

MC12080

1.1 GHz Prescaler

Description

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 $\div 10$, $\div 20$, $\div 40$, or $\div 80$.

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
- Pb-Free Packages are Available

Table 1. 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.

Table 2. MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|-------------------------------|------------------|-------------|-----------------|
| Power Supply Voltage, Pin 2 | V _{CC} | -0.5 to 7.0 | V _{dc} |
| 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 |

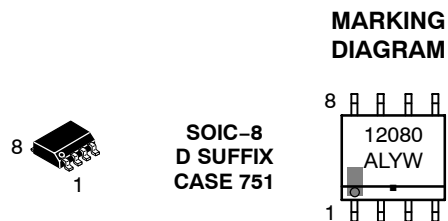
Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

NOTE: ESD data available upon request.



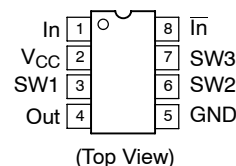
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- A = Assembly Location
- L = Wafer Lot
- Y = Year
- W = Work Week
- = Pb-Free Package

PIN CONNECTIONS



ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 3 of this data sheet.

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Table 3. 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 $T_A = 25^\circ\text{C}$.

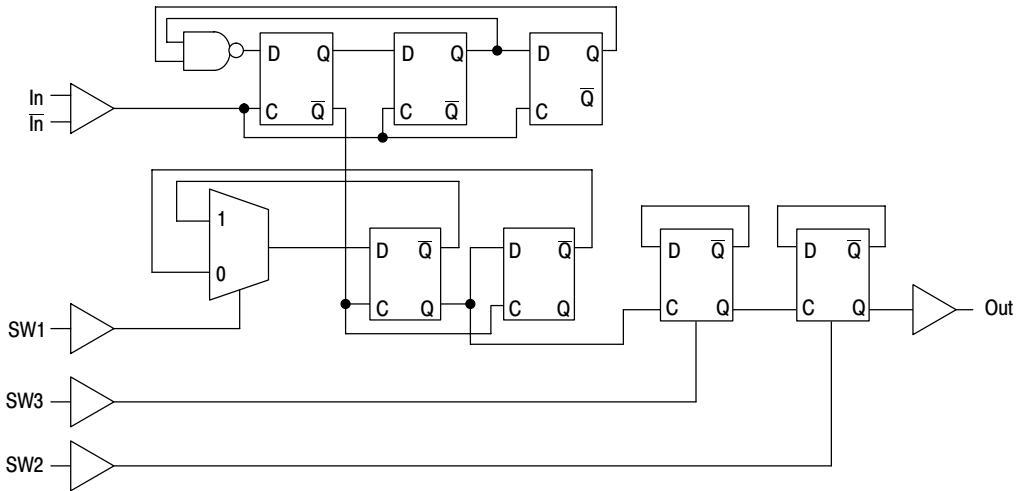


Figure 1. Logic Diagram

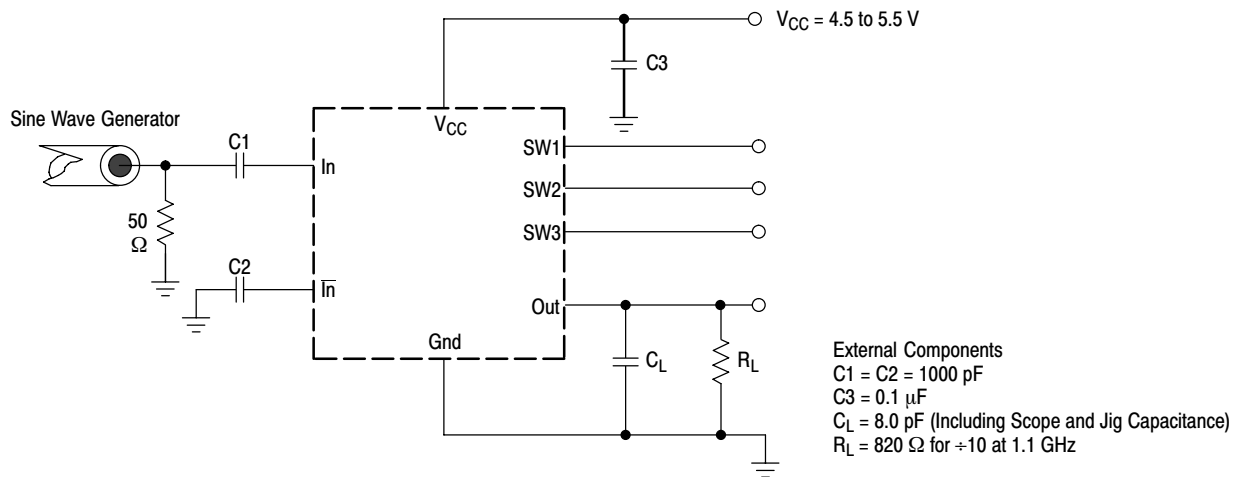
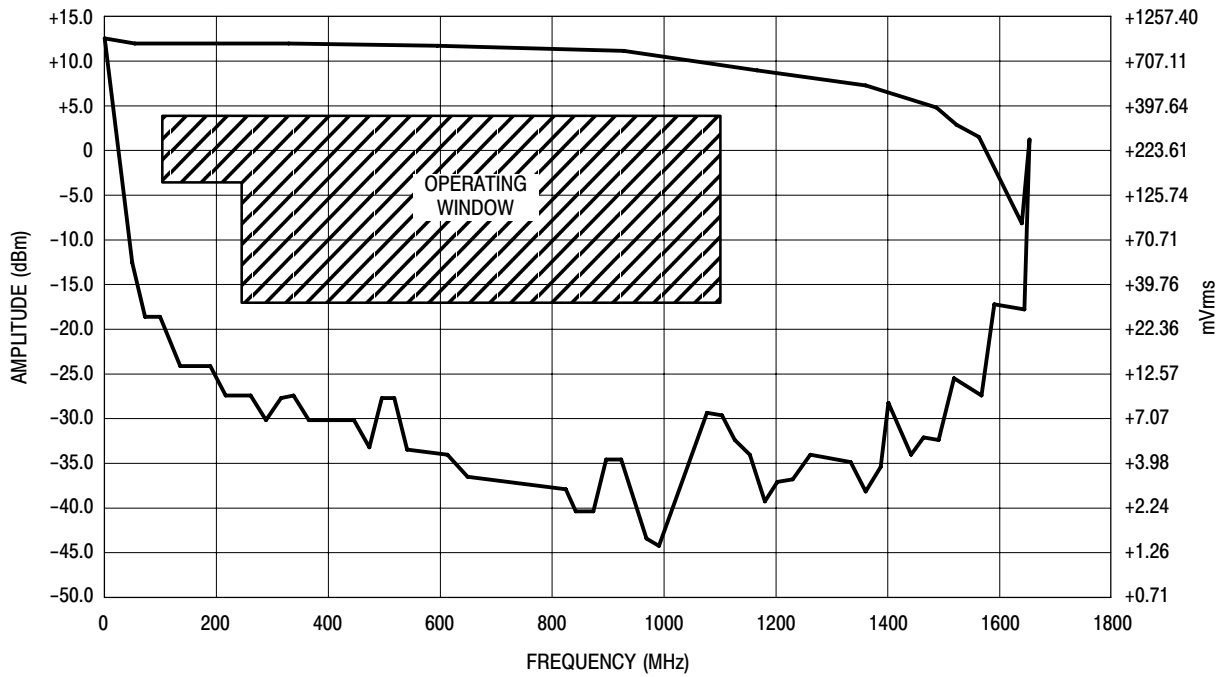


Figure 2. AC Test Circuit

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Divide Ratio = 10; $V_{CC} = 5.0 \text{ V}$; $T_A = 25^\circ\text{C}$

