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# SP8610 1000MHz ÷ 4

# SP8611 1300/1500MHz ÷ 4

The SP8610 and SP8611 are asynchronous ECL divide by four circuits with ECL compatible outputs which can also be used to drive 100Ω lines. They feature input sensitivities of 600mV p-p (800mV p-p above 1300MHz).

## FEATURES

- ECL Compatible Outputs
- AC-Coupled Inputs (Internal Bias)

## QUICK REFERENCE DATA

- Supply Voltage: -5.2V
- Power Consumption: 380mW
- Max. Input Frequency: 1500MHz (SP8611B)
- Temperature Range:
  - A Grade: -55°C to +110°C  
(+125°C with suitable heat sink)
  - B Grade: 0°C to +70°C

## ABSOLUTE MAXIMUM RATINGS

Supply voltage, $V_{EE}$	-8V
Output current	15mA
Storage temperature range	-65°C to +150°C
Max. junction temperature	+175°C
Max. clock input voltage	2.5V p-p

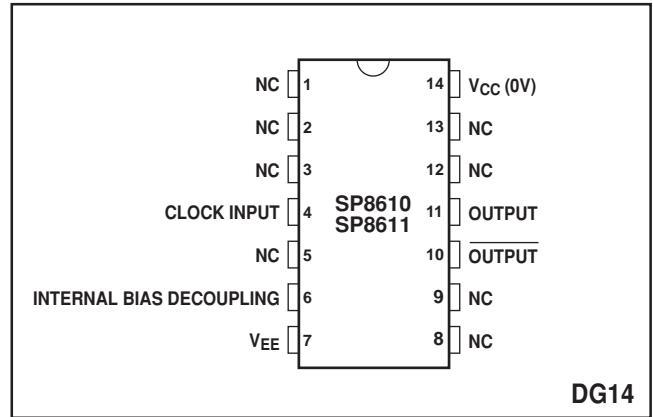


Fig. 1 Pin connections - top view

## ORDERING INFORMATION

- SP8610 A DG
- SP8610 B DG
- SP8610 AA DG
- SP8610 NA 1C
- SP8611 A DG
- SP8611 B DG
- SP8611 AA DG
- SP8611 NA 1C

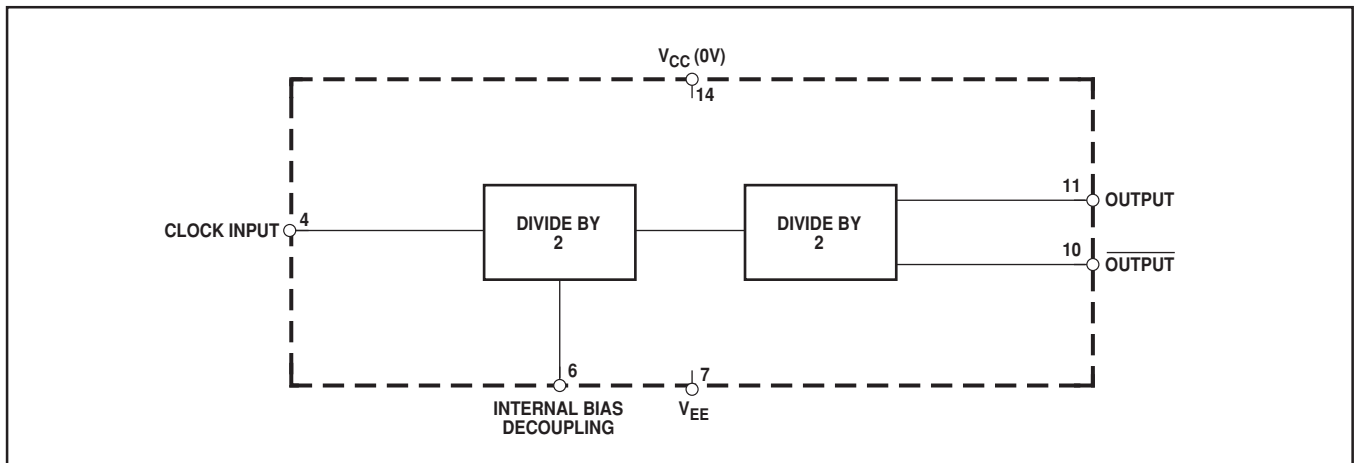


Fig. 2 Functional diagram

**ELECTRICAL CHARACTERISTICS**

Unless otherwise stated, the Electrical Characteristics are guaranteed over specified supply, frequency and temperature range

