SPRAGUE THE MARK OF RELIABILITY

Engineering Bulletin

ULNX-2103M

Developmental* Type ULNX-2103M†

Baier APR 1969

SSFP (SHUNT-SERIES FEEDBACK PAIR) BROADBAND AMPLIFIER

THE Type ULNX-2103M is a broadband amplifier fabricated within a monolithic silicon substrate. This device has a wide range of applications, in both industrial and commercial communication systems. Cascading the units with frequency-selective elements results in a wide range of i-f amplifiers.

This broadband amplifier offers the following design features:

- Frequency Response: 60 MHz at −3dB
- Voltage Gain: 31 dB typical
- 0 C to +85 C operating temperature range
- Optional emitter-follower input
- 8-lead plastic dual in-line "M" package.

The Type ULNX-2103M broadband amplifier provides a current gain of 10 which is approximately $\frac{Re+Rf}{Re}$. The voltage gain is approximately $\frac{RL}{Rs} \times \frac{Rf}{Re}$. The −3dB frequency point is defined by $\frac{1}{RL\ CL}$.

The basic amplifier is ideally suited to current amplification since the input impedance is about 10 ohms.

For some applications requiring a higher input impedance, it may be desirable to use the emitter-follower. This connection provides an input impedance of 1.2KΩ as defined by $\frac{RB \times RS}{Rf}$. When the emitter-follower input is used the f_{-3db} point is not affected.

In some applications, the response may peak prior to f_h, depending upon the values of R_S, R_L and C_L. A capacitor, C_f, may be connected in shunt with R_f (pins 4 and 8) to eliminate this peaking.

Variable-gain bandwidth characteristics can be obtained by paralleling the output-stage load resistor.
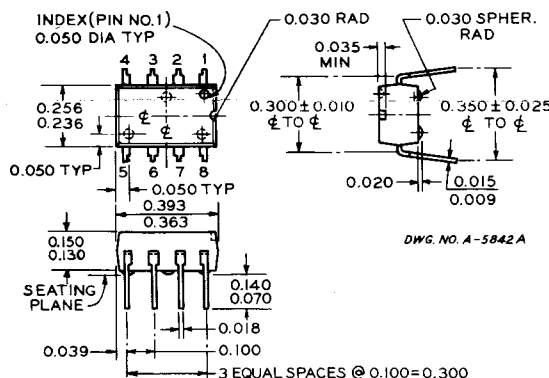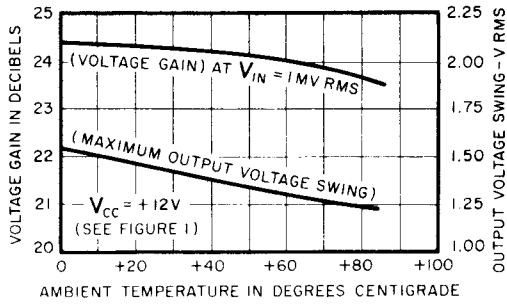

PACKAGE EM

ABSOLUTE MAXIMUM RATINGS

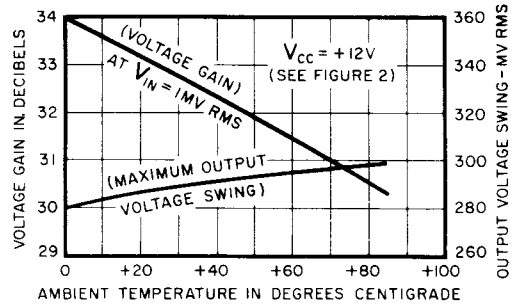|	
Power Supply	+16V
Operating Temperature Range	0 C to +85 C
Storage Temperature Range	−65 C to +125 C
Power Dissipation (internal)	200mW

†The SSFP Broadband Amplifier shown in this bulletin is presently fabricated in Sprague pilot plant facilities. When this device is transferred to regular production lines, the part number will be changed to ULN-2103M.

*The right is reserved to withdraw this developmental integrated circuit from production at any time.

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NOTES:

1. Use a series resistor $\geq 100\Omega$ when pin 8 is used as the input.
2. C_f is an optional external capacitor. See text, page 1.
3. Pin 5 is connected internally to the substrate.