Figure 3. Input Signal Amplitude versus Input Frequency

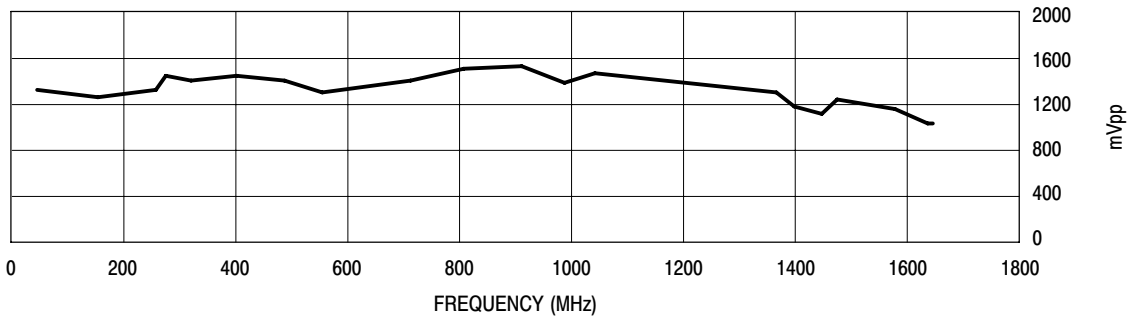


Figure 4. Output Amplitude versus Input Frequency

ORDERING INFORMATION

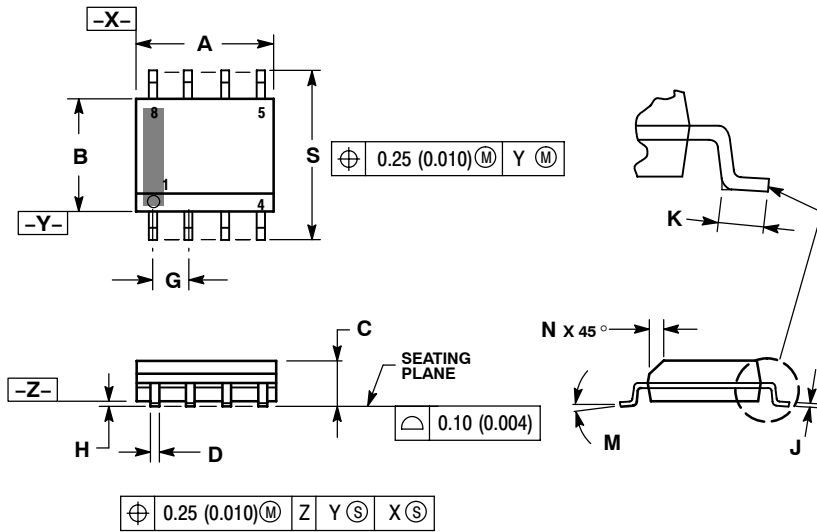
| Device | Package | Shipping [†] |
|-------------|---------------------|-----------------------|
| MC12080D | SOIC-8 | 98 Units / Rail |
| MC12080DG | SOIC-8 (Pb-Free) | 98 Units / Rail |
| MC12080DR2 | SOIC-8 | 2500 / Tape & Reel |
| MC12080DR2G | SOIC-8 (Pb-Free) | 2500 / Tape & Reel |

[†]For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

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PACKAGE DIMENSIONS

SOIC-8 NB CASE 751-07 ISSUE AG

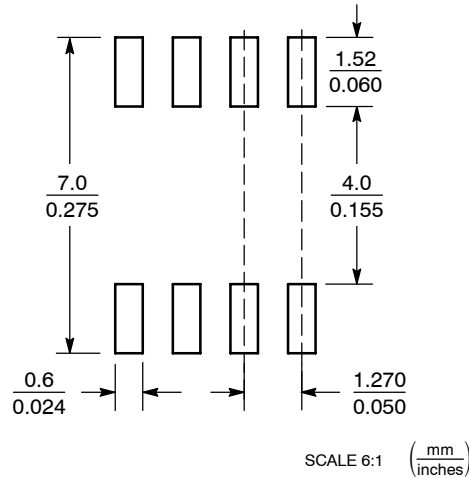


NOTES:

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.
6. 751-01 THRU 751-06 ARE OBSOLETE. NEW STANDARD IS 751-07.

| 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 |

SOLDERING FOOTPRINT*



*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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