to 15V
- Guaranteed noise margin   1.0V
- High noise immunity   0.4 Vcc (typ.)
- Low power   Fan out of 2
  TTL compatibility   driving 74L
- Expandable to "N" stage
- Applicable to binary or BCD
- Low power pinout: 54L85

(Absolute Maximum Ratings)
(Note 1)

Voltage at Any Pin
                                                        -0.3V to Vcc +0.3V

Operating Temperature Range
                                                        -55 C to +125 C

Storage Temperature Range
                                                        -65 C to +150 C

Power Dissipation (Pd)
     Dual-In-Line   700mW
     Small Outline   500mW

Operating Vcc Range
                                                        3.0V to 15V

Vcc
                                                        18V

Lead Temperature
     (Soldering, 10 seconds)   260 C

Note 1:   "Absolute Maximum Ratings" are those values beyond which the safety of the device
          cannot be guaranteed. Except for "Operating Temperature Range" they are not meant to
          imply that the devices should be operated at these limits. The table of "Electrical
          Characteristics" provides conditions for actual device operation.

3

Electrical Characteristics

DC PARAMETERS:

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
Voh	Logical "1" Output Voltage	Vcc = 5V, Ioh = -10uA, Vih = 3.5V, Vil = 1.5V			4.5		V	1, 2, 3
		Vcc = 10V, Ioh = -10uA, Vih = 8V, Vil = 2V			9		V	1, 2, 3
		Vcc = 4.5V, Ioh = -360uA, Vih = 3V, Vil = 0.8V			2.4		V	1, 2, 3
Vol	Logical "0" Output Voltage	Vcc = 5V, Iol = 10uA, Vil = 1.5V				0.5	V	1, 2, 3
		Vcc = 10V, Iol = 10uA, Vil = 2V				1	V	1, 2, 3
		Vcc = 4.5V, Iol = 360uA, Vil = 0.8V				0.4	V	1, 2, 3
Iih	Logical "1" Input Current	Vcc = 15V, Vin = 15V				0.15	uA	1, 3
						1	uA	2
Iil	Logical "0" Input Current	Vcc = 15V, Vin = 0V				-0.15	uA	1, 3
						-1	uA	2
Icc	Quiescent Device Current	Vcc = 15V				10	uA	1, 3
						300	uA	2
Isource	Output Source Current	Vcc = 5V, Vout = 0V			-1.75		mA	1, 3
					-1.2		mA	2
		Vcc = 10V, Vout = 0V			-8		mA	1, 3
					-5.6		mA	2
Isink	Output Sink Current	Vcc = 5V, Vout = 5V			1.75		mA	1, 3
					1.2		mA	2
		Vcc = 10V, Vout = 10V			8		mA	1, 3
					5.6		mA	2
		Vcc = 4.5V, Vout = 0.4V			360		uA	1, 2, 3
Vih	Logical "1" Input Voltage	Vcc = 5V	1		3.5		V	1, 2, 3
		Vcc = 10V	1		8		V	1, 2, 3
		Vcc = 4.5V (LP to CMOS)	1		3		V	1, 2, 3

4

Electrical Characteristics

DC PARAMETERS:(Continued)

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
Vil	Logical "0" Input Voltage	Vcc = 5V	1			1.5	V	1, 2, 3
		Vcc = 10V	1			2	V	1, 2, 3
		Vcc = 4.5V (LP to CMOS)	1			0.8	V	1, 2, 3

AC PARAMETERS: <u>PROPAGATION DELAY TIME:</u>

(The following conditions apply to all the following parameters, unless otherwise specified.)
AC: Cl = 50pF or equivalent impedance provided by diode load.

tPHL	From A/B to Output	Vcc = 5V	2			600	nS	9
			2			750	nS	10, 11
		Vcc = 10V	2			300	nS	9
			2			375	nS	10, 11
tPLH	From A/B to Output	Vcc = 5V	2			600	nS	9
			2			750	nS	10, 11
		Vcc = 10V	2			300	nS	9
			2			375	nS	10, 11
tPHL	From Cascade Input to Output	Vcc = 5V	2			500	nS	9
			2			625	nS	10, 11
		Vcc = 10V	2			250	nS	9
			2			312	nS	10, 11
tPLH	From Cascade Input to Output	Vcc = 5V	2			500	nS	9
			2			625	nS	10, 11
		Vcc = 10V	2			250	nS	9
			2			312	nS	10, 11

Note 1: Parameter tested go-no-go only.
Note 2: Tested at 25 C; guaranteed but not tested at +125 C and –55 C.