

The SP8904 is one of a range of very high speed low power prescalers for professional applications. The dividing elements are static D type flip flops and therefore allow operation down to DC if the drive signal is a pulse waveform with fast risetime. The output stage has a differential current output and provides a direct drive into a 50 ohm load.

**Ordering Information**  
 SP8904/KG/MP1S (tubes)  
 SP8904/KG/MP1T (tape and reel)

### Features

- Very High Operating Speed
- Operation down to DC with Square Wave Input
- Silicon Technology for Low Phase Noise  
(Typically better than  $-140\text{dBc/Hz}$  at 1KHz)
- 5V Single Supply Operation
- Low Power Dissipation: 350mW (Typ.)
- Surface Mount Plastic Package

### Absolute Maximum Ratings

Supply voltage, $V_{CC}$	6.5V
Storage temperature	$-65^{\circ}\text{C}$ to $+150^{\circ}\text{C}$
Maximum junction temperature	$+150^{\circ}\text{C}$
Prescaler input voltage	$2.5\text{V}_{\text{p-p}}$
Operating temperature	KG $-40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$ $T_{\text{CASE}}$

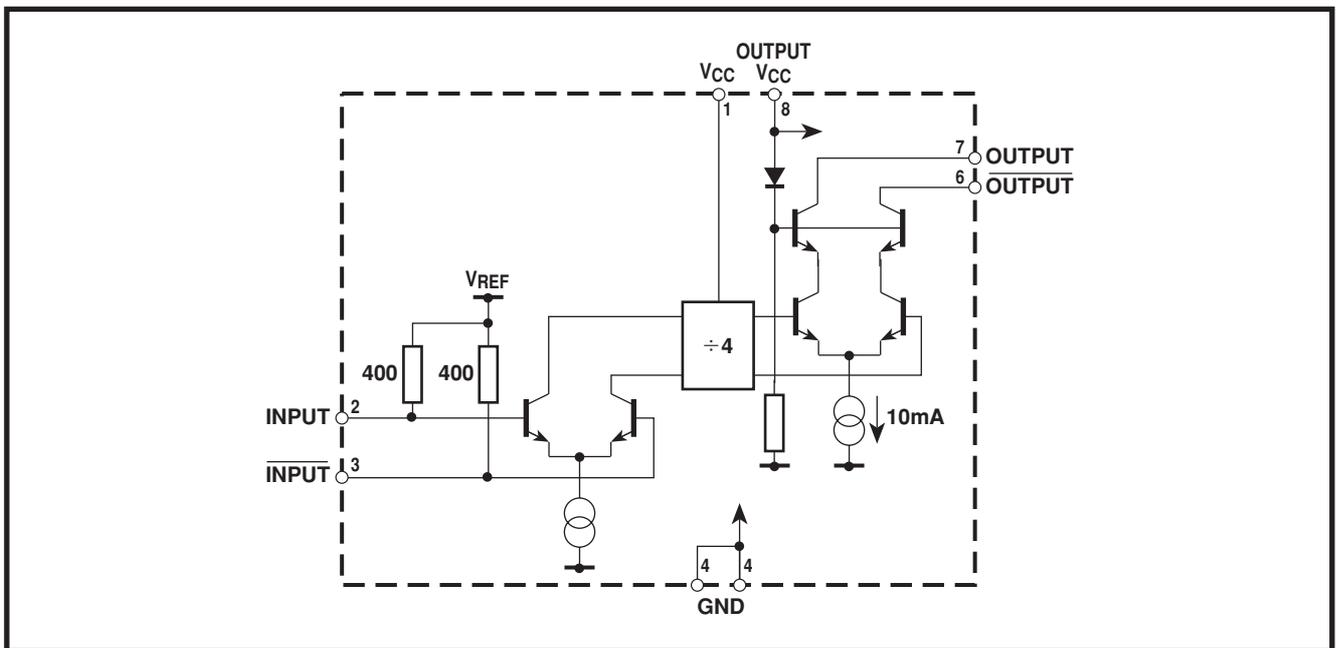


Figure 1 block diagram

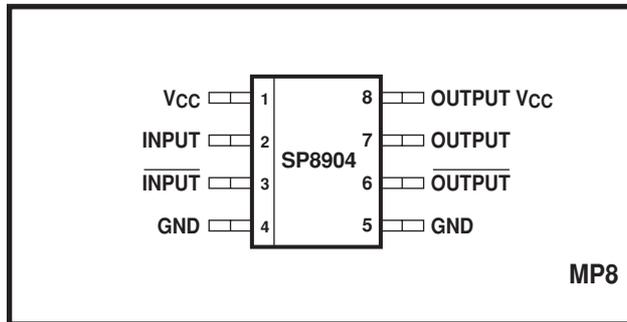


Figure 2 Pin connections - top view

## Electrical Characteristics

These characteristics are guaranteed by either production test or design over the following range of operating conditions unless otherwise stated:  $T_{AMB} = -40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ ,  $V_{CC} = 4.75\text{V}$  to  $5.25\text{V}$

Characteristic	Pin	Value			Units	Conditions
		Min.	Typ.	Max.		
Supply current	1, 8	-	70	95	mA	
Input frequency	2, 3	1.0	-	5.0	GHz	RMS sinewave
Input sensitivity	2, 3	-	-	180	mVrms	$f_{IN} = 1\text{GHz}$ and $4.2\text{GHz}$
Input sensitivity	2, 3	-	-	570	mVrms	$f_{IN} = 5\text{GHz}$
Input overload	2, 3	440	-	-	mVrms	$f_{IN} = 1\text{GHz}$ and $3\text{GHz}$
Input overload	2, 3	700	-	-	mVrms	$f_{IN} = 5.0\text{GHz}$ and $3.8\text{GHz}$
Output voltage	6, 7	-	0.5	-	Vp-p	Into $50\Omega$ pullup resistor
Output power	6, 7	-10.0	0	+2.0	dBm	$f_{IN} = 1\text{GHz}$ and $5\text{GHz}$ (see note 1)

