

# Limiters & Limiting Amplifiers

## Catalog Products (EAR99/Non-ITAR)



**TELEDYNE MICROWAVE SOLUTIONS**  
Everywhereyoulook™

## High Performance Limiters and Limiting Amplifiers

Typical and Guaranteed Specifications—50 Ω System



Model	Frequency Range MHz	Small Signal Gain dB			Gain Flatness ±dB		Noise Figure dB		Power Output At 1dB Compression dBm			Output Limiting Level +20 dBm Input			SWR In/Out		D.C.	
		Typ.	Min. 0/50C	Min. -55/85C	Max. 0/50C	Max. -55/85C	Max. 0/50C	Max. -55/85C	Typ	Min. 0/50C	Min. -55/85C	Typ	Max. 0/50C	Max. -55/85C	Max. 0/50C	Max. -55/85C	Volts Nom.	mA Typ.
<b>Limiting Amplifiers • Available in TO-8, SMA, and Surface Mount Packages</b>																		
LA507	50-500	13.0	12.5	11.5	0.5	0.7	6.5	7.0	12.0	11.0	9.0	16.2	17.2	18.0	1.7	1.9	15	51
LA1017	10-1000	12.5	11.5	11.0	0.5	0.7	6.7	7.2	13.5	12.5	12.0	15.5	16.5	17.0	1.7	1.8	15	45
LA3CP5001	4-200	52.0	51.0	44.0	1.4	2.0	2.5	3.0	13.0	12.0	11.0	15.0	16.0	17.0	1.5	1.6	15	65

Model	Frequency Range MHz	Insertion Loss dB			Maximum Limiting Output Level +20 dBm Input						SWR In/Out		Bias Voltage
		Typ.	Min. 0/50C	Min. -55/85C	20V Typ.	20V Max.	15V Typ.	15V Max.	10V Typ.	10V Max.	Max. 0/50C	Max. -55/85C	
<b>Limiters • Available in TO-8, SMA, and Surface Mount Packages</b>													
LC1501	50-1500	2.7	3.5	4.0	+2.0	+3.0	+1.0	+2.0	-1.0	0.0	2.0	2.0	5 to 20
LC1502	5-1500	2.7	3.5	4.0	+2.0	+3.0	+1.0	+2.0	-1.0	0.0	2.0	2.0	5 to 20
LC2034	500-2400	2.5	3.5	4.0	+2.2	+3.2	+1.0	+2.0	-1.0	—	2.0/2.2	2.0/2.2	5 to 20
LC3005	5-3000	0.6	1.0	1.5	—	—	—	—	+15.0 <sup>^</sup>	+16.0 <sup>^</sup>	1.5	1.7	—
LS6001	1000-6000	2.5	3.2	3.75	+4.8	+5.2	+2.5	+3.0	—	—	2.0	2.1	15 to 20

Model	Frequency Range (MHz)	Input Power Limited Range (dBm) Min.	Saturated Output Power (dBm) Min.	Output Power Flatness (dBm) Max.	Noise Figure (dBm) Max.	Operating Bias (VDC)	Case Type
<b>IF/RF Limiting Amplifiers • Guaranteed Specifications at 0° to 50°C Case Temperature</b>							
UTL or PSL-502	5-500	-3 to +7	-4.0	±0.5	11	+15, -15	TO-8F or SM-45
UTL or PSL-503	5-500	-5 to +7	-4.0	±1.0	10	+15	TO-8U or SM-45
UDL-503	5-500	-30 to +10	-2.0	±1.0	10	+15	DIP

Model	Frequency Range (MHz)	Input Power Limited Range (dBm) Min.	Saturated Output Power (dBm) Max.	Insertion Loss (dBm) Max.	Operating Bias (VDC) Nominal	Case Type
<b>Voltage Controlled Limiters • Guaranteed Specifications at 25°C Case Temperature</b>						
UTL or PSL-1001	50-1000	0 to +20	-5 to +21	3.71	+5 to +20	TO-8U or SM-45
UTL or PSL-1002	5-1000	0 to +20	-5 to +21	3.71	+5 to +20	TO-8U or SM-45

Current data sheets available on website. <sup>^</sup> LC3005 performance at 0 Volts, +28 dBm input level.

# LA507

## 50 TO 500 MHz TO-8 LIMITING AMPLIFIER

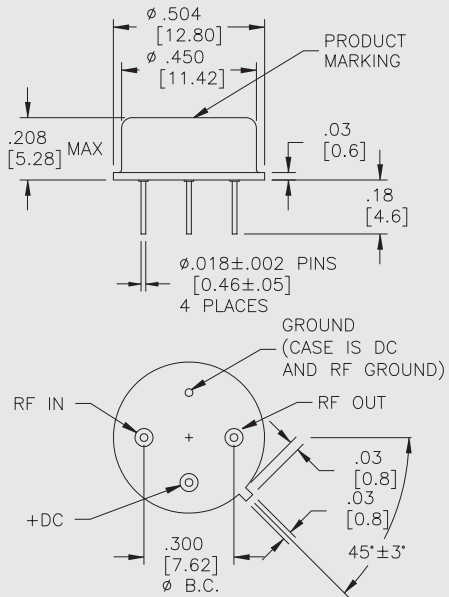
**Typical Values**

<b>High Output Level</b> .....	<b>+12.0 dBm</b>
<b>High Third Order I.P.</b> .....	<b>+29 dBm</b>
<b>Fast Pulse Recovery Time</b> .....	<b>&lt; 50 nsec</b>
<b>Low SWR</b> .....	<b>1.3:1</b>
<b>Symmetrical Clipping; High Even-Order Suppression</b>	
<b>High Performance Thin Film</b>	

**LA507**

### LA507

**TO-8 Package for Limiting Amplifiers**



## SPECIFICATIONS\*

Parameter	Typical	Guaranteed	
		0 to 50 °C	-55 to +85 °C
Frequency (Min.)	40-600 MHz	50-500 MHz	50-500 MHz
Small Signal Gain (Min.)	13.0 dB	12.5 dB	11.5 dB
Gain Flatness (Max.)	< ±0.2 dB	±0.5 dB	±0.7 dB
Noise Figure (Max.)	5.5 dB	6.5 dB	7.0 dB
SWR (Max.) Input/Output	< 1.3:1	1.7:1	1.9:1
Output Limiting Level (Max.) P <sub>in</sub> = +20 dBm	+16.2 dBm	+17.2 dBm	+18.0 dBm
Power Output (Min.) @ 1dB comp.	+12.0 dBm	+11.0 dBm	+9.0 dBm
DC Current (Max.)	51 mA	54 mA	56 mA

\* Measured in a 50-ohm system at +15 Vdc unless otherwise specified.

