MOTOROLA

MC12095

2.5 GHz Low Power Prescaler With Stand-By Mode

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

SEMICONDUCTOR TECHNICAL DATA

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 acheive 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

D SUFFIX
PLASTIC PACKAGE
CASE 751
(SO–8)

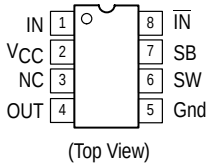
SD SUFFIX
PLASTIC PACKAGE
CASE 940
(SSOP–8)

FUNCTIONAL TABLE

SW	Divide Ratio
H	2
L	4

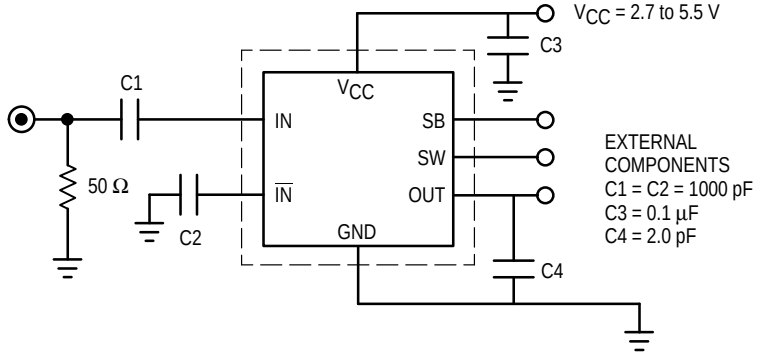
NOTES: 1. SW: H = (V_{CC} – 0.4 V) to V_{CC}; L = OPEN
2. SB: H = 2.0 V to V_{CC}; L = GND to 0.8 V

PIN CONNECTIONS



(Top View)

AC Test Circuit



ORDERING INFORMATION

Device	Operating Temp Range	Package
MC12095D	T_A = – 40° to +85°C	SO–8
MC12095SD		SSOP–8

MAXIMUM RATINGS

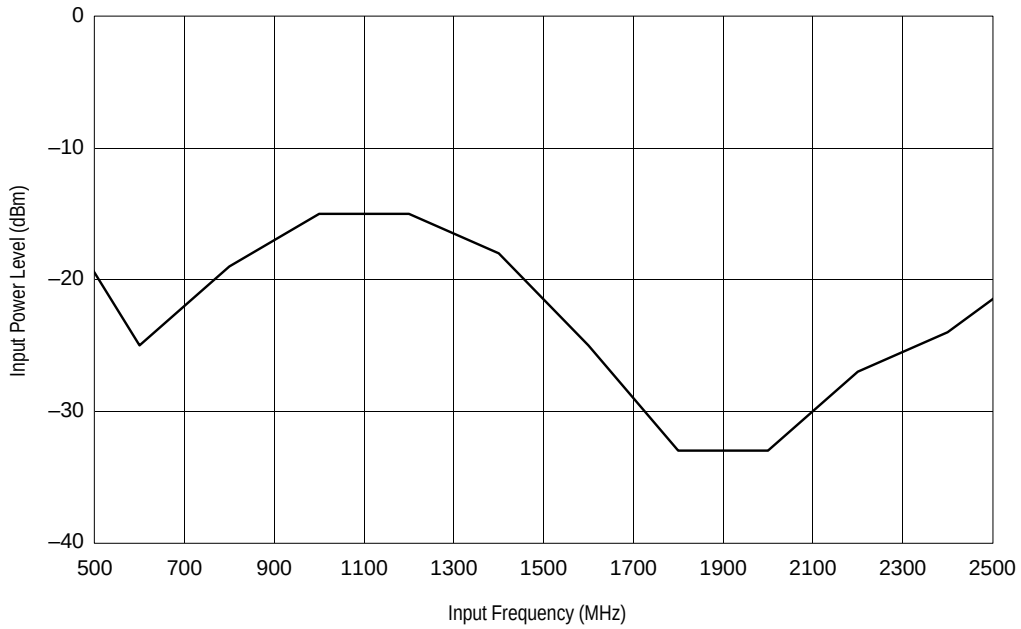
Parameter	Symbol	Value	Unit
Power Supply Voltage, Pin 2	V_{CC}	–0.5 to 6.0	Vdc
Operating Temperature Range	T_A	–40 to 85	°C
Storage Temperature Range	Tstg	–65 to 150	°C
Maximum Output Current, Pin 4	I_O	8.0	mA

NOTE: ESD data available upon request.

