



# ÷2, ÷4, ÷8 1.1GHz Low Power Prescaler with Stand-By Mode

The MC12093 is a single modulus prescaler for low power frequency division of a 1.1 GHz high frequency input signal. Motorola's advanced MOSAIC™ V technology is utilized to achieve low power dissipation of 6.75 mW at a minimum supply voltage of 2.7 V.

On-chip output termination provides output current to drive a 2.0 pF (typical) high impedance load. If additional drive is required for the prescaler output, an external resistor can be added parallel from the OUT pin to GND to increase the output power. Care must be taken not to exceed the maximum allowable current through the output.

Divide ratio control inputs SW1 and SW2 select the required divide ratio of ÷2, ÷4, or ÷8.

Stand-By mode is featured to reduce current drain to 50 µA typical when the standby pin SB is switched LOW disabling the prescaler.

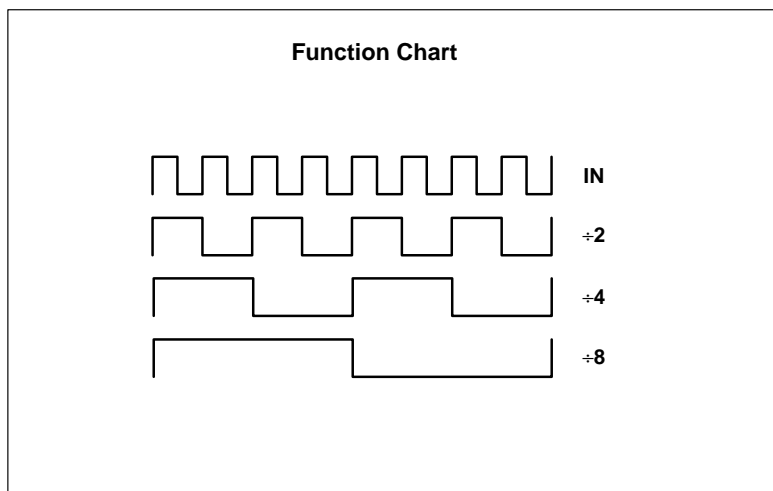
- 1.1 GHz Toggle Frequency
- Supply Voltage 2.7 V to 5.5 Vdc
- Low Power 3.0 mA Typical
- Operating Temperature -40 to 85°C
- Divide by 2, 4 or 8 Selected by SW1 and SW2 Pins
- On-Chip Termination

MOSAIC V is a trademark of Motorola

### FUNCTIONAL TABLE

| SW | SW2 | Divide Ratio |
|----|-----|--------------|
| L  | L   | 8            |
| H  | L   | 4            |
| L  | H   | 4            |
| H  | H   | 2            |

NOTES: 1. SW1 & SW2: H = (V<sub>CC</sub> - 0.5 V) to V<sub>CC</sub>; L = Open.  
 2. SB: H = 2.0 V to V<sub>CC</sub>, L = GND to 0.8 V.



## MC12093

### MECL PLL COMPONENTS ÷2, ÷4, ÷8 LOW POWER PRESCALER WITH STAND-BY MODE

SEMICONDUCTOR  
 TECHNICAL DATA

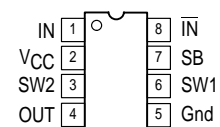


**D SUFFIX**  
 PLASTIC PACKAGE  
 CASE 751  
 (SO-8)



**SD SUFFIX**  
 PLASTIC PACKAGE  
 CASE 940  
 (SSOP-8)

### PIN CONNECTIONS



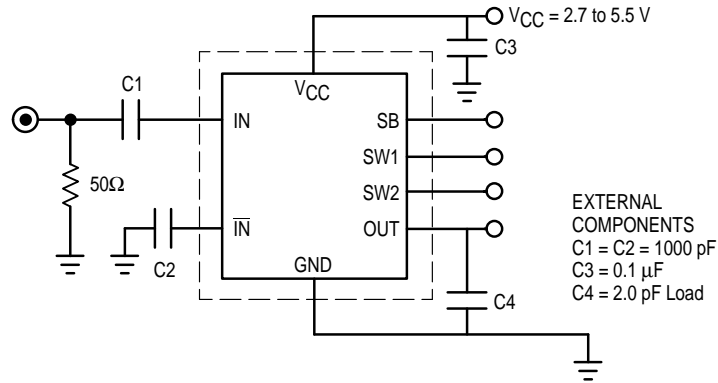
A LOW on the Stand-By Pin 7 disables the device.

