1.1GHz Prescaler

MC12080

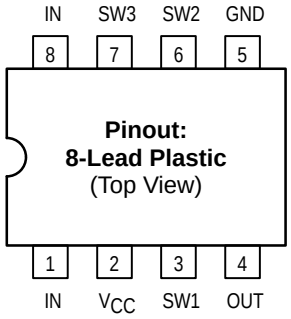
MECL PLL COMPONENTS

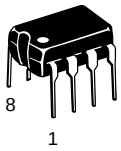
÷10/20/40/80 PRESCALER

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 ÷10, ÷20, ÷40, or ÷80.

An external load resistor is required to terminate the output. A 820Ω resistor is recommended to achieve a $1.2V_{pp}$ 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_{out} 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_{CC} = 5.0V
- Operating Temperature Range of –40°C to +85°C





P SUFFIX
PLASTIC PACKAGE
CASE 626-05

D SUFFIX
PLASTIC SOIC PACKAGE
CASE 751-05

MAXIMUM RATINGS

Symbol	Parameter	Value	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
I_O	Maximum Output Current, Pin 4	10	mA

ELECTRICAL CHARACTERISTICS (V_{CC} = 4.5 to 5.5V; T_A = –40 to +85°C)

Symbol	Parameter	Min	Typ	Max	Unit
ft	Toggle Frequency (Sine Wave)	0.1	1.4	1.1	GHz
I_{CC}	Supply Current Output (Pin 2)	—	3.7	5.0	mA
V_{in}	Input Voltage Sensitivity 100–250MHz 250–1100MHz	400 100	— —	1000 1000	mV_{PP}
V_{IH}	Divide Ratio Control Input High (SW1, SW2, SW3)	V_{CC} – 0.5V	V_{CC}	V_{CC} + 0.5V	V
V_{IL}	Divide Ratio Control Input Low (SW1, SW2, SW3)	Open	Open	Open	—
V_{out}	Output Voltage Swing[1] R_L = 820Ω, I_O = 4.0mA for ÷10 R_L = 1.6kΩ, I_O = 2.1mA for ÷20 R_L = 3.3kΩ, I_O = 1.1mA for ÷40 R_L = 6.2kΩ, I_O = 0.57mA for ÷80	0.8	1.2	—	V_{PP}

1 Assumes 8pF load and 1.1GHz input frequency (typical), I_O at V_{CC} = 5.0V and T_A = 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

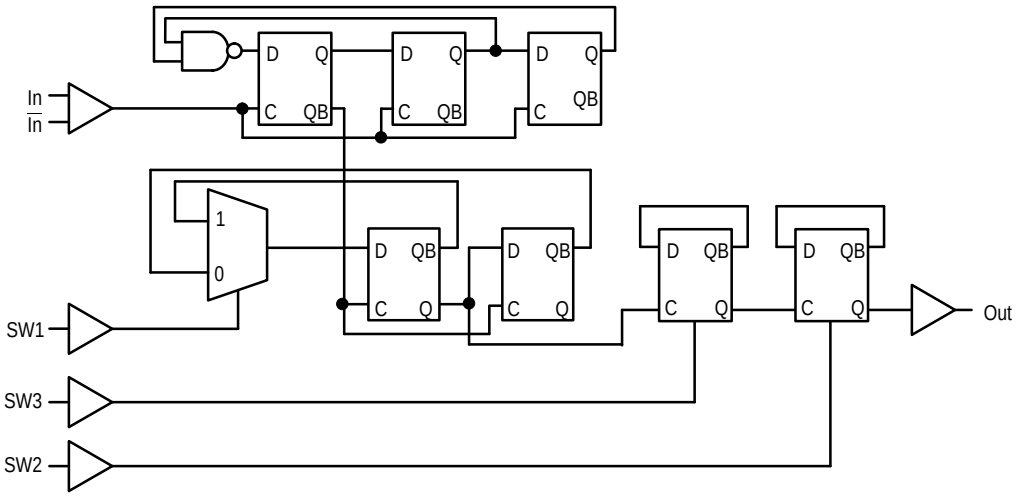


Figure 1. Logic Diagram (MC12080)

