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# 2.5 GHz Low Power Prescaler With Stand-By Mode

The MC12095 is a single modulus prescaler for low power frequency division of a 2.5 GHz high frequency input signal. Motorola's advanced MOSAIC™ V technology is utilized to achieve low power dissipation of 24 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 in 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 input (SW) selects the required divide ratio of ÷2 or ÷4. Stand-By mode is available to reduce current drain to 100µA typical when the standby pin SB is switched LOW disabling the prescaler.

- 2.5 GHz Toggle Frequency
- Supply Voltage 2.7 V to 5.5 Vdc
- Low Power 8.7 mA Typical
- Operating Temperature -40 to 85°C
- Divide by 2 or 4 Selected by the SW Pin

**NOTE:** For applications up to 1.1 GHz, please consult the MC12093 datasheet.

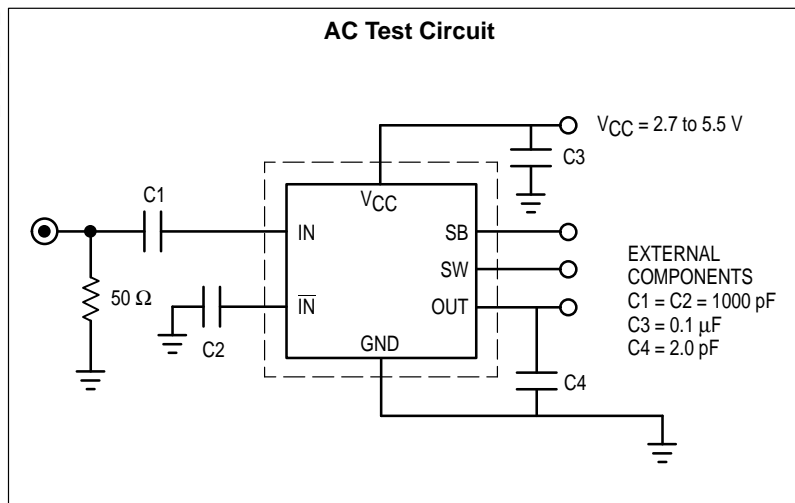
MOSAIC V is a trademark of Motorola

## FUNCTIONAL TABLE

SW	Divide Ratio
H	2
L	4

**NOTES:** 1. SW: H = (V<sub>CC</sub> - 0.4 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

## AC Test Circuit



# MC12095

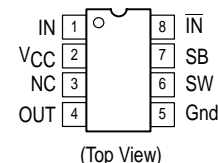
## MECL PLL COMPONENTS ÷2, ÷4 LOW POWER PRESCALER WITH STAND-BY MODE

SEMICONDUCTOR  
TECHNICAL DATA



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

## PIN CONNECTIONS



## ORDERING INFORMATION

Device	Operating Temp Range	Package
MC12095D	T <sub>A</sub> = -40 to 85°C	SO-8

**MAXIMUM RATINGS**

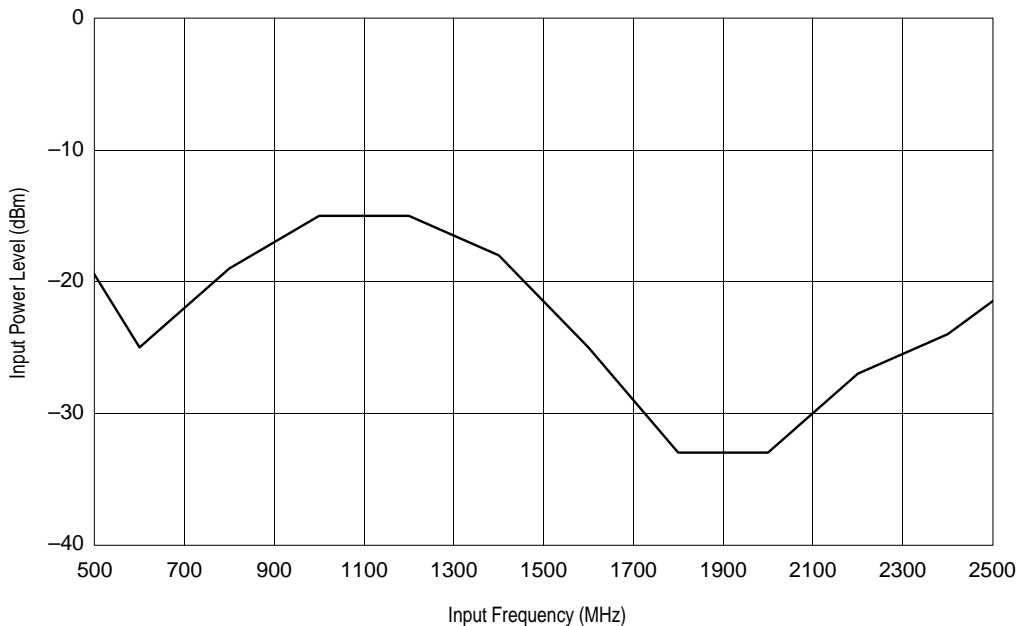
Parameter	Symbol	Value	Unit
Power Supply Voltage, Pin 2	$V_{CC}$	-0.5 to 6.0	Vdc
Operating Temperature Range	$T_A$	-40 to 85	°C
Storage Temperature Range	$T_{stg}$	-65 to 150	°C
Maximum Output Current, Pin 4	$I_O$	8.0	mA