### NOTE

1. Measured into  $50\Omega$  measuring instrument in parallel with  $50\Omega$  pullup resistor. See Figure 5.

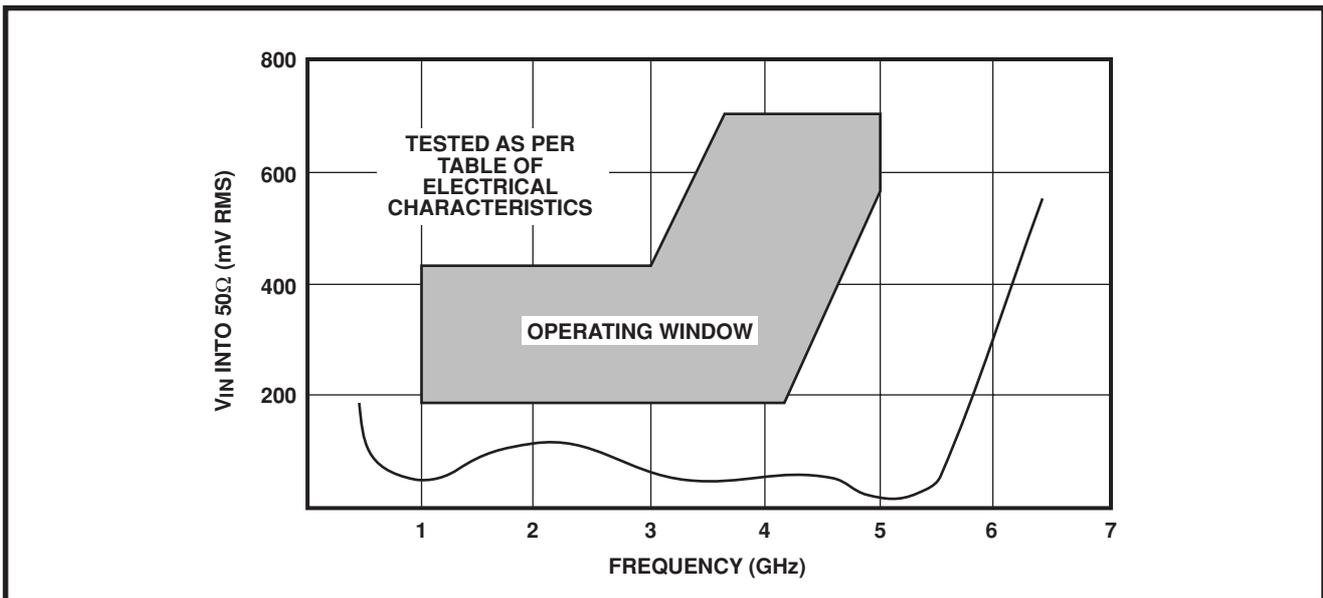


Figure3 Typical input sensitivity (sinewave drive)

