

Satellite Tuner Front End LNA with AGC

Preliminary Information

DS5137

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Features

- Single chip solution for satellite tuner LNA and AGC
- Provides for 30 dB minimum AGC
- Low DSB NF at maximum gain
- High signal handling at minimum gain
- Provides differential output drive
- ESD protection (Normal ESD handling procedures should be observed)

Applications

- Satellite receiver systems
- Data communications systems
- Master Antennae Distribution Systems

Ordering Information

 SL1914A/KG/MP1S
 SL1914A/KG/MP1T

Description

The SL1914 is a wideband LNA with AGC designed primarily for application in satellite tuner front ends, offering high signal handling capability with low noise figure compatible with most common tuner input requirements.

The SL1914 is optimised to complement the SL1925, ZIF quadrature downconverter, integrating all the active RF circuitry within the tuner, in a highly compact, efficient solution, and offering a full 1-45 MS/s tuner capability.

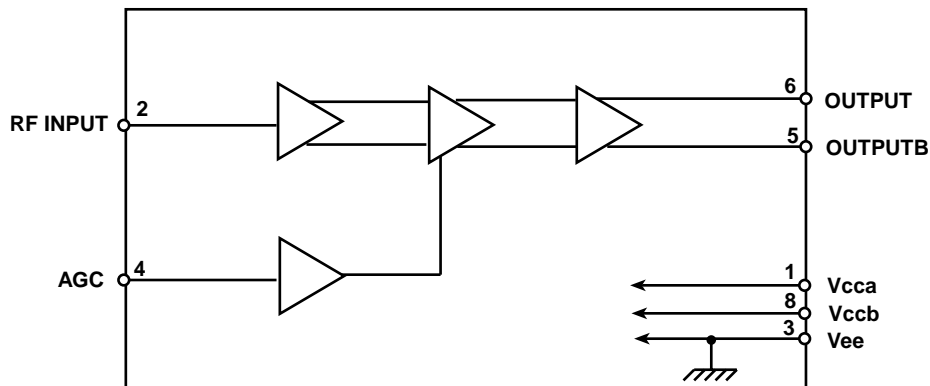


Figure 1 Block Diagram

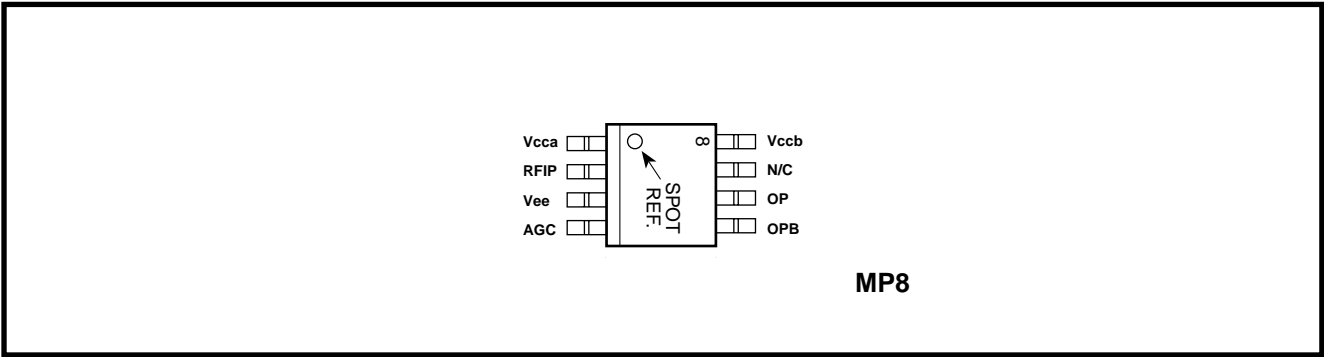


Figure 2 Pin Connections

Quick Reference Data

Characteristic		Units
Operating frequency	950 - 2150	MHz
Input DSB NF at max gain	9	dB
Maximum conversion gain	20	dB
Minimum conversion gain	-10	dB
IPIP _{32T}	117	dBμV
IPIP _{22T}	127	dBμV

Table 1

Functional Description

The SL1914 is a bipolar, low noise AGC amplifier designed primarily for application in satellite tuner front ends. It contains a low noise input amplifier, an AGC stage with a minimum of 30dB of gain control and a 75 Ohm output drive. It replaces all active circuitry in conventional architectures.

