

MECL PLL COMPONENTS $\div 64/65$, $\div 128/129$ DUAL MODULUS PRESCALER
SEMICONDUCTOR TECHNICAL DATA

Legacy Device: *Motorola MC12052A*


The ML12052 is a super low power dual modulus prescaler used in phase-locked loop applications with low power dissipation of 2.7 mW at a minimum supply voltage of 2.7 V.

The ML12052 can be used with CMOS synthesizers requiring positive edges to trigger internal counters such as Motorola's MC145xxx or Lansdale's ML145xxx series in a PLL to provide tuning signals up to 1.1 GHz in programmable frequency steps.

A Divide Ratio Control (SW) permits selection of a 64/65 or 128/129 divide ratio as desired.

The Modulus Control (MC) selects the proper divide number after SW has been biased to select the desired divide ratio.

- 1.1 GHz Toggle Frequency
- The ML12052 is Pin and Functionally Compatible with the Motorola or ON Semiconductor MC12022
- Low Power 1.0 mA Typical
- 2.0 mA Maximum, $V_{CC} = 2.7$ to 5.5 Vdc
- Short Setup Time (t_{set}) 16 ns Maximum @ 1.1 GHz
- Modulus Control Input Level is Compatible with Standard CMOS and TTL
- Maximum Input Voltage Should Be Limited to 6.5 Vdc
- Operating Temperature Range $T_A = -40$ to 85°C

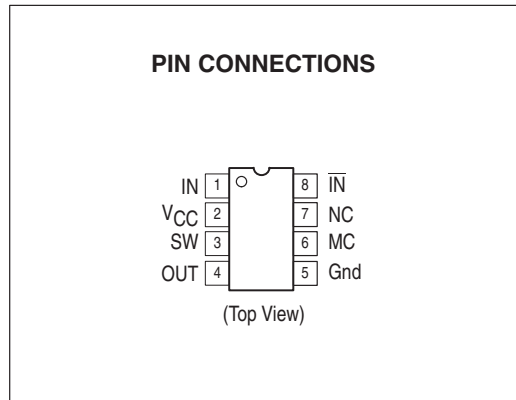


SO 8 = -5P
PLASTIC PACKAGE
CASE 751
(SO-8)

CROSS REFERENCE/ORDERING INFORMATION

PACKAGE	MOTOROLA	LANSDALE
SO 8	MC12052AD	ML12052-5P

Note: Lansdale lead free (Pb) product, as it becomes available, will be identified by a part number prefix change from **ML** to **MLE**.



FUNCTIONAL TABLE

SW	MC	Divide Ratio
H	H	64
H	L	65
L	H	128
L	L	129

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 6.5	Vdc

ELECTRICAL CHARACTERISTICS ($V_{CC} = 2.7$ to 5.5 VDC, $T_A = -40$ to 85°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 (Pin 2)	I_{CC}	–	1.0	2.0	mA
Modulus Control Input High (MC)	V_{IH1}	2.0	–	$V_{CC} + 0.5$ V	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	V_{CC}	$V_{CC} + 0.5$ V	VDC
Divide Ratio Control Input Low (SW)	V_{IL2}	Open	Open	Open	–
Output Voltage Swing (Note 2) ($C_L = 8.0$ pF, $R_L = 3.3$ k Ω)	V_{out}	0.8	1.1	–	V _{PP}
Modulus Setup Time MC to Out @ 1100 MHz	t_{set}	–	11	16	ns
Input Voltage Sensitivity 250–1100 MHz 100–250 MHz	V_{in}	100 400	– –	1000 1000	mV _{PP}
Output Current (Note 1) $V_{CC} = 2.7$ V, $C_L = 8.0$ pF, $R_L = 3.3$ k Ω $V_{CC} = 5.0$ V, $C_L = 8.0$ pF, $R_L = 7.2$ k Ω	I_O	– –	0.5 0.5	3.0 3.0	mA