**NOTE:** ESD data available upon request.

**ELECTRICAL CHARACTERISTICS** ( $V_{CC} = 2.7$  to  $5.5$  V;  $T_A = -40$  to  $85^\circ\text{C}$ , unless otherwise noted.)

Parameter	Symbol	Min	Typ	Max	Unit	
Toggle Frequency (Sine Wave)	$f_t$	500	3.0	2.5	GHz	
Supply Current	$I_{CC}$	-	8.7	14	mA	
Stand-By Current	ISB	-	100	200	$\mu\text{A}$	
Stand-By Input HIGH (SB)	$V_{IH1}$	2.0	-	$V_{CC} + 0.5$ V	V	
Stand-By Input LOW (SB)	$V_{IL1}$	GND	-	0.8	V	
Divide Ratio Control Input HIGH (SW)	$V_{IH2}$	$V_{CC} - 0.4$	$V_{CC}$	$V_{CC} + 0.5$ V	V	
Divide Ratio Control Input LOW (SW)	$V_{IL2}$	OPEN	OPEN	OPEN		
Output Voltage Swing (2pF Load)	$V_{OUT}$	500–1000 MHz Input	800	-	-	mVpp
		1000–1500 MHz Input	400	450	-	
		1500–2500 MHz Input	200	250	-	
Input Voltage Sensitivity	$V_{IN}$	200	-	1000	mVpp	

**Figure 1. Typical Minimum Input Sensitivity versus Input Frequency**



(Divide By 2 Mode,  $T = 25^\circ\text{C}$ ,  $V_{CC} = 2.7$  V)