The typical key performance numbers under nominal load ambient and supply conditions are contained in table headed Quick Reference Data.

Electrical Characteristics

$T_{amb} = -20^{\circ}\text{C}$ to $+70^{\circ}\text{C}$, $V_{ee} = 0\text{V}$, $V_{cc} = 5\text{V} \pm 5\%$, These characteristics are guaranteed by either production test or design. They apply within the specified ambient temperature and supply voltage unless otherwise stated.

Characteristic	Pin	Value			Units	Conditions
		Min	Typ	Max		
Supply current	1, 8		110	150	mA	AGC = 4V
Operating range		950		2150	MHz	
Input impedance	2		75		Ω	
IF input return loss	2	8			dB	
Input DSB NF	2		9	11	dB	Maximum gain, AGC = 0.75V
Variation in NF with gain setting				-1	dB/dB	
Conversion gain						Differential power gain into 75Ω
minimum				-10	dB	$V_{agc} = 4\text{V}$ See note 1.
maximum		21			dB	$V_{agc} = 0.75\text{V}$
Gain variation within channel				+0.5	dB	AGC monotonic from V_{ee} to V_{cc}
Input referred 1 dB gain compression	2	107			dB μV	Maximum channel bandwidth of 54MHz, within range 950 - 2150MHz
Input referred IP3	2	117			dB μV	Minimum specified gain setting
Input referred IP2	2	125			dB μV	Minimum specified gain setting, two tones at 99dB μV
Variation in second and third order intermodulation intercept points with gain setting				-1	dB/dB	Minimum specified gain setting, two tones at 99dB μV
AGC control slope variation	4			4:1		
AGC control input current	4			± 350	μA	
Output impedance	5, 6		75		Ω	
Output return loss	5, 6	6			dB	

Note 1: The AGC voltage should not exceed 4V.

Absolute Maximum Ratings

All voltages referred to Vee at 0V.

Characteristics	Min	Max	Unit	Conditions
Supply voltage	-0.3	7	V	Transient condition only Except AGC (pin 4)
IFIN and IFINB input voltage		117	dB μ V	
All I/O port DC offset	-0.3	VCC+0.3	V	
AGC input DC offset	-0.3	4	V	
Storage temperature	-55	150	°C	
Junction temperature		150	°C	
Package thermal resistance, chip to case		39.8	°C/W	
Package thermal resistance, chip to ambient		120	°C/W	Mil std-883 latest revision method 3015 class 1
Power consumption at 5.25V		790	mW	
ESD protection	2		kV	

