Advance Information

1.1GHz Super Low Power Dual Modulus Prescaler With Stand-By Mode

MC12053A

MECL PLL COMPONENTS

÷64/65, ÷128/129 LOW POWER DUAL MODULUS PRESCALER WITH STAND–BY MODE

The MC12053A is a super low power ÷64/65, ÷128/129 dual modulus prescaler. Motorola's advanced Bipolar MOSAIC™ V technology is utilized to achieve low power dissipation of 4.3mW at a minimum supply voltage of 2.7V.

The Divide Ratio Control input, SW, permits selection of divide ratio as desired. A HIGH on SW selects ÷64/65; an OPEN on SW selects ÷128/129. The Modulus Control input, MC, selects the proper divide number after SW has been biased to select the desired divide ratio.

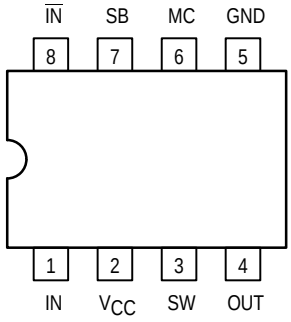
Stand-by mode is featured to reduce current drain to 50µA typical at 2.7V when the stand-by pin, SB, is switched LOW, disabling the prescaler. On-chip output termination provides 500µA (typical) output current, which is sufficient to drive a CMOS synthesizer input high impedance load (8pF typical).

- 1.1GHz Toggle Frequency
- Supply Voltage of 2.7 to 5.5V
- Low Power 1.5mA Typical at V_{CC} = 2.7V
- Operating Temperature Range of –40°C to +85°C
- On-Chip Output Termination
- The MC12053A Is Pin and Functionally Compatible With the MC12036
- Modulus Control Input Level Is Compatible With Standard CMOS and TTL

D SUFFIX
PLASTIC SOIC PACKAGE
CASE 751-03

SD SUFFIX
PLASTIC SSOP PACKAGE
CASE 940-02

Pinout: 8-Lead Plastic (Top View)



FUNCTIONAL TABLE

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

Note: SW: H = V_{CC} – 0.5 to V_{CC}, L = Open
MC & SB: 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 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 + V_{CC}	Vdc
I_O	Maximum Output Current, Pin 4	4.0	mA

MOSAIC V is a trademark of Motorola

This document contains information on a new product. Specifications and information herein are subject to change without notice.

ELECTRICAL CHARACTERISTICS (V_{CC} = 2.7V 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 (Pin 2)	V_{CC} = 2.7V V_{CC} = 5.0V		1.60 1.75	2.5 2.5	mA
I_{SB}	Stand-By Current	V_{CC} = 2.7V V_{CC} = 5.0V		50 100	250 250	µA
V_{IH1}	Modulus Control & Stand-By Input HIGH (MC & SB)		2.0		V_{CC}	V
V_{IL1}	Modulus Control & Stand-By Input LOW (MC & SB)		GND		0.8	V
V_{IH2}	Divide Ratio Control Input HIGH (SW)		V_{CC} – 0.5	V_{CC}	V_{CC} + 0.5	V
V_{IH2}	Divide Ratio Control Input LOW (SW)		Open	Open	Open	
V_{out}	Output Voltage Swing[1]		0.8	1.1		V_{PP}
t_{set}	Modulus Setup Time MC to OUT at 1100MHz			11	16	ns
V_{in}	Input Voltage Sensitivity	250–1100MHz 100–250MHz	100 400		1000 1000	mV_{PP}

