


**MOTOROLA**

## 2.8 GHz Prescaler

The MC12089 is a single modulus divide by 64 and 128 prescaler for low power frequency division of a 2.8 GHz high frequency input signal. The low power (10.2 mA typical at 5.0 V) and high operating frequency features make this prescaler ideal in satellite TV receiver applications.

Divide ratio control input SW selects the required divide ratio of  $\div 64$  or  $\div 128$ .

On-chip output termination provides 2.5 mA of output current to drive a 12 pF (typical) high impedance load. The output voltage swing under typical supply voltage and temperature conditions is 1.2 V. 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.

- 2.8 GHz Toggle Frequency
- Supply Voltage 4.5 to 5.5 V
- Low Power Dissipation 51 mW Typical
- Operating Temperature Range of  $-40$  to  $85^{\circ}\text{C}$

### FUNCTIONAL TABLE

SW	Divide Ratio
H	64
L	128

NOTE: H =  $V_{CC}$ ; L = Open.

### MAXIMUM RATINGS

Characteristic	Symbol	Range	Unit
Power Supply Voltage, Pin 4	$V_{CC}$	$-0.5$ to $7.0$	Vdc
Operating Temperature Range	$T_A$	$-40$ to $85$	$^{\circ}\text{C}$
Storage Temperature Range	$T_{stg}$	$-65$ to $150$	$^{\circ}\text{C}$
Maximum Output Current, Pin 7	$I_O$	$4.0$	mA

NOTE: ESD data available upon request.

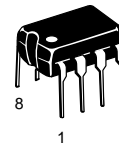
# MC12089

## MECL PLL COMPONENTS $\div 64/128$ PRESCALER

### SEMICONDUCTOR TECHNICAL DATA

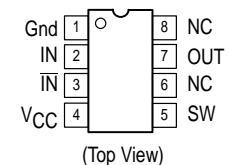


**D SUFFIX**  
PLASTIC PACKAGE  
CASE 751  
(SO-8)



**P SUFFIX**  
PLASTIC PACKAGE  
CASE 626

### PIN CONNECTIONS



### ORDERING INFORMATION

Device	Operating Temperature Range	Package
MC12089D	$T_A = -40^{\circ}$ to $+85^{\circ}\text{C}$	SO-8
MC12089P		Plastic

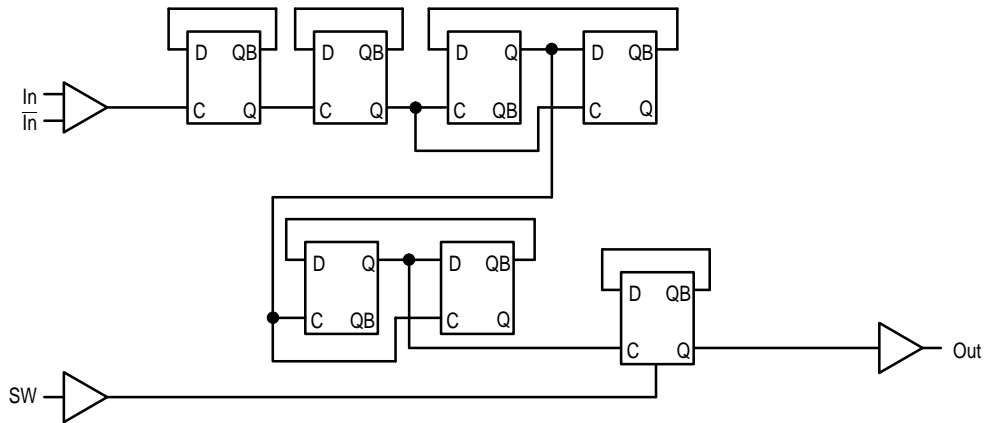
# MC12089

**ELECTRICAL CHARACTERISTICS** ( $V_{CC} = 4.5$  to  $5.5$  V;  $T_A = -40$  to  $85^\circ\text{C}$ , unless otherwise noted.)