## INTERMODULATION PERFORMANCE

(Typical @ 25 °C) Linear Region Only

<b>Second Order Harmonic Intercept Point</b> .....	<b>+48 dBm</b>
<b>Second Order Two Tone Intercept Point</b> .....	<b>+42 dBm</b>
<b>Third Order Two Tone Intercept Point</b> .....	<b>+29 dBm</b>

**LA507**

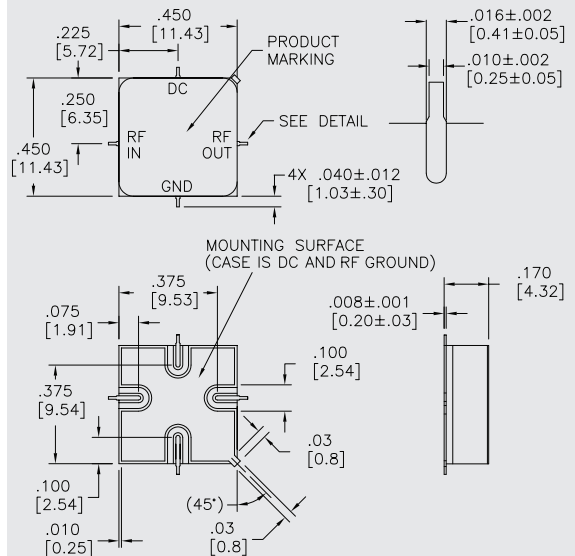
## ABSOLUTE MAXIMUM RATINGS

<b>Storage Temperature</b> .....	<b>-62 to +125 °C</b>
<b>Maximum Case Temperature</b> .....	<b>+125 °C</b>
<b>Maximum DC Voltage</b> .....	<b>+17 Volts</b>
<b>Maximum Continuous RF Input Power</b> .....	<b>+23 dBm</b>
<b>Maximum Short Term Input Power (1 Minute Max.)</b> .....	<b>400 Milliwatts</b>
<b>Maximum Peak Power (3 μsec Max.)</b> .....	<b>1 Watt</b>
<b>Burn-in Temperature</b> .....	<b>+100 °C</b>
<b>Thermal Resistance<sup>1</sup> (θ<sub>jc</sub>)</b> .....	<b>+47 °C/Watt</b>
<b>Junction Temperature Rise Above Case (T<sub>jc</sub>)</b> .....	<b>+38.3 °C</b>

<sup>1</sup> Thermal resistance is based on total power dissipation.

### LAS507

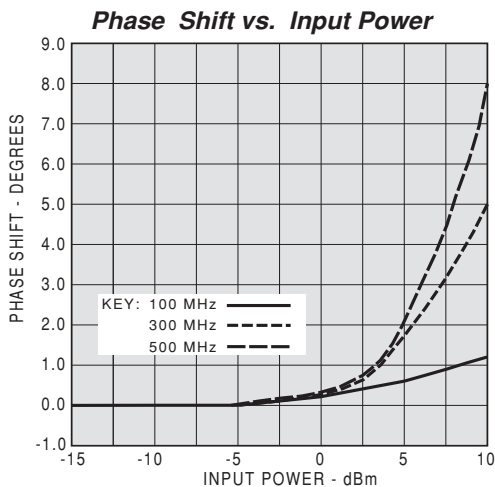
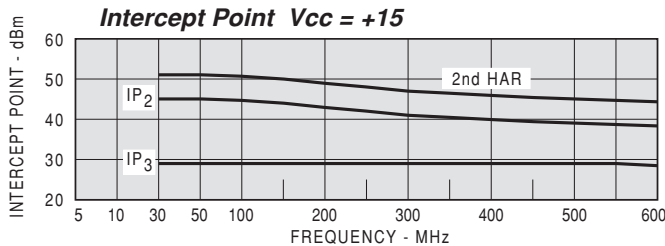
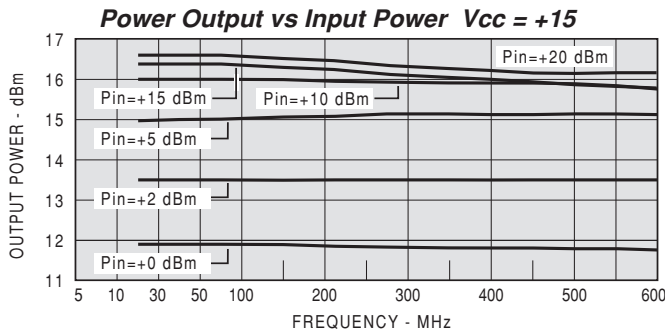
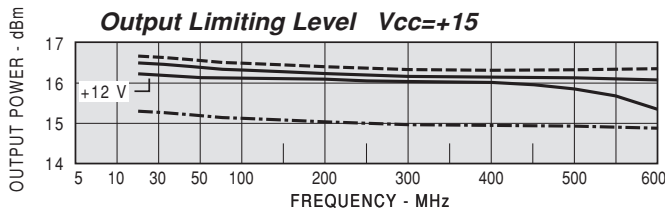
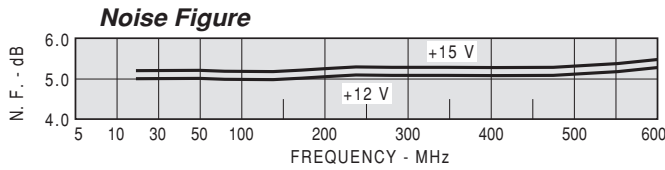
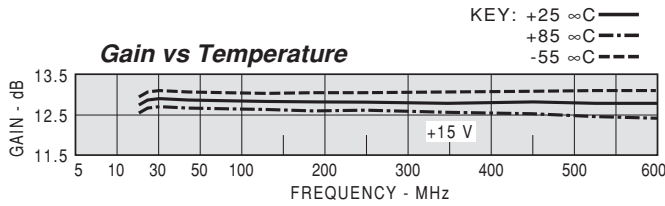
**SMT0-8 Package for Limiting Amplifiers**



DIMENSIONS ARE IN INCHES [MILLIMETERS]

