

MC12080

1.1 GHz Prescaler

The MC12080 is a single modulus divide by 10, 20, 40, 80 prescaler for low power frequency division of a 1.1 GHz 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. An 820 Ω resistor is recommended to achieve a 1.2 V_{pp} output swing, when dividing a 1.1 GHz input signal by the minimum divide by ratio of 10, assuming a 8.0 pF 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 1.1 GHz input frequency.

Features

- 1.1 GHz Toggle Frequency
- Supply Voltage 4.5 to 5.5 V
- Low Power 3.7 mA Typical at V_{CC} = 5.0 V
- Operating Temperature Range of -40 to 85°C

FUNCTIONAL 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: SW1, SW2 and SW3: H = V_{CC}, L = Open.

MAXIMUM RATINGS

| Rating | Symbol | Value | 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 |
| Maximum Output Current, Pin 4 | I _O | 10 | mA |

NOTE: ESD data available upon request.



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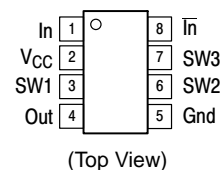
<http://onsemi.com>

MARKING DIAGRAM



A = Assembly Location
L = Wafer Lot
Y = Year
W = Work Week

PIN CONNECTIONS



ORDERING INFORMATION

| Device | Package | Shipping |
|------------|---------|------------------|
| MC12080D | SO-8 | 98 Units/Rail |
| MC12080DR2 | SO-8 | 2500 Tape & Reel |

MC12080

ELECTRICAL CHARACTERISTICS ($V_{CC} = 4.5$ to 5.5 V; $T_A = -40$ to 85°C , unless otherwise noted.)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|--|-----------|------------------|----------|------------------|----------|
| Toggle Frequency (Sine Wave) | ft | 0.1 | 1.4 | 1.1 | GHz |
| Supply Current Output (Pin 2) | I_{CC} | – | 3.7 | 5.0 | mA |
| Input Voltage Sensitivity 100 to 250 MHz 250 to 1100 MHz | V_{in} | 400 100 | – – | 1000 1000 | mVpp |
| Divide Ratio Control Input High (SW1, SW2, SW3) | V_{IH} | $V_{CC} - 0.5$ V | V_{CC} | $V_{CC} + 0.5$ V | V |
| Divide Ratio Control Input Low (SW1, SW2, SW3) | V_{IL} | Open | Open | Open | – |
| Output Voltage Swing (Note 1) $R_L = 820 \Omega$, $I_O = 4.0$ mA for ± 10 $R_L = 1.6$ k Ω , $I_O = 2.1$ mA for ± 20 $R_L = 3.3$ k Ω , $I_O = 1.1$ mA for ± 40 $R_L = 6.2$ k Ω , $I_O = 0.57$ mA for ± 80 | V_{out} | 0.8 | 1.2 | – | V_{pp} |

