MC12026A

1.1 GHz Dual Modulus Prescaler

The MC12026 is a high frequency, low voltage dual modulus prescaler used in phase–locked loop (PLL) applications.

The MC12026A can be used with CMOS synthesizers requiring positive edges to trigger internal counters in a PLL to provide tuning signals up to 1.1 GHz in programmable frequency steps.

A Divide Ratio Control (SW) permits selection of an 8/9 or 16/17 divide ratio as desired.

The Modulus Control (MC) selects the proper divide number after SW has been biased to select the desired divide ratio.

Features

- 1.1 GHz Toggle Frequency
- Supply Voltage 4.5 to 5.5 V
- Low Power 4.0 mA Typical
- Operating Temperature Range of –40 to 85°C
- The MC12026 is Pin Compatible with the MC12022
- Short Setup Time (t_{set}) 6.0 ns Typical @ 1.1 GHz
- Modulus Control Input Level is Compatible with Standard CMOS and TTL

FUNCTIONAL TABLE

SW	MC	Divide Ratio
H	H	8
H	L	9
L	H	16
L	L	17

1. SW: H = V_{CC}, L = Open. A logic L can also be applied by grounding this pin, but this is not recommended due to increased power consumption.
2. MC: H = 2.0 V to V_{CC}, L = GND to 0.8 V.

MAXIMUM RATINGS

Characteristics	Symbol	Value	Unit
Power Supply Voltage, Pin 2	V_{CC}	–0.5 to 7.0	Vdc
Operating Temperature Range	T_A	–40 to 85	°C
Storage Temperature Range	T_{stg}	–65 to 150	°C
Modulus Control Input, Pin 6	MC	–0.5 to 6.5	Vdc
Maximum Output Current, Pin 4	I_O	10.0	mA

NOTE: ESD data available upon request.

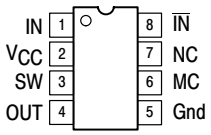
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PIN CONNECTIONS



(Top View)

ORDERING INFORMATION

Device	Package	Shipping
MC12026AD	SO–8	98 Units/Rail
MC12026ADR2	SO–8	2500 Tape & Reel

DEVICE MARKING INFORMATION

See general marking information in the device marking section on page 6 of this data sheet.

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ELECTRICAL CHARACTERISTICS (V_{CC} = 4.5 to 5.5; T_A = –40 to 85°C, unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
Toggle Frequency (Sin Wave)	f_t	0.1	1.4	1.1	GHz
Supply Current Output Unloaded (Pin 2)	I_{CC}	–	4.0	5.3	mA
Modulus Control Input High (MC)	V_{IH1}	2.0	–	V_{CC}	V
Modulus Control Input Low (MC)	V_{IL1}	GND	–	0.8	V
Divide Ratio Control Input High (SW)	V_{IH2}	V_{CC} – 0.5 V	V_{CC}	V_{CC} + 0.5 V	V
Divide Ratio Control Input Low (SW)	V_{IL2}	OPEN	OPEN	OPEN	–
Output Voltage Swing (R_L = 560 Ω; I_O = 5.5 mA) (Note 1) (R_L = 1.1 kΩ; I_O = 2.9 mA) (Note 2)	V_{out}	1.0	1.6	–	V_{pp}
Modulus Setup Time MC to Out (Note 3)	t_{SET}	–	6.0	9.0	ns
Input Voltage Sensitivity 100–250 MHz 250–1100 MHz	V_{in}	 400 100	 – –	 1000 1000	mVpp

1. Divide Ratio of ÷8/9 at 1.1 GHz, C_L = 8.0 pF.
2. Divide Ratio of ÷16/17 at 1.1 GHz, C_L = 8.0 pF.
3. Assuming R_L = 560 Ω at 1.1 GHz.

