

**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°C , $V_{CC} = 5.5$ 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_{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.

| 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_{CC} | -0.5 to $+7.0$ | Vdc |
| Operating Temperature Range | T_A | -40 to $+85$ | $^{\circ}\text{C}$ |
| Storage Temperature Range | T_{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_{in} and V_{out} should be constrained to the range $\text{GND} \leq (V_{in} \text{ or } V_{out}) \leq V_{CC}$.

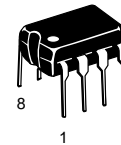
MC12034A MC12034B

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

SEMICONDUCTOR TECHNICAL DATA

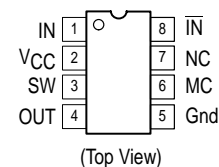


D SUFFIX
PLASTIC PACKAGE
CASE 751
(SO-8)



P SUFFIX
PLASTIC PACKAGE
CASE 626

PIN CONNECTIONS



ORDERING INFORMATION

| Device | Operating Temp Range | Package |
|-----------|--|---------|
| MC12034AD | $T_A = -40^{\circ}$ to $+85^{\circ}\text{C}$ | SO-8 |
| MC12034AP | | Plastic |
| MC12034BD | | SO-8 |
| MC12034BP | | Plastic |

MC12034A MC12034B

ELECTRICAL CHARACTERISTICS ($V_{CC} = 4.5$ to 5.5 Vdc, $T_A = -40$ to 85°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 Ω) | V_{out} | 1.0 | 1.6 | — | V _{pp} |
| Modulus Setup Time MC to Out | t_{SET} | — | 8.0 | 10.0 | ns |
| Input Voltage Sensitivity 500–2000 MHz | V_{in} | 100 | — | 1500 | mV _{pp} |
| Output Current ($C_L = 12$ pF, $R_L = 1.1$ k Ω) | I_O | — | — | 3.5 | mA |

Figure 1. Logic Diagram (MC12034A)

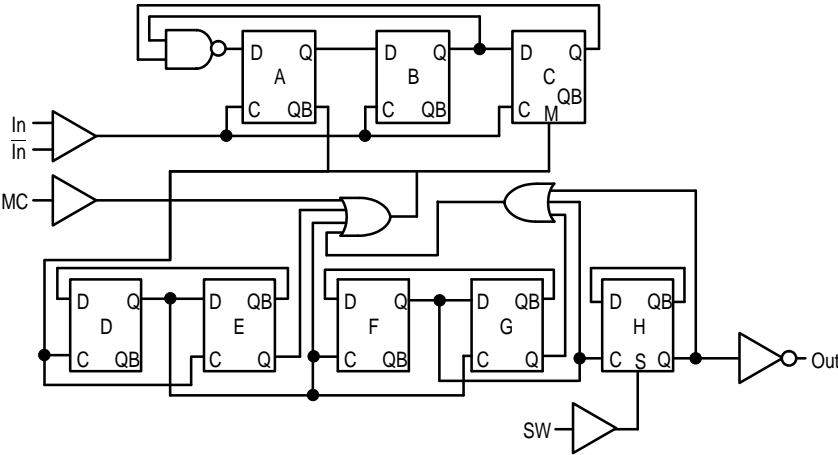


Figure 2. Modulus Setup Time

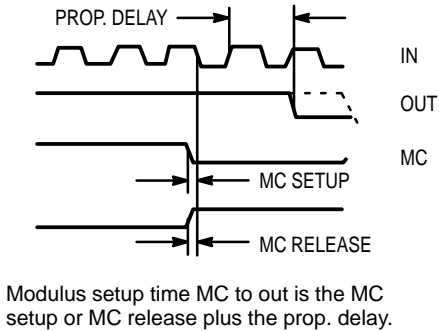
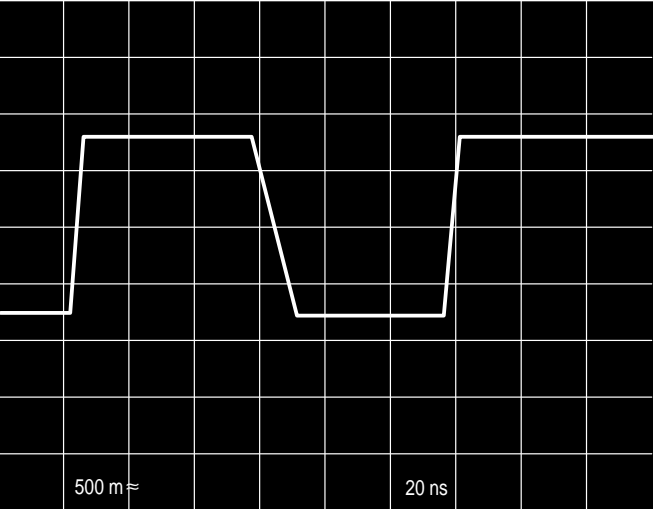


