1.1GHz Dual Modulus Prescaler

MC12026A
MC12026B

MECL PLL COMPONENTS

÷8/9, ÷16/17
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 such as Motorola's MC145xxx series in a PLL to provide tuning signals up to 1.1GHz in programmable frequency steps.

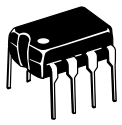
The MC12026B can be used with CMOS synthesizers requiring negative edges to trigger internal counters.

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.

NOTE: The "B" Version Is Not Recommended for New Designs

- 1.1GHz Toggle Frequency
- Supply Voltage 4.5V to 5.5V
- Low Power 4.0mA Typical
- Operating Temperature Range of –40°C to +85°C
- The MC12026 is Pin Compatible With the MC12022
- Short Setup Time (t_{set}) 6ns Typical @ 1.1GHz
- Modulus Control Input Level is Compatible With Standard CMOS and TTL

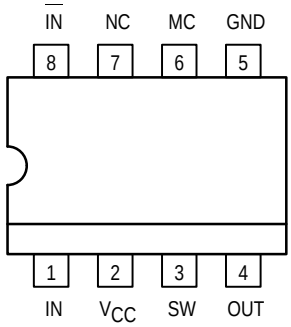


P SUFFIX
8–LEAD PLASTIC PACKAGE
CASE 626–05



D SUFFIX
8–LEAD PLASTIC SOIC PACKAGE
CASE 751–05

Pinout: 8–Lead Plastic (Top View)



FUNCTION TABLE

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

Note: SW: H = V_{CC}, L = OPEN
MC: H = 2.0V to V_{CC}; L = GND to 0.8V

MAXIMUM RATINGS

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

© Motorola, Inc. 1997

ELECTRICAL CHARACTERISTICS (V_{CC} = 4.5 to 5.5; T_A = –40 to +85°C)

Symbol	Characteristic	Min	Typ	Max	Unit
f_t	Toggle Frequency (Sin Wave)	0.1	1.4	1.1	GHz
I_{CC}	Supply Current Output Unloaded (Pin 2)	—	4.0	5.3	mA
V_{IH1}	Modulus Control Input High (MC)	2.0	—	V_{CC}	V
V_{IL1}	Modulus Control Input Low (MC)	GND	—	0.8	V
V_{IH2}	Divide Ratio Control Input High (SW)	V_{CC} – 0.5V	V_{CC}	V_{CC} + 0.5V	V
V_{IL2}	Divide Ratio Control Input Low (SW)	OPEN	OPEN	OPEN	—
V_{out}	Output Voltage Swing (R_L = 560Ω; I_O = 5.5mA)**1** (R_L = 1.1kΩ; I_O = 2.9mA)**2**	1.0	1.6	—	$V_{p–p}$
t_{SET}	Modulus Setup Time MC to Out**3**	—	6	9	ns
V_{in}	Input Voltage Sensitivity 100–250MHz 250–1100MHz	 400 100	 — —	 1000 1000	mVpp

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

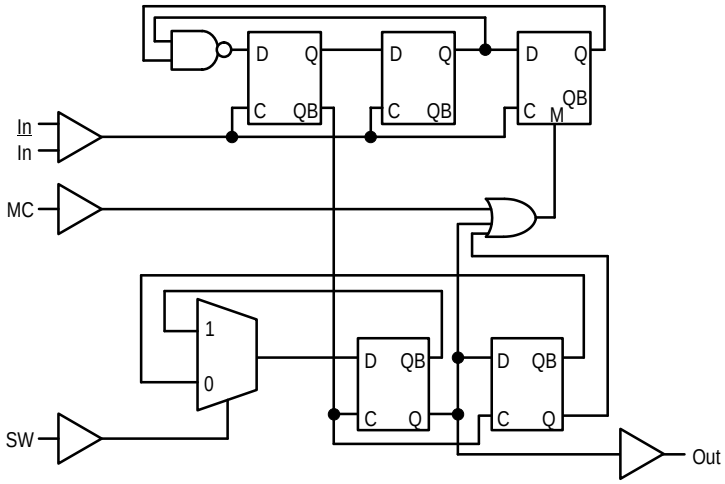
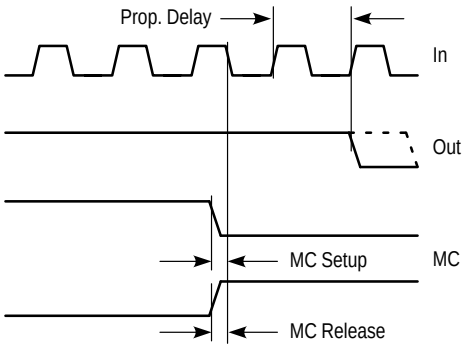