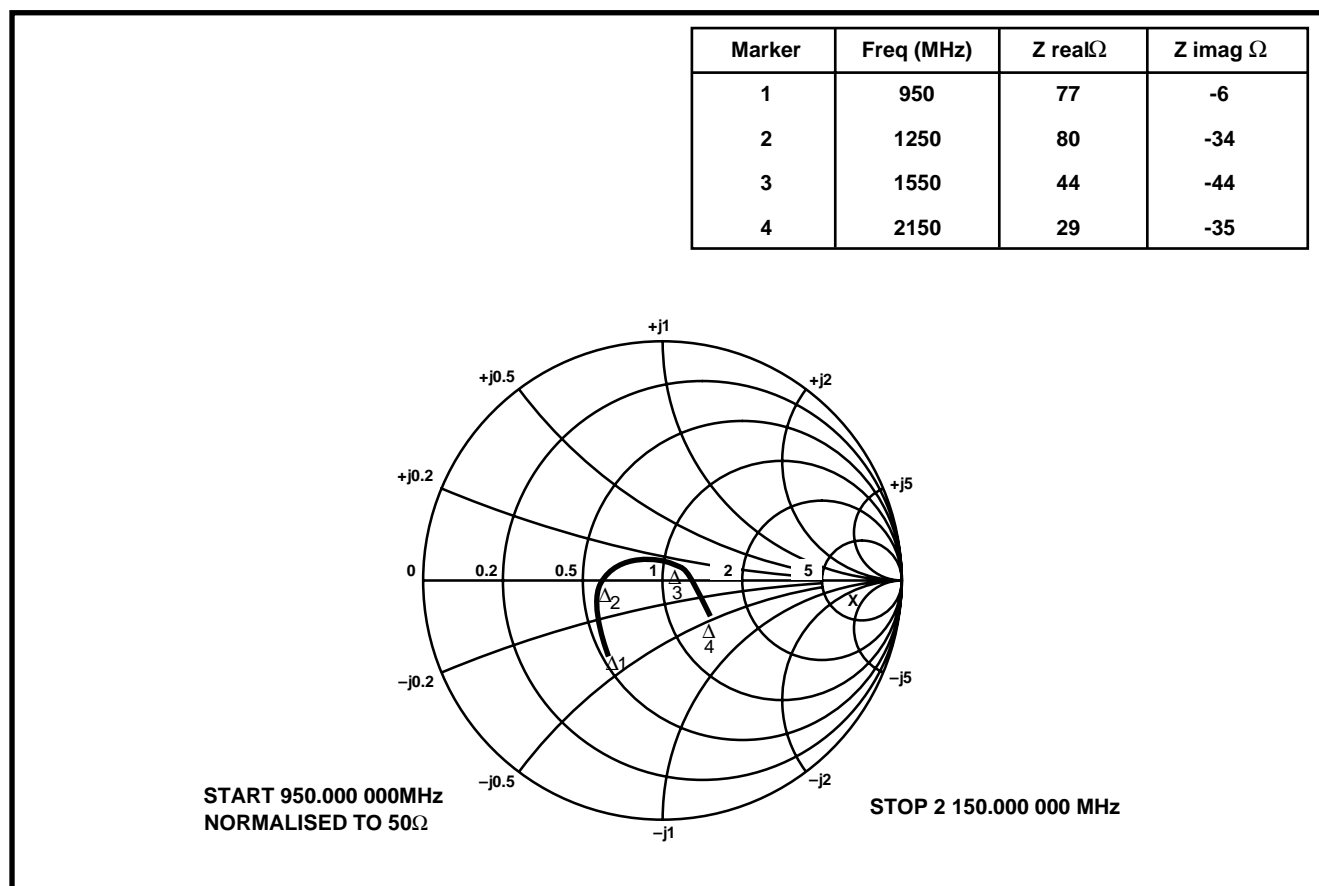


Figure 3 Input impedance (typical)