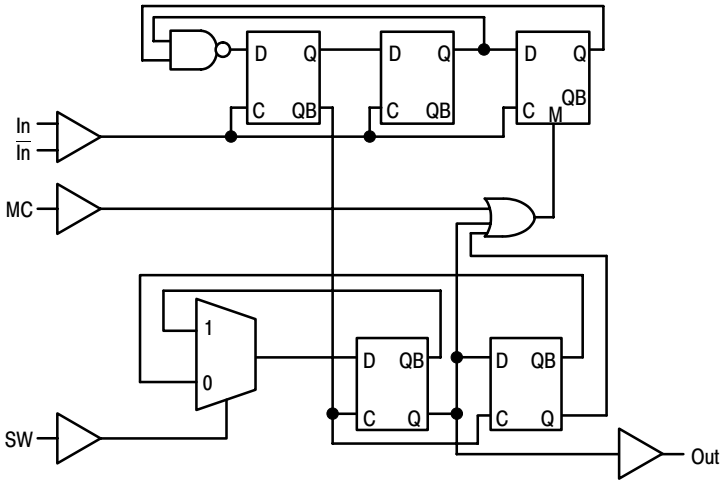
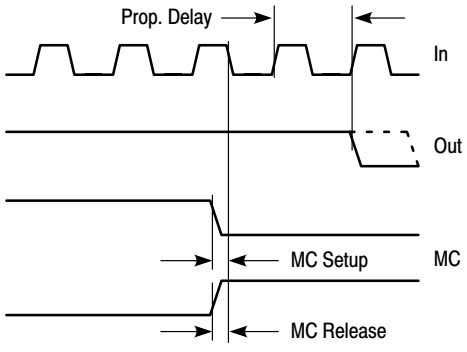


Figure 1. Logic Diagram (MC12026A)



Modulus setup time MC to out is the MC setup or MC release plus the prop delay.