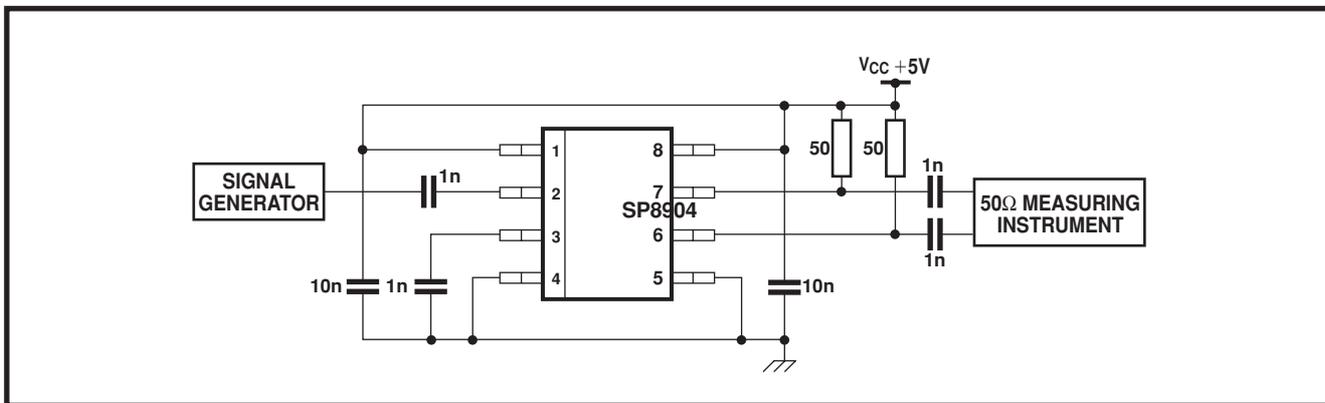


Figure 4 Typical application and test circuit

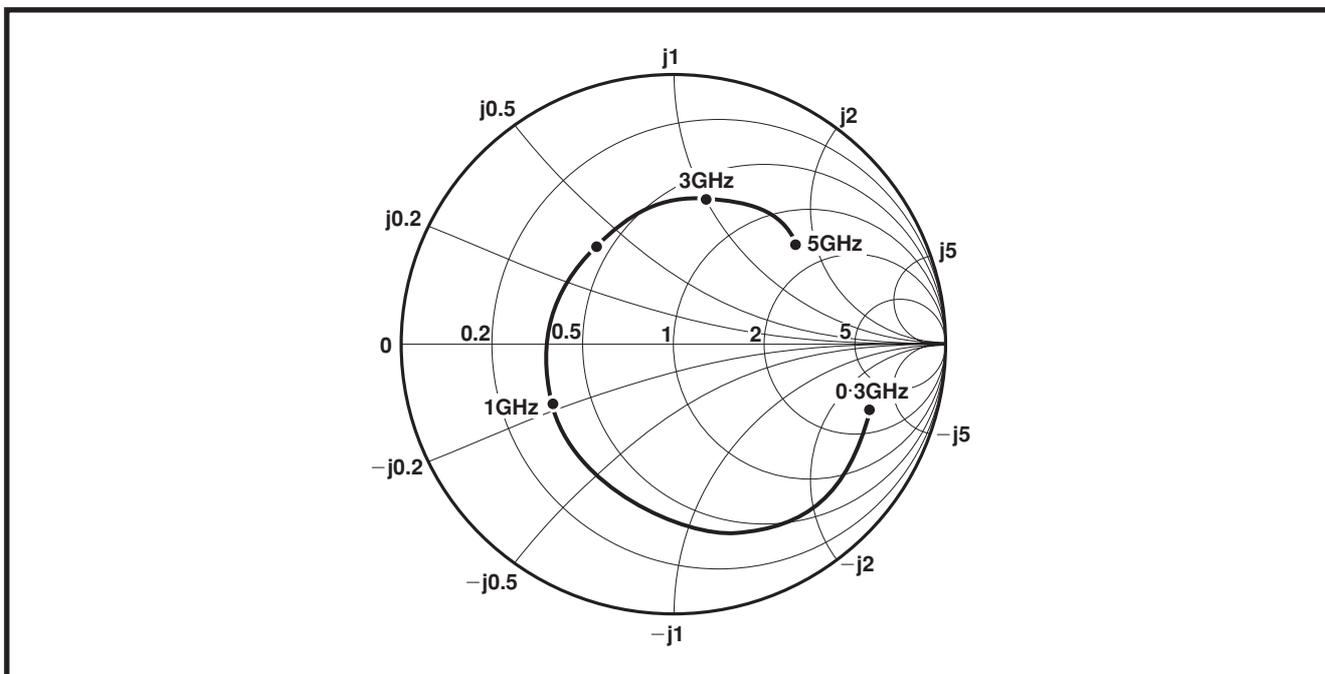


