



# 1.1 GHz Low Power Dual Modulus Prescaler

The MC12058 is a low power  $\div 126/128$ ,  $\div 254/256$  dual modulus prescaler. Motorola's advanced Bipolar MOSAIC™ V technology is utilized to achieve low power dissipation of 3.0 mW at a minimum supply voltage of 2.7 V. The MC12058 can be operated down to a minimum supply voltage of 2.7 V required for battery operated portable systems.

On-chip output termination provides 250  $\mu$ A (typical) output current to drive a 8.0 pF (typical) high impedance load. The Divide Ratio Control input, SW, permits selection of divide ratio as desired. A HIGH on SW selects  $\div 126/128$ ; an OPEN on SW selects  $\div 254/256$ . The Modulus Control input, MC, selects the proper divide number after SW has been biased to select the desired divide ratio.

- 1.1 GHz Toggle Frequency
- Supply Voltage 2.7 to 5.5 V
- Low Power 1.1 mA Typical at  $V_{CC} = 3.0$  V
- Operating Temperature Range of  $-40$  to  $85^{\circ}\text{C}$
- On-Chip Output Termination

MOSAIC V is a trademark of Motorola

## FUNCTIONAL TABLE

SW	MC	Divide Ratio
H	H	126
H	L	128
L	H	254
L	L	256

**NOTES:** 1. SW: H =  $V_{CC}$ , L = Open. A logic L can also be applied by grounding this pin, but this is not recommended due to increased power consumption.  
2. MC: H = 2.0 V to  $V_{CC}$ , L = GND to 0.8 V.

## MAXIMUM RATINGS

Characteristic	Symbol	Range	Unit
Power Supply Voltage, Pin 2	$V_{CC}$	$-0.5$ to $7.0$	Vdc
Operating Temperature Range	$T_A$	$-40$ to $85$	$^{\circ}\text{C}$
Storage Temperature Range	$T_{stg}$	$-65$ to $150$	$^{\circ}\text{C}$
Modulus Control Input, Pin 6	MC	$-0.5$ to $V_{CC}$	Vdc
Maximum Output Current, Pin 4	$I_O$	4.0	mA

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

## MC12058

### MECL PLL COMPONENTS $\div 126/128$ , $\div 254/256$ LOW POWER DUAL MODULUS PRESCALER

#### SEMICONDUCTOR TECHNICAL DATA

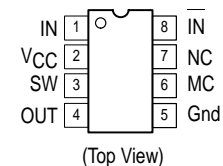


**D SUFFIX**  
PLASTIC PACKAGE  
CASE 751  
(SO-8)



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

## PIN CONNECTIONS



## ORDERING INFORMATION

Device	Operating Temp Range	Package
MC12058D	$T_A = -40^{\circ}$ to $+85^{\circ}\text{C}$	SO-8
MC12058SD		SSOP-8

