



Obsolescence Notice

This product is obsolete.

This information is available for your convenience only.

For more information on Zarlink's obsolete products and replacement product lists, please visit http://products.zarlink.com/obsolete_products/

***THIS DOCUMENT IS FOR MAINTENANCE
PURPOSES ONLY AND IS NOT
RECOMMENDED FOR NEW DESIGNS***

SL521

150MHz WIDEBAND LOG AMPLIFIER

The SL521A, B and C are bipolar monolithic Integrated circuit wideband amplifiers, intended primarily for use in successive detection logarithmic IF strips, operating at centre frequencies between 10MHz and 100MHz. The devices provide amplification, limiting and rectification, are suitable for direct coupling and incorporate supply line decoupling. The mid-band voltage gain of the SL521 is typically 12dB (4 times). The SL521A, B and C differ mainly in the tolerance of voltage gain and upper cut-off frequency.

The device is also available as the 5962-90792 which has guaranteed operation over the full Military Temperature Range and is screened to MIL-STD-883 Class B. Data is available separately.

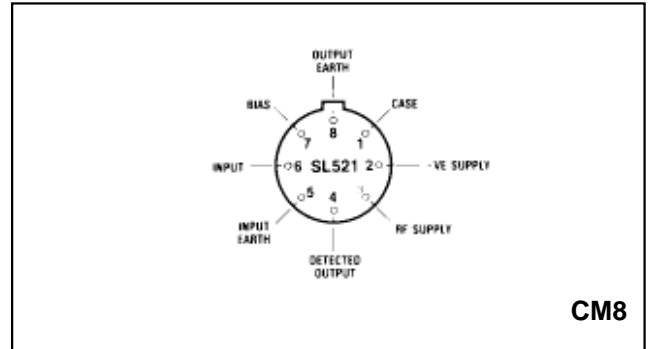


Fig.1 Pin connections - bottom view

FEATURES

- Wide Defined Gain
- 4dB Noise Figure
- High I/P impedance
- Low O/P impedance
- 165MHz Bandwidth
- On Chip Supply Decoupling
- Low External Component Count

ABSOLUTE MAXIMUM RATINGS (Non-simultaneous)

Storage temperature range	-65°C to +150°C
Operating temperature range	-55°C to +125°C
Chip operating temperature	+175°C
Chip-to-ambient thermal resistance	225°C/W
Chip-to-case thermal resistance	65°C/W
Maximum instantaneous voltage at	
Video output	+12V
Supply voltage	+9V

ORDERING INFORMATION

SL521 A CM 5962-90792 (SMD)
SL521 B CM
SL521 C CM

APPLICATIONS

- Logarithmic IF Strips with Gains up to 108dB and Linearity better than 1dB

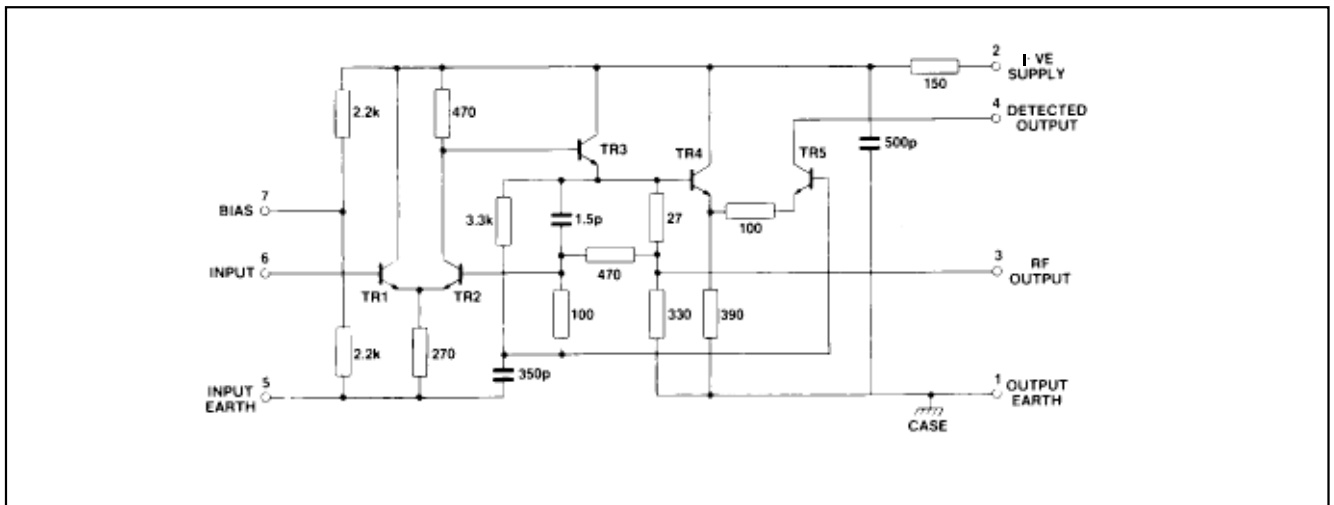


Fig.2 Circuit diagram SL521

ELECTRICAL CHARACTERISTICS

These characteristics are guaranteed over the following conditions (unless otherwise stated)

- Temperature = +22°C + 2°C
- Supply voltage = +6V
- DC connection between input and bias pins.

