T-45-19-05

SP8685A&B

500MHz ÷ 10/11

The SP8685 is an ECL variable modulus divider, with ECL 10K compatible outputs. It divides by 10 when either of the ECL control inputs, $\overline{PE1}$ or $\overline{PE2}$, is in the high state and by 11 when both are low (or open circuit).

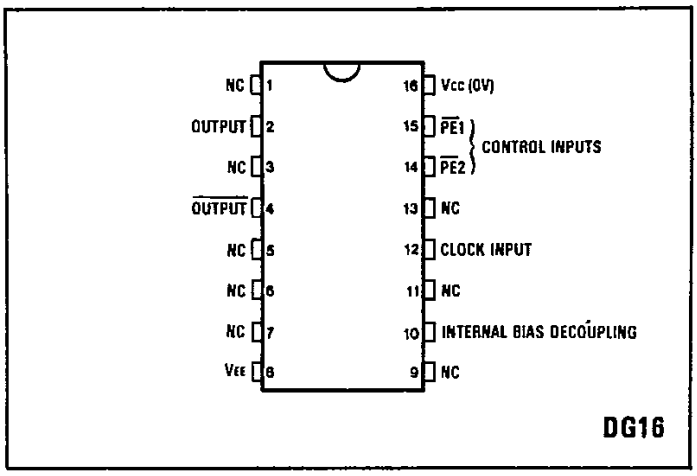


Fig.1 Pin connections - top view

FEATURES

- Divides by 10 and 11
- AC Coupled Input (Internal Bias)
- ECL Compatible Output

QUICK REFERENCE DATA

- Supply Voltage: -5.2V
- Power Consumption: 300mW
- Temperature Range:
  - -55°C to +125°C (A Grade)
  - -30°C to +70°C (B Grade)

ABSOLUTE MAXIMUM RATINGS

Supply voltage	-8V
Output current	20mA
Storage temperature range	-55°C to +150°C
Max. junction temperature	+175°C
Max. clock I/P voltage	2.5V p-p

