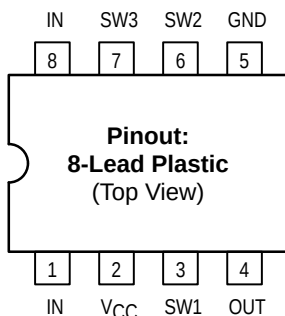


# 1.1GHz Prescaler

The MC12080 is a single modulus divide by 10, 20, 40, 80 prescaler for low power frequency division of a 1.1GHz high frequency input signal. Divide ratio control inputs SW1, SW2 and SW3 select the required divide ratio of  $\div 10$ ,  $\div 20$ ,  $\div 40$ , or  $\div 80$ .

An external load resistor is required to terminate the output. A 820 $\Omega$  resistor is recommended to achieve a 1.2V<sub>pp</sub> output swing, when dividing a 1.1GHz input signal by the minimum divide by ratio of 10, assuming a 8pF load. Output current can be minimized dependent on conditions such as output frequency, capacitive load being driven, and output voltage swing required. Typical values for load resistors are included in the V<sub>out</sub> specification for various divide ratios at 1.1GHz input frequency.

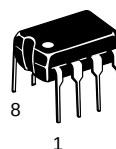
- 1.1GHz Toggle Frequency
- Supply Voltage 4.5V to 5.5V
- Low Power 3.7mA Typical at V<sub>CC</sub> = 5.0V
- Operating Temperature Range of -40°C to +85°C



## MC12080

### MECL PLL COMPONENTS

$\div 10/20/40/80$   
**PRESCALER**



**P SUFFIX**  
PLASTIC PACKAGE  
CASE 626-05

**D SUFFIX**  
PLASTIC SOIC PACKAGE  
CASE 751-05



### MAXIMUM RATINGS

| Symbol           | Parameter                     | Value        | Unit |
|------------------|-------------------------------|--------------|------|
| V <sub>CC</sub>  | Power Supply Voltage, Pin 2   | -0.5 to +7.0 | VDC  |
| T <sub>A</sub>   | Operating Temperature Range   | -40 to +85   | °C   |
| T <sub>stg</sub> | Storage Temperature Range     | -65 to +150  | °C   |
| I <sub>O</sub>   | Maximum Output Current, Pin 4 | 10           | mA   |

### ELECTRICAL CHARACTERISTICS (V<sub>CC</sub> = 4.5 to 5.5V; T<sub>A</sub> = -40 to +85°C)

| Symbol           | Parameter                                                                                                                                                                                                                                                                                                                             | Min                       | Typ             | Max                    | Unit             |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-----------------|------------------------|------------------|
| f <sub>t</sub>   | Toggle Frequency (Sine Wave)                                                                                                                                                                                                                                                                                                          | 0.1                       | 1.4             | 1.1                    | GHz              |
| I <sub>CC</sub>  | Supply Current Output (Pin 2)                                                                                                                                                                                                                                                                                                         | —                         | 3.7             | 5.0                    | mA               |
| V <sub>in</sub>  | Input Voltage Sensitivity                                                                                                                                                                                                                                                                                                             | 100–250MHz<br>250–1100MHz | 400<br>100      | —<br>1000<br>1000      | mV <sub>pp</sub> |
| V <sub>IH</sub>  | Divide Ratio Control Input High (SW1, SW2, SW3)                                                                                                                                                                                                                                                                                       | V <sub>CC</sub> - 0.5V    | V <sub>CC</sub> | V <sub>CC</sub> + 0.5V | V                |
| V <sub>IL</sub>  | Divide Ratio Control Input Low (SW1, SW2, SW3)                                                                                                                                                                                                                                                                                        | Open                      | Open            | Open                   | —                |
| V <sub>out</sub> | Output Voltage Swing <sup>1</sup><br>R <sub>L</sub> = 820 $\Omega$ , I <sub>O</sub> = 4.0mA for $\div 10$<br>R <sub>L</sub> = 1.6k $\Omega$ , I <sub>O</sub> = 2.1mA for $\div 20$<br>R <sub>L</sub> = 3.3k $\Omega$ , I <sub>O</sub> = 1.1mA for $\div 40$<br>R <sub>L</sub> = 6.2k $\Omega$ , I <sub>O</sub> = 0.57mA for $\div 80$ | 0.8                       | 1.2             | —                      | V <sub>pp</sub>  |

1. Assumes 8pF load and 1.1GHz input frequency (typical), I<sub>O</sub> at V<sub>CC</sub> = 5.0V and T<sub>A</sub> = 25°C



