GEC PLESSEY
SEMICONDUCTORS

OCTOBER 1995

PRELIMINARY INFORMATION

DS3172-3.3

# SP8902

## 5.0/5.5GHz ÷ 2 FIXED MODULUS DIVIDER

(Supersedes September 1993 Edition)

The SP8902 is one of a range of very high speed low power prescalers for professional and military 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.

### FEATURES

- Very High Operating Speed
- Operation down to DC with square wave input
- Silicon Technology for low Phase Noise
  (Typically better than –140dBc/Hz at 1KHz)
- 5V Single Supply Operation
- Low Power Dissipation-335mW (Typ.)
- Specified over the full Military Temperature Range

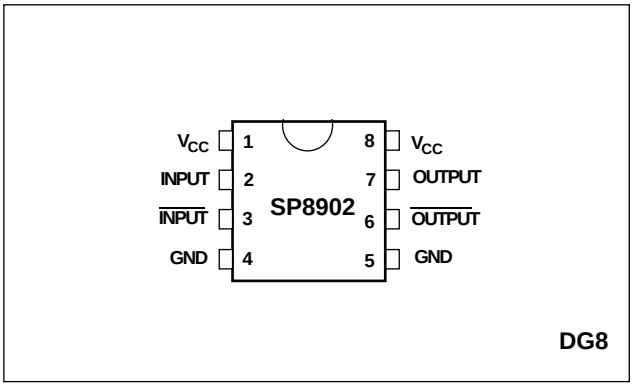



*Fig.1 Pin connections - top view*

### ABSOLUTE MAXIMUM RATINGS

| | | |
|---|---|---|
| Supply Voltage, $V_{CC}$ | | 6.5V |
| Storage Temperature | | –65°C to +150°C |
| Maximum Junction Temperature | | +175°C |
| Prescaler Input Voltage | | 2.5Vp-p |
| Operating Temperature | KG | –55°C to +125°C $T_{case}$ |
| | IG | –40°C to +85°C $T_{case}$ |

### ORDERING INFORMATION

SP8902/KG/DG1S
SP8902/IG/DG1S
SP8902/RG/1CAC (naked die)