Characteristic	Circuits	Value			Units	Conditions
		Min.	Typ.	Max.		
Voltage gain, f = 30MHz	A	11.5		12.5	dB	10 ohms source, 8pF load
	B	11.3		12.7	dB	
	C	11.0		13.0	dB	
Voltage gain, f = 60MHz	A	11.3		12.7	dB	
	B	11.0		13.0	dB	
	C	10.7		13.3	dB	
Upper cut-off frequency (Fig. 3)	A	150	170		MHz	10 ohms source, 8pF load
	B	140	170		MHz	
	C	130	170		MHz	
Lower cut-off frequency (Fig. 3)	A B C		5	7	MHz	10 ohms source, 8pF load
Propagation delay	A B C		2		ns	
Maximum rectified video output current (Fig. 4 and 5)	A	1.00		1.10	mA	f = 60MHz, 0.5V rms input
	B	0.95		1.15	mA	
	C	0.90		1.20	mA	
Variation of gain with supply voltage	A B C		0.7		db/V	
Variation of maximum rectified output current with supply voltage	A B C		25		%/V	
Maximum input signal before overload	A B C	1.8	1.9		V rms	See note below f = 60MHz, Rs = 450 ohms
Noise figure (Fig. 6)			4	5.25	dB	
Supply current	A	12.5	15.0	18.0	mA	
	B	12.5	15.0	18.0	mA	
	C	11.5	15.0	19.0	mA	
Maximum RF output voltage			1.2		Vp-p	

Note: Overload occurs when the input signal reaches a level sufficient to forward bias the base-collector junction to TR2 on peaks.

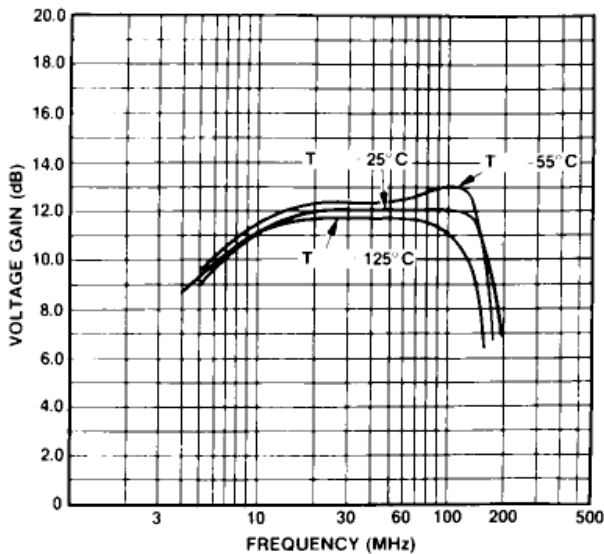


Fig.3 Voltage gain v. frequency (typical)

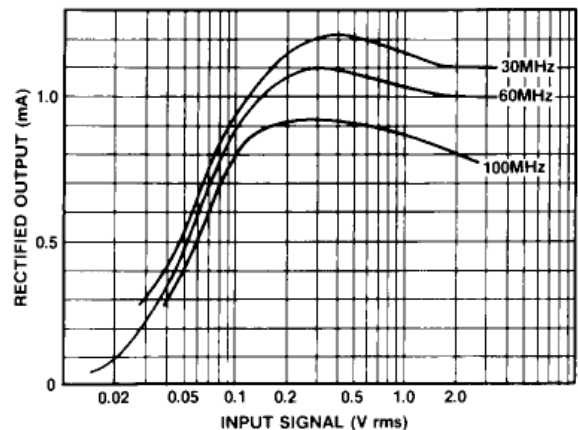


Fig.4 Rectified output current v. input signal (typical)

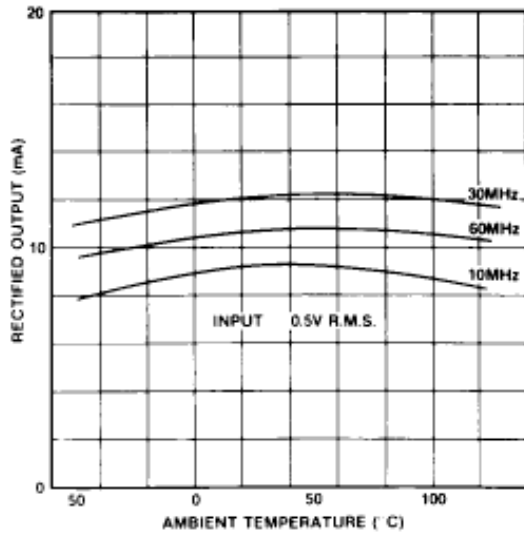


Fig.5 Maximum rectified output current v. temperature (typical)

OPERATING NOTES

The amplifiers are intended for use directly coupled, as shown in Fig 8.

