1.1GHz Dual Modulus Prescaler

MC12028A
MC12028B

MECL PLL COMPONENTS

÷32/33, ÷64/65
DUAL MODULUS
PRESCALER

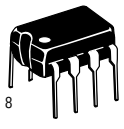
The MC12028A can be used with CMOS synthesizers requiring positive edges to trigger internal counters such as Motorola's MC145XXX series in a PLL to provide tuning signals up to 1.1GHz in programmable frequency steps.

The MC12028B can be used with CMOS synthesizers requiring negative edges to trigger internal counters.

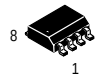
A Divide Ratio Control (SW) permits selection of a 32/33 or 64/65 divide ratio as desired.

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

- 1.1 GHz Toggle Frequency
- MC12028A for Positive Edge Triggered Synthesizers
- MC12028B for Negative Edge Triggered Synthesizers
- 6.5mA Maximum, –40° to +85°C, V_{CC} = 5.5Vdc
- Modulus Control Input Level Is Compatible With Standard CMOS and TTL
- Low–Power 4.0mA Typical



P SUFFIX
PLASTIC PACKAGE
CASE 626–05



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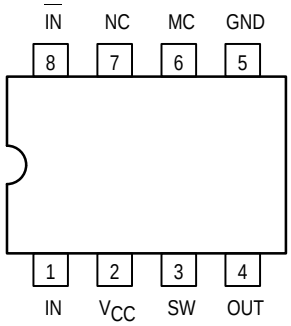
FUNCTIONAL TABLE

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

Note: SW: H = V_{CC}, L = Open
MC: H = 2.0 V to V_{CC}, L = GND to 0.8 V

Pinout: 8–Lead Plastic (Top View)



DESIGN GUIDE

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

* Equivalent to a two–input NAND gate

MAXIMUM RATINGS

Symbol	Characteristic	Range	Unit
V_{CC}	Power Supply Voltage, Pin 2	–0.5 to + 7.0	Vdc
T_A	Operating Temperature Range	–40 to + 85	°C
T_{stg}	Storage Temperature Range	–65 to + 150	°C
MC	Modulus Control Input, Pin 6	–0.5 to +6.5	Vdc

MOTOROLA

ELECTRICAL CHARACTERISTICS (V_{CC} = 4.5 to 5.5V; T_A = –40°C to +85°C)

Symbol	Characteristic	Min	Typ	Max	Unit
f_t	Toggle Frequency (Sine Wave Input)	0.1	1.4	1.1	GHz
I_{CC}	Supply Current Output Unloaded (Pin 2)		4.0	6.5	mA
V_{IH1}	Modulus Control Input High (MC)	2.0		V_{CC} + 0.5V	V
V_{IL1}	Modulus Control Input Low (MC)			0.8	V
V_{IH2}	Divide Ratio Control Input High (SW)	V_{CC} – 0.5V	V_{CC}	V_{CC} + 0.5V	Vdc
V_{IL2}	Divide Ratio Control Input Low (SW)	Open	Open	Open	—
V_{out}	Output Voltage Swing (C_L = 12pF; R_L = 2.2kΩ)	1.0	1.6		V_{p-p}
t_{set}	Modulus Setup Time MC to Out		11	16	ns
V_{in}	Input Voltage Sensitivity 250–1100 MHz 100–250 MHz	100 400		1500 1500	mVpp
I_O	Output Current (C_L = 12pF; R_L = 2.2kΩ)		1.5	4.0	mA