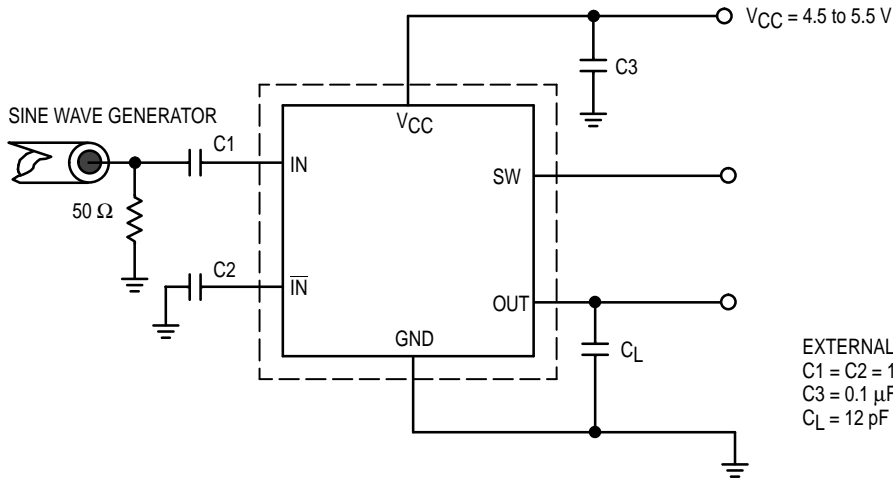
Parameter	Symbol	Min	Typ	Max	Unit
Toggle Frequency (Sine Wave)	ft	0.25	3.4	2.8	GHz
Supply Current Output (Pin 2)	$I_{CC}$	–	10.2	14.5	mA
Input Voltage Sensitivity	$V_{in}$	400	–	1000	mVpp
		100	–	1000	
Divide Ratio Control Input High (SW)	$V_{IH}$	$V_{CC}$	$V_{CC}$	$V_{CC}$	V
Divide Ratio Control Input Low (SW)	$V_{iL}$	Open	Open	Open	–
Output Voltage Swing (Note 1)	$V_{out}$	0.8	1.2	–	$V_{pp}$

