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1.1 GHz Dual Modulus Prescaler

MC12026A MC12026B

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 1.1 GHz 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

- 1.1 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}) 6ns Typical @ 1.1 GHz
- Modulus Control Input Level is Compatible With Standard CMOS and TTL

MECL PLL COMPONENTS ÷8/9, ÷16/17 DUAL MODULUS PRESCALER

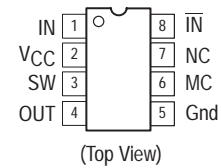
SEMICONDUCTOR TECHNICAL DATA



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CASE 751
(SO-8)

No replacement available.

PIN CONNECTIONS



FUNCTIONAL TABLE

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

NOTES: 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	Range	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.

ORDERING INFORMATION

Device	Operating Temp Range	Package
MC12026AD	$T_A = -40$ to 85°C	SO-8
MC12026BD		

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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}	$V_{CC} - 0.5\text{ V}$	V_{CC}	$V_{CC} + 0.5\text{ V}$	V
Divide Ratio Control Input Low (SW)	V_{IL2}	OPEN	OPEN	OPEN	–
Output Voltage Swing ($R_L = 560\ \Omega$; $I_O = 5.5\text{ mA}$) ¹ ($R_L = 1.1\text{ k}\Omega$; $I_O = 2.9\text{ mA}$) ²	V_{out}	1.0	1.6	–	V_{pp}
Modulus Setup Time MC to Out ³	t_{SET}	–	6	9	ns
Input Voltage Sensitivity 100–250 MHz 250–1100 MHz	V_{in}	400 100	– –	1000 1000	mVpp

- notes:
1. Divide Ratio of +8/9 at 1.1 GHz, $C_L = 8.0\text{ pF}$
 2. Divide Ratio of +16/17 at 1.1 GHz, $C_L = 8.0\text{ pF}$
 3. Assuming $R_L = 560\ \Omega$ at 1.1 GHz

Figure 1. Logic Diagram (MC12026A)

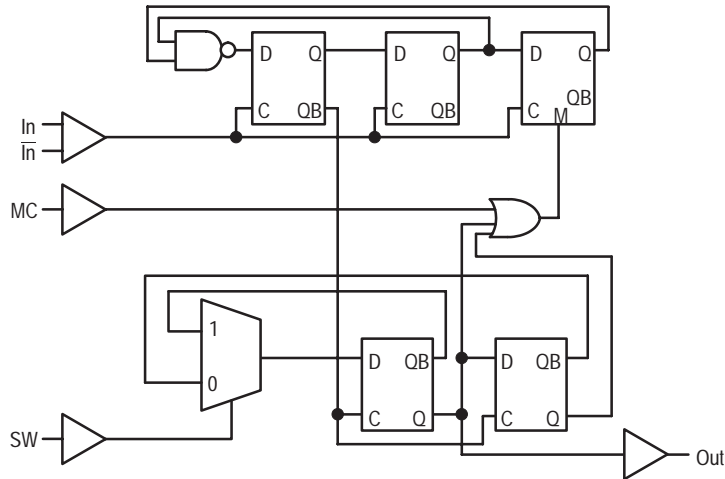
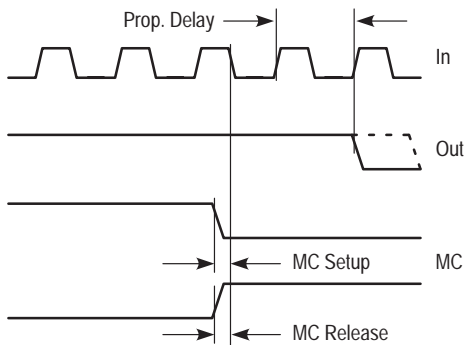