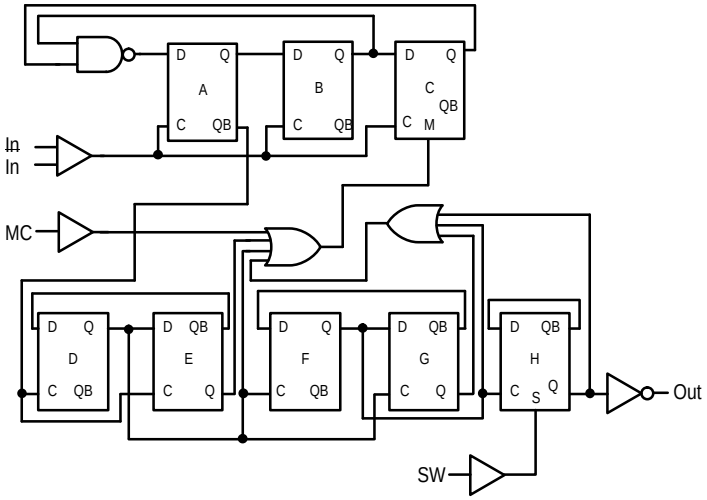
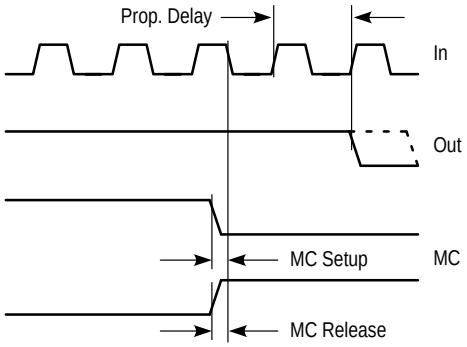


Figure 1. Logic Diagram (MC12028A)