Figure 3. Typical Output Waveform



MC12034A MC12034B

Figure 4. AC Test Circuit

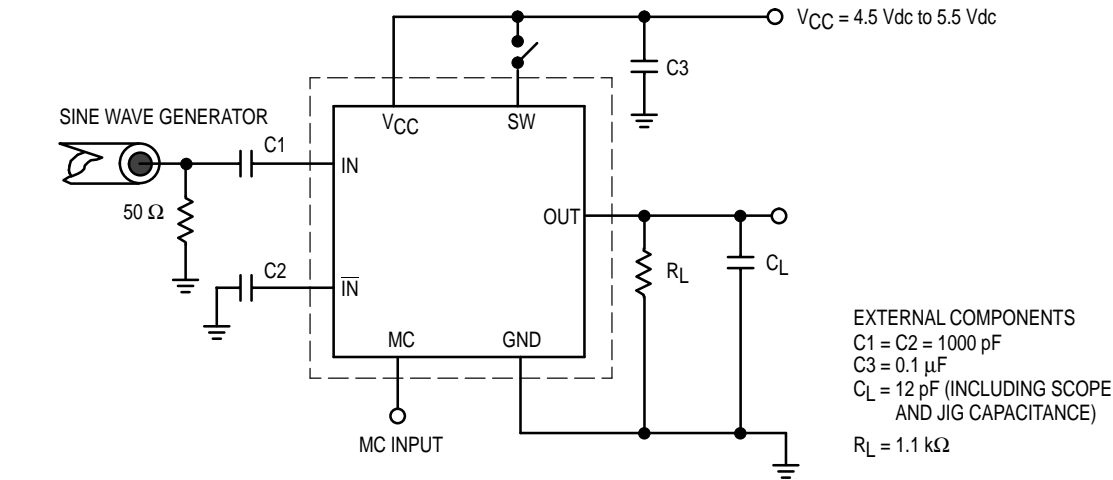


Figure 5. Input Signal Amplitude versus Input Frequency

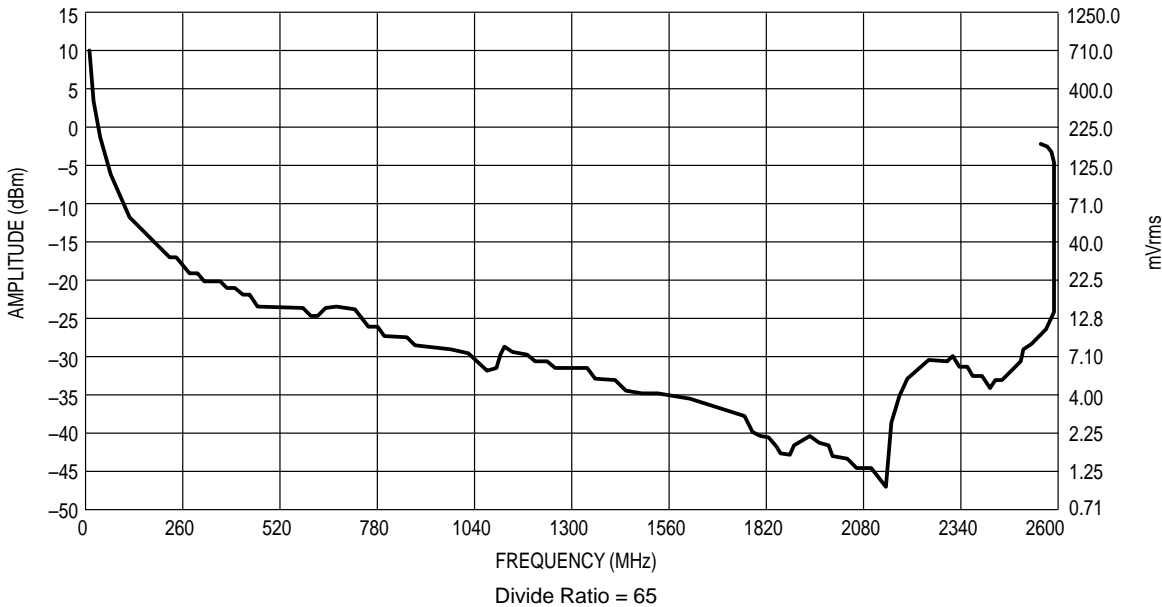
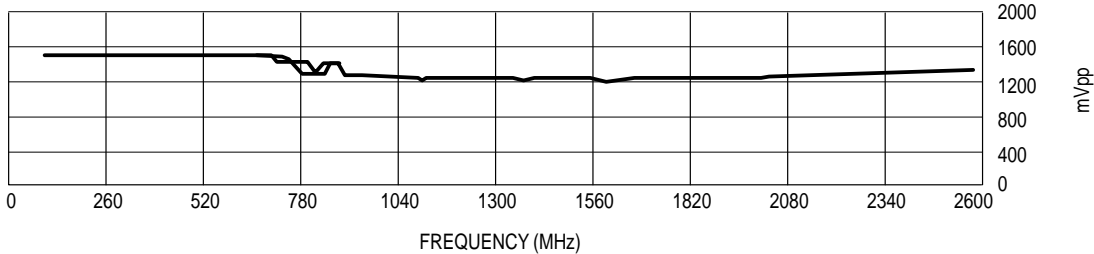
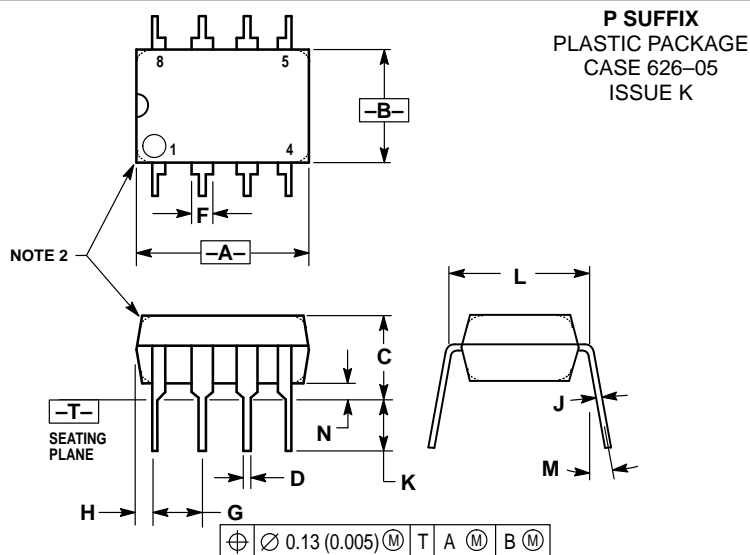


