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

MC12022TVA
MC12022TVB

MECL PLL COMPONENTS

÷64/65, ÷128/129
LOW VOLTAGE
DUAL MODULUS PRESCALER

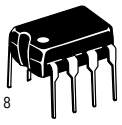
The MC12022TVA can be used with CMOS synthesizers requiring positive edges to trigger internal counters such as Motorola's MC145XXX. This device is a low voltage version of the MC12022A/B with the addition of on–chip output termination.

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



P SUFFIX
PLASTIC PACKAGE
CASE 626–05

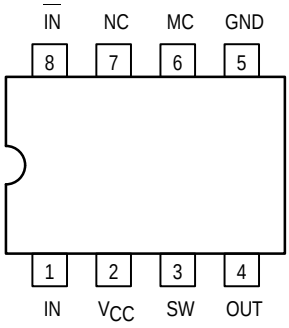
D SUFFIX
PLASTIC SOIC PACKAGE
CASE 751–05

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

Pinout: 8–Lead Plastic (Top View)



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

MOTOROLA

ELECTRICAL CHARACTERISTICS (V_{CC} = 2.7 to 5.0 Vdc, 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_{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} + 0.5V	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	–
$V_{out(L)}$	Output Voltage Swing @ 2.7V, C_L = 8pF	0.8	1.0	–	$V_{p–p}$
$V_{out(H)}$	Output Voltage Swing @ 5.0V, C_L = 8pF	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

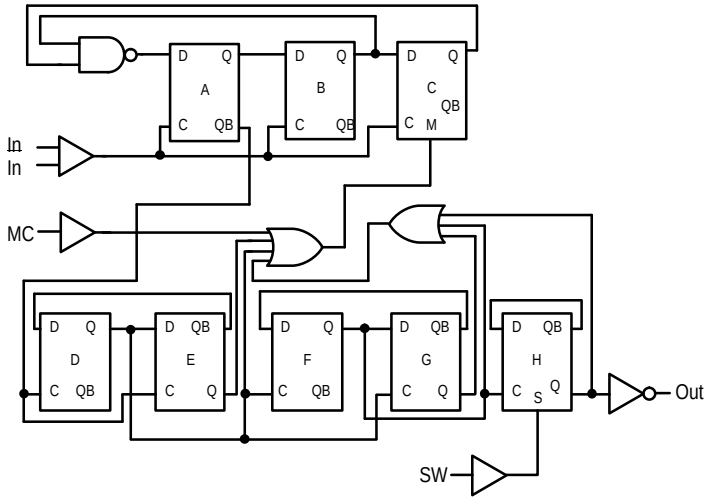
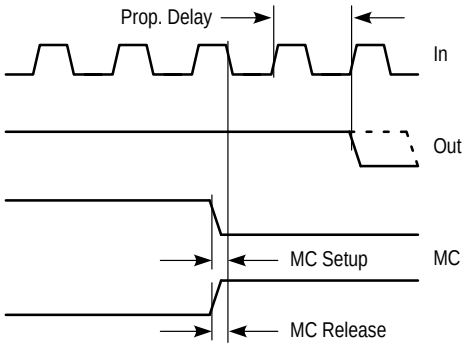
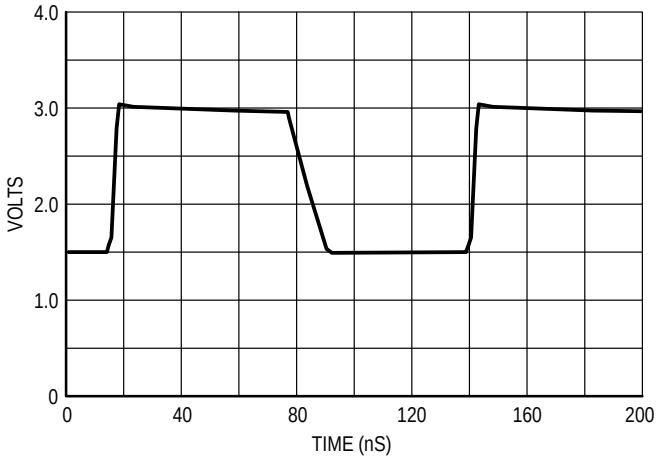


Figure 1. Logic Diagram (MC12022TVA)