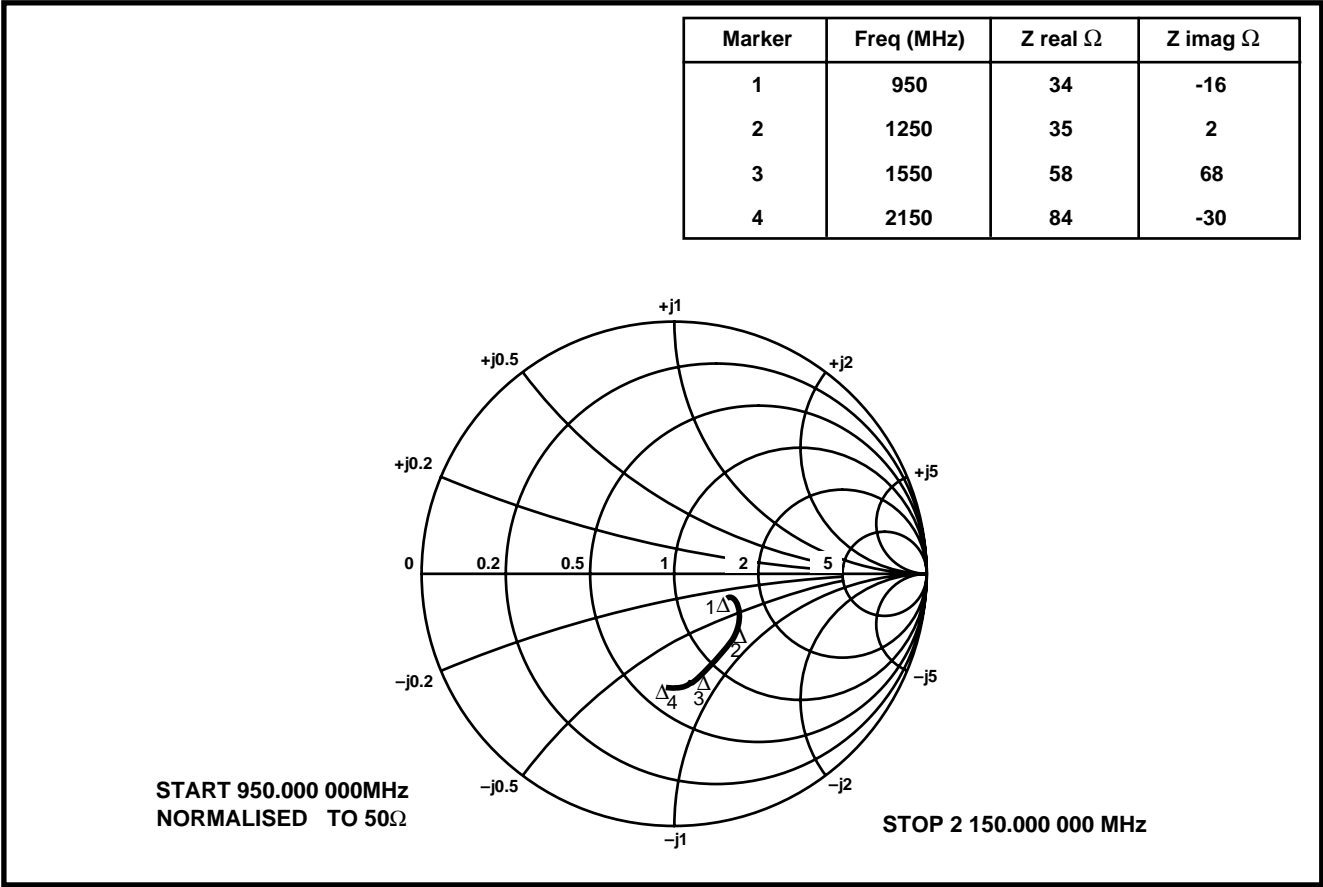
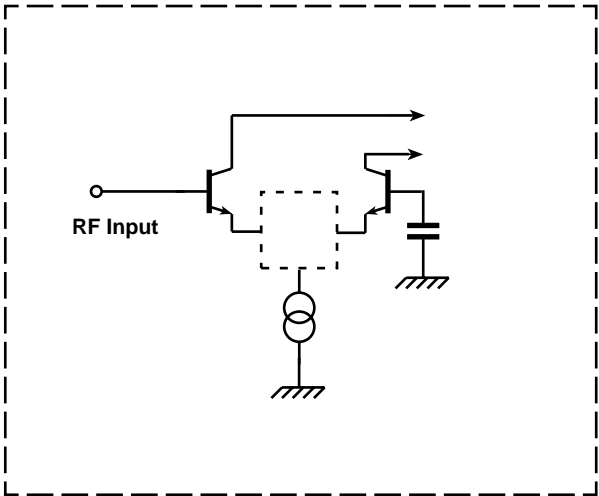
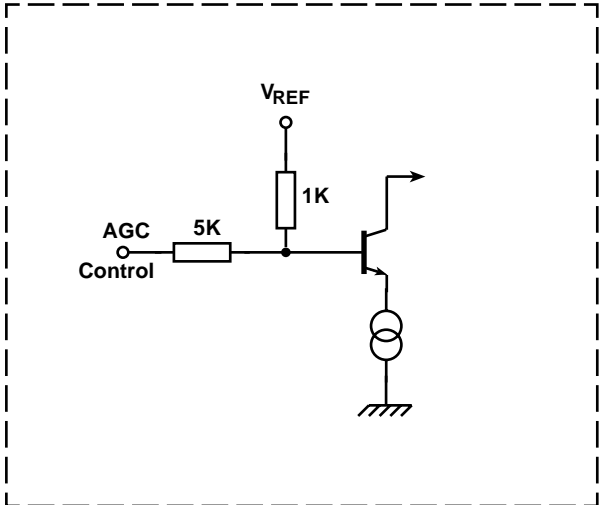


