

MC12095

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. 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 100 µA typical when the standby pin SB is switched LOW disabling the prescaler.

Features

- 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

FUNCTIONAL TABLE

SW	Divide Ratio
H	2
L	4

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

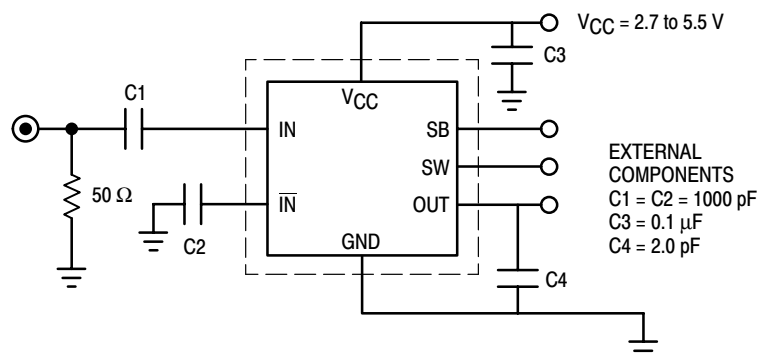


Figure 1. AC Test Circuit



ON Semiconductor™

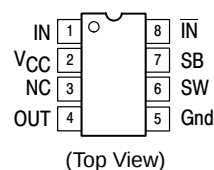
<http://onsemi.com>

MARKING DIAGRAM



A = Assembly Location
L = Wafer Lot
Y = Year
W = Work Week

PIN CONNECTIONS



ORDERING INFORMATION

Device	Package	Shipping
MC12095D	SO-8	96 Units/Rail
MC12095DR2	SO-8	2500 Tape & Reel

MC12095

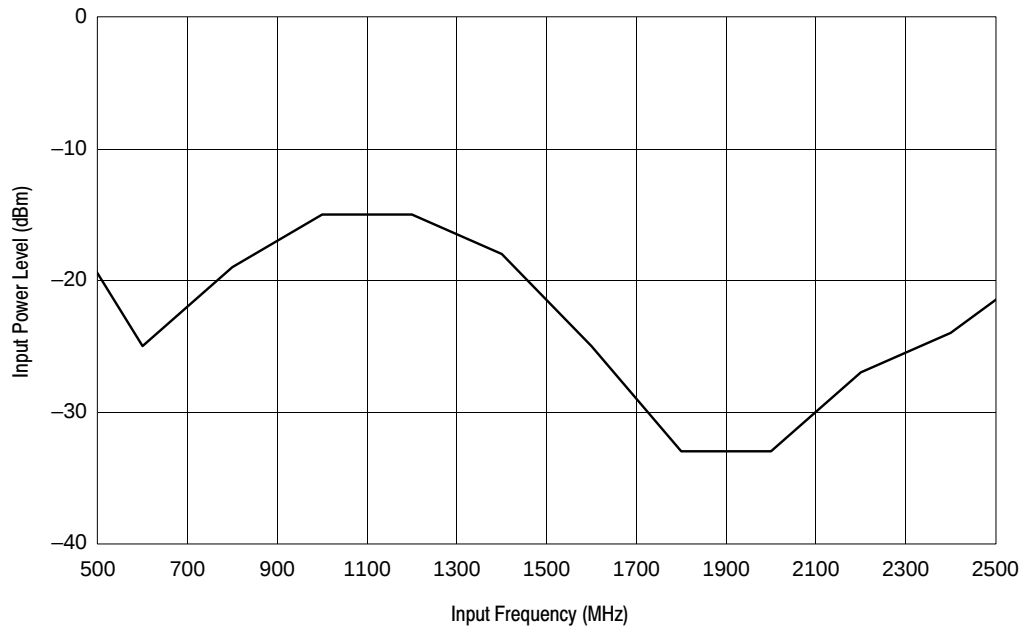
MAXIMUM RATINGS

Rating	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°C, unless otherwise noted.)

