

The SP8782 is a multi-modulus divider which divides by 16/17 when the Ratio Select input is low and by 32/33 when the Ratio Select input is high. When high, the Modulus Control input selects the lower division ratio (16 or 32) and the higher ratio (17 or 33) when it is low.

The device uses resynchronisation techniques to reduce the effects of propagation delays in frequency synthesis.

The SP8782A (ceramic DIL package) is characterised over the full military temperature range of -55°C to $+125^{\circ}\text{C}$, the SP8782B (miniature plastic DIL package) over the industrial range of -40°C to $+85^{\circ}\text{C}$

FEATURES

- Advanced Resynchronisation Techniques to Negate Loop Delay Effects
- CMOS Compatible Output Capability
- Multi-Modulus Division

QUICK REFERENCE DATA

- Supply Voltage Range: 4V to 5.5V
- Full Military Temperature Range:
 -55°C to $+125^{\circ}\text{C}$ (SP8782A)

ORDERING INFORMATION

SP8782 A DG
 SP8782 B MP
 DES9208921/AC/DG (SMD)

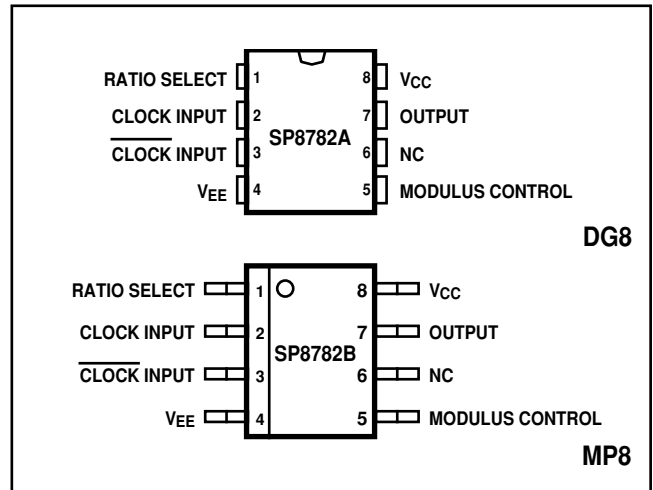


Fig. 1 Pin connections - top view (not to scale)

ABSOLUTE MAXIMUM RATINGS

Supply voltage	6V
Clock input level	2.5V p-p
Junction temperature	$+175^{\circ}\text{C}$
Storage temperature range:	
SP8782A	-55°C to $+150^{\circ}\text{C}$
SP8782B	-55°C to $+125^{\circ}\text{C}$