Figure 2. Modulus Setup Time



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

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Figure 3. AC Test Circuit

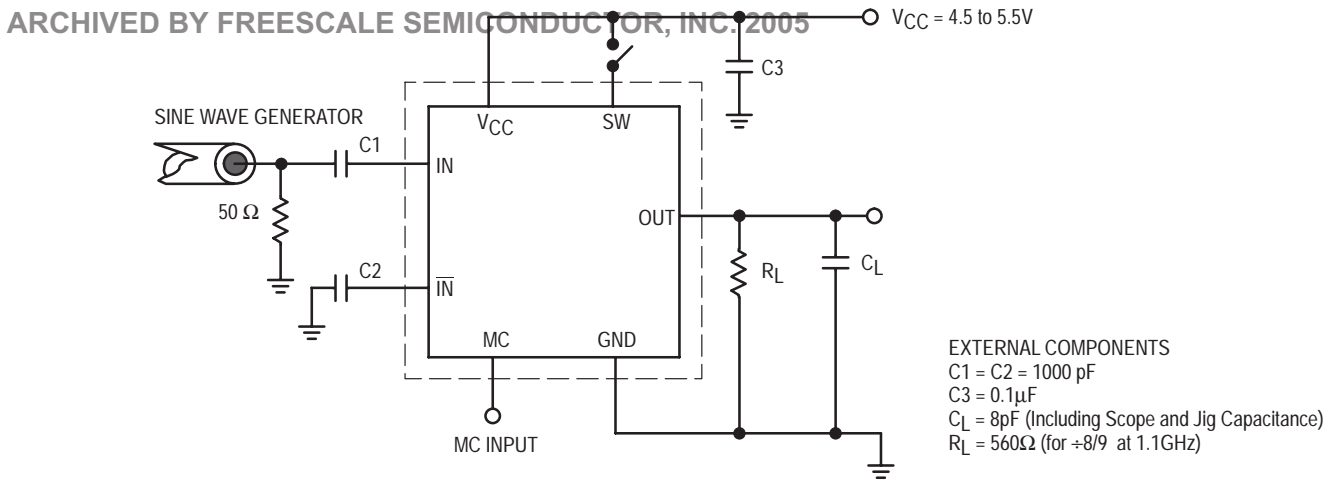


Figure 4. Input Signal Amplitude versus Input Frequency

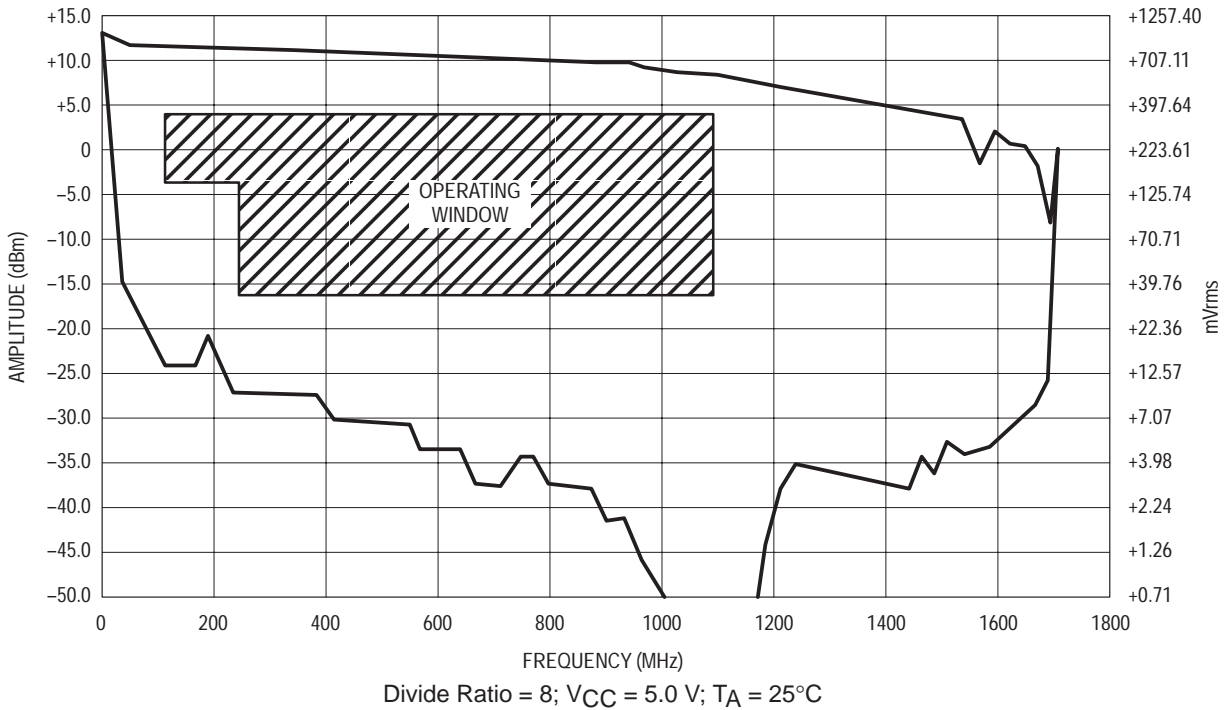
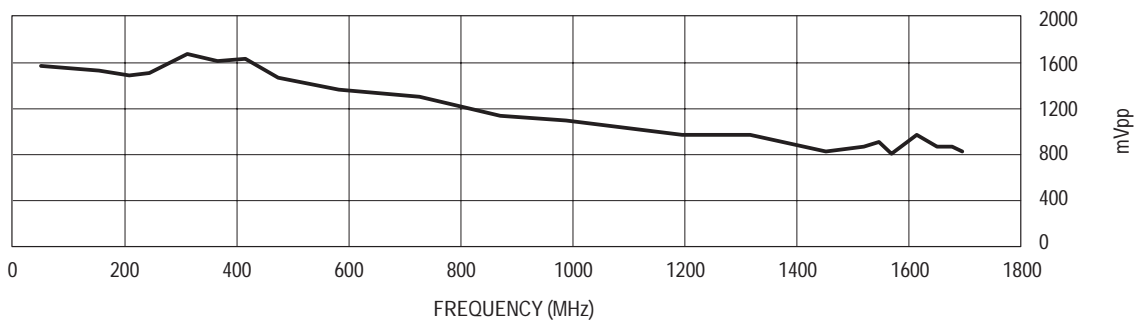