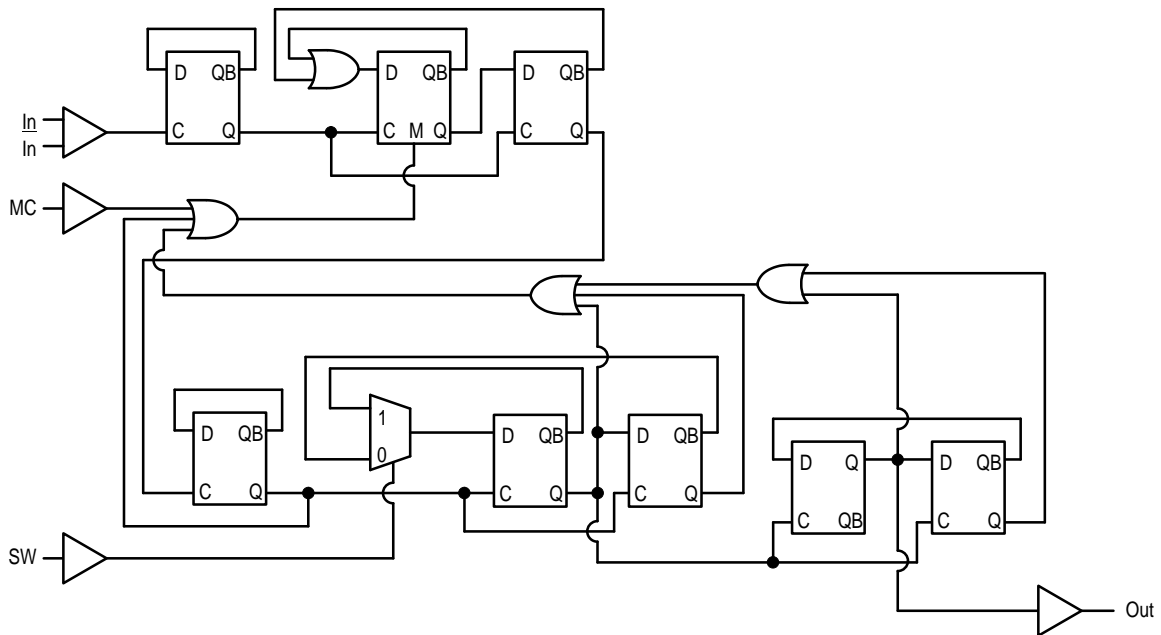
# MC12058

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

Characteristic	Symbol	Min	Typ	Max	Unit	
Toggle Frequency (Sine Wave Input)	$f_t$	0.1	1.4	1.1	GHz	
Supply Current Output (Pin 2)	$I_{CC}$	–	1.1	2.0	mA	
Modulus Control Input HIGH (MC)	$V_{IH1}$	2.0	–	$V_{CC} + 0.5$	V	
Modulus Control Input LOW (MC)	$V_{IL1}$	Gnd	–	0.8	V	
Divide Ratio Control Input HIGH (SW)	$V_{IH2}$	$V_{CC} - 0.5$	$V_{CC}$	$V_{CC} + 0.5$	V	
Divide Ratio Control Input LOW (SW)	$V_{IH2}$	Open	Open	Open	–	
Output Voltage Swing (Note 1)	$V_{out}$	0.8	1.1	–	$V_{pp}$	
Modulus Setup Time MC to OUT at 1100 MHz	$t_{set}$	–	11	16	ns	
Input Voltage Sensitivity	$V_{in}$	250–1100 MHz	100	–	1000	mVpp
		100–250 MHz	400	–	1000	

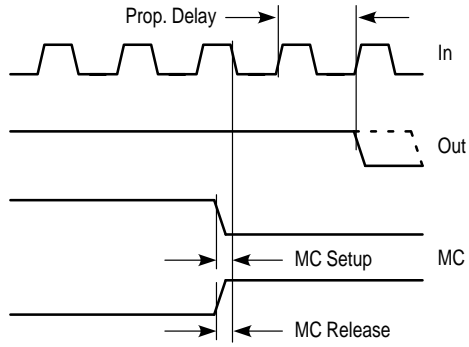
**NOTE:** Assumes 8.0 pF high impedance load.