**TYPICAL PERFORMANCE**

**TYPICAL AUTOMATIC TEST DATA**



MODEL: LA507 Vcc = +15V Icc = 52.81 mA

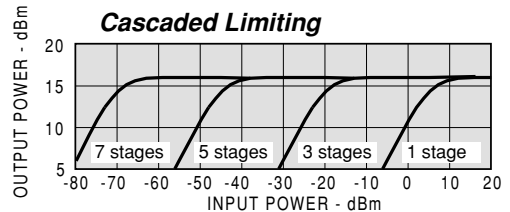
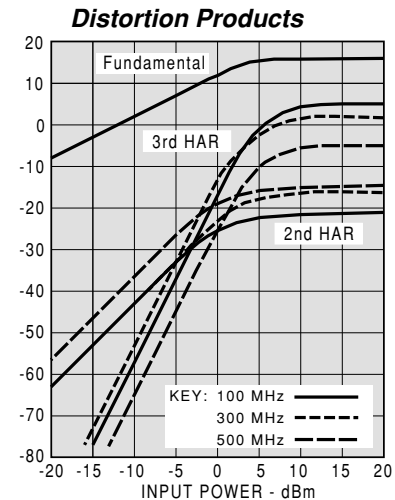
FREQ MHz	VSWR IN	VSWR OUT	GAIN DB	GROUP DELAY NSEC	REV/ISO DB
20	2.11	1.45	12.3		-21.2
50	1.47	1.19	12.7		-20.4
100	1.36	1.15	12.7	0.882	-20.3
200	1.38	1.18	12.6	0.656	-20.3
300	1.43	1.21	12.6	0.602	-20.3
400	1.48	1.22	12.6	0.607	-20.2
500	1.47	1.22	12.7	0.603	-20.1
600	1.44	1.22	12.8	0.626	-19.9

MODEL: LA507 LINEAR S-PARAMETERS Vcc = +15V Icc = 52.81 mA

FREQ. MHz	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
20	0.36	-57.3	4.13	-158.2	0.088	17	0.18	112.5
50	0.19	-60.7	4.31	-179.6	0.096	3	0.09	77.3
100	0.15	-64.1	4.31	165.1	0.096	-4	0.07	58.7
200	0.16	-83.8	4.29	142.8	0.096	-13	0.08	40.5
300	0.18	-103.8	4.26	122.6	0.097	-21	0.09	21.5
400	0.19	-121.0	4.28	102.4	0.097	-30	0.10	-3.1
500	0.19	-134.2	4.29	81.7	0.099	-38	0.10	-34.5
600	0.18	-145.8	4.35	60.6	0.101	-46	0.10	-78.6

MODEL: LA507/LA507/LA507 Vcc = +15V Icc = 157.28 mA

FREQ MHz	VSWR IN	VSWR OUT	GAIN DB	GROUP DELAY NSEC	REV/ISO DB
20	1.70	1.64	38.7		-64.3
50	1.35	1.23	38.9		-62.4
100	1.27	1.16	38.8	2.918	-62.3
200	1.29	1.16	38.8	2.192	-59.8
300	1.45	1.23	38.5	2.045	-64.0
400	1.72	1.35	38.2	1.994	-60.9
500	1.91	1.44	38.1	1.939	-59.6
600	1.87	1.49	38.4	1.974	-60.5



# LA1017

## 10 TO 1000 MHz TO-8 LIMITING AMPLIFIER

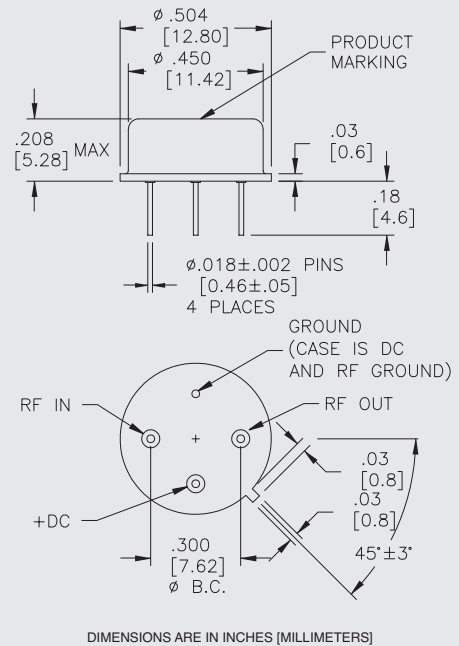
**Typical Values**

<b>High Output Level</b> .....	<b>+13.5 dBm</b>
<b>High Third Order I.P.</b> .....	<b>+28 dBm</b>
<b>Fast Pulse Recovery Time</b> .....	<b>&lt; 50 nsec</b>
<b>Symmetrical Clipping; High Even-Order Suppression</b>	
<b>High Performance Thin Film</b>	
<b>Standard Size TO-8 Package</b>	

**LA1017**

### LA1017

**TO-8 Package for Limiting Amplifiers**



## SPECIFICATIONS\*

Parameter	Typical	Guaranteed	
		0 to 50 °C	-55 to +85 °C
Frequency (Min.)	10-1000 MHz	10-1000 MHz	10-1000 MHz
Small Signal Gain (Min.)	12.5 dB	11.5 dB	11.0 dB
Gain Flatness (Max.)	< ±0.3 dB	±0.5 dB	±0.7 dB
Noise Figure (Max.)	5.5 dB	6.7 dB	7.2 dB
SWR (Max.) Input/Output	1.5:1	1.7:1	1.8:1
Output Limiting Level (Max.) P <sub>in</sub> = +20 dBm	+15.5 <sup>^</sup> dBm	+16.5 <sup>^</sup> dBm	+17.0 <sup>^</sup> dBm
Power Output (Min.) @ 1dB comp.	+13.5 dBm	+12.5 dBm	+12.0 dBm
DC Current (Max.)	45 mA	48 mA	52 mA

\* Measured in a 50-ohm system at +15 Vdc unless otherwise specified.  
<sup>^</sup> 2.0 dBm higher above 800 MHz.

## INTERMODULATION PERFORMANCE

Typical @ 25 °C	Linear Region Only	<b>LA1017</b>
<b>Second Order Harmonic Intercept Point</b> .....		<b>+48 dBm</b>
<b>Second Order Two Tone Intercept Point</b> .....		<b>+42 dBm</b>
<b>Third Order Two Tone Intercept Point</b> .....		<b>+28 dBm</b>

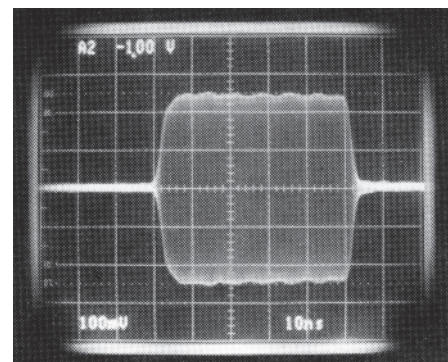
## ABSOLUTE MAXIMUM RATINGS

<b>Storage Temperature</b> .....	-62 to +125 °C
<b>Maximum Case Temperature</b> .....	+125 °C
<b>Maximum DC Voltage</b> .....	+17 Volts
<b>Maximum Continuous RF Input Power</b> .....	+23 dBm
<b>Maximum Short Term Input Power (1 Minute Max.)</b> .....	400 Milliwatts
<b>Maximum Peak Power (3 μsec Max.)</b> .....	1 Watt
<b>Burn-in Temperature</b> .....	+100 °C
<b>Thermal Resistance<sup>1</sup> (θjc)</b> .....	+46 °C/Watt
<b>Junction Temperature Rise Above Case (Tjc)</b> .....	+32.3 °C

<sup>1</sup> Thermal resistance is based on total power dissipation.