Figure 5. Output Amplitude versus Input Frequency

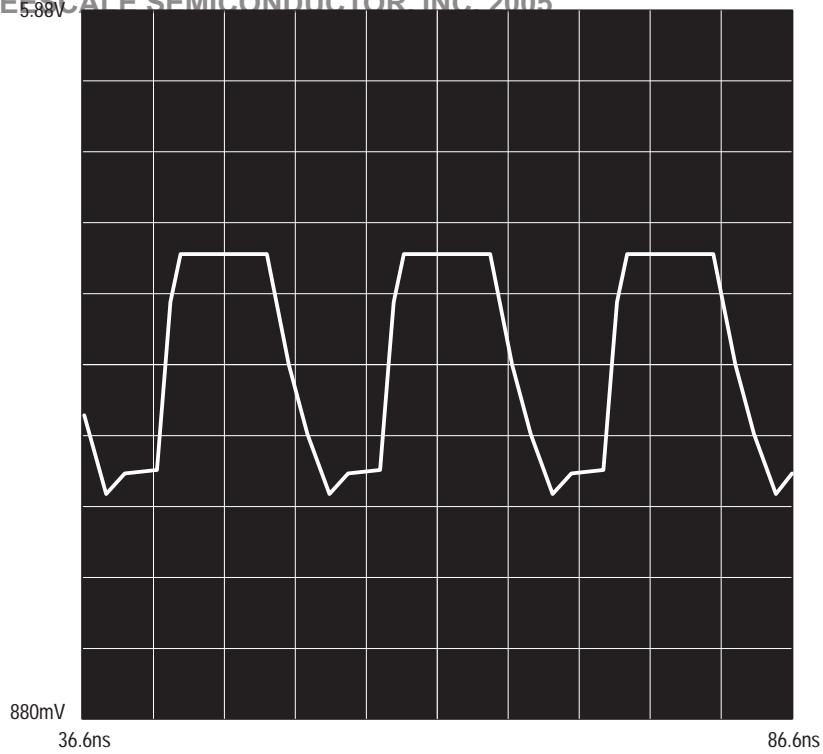


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Figure 6. Typical Output Waveform