Figure 5 Typical input impedance

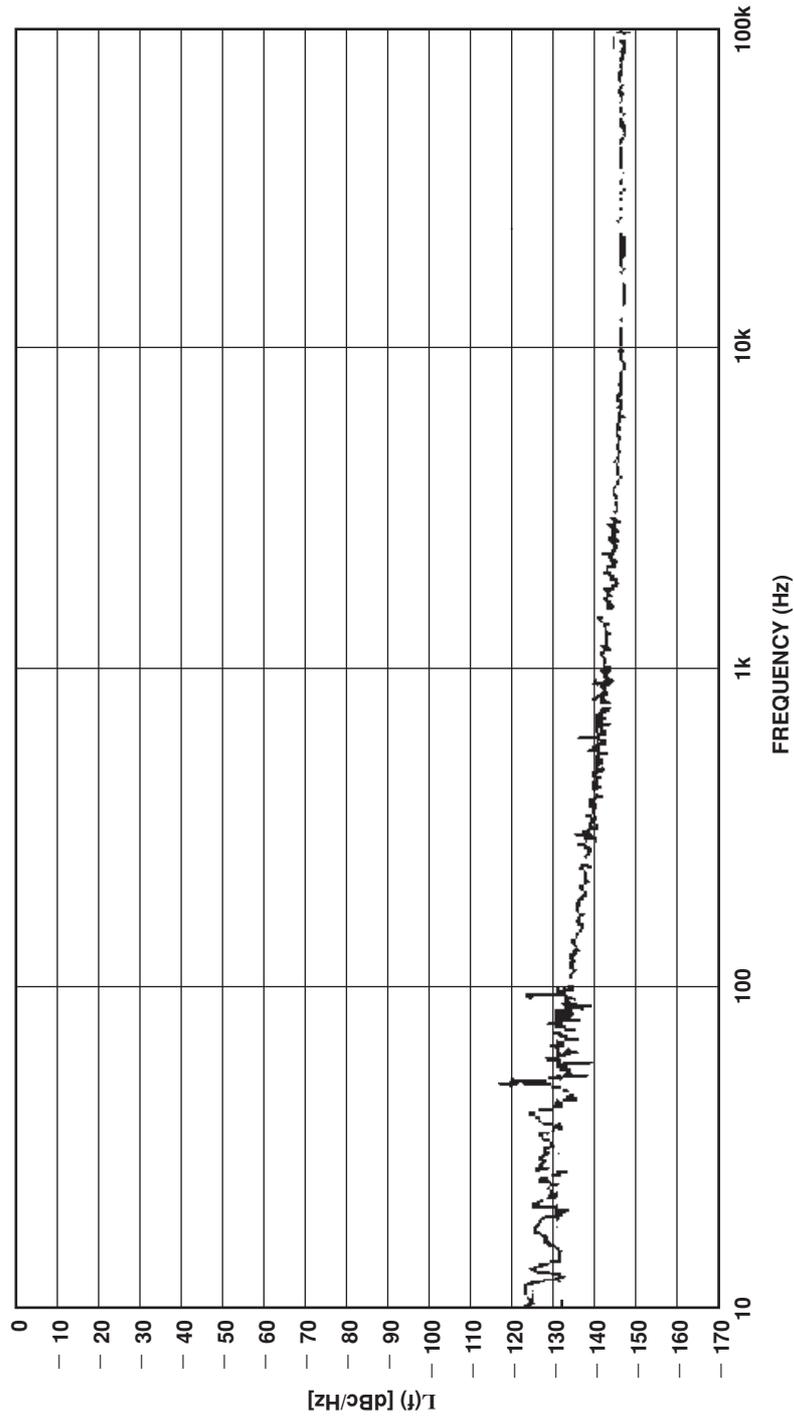
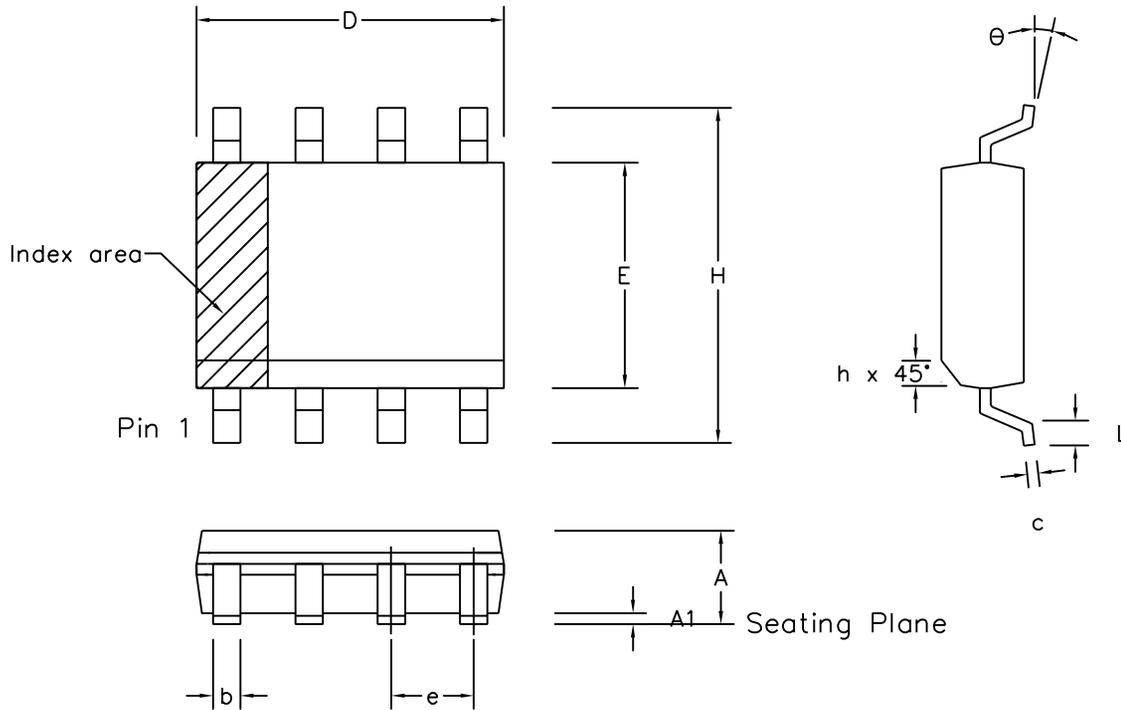


Figure 6 Typical phase noise, input frequency = 3GHz



	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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