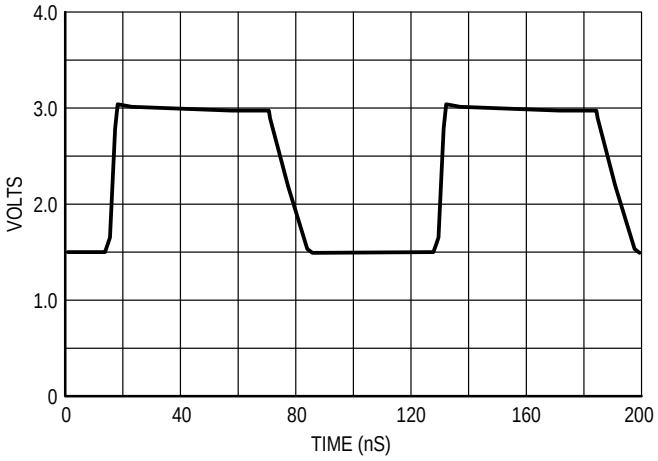


Modulus setup time MC to out is the MC setup or MC release plus the prop delay.

Figure 2. Modulus Setup Time



(÷64, 500MHz Input Frequency, V_{CC} = 5.0V, T_A = 25°C, Output Loaded)



(÷128, 1.1GHz Input Frequency, V_{CC} = 5.0V, T_A = 25°C, Output Loaded)