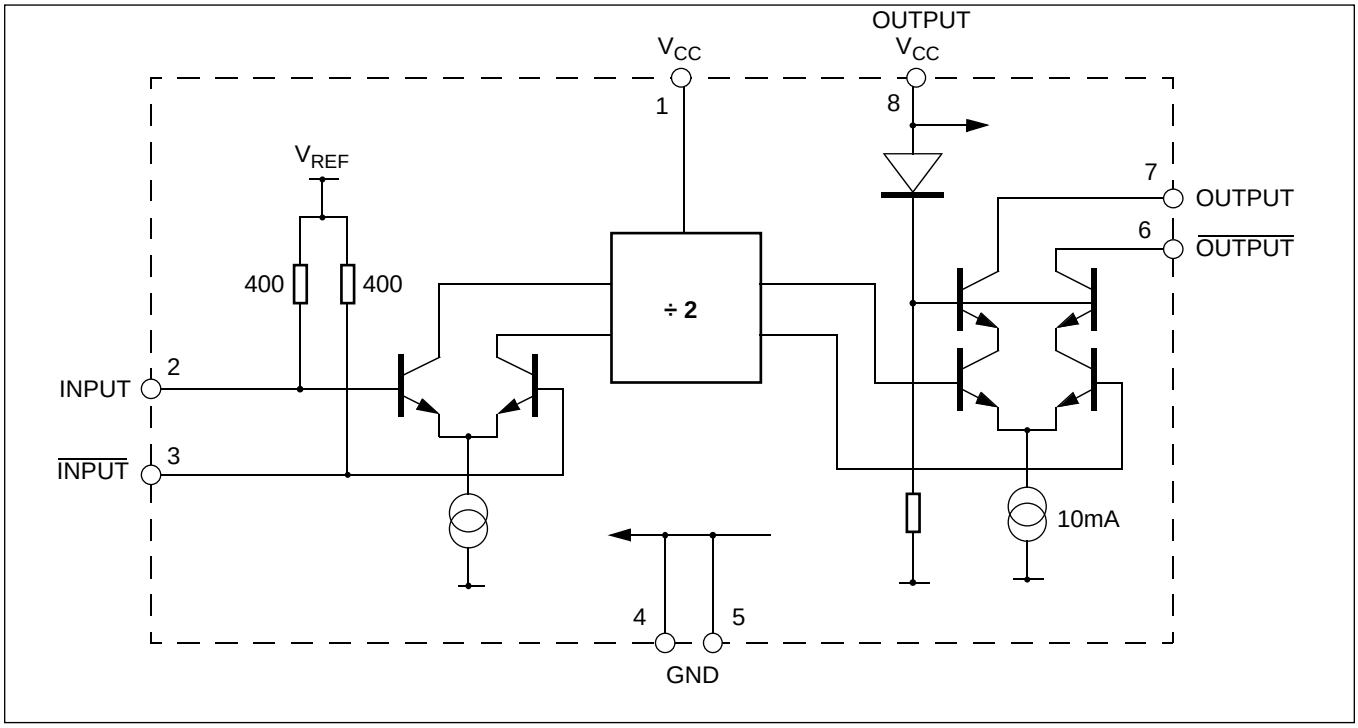



*Fig.2 SP8902 block diagram*

## SP8902KG ELECTRICAL CHARACTERISTICS

Guaranteed over the full specified temperature and supply voltage range

**Test conditions (unless otherwise stated):**

Temperature $T_{case}$ = –55°C and +125°C using thermostream temperature control equipment.

Supply Voltage: $V_{CC}$ = 4.75V and 5.25V

| Characteristic | Pin | Value | | | Units | Conditions |
|---|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | | |
| Supply current | 1, 8 | - | 67 | 92 | mA | |
| Input frequency | 2, 3 | 1.0 | - | 5.0 | GHz | RMS sinewave |
| Input frequency | 2, 3 | 1.0 | - | 5.5 | GHz | RMS sinewave, $T_{case}$ = –55°C & +85°C |
| Input sensitivity | 2, 3 | - | - | 180 | mVrms | fin = 1 & 4.2GHz |
| Input sensitivity | 2, 3 | - | - | 570 | mVrms | fin = 5GHz |
| Input sensitivity | 2, 3 | - | - | 570 | mVrms | fin = 5.5GHz, $T_{case}$ = –55°C & +85°C |
| Input overload | 2, 3 | 440 | - | - | mVrms | fin = 1 & 3GHz |
| Input overload | 2, 3 | 700 | - | - | mVrms | fin = 3.8 & 5.0GHz |
| Input overload | 2, 3 | 700 | - | - | mVrms | fin = 5.5GHz, $T_{case}$ = –55°C & +85°C |
| Output voltage | 6, 7 | - | 0.5 | - | Vp/p | Into 50Ω pull up resistor |
| Output power | 6, 7 | –15.0 | –9.0 | +2.0 | dBm | fin = 1, 3, 4.2, 5GHz (see note 1) |

**NOTE 1.**

Measured into 50Ω measuring instrument in parallel with 50Ω pull up resistor. See Fig.5.

## SP8902IG ELECTRICAL CHARACTERISTICS

Guaranteed across the temperature range of $T_{case}$ = –40°C to +85°C, but tested at $T_{amb}$ = +25°C

With Supply Voltage: $V_{CC}$ = 4.75V and 5.25V

| Characteristic | Pin | Value | | | Units | Conditions |
|---|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | | |
| Supply current | 1, 8 | - | 67 | 92 | mA | |
| Input frequency | 2, 3 | 1.0 | - | 5.0 | GHz | RMS sinewave |
| Input sensitivity | 2, 3 | - | - | 180 | mVrms | fin = 1 & 4.2GHz |
| Input sensitivity | 2, 3 | - | - | 570 | mVrms | fin = 5GHz |
| Input overload | 2, 3 | 440 | - | - | mVrms | fin = 1 & 3.0GHz |

The thermal resistances of the DG package are approximately $\theta_{JA}$ = 150°C/W and $\theta_{JC}$ = 30°C/W. These are given to offset the decision on the heat sink requirement for individual applications.