NOTES: 1. Divide ratio of $\square 64/65$ @ 1.1 GHz
 2. Valid over voltage range 2.7 to 5.5 V; $R_L = 3.3$ k Ω @ $V_{CC} = 2.7$ V; $R_L = 7.2$ k Ω @ $V_{CC} = 5.0$ V

Figure 1. Logic Diagram (ML12052)

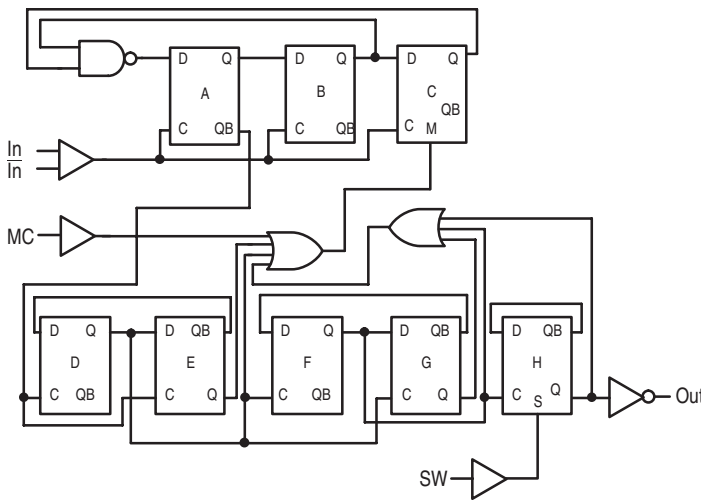


Figure 2. Modulus Setup Time

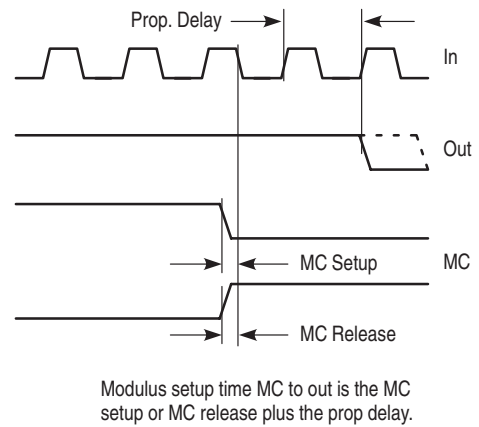


Figure 3. AC Test Circuit