1. Assumes 8.0 pF load and 1.1 GHz input frequency (typical), I_O at $V_{CC} = 5.0$ V and $T_A = 25^\circ\text{C}$.

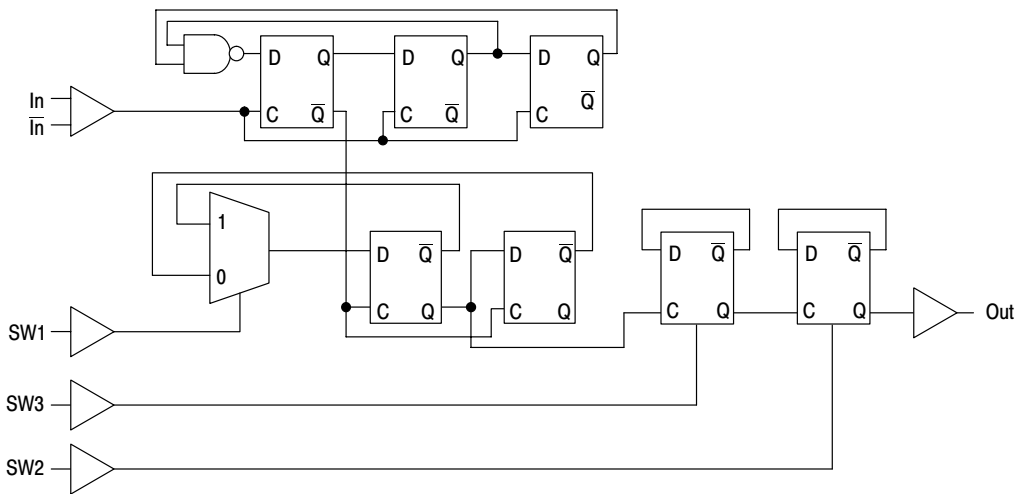


Figure 1. Logic Diagram

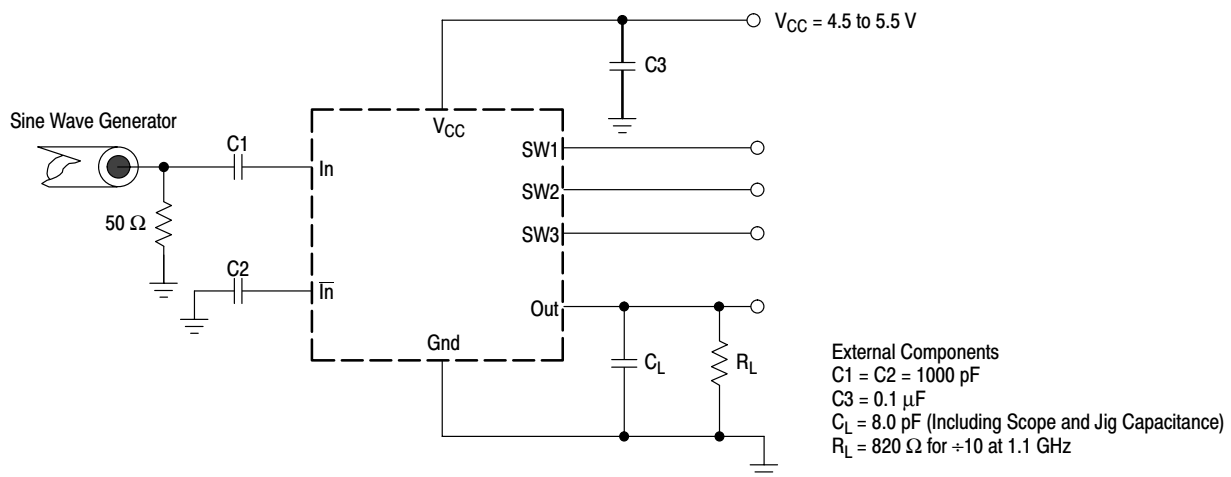


Figure 2. AC Test Circuit

MC12080

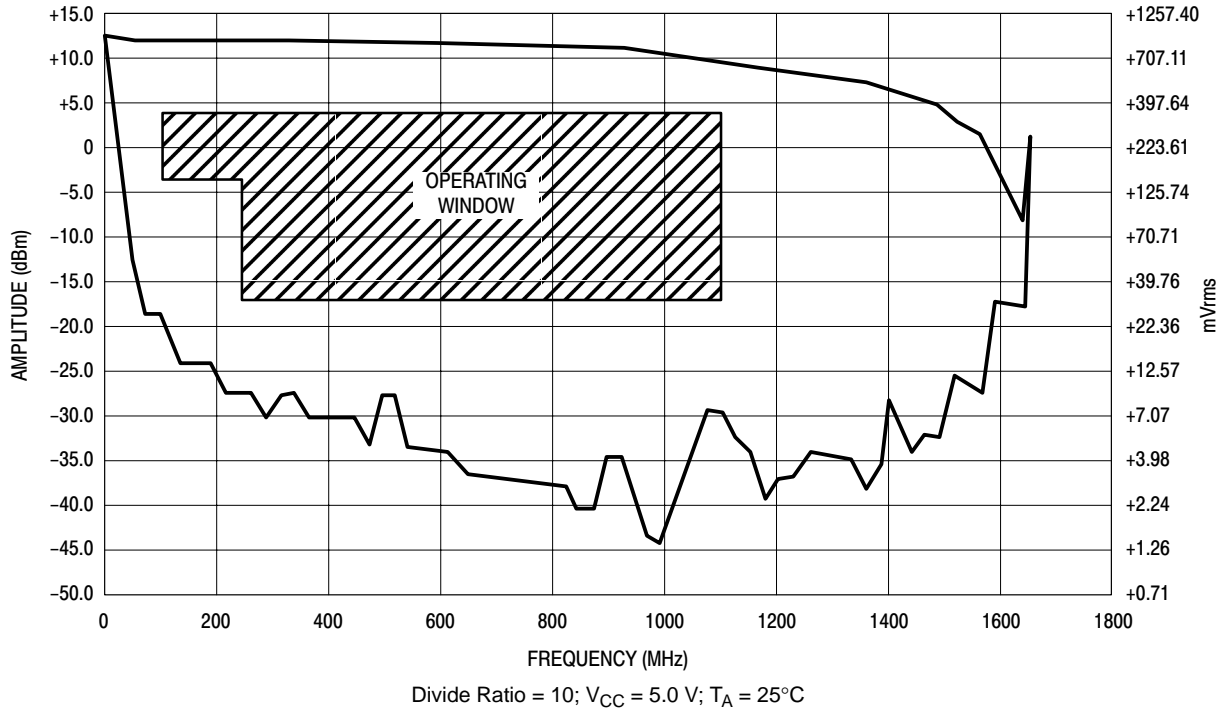


Figure 3. Input Signal Amplitude versus Input Frequency

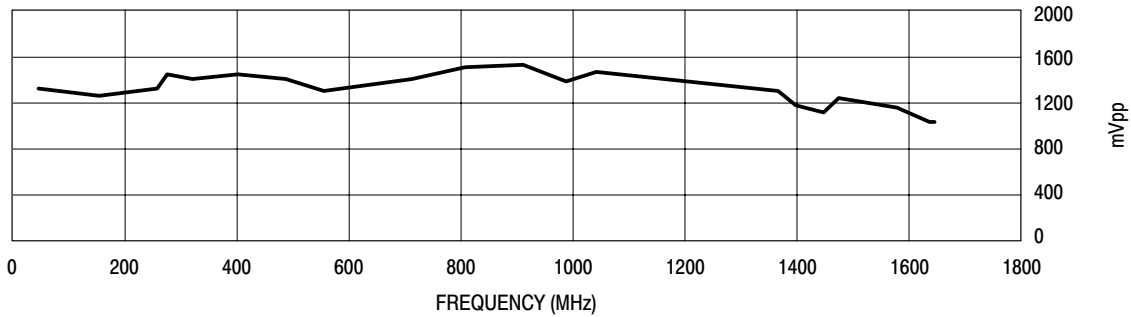
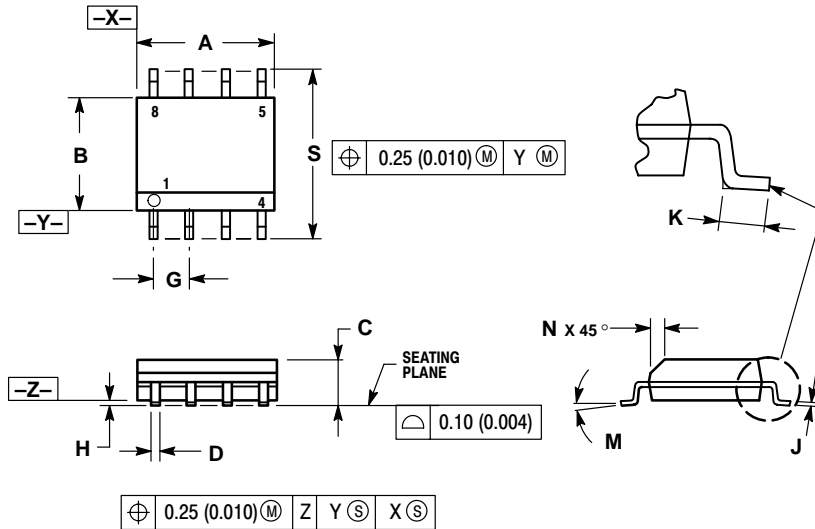


Figure 4. Output Amplitude versus Input Frequency

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PACKAGE DIMENSIONS


SO-8
D SUFFIX
CASE 751-07
ISSUE W



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION 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.

| DIM | MILLIMETERS | | INCHES | |
|-----|-------------|------|-----------|-------|
| | MIN | MAX | MIN | MAX |
| A | 4.80 | 5.00 | 0.189 | 0.197 |
| B | 3.80 | 4.00 | 0.150 | 0.157 |
| C | 1.35 | 1.75 | 0.053 | 0.069 |
| D | 0.33 | 0.51 | 0.013 | 0.020 |
| G | 1.27 BSC | | 0.050 BSC | |
| H | 0.10 | 0.25 | 0.004 | 0.010 |
| J | 0.19 | 0.25 | 0.007 | 0.010 |
| K | 0.40 | 1.27 | 0.016 | 0.050 |
| M | 0° | 8° | 0° | 8° |
| N | 0.25 | 0.50 | 0.010 | 0.020 |
| S | 5.80 | 6.20 | 0.228 | 0.244 |

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