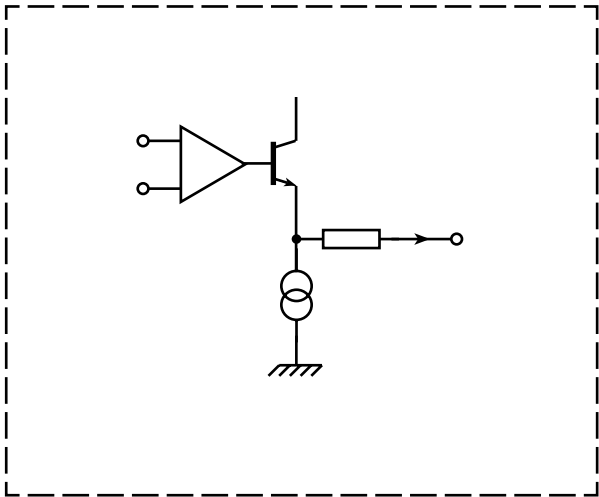
Figure 4 Output impedance (typical)



RF Input (pin 2)



AGC Input (pin 4)



RF outputs (pins 5, 6)

Figure 6 Input/Output interface circuit

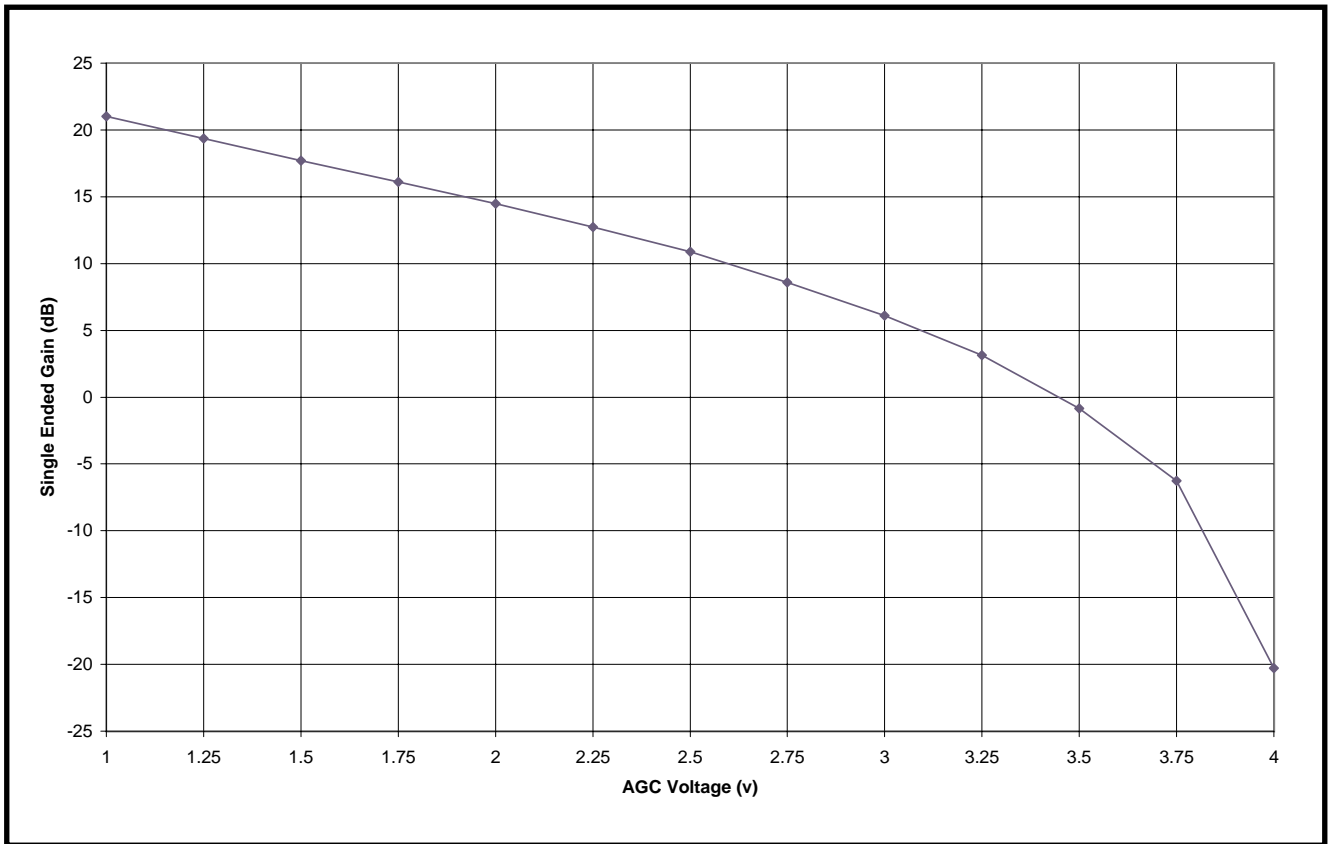
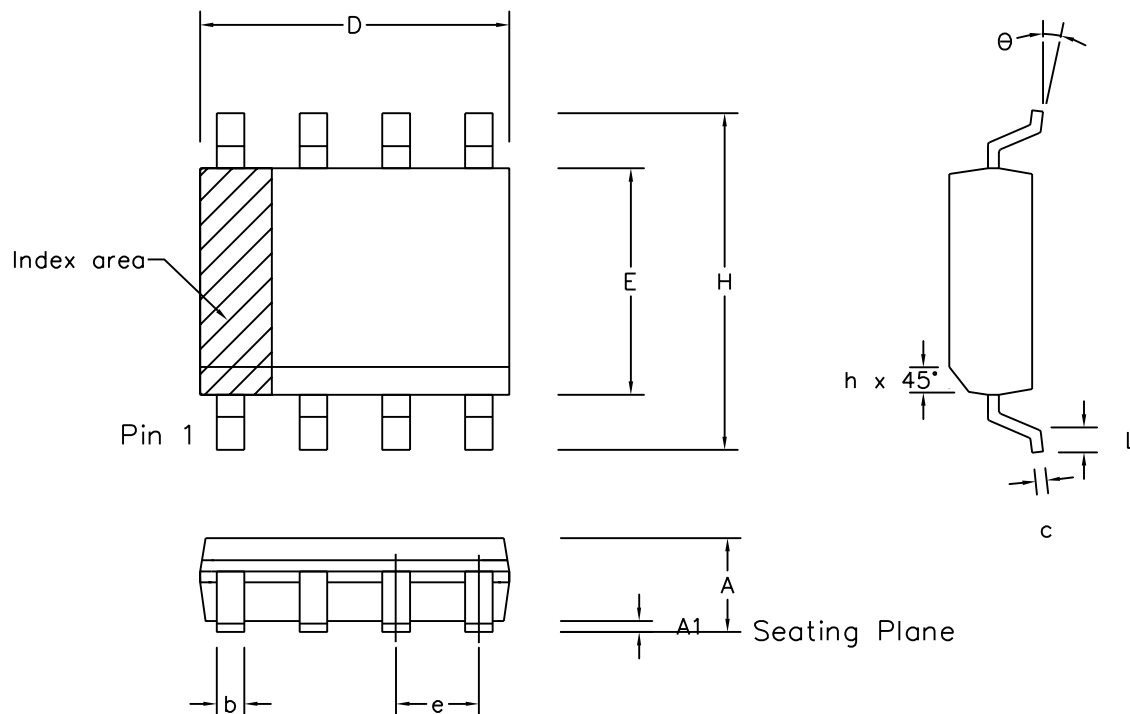


