

1.1GHz Low Voltage, Low Power Two-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

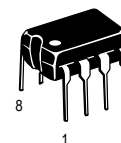
Symbol	Characteristic	Range	Unit
V_{CC}	Power Supply Voltage, Pin 8	-0.5 to + 7.0	Vdc
T_A	Operating Temperature Range	-40 to + 85	°C
T_{stg}	Storage Temperature Range	-65 to + 150	°C
MC	Modulus Control Input, Pin 6	-0.5 to + 6.5	Vdc

MC12022TVA MC12022TVB

MECL PLL COMPONENTS

÷64/65, ÷128/129

LOW VOLTAGE TWO-MODULUS PRESCALER

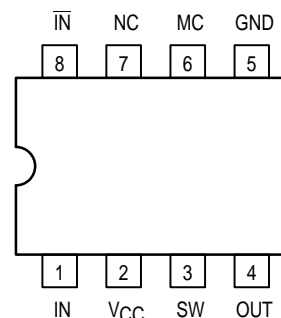


P SUFFIX
PLASTIC PACKAGE
CASE 626-05



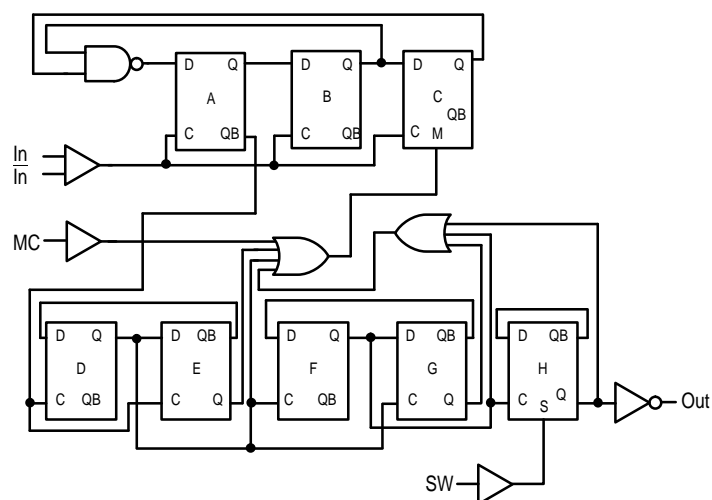
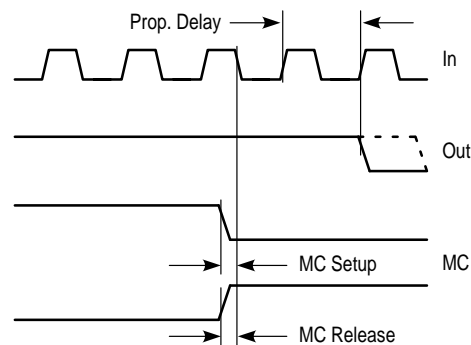
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Pinout: 8-Lead Plastic (Top View)

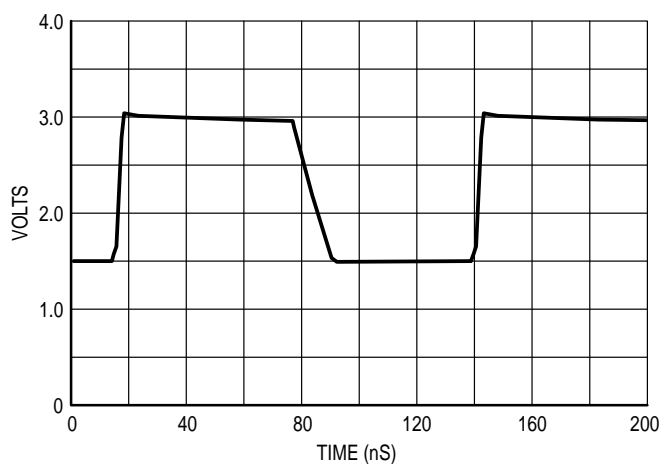


ELECTRICAL CHARACTERISTICS ($V_{CC} = 2.7$ to 5.0 Vdc, $T_A = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$)

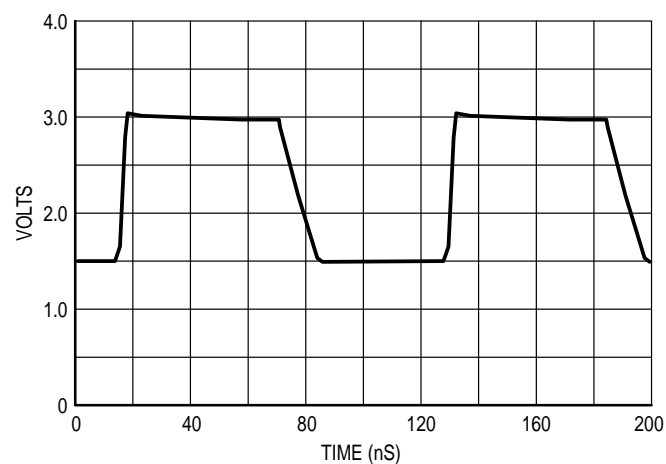
Symbol	Characteristic	Min	Typ	Max	Unit
f_t	Toggle Frequency (Sine Wave Input)	0.1	1.4	1.1	GHz
I_{CCL}	Supply Current (Pin 2 at 2.7 Vdc)	—	4.0	6.5	mA
I_{CCH}	Supply Current (Pin 2 at 5.0 Vdc)	—	5.8	8.0	mA
V_{IH1}	Modulus Control Input High (MC)	2.0	—	—	V
V_{IL1}	Modulus Control Input Low (MC)	—	—	0.8	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