Supply voltage,  $V_{CC} = 0V$ ,  $V_{EE} = -5.2V \pm 0.25V$

Temperature,  $T_{AMB} = -55^{\circ}C$  to  $+125^{\circ}C$  (A Grade) (Note 1),  $0^{\circ}C$  to  $+70^{\circ}C$  (B Grade)

Characteristic	Symbol	Value		Units	Type	Conditions	Notes
		Min.	Max.				
Maximum frequency (sinewave input)	$f_{MAX}$	1.0		GHz	SP8605A,B	Input = 400-1200mV p-p	6
		1.3		GHz	SP8606A	Input = 800-1200mV p-p	6
		1.5		GHz	SP8606B	Input = 400-1200mV p-p	6
Minimum frequency (sinewave input)	$f_{MIN}$		150	MHz	All	Input = 600-1200mV p-p	4
Current consumption	$I_{EE}$		100	mA	All	$V_{EE} = -5.45V$ , outputs unloaded	5
Output low voltage	$V_{OL}$	-1.92	-1.62	V	All	$V_{EE} = -5.2V$ , $R_L = 430\Omega$ (25°C)	
Output high voltage	$V_{OH}$	-0.93	-0.75	V	All	$V_{EE} = -5.2V$ , $R_L = 430\Omega$ (25°C)	
Minimum output swing	$V_{OUT}$	500		mV	All	$V_{EE} = -5.2V$ , $R_L = 430\Omega$	5

**NOTES**

1. The A Grade devices must be used with a heat sink to maintain chip temperature below  $+150^{\circ}C$  when operating in a  $T_{AMB}$  of  $+125^{\circ}C$ .
2. The temperature coefficients of  $V_{OH} = +1.2mV/^{\circ}C$ , and  $V_{OL} = +0.24mV/^{\circ}C$  but these are not tested.
3. The test configuration for dynamic testing is shown in Fig.5.
4. Tested at  $25^{\circ}C$  and  $+125^{\circ}C$  only ( $+70^{\circ}C$  for B grade).
5. Tested at  $25^{\circ}C$  only
6. Tested at  $+125^{\circ}C$  only ( $+70^{\circ}C$  for B grade).