ELECTRICAL CHARACTERISTICS (V_{CC} = 2.7 to 5.5 V; T_A = –40 to 85°C, unless otherwise noted.)

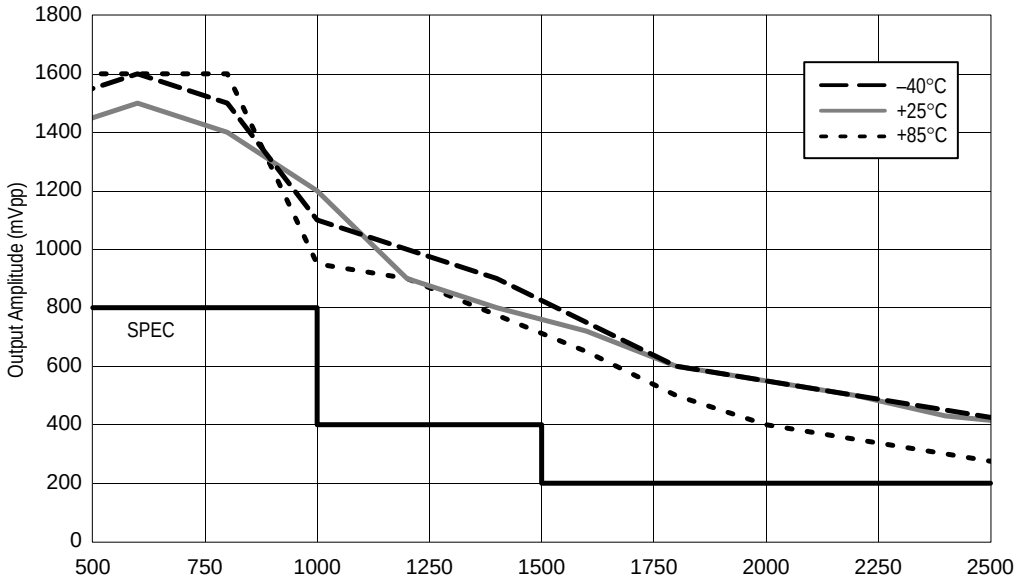
Parameter		Symbol	Min	Typ	Max	Unit
Toggle Frequency (Sine Wave)		f_t	500	3.0	2.5	GHz
Supply Current		I_{CC}	–	8.7	14	mA
Stand–By Current		ISB	–	100	200	µA
Stand–By Input HIGH (SB)		V_{IH1}	2.0	–	V_{CC} + 0.5 V	V
Stand–By Input LOW (SB)		V_{IL1}	GND	–	0.8	V
Divide Ratio Control Input HIGH (SW)		V_{IH2}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

Figure 1. Typical Minimum Input Sensitivity versus Input Frequency



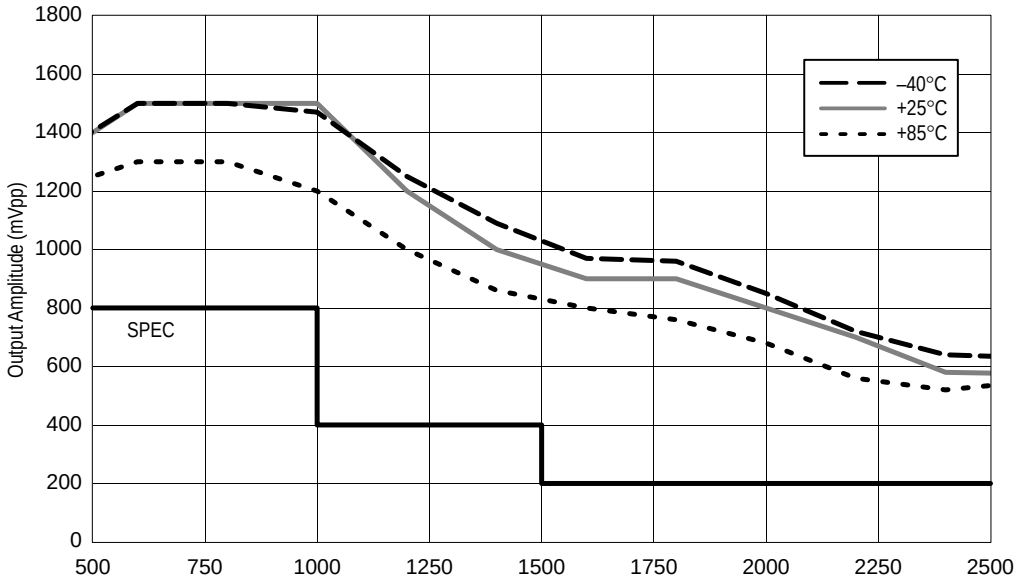
(Divide By 2 Mode, T = 25°C, V_{CC} = 2.7 V)