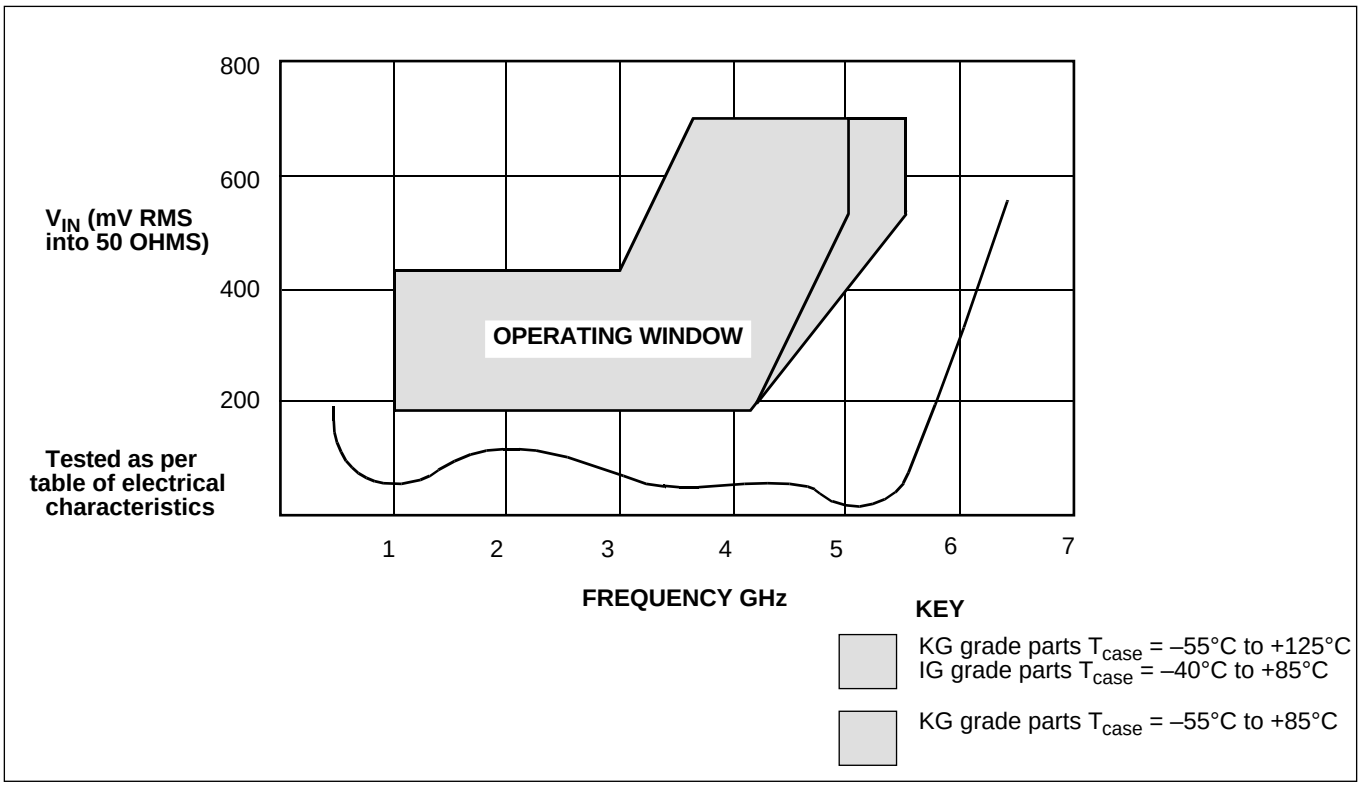



*Fig.3 Typical input sensitivity (sine wave drive)*