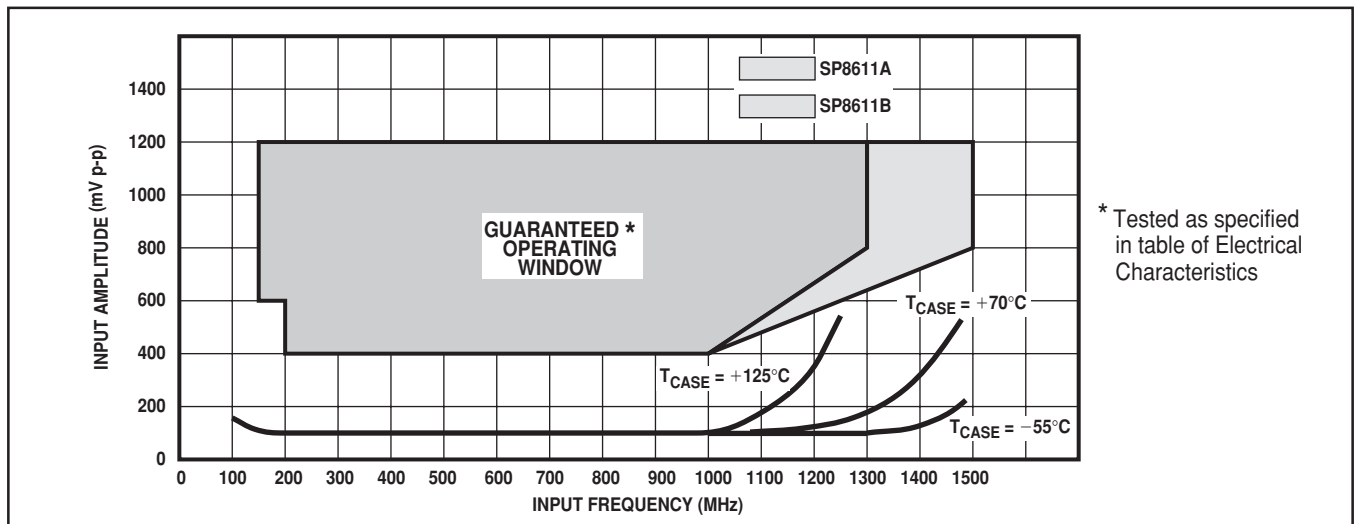


Fig. 3 Typical input characteristic of SP8611

**THERMAL CHARACTERISTICS**

$\theta_{JC}$  approximately  $30^{\circ}C/W$

$\theta_{JA}$  approximately  $110^{\circ}C/W$

**OPERATING NOTES**

1. The clock input (pin 4) should be capacitively coupled to the signal source. The input signal path is completed by connecting a capacitor from the internal bias decoupling, pin 6, to ground.
2. In the absence of a signal the device will self-oscillate. If this is undesirable, it may be prevented by connecting a  $10k\Omega$  resistor from the unused input to  $V_{EE}$  i.e. from pin 4 to pin 7. This will reduce the input sensitivity by approximately 100mV.
3. The circuit will operate at very low input frequencies but slew rate must be better than  $200V/\mu s$ .

4. The input impedance of the SP8610/11 is a function of frequency, see Fig. 4.
5. The emitter follower outputs require external load resistors. These should not be less than  $330\Omega$  and a value of  $430\Omega$  is recommended. Interfacing to ECLIII/10K is shown in Fig. 7.
6. These devices may be used with split supply lines and ground referenced input; a suitable configuration is shown in Fig. 6.
7. All components should be suitable for the frequency in use.