FUNCTION TABLE

| SW1 | SW2 | SW3 | Divide Ratio |
|-----|-----|-----|--------------|
| L   | L   | L   | 80           |
| L   | L   | H   | 40           |
| L   | H   | L   | 40           |
| L   | H   | H   | 20           |
| H   | L   | L   | 40           |
| H   | L   | H   | 20           |
| H   | H   | L   | 20           |
| H   | H   | H   | 10           |

NOTE: For SW1, SW2 and SW3: H =  $V_{CC}$ ; L = Open

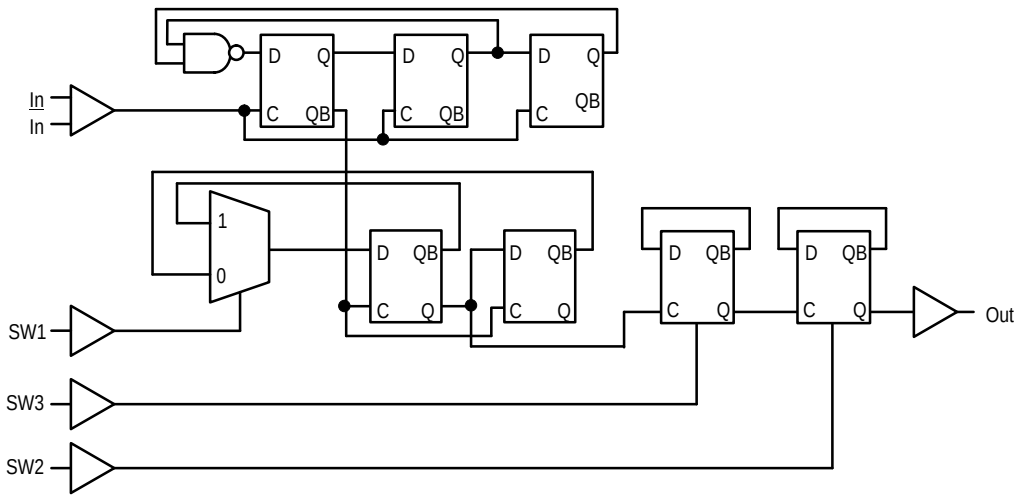


Figure 1. Logic Diagram (MC12080)