**NOTE:** 1. Assumes  $C_L = 12$  pF

**Figure 1. Logic Diagram (MC12089)**



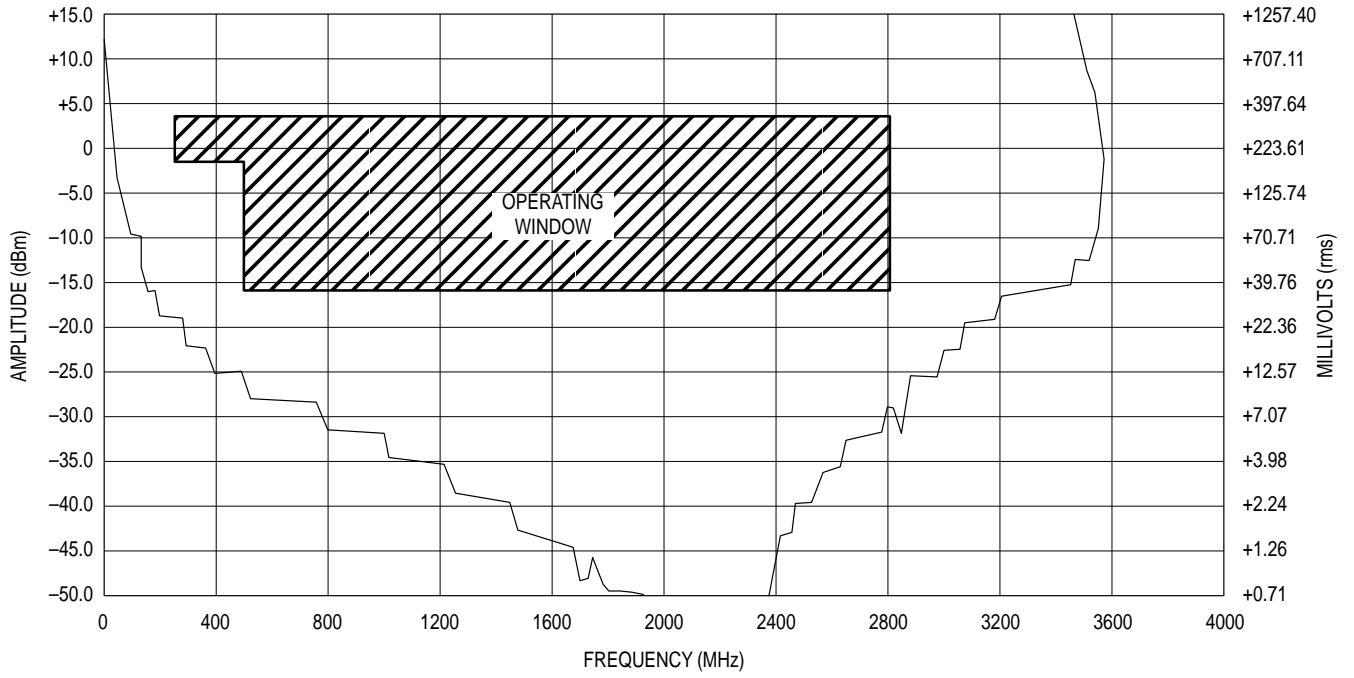
**Figure 2. AC Test Circuit**



EXTERNAL COMPONENTS  
 $C_1 = C_2 = 1000$  pF  
 $C_3 = 0.1$   $\mu\text{F}$   
 $C_L = 12$  pF (Including Scope and Jig Capacitance)