Figure 5 gain variation with AGC voltage (typical)



	Min mm	Max mm	Min inch	Max inch
A	1.35	1.75	0.053	0.069
A1	0.10	0.25	0.004	0.010
D	4.80	5.00	0.189	0.197
H	5.80	6.20	0.228	0.244
E	3.80	4.00	0.150	0.157
L	0.40	1.27	0.016	0.050
e	1.27 BSC		0.050 BSC	
b	0.33	0.51	0.013	0.020
c	0.19	0.25	0.008	0.010
O	0°	8°	0°	8°
h	0.25	0.50	0.010	0.020
	Pin Features			
N	8		8	
Conforms to JEDEC MS-012AA Iss. C				

Notes:

1. The chamfer on the body is optional. If not present, a visual index feature, e.g. a dot, must be located within the cross-hatched area.
2. Controlling dimensions are in inches.
3. Dimension D do not include mould flash, protusion or gate burrs. These shall not exceed 0.006" per side.
4. Dimension $E1$ do not include inter-lead flash or protusion. These shall not exceed 0.010" per side.
5. Dimension b does not include dambar protusion / intrusion. Allowable dambar protusion shall be 0.004" total in excess of b dimension.

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ISSUE	1	2	3	4	5	Previous package codes MP / S	Package Outline for 8 lead SOIC (0.150" Body width)
ACN	6745	201936	202595	203705	212424		
DATE	5Apr95	27Feb97	12Jun97	9Dec97	22Mar02		
APPRD.							GPD00010





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