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

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

The Divide Ratio Control input, SW, permits selection of divide ratio as desired. A HIGH on SW selects  $\div 64/65$ ; an OPEN on SW selects  $\div 128/129$ . 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 50  $\mu$ A typical at 2.7 V when the stand-by pin, SB, is switched LOW, disabling the prescaler. On-chip output termination provides 500  $\mu$ A (typical) output current, which is sufficient to drive a CMOS synthesizer input high impedance load (8.0 pF typical).

- 1.1 GHz Toggle Frequency
- Supply Voltage of 2.7 to 5.5 V
- Low Power 1.5 mA Typical at  $V_{CC} = 2.7$  V
- Operating Temperature Range of  $-40$  to  $85^{\circ}\text{C}$
- 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

MOSAIC V is a trademark of Motorola

## FUNCTIONAL TABLE

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

NOTES: 1. SW: H =  $V_{CC} - 0.5$  to  $V_{CC}$ , 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 & SB: 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 $85$	$^{\circ}\text{C}$
Storage Temperature Range	$T_{stg}$	$-65$ to $150$	$^{\circ}\text{C}$
Modulus Control Input, Pin 6	MC	$-0.5$ to $V_{CC}$	Vdc
Maximum Output Current, Pin 4	$I_O$	4.0	mA

NOTE: ESD data available upon request.

# MC12053A

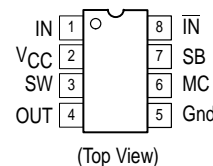
## MECL PLL COMPONENTS $\div 64/65$ , $\div 128/129$ LOW POWER DUAL MODULUS PRESCALER WITH STAND-BY MODE

### SEMICONDUCTOR TECHNICAL DATA



D SUFFIX  
 PLASTIC PACKAGE  
 CASE 751  
 (SO-8)

## PIN CONNECTIONS



## ORDERING INFORMATION

Device	Operating Temp Range	Package
MC12053AD	$T_A = -40$ to $85^{\circ}\text{C}$	SO-8

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### ELECTRICAL CHARACTERISTICS ( $V_{CC} = 2.7$ to $5.5$ V; $T_A = -40$ to $85^\circ\text{C}$ , unless otherwise notex.)

Characteristic	Symbol	Min	Typ	Max	Unit
Toggle Frequency (Sine Wave Input)	$f_t$	0.1	1.4	1.1	GHz
Supply Current Output (Pin 2)	$I_{CC}$	–	1.60 1.75	2.5 2.5	mA
Stand-By Current	$I_{SB}$	–	50 100	250 250	$\mu\text{A}$
Modulus Control & Stand-By Input HIGH (MC & SB)	$V_{IH1}$	2.0	–	$V_{CC} + 0.5$	V
Modulus Control & Stand-By Input LOW (MC & SB)	$V_{IL1}$	Gnd	–	0.8	V
Divide Ratio Control Input HIGH (SW)	$V_{IH2}$	$V_{CC} - 0.5$	$V_{CC}$	$V_{CC} + 0.5$	V
Divide Ratio Control Input LOW (SW)	$V_{IL2}$	Open	Open	Open	
Output Voltage Swing (Note 1)	$V_{out}$	0.8	1.1	–	$V_{pp}$
Modulus Setup Time MC to OUT at 1100 MHz	$t_{set}$	–	11	16	ns
Input Voltage Sensitivity	$V_{in}$	100 400	– –	1000 1000	mVpp

NOTE: Assumes 8.0 pF high impedance load.

Figure 1. Logic Diagram (MC12053A)

