

**MOTOROLA**

## ÷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

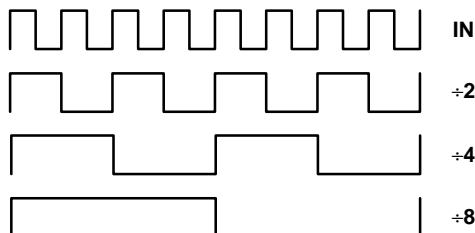
MOSAIC V is a trademark of Motorola

### FUNCTIONAL TABLE

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

NOTES: 1. SW1 & SW2: H = ( $V_{CC} - 0.5$  V) to  $V_{CC}$ ; L = Open.  
2. SB: H = 2.0 V to  $V_{CC}$ ; L = GND to 0.8 V.

### Function Chart



## MC12093

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

#### SEMICONDUCTOR TECHNICAL DATA

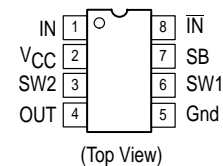


**D SUFFIX**  
PLASTIC PACKAGE  
CASE 751  
(SO–8)



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

### PIN CONNECTIONS



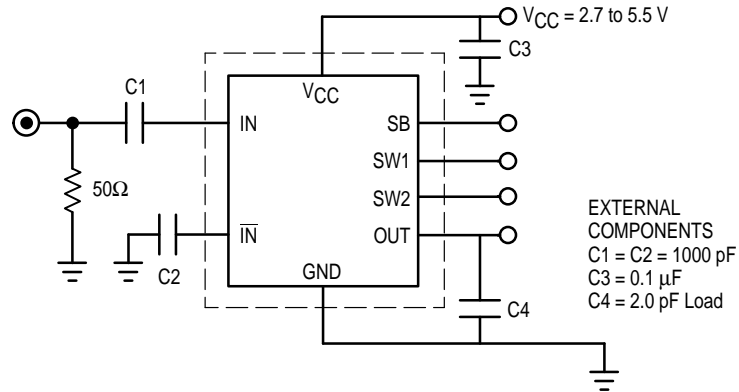
A LOW on the Stand-By Pin 7 disables the device.

### ORDERING INFORMATION

Device	Operating Temp Range	Package
MC12093D	$T_A =$ – 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.

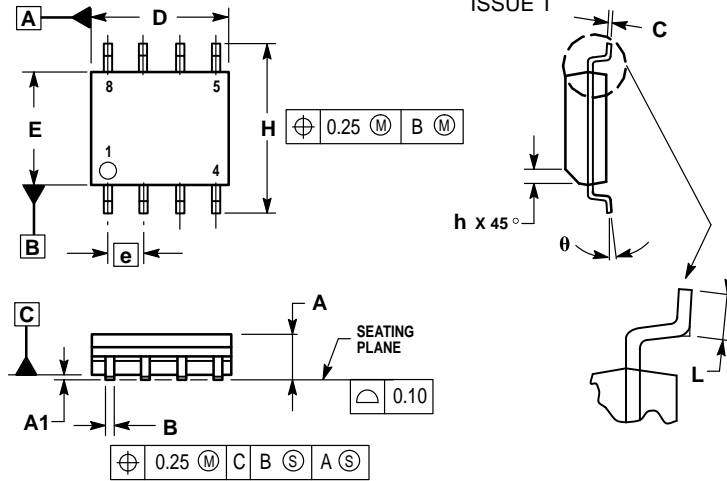
## ELECTRICAL CHARACTERISTICS ( $V_{CC} = 2.7 \text{ to } 5.5 \text{ V}$ ; $T_A = -40 \text{ to } 85^\circ\text{C}$ )

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					
250–1100 MHz	$V_{IN}$	100	–	1000	mVpp
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.

## OUTLINE DIMENSIONS

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

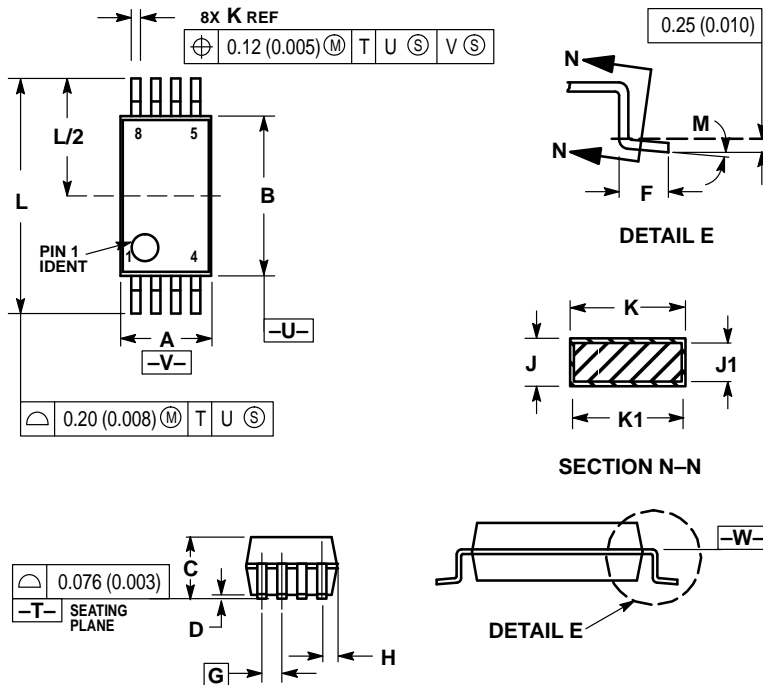


## NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. DIMENSIONS ARE IN MILLIMETER.
3. DIMENSION D AND E DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 PER SIDE.
5. DIMENSION B DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 TOTAL IN EXCESS OF THE B DIMENSION AT MAXIMUM MATERIAL CONDITION.

MILLIMETERS		
DIM	MIN	MAX
A	1.35	1.75
A1	0.10	0.25
B	0.35	0.49
C	0.19	0.25
D	4.80	5.00
E	3.80	4.00
e	1.27 BSC	
H	5.80	6.20
h	0.25	0.50
L	0.40	1.25
θ	0°	7°


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



## NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH OR GATE BURRS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
4. DIMENSION B DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. INTERLEAD FLASH OR PROTRUSION SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
5. DIMENSION K DOES NOT INCLUDE DAMBAR PROTRUSION/INTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.13 (0.005) TOTAL IN EXCESS OF K DIMENSION AT MAXIMUM MATERIAL CONDITION. DAMBAR INTRUSION SHALL NOT REDUCE DIMENSION K BY MORE THAN 0.07 (0.002) AT LEAST MATERIAL CONDITION.
6. TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.
7. DIMENSION A AND B ARE TO BE DETERMINED AT DATUM PLANE -W-.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.87	3.13	0.113	0.123
B	5.20	5.38	0.205	0.212
C	1.73	1.99	0.068	0.078
D	0.05	0.21	0.002	0.008
F	0.63	0.95	0.024	0.037
G	0.65 BSC		0.026 BSC	
H	0.44	0.60	0.017	0.023
J	0.09	0.20	0.003	0.008
J1	0.09	0.16	0.003	0.006
K	0.25	0.38	0.010	0.015
K1	0.25	0.33	0.010	0.013
L	7.65	7.90	0.301	0.311
M	0°	8°	0°	8°

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