

# SP8607 A, B&M

## 600 MHz $\div 2$

The SP8607 is a divide-by-2 counter with a minimum guaranteed toggle frequency of 600 MHz over a 0°C to +70°C temperature range. The device is designed for capacitive coupling to the signal source to either of the two inputs and it has two complementary emitter follower outputs. Power dissipation is typically only 70mW with a 5.2V supply.

### FEATURES

- 600 MHz Operation
- -55°C to 125°C Guaranteed for 'A' grade
- Only 70mW Dissipation at 5.2V

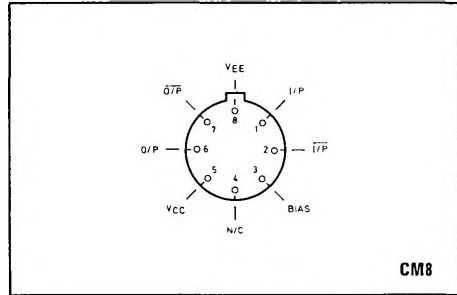


Fig. 1 Pin connections

### ELECTRICAL CHARACTERISTICS

Test conditions (unless otherwise stated):

Connections as test circuit, Fig. 3

$T_{amb}$ : (A grade) -55°C to +125°C

(B grade) 0°C to +70°C

(M grade) -40°C to +85°C

Supply voltage  $V_{CC} = 0V$

$V_{EE} = -5.2V \pm 0.25V$

Specified input voltage range: 400 to 800mV p-p

### ABSOLUTE MAXIMUM RATINGS

Power Supply Voltage $ V_{CC} - V_{EE} $	8V
Input Voltage DC	$\leq$ Supply
Input Voltage AC	2.5V p-p
Output Current	15mA
Operating Junction Temp.	+150°C
Storage Temp Range	-55°C to +150°C

Characteristic	Value			Units	Conditions
	Min	Typ.	Max		
Max. toggle frequency	600	800		MHz	$V_{EE} = -5.2V$ , $f_{in} = 600\text{ MHz}$
Min. input frequency (sine wave)		50		MHz	
Min. slew rate of square wave input for correct operations to OHZ		40	100	V/ $\mu$ s	
Output voltage swing	400			mVp-p	
Output voltage levels					
$V_{OH}$		-0.75		V	$f_{in} = 0\text{ Hz}$
$V_{OL}$		-1.5		V	
Input impedance		400		$\Omega$	$f_{in} = 0\text{ Hz}$
O/P pulldown resistors		4.0		k $\Omega$	
Bias voltage level		-2.6		V	2.7k $\Omega$ resistor from pin 3 to $V_{CC}$
Power supply drain current		14	18	V	$V_{EE} = -5.2V$

# SP8607

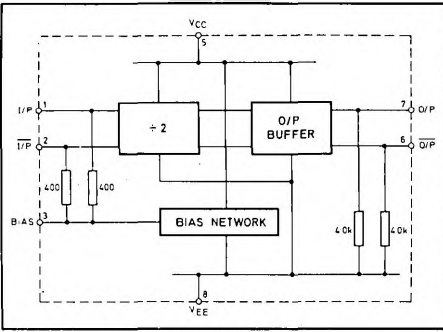


Fig. 2 SP8607 block diagram

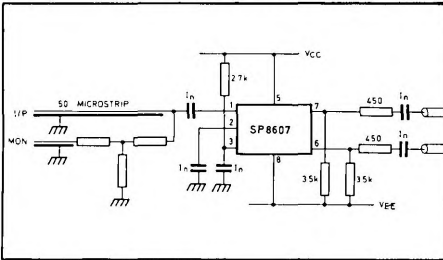


Fig. 3 Test circuit for SP8607

## OPERATING NOTES

All components used with the SP8607 should be suitable for the frequencies involved, resistors and capacitors should be of low inductance types and unterminated loads should be kept short to minimise uncounted reflections. The test circuit uses positive earth because this minimises noise problems and the danger of accidentally shorting the O/P transistors to a negative voltage. However, the device will operate satisfactorily and to the specification, with a negative earth provided that the positive supply is well decoupled to the UHF earth.

There are two complementary inputs connected to an internally-generated temperature-compensated bias point via two 400 ohm resistors. The signal source would normally be capacitively coupled to one of the inputs and the other should be decoupled to earth. If two complementary input signals are available (when cascading SP8607s for example) both inputs should be used

The input signal can be directly connected to the device either by using a voltage dropping network or by using split power supplies (see Fig. 4). In this mode the device is very tolerant of the actual values of V<sub>CC</sub> and V<sub>EE</sub> although |V<sub>CC</sub> - V<sub>EE</sub>| should stay within 5.2V ± 0.25V. A 2.7kΩ resistor is connected from V<sub>CC</sub> to the bias pin in the test circuit because this greatly improves the device's ability to operate with large input signals

It is important that pins 2 and 3 are decoupled by a capacitor in the range 100 - 1000pF because device sensitivity can be reduced by decoupling to a poor earth

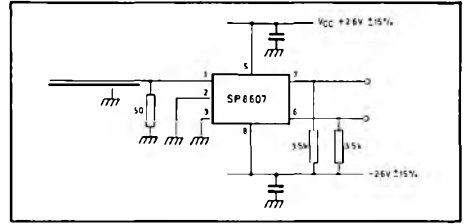


Fig. 4 Direct coupling using split power supplies

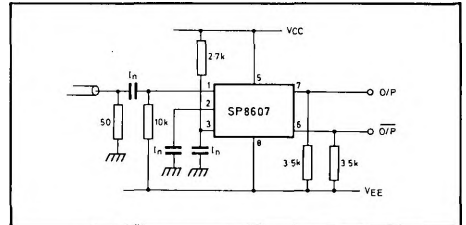


Fig. 5 SP8607 with input pulldown resistor

In the absence of an input signal, or if the input signal is of very low amplitude, the device may give an output signal of about 250 MHz. This is due to the balanced nature of the internal ÷ 2 circuit and can be stopped if required by connecting a 10 kohm resistor between the input and the negative rail. (See Fig. 5). This causes a drop in sensitivity of about 100 mV but typical devices still easily meet the 400 - 800 mV input amplitude specification. With sine wave inputs below 50MHz the SP8607 miscounts because the slew rate of the input signal is too slow. Below this frequency a square wave input is needed with a slew rate of 100V/μ or more.

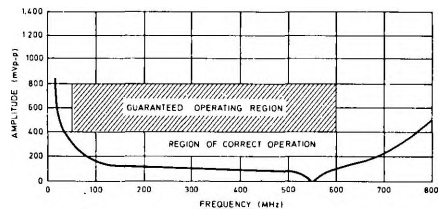


Fig. 6 Typical operating characteristic