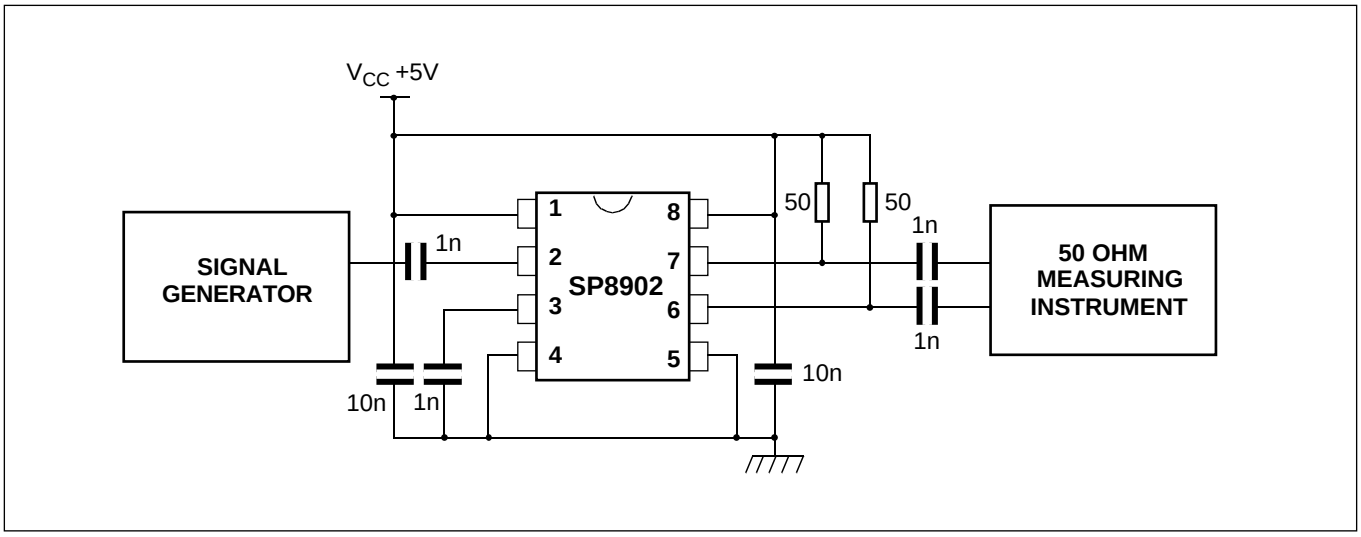
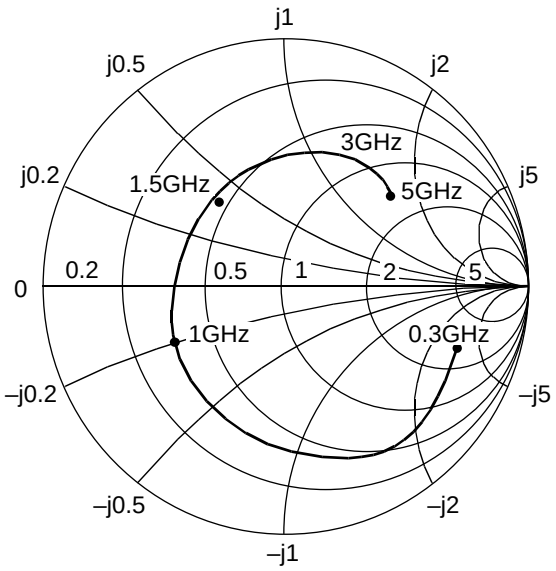
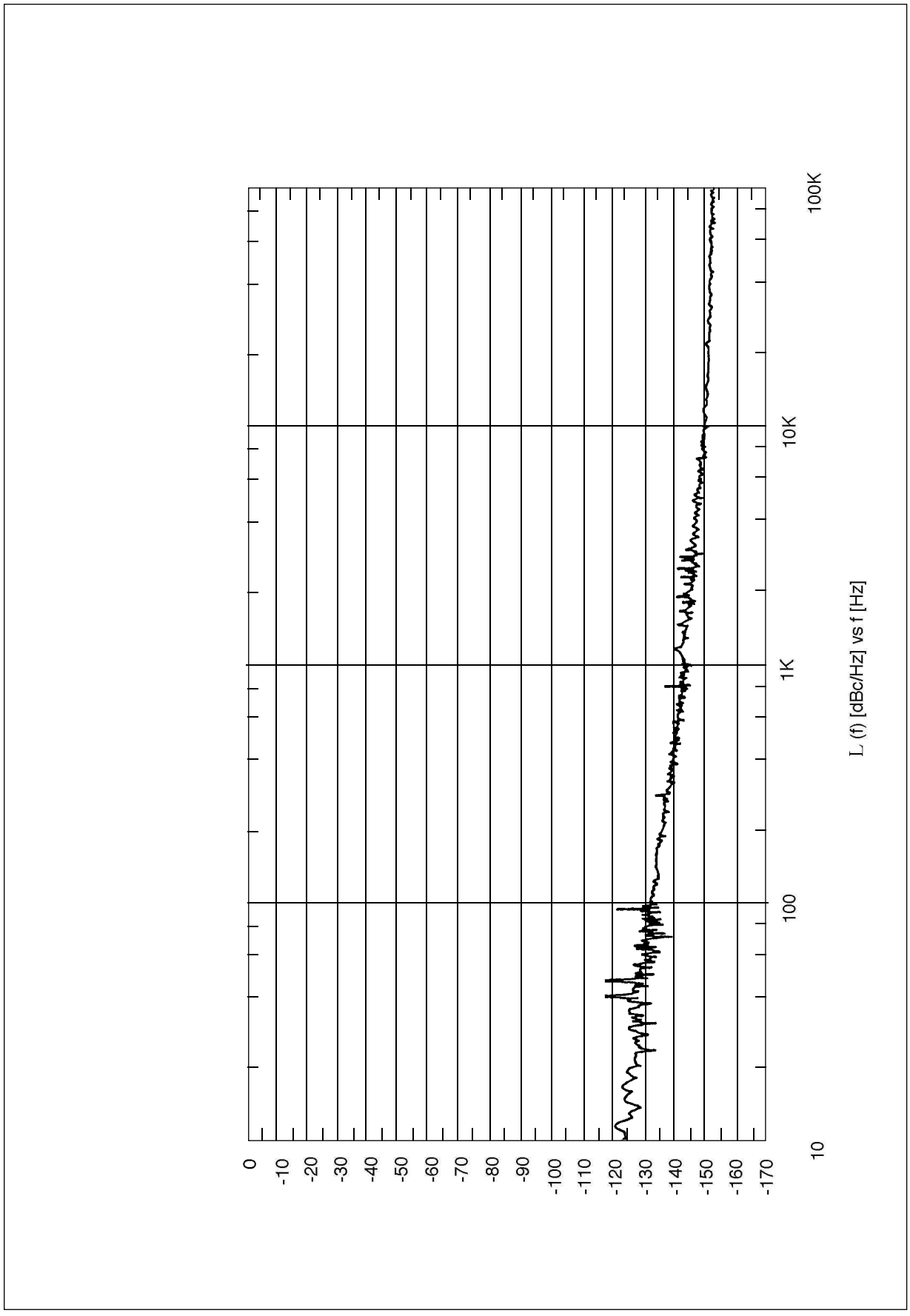



