


**MOTOROLA**

## 2.0GHz Dual Modulus Prescaler

The MC12034A 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 2.0 GHz in programmable frequency steps.

The MC12034B can be used with CMOS synthesizers requiring negative edges to trigger internal counters such as Fujitsu's MB87001.

A Divide Ratio Control (SW) permits selection of a 32/33 or 64/65 divide ratio as desired.

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

- 2.0 GHz Toggle Frequency
- Supply Voltage 4.5 to 5.5 V
- MC12034A for Positive Edge Triggered Synthesizers
- 12mA Maximum,  $-40$  to  $85^{\circ}\text{C}$ ,  $V_{\text{CC}} = 5.5$  Vdc
- Modulus Control Input is Compatible with Standard CMOS and TTL
- Low-Power 8.5 mA Typical

### FUNCTIONAL TABLE

SW	MC	Divide Ratio
H	H	32
H	L	33
L	H	64
L	L	65

**NOTES:** 1. SW: H =  $V_{\text{CC}}$ , 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  $V_{\text{CC}}$ , L = GND to 0.8 V.

Design Criteria	Value	Unit
Internal Gate Count *	67	ea
Internal Gate Propagation Delay	200	ps
Internal Gate Power Dissipation	0.75	mW
Speed Power Product	0.15	pJ

**NOTE:** \*Equivalent to a two-input NAND gate.

### MAXIMUM RATINGS

Characteristic	Symbol	Range	Unit
Power Supply Voltage, Pin 2	$V_{\text{CC}}$	$-0.5$ to $+7.0$	Vdc
Operating Temperature Range	$T_{\text{A}}$	$-40$ to $+85$	$^{\circ}\text{C}$
Storage Temperature Range	$T_{\text{stg}}$	$-65$ to $+150$	$^{\circ}\text{C}$
Modulus Control Input, Pin 6	MC	$-0.5$ to $+6.5$	Vdc

- NOTES:** 1. ESD data available upon request.  
2. This device contains protection circuitry to guard against damage due to high static voltages or electric fields. However, precautions must be taken to avoid applications of any voltage higher than maximum rated voltages to this high impedance circuit. For proper operation,  $V_{\text{in}}$  and  $V_{\text{out}}$  should be constrained to the range  $\text{GND} \leq (V_{\text{in}} \text{ or } V_{\text{out}}) \leq V_{\text{CC}}$ .

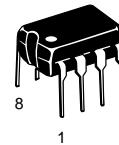
## MC12034A MC12034B

### MECL PLL COMPONENTS $\div 32/33$ , $\div 64/65$ DUAL MODULUS PRESCALER

#### SEMICONDUCTOR TECHNICAL DATA

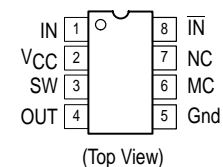


**D SUFFIX**  
PLASTIC PACKAGE  
CASE 751  
(SO-8)



**P SUFFIX**  
PLASTIC PACKAGE  
CASE 626

### PIN CONNECTIONS



### ORDERING INFORMATION

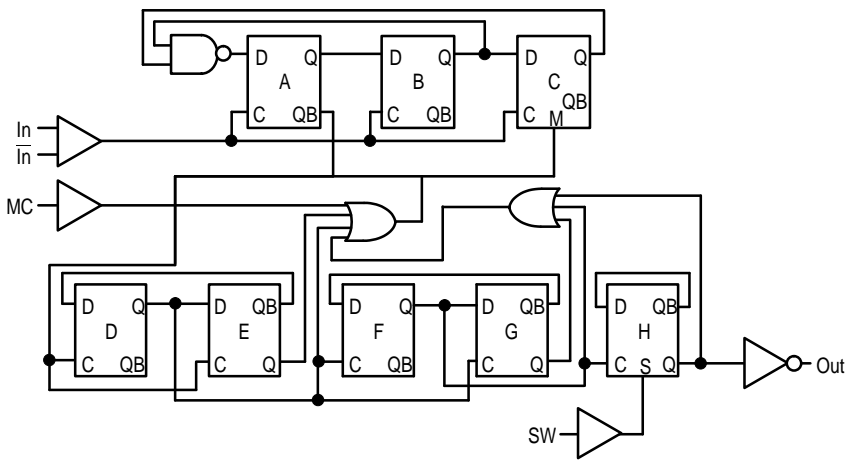
Device	Operating Temp Range	Package
MC12034AD	$T_{\text{A}} = -40^{\circ}$ to $+85^{\circ}\text{C}$	SO-8
MC12034AP		Plastic
MC12034BD		SO-8
MC12034BDP		Plastic