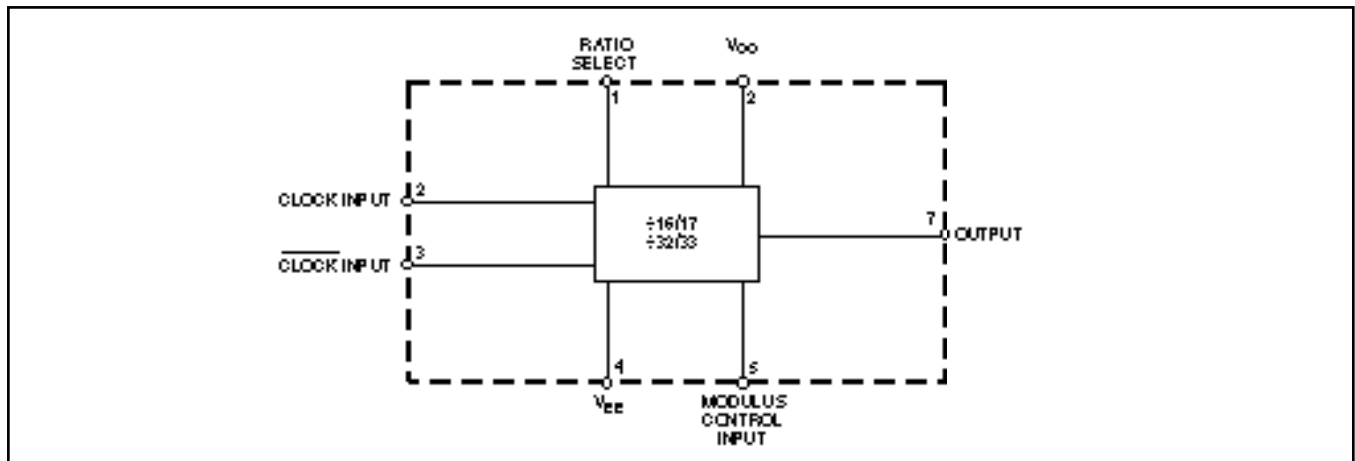


Fig. 2 Functional diagram

ELECTRICAL CHARACTERISTICS

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

Supply voltage, $V_{CC} = +4V$ to $+5.5V$, $V_{EE} = 0V$

Temperature, $T_{AMB} = -55^{\circ}C$ to $+125^{\circ}C$ (SP8782A), $-40^{\circ}C$ to $+85^{\circ}C$ (SP8782B)

Characteristic	Pin	Value		Units	Conditions
		Min.	Max.		
Maximum frequency (sinewave input)	2, 3	1		GHz	Input = 200-1200mV p-p
Minimum frequency (sinewave input)	2, 3		50	MHz	Input = 400-1200mV p-p
Min slew rate for low frequency operation	2, 3		100	V/ μ s	
Power supply current, I_{CC}	8		60	mA	Output unloaded, $V_{CC} = 5.5V$
Output low voltage	7	0	1.7	V	
Output high voltage	7	$V_{CC} - 1.4$	V_{CC}	V	
Modulus control input high voltage	5	$0.7V_{CC}$	V_{CC}	V	At driver end of 3k resistor
Modulus control input low voltage	5	0	$0.3V_{CC}$	V	At driver end of 3k resistor
Modulus control input high current	5	0.6	1.2	mA	Via 3k resistor to V_{CC}
Modulus control input low current	5	-0.6	-1.2	mA	Via 3k resistor to V_{CC}
Ratio select input high voltage	1	$0.6V_{CC}$	V_{CC}	V	
Ratio select input low voltage	1	0	$0.4V_{CC}$	V	
Ratio select input current	1	-10	10	μ A	
Clock to output propagation delay	2, 3, 7		3	ns	
Set-up time, t_s	5, 7	3		ns	See note 1 and Fig. 3a
Release time, t_r	5, 7	3		ns	See note 2 and Fig. 3b

NOTES

1. The set-up time t_s is defined as the minimum time that can elapse between L H transition of the modulus control input and the next L H output transition to ensure that the $\div 16$ (32) mode is obtained.

2. The release time t_r is defined as the minimum time that can elapse between H L transition of the modulus control input and the next L H output transition to ensure that the $\div 17$ (33) mode is obtained.

Modulus control input	Ratio select input	
	0	1
0	$\div 17$	$\div 33$
1	$\div 16$	$\div 32$