## RESPONSE TIME

**Typical Response Time at 25 °C**



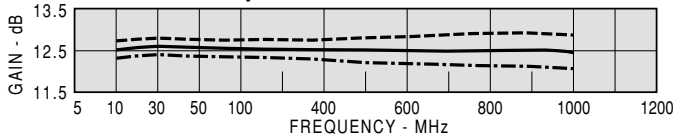
**Frequency = 140 MHz**

**TYPICAL PERFORMANCE**

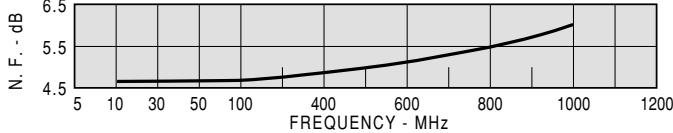
**Typical Performance**

KEY: +25 °C —  
+85 °C - -  
-55 °C - - -

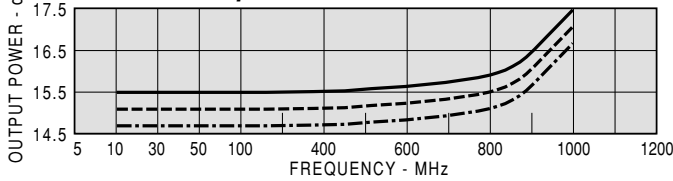
**Gain vs Temperature**



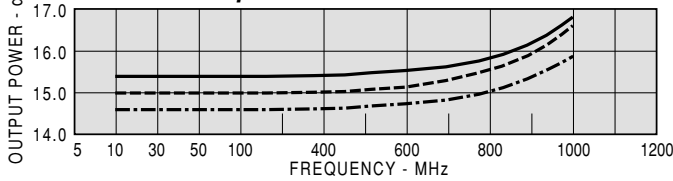
**Noise Figure Vcc = 15 & 12**



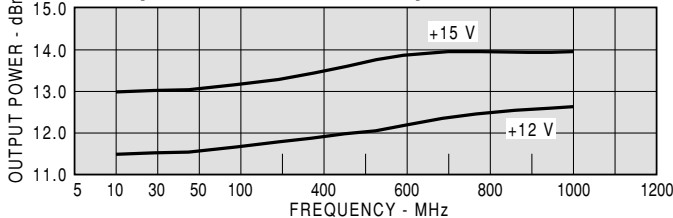
**Limited Output Vcc = 15 Power In = +20 dBm**



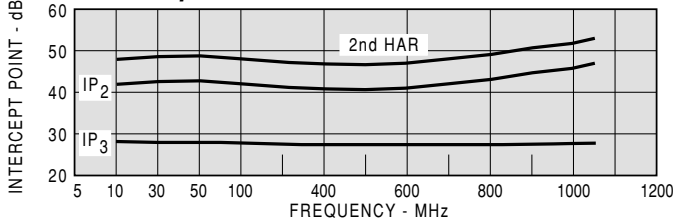
**Limited Output Vcc = 12 Power In = +20 dBm**



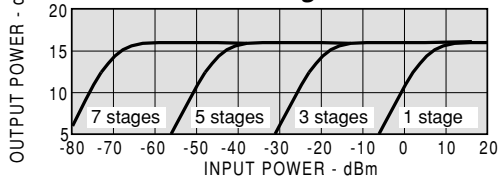
**Output Power @ 1 dB Compression**



**Intercept Point Vcc = 15**



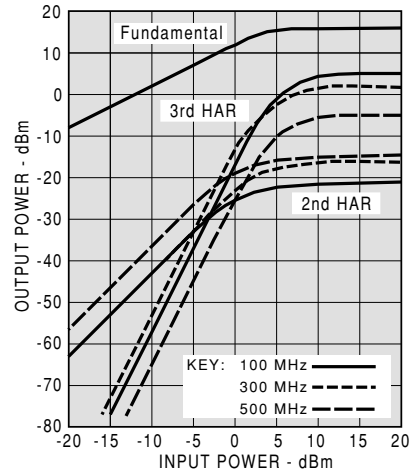
**Cascaded Limiting**



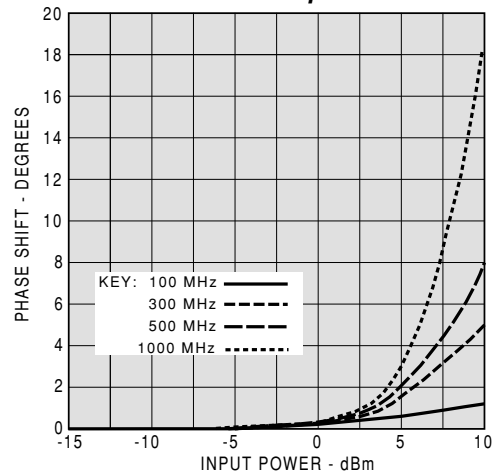
**TYPICAL AUTOMATIC TEST DATA**

MODEL: LA1017		Vcc = +15V		Icc = 44.73 mA	
FREQ	VSWR	VSWR	GAIN	GROUP DELAY	REV/ISO
MHZ	IN	OUT	DB	NSEC	DB
10	1.48	1.48	12.5		-19.8
20	1.22	1.31	12.5		-19.5
50	1.10	1.24	12.6	0.971	-19.4
100	1.10	1.23	12.6	0.625	-19.4
200	1.14	1.24	12.5	0.532	-19.5
300	1.20	1.27	12.5	0.538	-19.5
400	1.25	1.29	12.5	0.526	-19.6
500	1.27	1.29	12.5	0.526	-19.6
600	1.28	1.27	12.5	0.545	-19.5
700	1.31	1.23	12.6	0.547	-19.5
800	1.34	1.20	12.6	0.578	-19.4
900	1.39	1.22	12.7	0.599	-19.5
1000	1.47	1.33	12.5	0.626	-19.5
1100	1.61	1.52	12.2	0.654	-19.5

**Distortion Products**



**Phase Shift vs. Input Power**



# LC1502

## 5.0 TO 1500 MHz TO-8 LIMITER

Typical Values	<b>LC1502</b>
Voltage Variable Limiting Level .....	-13 to 0 dB
Low Insertion Loss .....	<2.0 dB
Balanced Circuit:	
High Even Order Suppression .....	>50 dB at +10 dBm Input
Fast Recovery Time .....	< 50 ns
High Performance Thin Film	
Standard Size TO-8 Package	