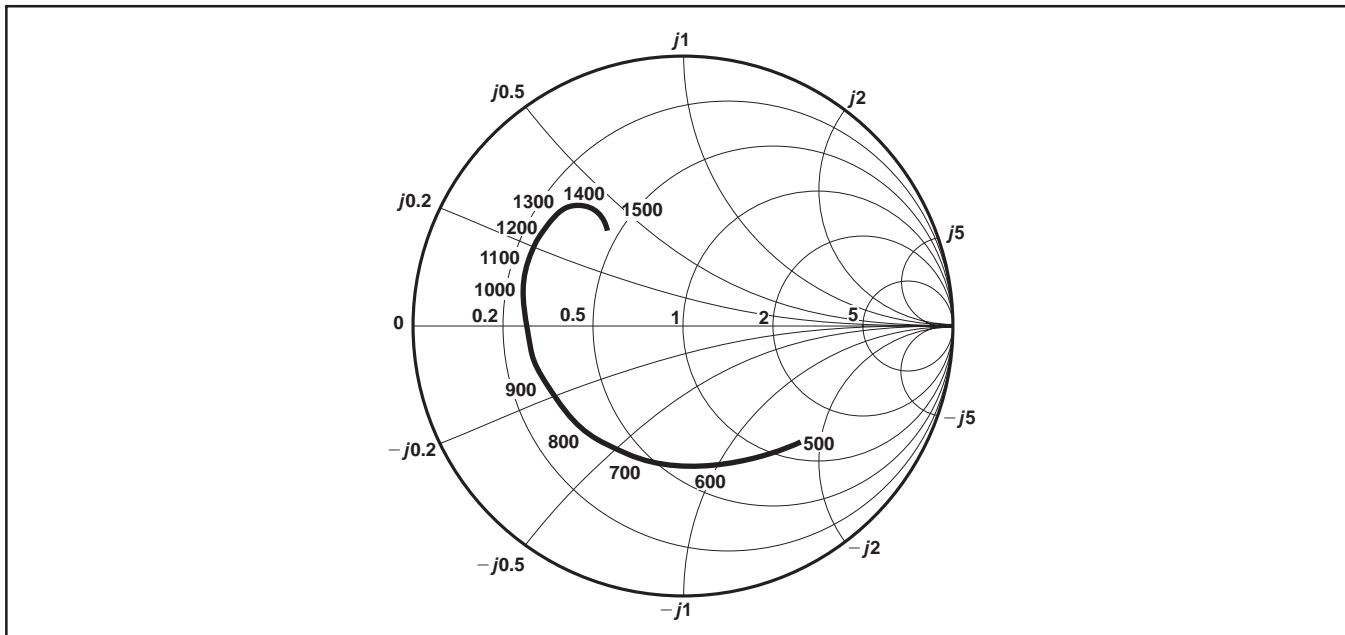


Fig. 4 Typical input impedance. Test conditions: supply voltage =  $-5.2V$ , ambient temperature =  $25^{\circ}C$ , frequencies in MHz, Impedances normalised to  $50\Omega$