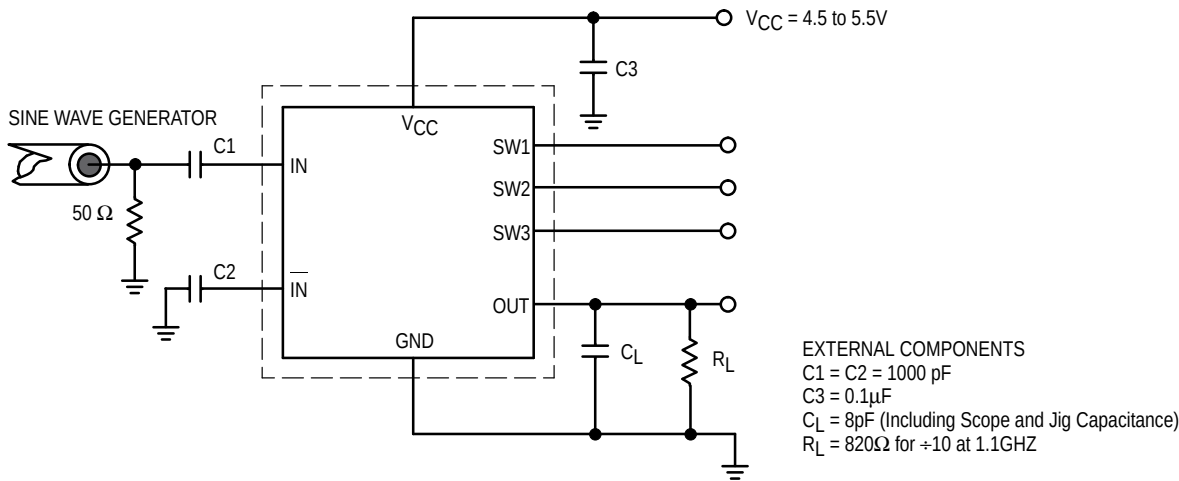
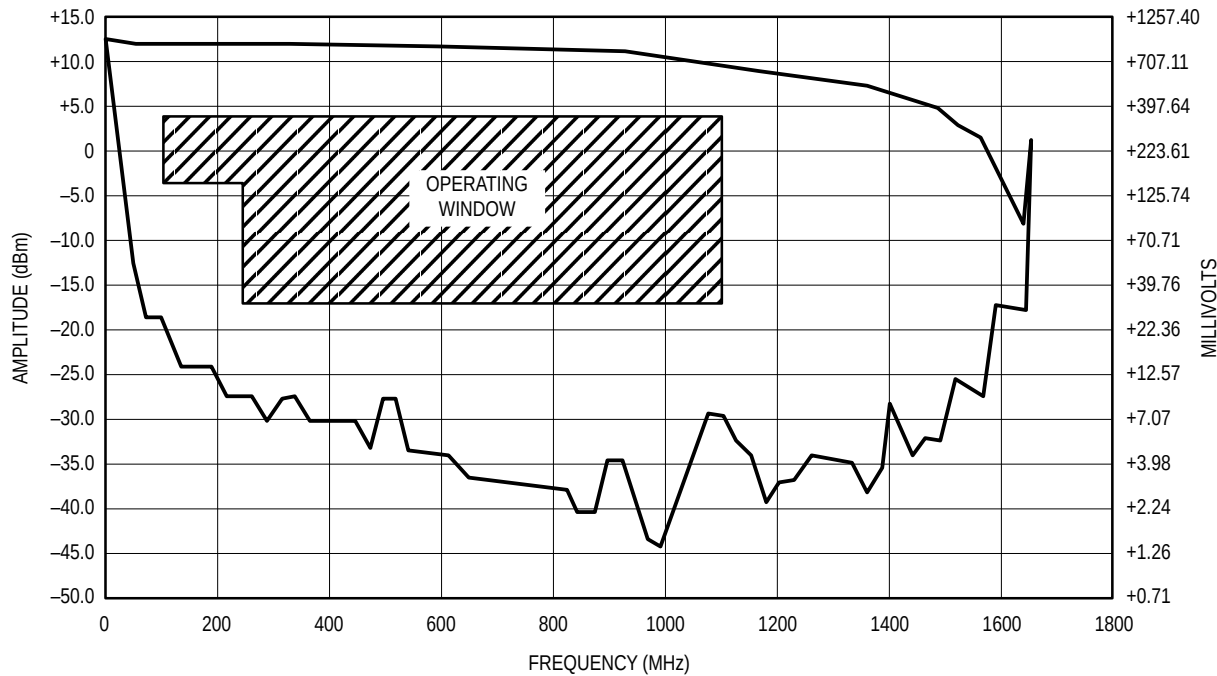
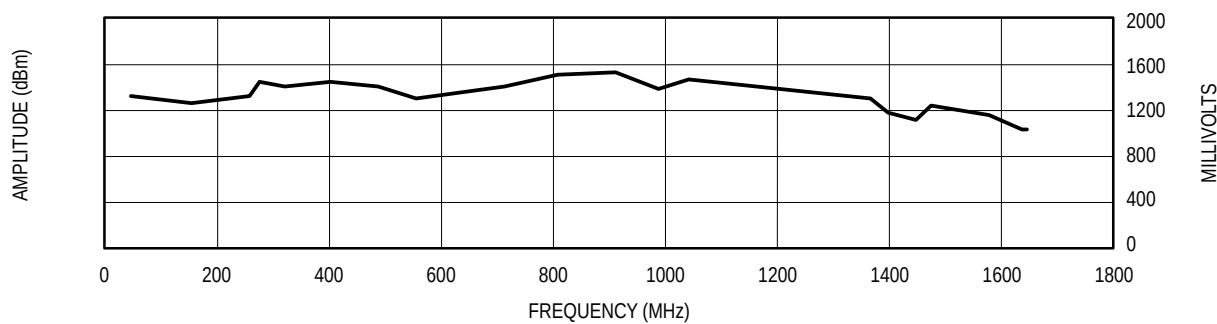