### SPECIFICATIONS\*

Parameter	Typical	Guaranteed	
		0 to 50 °C	-55 to +85 °C
Frequency (Min.)	5-1600 MHz	5-1500 MHz	5-1500 MHz
Frequency Variation	<0.1 dB/100 MHz	0.2 dB/100 MHz	0.3 dB/100 MHz
Insertion Loss	To 1000 MHz	1.9 dB	2.5 dB
	To 1500 MHz	2.7 dB	3.5 dB
Input SWR (Max.) (P <sub>IN</sub> <+20 dBm)	To 1000 MHz	1.4:1	1.8:1
	To 1500 MHz	1.6:1	2.0:1
Output SWR (Max.) (P <sub>IN</sub> <-10 dBm)	To 1000 MHz	1.4:1	1.8:1
	To 1500 MHz	1.6:1	2.0:1
Flatness vs. Freq. (Max) (P <sub>IN</sub> <+20 dBm)	To 500 MHz	<±0.1 dB	<±0.3 dB
	To 1000 MHz	<±0.2 dB	<±0.5 dB
	To 1500 MHz	<±0.5 dB	<±1.1 dB
Bias Current (Max.)	+20 Vdc	9.5 mA	11.5 mA
	+15 Vdc	7.0 mA	9.0 mA
	+10 Vdc	4.7 mA	6.0 mA
	+5 Vdc	2.2 mA	3.5 mA

LIMITING AND INSERTION LOSS CHARACTERISTICS (25 °C)								
Bias Voltage	Output level at Limiting Threshold (1 dB Compression)		Maximum Output Limiting Level (+20 dBm Input)		Insertion Loss (500 MHz)		Insertion Loss (1000 MHz)	
	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Max.
+20 volts	-2.0 dBm	0.0 dBm	+2.0 dBm	+3.0 dBm	1.7 dB	2.0 dB	1.8 dB	2.2 dB
+15 volts	-2.5 dBm	-1.0 dBm	+1.0 dBm	+2.0 dBm	1.9 dB	2.2 dB	2.0 dB	2.4 dB
+10 volts	-4.0 dBm	-3.0 dBm	-1.0 dBm	0.0 dBm	2.3 dB	2.8 dB	2.5 dB	3.0 dB
+ 5 volts	-9.0 dBm	—	-7.0 dBm	—	3.1 dB	—	3.3 dB	—

\* Measured in a 50-ohm system at +15 Vdc bias unless otherwise specified.

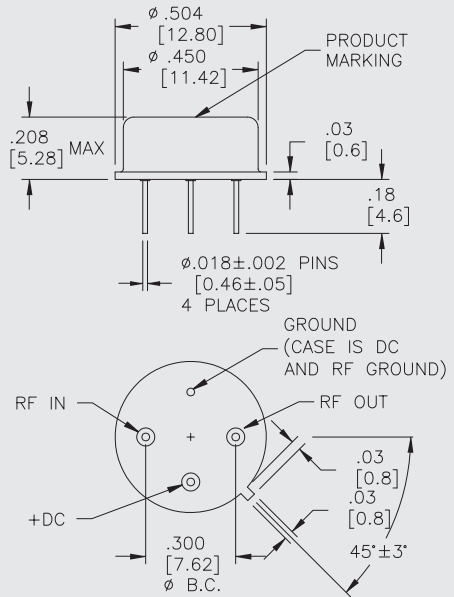
### ABSOLUTE MAXIMUM RATINGS

Ambient Operation Temperature .....	-55°C to 110°C
Storage Temperature .....	-62° to 150 °C
Maximum Case Temperature .....	125 °C
Maximum DC Voltage .....	+25 Volts
Maximum Continuous RF Input Power .....	200 Milliwatts
Maximum Peak Power (3 μsec Max.) .....	1 Watt
Burn-in Temperature .....	125°C
Thermal Resistance <sup>1</sup> (θ <sub>jc</sub> ) .....	2.1 °C/Watt
Junction Temperature Rise Above Case (T <sub>jc</sub> ) .....	0.2 °C

<sup>1</sup> Thermal resistance is based on total power dissipation.

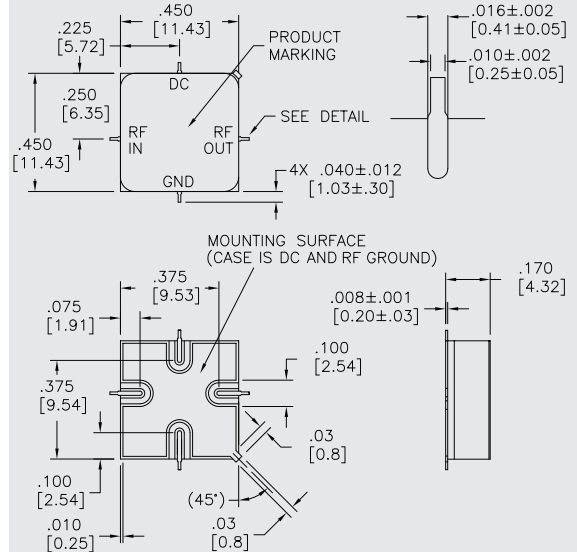
### LC1502

#### TO-8 Package for Limiters



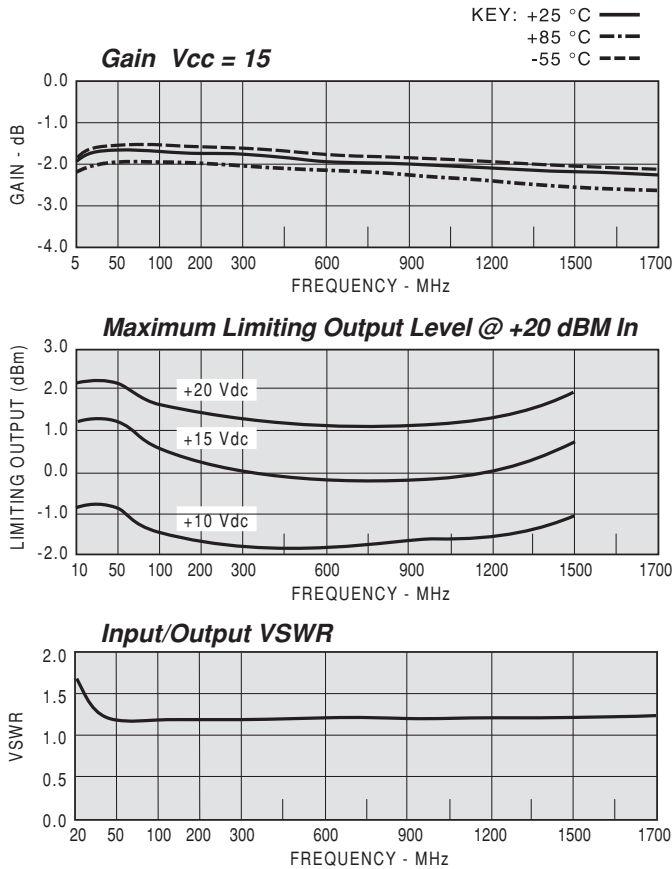
### LS1502

#### SMT0-8 Package for Limiters



DIMENSIONS ARE IN INCHES [MILLIMETERS]

