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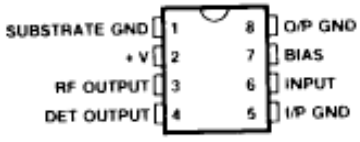
SL1615

WIDEBAND LOG IF STRIP AMPLIFIER

The SL1615 is a bipolar monolithic integrated circuit wideband amplifier intended for use in successive detection logarithmic IF strips, operating at centre frequencies between 10MHz and 60MHz. The device provides amplification, limiting and rectification, is suitable for direct coupling and incorporates supply line decoupling. The mid-band voltage gain of the SL1615 is typically 12dB.



MP8

Fig.1 Pin connections - top view

FEATURES

- Well Defined Gain
- 4.5dB Noise Figure
- High I/P impedance
- Low O/P impedance
- 150MHz Bandwidth
- On-Chip Supply Decoupling
- Low External Component Count

APPLICATIONS

- Logarithmic IF Strips with Gains up to 108dB and Linearity Better than 2dB
- Low Cost Radar
- Radio Telephone Filed Strength Meters

ABSOLUTE MAXIMUM RATINGS

Storage temperature range	-55°C to +150°C
Operating temperature range	-30°C to +85°C
Thermal resistance	
Chip-to-ambient	163°C/W
Chip-to-case	57°C/W
Maximum instantaneous voltage at video output	+12V
Supply voltage	9V

ORDERING INFORMATION

SL1615 NA MP

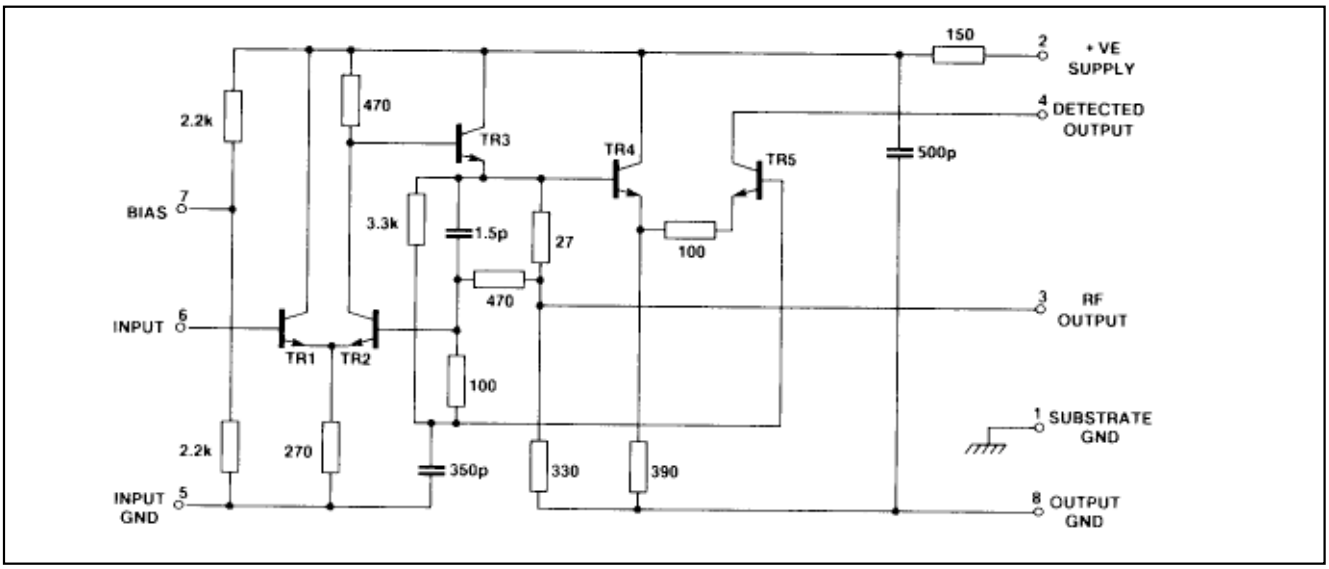


Fig.2 Circuit diagram

ELECTRICAL CHARACTERISTICS

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

Temperature = +22°C ±2°C, Supply Voltage = +6V, DC Connection between Input and Bias Pins