Figure 2. Modulus Setup Time

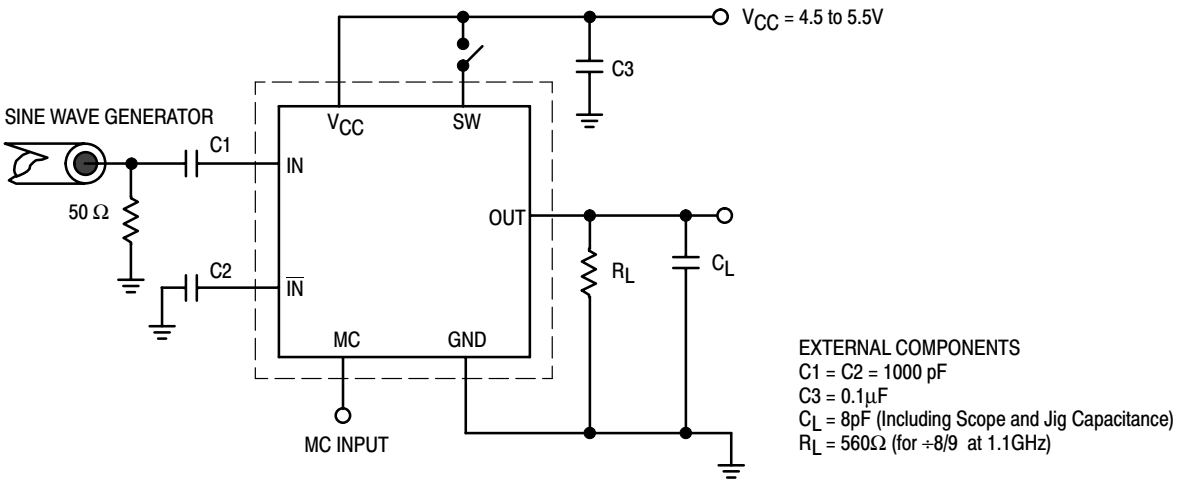
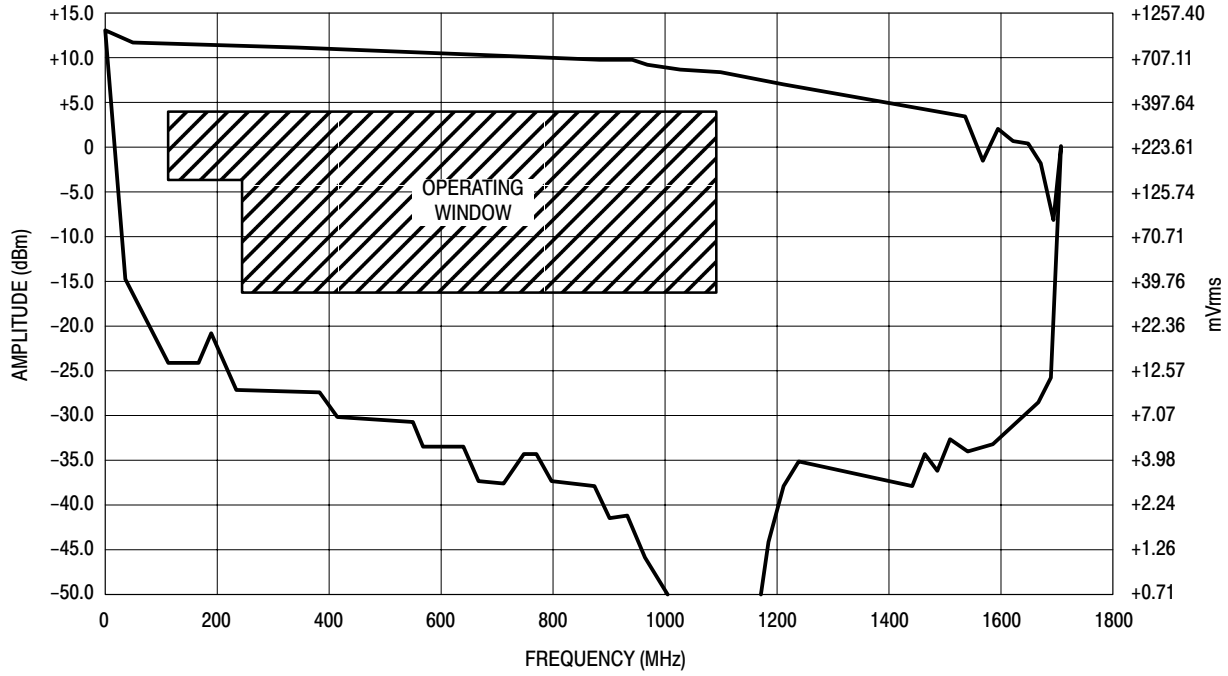