Figure 1. Logic Diagram (MC12026A)



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

Figure 2. Modulus Setup Time

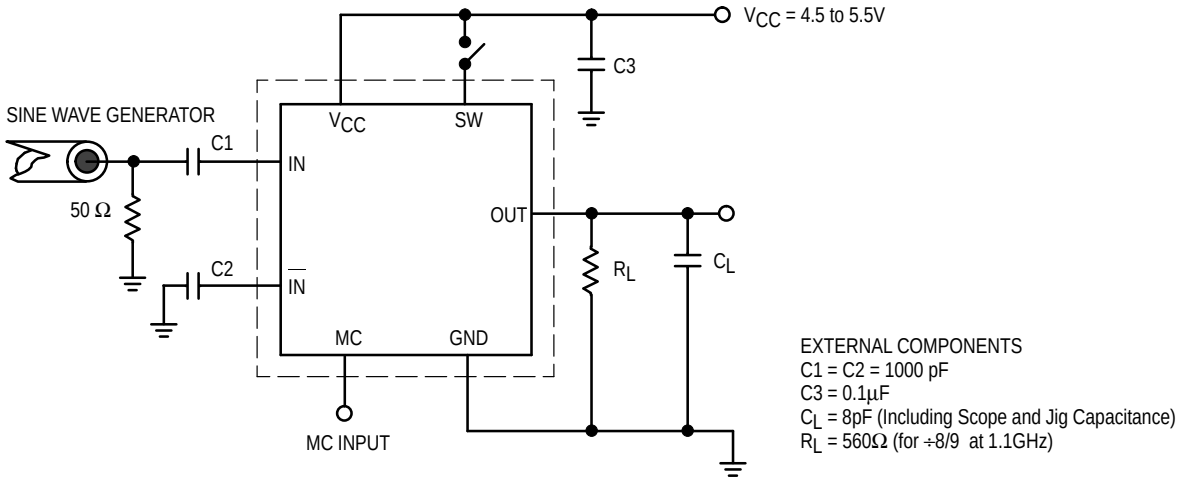


Figure 3. AC Test Circuit

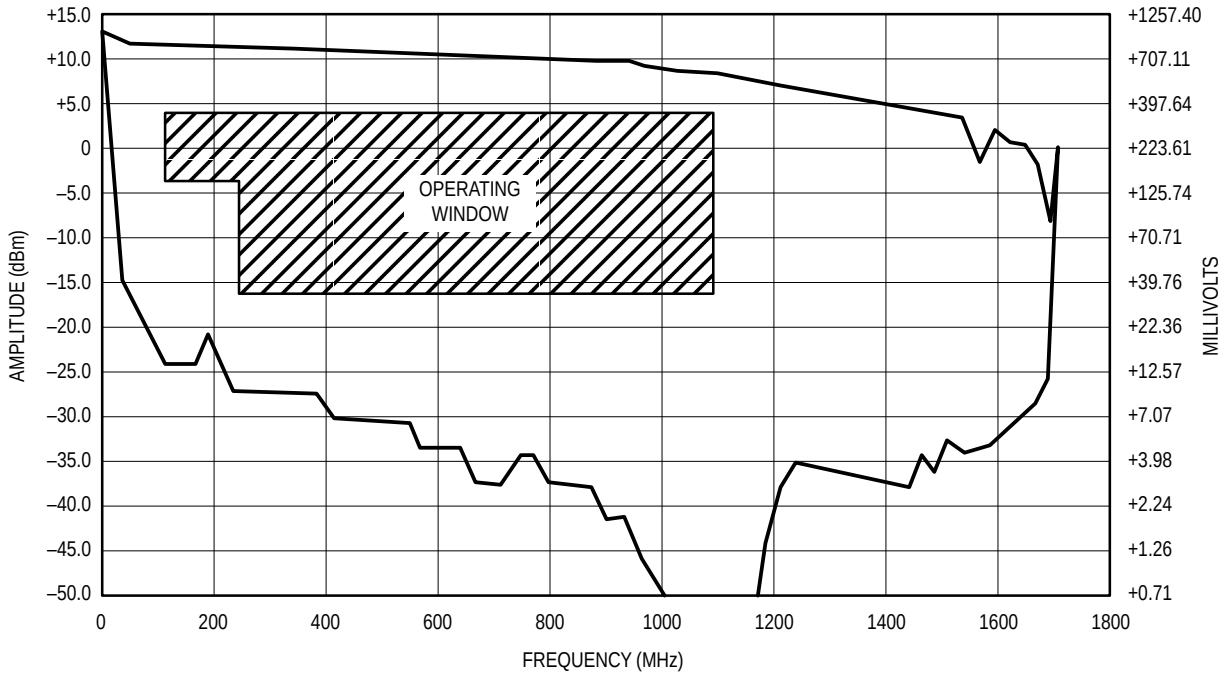


Figure 4. Input Signal Amplitude versus Input Frequency
