

## 1.1GHz Low Voltage, Low Power Dual Modulus Prescaler With On-Chip Output Termination

The MC12022TVA can be used with CMOS synthesizers requiring positive edges to trigger internal counters such as Motorola's MC145XXX. This device is a low voltage version of the MC12022A/B with the addition of on-chip output termination.

The MC12022TVB 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.

- 1.1 GHz Toggle Frequency
- Supply Voltage of 2.7 to 5.0V
- Low-Power 4.0mA Typical @  $V_{CC} = 2.7V$
- Short Setup Time ( $t_{set}$ ) 16ns Maximum @ 1.1GHz
- Modulus Control Input Level Is Compatible With Standard CMOS and TTL
- Output Load Resistor on Die

### FUNCTIONAL TABLE

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

Note: SW: H =  $V_{CC}$ , L = Open

MC: H = 2.0 V to  $V_{CC}$ , L = Gnd to 0.8 V

### MAXIMUM RATINGS

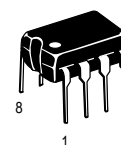
Symbol	Characteristic	Range	Unit
$V_{CC}$	Power Supply Voltage, Pin 8	-0.5 to +7.0	Vdc
$T_A$	Operating Temperature Range	-40 to +85	°C
$T_{stg}$	Storage Temperature Range	-65 to +150	°C
MC	Modulus Control Input, Pin 6	-0.5 to +6.5	Vdc

## MC12022TVA MC12022TVB

### MECL PLL COMPONENTS

÷64/65, ÷128/129

### LOW VOLTAGE DUAL MODULUS PRESCALER

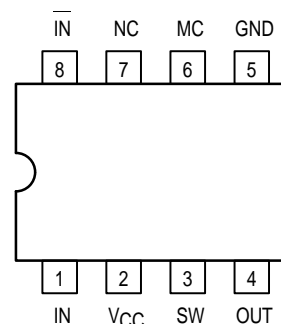


**P SUFFIX**  
PLASTIC PACKAGE  
CASE 626-05



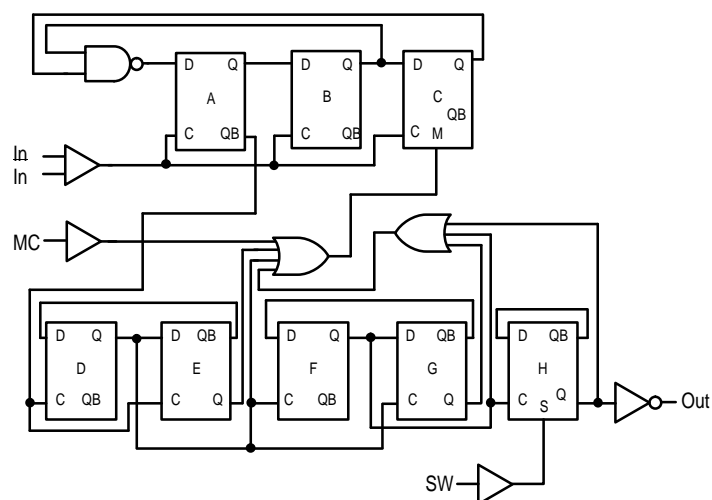
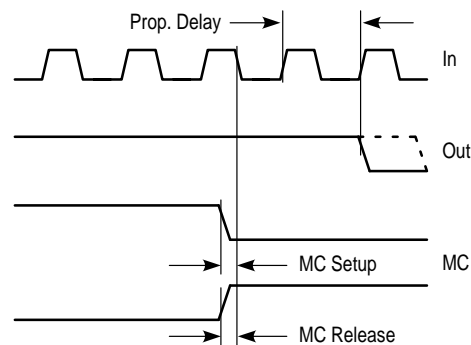
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### Pinout: 8-Lead Plastic (Top View)