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

Figure 2. Modulus Setup Time

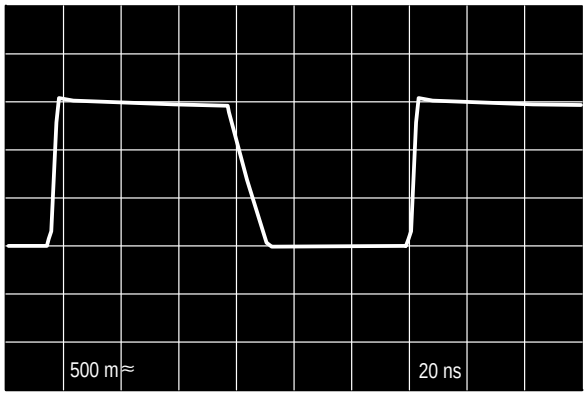


Figure 3. Typical Output Waveform

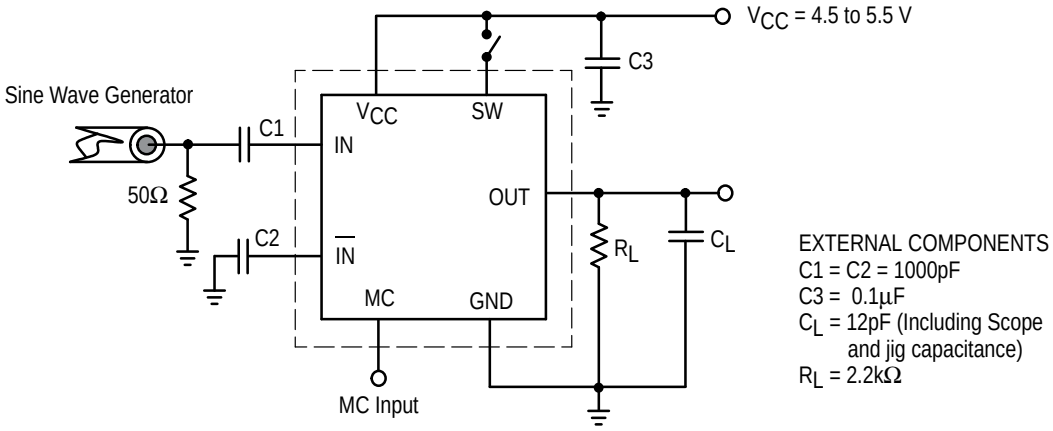


Figure 4. AC Test Circuit

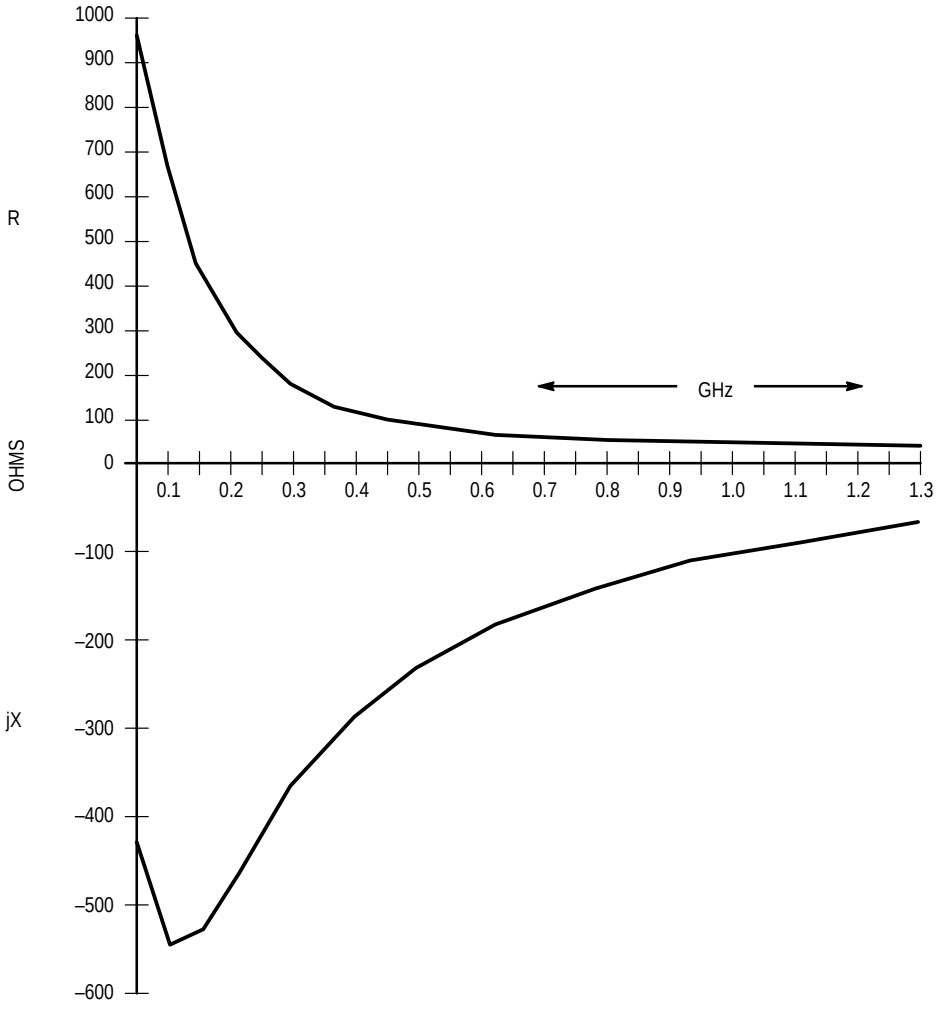


Figure 5. Typical Input Impedance versus Input Frequency

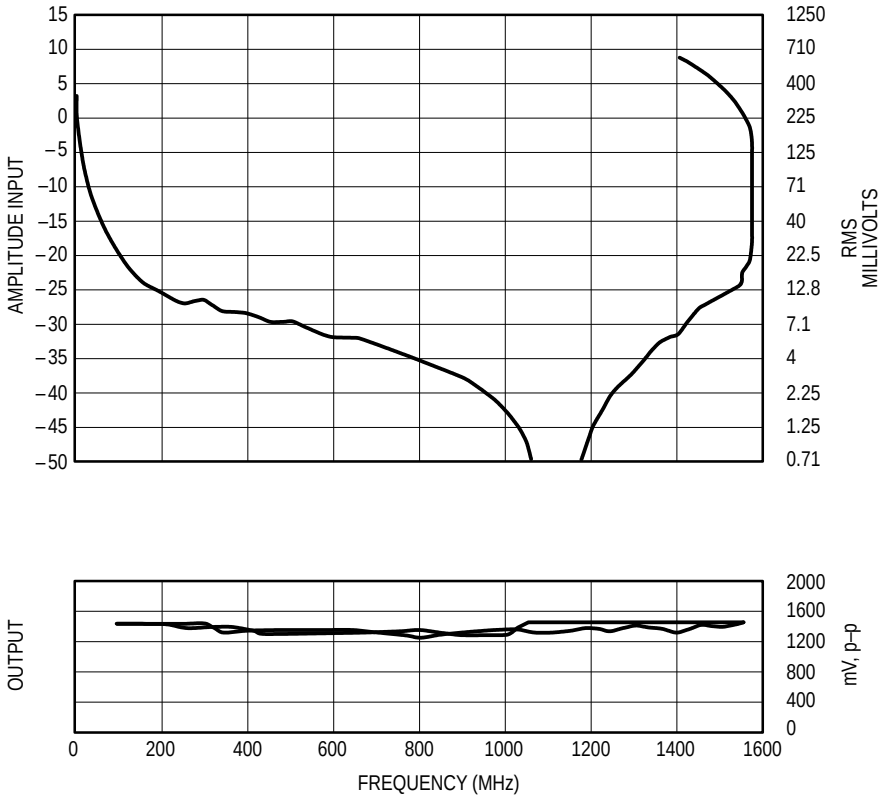


Figure 6. Input Signal Amplitude versus Input Frequency
Divide Ratio = 32

OUTLINE DIMENSIONS

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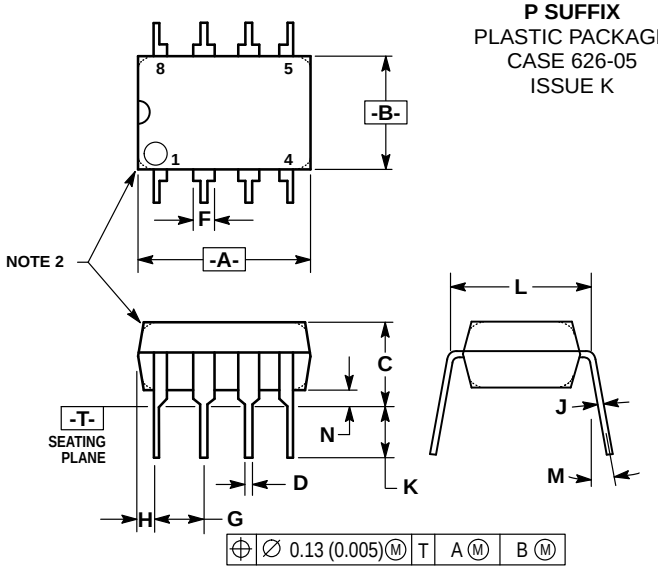