Divide Ratio = 8; V_{CC} = 5.0V; T_A = 25°C

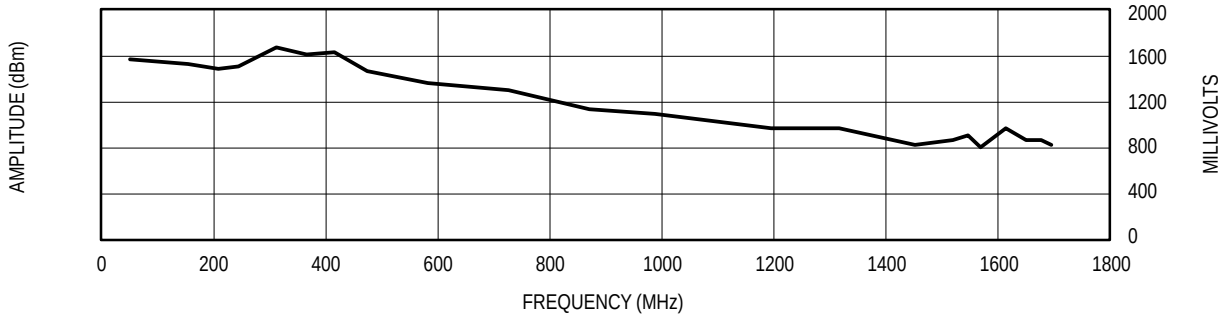


Figure 5. Output Amplitude versus Input Frequency

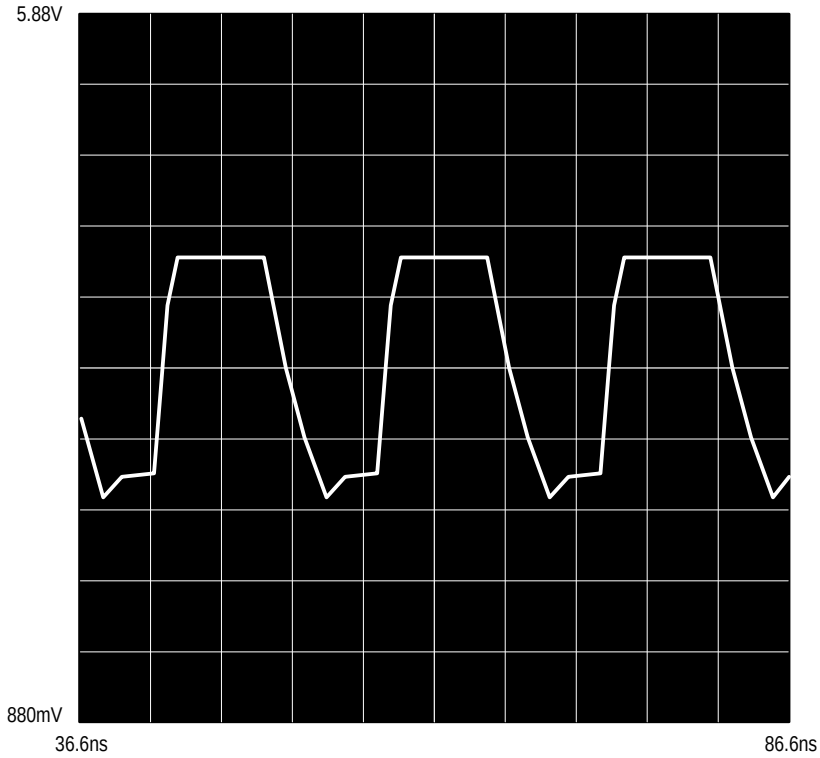


Figure 6. Typical Output Waveform
(÷8, 1.1GHz Input Frequency, V_{CC} = 5.0, T_A = 25°C, Output Loaded With 8pF)