Characteristic	Value			Units	Conditions
	Min.	Typ.	Max.		
Voltage Gain, f = 30MHz	10		14	dB	10Ω Source, 8pF Load
Voltage Gain, f = 60MHz	10.7		13.3	dB	10Ω Source, 8pF Load
Upper Cut-off frequency (Fig.3)	130	170		MHz	10Ω Source, 8pF Load
Lower Cut-off frequency (Fig.3)		5		MHz	10Ω Source, 8pF Load
Propagination Delay		2		ns	
Maximum rectified Video Output Current (Fig.4 and 5)	0.80		1.40	mA	f = 60MHz, 0.5V rms Input
Variation of Gain with Supply Voltage		0.7		db/V	
Variation of Maximum Rectified Output Current with Supply Voltage		25		%/V	
Maximum Input Signal before Overload	1.8	1.9		V/rms	See Note below
Noise Figure (Fig.6)		4		dB	f = 60MHz, Rs = 450Ω
Supply Current	11.5		20	mA	
Maximum RF Output Voltage		1.2		Vp-p	

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

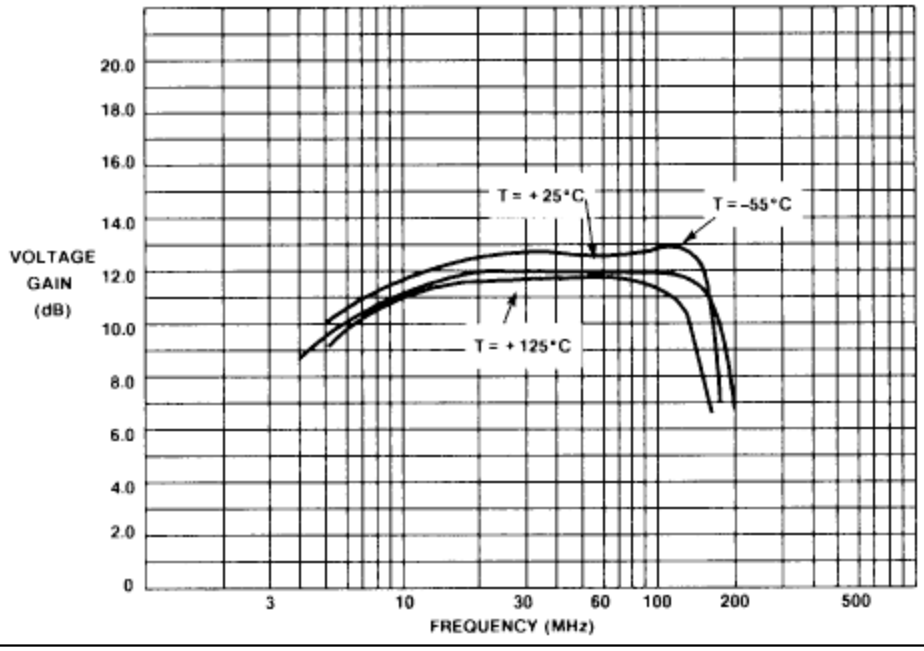


Fig.3 Voltage gain v. frequency

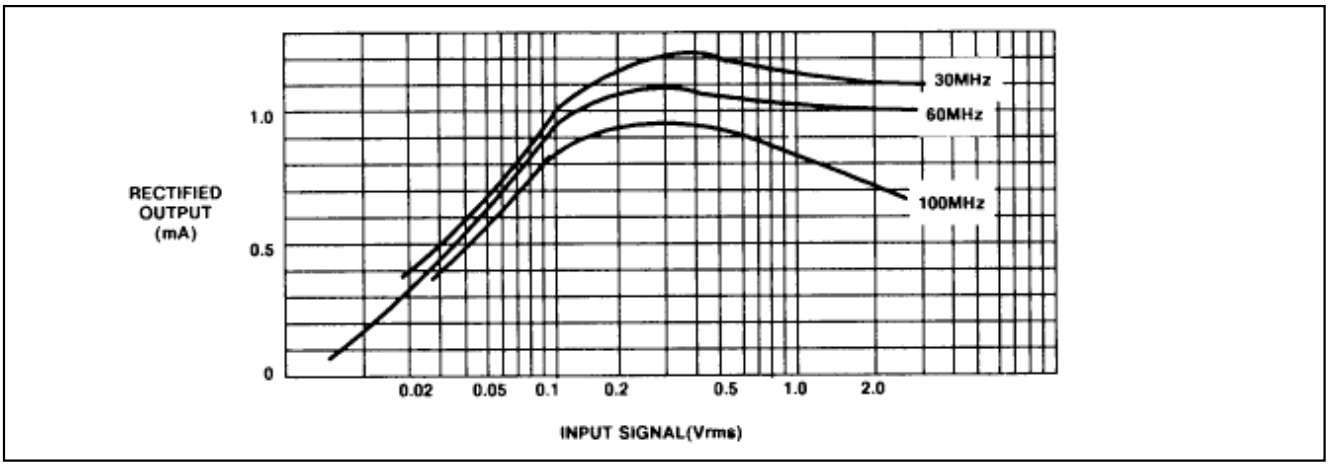


Fig.4 Rectified Output Current v. Input Signal

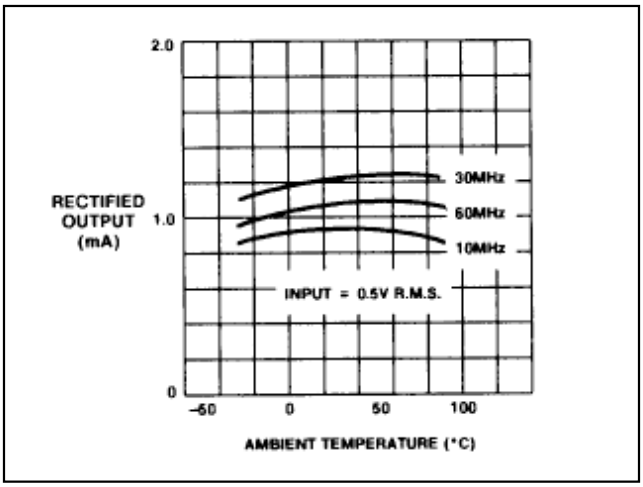


Fig.5 Maximum Rectified Output Current v. Temperature

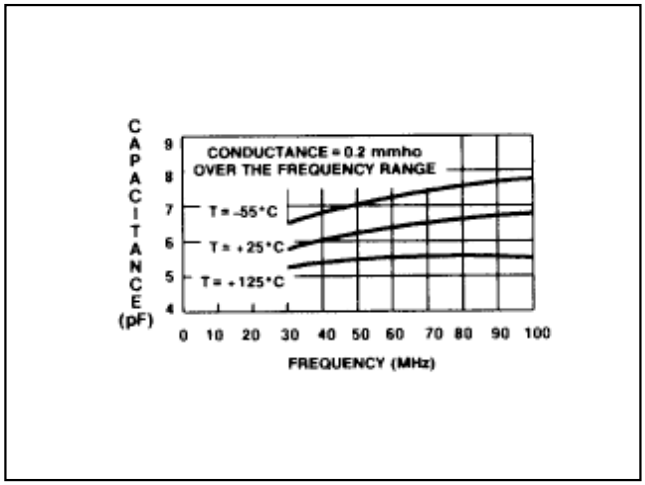


Fig.7 Input Admittance with Open Circuit Output

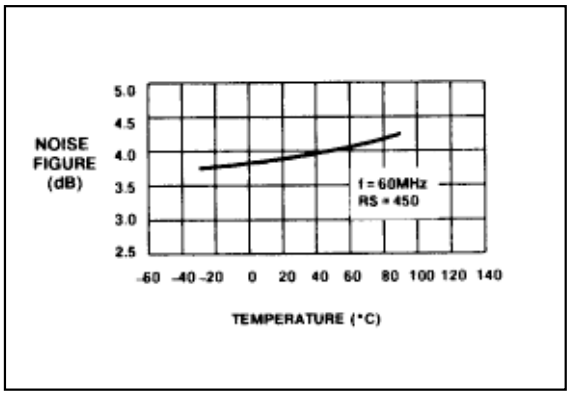


Fig.6 Typical Noise Figure v. Temperature

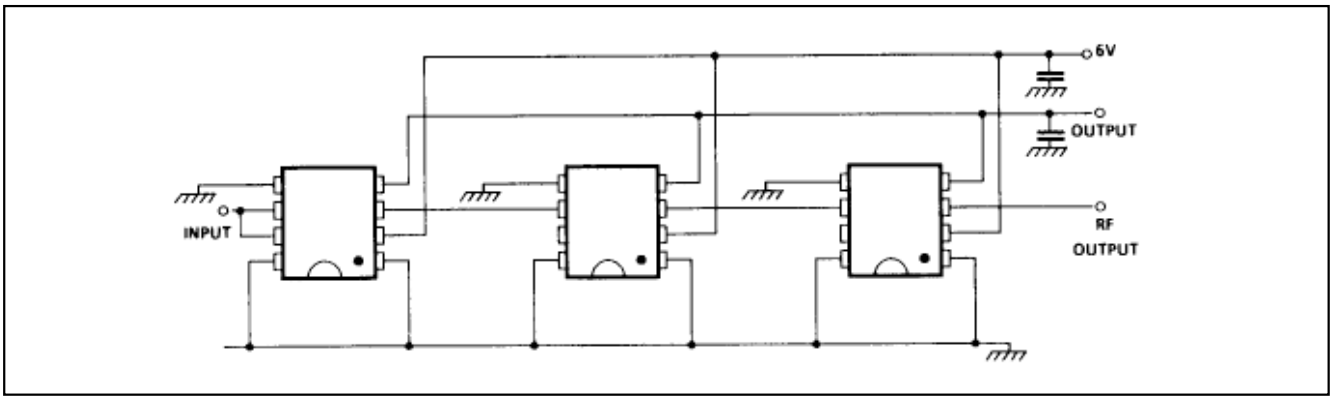


Fig.8 Direct coupled amplifiers

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 parallel or series circuit cannot be used. This 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 C3 must be chosen so that at resonance its admittance equals the total loss conductance across the tuned circuit. Resistor