1 Assumes 8pF high impedance load.

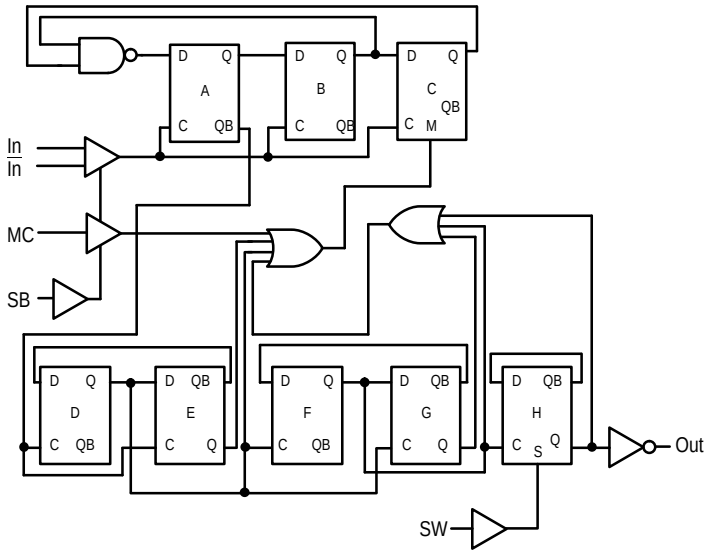
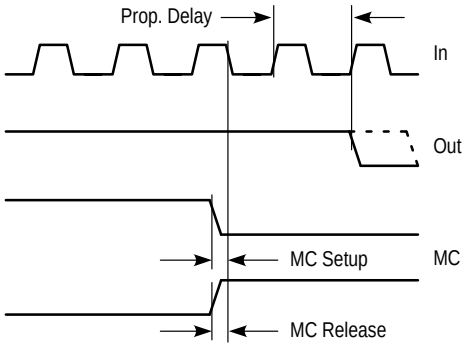
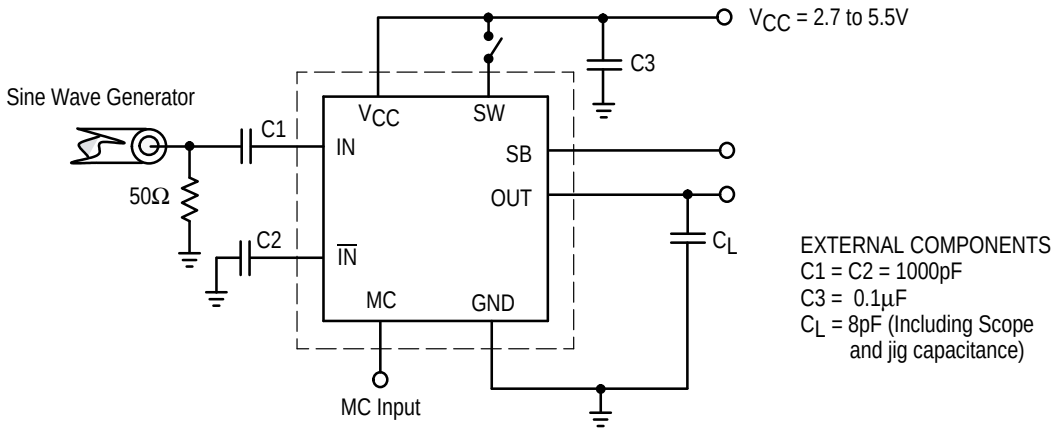


Figure 1. Logic Diagram (MC12053A)



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

Figure 2. Modulus Setup Time



EXTERNAL COMPONENTS
C1 = C2 = 1000pF
C3 = 0.1µF
C_L = 8pF (Including Scope and jig capacitance)