Table 1 Truth table for control inputs

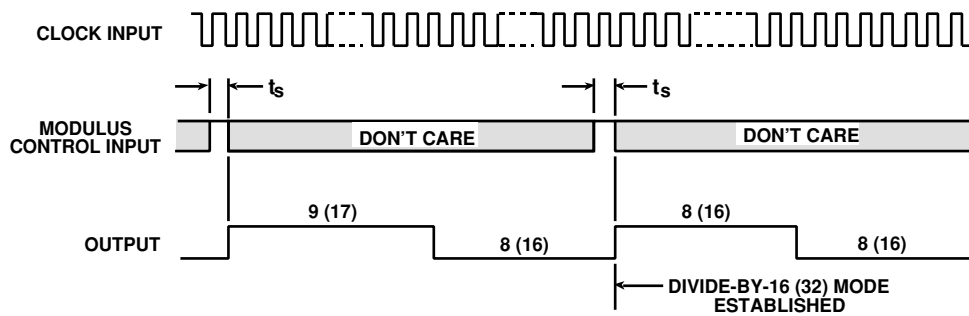


Fig. 3a Setting divide-by-16 (32) mode

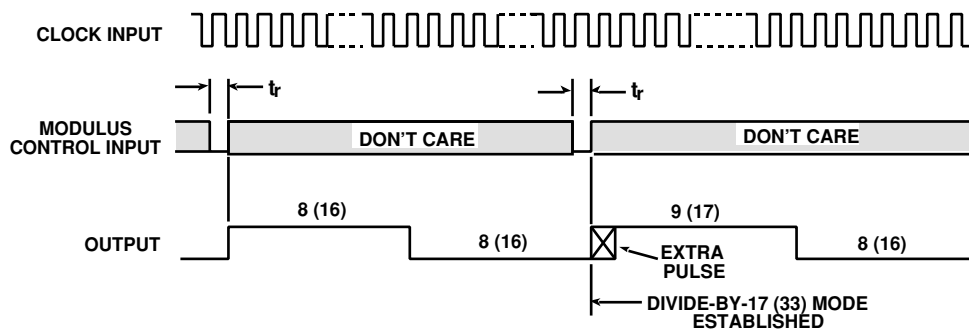


Fig. 3b Setting divide-by-17 (33) mode

Fig. 3 Timing diagrams

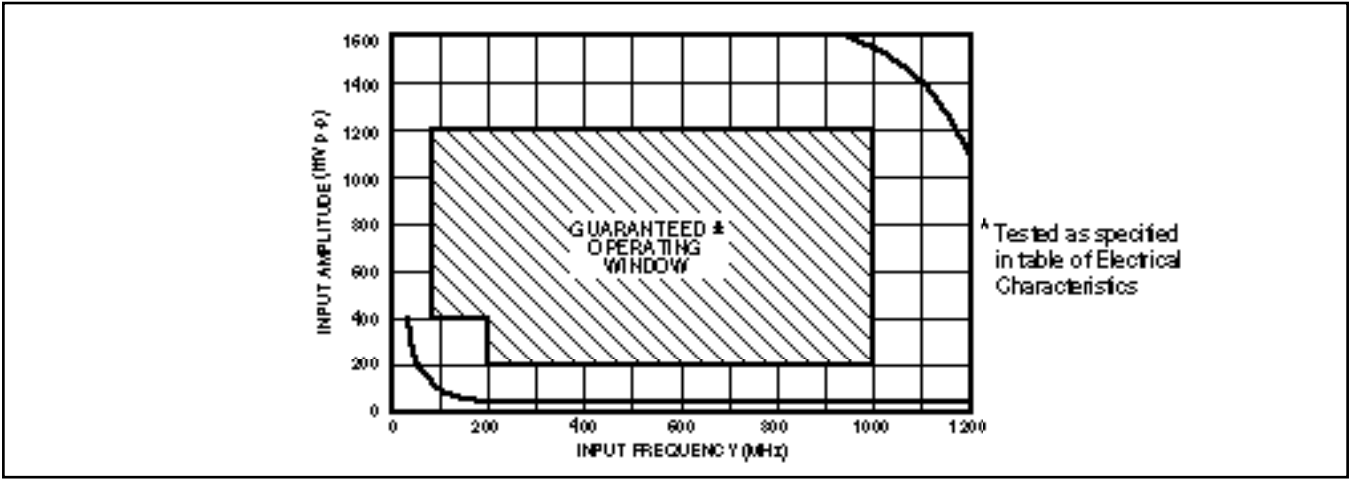
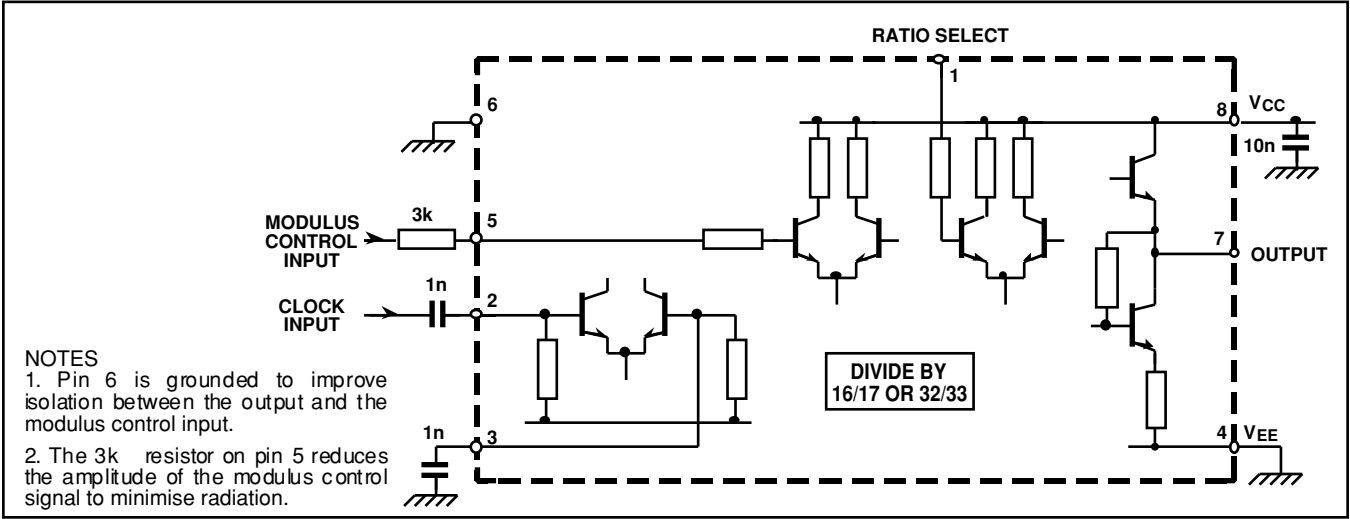