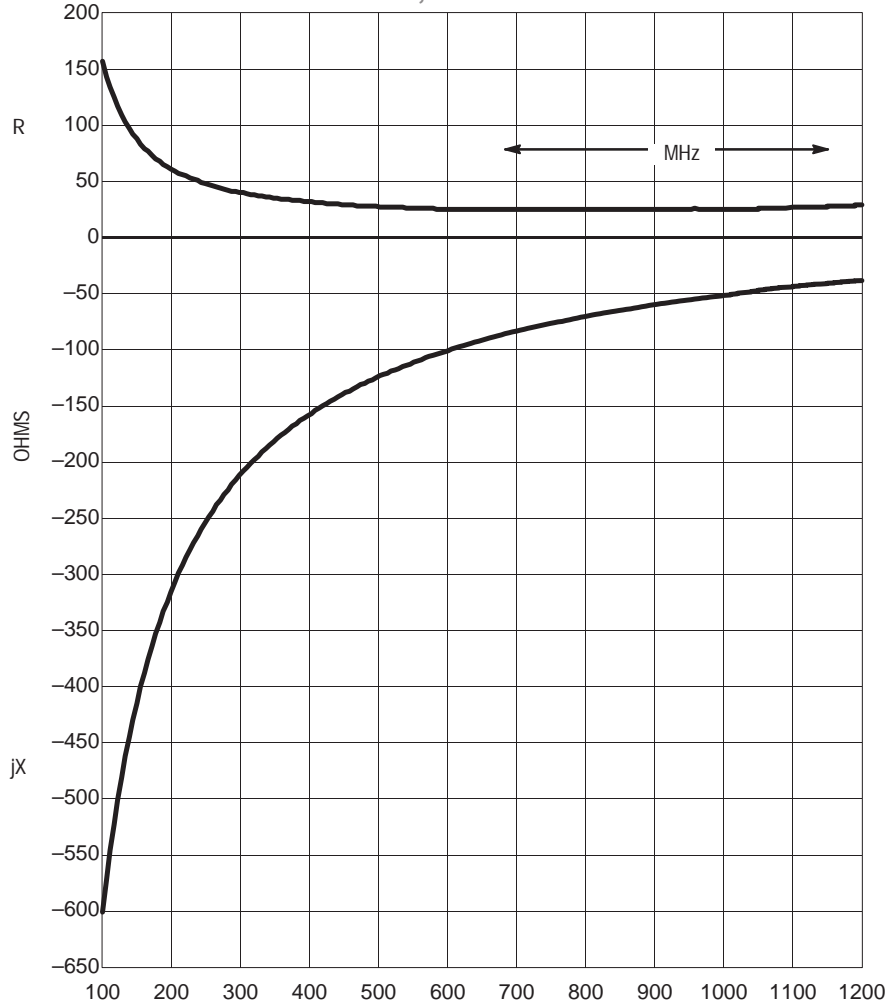
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(±8, 1.1 GHz Input Frequency, $V_{CC} = 5.0$, $T_A = 25^\circ\text{C}$, Output Loaded With 8.0pF)

Figure 7. Typical Input Impedance versus Input Frequency

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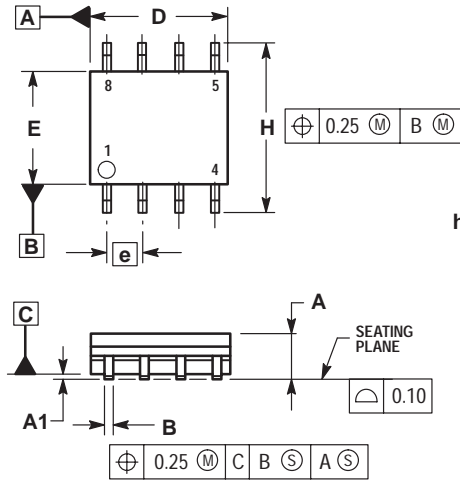
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OUTLINE DIMENSIONS

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ISSUE T



NOTES:

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

DIM	MILLIMETERS	
	MIN	MAX
A	1.35	1.75
A1	0.10	0.25
B	0.35	0.49
C	0.19	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°

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