

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  $-140\text{dBc}/\text{Hz}$  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	$2.5\text{Vp-p}$
Operating temperature	KG $-40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$ $T_{CASE}$

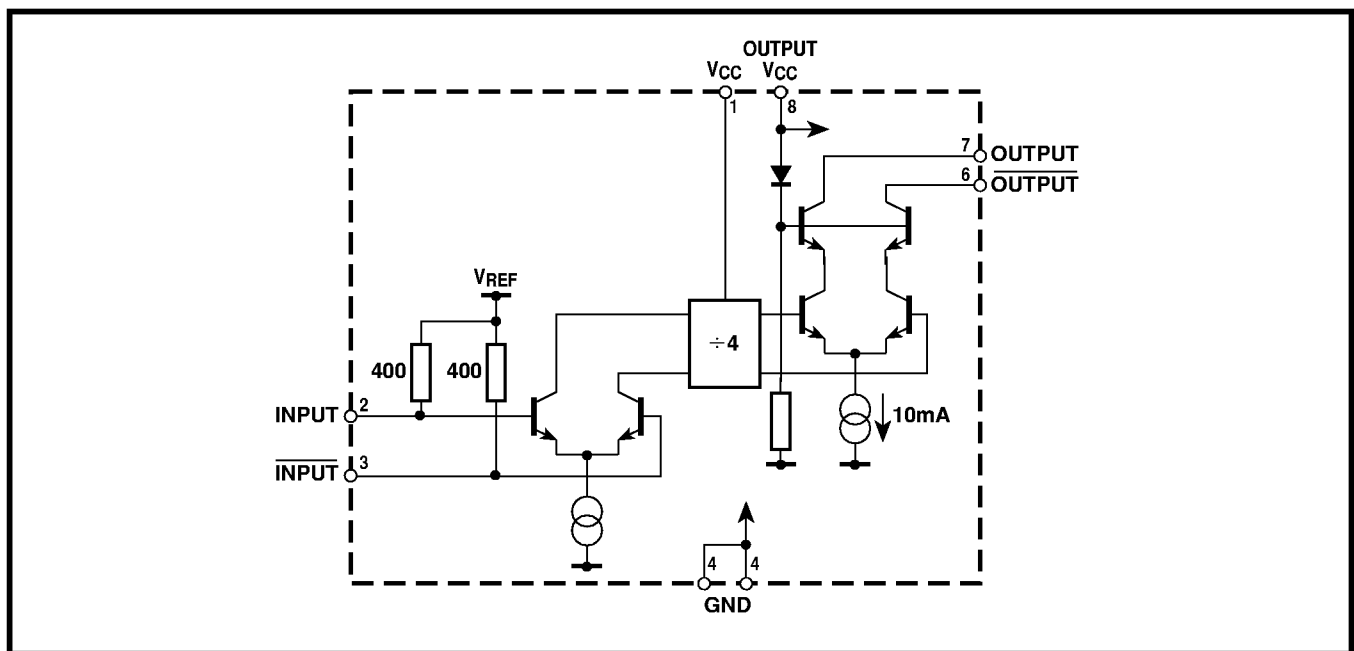


Figure 1 block diagram

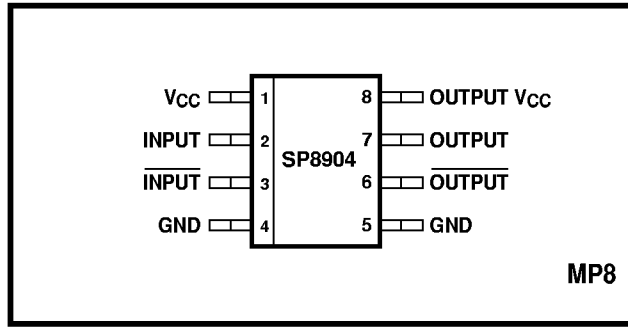


Figure 2 Pin connections - top view

**Electrical Characteristics**

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

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	$f_{IN} = 1GHz$ and $4.2GHz$
Input sensitivity	2, 3	-	-	570	mVrms	$f_{IN} = 5GHz$
Input overload	2, 3	440	-	-	mVrms	$f_{IN} = 1GHz$ and $3GHz$
Input overload	2, 3	700	-	-	mVrms	$f_{IN} = 5.0GHz$ and $3.8GHz$
Output voltage	6, 7	-	0.5	-	Vp-p	Into $50\Omega$ pullup resistor
Output power	6, 7	-10.0	0	+2.0	dBm	$f_{IN} = 1GHz$ and $5GHz$ (see note 1)