Fig. 4 Typical input characteristics



NOTES
 1. Pin 6 is grounded to improve isolation between the output and the modulus control input.
 2. The 3k resistor on pin 5 reduces the amplitude of the modulus control signal to minimise radiation.

Fig. 5 Typical application showing interfacing

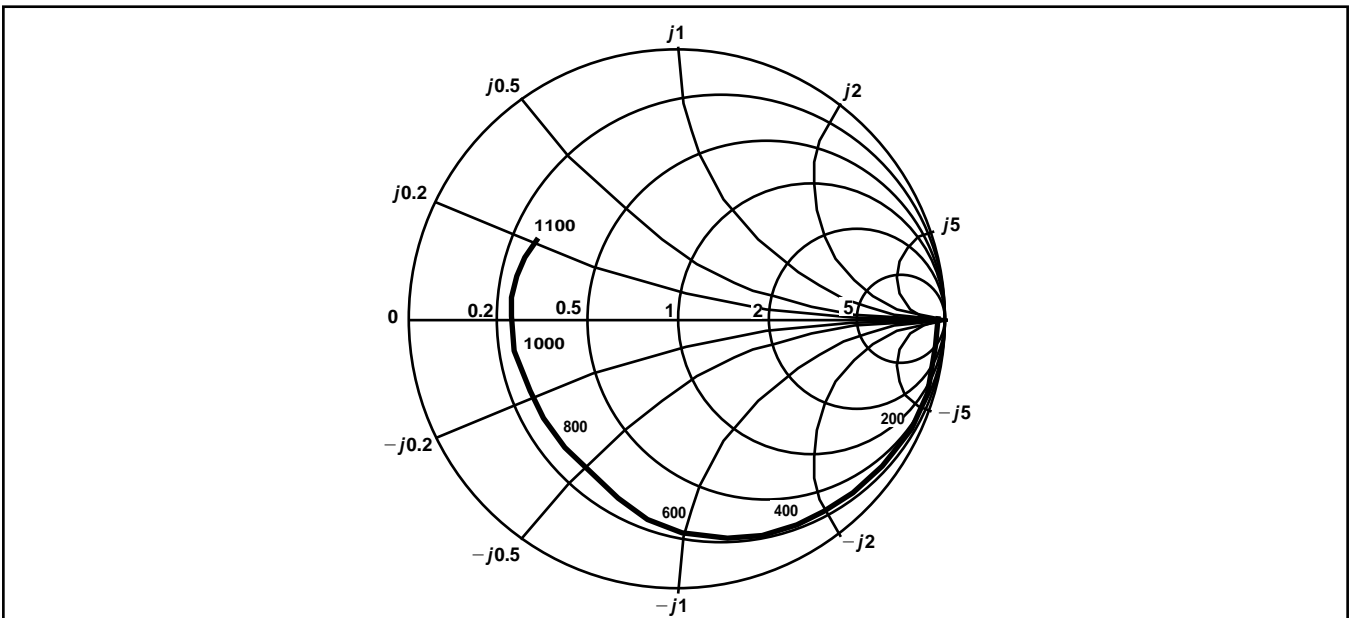
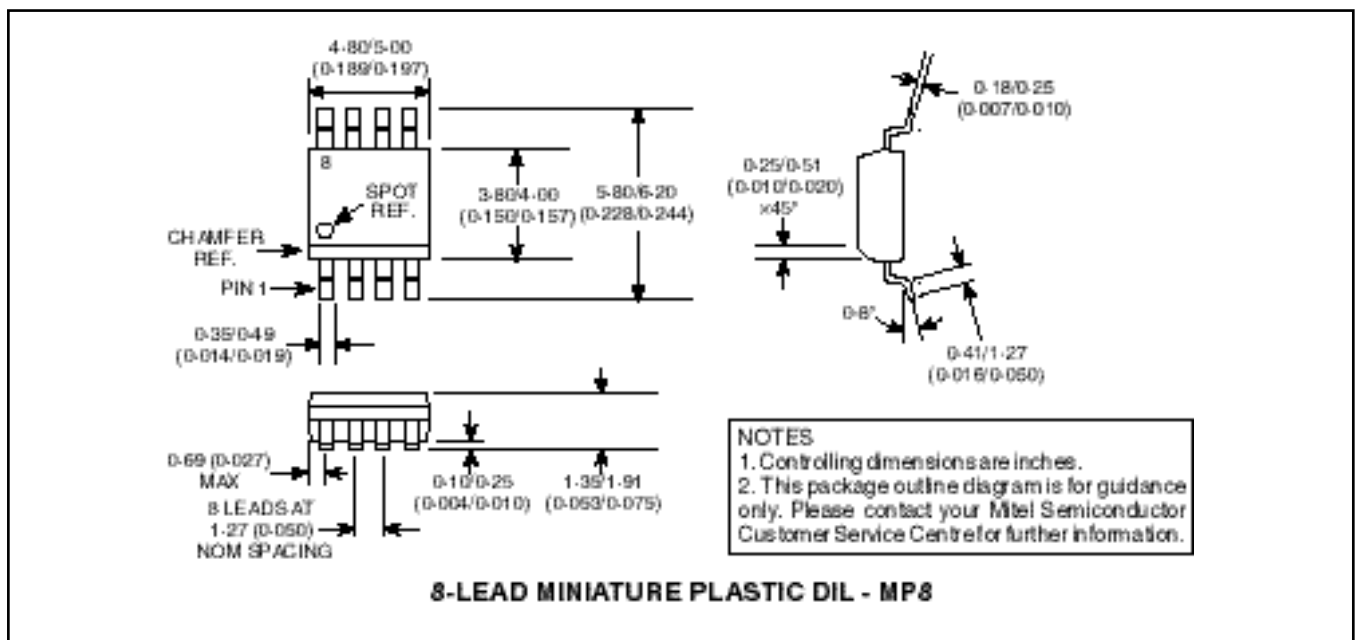
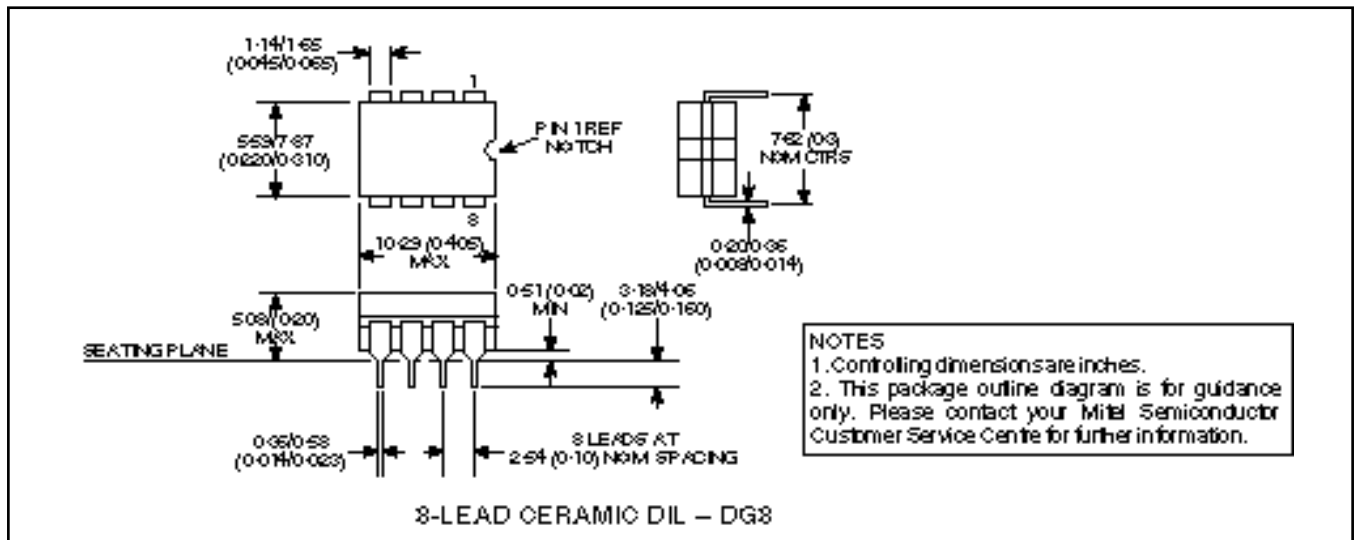