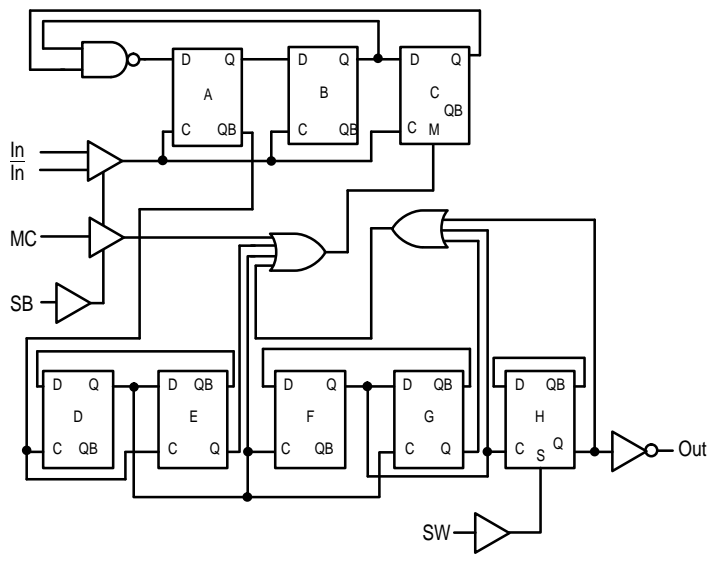


Figure 2. Modulus Setup Time

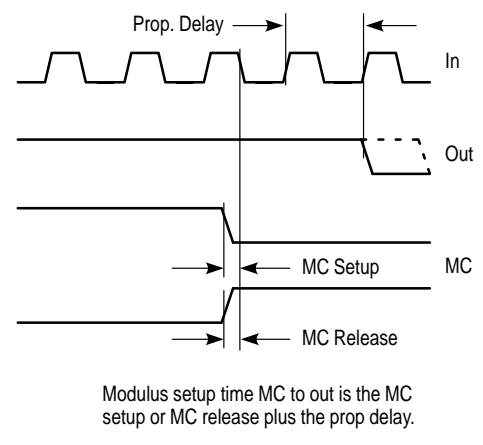
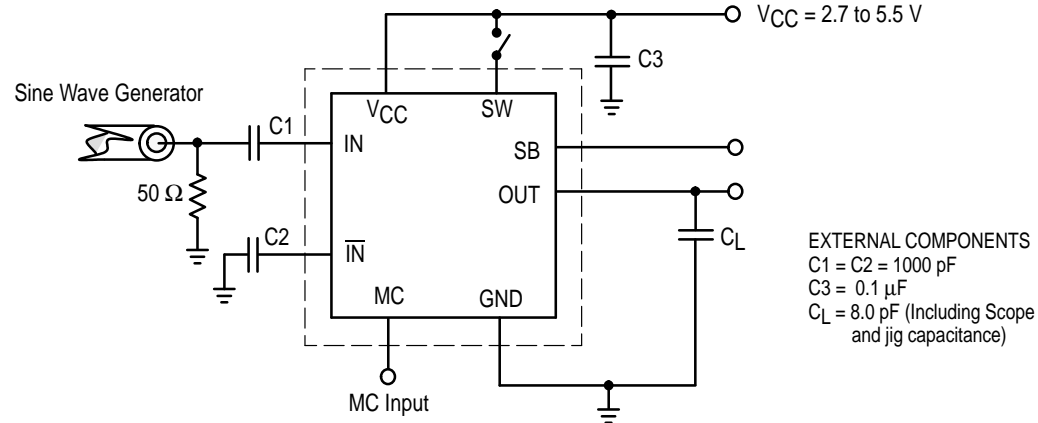


Figure 3. AC Test Circuit



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Figure 4. Input Signal Amplitude versus Input Frequency