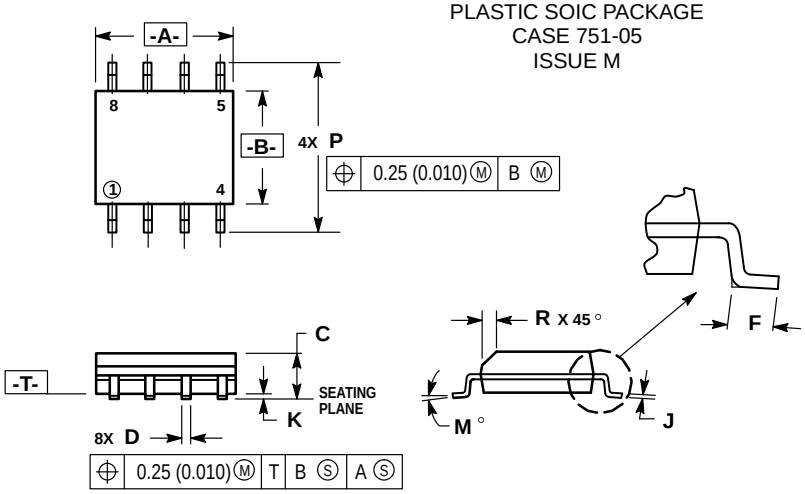
CASE 626-05
ISSUE K



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

D SUFFIX
PLASTIC SOIC PACKAGE
CASE 751-05
ISSUE M



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	4.80	5.00	0.189	0.196
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.054	0.068
D	0.35	0.49	0.014	0.019
F	0.40	1.25	0.016	0.049
G	1.27 BSC		0.050 BSC	
J	0.18	0.25	0.007	0.009
K	0.10	0.25	0.004	0.009
M	0°	7°	0°	7°
P	5.80	6.20	0.229	0.244
R	0.25	0.50	0.010	0.019

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