## TYPICAL PERFORMANCE



## TYPICAL AUTOMATIC TEST DATA

Model: LC1502		Vcc=+15V					Icc=8.02	
FREQ	SWR	SWR	GAIN	PHASE	DELAY	REV/ISO		
MHZ	IN	OUT	DB	DEG	NSEC	DB		
5	1.68	1.68	-1.93	15		-1.90		
50	1.17	1.17	-1.64	-2		-1.60		
100	1.16	1.16	-1.66	-7	0.25	-1.70		
200	1.17	1.17	-1.70	-14	0.21	-1.70		
300	1.17	1.17	-1.74	-22	0.20	-1.70		
400	1.17	1.18	-1.80	-29	0.20	-1.80		
500	1.16	1.18	-1.87	-36	0.20	-1.90		
600	1.16	1.18	-1.93	-43	0.19	-1.90		
700	1.16	1.18	-1.94	-49	0.19	-1.90		
800	1.15	1.18	-1.95	-56	0.19	-1.90		
900	1.15	1.18	-1.96	-63	0.19	-2.00		
1000	1.14	1.18	-1.97	-71	0.20	-2.00		
1100	1.13	1.18	-1.99	-78	0.20	-2.00		
1200	1.13	1.18	-2.02	-85	0.20	-2.00		
1300	1.13	1.18	-2.05	-92	0.20	-2.00		
1400	1.13	1.19	-2.10	-99	0.19	-2.10		
1500	1.14	1.2	-2.13	-107	0.20	-2.10		
1600	1.15	1.2	-2.18	-114	0.20	-2.20		
1700	1.16	1.21	-2.19	-121	0.21	-2.20		

Model: LC1502		LINEAR S-PARAMETERS						Icc=8.02	
FREQ.		S11		S21		S12		S22	
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	
5	0.25	-59.1	0.80	15.3	0.800	15.2	0.08	0.25	-59.3
50	0.08	-18.3	0.83	-2.2	0.828	-2.2	0.08	0.08	-18.5
100	0.08	-12.7	0.83	-6.7	0.826	-6.7	0.08	0.08	-12.5
200	0.08	-13.7	0.82	-14.3	0.822	-14.3	0.08	0.08	-13.7
300	0.08	-18.7	0.82	-21.6	0.818	-21.6	0.08	0.08	-19.2
400	0.08	-24.5	0.81	-28.8	0.812	-28.8	0.08	0.08	-26.1
500	0.08	-33.3	0.81	-35.8	0.806	-35.8	0.08	0.08	-35.3
600	0.08	-42.2	0.80	-42.6	0.800	-42.6	0.08	0.08	-47.2
700	0.07	-51.2	0.80	-49.4	0.799	-49.4	0.08	0.08	-59.4
800	0.07	-64.1	0.80	-56.3	0.800	-56.3	0.08	0.08	-68.5
900	0.07	-76.7	0.80	-63.3	0.799	-63.3	0.08	0.08	-79.7
1000	0.06	-88.6	0.80	-70.5	0.797	-70.5	0.08	0.08	-89.7
1100	0.06	-104.2	0.79	-77.7	0.794	-77.7	0.08	0.08	-100.8
1200	0.06	-119.4	0.79	-84.8	0.793	-84.9	0.08	0.08	-111.4
1300	0.06	-132.0	0.79	-92.2	0.790	-92.2	0.08	0.08	-122.7
1400	0.06	-148.7	0.78	-99.2	0.786	-99.3	0.09	0.09	-133.3
1500	0.07	-163.0	0.78	-106.6	0.782	-106.7	0.09	0.09	-144.0
1600	0.07	-176.2	0.78	-113.8	0.778	-113.8	0.09	0.09	-154.7
1700	0.07	170.6	0.78	-121.2	0.776	-121.2	0.09	0.09	-164.2

Model: LC1502		Vcc=+12V					Icc=6.37	
FREQ	SWR	SWR	GAIN	PHASE	DELAY	REV/ISO		
MHZ	IN	OUT	DB	DEG	NSEC	DB		
5	1.68	1.68	-2.07	15		-1.80		
50	1.20	1.2	-1.79	-2		-1.80		
100	1.20	1.2	-1.81	-7	0.25	-1.80		
200	1.20	1.2	-1.85	-14	0.21	-1.80		
300	1.20	1.21	-1.89	-22	0.20	-1.90		
400	1.20	1.21	-1.95	-29	0.20	-2.00		
500	1.20	1.21	-2.01	-36	0.20	-2.00		
600	1.20	1.22	-2.07	-43	0.19	-2.10		
700	1.19	1.22	-2.09	-49	0.19	-2.10		
800	1.18	1.21	-2.09	-56	0.19	-2.10		
900	1.18	1.21	-2.11	-63	0.20	-2.10		
1000	1.17	1.21	-2.11	-71	0.20	-2.10		
1100	1.16	1.21	-2.14	-78	0.20	-2.10		
1200	1.16	1.21	-2.17	-85	0.20	-2.20		
1300	1.15	1.21	-2.20	-92	0.21	-2.20		
1400	1.15	1.22	-2.26	-99	0.20	-2.20		
1500	1.16	1.22	-2.28	-107	0.21	-2.30		
1600	1.16	1.23	-2.34	-114	0.20	-2.30		
1700	1.17	1.23	-2.35	-121	0.20	-2.40		