Figure 3. AC Test Circuit



Divide Ratio = 8; V_{CC} = 5.0 V; T_A = 25°C

Figure 4. Input Signal Amplitude versus Input Frequency

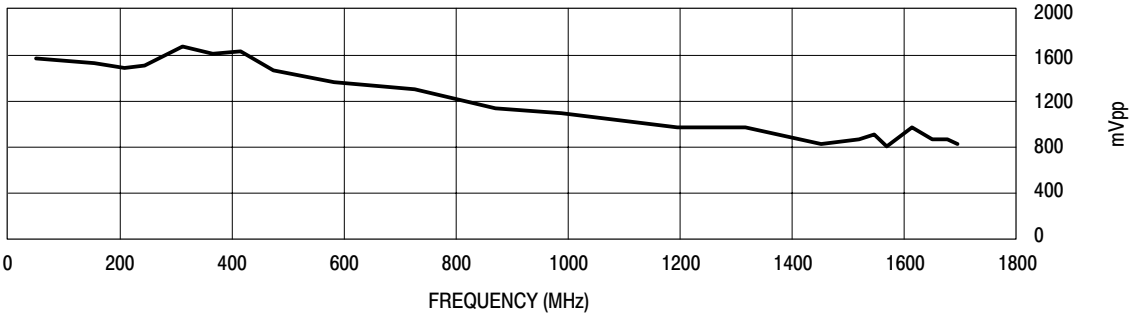
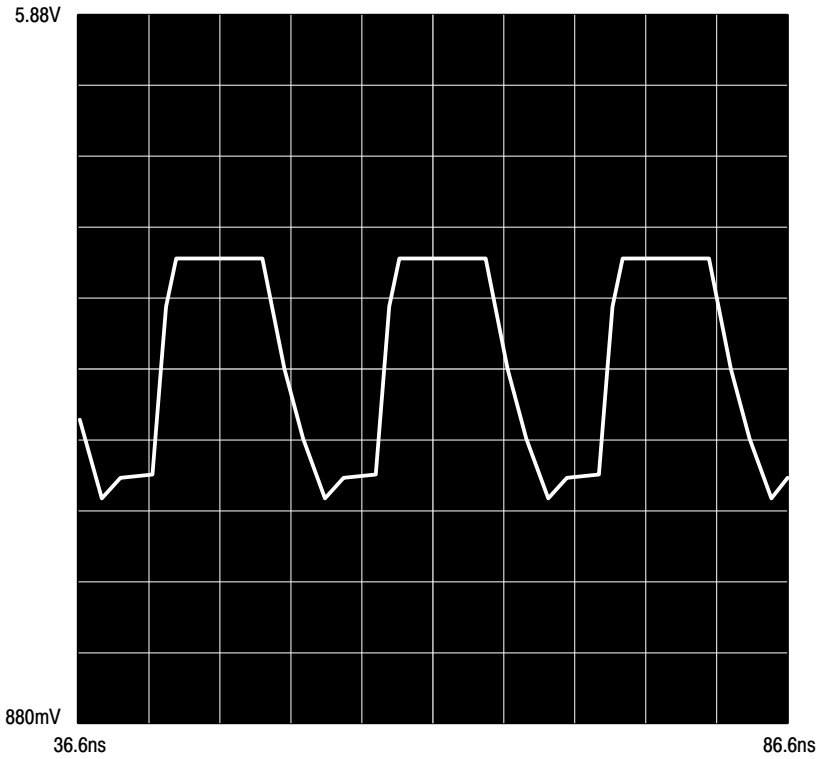


Figure 5. Output Amplitude versus Input Frequency



(÷8, 1.1 GHz Input Frequency, V_{CC} = 5.0, T_A = 25°C, Output Loaded With 8.0pF)