### ORDERING INFORMATION

| Device    | Operating Temp Range               | Package |
|-----------|------------------------------------|---------|
| MC12093D  | T <sub>A</sub> =<br>- 40° to +85°C | SO-8    |
| MC12093SD |                                    | SSOP-8  |

# MC12093

Figure 1. AC Test Circuit



## MAXIMUM RATINGS

| Parameter                     | Symbol    | Value       | Unit |
|-------------------------------|-----------|-------------|------|
| Power Supply Voltage, Pin 2   | $V_{CC}$  | -0.5 to 6.0 | Vdc  |
| Operating Temperature Range   | $T_A$     | -40 to 85   | °C   |
| Storage Temperature Range     | $T_{stg}$ | -65 to 150  | °C   |
| Maximum Output Current, Pin 4 | $I_O$     | 4.0         | mA   |

NOTE: ESD data available upon request.

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

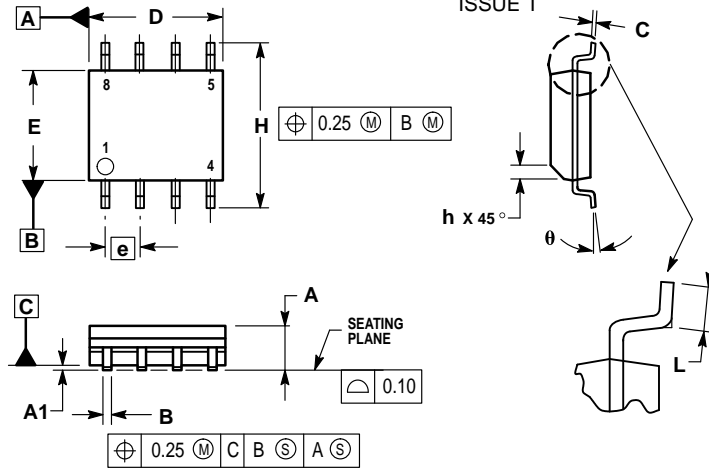
| Parameter                                   | Symbol    | Min            | Typ      | Max            | Unit     |
|---|-----------|----------------|----------|----------------|----------|
| Toggle Frequency (Sine Wave)                | ft        | 0.1            | 1.4      | 1.1            | GHz      |
| Supply Current                              | $I_{CC}$  | -              | 3.0      | 4.5            | mA       |
| Stand-By Current                            | ISB       | -              | 120      | 200            | μA       |
| Stand-By Input HIGH (SB)                    | $V_{IH1}$ | 2.0            | -        | $V_{CC}$       | V        |
| Stand-By Input LOW (SB)                     | $V_{IL1}$ | Gnd            | -        | 0.8            | V        |
| Divide Ratio Control Input HIGH (SW1 & SW2) | $V_{IH2}$ | $V_{CC} - 0.5$ | $V_{CC}$ | $V_{CC} + 0.5$ | V        |
| Divide Ratio Control Input LOW (SW1 & SW2)  | $V_{IL2}$ | OPEN           | OPEN     | OPEN           |          |
| Output Voltage Swing (2.0 pF Load)          | $V_{OUT}$ |                |          |                | $V_{pp}$ |
| Output Frequency 12.5–350 MHz (Note 1)      |           | 0.6            | 0.80     | -              |          |
| Output Frequency 350–400 MHz (Note 2)       |           | 0.5            | 0.70     | -              |          |
| Output Frequency 400–450 MHz (Note 3)       |           | 0.4            | 0.55     | -              |          |
| Output Frequency 450–550 MHz (Note 4)       |           | 0.3            | 0.45     | -              |          |
| Input Voltage Sensitivity                   |           |                |          |                | mVpp     |
| 250–1100 MHz                                | $V_{IN}$  | 100            | -        | 1000           |          |
| 100–250 MHz                                 |           | 400            | -        | 1000           |          |