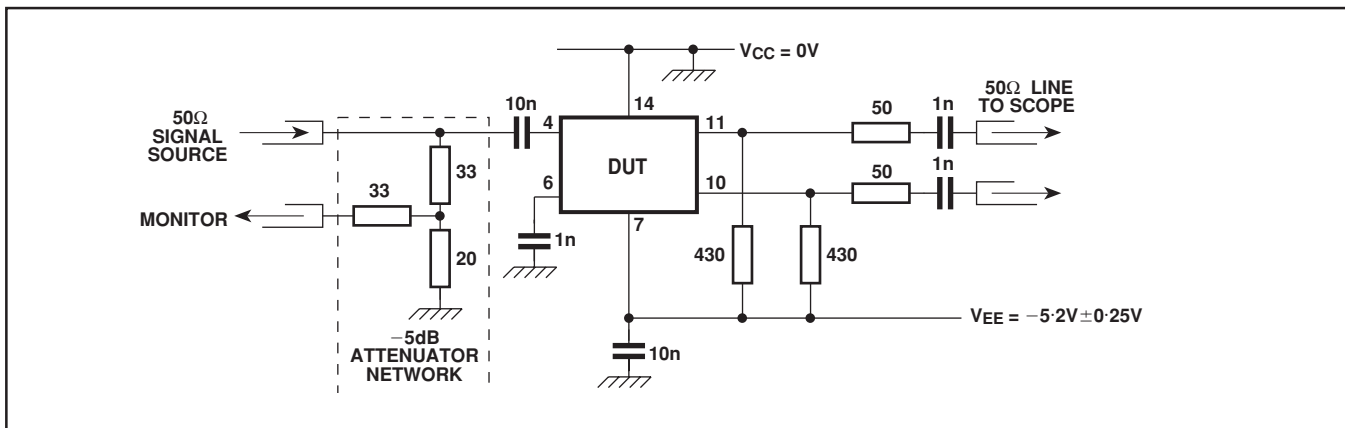


Fig. 5 Toggle frequency test circuit

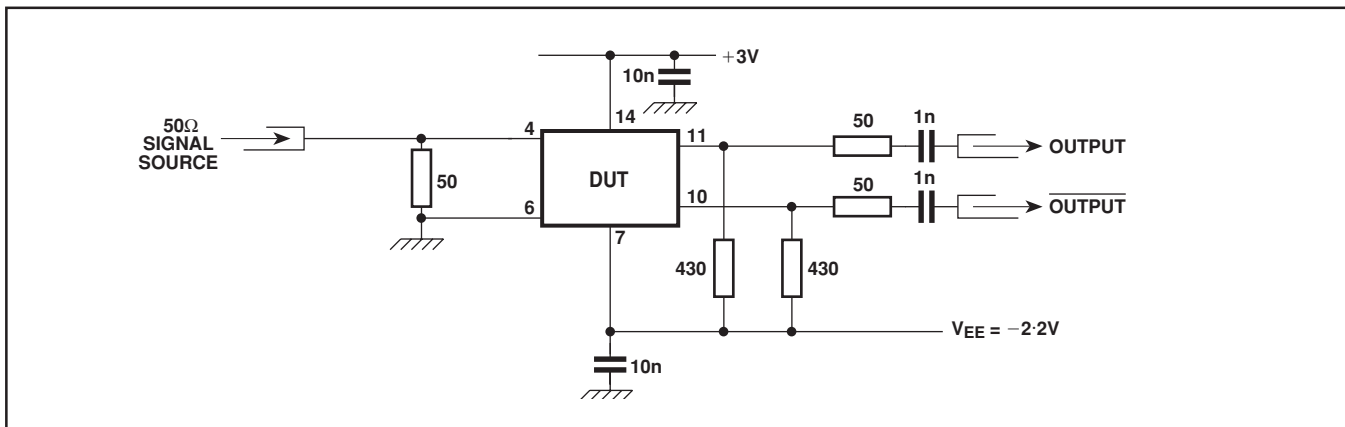


Fig. 6 Circuit for using the input signal about ground potential

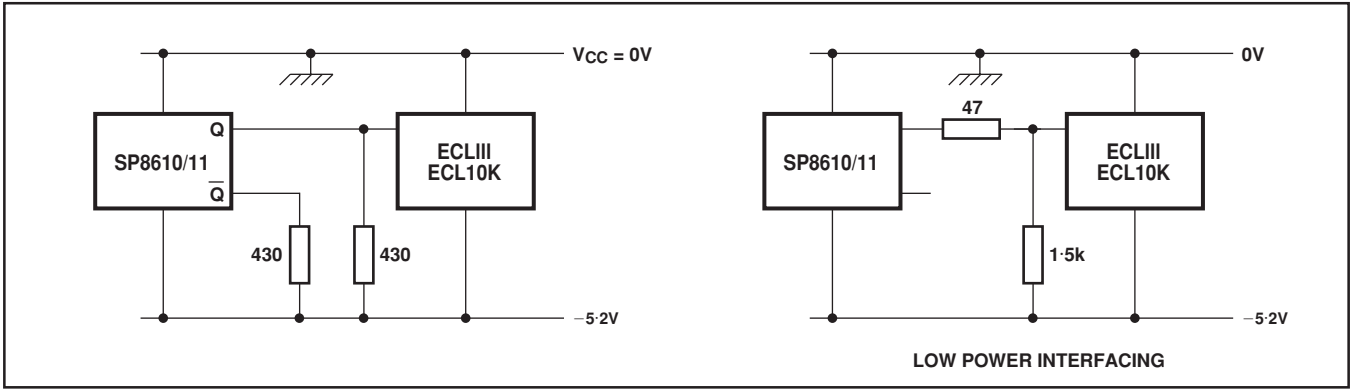


Fig. 7 Interfacing SP8610/11 to ECL10K and ECLIII

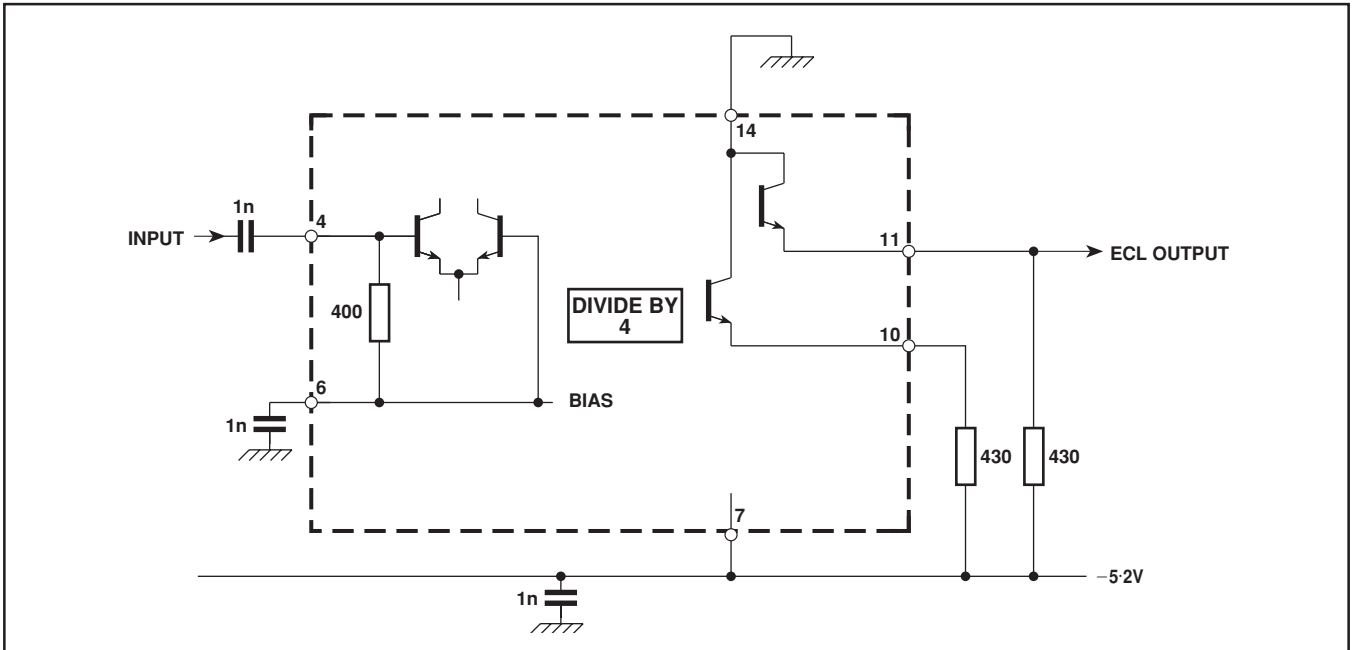
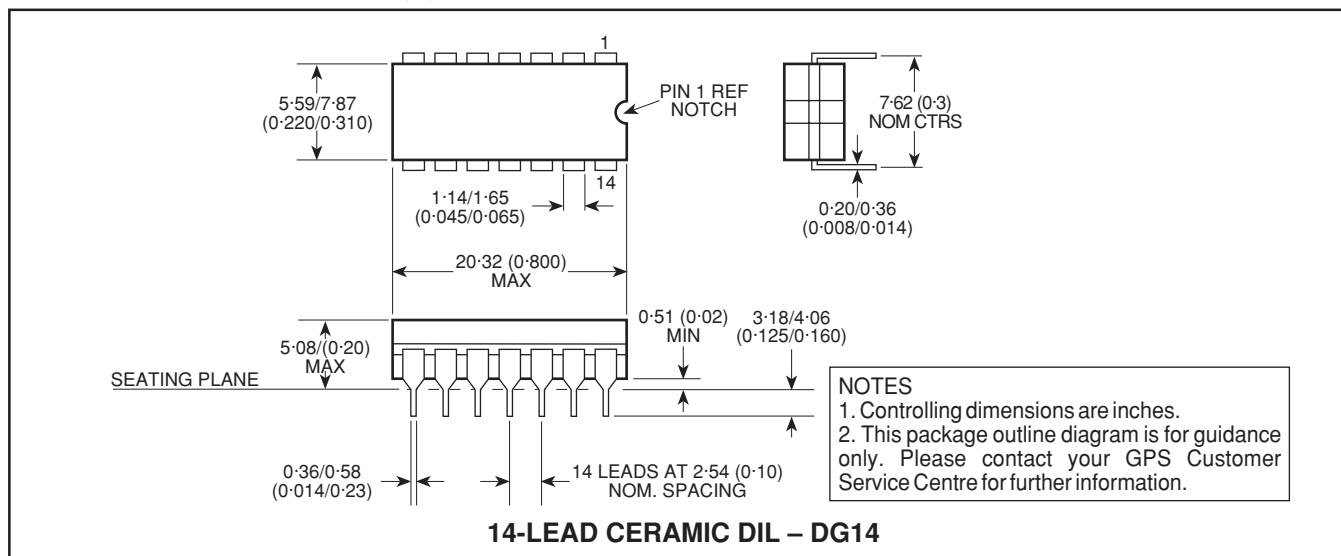


Fig. 8 Typical application showing interfacing

NOTES

**PACKAGE DETAILS**

Dimensions are shown thus: mm (in).



**NOTES**  
 1. Controlling dimensions are inches.  
 2. This package outline diagram is for guidance only. Please contact your GPS Customer Service Centre for further information.



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