R12 may be introduced to improve the symmetry of filter response, providing other values are adjusted for unity gain at resonance.

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

Values of 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 ground leads to avoid the introduction of common ground lead inductance between input and output circuits. the equipment designer should take care to aviod the subsequent introduction of such inductance.

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

The on-chip 500pF supply decoupling capacitor has a resistance of, typically 10Ω. 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).

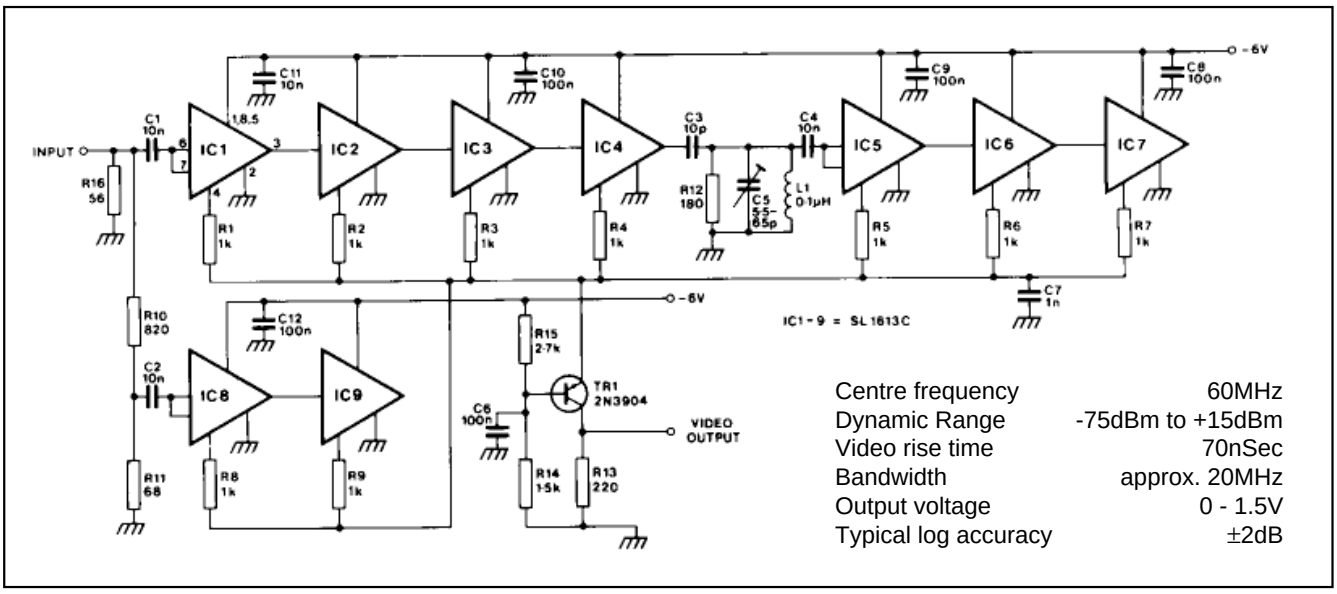


Fig.9 Circuit diagram of low strip

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