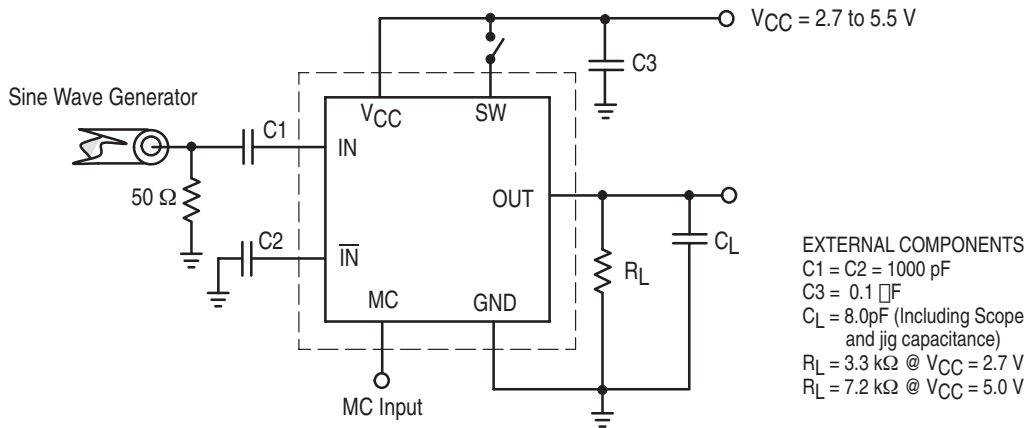


Figure 4. Typical Input Impedance versus Input Frequency

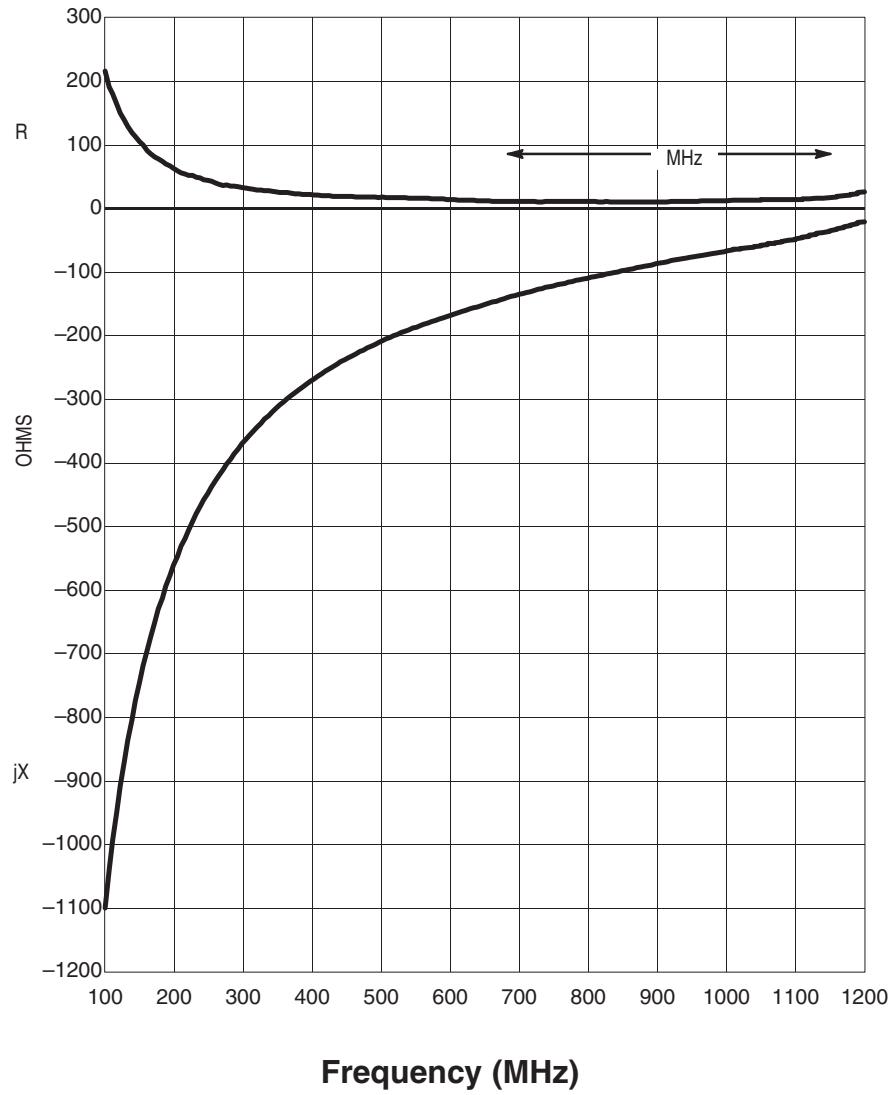


Figure 5.. Generic block diagram showing prescaler connection to PLL device

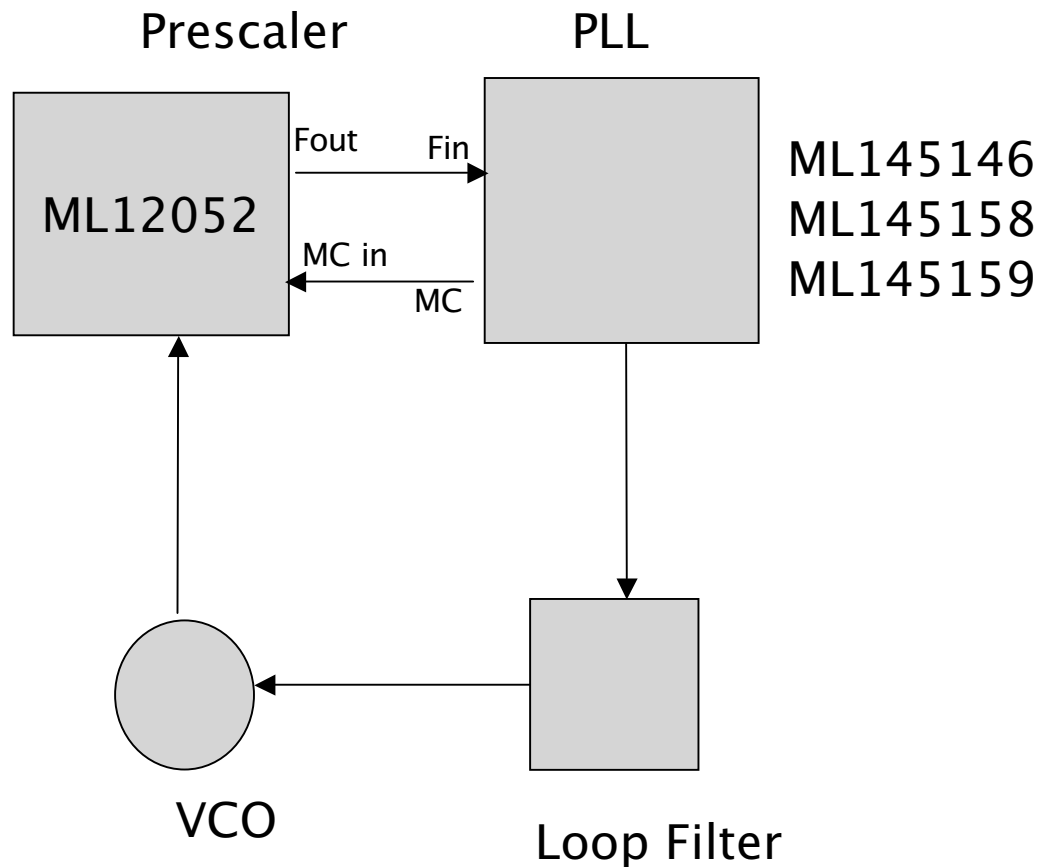
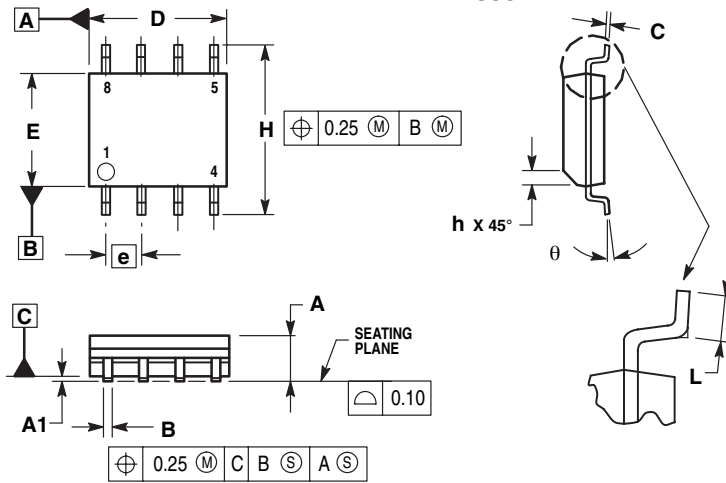


Figure 5 shows a generic block diagram for connecting a prescaler to a PLL device that supports dual modulus control. Application note AN535 describes using a two-modulus prescaler technique. By using prescaler higher frequencies can be achieved than by a single CMOS PLL device.

OUTLINE DIMENSIONS

SO = -5P
 (ML12052-5P)
 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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