NOTE

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

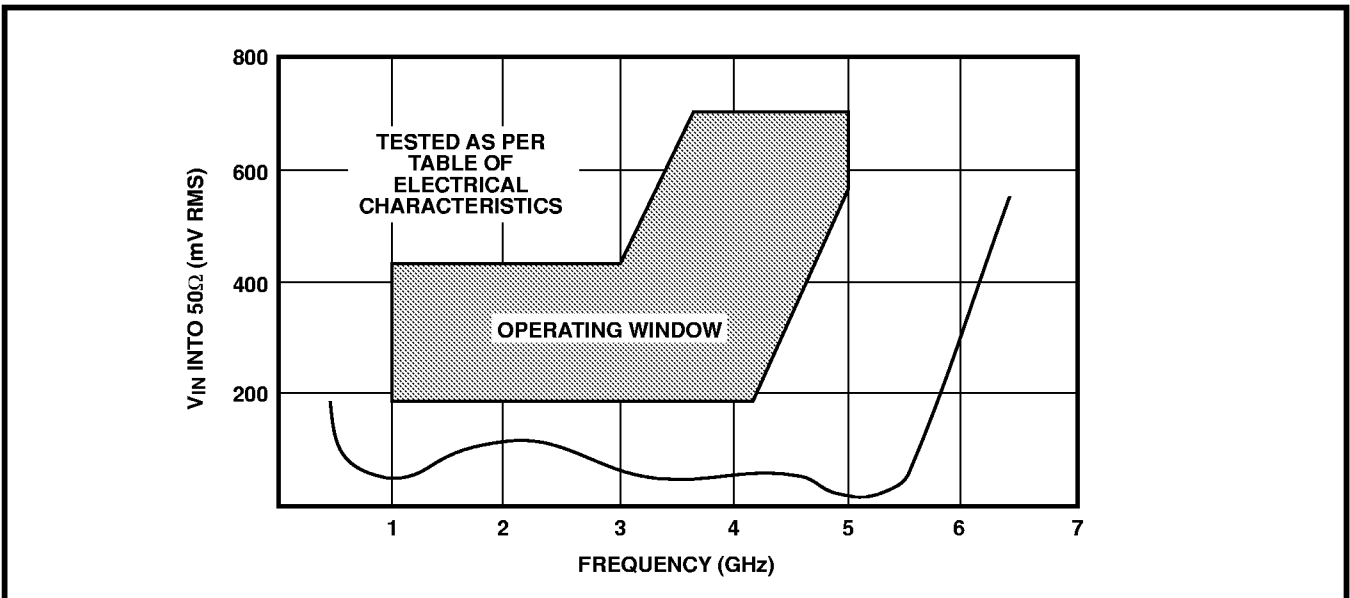


Figure3 Typical input sensitivity (sinewave drive)