Figure 2. Typical Output Amplitude versus Frequency over Temperature



(Divide By 2 Mode, V_{CC} = 2.7 V)

Figure 3. Typical Output Amplitude versus Frequency over Temperature



(Divide By 4 Mode, V_{CC} = 2.7 V)

Figure 4. Input Impedance versus Frequency

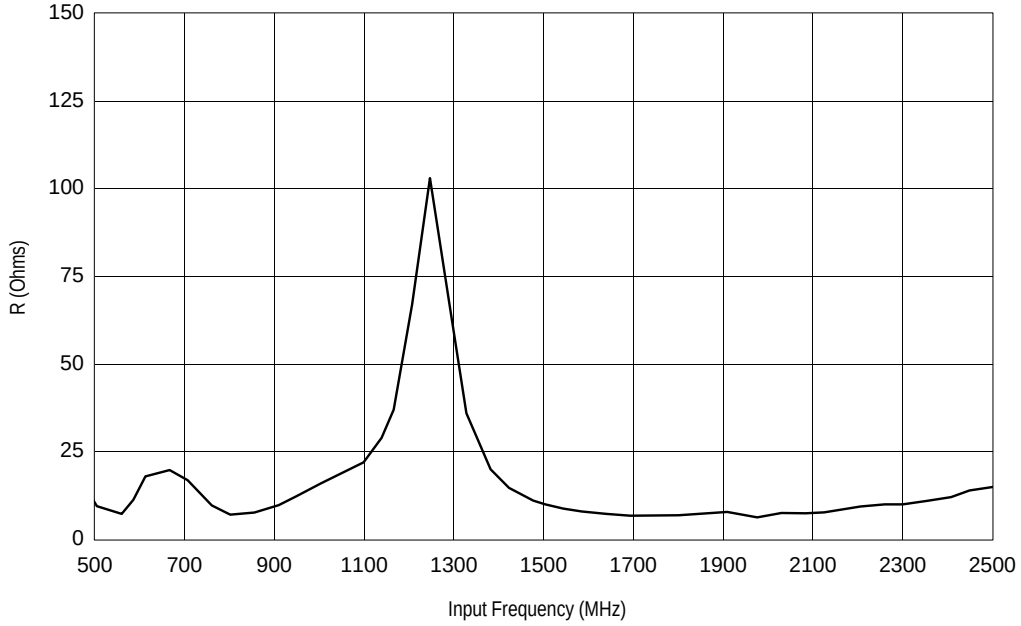
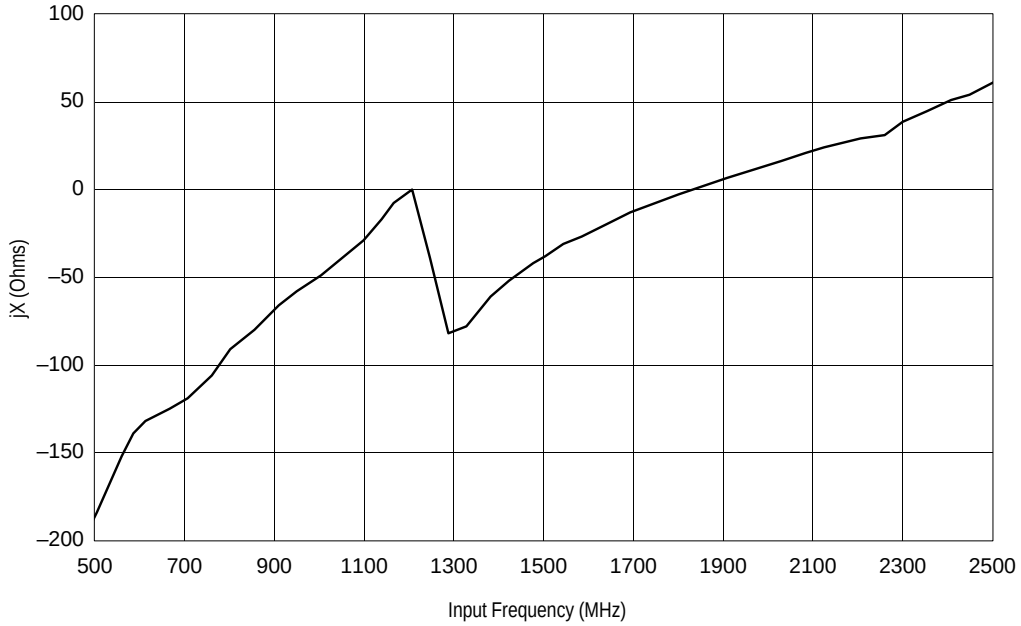
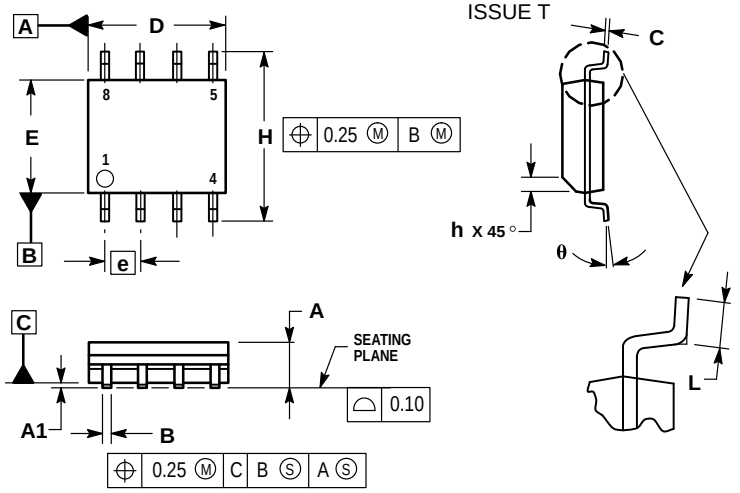