# MC12089

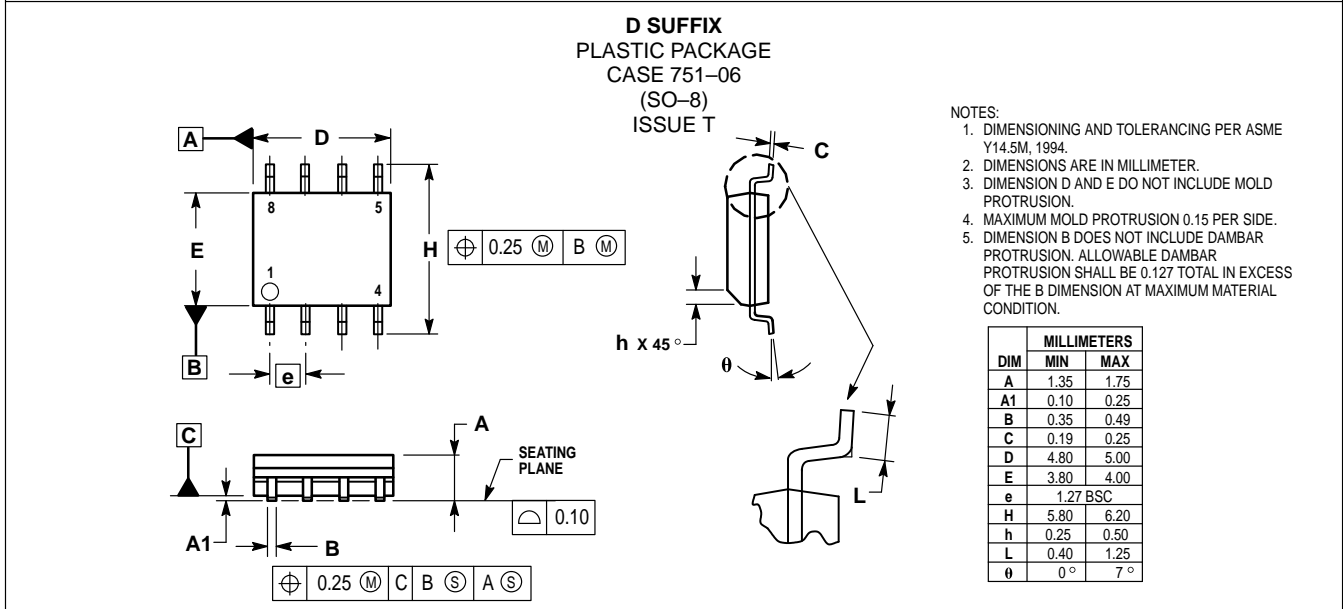
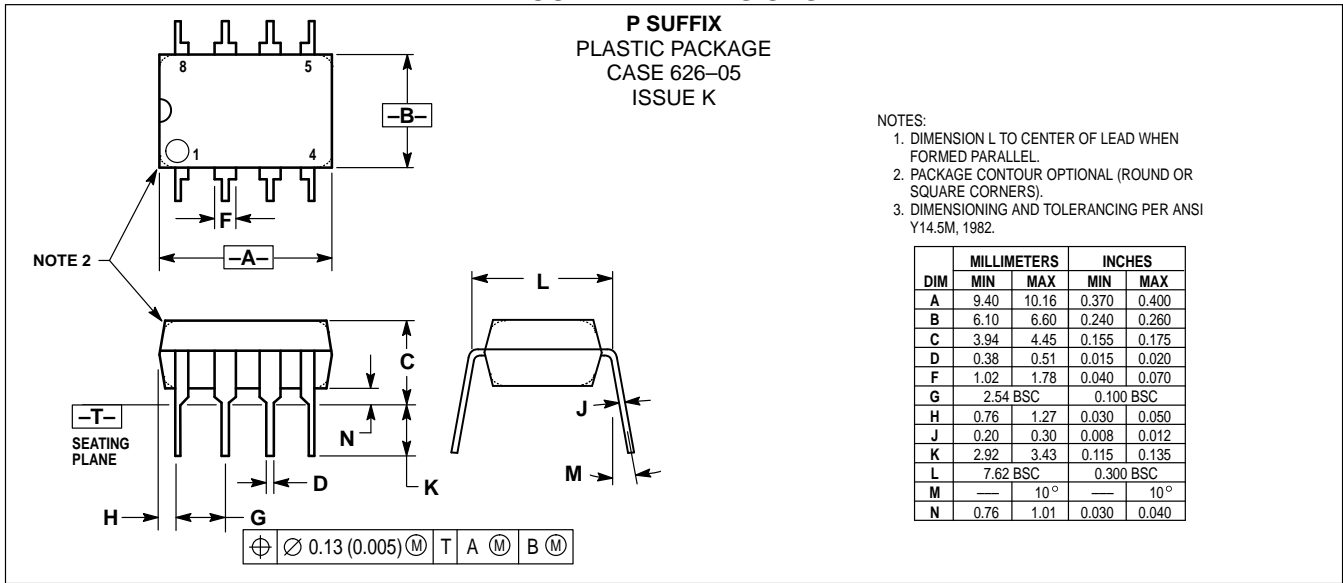
## Figure 3. Input Signal Amplitude versus Input Frequency



Divide Ratio = 64;  $V_{CC} = 5.0\text{ V}$ ;  $T_A = 25^\circ\text{C}$

# MC12089

## OUTLINE DIMENSIONS



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**JAPAN:** Nippon Motorola Ltd.: SPD, Strategic Planning Office, 141,  
4-32-1 Nishi-Gotanda, Shagawa-ku, Tokyo, Japan. 03-5487-8488

**Customer Focus Center: 1-800-521-6274**

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**ASIA/PACIFIC:** Motorola Semiconductors H.K. Ltd.; 8B Tai Ping Industrial Park,  
51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852-26629298

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