The seventh stage in an untuned cascade will be giving virtually full output on noise.

Noise may be reduced by inserting a single tuned circuit in the chain. As there is a large mismatch between stages a simple shunt or series circuit cannot be used. The choice of network is also controlled by the need to avoid distorting the logarithmic law; the network must give unity voltage transfer at resonance. A suitable network is shown in Fig 9. The value of C1 must be chosen so that at resonance its admittance equals the total loss conductance across the tuned circuit. Resistor R1 may be introduced to improve the symmetry of filter response, providing other values are adjusted for unity gain at resonance.

A simple capacitor may not be suitable for decoupling the output line if many stages and fast rise times are required. Alternative arrangements may be derived, based on the parasitic parameters given.

Values of positive supply line decoupling capacitor required for untuned cascades are given below. Smaller values can be used in high frequency tuned cascades.

	Number of stages			
	6 or more	5	4	3
Minimum capacitance	30nF	10nF	3nF	1nF

The amplifiers have been provided with two earth leads to avoid the introduction of common ground lead inductance between input and output circuits. The equipment designer should take care to avoid the subsequent introduction of such inductance.

The 500pF supply decoupling capacitor has a resistance of, typically, 1 0Q. It is a junction type having a low breakdown voltage and consequently the positive supply current will increase rapidly if the supply voltage exceeds 7.5V (see Absolute Maximum Ratings).

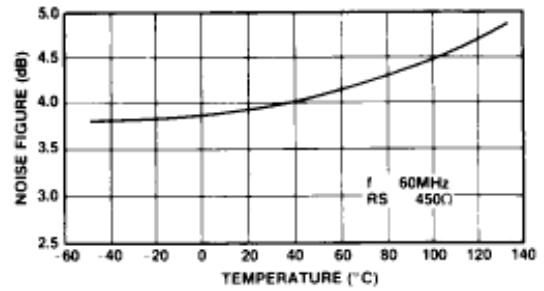


Fig.6 Noise figure v. temperature (typical)

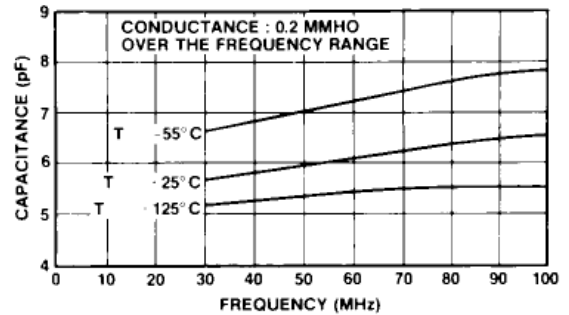


Fig.7 Input admittance with open-circuit output (typical)

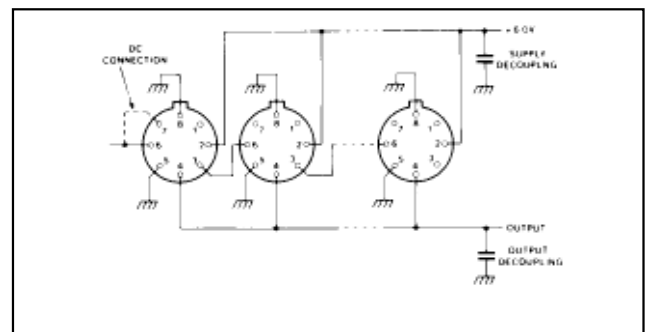


Fig.8 Direct Coupled amplifiers

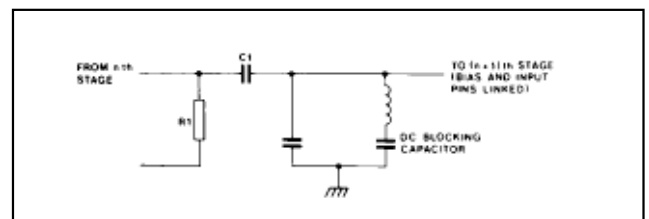


Fig.9 Suitable interstage-tuned circuit

SL521

Parasitic Feedback Parameters (Approximate)