*Fig.4 Typical application and test circuit*




**DG PACKAGE**

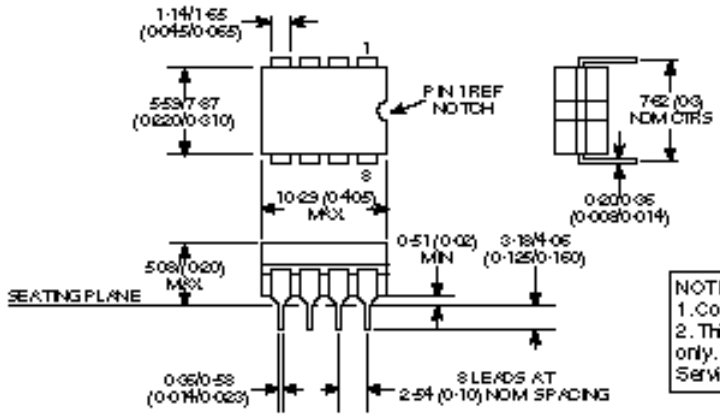
*Fig.5 Typical input impedance*


0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
-170
10
100
1K
10K
100K
L (f) [dBc/Hz] vs f [Hz]

## SP8902

### PACKAGE DETAILS

Dimensions are shown thus: mm (in). For further package information please contact your local Customer Service Centre.




NOTES
1. Controlling dimensions are inches.
2. This package outline diagram is for guidance only. Please contact your GPS Customer Service Centre for further information.

**8 LEAD CERAMIC DIL DG8 COMPLIES WITH MIL STD 1835**

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