PLESSEY
SEMICONDUCTORS

# SP 8000 SERIES

## HIGH SPEED DIVIDERS

# SP8675B&M 1.0GHz ÷8
# SP8676B&M 1.1GHz ÷8
# SP8677B&M 1.2GHz ÷8

The SP8675/6/7 are high speed counters for operation at input frequencies up to 1.2GHz.

The devices have a typical power dissipation of 470mW at the nominal supply voltage of 6.8V.

The clock input is biased internally and is coupled to the signal source by a capacitor. The input signal path is completed by an input reference decoupling capacitor which is connected to earth. If no signal is present at the clock input the device will self-oscillate. If this is undesirable it may be prevented by connecting a 15kΩ resistor from the input $V_{EE}$ (pin 10 to pin 7). This will reduce the input sensitivity of the device by approximately 100mV.

The clock inhibit input is compatible with standard ECL III circuits using a common $V_{CC}$ to the SP8675/6/7. A 6kΩ pulldown resistor is included on the chip. The input should be left open circuit when not in use. The SP8675/6/7 outputs are compatible with standard ECL II circuits. They may be used to drive ECL 10K by the inclusion of two resistors as shown in Fig. 4.

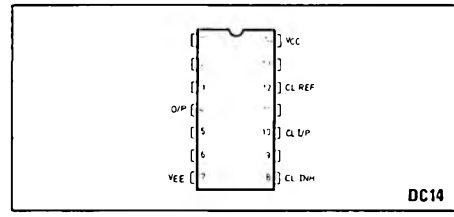


*Fig. 1 Pin connections*

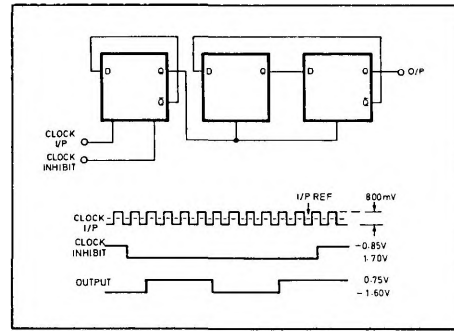


*Fig. 2 Logic diagram and timing*

## FEATURES

- Guaranteed Operation over Large Temperature Range: 'B' Grade 0°C to +70°C
  'M' Grade —40°C to +85°C
- Wide Input Dynamic Range
- Self Biasing Clock Input
- Clock Inhibit Input for Direct Gating
- Capability

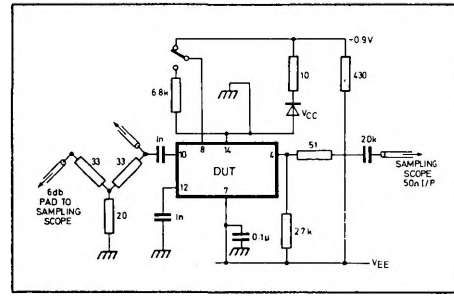


*Fig. 3 Test circuit*

## ABSOLUTE MAXIMUM RATINGS

Power supply voltage $V_{CC}$—$V_{EE}$ 0 to 10V
Input voltage inhibit input $V_{EE}$ to $V_{CC}$
Input voltage CP input 2.5V p-p
Output current 20mA
Operating junction temperature +150°C
Storage temperature —55°C to +150°C

## ELECTRICAL CHARACTERISTICS

**Test Conditions (unless otherwise stated)**

| | |
|---|---|
| Supply voltage | 6.8V ±0.3V |
| Clock input | AC coupled, self-biasing |
| Clock inhibit input | ECL III compatible |
| Output | ECL II compatible |
| $T_{amb}$ 'B' grade | 0°C to +70°C (see note 1) |
| 'M' grade | −40°C to +85°C (see note 1) |
| Supply voltage | $V_{CC}$ = OV $V_{EE}$ = −6.8V |
| Clock input voltage | 400mV to 1.2V (peak to peak) |

| Characteristic | Value | | | Units | Conditions |
|---|---|---|---|---|---|
| | Min. | Typ. | Max. | | |
| Max. i/p frequency SP8675 | 1.0 | | | GHz | 400mV to 1.2V p-p |
| SP8676 | 1.1 | | | GHz | 600mV to 1.2V p-p |
| SP8677 | 1.2 | | | GHz | 600mV to 1.0V p-p |
| Min i/p frequency | | | 200 | MHz | Sine wave input 400mV p-p |
| | | | 150 | MHz | Sine wave input 600mV p-p |
| Min slew rate for square wave input | | | 200 | V/µsec | |
| Clock i/p impedance | | 400 | | Ω | At low frequency |
| Inhibit input reference level | | −1.3 | | V | At 25°C compatible with ECL III throughout the temperature range |
| Inhibit input pulldown resistor (internal) | | 6 | | kΩ | |
| Output pulldown resistor (internal) | | 3 | | kΩ | |
| Power supply drain current | | 70 | 95 | mA | at 25°C |

NOTES

1. The SP8677M is tested at $T_{case}$ = −40°C to +85°C. The SP8677M requires a suitable heatsink to be connected during operation.

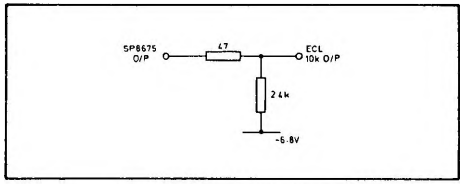


*Fig. 4 SP8675 to ECL10K interface*

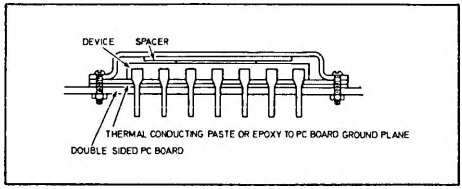


*Fig. 5 Heat sink for 'M' grade devices*