Characteristic	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	I_{SB}	–	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)	V_{OUT}	500–1000 MHz Input	800	–	mVpp
		1000–1500 MHz Input	400	–	
		1500–2500 MHz Input	200	–	
Input Voltage Sensitivity	V_{IN}	200	–	1000	mVpp



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

Figure 2. Typical Minimum Input Sensitivity versus Input Frequency

MC12095

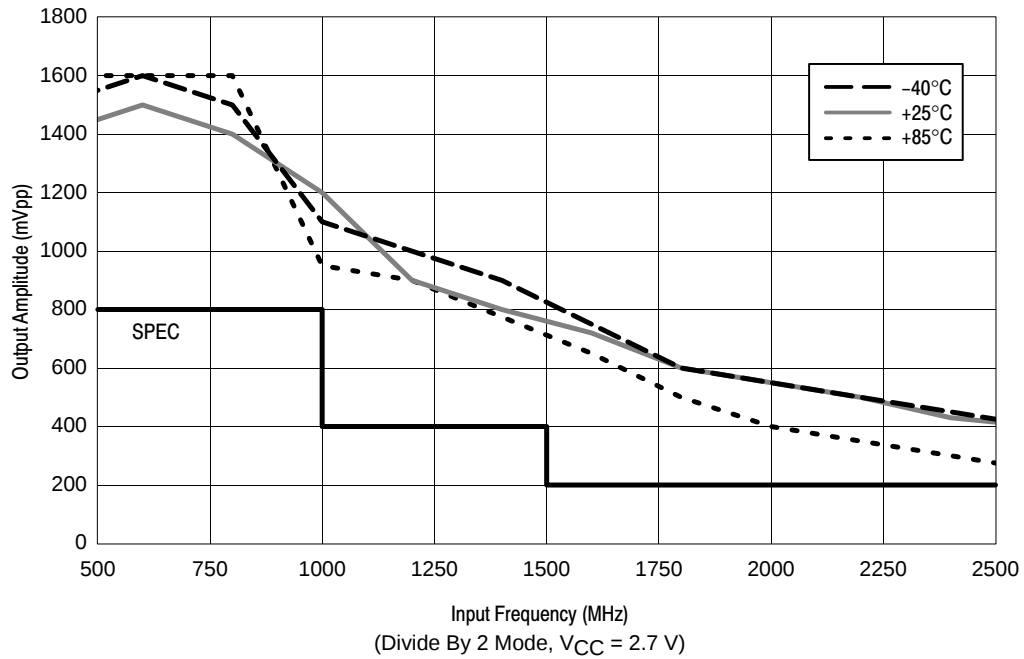


Figure 3. Typical Output Amplitude versus Frequency Over Temperature

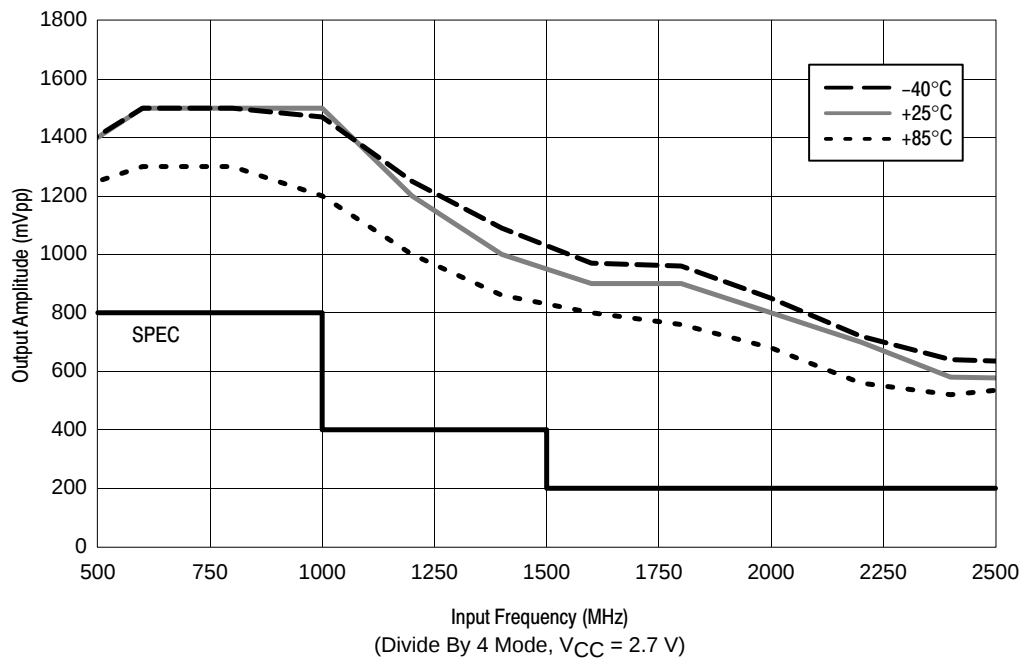


Figure 4. Typical Output Amplitude versus Frequency Over Temperature

MC12095

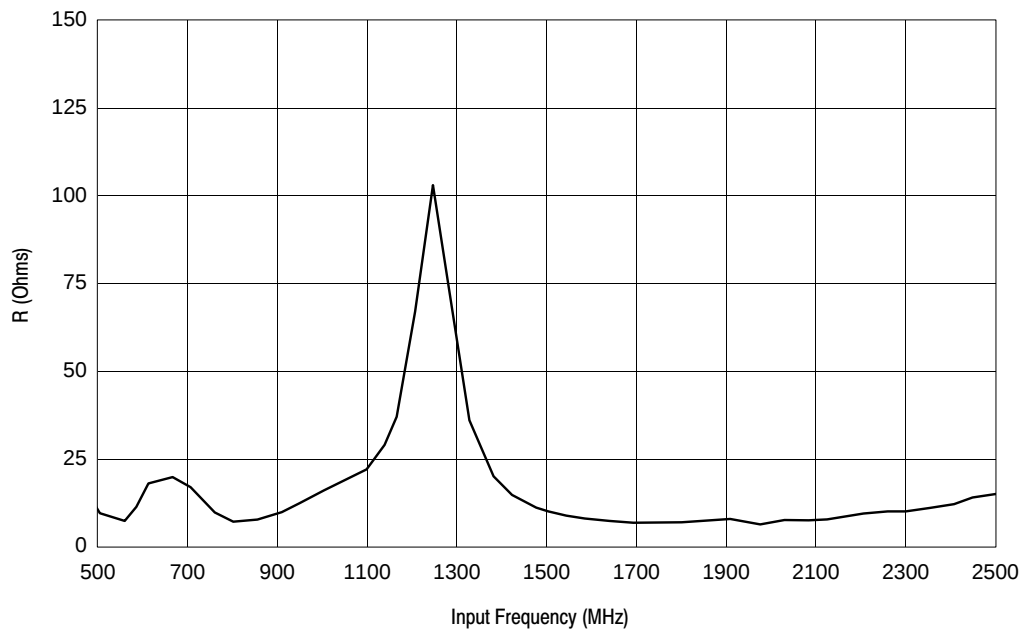