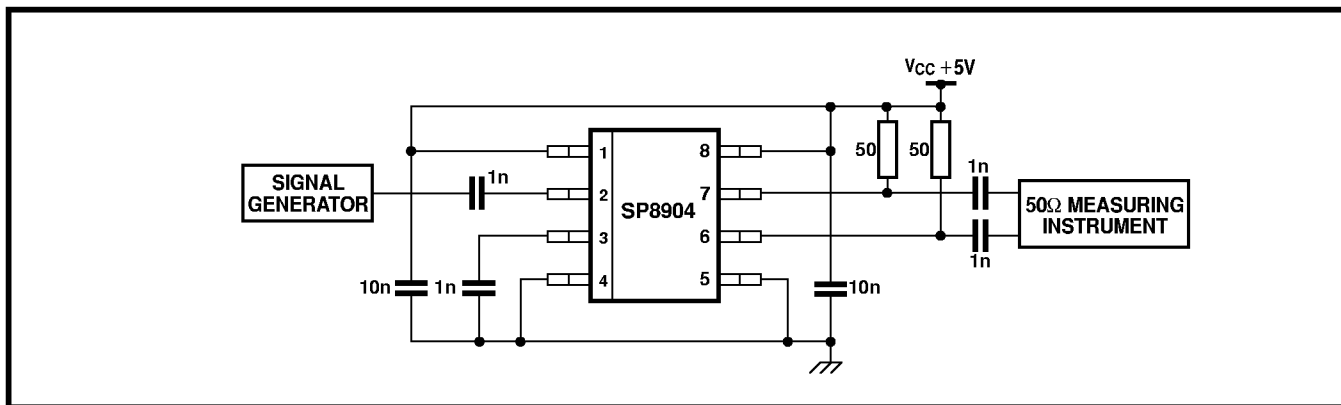


Figure 4 Typical application and test circuit

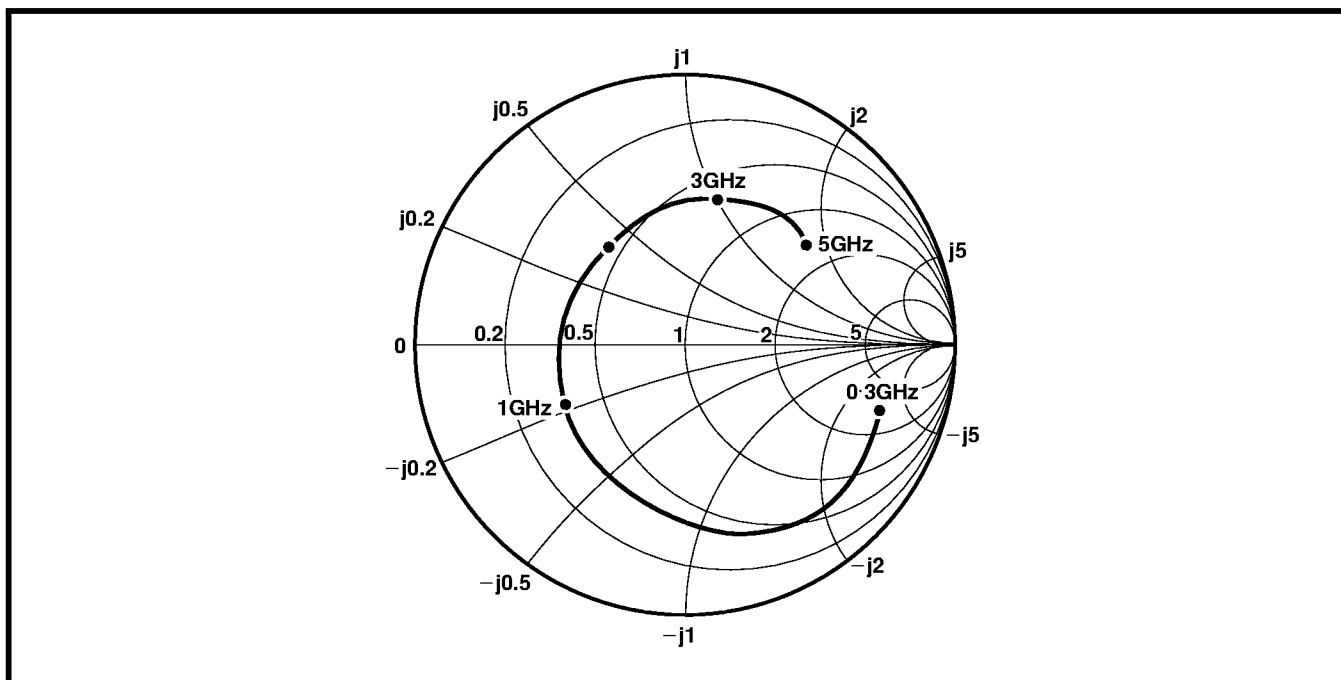


Figure 5 Typical input impedance

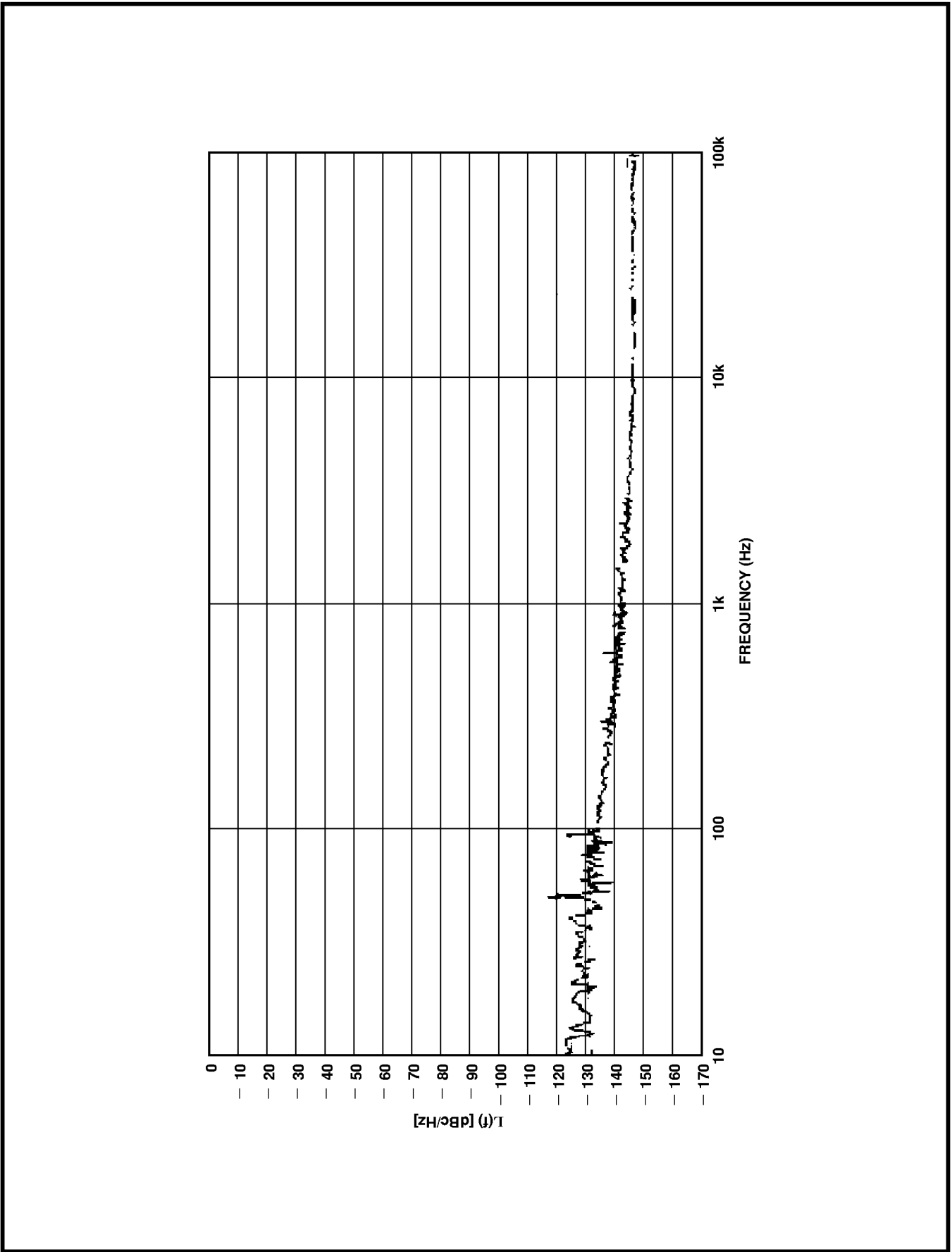
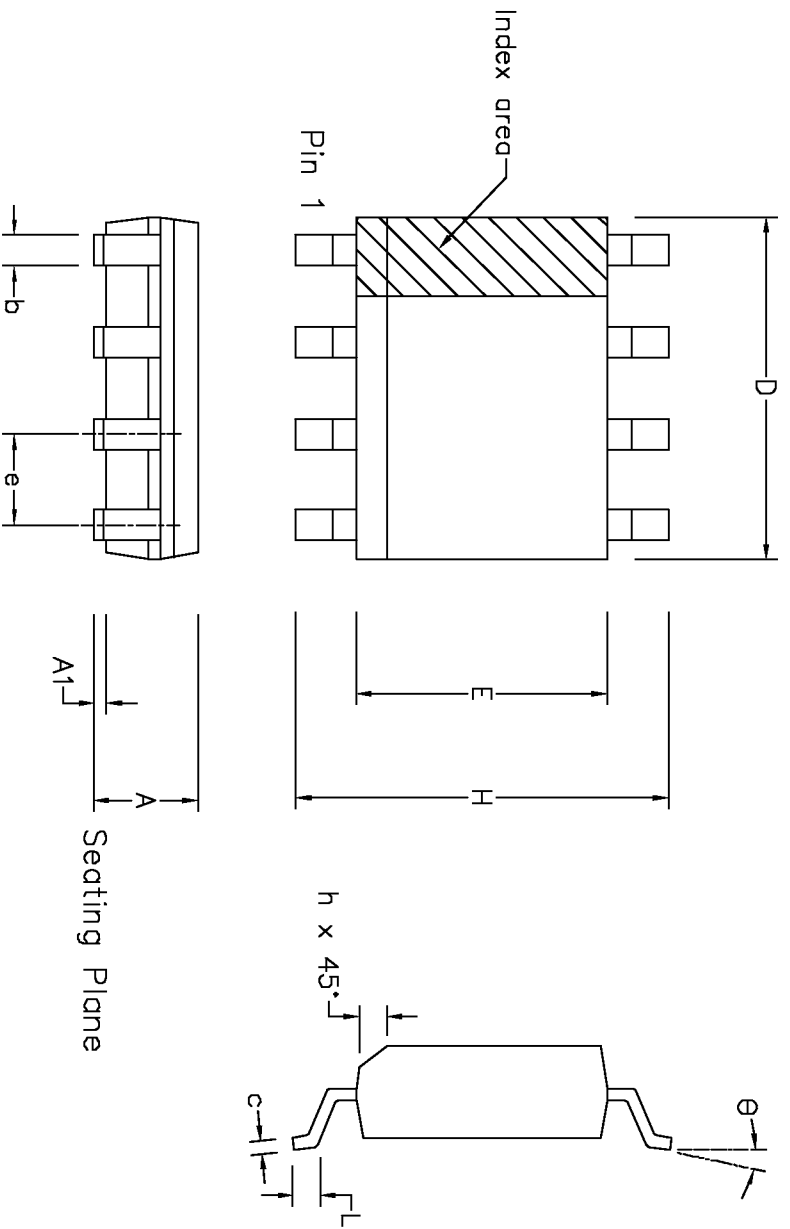


Figure 6 Typical phase noise, input frequency = 3GHz



	Min	Max	Min	Max
	mm	mm	inch	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 it is not present, a visual index feature, e.g. a dot, must be located within the cross-hatched area.
2. Controlling dimension 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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ORIGINATING SITE: SWINDON

ISSUE	1	2	3	4
ACN	006745	201936	202595	203705
DATE	5APR95	27FEB97	12JUN97	9DEC97
APPROVED				

MITEL SEMICONDUCTOR

Title: Package Outline Drawing for  
8 lds SOIC(N)-0.150" Body Width (MP)

Drawing Number

GPD000010