



**MOTOROLA**

# Consider MC12054A for New Design 2.0GHz Dual Modulus Prescaler

The MC12032A 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 MC12032B can be used with CMOS synthesizers requiring negative edges to trigger internal counters.

A Divide Ratio Control (SW) permits selection of a 64/65 or 128/129 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**

- 2.0 GHz Toggle Frequency
- Supply Voltage 4.5 to 5.5 V
- MC12032A for Positive Edge Triggered Synthesizers
- 12 mA Maximum, -40 to 85°C, V<sub>CC</sub> = 5.5 Vdc
- Modulus Control Input Level Is Compatible With Standard CMOS and TTL
- Low-Power 8.5 mA Typical

### FUNCTIONAL TABLE

SW	MC	Divide Ratio
H	H	64
H	L	65
L	H	128
L	L	129

**NOTES:** 1. SW: H = V<sub>CC</sub>, L = Open. A logic L can also be applied by grounding the 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 GUIDE

Criteria	Value	Unit
Internal Gate Count*		ea
Internal Gate Propagation Delay	10	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

**NOTE:** ESD data available upon request.

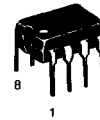
## MC12032A MC12032B

### MECL PLL COMPONENTS -64/65, +128/129 DUAL MODULUS PRESCALER

#### SEMICONDUCTOR TECHNICAL DATA

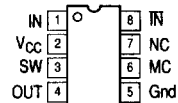


**D SUFFIX**  
PLASTIC PACKAGE  
CASE 751  
(SO-8)



**P SUFFIX**  
PLASTIC PACKAGE  
CASE 626

### PIN CONNECTIONS



(Top View)

### ORDERING INFORMATION

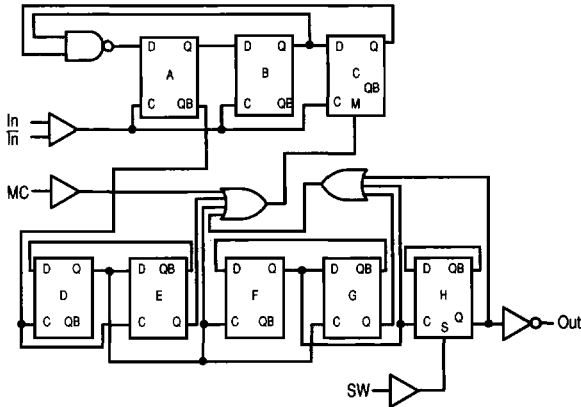
Device	Operating Temp Range	Package
MC12032AD	T <sub>A</sub> = -40° to +85°C	SO-8
MC12032AP		Plastic
MC12032BD		SO-8
MC120328BP		Plastic

## MC12032A MC12032B

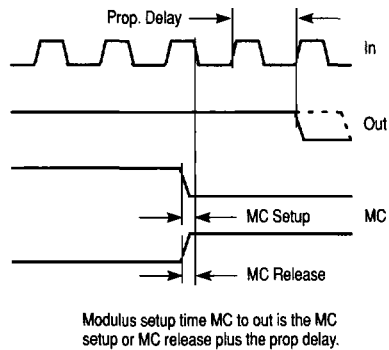
**ELECTRICAL CHARACTERISTICS** ( $V_{CC} = 4.5$  to  $5.5$  V;  $T_A = -40$  to  $85^\circ\text{C}$ , unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Toggle Frequency (Sine Wave Input)	$f_t$	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; $R_L = 2.2$ k $\Omega$ )	$V_{out}$	1.0	1.6	–	$V_{pp}$
Modulus Setup Time MC to Out	$t_{set}$	–	8.0	10	ns
Input Voltage Sensitivity 500–2000 MHz	$V_{in(min)}$	100	–	1500	mVpp
Output Current ( $C_L = 12$ pF; $R_L = 2.2$ k $\Omega$ )	$I_O$	–	1.5	4.0	mA