ELECTRICAL CHARACTERISTICS

at V = +12 V$_{DC}$, T = 25 C, Pins 3 and 5 at Ground

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units	Notes
Voltage Gain	A_v	$f = 1\text{MHz}, V_{in} = 1\text{mV} @ \text{Pin } 8, R_L = 1\text{K}\Omega$	30	31		dB	1
Upper Frequency Cut-off	f_h	@ −3dB point, V_{out} @ Pin 6, $R_L = 1\text{K}\Omega$	50	60		MHz	1, 2
Output Voltage Swing	V_o	$f = 1\text{MHz}, V_{out}$ @ Pin 6, $R_L = 1\text{K}\Omega$			2.75	V_{rms}	1
Power Supply Current	I_{VCC}			10		mA	
Output Quiescent Voltage	V_{ODC}			6.7		V	
Input Resistance @ Pin 1	R_{in}			1.2K		Ω	
Input Resistance @ Pin 8	R_{in}			10		Ω	
Output Resistance	R_{out}	R_{out} @ Pin 6		750		Ω	

NOTES:
1. Use a 100Ω series resistor to apply input signal to Pin 8.
2. Use 2.5pF probe (Boonton 91-12E, or equivalent).

AMPLIFIER VOLTAGE GAIN AS A FUNCTION OF FREQUENCY

VOLTAGE GAIN AS A FUNCTION OF POWER SUPPLY VOLTAGE

DWG NO A-5930

DWG NO A-5931

**VOLTAGE GAIN AND OUTPUT VOLTAGE SWING
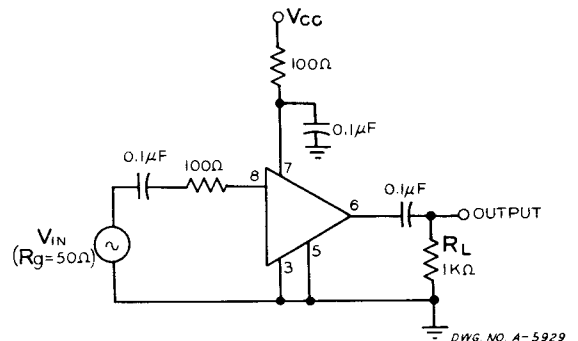AS A FUNCTION OF AMBIENT TEMPERATURE**
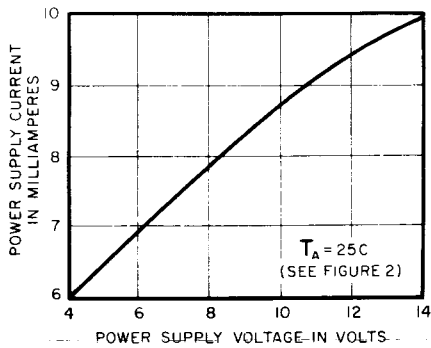
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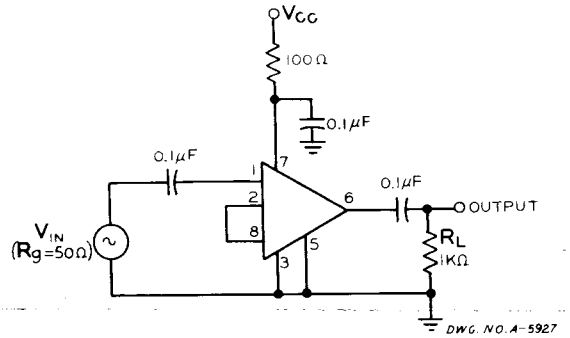
**POWER SUPPLY CURRENT AS A FUNCTION OF POWER SUPPLY
VOLTAGE**

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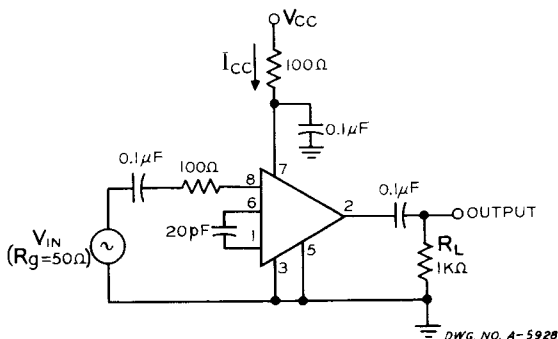
FIGURE 1

DWG. NO. A-5928

FIGURE 2

DWG NO A-5929

FIGURE 3