Figure 3. Typical Output Waveform

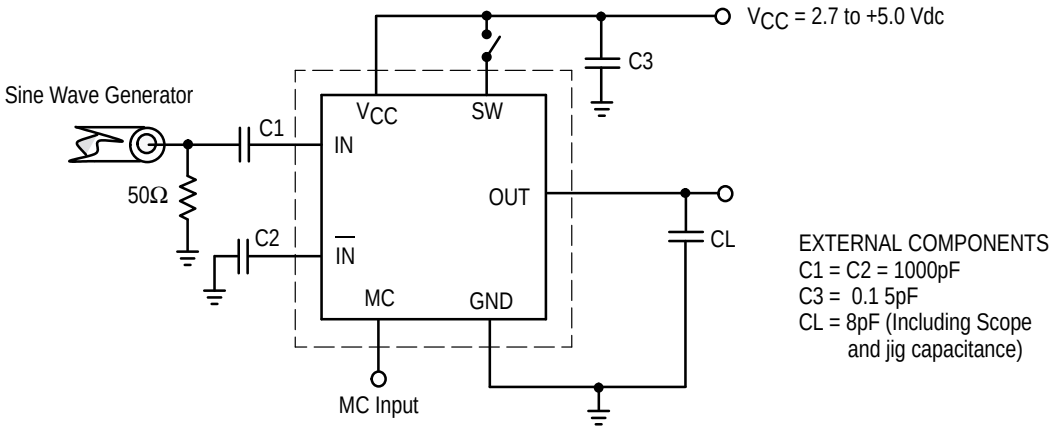


Figure 4. AC Test Circuit

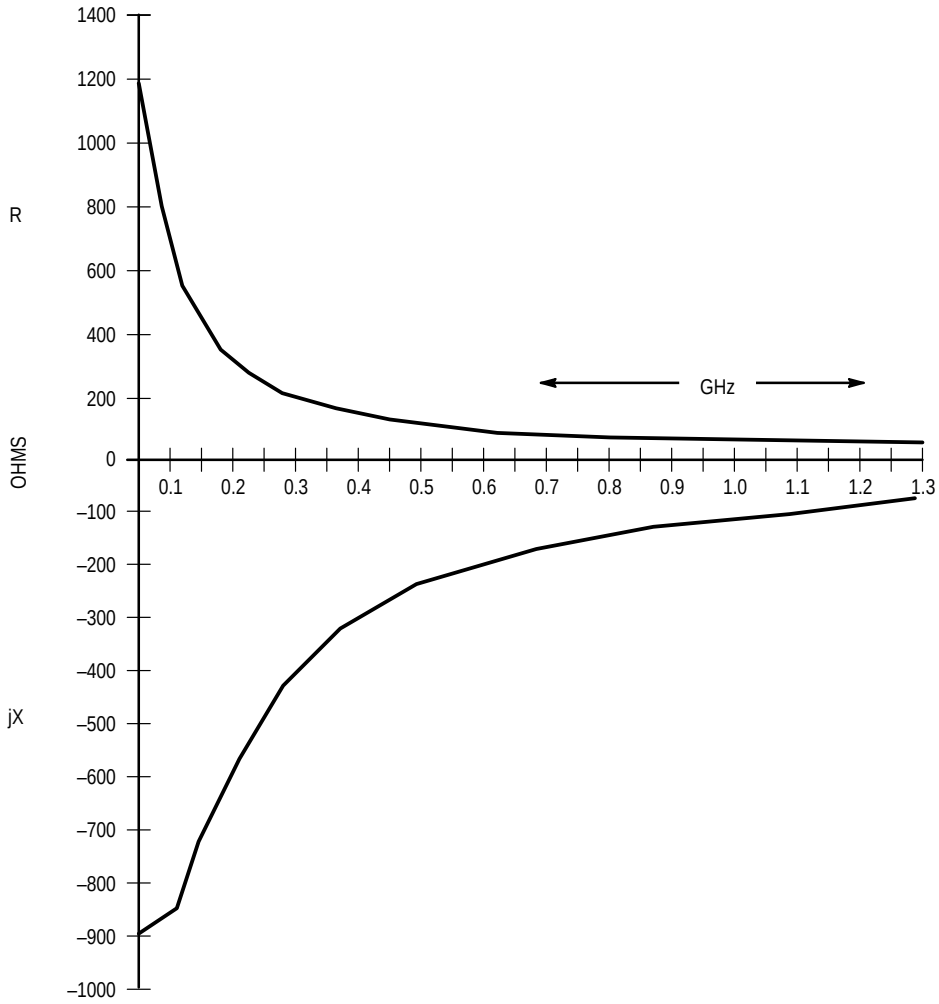


Figure 5. Typical Input Impedance versus Input Frequency

OUTLINE DIMENSIONS

P SUFFIX
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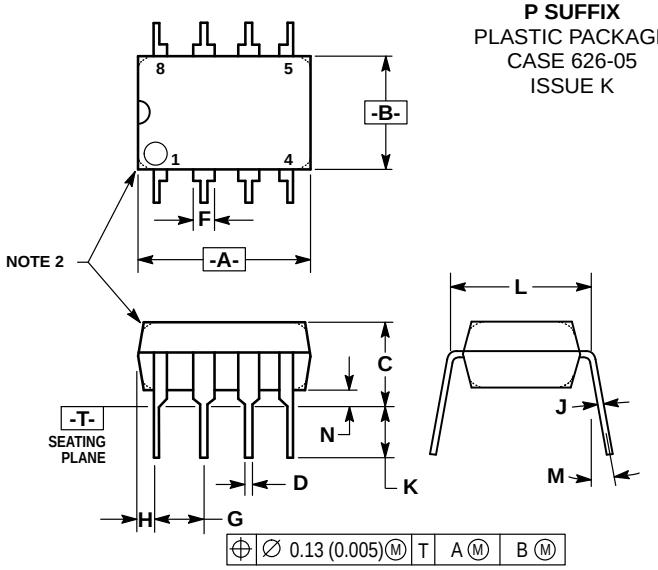
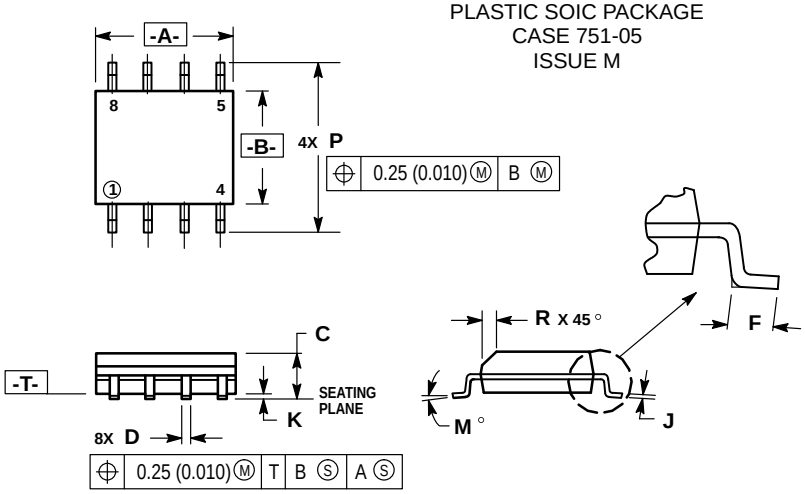
ISSUE K



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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