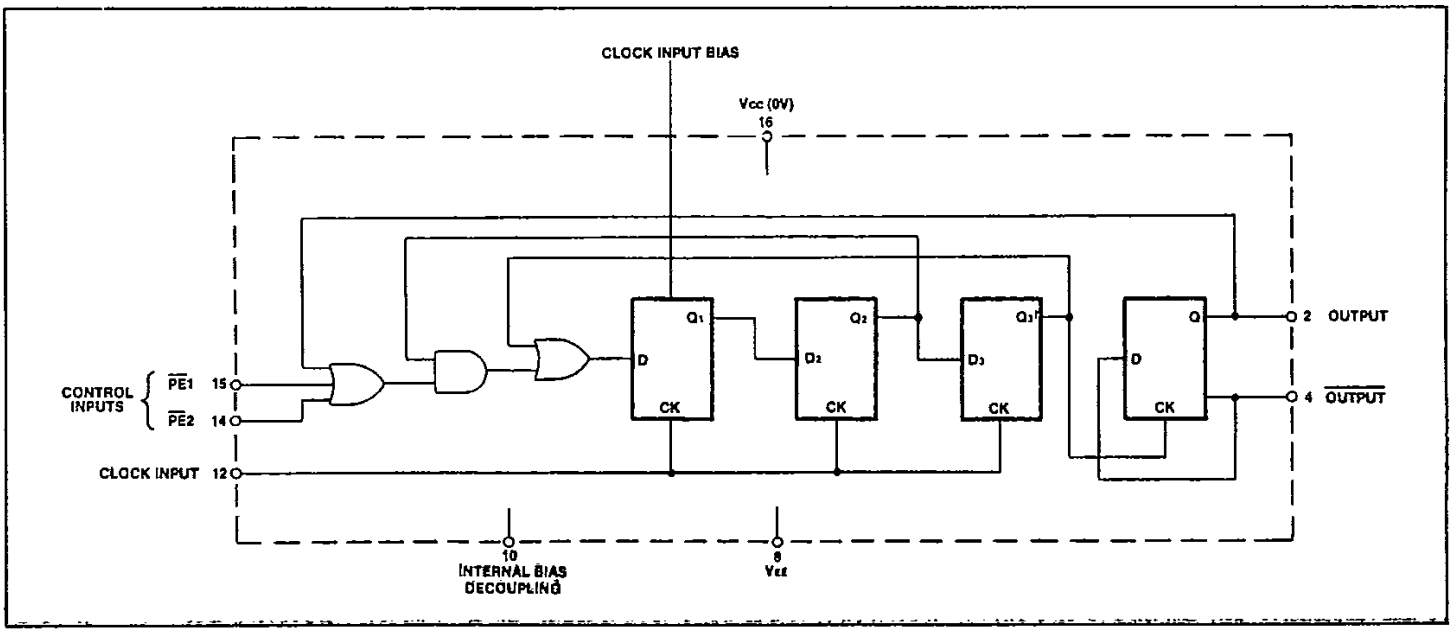


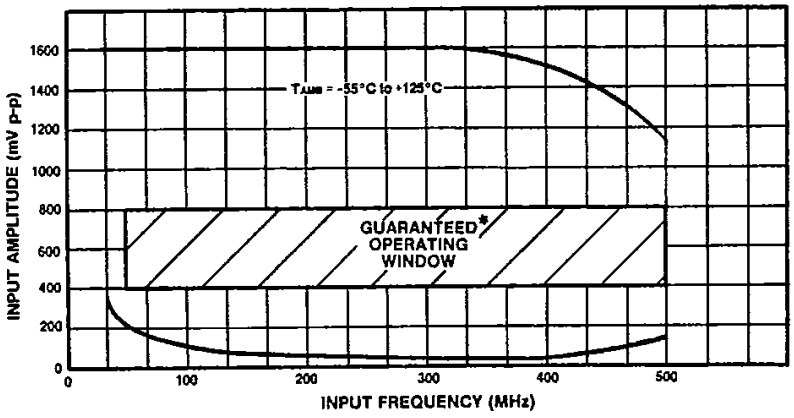
Fig.2 Functional diagram

ELECTRICAL CHARACTERISTICS

Supply Voltage: V_{CC} = 0V V_{EE} = -5.2V ± 0.25V
Temperature: A Grade T_{amb} = -55°C to +125°C
B Grade T_{amb} = -30°C to +70°C

Characteristic	Symbol	Value Min.	Value Max.	Units	Conditions	Notes
Maximum frequency (sinewave input)	f_{max}	500		MHz	Input = 400-800mV p-p	
Minimum frequency (sinewave input)	f_{min}		50	MHz	Input = 400-800mV p-p	Note 6
Power supply current	I_{EE}		70	mA	V_{EE} = -5.2V	Note 6
Output high voltage	V_{OH}	-0.87	-0.7	V	V_{EE} = -5.2V (25°C)	
Output low voltage	V_{OL}	-1.8	-1.5	V	V_{EE} = -5.2V (25°C)	
$\overline{PE}$ input high voltage	V_{INH}	-0.93		V	V_{EE} = -5.2V (25°C)	
$\overline{PE}$ input low voltage	V_{INL}		-1.62	V	V_{EE} = -5.2V (25°C)	
Clock to output delay	t_p		6	ns		Note 7
Set-up time	t_s	2		ns		Note 7
Release time	t_r	2		ns		Note 7

NOTES
1. Unless otherwise stated, the electrical characteristics shown above are guaranteed over specified supply, frequency and temperature range.
2. The temperature coefficient of V_{OH} = +1.63mV/°C, V_{OL} = +0.94mV/°C and of V_{IN} = +1.22mV/°C but these are not tested.
3. The test configuration for dynamic testing is shown in Fig.6.
4. The set up time t_s is defined as minimum time that can elapse between L ⟶ H transition of control input and the next L ⟶ H clock pulse transition to ensure that +10 is obtained.
5. The release time t_r is defined as the minimum time that can elapse between H ⟶ L transition of the control input and the next L ⟶ H clock pulse transition to ensure that the +11 mode is obtained.
6. Tested at 25°C only.
7. Guaranteed but not tested.