Fig. 6 Typical input impedance. Test conditions: supply voltage = 5V, ambient temperature = 25°C, frequencies in MHz, Impedances normalised to 50

PACKAGE DETAILS

Dimensions are shown thus: mm (in).





HEADQUARTERS OPERATIONS

MITEL SEMICONDUCTOR

Cheney Manor, Swindon,
Wiltshire SN2 2QW, United Kingdom.
Tel: (01793) 518000
Fax: (01793) 518411

MITEL SEMICONDUCTOR

1500 Green Hills Road,
Scotts Valley, California 95066-4922
United States of America.
Tel (408) 438 2900
Fax: (408) 438 5576/6231

Internet: <http://www.gpsemi.com>

CUSTOMER SERVICE CENTRES

- **FRANCE & BENELUX** Les Ulis Cedex Tel: (1) 69 18 90 00 Fax : (1) 64 46 06 07
- **GERMANY** Munich Tel: (089) 419508-20 Fax : (089) 419508-55
- **ITALY** Milan Tel: (02) 6607151 Fax: (02) 66040993
- **JAPAN** Tokyo Tel: (03) 5276-5501 Fax: (03) 5276-5510
- **KOREA** Seoul Tel: (2) 5668141 Fax: (2) 5697933
- **NORTH AMERICA** Scotts Valley, USA Tel: (408) 438 2900 Fax: (408) 438 5576/6231
- **SOUTH EAST ASIA** Singapore Tel:(65) 3827708 Fax: (65) 3828872
- **SWEDEN** Stockholm Tel: 46 8 702 97 70 Fax: 46 8 640 47 36
- **TAIWAN, ROC** Taipei Tel: 886 2 25461260 Fax: 886 2 27190260
- **UK, EIRE, DENMARK, FINLAND & NORWAY**
Swindon Tel: (01793) 726666 Fax : (01793) 518582

These are supported by Agents and Distributors in major countries world-wide.

© Mitel Corporation 1998 Publication No. DS3653 Issue No. 1.2 October 1995

TECHNICAL DOCUMENTATION – NOT FOR RESALE. PRINTED IN UNITED KINGDOM

This publication is issued to provide information only which (unless agreed by the Company in writing) may not be used, applied or reproduced for any purpose nor form part of any order or contract nor to be regarded as a representation relating to the products or services concerned. No warranty or guarantee express or implied is made regarding the capability, performance or suitability of any product or service. The Company reserves the right to alter without prior notice the specification, design or price of any product or service. Information concerning possible methods of use is provided as a guide only and does not constitute any guarantee that such methods of use will be satisfactory in a specific piece of equipment. It is the user's responsibility to fully determine the performance and suitability of any equipment using such information and to ensure that any publication or data used is up to date and has not been superseded. These products are not suitable for use in any medical products whose failure to perform may result in significant injury or death to the user. All products and materials are sold and services provided subject to the Company's conditions of sale, which are available on request.

All brand names and product names used in this publication are trademarks, registered trademarks or trade names of their respective owners.