Figure 3. AC Test Circuit

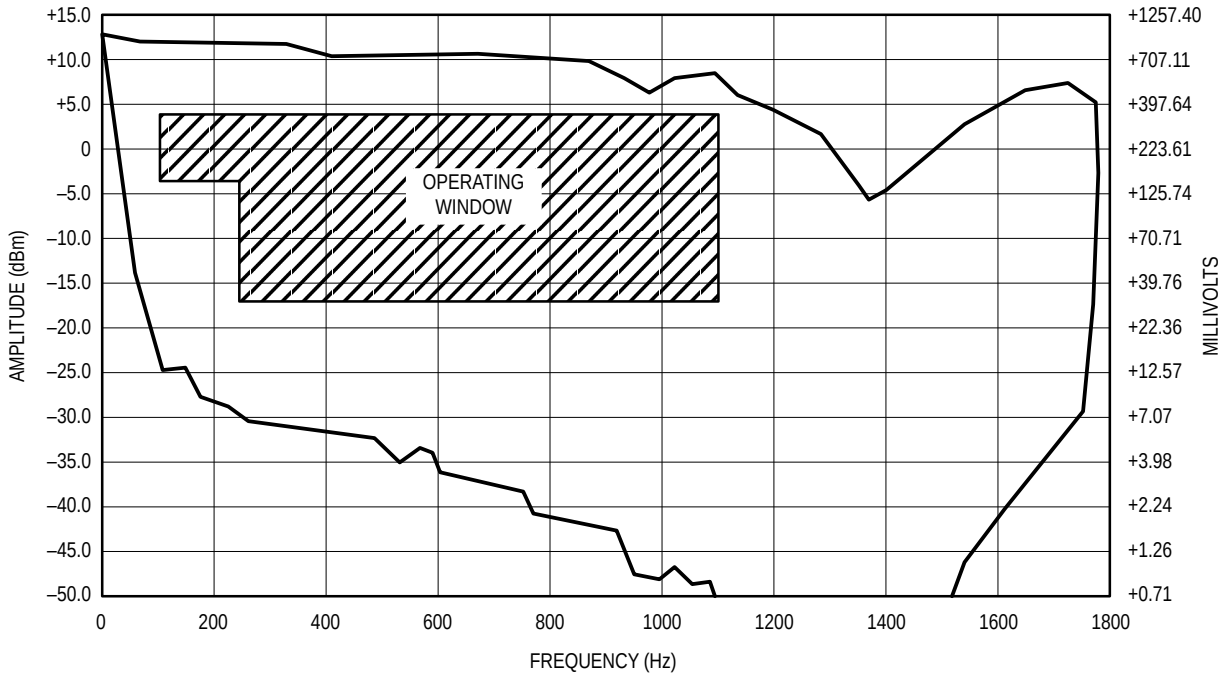


Figure 4. Input Signal Amplitude versus Input Frequency
Divide Ratio = 64; V_{CC} = 2.7V; T_A = 25°C

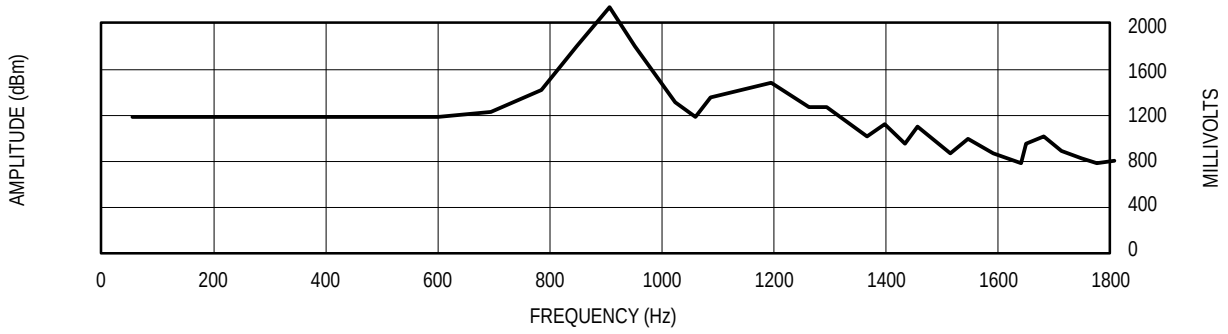
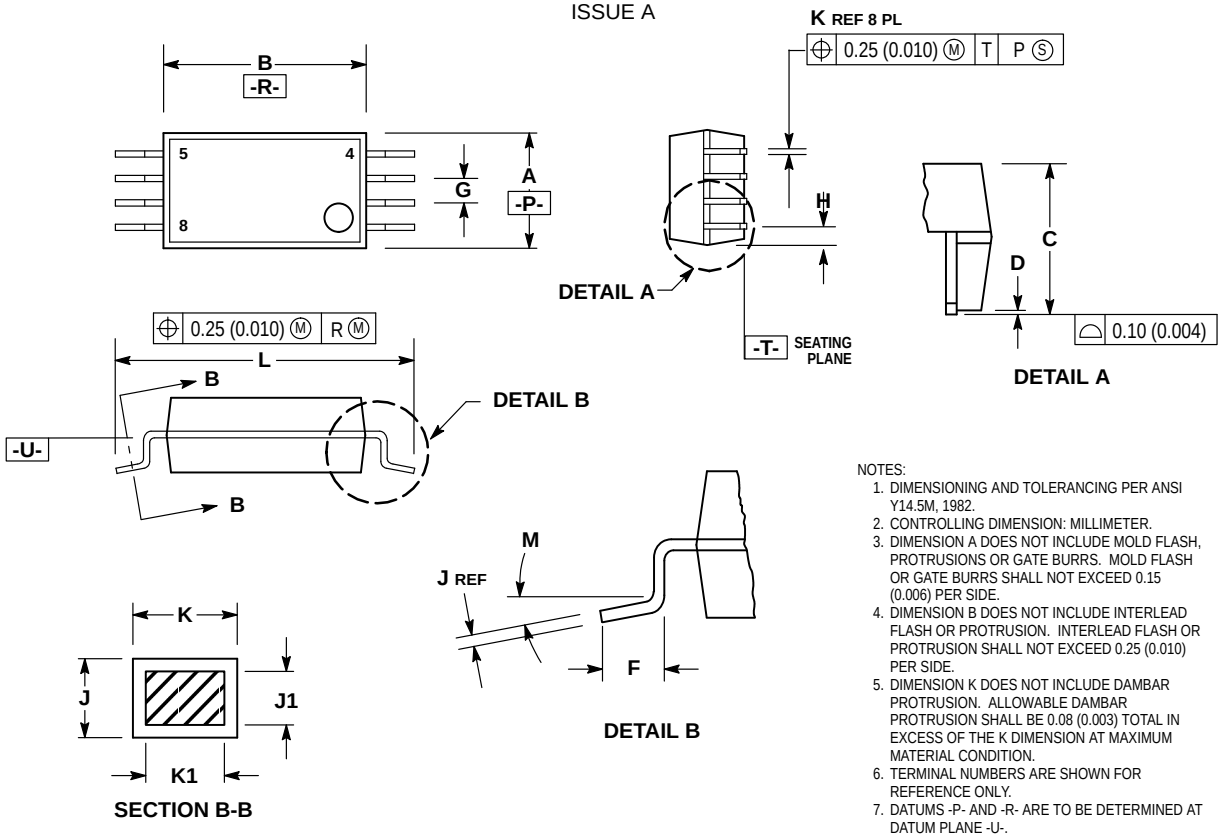