NOTES: 1. Input frequency 1.1 GHz, +8, minimum output frequency of 12.5 MHz.  
 2. Input frequency 700–800 MHz, +2.  
 3. Input frequency 800–900 MHz, +2.  
 4. Input frequency 900–1100 MHz, +2.

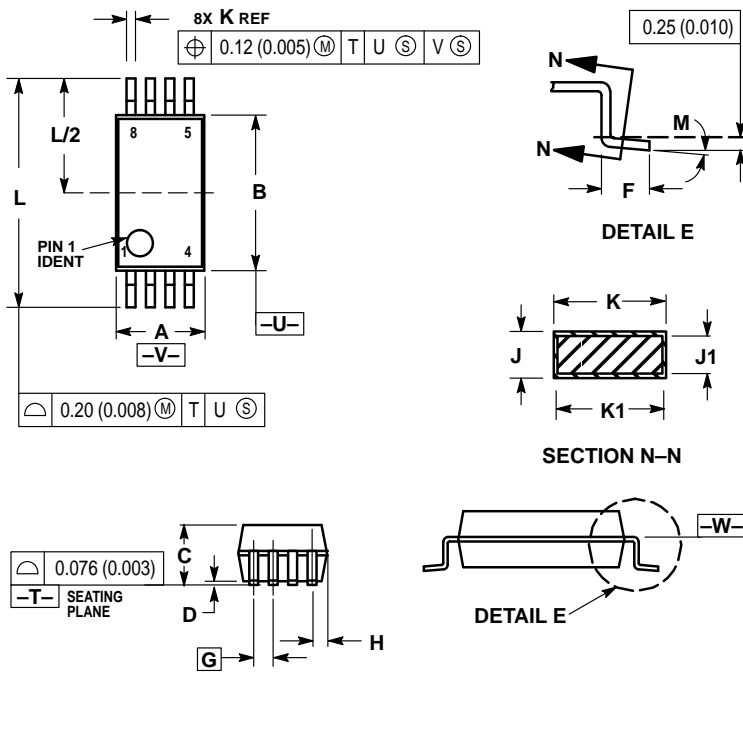
# MC12093

## OUTLINE DIMENSIONS


### D SUFFIX PLASTIC PACKAGE CASE 751-06 (SO-8) ISSUE T



### SD SUFFIX PLASTIC PACKAGE CASE 940-03 (SSOP-8) ISSUE B



## MC12093

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 which may be provided in Motorola data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. 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.

Mfax is a trademark of Motorola, Inc.

#### How to reach us:

**USA/EUROPE/Locations Not Listed:** Motorola Literature Distribution;  
P.O. Box 5405, Denver, Colorado 80217. 1-303-675-2140 or 1-800-441-2447

**JAPAN:** Nippon Motorola Ltd.: SPD, Strategic Planning Office, 141,  
4-32-1 Nishi-Gotanda, Shagawa-ku, Tokyo, Japan. 03-5487-8488

#### Customer Focus Center: 1-800-521-6274

**Mfax™:** RMFAX0@email.sps.mot.com – TOUCHTONE 1-602-244-6609  
Motorola Fax Back System – US & Canada ONLY 1-800-774-1848  
– <http://sps.motorola.com/mfax/>

**ASIA/PACIFIC:** Motorola Semiconductors H.K. Ltd.; 8B Tai Ping Industrial Park,  
51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852-26629298

**HOME PAGE:** <http://motorola.com/sps/>



**MOTOROLA**



MC12093/D