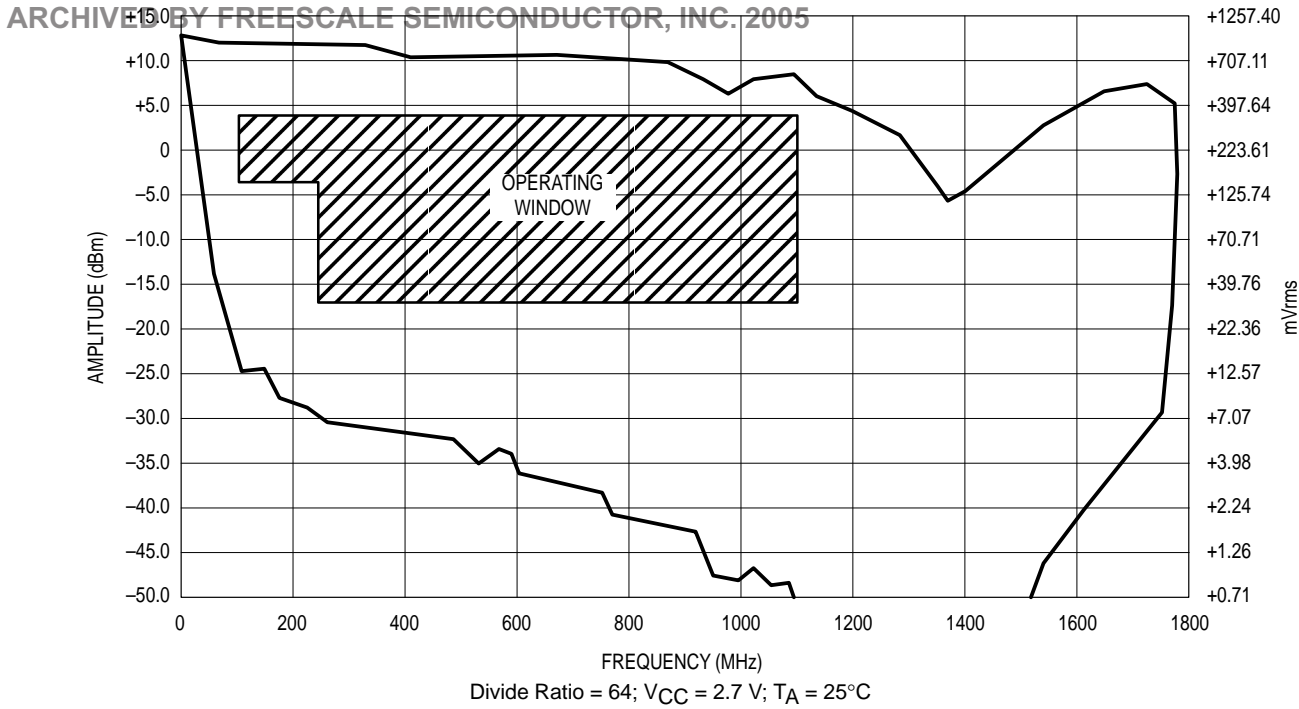
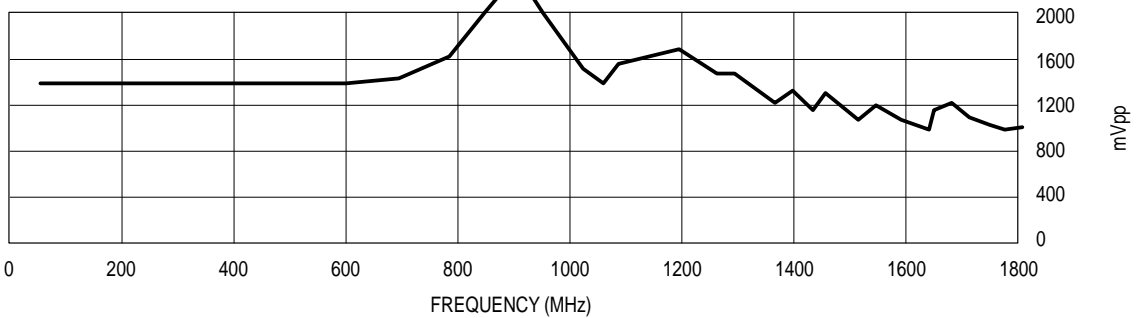


Figure 5. Output Amplitude versus Input Frequency



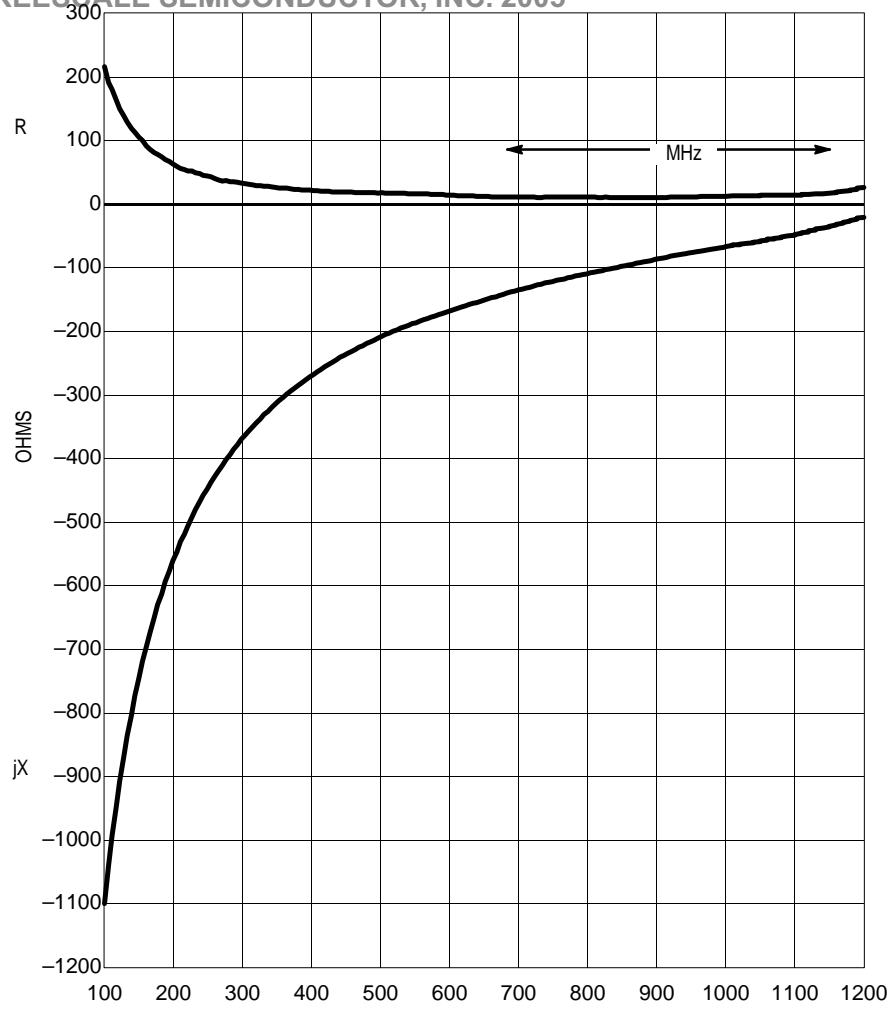
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Figure 6. Typical Input Impedance versus Input Frequency

