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# 2.0 GHz 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.

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°C, V<sub>CC</sub> = 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<sub>CC</sub>, 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<sub>CC</sub>, 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 <sub>CC</sub>	-0.5 to 7.0	Vdc
Operating Temperature Range	T <sub>A</sub>	-40 to 85	°C
Storage Temperature Range	T <sub>stg</sub>	-65 to 150	°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<sub>in</sub> and V<sub>out</sub> should be constrained to the range Gnd ≤ (V<sub>in</sub> or V<sub>out</sub>) ≤ V<sub>CC</sub>.

# MC12034A

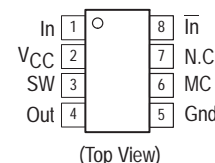
## MECL PLL COMPONENTS ÷32/33, ÷64/65 DUAL MODULUS PRESCALER

SEMICONDUCTOR  
TECHNICAL DATA



D SUFFIX  
PLASTIC PACKAGE  
CASE 751  
(SO-8, Tape and Reel Only)

## PIN CONNECTIONS



## ORDERING INFORMATION

Device	Operating Temp Range	Package
MC12034ADR2	T <sub>A</sub> = -40 to 85°C	SO-8 Tape & Reel

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**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 to 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

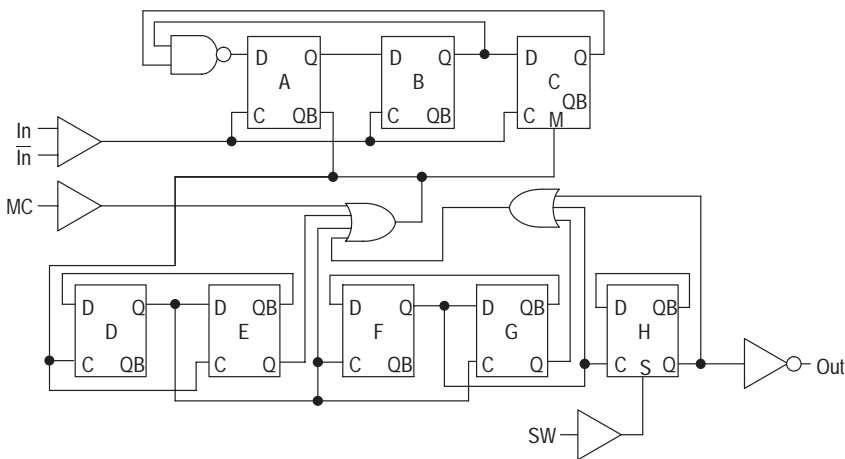
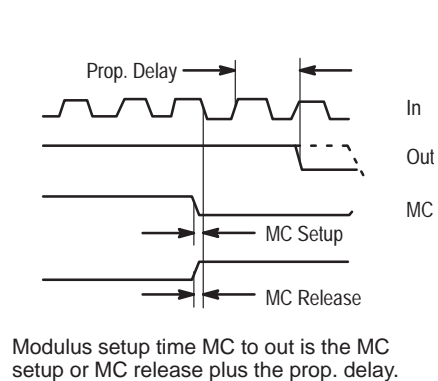
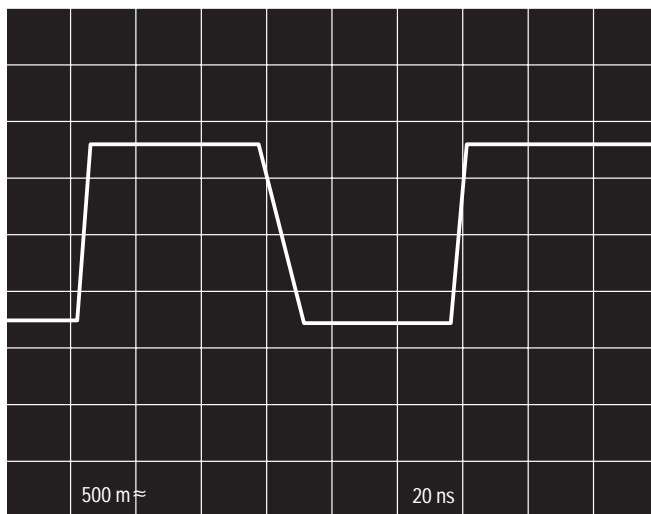


Figure 2. Modulus Setup Time



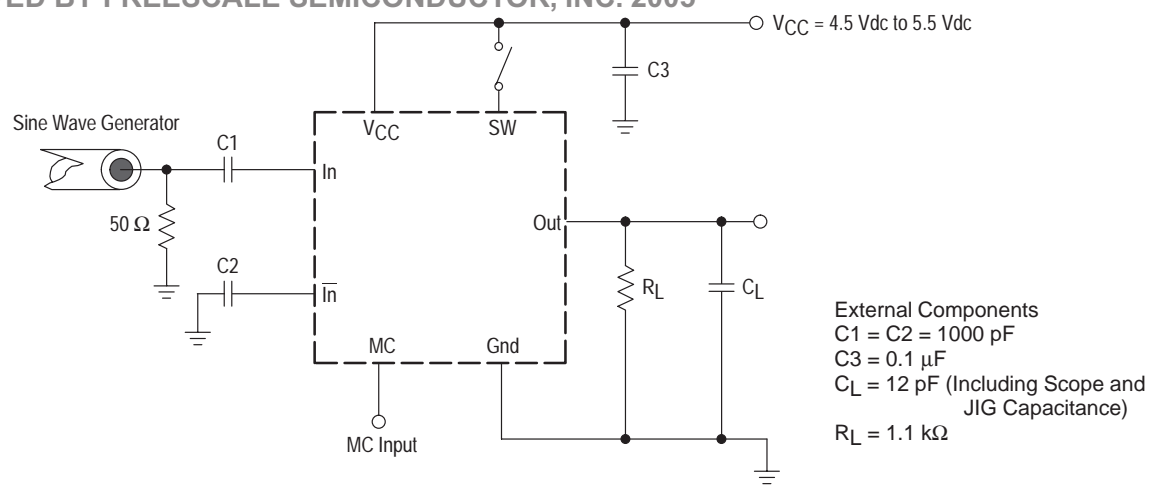
Modulus setup time MC to out is the MC setup or MC release plus the prop. delay.