Figure 6. Output Amplitude versus Input Frequency



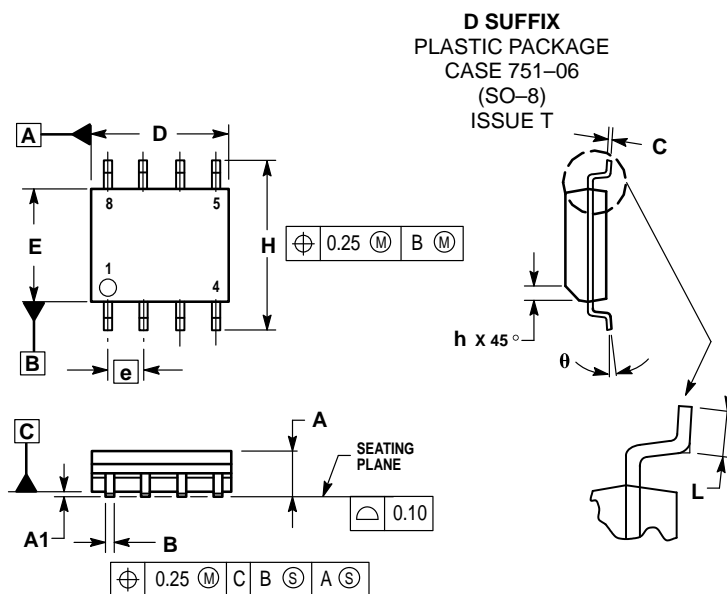
OUTLINE DIMENSIONS



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 |



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 |
| Ø | 0° | 7° |

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MC12034A/D