*Tested as specified in table of Electrical Characteristics

Fig.3 Typical input characteristic SP8685A

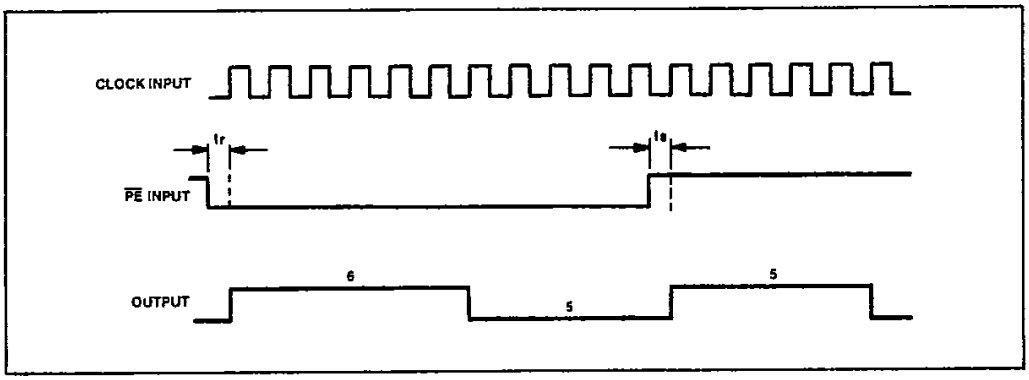


Fig.4 Timing diagram

OPERATING NOTES

1. The clock input is biased internally and is coupled to the signal source with a suitable capacitor. The input signal path is completed by an input reference decoupling capacitor which is connected to earth.
2. If no signal is present the device will self-oscillate. If this is undesirable it may be prevented by connecting a 15k resistor from clock input (Pin 12) to V_{EE}. This will reduce the input sensitivity by approximately 100mV.
3. The circuit will operate down to DC but slew rate must be better than 100V/µs.
4. The outputs are compatible with ECL II but can be interfaced to ECL 10K as shown in Fig.7.
5. The $\overline{PE}$ inputs are ECL III/10K compatible and include a 4.3k internal pulldown resistor. Unused inputs can therefore be left open.

TRUTH TABLE FOR CONTROL INPUTS

$\overline{PE1}$	$\overline{PE2}$	Division Ratio
L	L	11
H	L	10
L	H	10
H	H	10

6. Input impedance is a function of frequency. See Fig. 5.
7. All components should be suitable for the frequency in use.

