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1.1 GHz Super Low Power Dual Modulus Prescaler

The MC12052A is a super low power dual modulus prescaler used in phase-locked loop applications. Motorola's advanced Bipolar MOSAIC™ V technology is utilized to achieve low power dissipation of 2.7 mW at a minimum supply voltage of 2.7 V.

The MC12052A 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 1.1 GHz in programmable frequency steps.

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
- The MC12052 is Pin and Functionally Compatible with the MC12022
- Low Power 1.0 mA Typical
- 2.0 mA Maximum, -40 to 85°C, V_{CC} = 2.7 to 5.5 Vdc
- Short Setup Time (t_{set}) 16 ns Maximum @ 1.1 GHz
- Modulus Control Input Level is Compatible with Standard CMOS and TTL
- Maximum Input Voltage Should Be Limited to 6.5 Vdc

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FUNCTIONAL TABLE

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

NOTES: 1. SW: H = V_{CC}, L = Open. A logic L can also be applied by grounding this pin, but this is not recommended due to increased power consumption.
2. MC: H = 2.0 V to V_{CC}, L = GND to 0.8 V.

MAXIMUM RATINGS

Characteristic	Symbol	Range	Unit
Power Supply Voltage, Pin 2	V _{CC}	-0.5 to 7.0	Vdc
Operating Temperature Range	T _A	-40 to 85	°C
Storage Temperature Range	T _{stg}	-65 to 150	°C
Modulus Control Input, Pin 6	MC	-0.5 to 6.5	Vdc

MC12052A

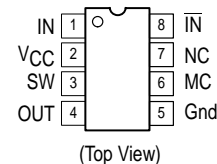
MECL PLL COMPONENTS ÷64/65, ÷128/129 LOW POWER DUAL MODULUS PRESCALER

SEMICONDUCTOR
TECHNICAL DATA



D SUFFIX
PLASTIC PACKAGE
CASE 751
(SO-8)

PIN CONNECTIONS



ORDERING INFORMATION

Device	Operating Temp Range	Package
MC12052AD	T _A = -40 to 85°C	SO-8

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ELECTRICAL CHARACTERISTICS (V_{CC} = 2.7 to 5.5 VDC, T_A = -40 to 85°C, unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
Toggle Frequency (Sine Wave Input)	f _t	0.1	1.4	1.1	GHz
Supply Current (Pin 2)	I _{CC}	-	1.0	2.0	mA
Modulus Control Input High (MC)	V _{IH1}	2.0	-	V _{CC} + 0.5 V	V
Modulus Control Input Low (MC)	V _{IL1}	Gnd	-	0.8	V
Divide Ratio Control Input High (SW)	V _{IH2}	V _{CC} - 0.5 V	V _{CC}	V _{CC} + 0.5 V	VDC
Divide Ratio Control Input Low (SW)	V _{IL2}	Open	Open	Open	-
Output Voltage Swing (Note 2) (C _L = 8.0 pF, R _L = 3.3 kΩ)	V _{out}	0.8	1.1	-	V _{PP}
Modulus Setup Time MC to Out @ 1100 MHz	t _{set}	-	11	16	ns
Input Voltage Sensitivity 250–1100 MHz 100–250 MHz	V _{in}	100 400	- -	1000 1000	mV _{PP}
Output Current (Note 1) V _{CC} = 2.7 V, C _L = 8.0 pF, R _L = 3.3 kΩ V _{CC} = 5.0 V, C _L = 8.0 pF, R _L = 7.2 kΩ	I _O	- -	0.5 0.5	3.0 3.0	mA

NOTES: 1. Divide ratio of +64/65 @ 1.1 GHz
2. Valid over voltage range 2.7 to 5.5 V; R_L = 3.3 kΩ @ V_{CC} = 2.7 V; R_L = 7.2 kΩ @ V_{CC} = 5.0 V

Figure 1. Logic Diagram (MC12052A)