Model: LC1502		LINEAR S-PARAMETERS						Icc=6.37	
FREQ		S11		S21		S12		S22	
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	
5	0.26	-56.1	0.79	15.0	0.788	15	0.25	0.25	-56.1
50	0.09	-15.8	0.81	-2.2	0.813	-2.2	0.09	0.09	-15.9
100	0.09	-11.6	0.81	-6.6	0.811	-6.7	0.09	0.09	-11.6
200	0.09	-13.4	0.81	-14.3	0.808	-14.3	0.09	0.09	-14.0
300	0.09	-18.9	0.80	-21.6	0.804	-21.6	0.09	0.09	-19.5
400	0.09	-25.2	0.80	-28.8	0.799	-28.8	0.10	0.10	-26.7
500	0.09	-33.6	0.79	-35.8	0.793	-35.8	0.10	0.10	-35.3
600	0.09	-41.8	0.79	-42.7	0.787	-42.6	0.10	0.10	-46.0
700	0.09	-50.9	0.79	-49.4	0.786	-49.4	0.10	0.10	-57.6
800	0.08	-63.1	0.79	-56.3	0.786	-56.4	0.10	0.10	-66.8
900	0.08	-74.5	0.78	-63.4	0.785	-63.4	0.09	0.09	-77.3
1000	0.08	-85.3	0.78	-70.6	0.784	-70.6	0.09	0.09	-86.5
1100	0.07	-99.4	0.78	-77.7	0.781	-77.7	0.09	0.09	-96.9
1200	0.07	-113.3	0.78	-84.9	0.780	-84.9	0.10	0.10	-107.4
1300	0.07	-125.0	0.78	-92.3	0.776	-92.3	0.10	0.10	-118.3
1400	0.07	-140.6	0.77	-99.3	0.773	-99.4	0.10	0.10	-128.5
1500	0.07	-154.4	0.77	-106.7	0.769	-106.7	0.10	0.10	-138.8
1600	0.08	-167.8	0.76	-113.9	0.765	-113.9	0.10	0.10	-149.2
1700	0.08	178.3	0.76	-121.2	0.763	-121.3	0.10	0.10	-158.6



# LA3CP5001 4 TO 200 MHz LIMITING AMPLIFIER

Typical Values	LA3CP5001
Low Noise Figure .....	2.1 dB
High Gain .....	52 dB
Wide Input Limiting Range .....	-35 to +10 dBm
Output Range .....	+14 to +16 dBm
High Performance Thin Film Standard Three-stage CougarPak™ Package	

## SPECIFICATIONS\*

Parameter	Typical	Guaranteed	
		0 to 50 °C	-55 to +85 °C
Frequency (Min.)	2-250 MHz	4-200 MHz	4-200 MHz
Small Signal Gain (Min)	52.0 dB	51.0 dB	49.0 dB
Gain Flatness (Max)	1.0 dB	1.4 dB	2.0 dB
Noise Figure (Max)	2.1 dB	2.5 dB	3.0 dB
SWR (Max) Input/Output	1.2:1	1.5:1	1.6:1
Power Output (Min) @ 1dB comp.	13.0 dBm	12.0 dBm	11.0 dBm
Output Limiting Level (Max) P <sub>in</sub> = -35 to +10 dBm	15.0 dBm	16.0 dBm	17.0 dBm
DC Current (Max.)	65 mA	70 mA	75 mA

\* Measured in a 50-ohm system at +15 Vdc unless otherwise specified.  
^ 2.0 dBm higher above 800 MHz.

## INTERMODULATION PERFORMANCE

Typical @ 25 °C	Linear Region Only	LA3CP5001
Second Order Harmonic Intercept Point .....		+48 dBm
Second Order Two Tone Intercept Point .....		+42 dBm
Third Order Two Tone Intercept Point .....		+28 dBm

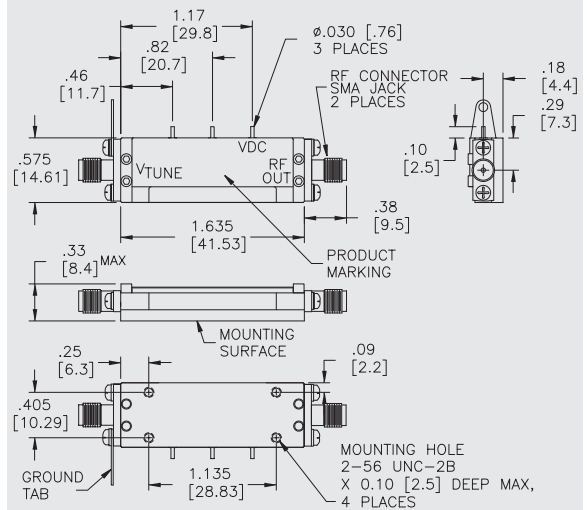
## ABSOLUTE MAXIMUM RATINGS

Storage Temperature .....	-62 to +125 °C
Maximum Case Temperature .....	+125 °C
Maximum DC Voltage .....	+17 Volts
Maximum Continuous RF Input Power .....	+12 dBm
Burn-in Temperature .....	+100 °C
Thermal Resistance <sup>1</sup> (θ <sub>jc</sub> ) .....	+39.4 °C/Watt
Junction Temperature Rise Above Case (T <sub>jc</sub> ) .....	+17.7 °C

<sup>1</sup> Thermal resistance is based on total power dissipation.

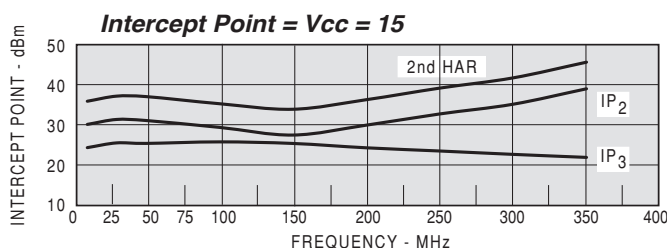
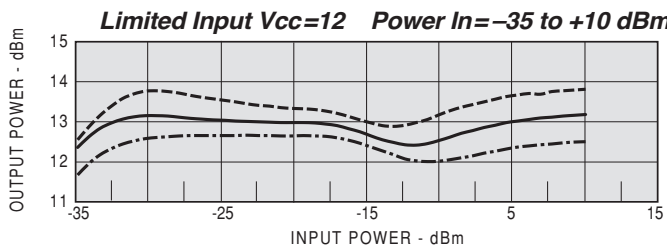
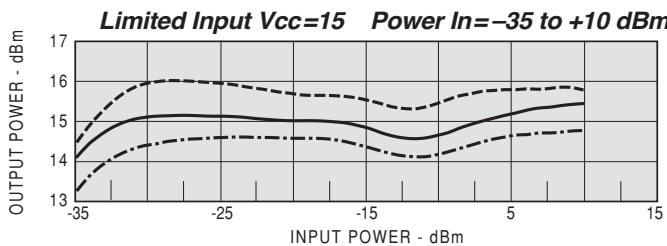
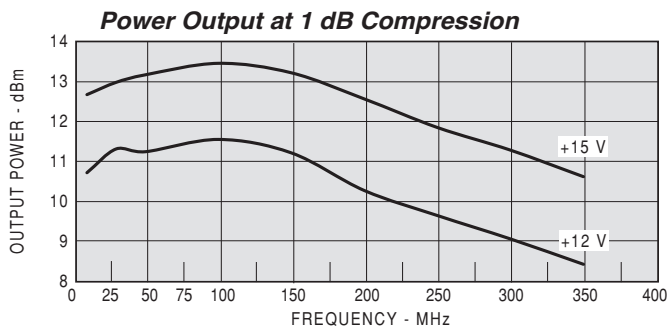
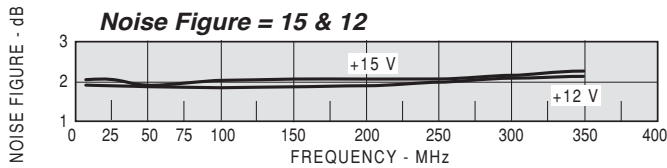
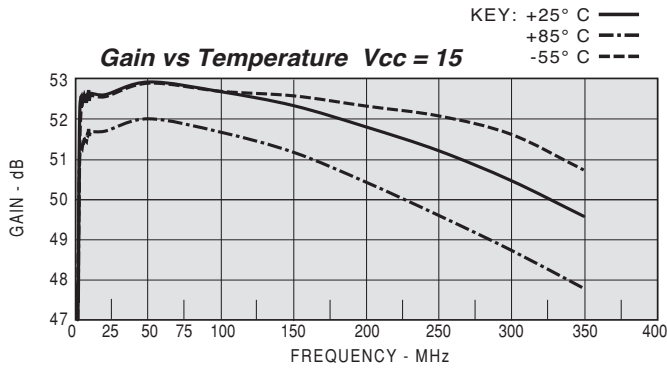
## LA3CP5001