The quotation of these parameters does not indicate that elaborate decoupling arrangements are required, the amplifier has been designed specifically to avoid this requirement. The parameters have been given so that the necessity or otherwise of further decoupling, may become a matter of calculation rather than guesswork.

$$\frac{\tilde{I}_4}{V_6} = \frac{\text{RF current component from pin 4}}{\text{Voltage at pin 6}} = 20 \text{ mmhos}$$

(This figure allows for detector being forward biased by noise signals).

$$\frac{V_4}{V_6} = \frac{\text{Effective voltage induced at pin 6}}{\text{Voltage at pin 4}} = 0.003$$

$$\frac{I_2}{V_6} = \frac{\text{Current from pin 2}}{\text{Voltage at pin 6}} = 6 \text{ mmhos (f = 10MHz)}$$

$$\left[\frac{V_6}{V_2} \right]_a = \frac{\text{Voltage induced at pin 6}}{\text{Voltage at pin 2}} = 0.03 \text{ (f = 10MHz)}$$

Voltage at pin 2
(pin joined to pin 7 and
fed from 300Ω source)

$$\left[\frac{V_6}{V_2} \right]_b = \frac{\text{Voltage induced at pin 6}}{\text{Voltage at pin 2}} = 0.01 \text{ (f = 10MHz)}$$

Voltage at pin 2
(pin 7 decoupled)

$$\frac{I_2}{V_6} \left[\frac{V_6}{V_2} \right]_a \left[\frac{V_6}{V_2} \right]_b \text{ decrease with frequency above 10MHz at 6dB/octave}$$



HEADQUARTERS OPERATIONS
GEC PLESSEY SEMICONDUCTORS
Cheney Manor, Swindon,
Wiltshire SN2 2QW, United Kingdom.
Tel: (0793) 518000
Fax: (0793) 518411

GEC PLESSEY SEMICONDUCTORS
P.O. Box 660017
1500 Green Hills Road,
Scotts Valley, California 95067-0017,
United States of America.
Tel: (408) 438 2900
Fax: (408) 438 5576

CUSTOMER SERVICE CENTRES

- **FRANCE & BENELUX** Les Ulis Cedex Tel: (1) 64 46 23 45 Fax : (1) 64 46 06 07
- **GERMANY** Munich Tel: (089) 3609 06-0 Fax : (089) 3609 06-55
- **ITALY** Milan Tel: (02) 66040867 Fax: (02) 66040993
- **JAPAN** Tokyo Tel: (03) 5276-5501 Fax: (03) 5276-5510
- **NORTH AMERICA** Scotts Valley, USA Tel (408) 438 2900 Fax: (408) 438 7023.
- **SOUTH EAST ASIA** Singapore Tel: (65) 3827708 Fax: (65) 3828872
- **SWEDEN** Stockholm, Tel: 46 8 702 97 70 Fax: 46 8 640 47 36
- **UK, EIRE, DENMARK, FINLAND & NORWAY**
Swindon Tel: (0793) 518510 Fax : (0793) 518582

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

© GEC Plessey Semiconductors 1994

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 knowledge 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.



**For more information about all Zarlink products
visit our Web Site at
www.zarlink.com**

Information relating to products and services furnished herein by Zarlink Semiconductor Inc. or its subsidiaries (collectively "Zarlink") is believed to be reliable. However, Zarlink assumes no liability for errors that may appear in this publication, or for liability otherwise arising from the application or use of any such information, product or service or for any infringement of patents or other intellectual property rights owned by third parties which may result from such application or use. Neither the supply of such information or purchase of product or service conveys any license, either express or implied, under patents or other intellectual property rights owned by Zarlink or licensed from third parties by Zarlink, whatsoever. Purchasers of products are also hereby notified that the use of product in certain ways or in combination with Zarlink, or non-Zarlink furnished goods or services may infringe patents or other intellectual property rights owned by Zarlink.

This publication is issued to provide information only and (unless agreed by Zarlink 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. The products, their specifications, services and other information appearing in this publication are subject to change by Zarlink without notice. No warranty or guarantee express or implied is made regarding the capability, performance or suitability 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. Manufacturing does not necessarily include testing of all functions or parameters. 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 Zarlink's conditions of sale which are available on request.

Purchase of Zarlink's I²C components conveys a licence under the Philips I²C Patent rights to use these components in and I²C System, provided that the system conforms to the I²C Standard Specification as defined by Philips.

Zarlink, ZL and the Zarlink Semiconductor logo are trademarks of Zarlink Semiconductor Inc.

Copyright Zarlink Semiconductor Inc. All Rights Reserved.

TECHNICAL DOCUMENTATION - NOT FOR RESALE