# MC12034A MC12034B

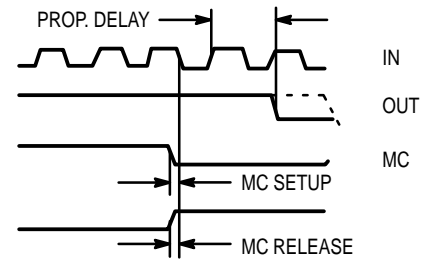
**ELECTRICAL CHARACTERISTICS** ( $V_{CC} = 4.5$  to  $5.5$  Vdc,  $T_A = -40$  to  $85^\circ\text{C}$ , unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
Toggle Frequency (Sine Wave)	$f_t$	0.5	2.4	2.0	GHz
Supply Current Output Unloaded (Pin 2)	$I_{CC}$	–	8.5	12	mA
Modulus Control Input High (MC)	$V_{IH1}$	2.0	–	$V_{CC}$	V
Modulus Control Input Low (MC)	$V_{IL1}$	–	–	0.8	V
Divide Ratio Control Input High (SW)	$V_{IH2}$	$V_{CC}$	$V_{CC}$	$V_{CC}$	Vdc
Divide Ratio Control Input Low (SW)	$V_{IL2}$	OPEN	OPEN	OPEN	–
Output Voltage Swing ( $C_L = 12$ pF, $R_L = 1.1$ k $\Omega$ )	$V_{out}$	1.0	1.6	–	V <sub>pp</sub>
Modulus Setup Time MC to Out	$t_{SET}$	–	8.0	10.0	ns
Input Voltage Sensitivity 500–2000 MHz	$V_{in}$	100	–	1500	mV <sub>pp</sub>
Output Current ( $C_L = 12$ pF, $R_L = 1.1$ k $\Omega$ )	$I_O$	–	–	3.5	mA