### CougarPak™ Package for Limiters



DIMENSIONS ARE IN INCHES [MILLIMETERS]

## TYPICAL PERFORMANCE



## TYPICAL AUTOMATIC TEST DATA

Model: LA3CP5001 Vcc=+15V Icc=63.43

FREQ. MHz	SWR IN	SWR OUT	GAIN DB	PHASE DEG	DELAY NSEC	REV/ISO DB
1.0	3.37	1.57	41.54	148.13	185.15	-66.46
1.5	2.60	1.43	47.89	114.80	185.15	-66.07
2.0	1.87	1.31	50.98	87.42	152.11	-73.28
2.5	1.46	1.22	52.13	66.78	114.64	-73.44
3.0	1.27	1.16	52.31	52.19	81.05	-72.84
3.5	1.18	1.13	52.39	42.94	51.41	-69.56
4.0	1.12	1.12	52.26	36.71	34.63	-74.47
4.5	1.11	1.10	52.35	31.46	29.14	-73.01
5.0	1.10	1.09	52.35	28.14	18.49	-74.83
5.5	1.09	1.08	52.42	24.60	19.66	-78.31
6.0	1.09	1.07	52.36	21.69	16.16	-77.89
6.5	1.08	1.07	52.39	19.19	13.91	-84.09
7.0	1.10	1.07	52.27	17.10	11.61	-68.64
7.5	1.11	1.06	52.42	15.25	10.26	-69.47
8.0	1.09	1.06	52.39	13.26	11.03	-67.47
8.5	1.09	1.06	52.54	12.34	5.12	-72.37
9.0	1.10	1.06	52.33	11.00	7.47	-64.59
10.0	1.10	1.06	52.46	7.47	9.80	-76.33
20.0	1.10	1.06	52.43	-7.48	4.15	-75.17
50.0	1.15	1.09	52.74	-39.48	2.96	-60.49
100.0	1.24	1.13	52.5	-83.69	2.46	-65.18
150.0	1.24	1.19	52.16	-127.86	2.45	-67.76
200.0	1.36	1.22	51.64	-170.01	2.34	-59.45
250.0	1.38	1.20	51.06	146.92	2.39	-70.04
300.0	1.47	1.16	50.33	101.10	2.55	-73.29
350.0	1.57	1.19	49.46	55.16	2.55	-67.49

Model: LA3CP5001 Vcc=+15V Icc=63.65

LINEAR S-PARAMETERS

FREQ. MHz	S11 MAG	S11 ANG	S21 MAG	S21 ANG	S12 MAG	S12 ANG	S22 MAG	S22 ANG
1.0	0.54	-49.06	119.76	148.08	0.000	-172.29	0.22	178.03
1.5	0.44	-71.59	248.80	114.70	0.000	-179.89	0.18	146.54
2.0	0.31	-91.29	354.62	87.28	0.000	-118.28	0.13	123.91
2.5	0.19	-102.95	404.02	66.69	0.000	30.21	0.10	110.74
3.0	0.12	-102.47	412.75	52.09	0.000	65.4	0.08	106.86
3.5	0.09	-103.76	416.41	42.82	0.000	28.33	0.06	104.12
4.0	0.06	-79.75	410.08	36.62	0.000	-44.45	0.05	104.28
4.5	0.06	-76.01	414.25	31.42	0.000	-161.08	0.05	105.23
5.0	0.05	-63.52	414.30	28.08	0.000	-97.49	0.04	104.73
5.5	0.04	-53.84	417.71	24.56	0.000	-6.84	0.04	100.89
6.0	0.04	-43.15	414.85	21.63	0.000	-64.89	0.04	101.89
6.5	0.04	-48.63	416.47	19.15	0.000	84.99	0.04	103.49
7.0	0.04	-50.68	410.93	17.04	0.000	-9.83	0.03	104.92
7.5	0.05	-20.92	417.79	15.20	0.000	-2.68	0.03	102.54
8.0	0.04	-43.61	416.25	13.24	0.000	-34.54	0.03	104.46
8.5	0.05	-25.56	423.92	12.32	0.000	-104.25	0.03	104.80
9.0	0.04	-21.99	413.53	11.01	0.000	42.07	0.03	100.39
10.0	0.04	-22.91	419.46	7.50	0.000	-60.95	0.03	104.18
20.0	0.05	-43.11	418.13	-7.54	0.000	-16.22	0.02	90.89
50.0	0.07	-45.94	433.80	-39.50	0.000	-83.46	0.04	75.88
100.0	0.08	-59.59	421.21	-83.73	0.000	74.08	0.06	59.98
150.0	0.10	-61.08	405.63	-127.84	0.000	-153.27	0.09	33.26
200.0	0.13	-90.09	381.96	-169.97	0.000	-142.59	0.10	-1.70
250.0	0.15	-92.04	357.37	146.94	0.000	10.67	0.09	-35.67
300.0	0.20	-89.43	328.23	101.15	0.000	-66.96	0.07	-102.17
350.0	0.21	-108.02	297.10	55.19	0.000	163.25	0.08	158.83



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