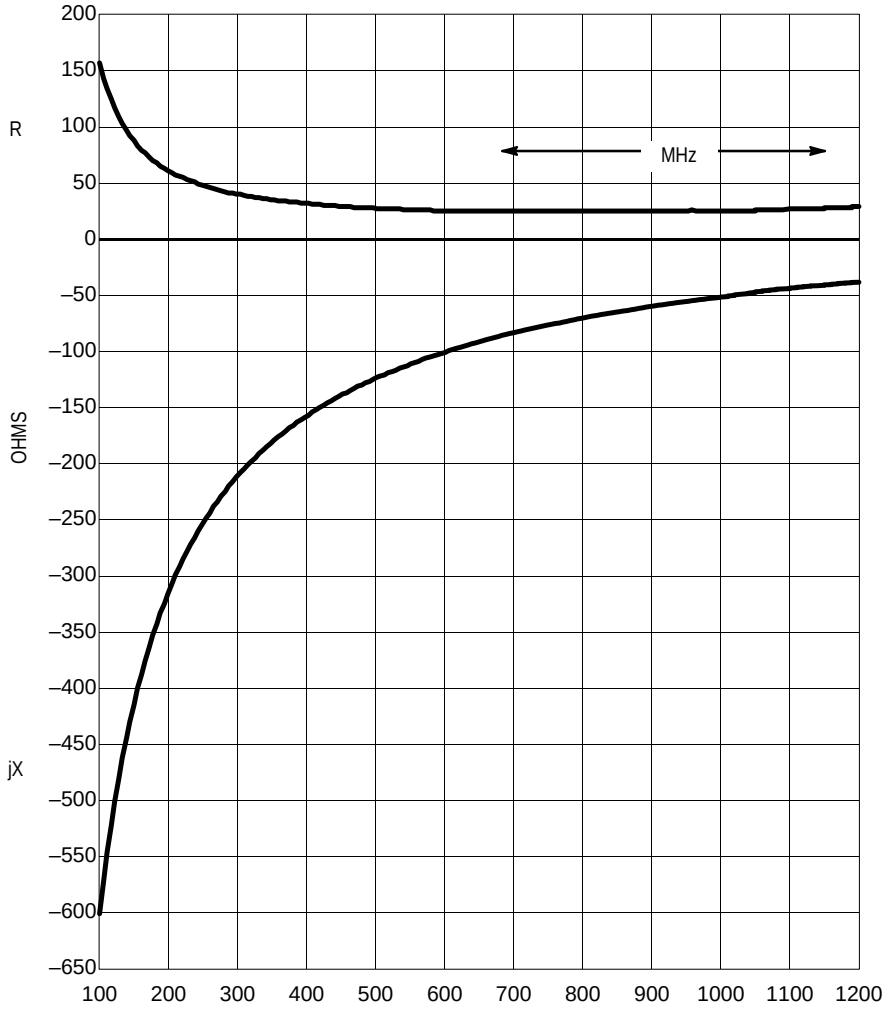
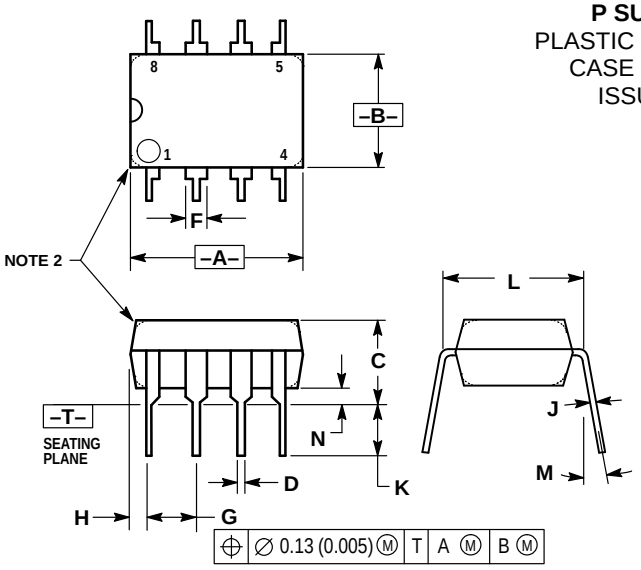