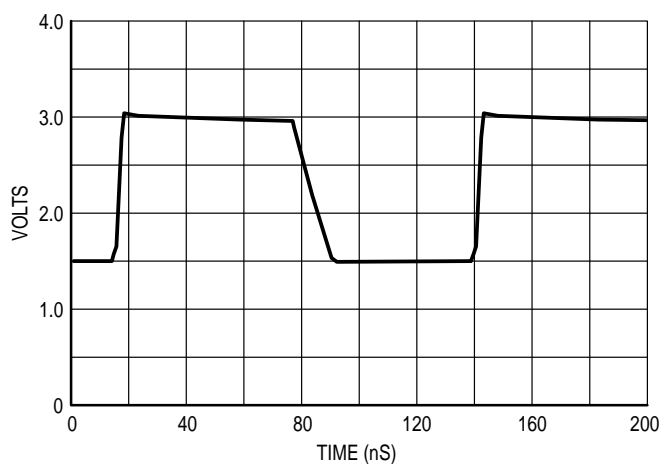


**ELECTRICAL CHARACTERISTICS** ( $V_{CC} = 2.7$  to  $5.0$  Vdc,  $T_A = -40^\circ\text{C}$  to  $+85^\circ\text{C}$ )

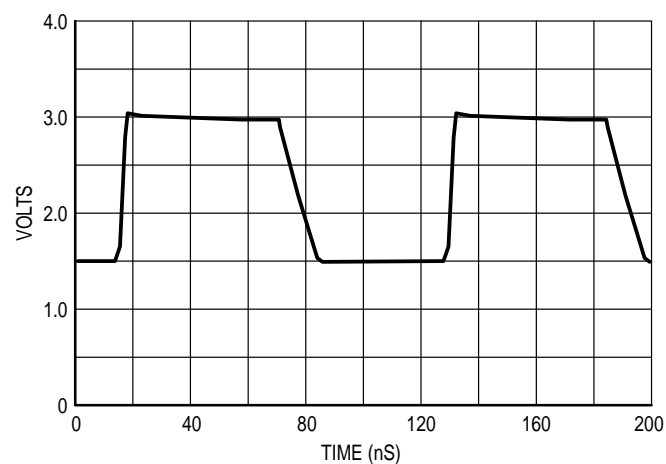
Symbol	Characteristic	Min	Typ	Max	Unit
$f_t$	Toggle Frequency (Sine Wave Input)	0.1	1.4	1.1	GHz
$I_{CCL}$	Supply Current (Pin 2 at 2.7 Vdc)	—	5.2	6.5	mA
$I_{CCH}$	Supply Current (Pin 2 at 5.0 Vdc)	—	5.8	8.0	mA
$V_{IH1}$	Modulus Control Input High (MC)	2.0	—	$V_{CC} + 0.5\text{V}$	V
$V_{IL1}$	Modulus Control Input Low (MC)	—	—	0.8	V
$V_{IH2}$	Divide Ratio Control Input High (SW)	$V_{CC} - 0.5\text{V}$	$V_{CC}$	$V_{CC} + 0.5\text{V}$	Vdc
$V_{IL2}$	Divide Ratio Control Input Low (SW)	Open	Open	Open	—
$V_{out(L)}$	Output Voltage Swing @ 2.7V, $C_L = 8\text{pF}$	0.8	1.0	—	$V_{p-p}$
$V_{out(H)}$	Output Voltage Swing @ 5.0V, $C_L = 8\text{pF}$	1.0	1.4	—	$V_{p-p}$
$t_{set}$	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