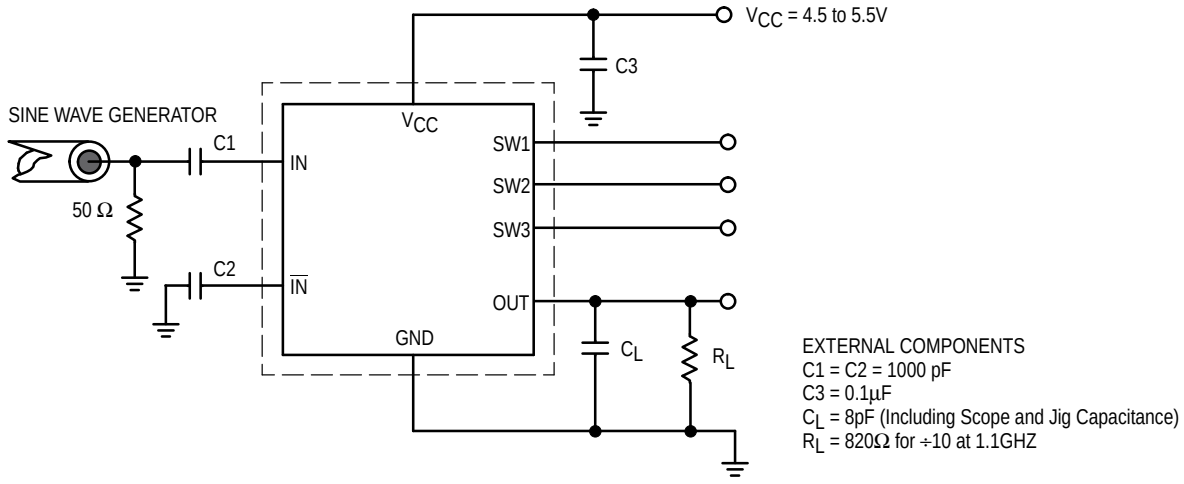


Figure 2. AC Test Circuit

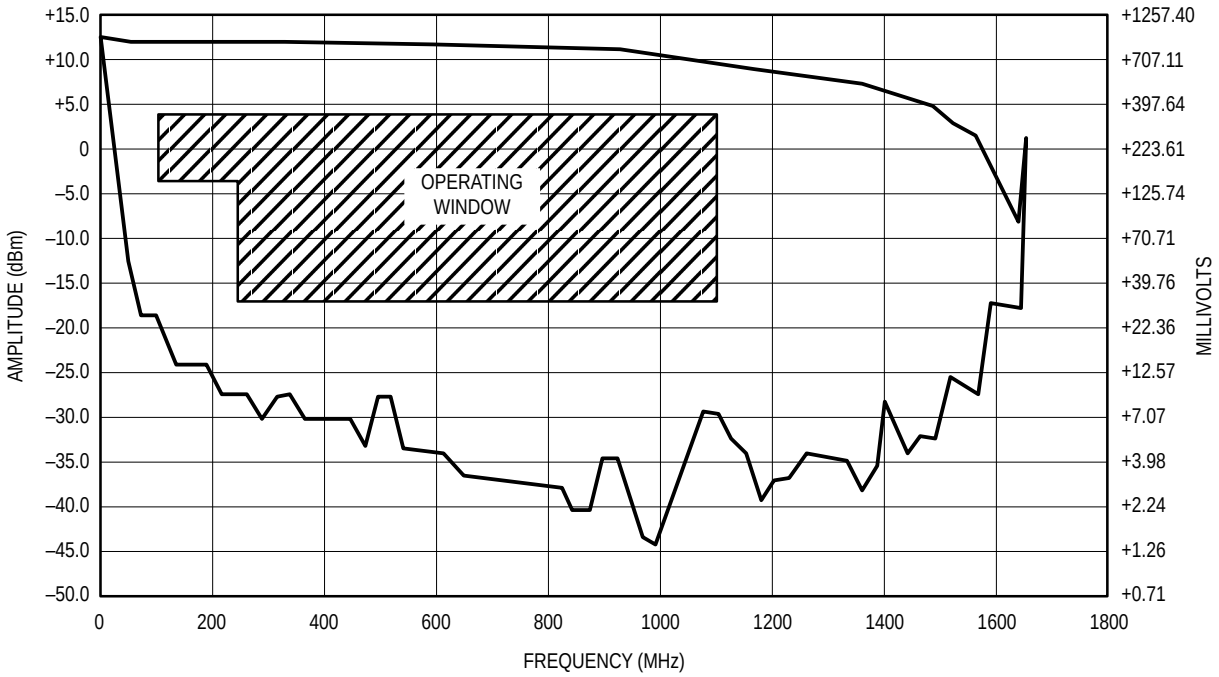


Figure 3. Input Signal Amplitude versus Input Frequency
Divide Ratio = 10; V_{CC} = 5.0V; T_A = 25°C