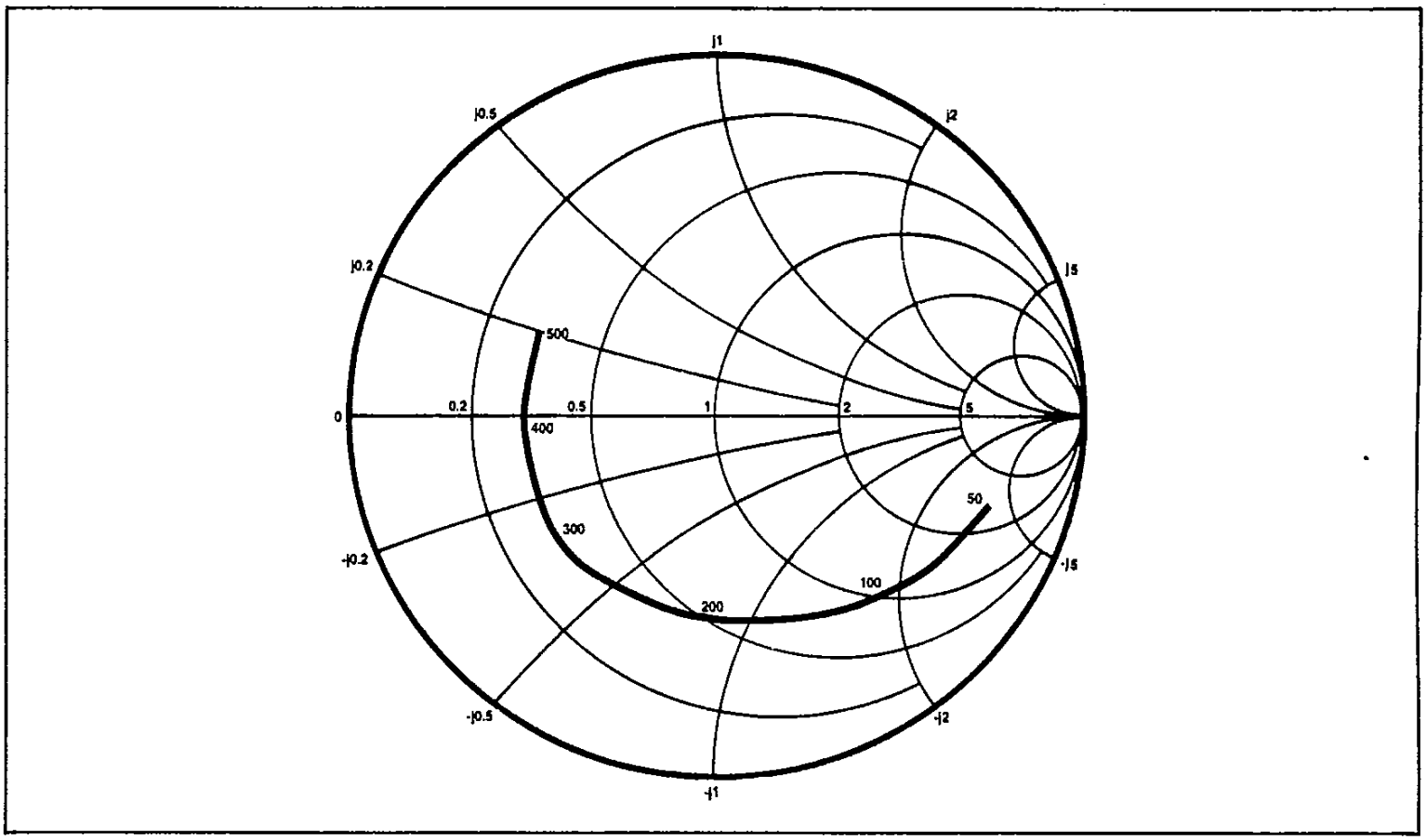


Fig.5 Typical input impedance. Test conditions: supply voltage -5.2V, ambient temperature 25° C, frequencies in MHz, impedances normalised to 50 ohms.

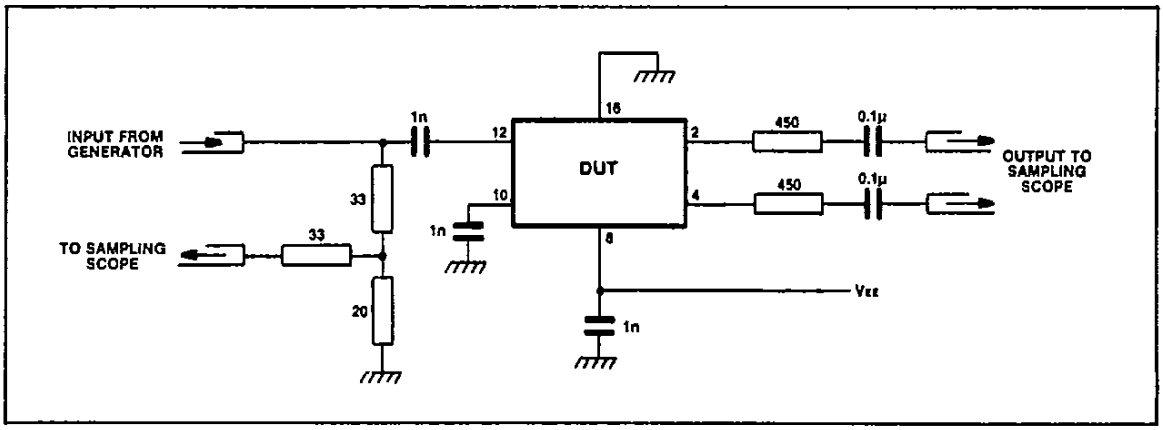


Fig.6 Test circuit

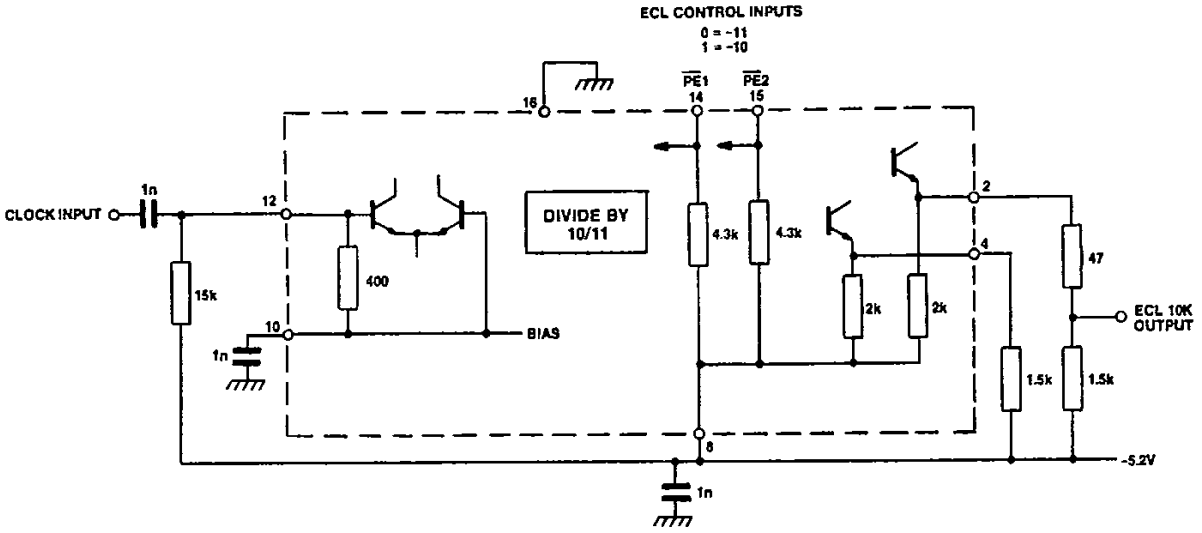


Fig.7 Typical application showing interfacing