**Figure 1. Logic Diagram (MC12022TVA)**

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

**Figure 2. Modulus Setup Time**

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



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

**Figure 3. Typical Output Waveform**

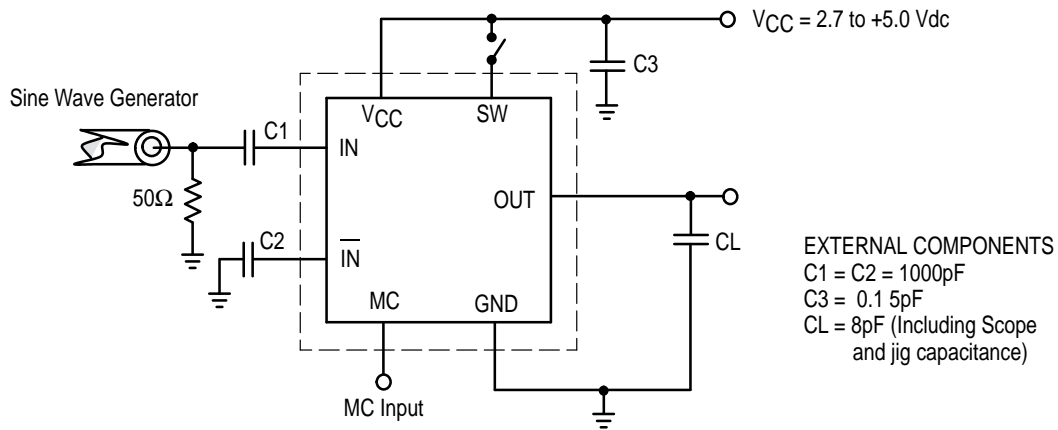


Figure 4. AC Test Circuit

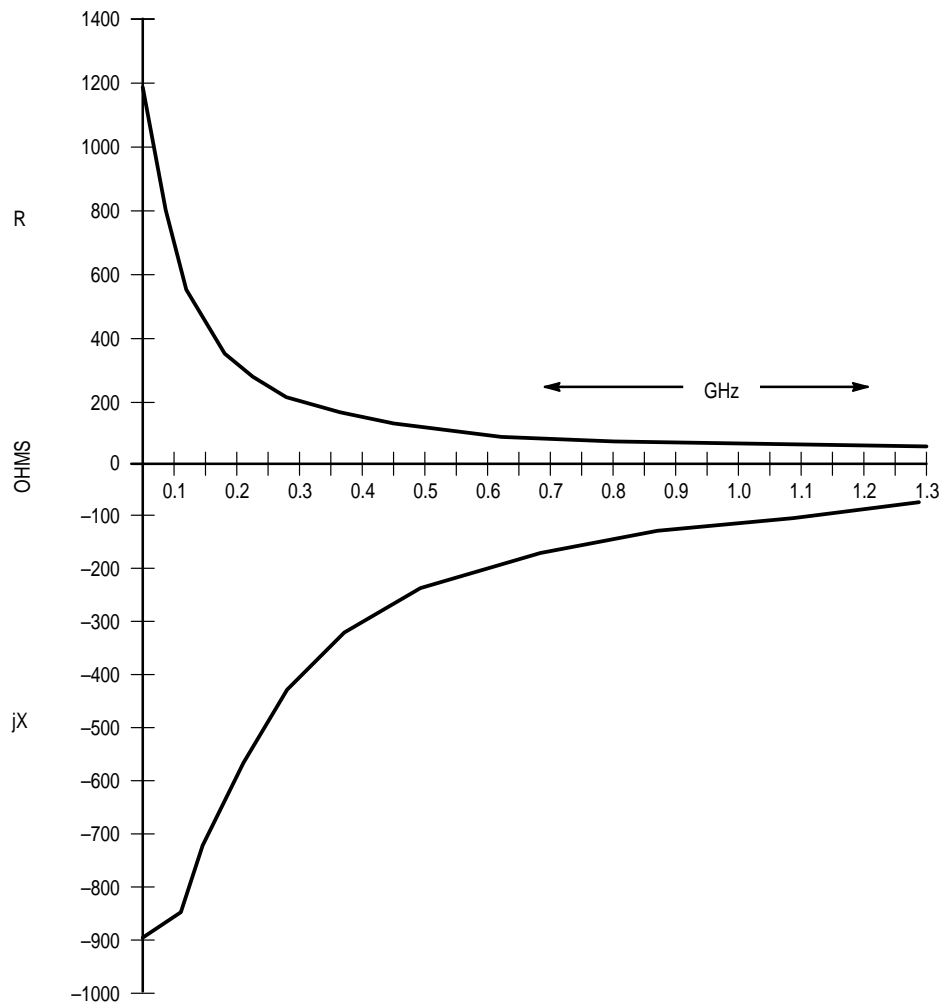
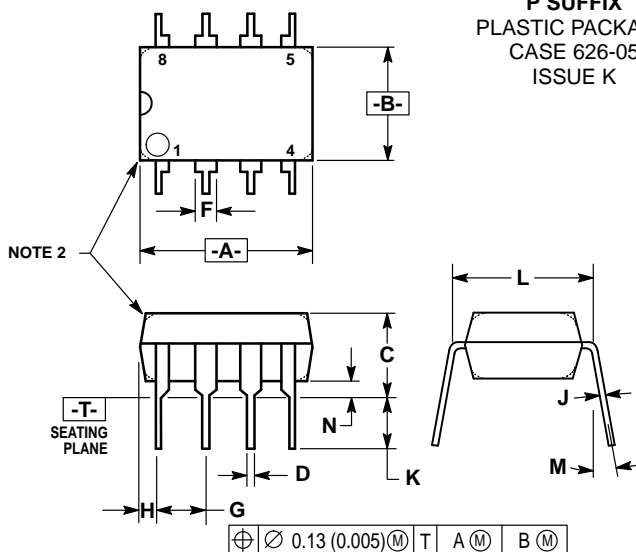


Figure 5. Typical Input Impedance versus Input Frequency

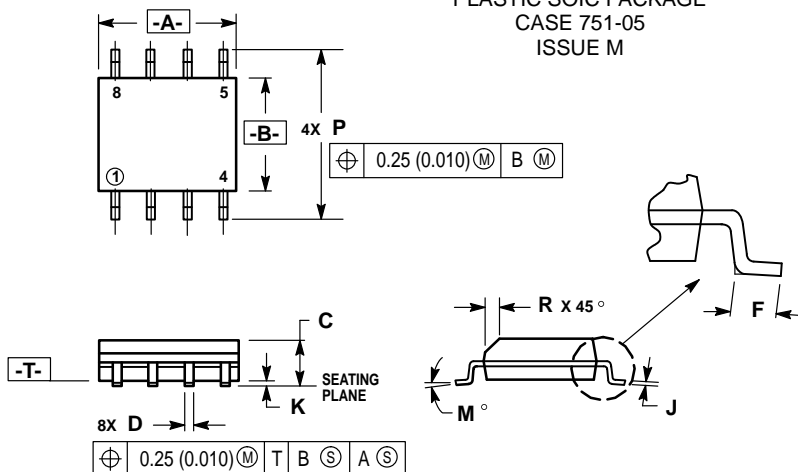
## OUTLINE DIMENSIONS

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## 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.


DIM	MILLIMETERS		INCHES	
	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**  
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 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.

DIM	MILLIMETERS		INCHES	
	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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