Figure 2. Typical Output Amplitude versus Frequency over Temperature

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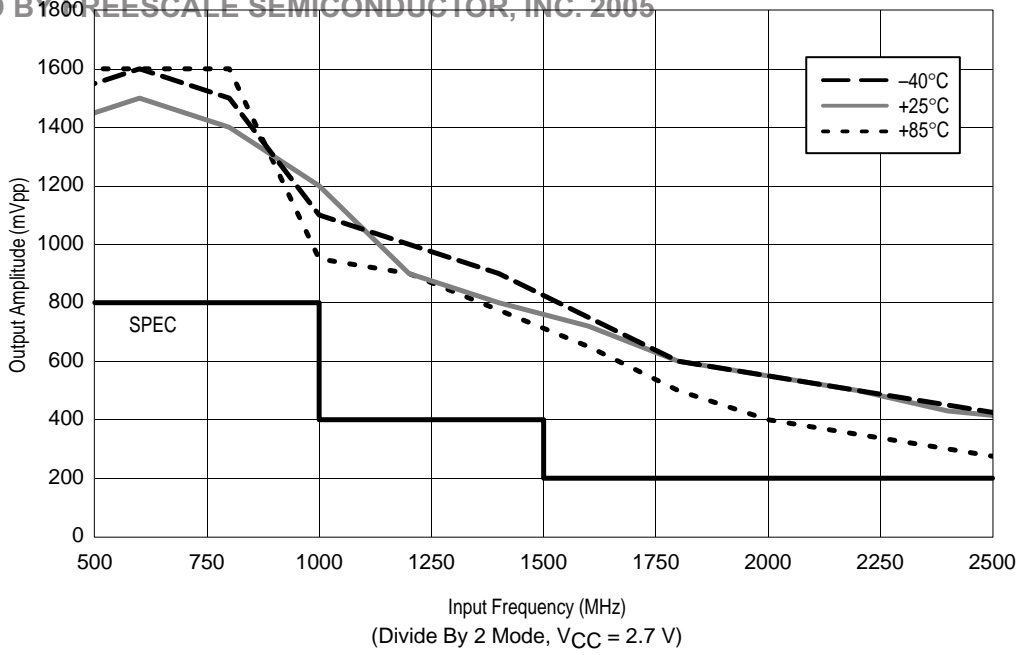
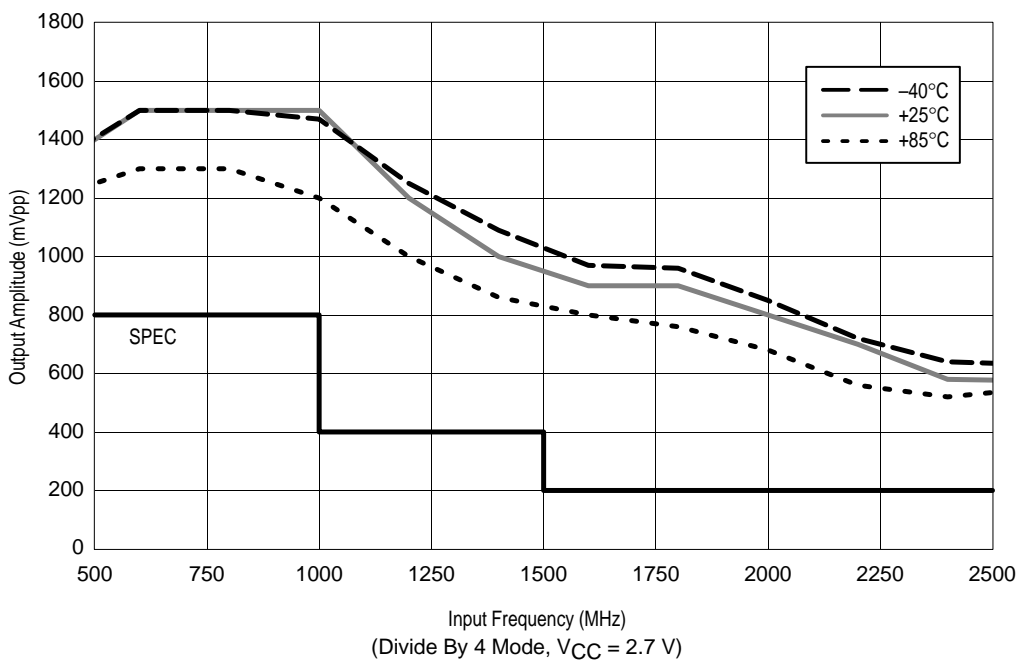


Figure 3. Typical Output Amplitude versus Frequency over Temperature



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Figure 4. Input Impedance versus Frequency