**Figure 1. Logic Diagram (MC12034A)**

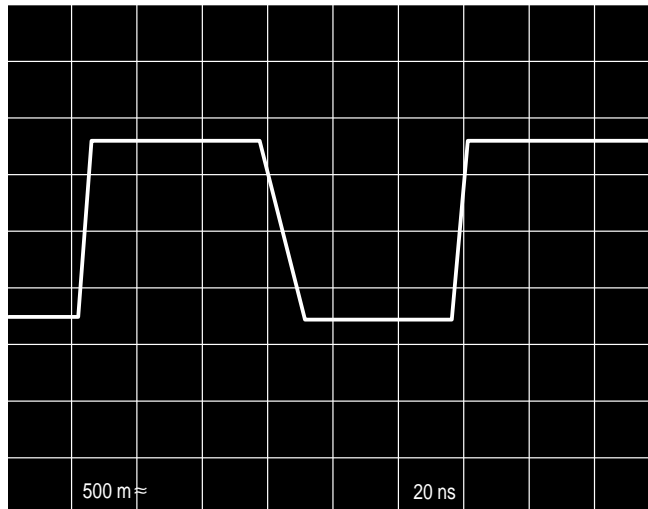


**Figure 2. Modulus Setup Time**



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

**Figure 3. Typical Output Waveform**



# MC12034A MC12034B

Figure 4. AC Test Circuit

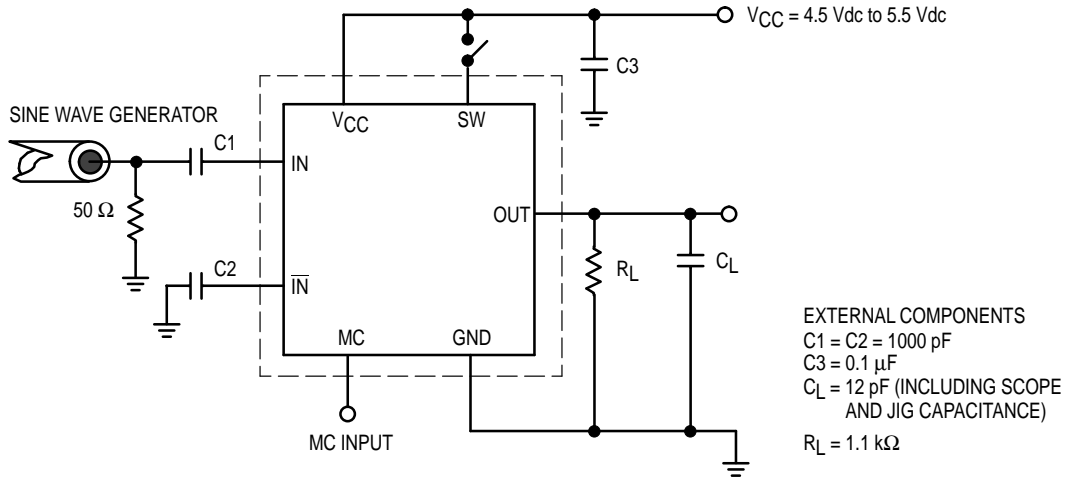


Figure 5. Input Signal Amplitude versus Input Frequency

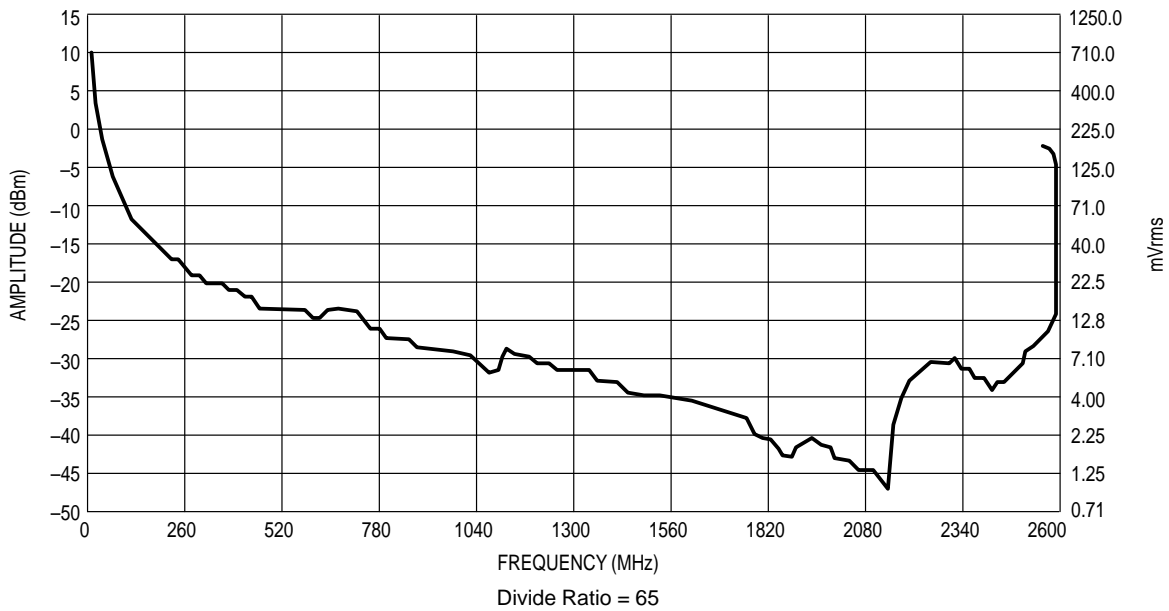
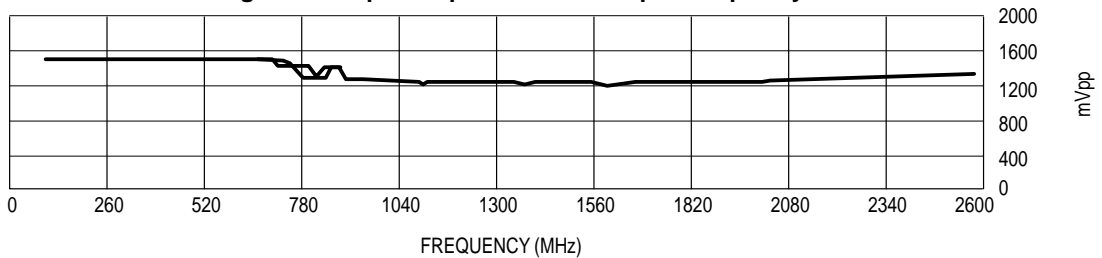
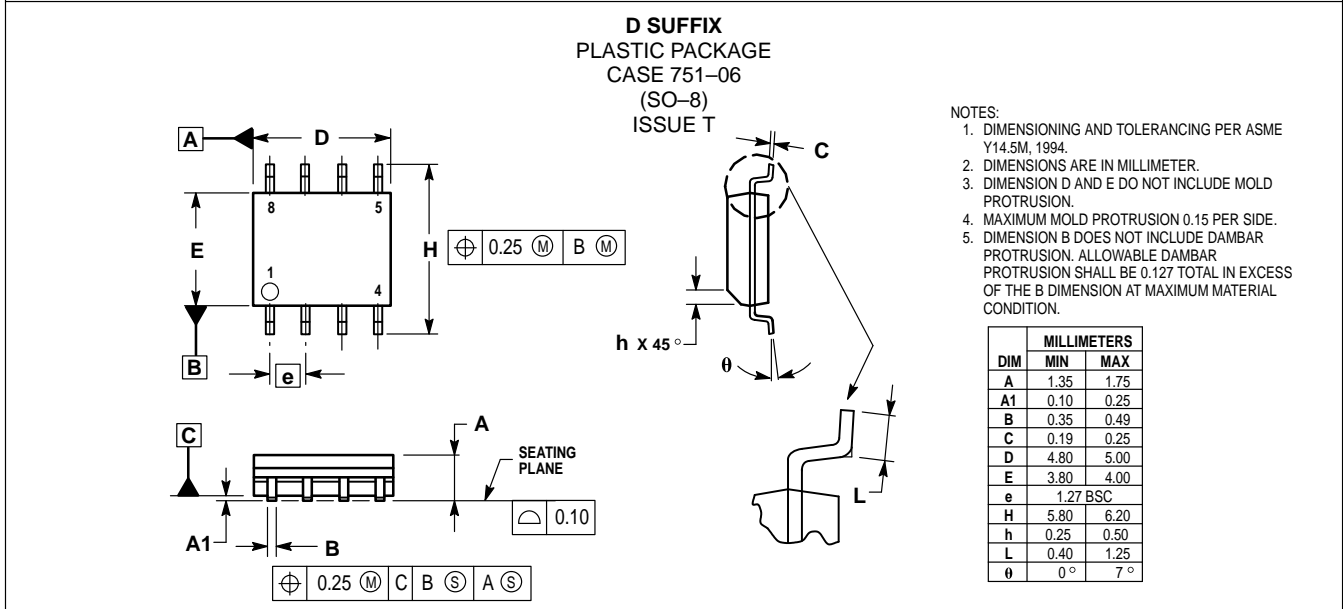
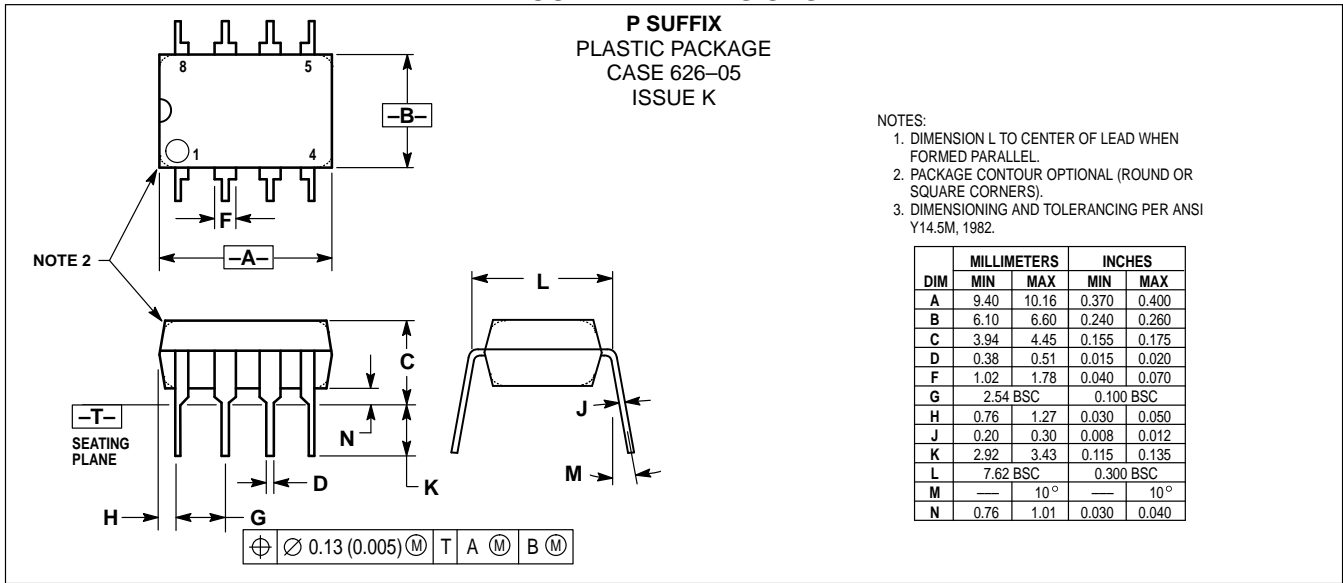


Figure 6. Output Amplitude versus Input Frequency



# MC12034A MC12034B

## OUTLINE DIMENSIONS



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.

Mfax is a trademark of Motorola, Inc.

### How to reach us:

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

**JAPAN:** Nippon Motorola Ltd.: SPD, Strategic Planning Office, 141,  
4-32-1 Nishi-Gotanda, Shagawa-ku, Tokyo, Japan. 03-5487-8488

**Customer Focus Center: 1-800-521-6274**

**Mfax™:** RMFAX0@email.sps.mot.com - TOUCHTONE 1-602-244-6609  
Motorola Fax Back System - US & Canada ONLY 1-800-774-1848  
- http://sps.motorola.com/mfax/

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

**HOME PAGE:** <http://motorola.com/sps/>



MC12034A/D