**Figure 1. Logic Diagram (MC12058)**



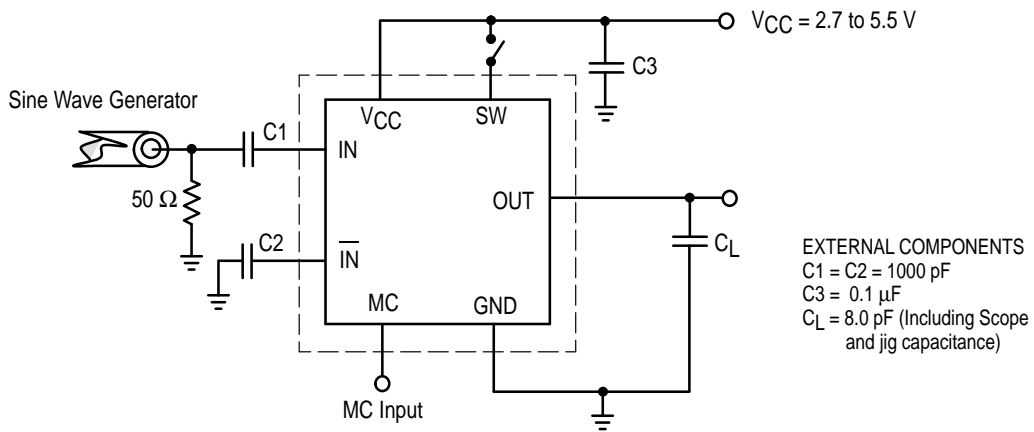
# MC12058

### Figure 2. Modulus Setup Time



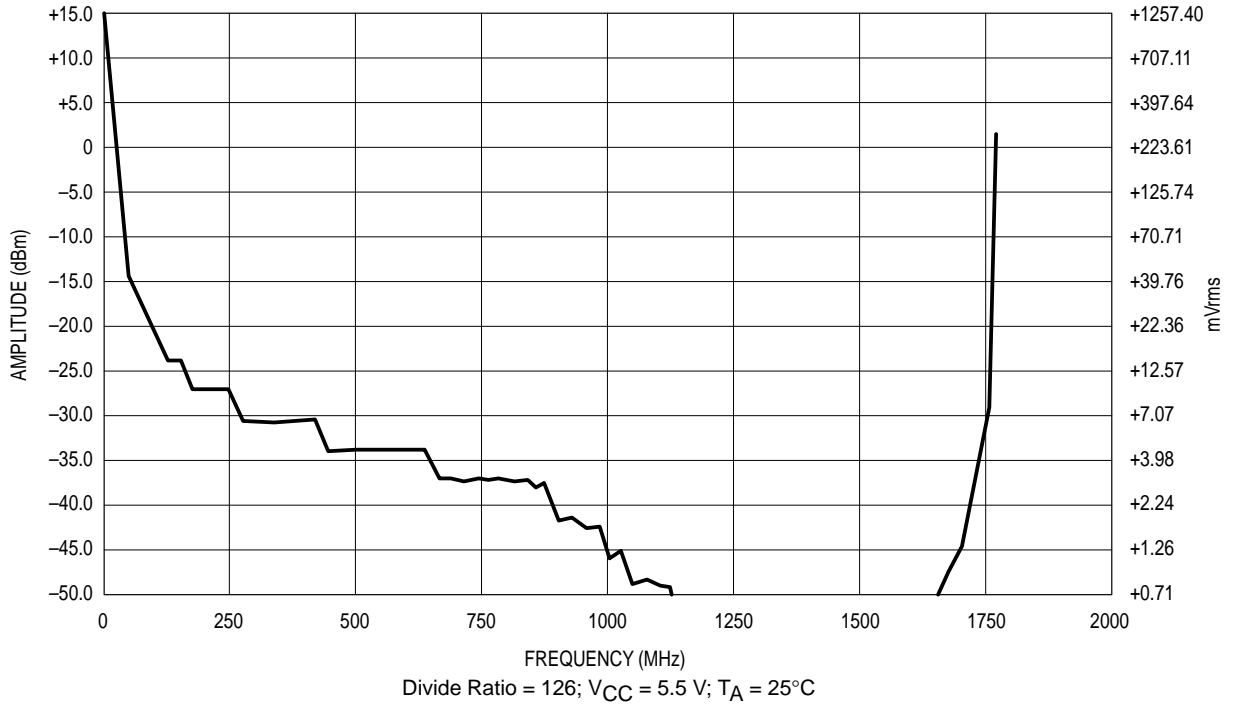
Modulus setup time MC to out is the MC setup or MC release plus the prop delay.