Figure 5. Input Impedance versus Frequency



OUTLINE DIMENSIONS

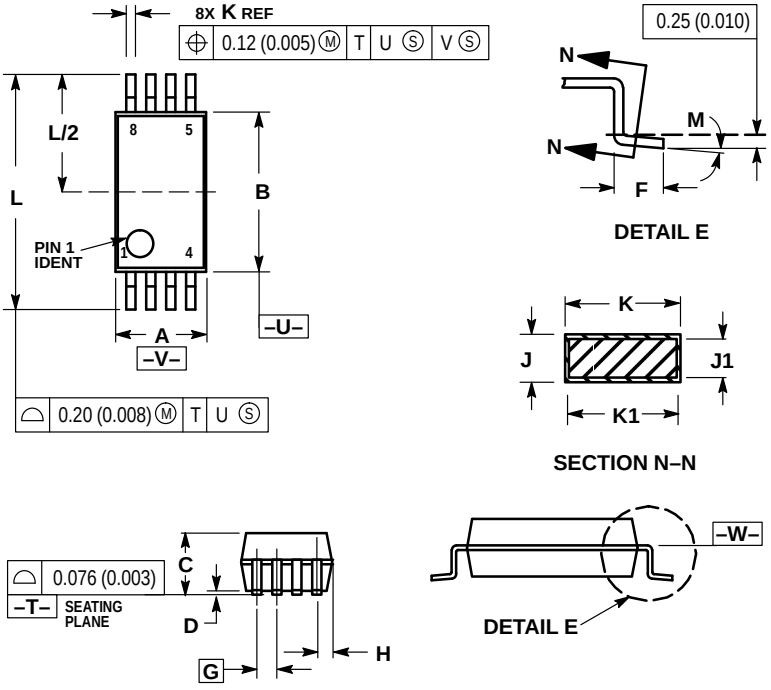
D SUFFIX
PLASTIC PACKAGE
CASE 751–06
(SO–8)
ISSUE T



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–.

	MILLIMETERS		INCHES	
DIM	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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