Figure 7. Typical Input Impedance versus Input Frequency

OUTLINE DIMENSIONS

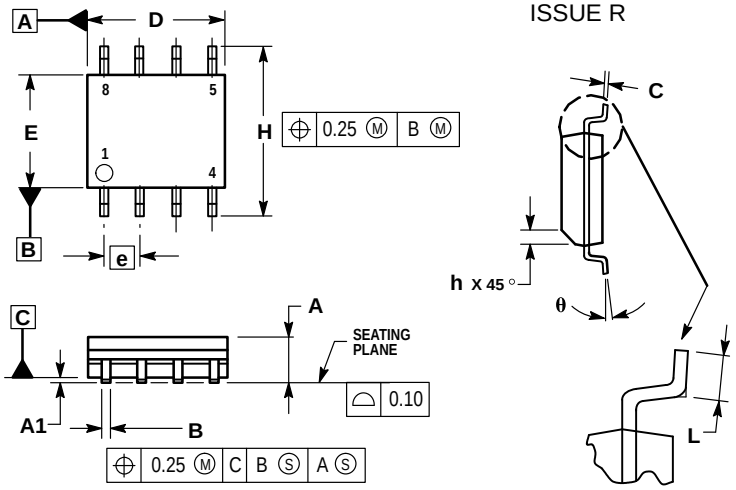
P SUFFIX
PLASTIC PACKAGE
CASE 626–05
ISSUE K



NOTES:
1. DIMENSION L TO CENTER OF LEAD WHEN FORMED PARALLEL.
2. PACKAGE CONTOUR OPTIONAL (ROUND OR SQUARE CORNERS).
3. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	9.40	10.16	0.370	0.400
B	6.10	6.60	0.240	0.260
C	3.94	4.45	0.155	0.175
D	0.38	0.51	0.015	0.020
F	1.02	1.78	0.040	0.070
G	2.54 BSC		0.100 BSC	
H	0.76	1.27	0.030	0.050
J	0.20	0.30	0.008	0.012
K	2.92	3.43	0.115	0.135
L	7.62 BSC		0.300 BSC	
M	—	10°	—	10°
N	0.76	1.01	0.030	0.040

D SUFFIX
PLASTIC SOIC PACKAGE
CASE 751–05
ISSUE R



NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. DIMENSIONS ARE IN MILLIMETERS.
3. DIMENSION D AND E DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 PER SIDE.
5. DIMENSION B DOES NOT INCLUDE MOLD PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 TOTAL IN EXCESS OF THE B DIMENSION AT MAXIMUM MATERIAL CONDITION.

	MILLIMETERS	
DIM	MIN	MAX
A	1.35	1.75
A1	0.10	0.25
B	0.35	0.49
C	0.18	0.25
D	4.80	5.00
E	3.80	4.00
e	1.27 BSC	
H	5.80	6.20
h	0.25	0.50
L	0.40	1.25
θ	0°	7°

Motorola reserves the right to make changes without further notice to any products herein. Motorola makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Motorola assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. “Typical” parameters which may be provided in Motorola data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including “Typicals” must be validated for each customer application by customer’s technical experts. Motorola does not convey any license under its patent rights nor the rights of others. Motorola products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the Motorola product could create a situation where personal injury or death may occur. Should Buyer purchase or use Motorola products for any such unintended or unauthorized application, Buyer shall indemnify and hold Motorola and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that Motorola was negligent regarding the design or manufacture of the part. Motorola and Ⓜ are registered trademarks of Motorola, Inc. Motorola, Inc. is an Equal Opportunity/Affirmative Action Employer.

How to reach us:
USA / EUROPE / Locations Not Listed: Motorola Literature Distribution; P.O. Box 5405; Denver, Colorado 80217. 303–675–2140 or 1–800–441–2447

Mfax™: RMFAX0@email.sps.mot.com – TOUCHTONE 602–244–6609
INTERNET: http://Design–NET.com

JAPAN: Nippon Motorola Ltd.; Tatsumi–SPD–JLDC, 6F Seibu–Butsuryu–Center, 3–14–2 Tatsumi Koto–Ku, Tokyo 135, Japan. 81–3–3521–8315

ASIA / PACIFIC: Motorola Semiconductors H.K. Ltd.; 8B Tai Ping Industrial Park, 51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852–26629298