Figure 5. Input Impedance versus Frequency

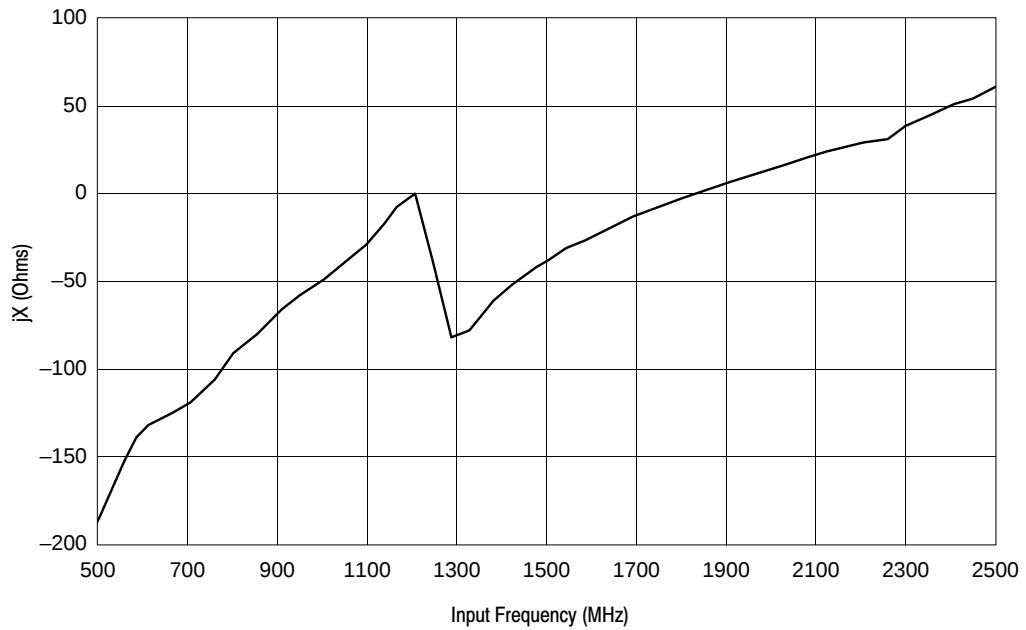
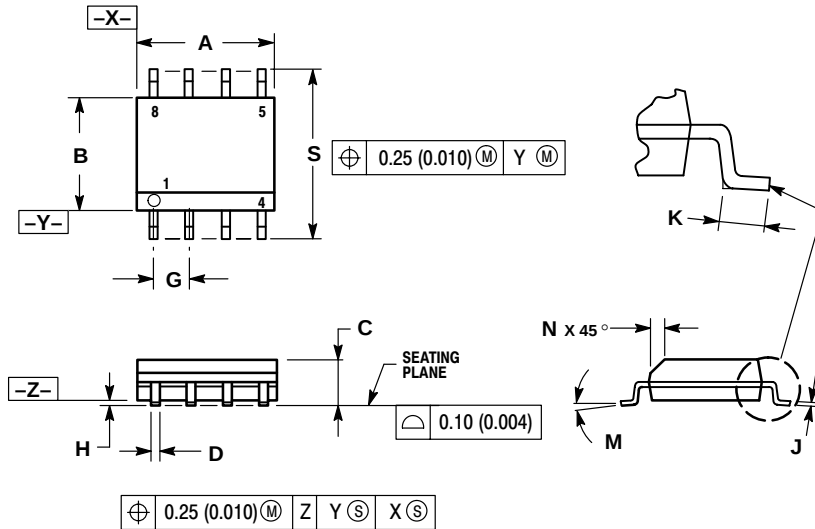


Figure 6. Input Impedance versus Frequency

MC12095

PACKAGE DIMENSIONS

SO-8
D SUFFIX
CASE 751-07
ISSUE W



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.

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

Notes

Notes

MOSAIC V is a trademark of Motorola, Inc.

ON Semiconductor and  are trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC 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 special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC 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. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC 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 SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC 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 SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer.

PUBLICATION ORDERING INFORMATION

Literature Fulfillment:

Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada
Email: ONlit@hibbertco.com

N. American Technical Support: 800-282-9855 Toll Free USA/Canada

JAPAN: ON Semiconductor, Japan Customer Focus Center
4-32-1 Nishi-Gotanda, Shinagawa-ku, Tokyo, Japan 141-0031
Phone: 81-3-5740-2700
Email: r14525@onsemi.com

ON Semiconductor Website: <http://onsemi.com>

For additional information, please contact your local Sales Representative.