Figure 2. AC Test Circuit

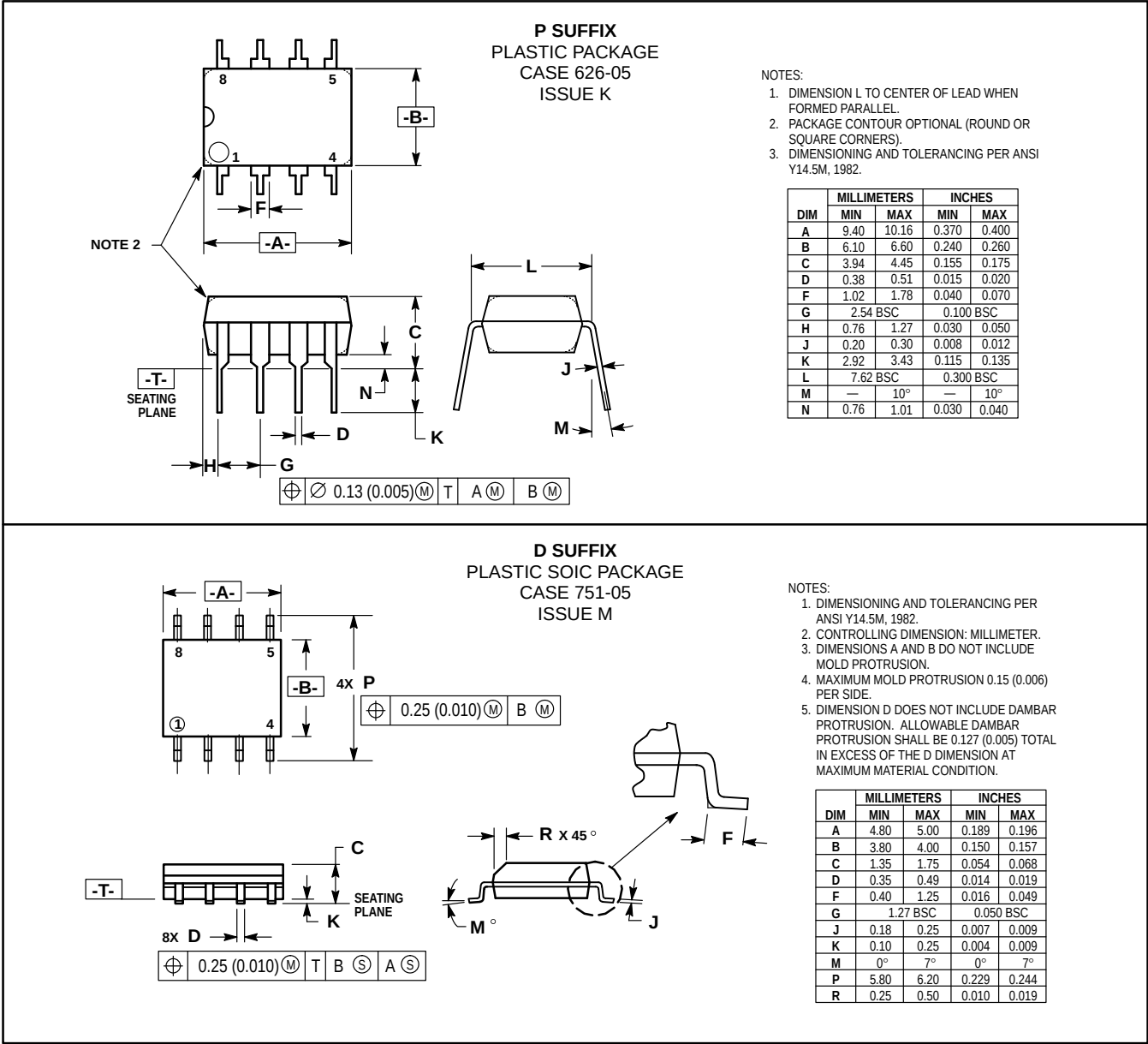


**Figure 3. Input Signal Amplitude versus Input Frequency**  
Divide Ratio = 10;  $V_{CC} = 5.0V$ ;  $T_A = 25^{\circ}C$



**Figure 4. Output Amplitude versus Input Frequency**

OUTLINE DIMENSIONS



Motorola reserves the right to make changes without further notice to any products herein. Motorola makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Motorola assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. "Typical" parameters can and do vary in different applications. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. Motorola does not convey any license under its patent rights nor the rights of others. Motorola products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the Motorola product could create a situation where personal injury or death may occur. Should Buyer purchase or use Motorola products for any such unintended or unauthorized application, Buyer shall indemnify and hold Motorola and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that Motorola was negligent regarding the design or manufacture of the part. Motorola and  are registered trademarks of Motorola, Inc. Motorola, Inc. is an Equal Opportunity/Affirmative Action Employer.

**Literature Distribution Centers:**  
USA: Motorola Literature Distribution; P.O. Box 20912; Phoenix, Arizona 85036.  
EUROPE: Motorola Ltd.; European Literature Centre; 88 Tanners Drive, Blakelands, Milton Keynes, MK14 5BP, England.  
JAPAN: Nippon Motorola Ltd.; 4-32-1, Nishi-Gotanda, Shinagawa-ku, Tokyo 141 Japan.  
ASIA-PACIFIC: Motorola Semiconductors H.K. Ltd.; Silicon Harbour Center, No. 2 Dai King Street, Tai Po Industrial Estate, Tai Po, N.T., Hong Kong.

