National Semiconductor

MICROCIRCUIT DATA SHEET

MNCD40106BM-X REV 1A0

Original Creation Date: 10/05/95
Last Update Date: 06/16/98
Last Major Revision Date: 03/05/98

HEX SCHMITT TRIGGER

General Description

The CD40106B Hex Schmitt Trigger is a monolithic complementary MOS (CMOS) integrated circuit constructed with N and P-channel enhancement transistors. The positive and negative-going threshold voltages, Vt+ and Vt-, show low variation with respect to temperature (typ 0.0005V/ C at Vdd = 10V), and hysteresis, Vt+ - Vt- $\geq$ 0.2Vdd is guaranteed.

All inputs are protected from damage due to static discharge by diode clamps to Vdd and Vss.

Industry Part Number

CD40106BM

NS Part Numbers

CD40106BMJ/883*
CD40106BMW/883

Prime Die

CD40106BM

Controlling Document

5962-8550101CA*

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

- Wide supply voltage range	3V to 15V
- High noise immunity	0.7Vdd (typ.)
- Low power TTL compatibility	Fan out of 2 driving 74L or 1 driving 74LS
- Hysteresis	0.4Vdd (typ.)

- Equivalent to MM54C14/MM74C14
- Equivalent to MC14584B
- Standard Military Drawing (SMD)
  - CD40106: 5962-8550101CA*

(Absolute Maximum Ratings)

(Note 1, 2)

DC Supply Voltage (Vdd)	-0.5 to +18Vdc
Input Voltage (Vin)	-0.5 to Vdd +0.5Vdc
Storage Temperature Range (Ts)	-65 C to +150 C
Power Dissipation (Pd)	
Dual-In-Line	700mW
Small Outline	500mW
Lead Temperature (Tl) (Soldering, 10 seconds)	260 C

Note 1: "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. They are not meant to imply that the devices should be operated at these limits. The table of "Recommended Operating Conditions" and "Electrical Characteristics" provides conidtions for actual device operation.
Note 2: Vss = 0V unless otherwise specified.

Recommended Operating Conditions

(Note 1)

DC Supply Voltage (Vdd)	3 to 15Vdc
Input Voltage (Vin)	0 to Vdd Vdc
Operating Temperature Range (TA)	
CD40106BM	-55 C to +125 C

Note 1: Vss = 0V unless otherwise specified.

Electrical Characteristics

DC PARAMETERS

(The following conditions apply to all the following parameters, unless otherwise specified.)
DC: Vss = 0V

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
Vol	Logical "0" Output Voltage	Vdd = 5V, Vih = 5V, Vil = 0V, Iout < 1uA				0.05	V	1, 2, 3
		Vdd = 10V, Vih = 10V, Vil = 0V, Iout < 1uA				0.05	V	1, 2, 3
		Vdd = 15V, Vih = 15V, Vil = 0V, Iout < 1uA				0.05	V	1, 2, 3
Voh	Logical "1" Output Voltage	Vdd = 5V, Vih = 5V, Vil = 0V, Iout < 1uA			4.95		V	1, 2, 3
		Vdd = 10V, Vih = 10V, Vil = 0V, Iout < 1uA			9.95		V	1, 2, 3
		Vdd = 15V, Vih = 15V, Vil = 0V, Iout < 1uA			14.95		V	1, 2, 3
Iih	Logical "1" Input Current	Vdd = 15V, Vin = 15V (all inputs tied)				97	nA	1
						1000	nA	2
						100	nA	3
Iil	Logical "0" Input Current	Vdd = 15V, Vin = 0V (all inputs tied)				-97	nA	1
						-1000	nA	2
						-100	nA	3
Ioh	Logical "1" Output Current	Vdd = 5V, Vih = 5V, Vil = 0V, Vout = 4.6V			-0.525		mA	1
					-0.36		mA	2
					-0.64		mA	3
		Vdd = 10V, Vih = 10V, Vil = 0V, Vout = 9.5V			-1.34		mA	1
					-0.9		mA	2
					-1.6		mA	3
		Vdd = 15V, Vih = 15V, Vil = 0V, Vout = 13.5V			-3.5		mA	1
					-2.4		mA	2
					-4.2		mA	3

Electrical Characteristics

DC PARAMETERS(Continued)

(The following conditions apply to all the following parameters, unless otherwise specified.)
DC: Vss = 0V