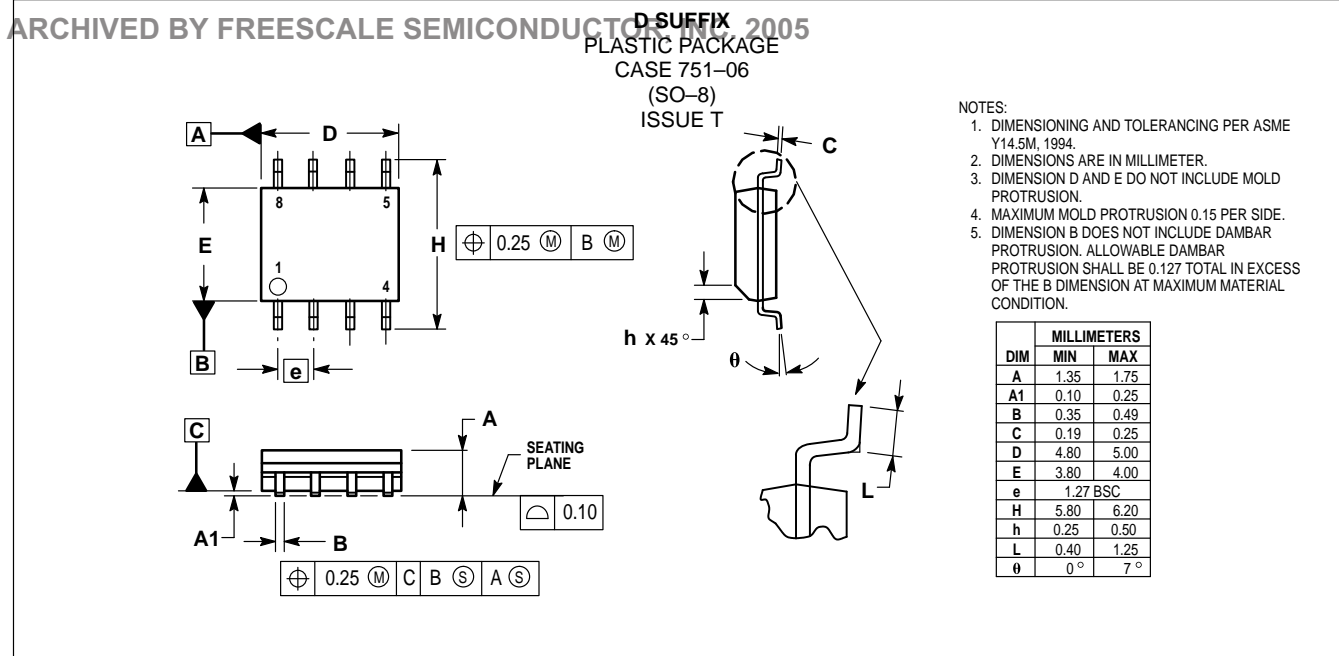
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