### Figure 3. AC Test Circuit

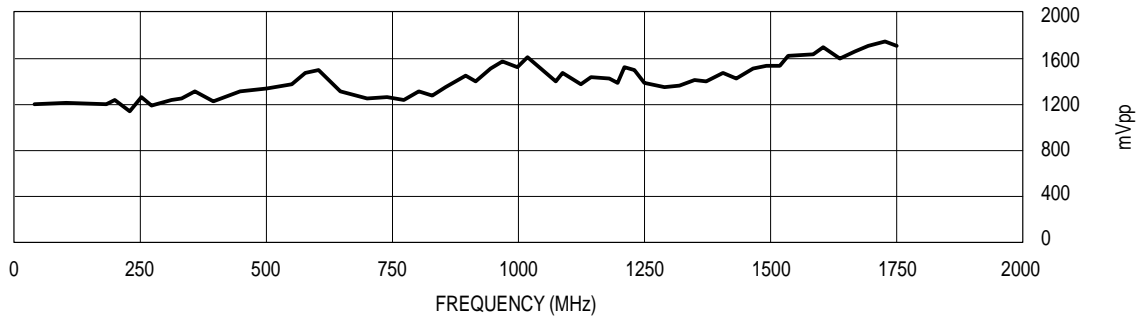


# MC12058

## Figure 4. Input Signal Amplitude versus Input Frequency

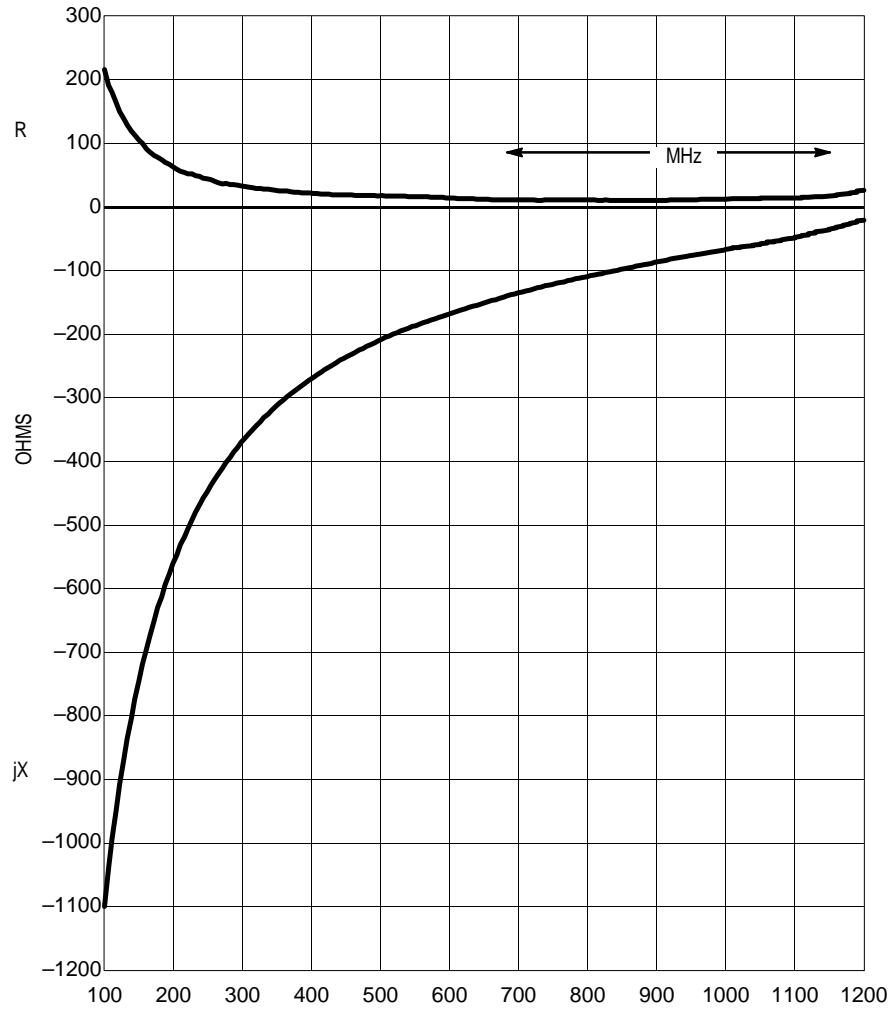


## Figure 5. Output Amplitude versus Input Frequency



# MC12058

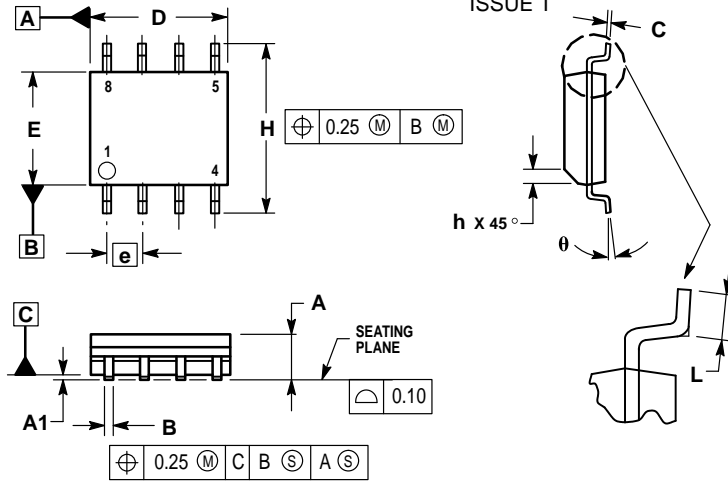
Figure 6. Typical Input Impedance versus Input Frequency