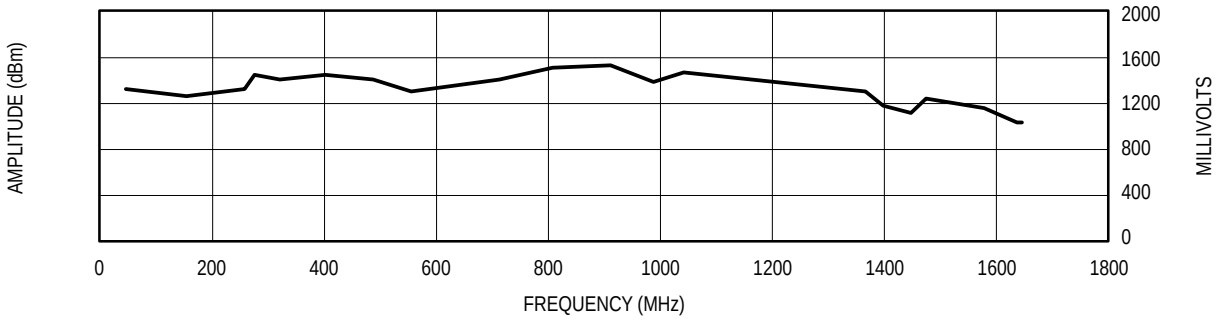
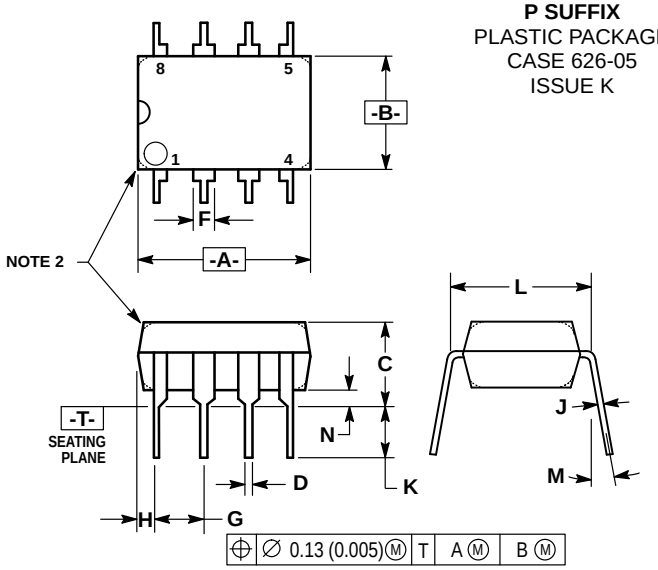


Figure 4. Output Amplitude versus Input Frequency

OUTLINE DIMENSIONS

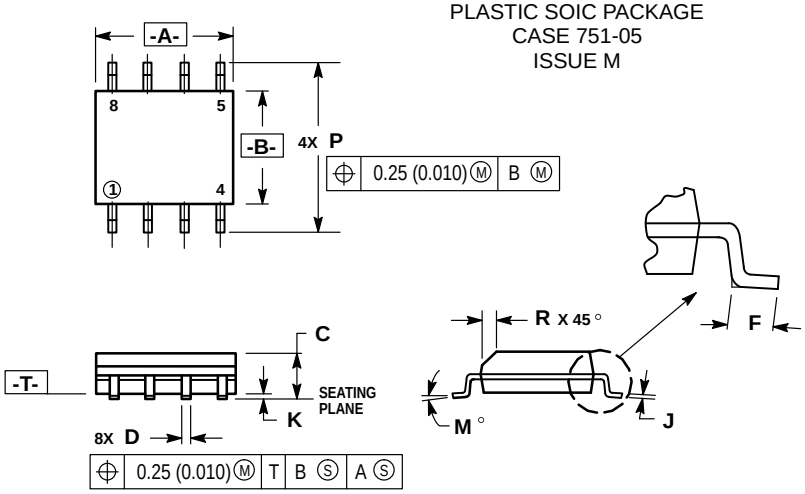
P SUFFIX
PLASTIC PACKAGE
CASE 626-05
ISSUE K



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

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.