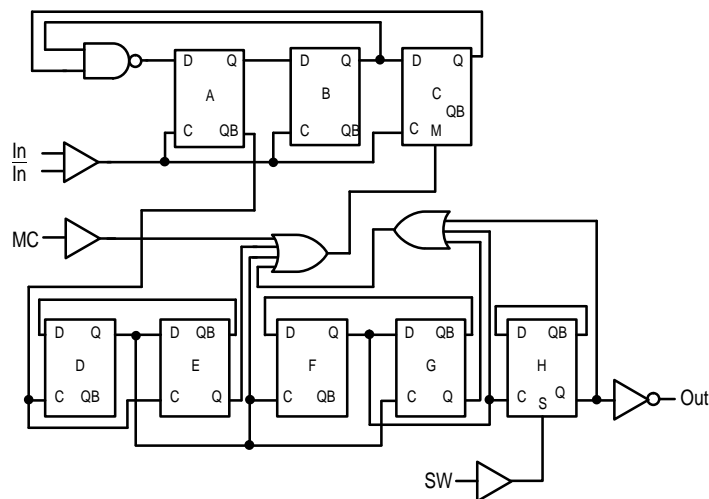
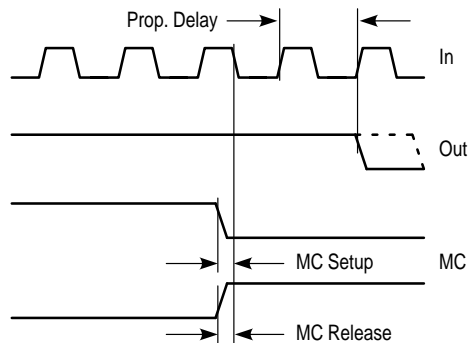
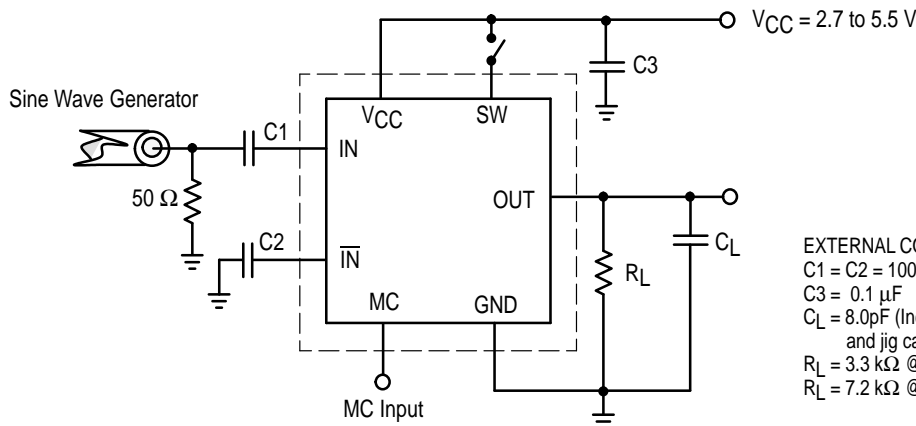