Figure 6. Typical Output Waveform

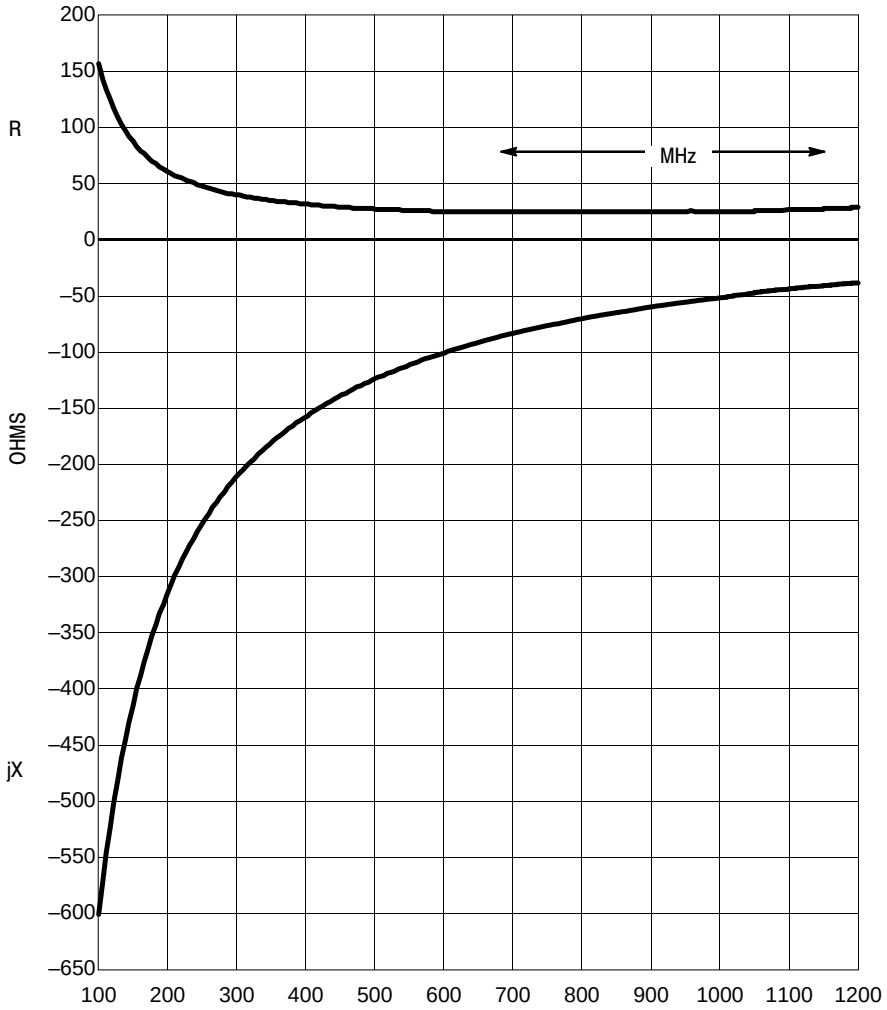
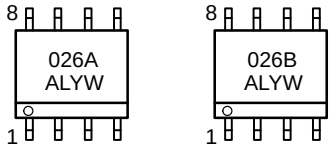


Figure 7. Typical Input Impedance versus Input Frequency

MARKING DIAGRAMS

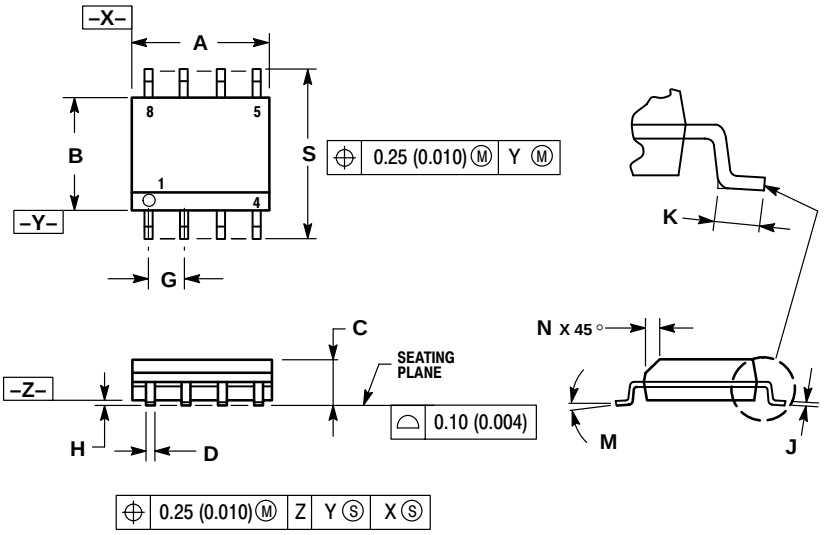
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A	= Assembly Location
WL, L	= Wafer Lot
YY, Y	= Year
WW, W	= Work Week

PACKAGE DIMENSIONS

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ISSUE W



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	4.80	5.00	0.189	0.197
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.053	0.069
D	0.33	0.51	0.013	0.020
G	1.27 BSC		0.050 BSC	
H	0.10	0.25	0.004	0.010
J	0.19	0.25	0.007	0.010
K	0.40	1.27	0.016	0.050
M	0 °	8 °	0 °	8 °
N	0.25	0.50	0.010	0.020
S	5.80	6.20	0.228	0.244

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