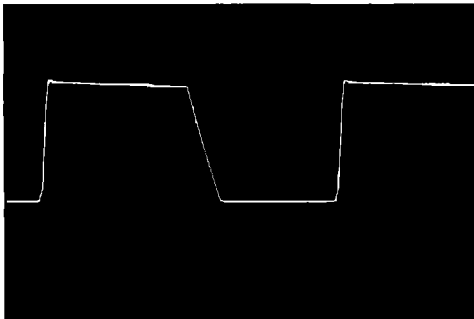
**Figure 1. Logic Diagram (MC12032A)**



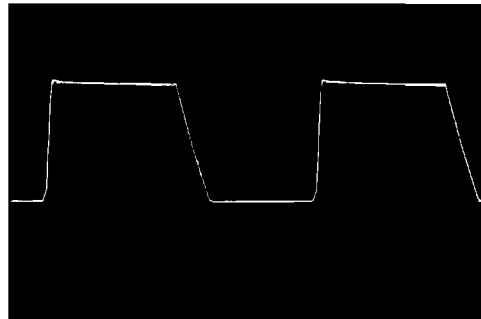
**Figure 2. Modulus Setup Time**



**Figure 3. Typical Output Waveforms**



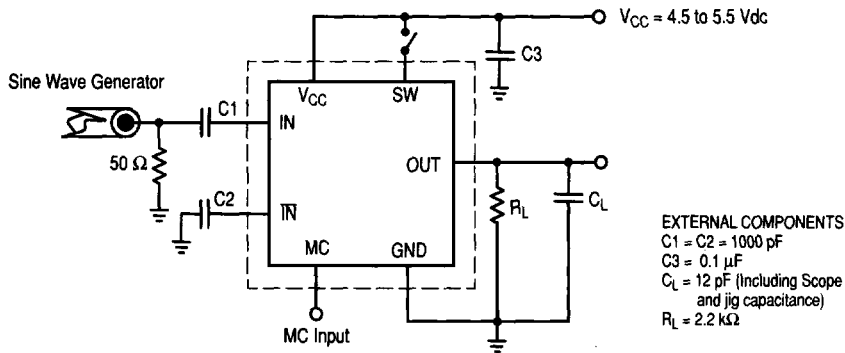
(+64, 500 MHz Input Frequency,  $V_{CC} = 5.0$  V,  $T_A = 25^\circ\text{C}$ , Output Loaded)



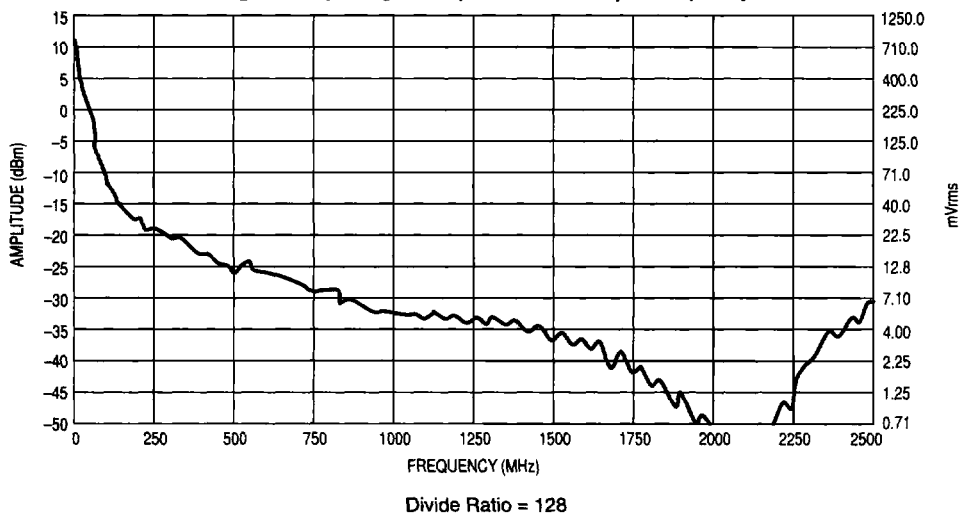
(+128, 1.1 GHz Input Frequency,  $V_{CC} = 5.0$  V,  $T_A = 25^\circ\text{C}$ , Output Loaded)

# MC12032A MC12032B

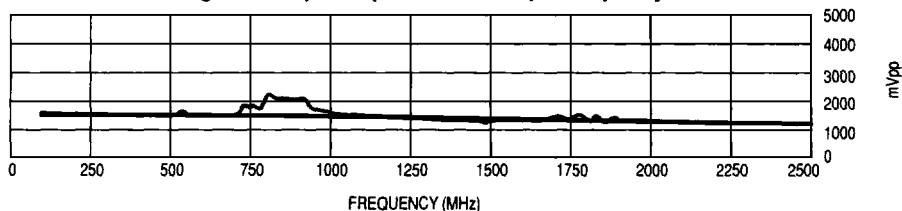
**Figure 4. AC Test Circuit**



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



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



# MC12032A MC12032B

Figure 7. Typical Input Impedance versus Input Frequency