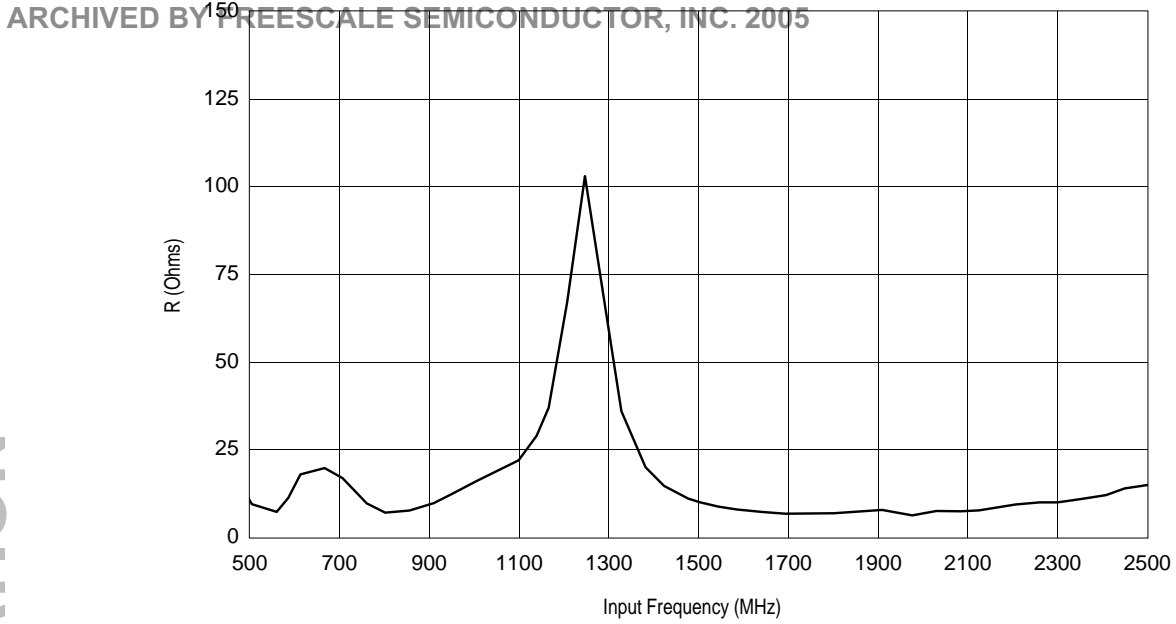
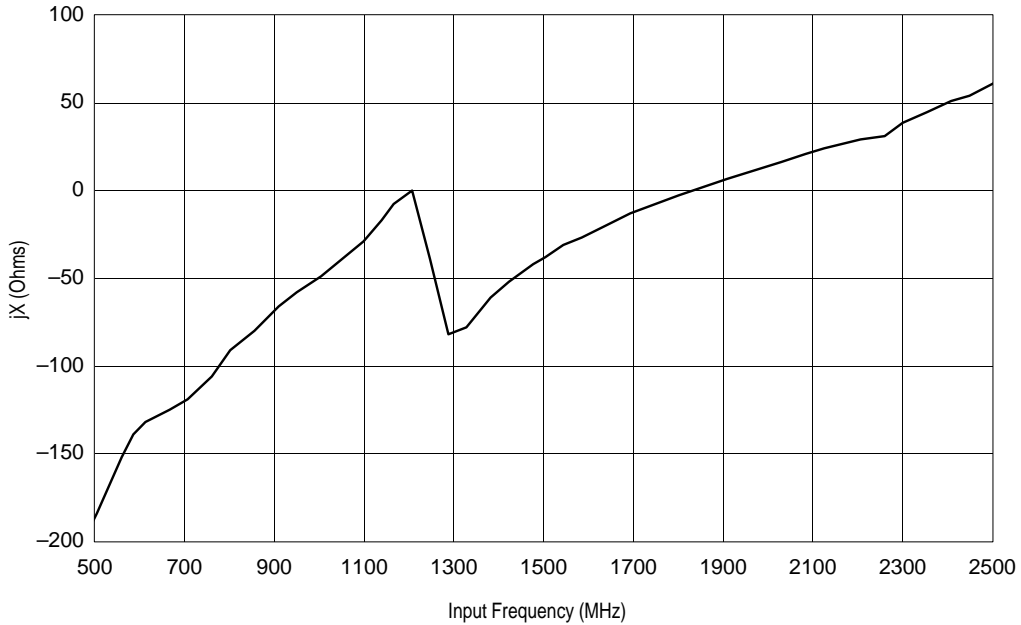


Figure 5. Input Impedance versus Frequency



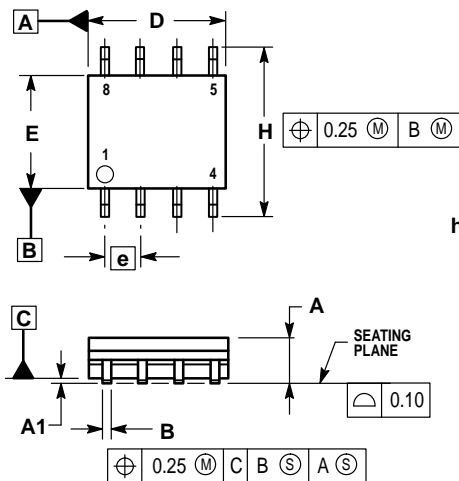
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OUTLINE DIMENSIONS

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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.

DIM	MILLIMETERS	
	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°

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