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
Iol	Logical "0" Output Current	Vdd = 5V, Vih = 5V, Vil = 0V, Vout = 0.4V			0.51		mA	1
					0.36		mA	2
					0.64		mA	3
		Vdd = 10V, Vih = 10V, Vil = 0V, Vout = 0.5V			1.3		mA	1
					0.9		mA	2
					1.6		mA	3
		Vdd = 15V, Vih = 15V, Vil = 0V, Vout = 1.5V			3.4		mA	1
					2.4		mA	2
					4.2		mA	3
Isource	Output Source Current	Vdd = 5V, Vih = 5V, Vil = 0V, Vout = 0V			-1.94		mA	1
					-1.4		mA	2
					-2.5		mA	3
Isink	Output Sink Current	Vdd = 5V, Vih = 5V, Vil = 0V, Vout = 5V			2.14		mA	1
					1.4		mA	2
					2.45		mA	3
Icc	Power Supply Current	Vdd = 5V, Vih = 5V, Vil = 0V				1	uA	1, 3
						30	uA	2
		Vdd = 10V, Vih = 10V, Vil = 0V				2	uA	1, 3
						60	uA	2
		Vdd = 15V, Vih = 15V, Vil = 0V				4	uA	1, 3
						120	uA	2
		Vdd = 18V, Vih = 18V, Vil = 0V				100	uA	1
Vt-	Threshold Voltage	Vdd = 5V	1		0.7	2	V	1, 2, 3
		Vdd = 10V	1		1.4	4	V	1, 2, 3
		Vdd = 15V	1		2.1	6	V	1, 2, 3

Electrical Characteristics

DC PARAMETERS(Continued)

(The following conditions apply to all the following parameters, unless otherwise specified.)
DC: Vss = 0V

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
Vt+	Threshold Voltage	Vdd = 5V	1		3	4.3	V	1, 2, 3
		Vdd = 10V	1		6	8.6	V	1, 2, 3
		Vdd = 15V	1		9	12.9	V	1, 2, 3
Vh	Hysteresis	Vdd = 5V	1		1	3.6	V	1, 2, 3
		Vdd = 10V	1		2	7.2	V	1, 2, 3
		Vdd = 15V	1		3	10.8	V	1, 2, 3

Electrical Characteristics

AC PARAMETERS

(The following conditions apply to all the following parameters, unless otherwise specified.)
AC: tr=tf=20nS, Cl = 50pF, Rl = 200K

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
tPLH	Propagation Delay Time	Vdd = 5V	3			400	nS	9
			3			560	nS	10
			3			320	nS	11
		Vdd = 10V	2			200	nS	9
			2			280	nS	10
			2			160	nS	11
		Vdd = 15V	2			160	nS	9
			2			225	nS	10
			2			130	nS	11
tPHL	Propagation Delay Time	Vdd = 5V	3			400	nS	9
			3			560	nS	10
			3			320	nS	11
		Vdd = 10V	2			200	nS	9
			2			280	nS	10
			2			160	nS	11
		Vdd = 15V	2			160	nS	9
			2			225	nS	10
			2			130	nS	11
tTLH	Transition Time	Vdd = 5V	3			200	nS	9
			3			300	nS	10, 11
		Vdd = 10V	2			100	nS	9
			2			150	nS	10, 11
		Vdd = 15V	2			80	nS	9
			2			120	nS	10, 11
tTHL	Transition Time	Vdd = 5V	3			200	nS	9
			3			300	nS	10, 11
		Vdd = 10V	2			100	nS	9
			2			150	nS	10, 11
		Vdd = 15V	2			80	nS	9
			2			120	nS	10, 11

Electrical Characteristics

AC PARAMETERS(Continued)

(The following conditions apply to all the following parameters, unless otherwise specified.)
AC: tr=tf=20nS, Cl = 50pF, Rl = 200K

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
		Continuity Tests	4					9, 10, 11

Note 1: Parameter tested go-no-go only.
Note 2: Guaranteed parameter not tested.
Note 3: Tested at 25 C; guaranteed but not tested at +125 C and -55 C.
Note 4: Engineering setup tests, no limits.

Revision History

Rev	ECN #	Rel Date	Originator	Changes
1A0	M0002797	06/16/98	Linda Collins	New update: MNCD40106BM-X rev. 1A0 Deleted the Drift values and the High temp stress tests.