Figure 2. Modulus Setup Time



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

Figure 3. AC Test Circuit

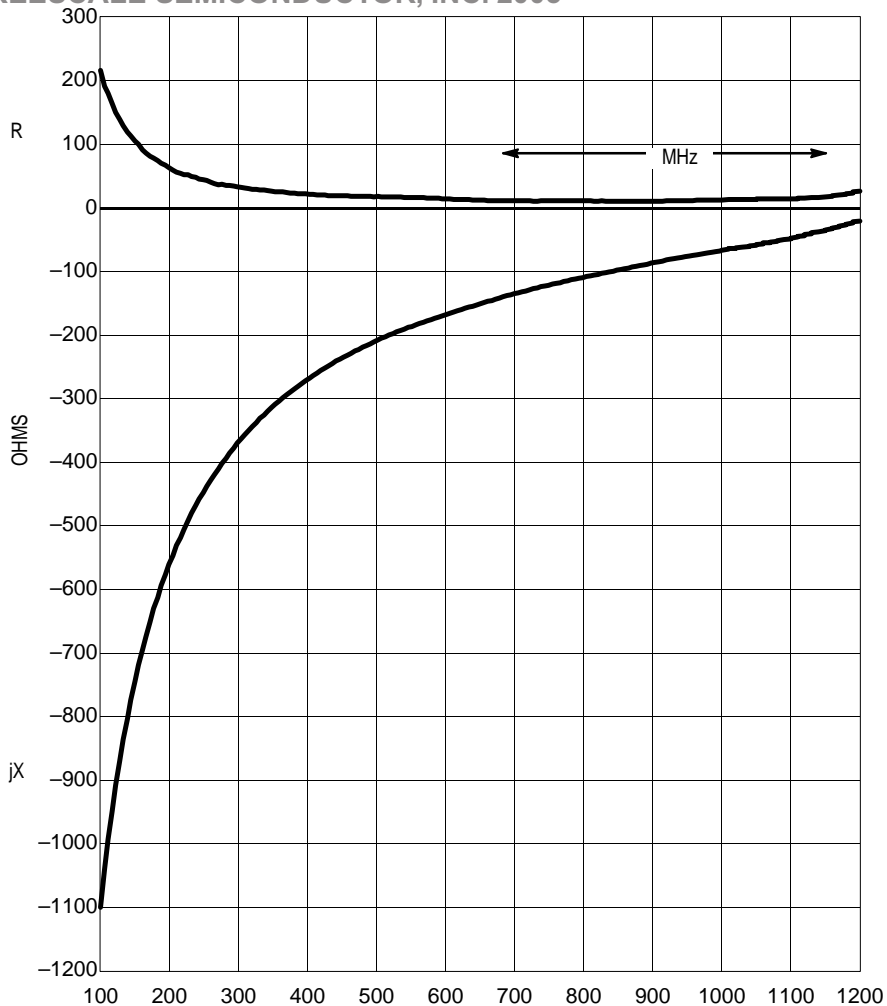


EXTERNAL COMPONENTS
C1 = C2 = 1000 pF
C3 = 0.1 μF
C_L = 8.0pF (including Scope and jig capacitance)
R_L = 3.3 kΩ @ V_{CC} = 2.7 V
R_L = 7.2 kΩ @ V_{CC} = 5.0 V



Figure 4. Typical Input Impedance versus Input Frequency

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OUTLINE DIMENSIONS

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D-SUFFIX
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CASE 751-06
(SO-8)
ISSUE T

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. DIMENSIONS ARE IN MILLIMETER.
3. DIMENSION D AND E DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 PER SIDE.
5. DIMENSION B DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 TOTAL IN EXCESS OF THE B DIMENSION AT MAXIMUM MATERIAL CONDITION.

MILLIMETERS		
DIM	MIN	MAX
A	1.35	1.75
A1	0.10	0.25
B	0.35	0.49
C	0.19	0.25
D	4.80	5.00
E	3.80	4.00
e	1.27 BSC	
H	5.80	6.20
h	0.25	0.50
L	0.40	1.25
θ	0°	7°

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How to reach us:

USA/EUROPE/Locations Not Listed: Motorola Literature Distribution; P.O. Box 5405, Denver, Colorado 80217. 1-303-675-2140 or 1-800-441-2447

JAPAN: Motorola Japan Ltd.; SPD, Strategic Planning Office, 141, 4-32-1 Nishi-Gotanda, Shinagawa-ku, Tokyo, Japan. 81-3-5487-8488

Customer Focus Center: 1-800-521-6274

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ASIA/PACIFIC: Motorola Semiconductors H.K. Ltd.; 8B Tai Ping Industrial Park, 51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852-26629298

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