# MC12058

## OUTLINE DIMENSIONS

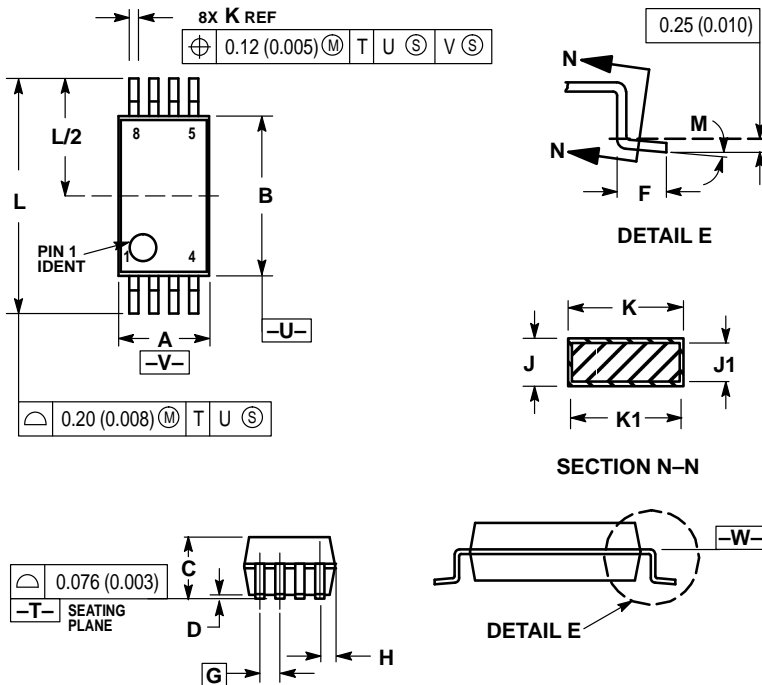
**D SUFFIX**  
**PLASTIC PACKAGE**  
**CASE 751-06**  
**(SO-8)**  
**ISSUE T**



**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.

**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-.

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