PLESSEY
Semiconductors

SL1521, A, B & C

WIDEBAND AMPLIFIERS

The SL1521A, B and C are wide band amplifiers intended for use in successive detection logarithmic IF strips operating at centre frequencies of up to 200MHz. It is a plug in replacement for the SL521 series of RF amplifiers. The mid-band voltage gain of the SL1521 is typically 12dB. The SL1521 A, B and C differ mainly in the tolerance of voltage gain.

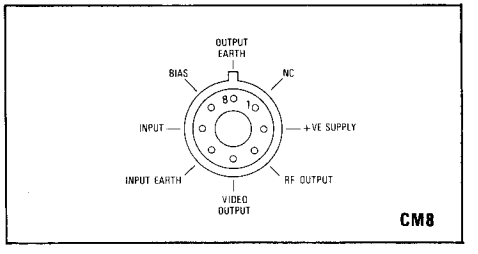

Fig. 1 Pin connections

APPLICATIONS

- Radar IF Strips
- Wideband Amplification

ABSOLUTE MAXIMUM RATINGS

Storage temperature	−55°C to +150°C
Operating temperature	−55°C to +125°C
Maximum chip operating temperature	150°C
Chip to ambient thermal resistance	250°C/W

Test circuits: see Fig.8

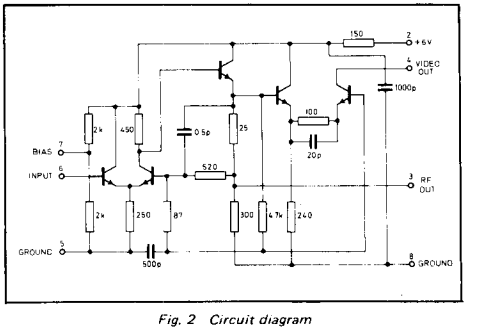

Fig. 2 Circuit diagram

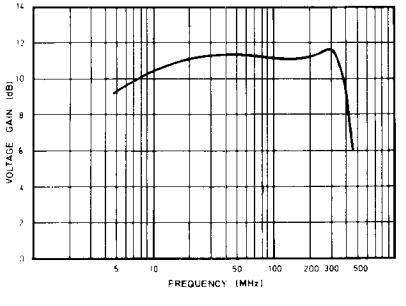

Fig. 3 Voltage gain v. frequency

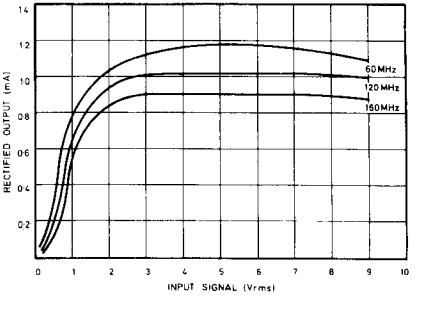

Fig. 4 Rectified output current v. input signal

ELECTRICAL CHARACTERISTICS

Test conditions (unless otherwise stated):
Temperature = +22°C ±2°C
Supply voltage = +5.2V
DC connection between input and bias pins.

Characteristic	Circuit	Value			Units	Conditions
		Min.	Typ.	Max.		
Voltage gain, f = 120 MHz	SL1521 A	11.5		12.5	dB	
	SL1521 B	11.2		12.8	dB	3mVrms input
	SL1521 C	10.8		13.1	dB	50 ohms source
Voltage gain, f = 160MHz	SL1521 A	11.2		12.8	dB	4pF load + 500 Ω
	SL1521 B	11.0		13.0	dB	
	SL1521 C	10.6		13.4	dB	
Upper cut-off frequency	SL1521 A	315	350		MHz	
	SL1521 B	315	350		MHz	50 ohms source
	SL1521 C	300	350		MHz	
Lower cut-off frequency	All types		6	10	MHz	50 ohms source
Propagation delay	All types		0.6		ns	
Maximum rectified video output current	SL1521 A	0.95		1.05	mA	f = 120 MHz
	SL1521 B	0.90		1.10	mA	0.5Vrms input
	SL1521 C	0.90		1.20	mA	4pF load, no RL
Variation of gain with supply voltage	All types		1.0		dB/V	
Variation of maximum rectified output current with supply voltage	All types		30		%/V	
Maximum input signal before overload	All types		1.5		V rms	See note below
Noise figure			3	4.5	dB	f = 120 MHz, source
Supply current	All types	10.0	15.0	20.0	mA	resistance optimised
Maximum RF output voltage	All types	1.0			Vp-p	

Note: Overload occurs when the input signal reaches a level sufficient to forward bias the base-collector junction to TR1 on peaks.

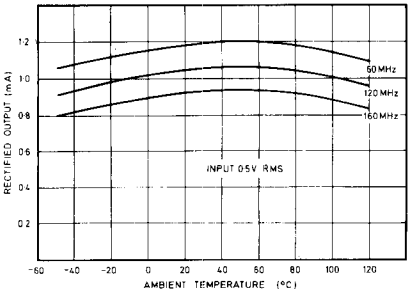

Fig. 5 Maximum rectified output current v. temperature

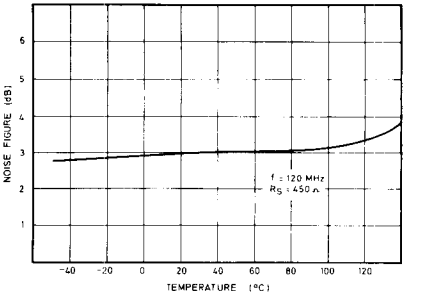

Fig. 6 Typical noise figure v. temperature

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.

A simple capacitor may not be suitable for decoupling the output line if many stages and fast rises times are required.

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

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

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

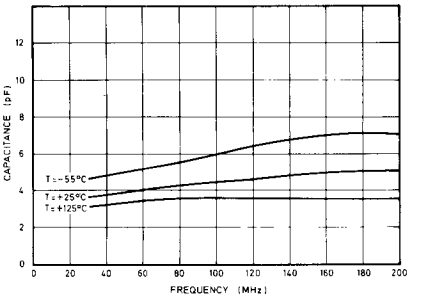

Fig. 7 Input admittance with open-circuit output

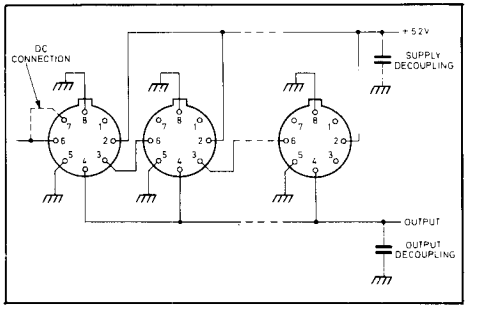

Fig. 8 Direct coupled amplifiers

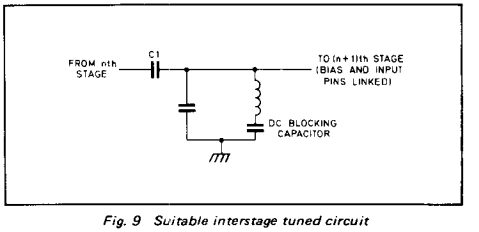

Fig. 9 Suitable interstage tuned circuit