Figure 5. Output Amplitude versus Input Frequency

OUTLINE DIMENSIONS

SD SUFFIX
PLASTIC SSOP PACKAGE
CASE 940-02
ISSUE A

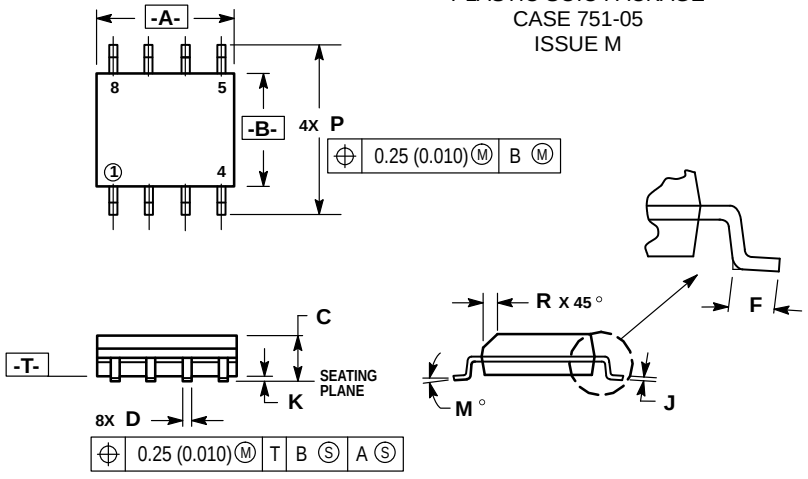


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH OR GATE BURRS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
4. DIMENSION B DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. INTERLEAD FLASH OR PROTRUSION SHALL NOT EXCEED 0.25 (0.010) PER SIDE.
5. DIMENSION K DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08 (0.003) TOTAL IN EXCESS OF THE K DIMENSION AT MAXIMUM MATERIAL CONDITION.
6. TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.
7. DATUMS -P- AND -R- ARE TO BE DETERMINED AT DATUM PLANE -U-.
8. DIMENSION A AND B ARE TO BE DETERMINED AT DATUM PLANE -U-.
9. CROSS SECTION B-B TO BE DETERMINED AT 0.10 (0.004) TO 0.25 (0.010) FROM THE LEADTIP.

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	2.87	3.13	0.113	0.123
B	5.20	5.38	0.205	0.212
C	1.73	1.99	0.068	0.078
D	0.05	0.21	0.002	0.008
F	0.55	0.95	0.022	0.037
G	0.65 BSC		0.026 BSC	
H	0.50	—	0.020	—
J	0.09	0.20	0.004	0.008
J1	0.09	0.16	0.004	0.006
K	0.22	0.38	0.009	0.015
K1	0.22	0.33	0.009	0.013
L	7.65	7.90	0.301	0.311
M	0°	8°	0°	8°

OUTLINE DIMENSIONS

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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