Figure 3. Typical Output Waveform

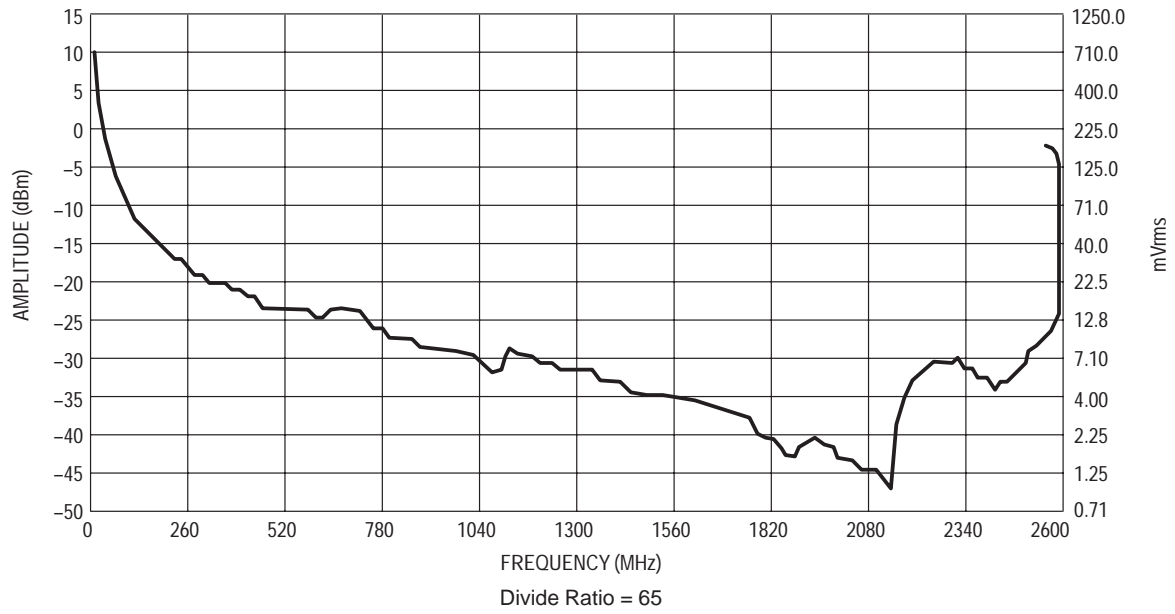


**Figure 4. AC Test Circuit**

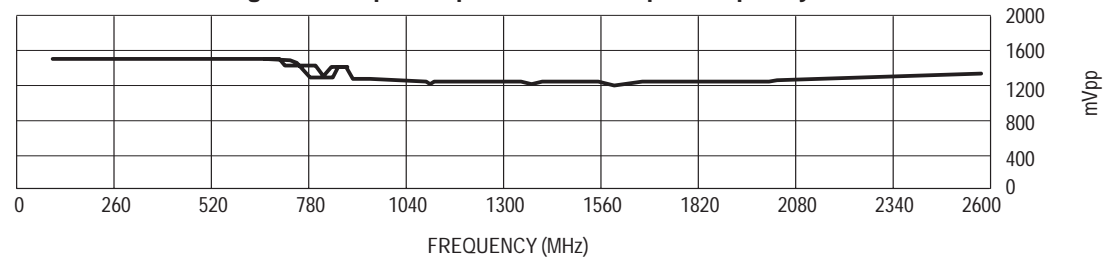
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**Figure 5. Input Signal Amplitude versus Input Frequency**



**Figure 6. Output Amplitude versus Input Frequency**



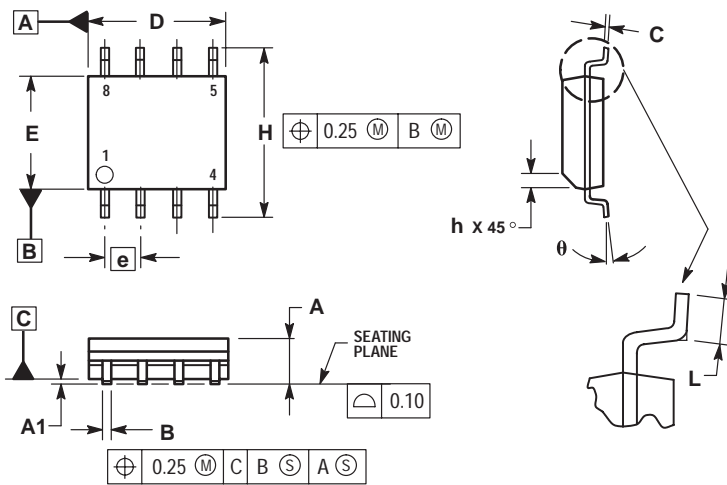
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OUTLINE DIMENSIONS

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DSUFFIX 2005  
 PLASTIC PACKAGE  
 CASE 751-06  
 (SO-8)  
 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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