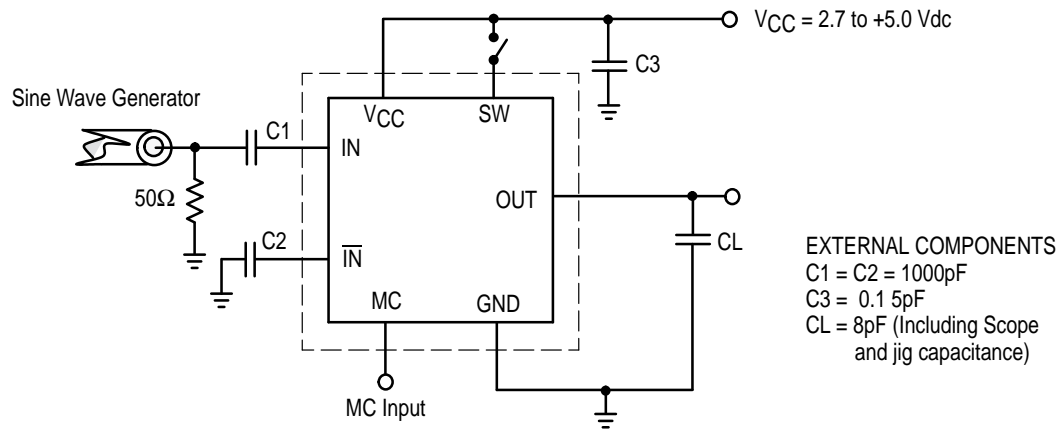
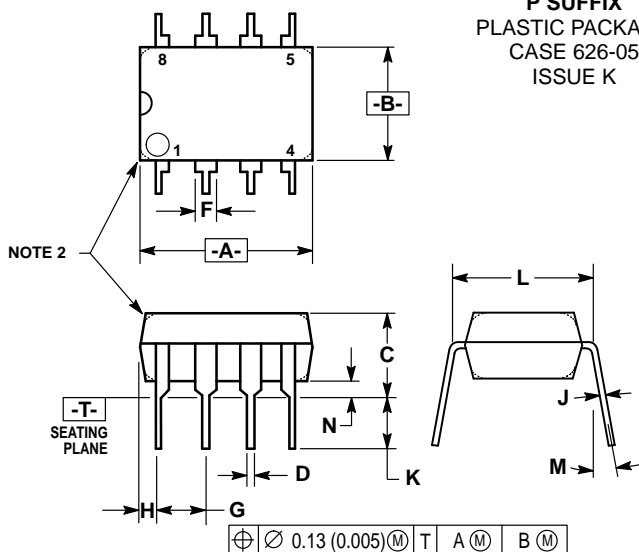


Figure 5. AC Test Circuit

OUTLINE DIMENSIONS

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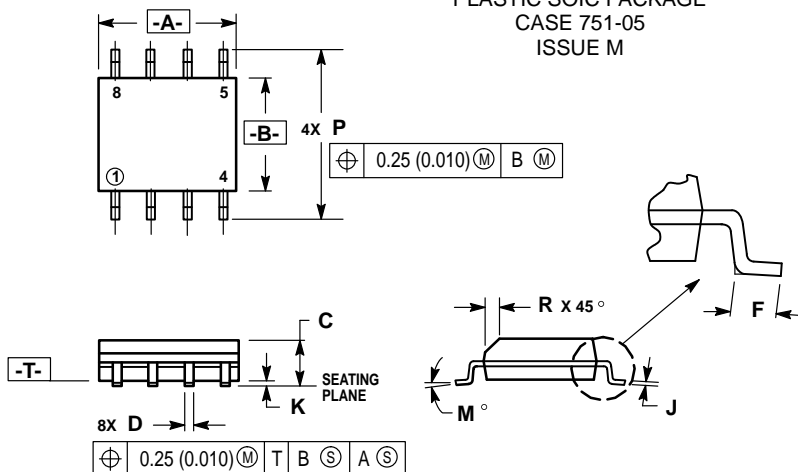


NOTES:

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


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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	0.0688
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	0.020

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