SENSITIVE 2.6 GHz DIVIDE-BY-2 PRESCALER

GENERAL DESCRIPTION

The SAB8726 is a prescaler for satellite television applications. It has an input frequency range of 1 GHz to 2.6 GHz with high input sensitivity.

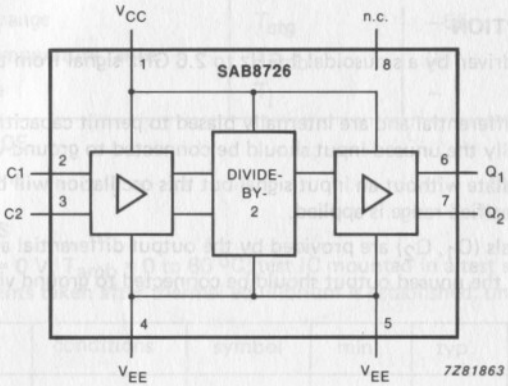


Fig. 1 Block diagram.

QUICK REFERENCE DATA

parameter	conditions	symbol	min.	typ.	max.	unit
Supply voltage	pin 1 to pins 4, 5	V_{CC}	4.5	5.0	5.5	V
Supply current	pin 1	I_{CC}	–	35	–	mA
Input frequency range	pins 2 and 3	f_i	1	–	2.6	GHz
Input sensitivity						
Input voltage (RMS value)		$V_{i(rms)}$	–	–	70	dBm/mV
Output voltage (RMS value)	pins 6 and 7	$V_{o(rms)}$	–	90	–	dBm/mV
Operating ambient temperature range		T_{amb}	0	–	80	°C

PACKAGE OUTLINE

8-lead DIL; plastic (SOT97).

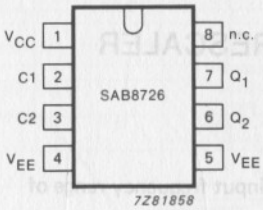


Fig. 2 Pinning diagram.

PINNING

1	V_{CC}	positive supply voltage
2	C1	differential inputs
3	C2	
4	V_{EE}	ground (0 V)
5	V_{EE}	ground (0 V)
6	Q_1	complementary outputs
7	Q_2	
8	n.c.	not connected

FUNCTIONAL DESCRIPTION

This IC is designed to be driven by a sinusoidal 1 GHz to 2.6 GHz signal from the local-oscillator of a satellite TV tuner.

The inputs (C1, C2) are differential and are internally biased to permit capacitive coupling (Fig. 5a). When driven asymmetrically the unused input should be connected to ground via a capacitor (Fig. 5b).

The divider stage will oscillate without an input signal but this oscillation will be suppressed when an input signal within the specified range is applied.

Two complementary signals (Q_1, Q_2) are provided by the output differantial amplifier stage (Fig. 5c).

For asymmetrical output, the unused output should be connected to ground via a 50 Ω resistor and a capacitor (Fig. 5d).

DEVELOPMENT DATA

ELECTROSTATIC DISCHARGE PROTECTION

Inputs and outputs have electrostatic discharge protection in accordance with specification MIL-STD-883C, class A.

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

parameter	symbol	min.	max.	unit
Supply voltage (DC)	V_{CC}	–	7.0	V
Input voltage	V_i	0	V_{CC}	V
Storage temperature range	T_{stg}	−55	+ 150	°C
Operating ambient temperature range	T_{amb}	0	+ 80	°C
Junction temperature	T_j	–	+ 150	°C

THERMAL RESISTANCE

From junction to ambient $R_{th\,j\text{-}a}$ = 120 K/W

DC CHARACTERISTICS

V_{CC} = 5 V ± 10%; V_{EE} = 0 V; T_{amb} = 0 to 80 °C; test IC mounted in a test socket or on a printed circuit board; measurements taken after thermal equilibrium is established; unless otherwise specified.

parameter	conditions	symbol	min.	typ.	max.	unit
Supply current		I_{CC}	–	35	45	mA
Output voltage HIGH		V_{OH}	–	–	V_{CC}	V
Output voltage LOW		V_{OL}	–	–	V_{CC}−0.4	V

AC CHARACTERISTICS

V_{CC} = 5 V ± 10%; T_{amb} = 0 to + 80 °C; f_{in} = 1 to 2.6 GHz; unless otherwise specified

parameter	conditions	symbol	min.	typ.	max.	unit
Input						
Input frequency range		f_i	1	–	2.6	GHz
Input sensitivity						
Input voltage (RMS value)	50 Ω system					
	f_i = 1 GHz	$V_{i(rms)}$	–	–	−10/70	dBm/mV
	f_i = 2.6 GHz	$V_{i(rms)}$	–	–	−10/70	dBm/mV
Input overload voltage (RMS value)	50 Ω system					
	f_i = 1 GHz	$V_{i(rms)}$	7/500	–	–	dBm/mV
	f_i = 2.6 GHz	$V_{i(rms)}$	7/500	–	–	dBm/mV
Output						
Output voltage HIGH		V_{OH}	–	–	V_{CC}	V
Output voltage LOW		V_{OL}	–	–	V_{CC}−0.4	V
Output voltage level	V_i = 0 dBm; f_i = 2 GHz; R_L = 50 Ω	V_o	–	−8/90	–	dBm/mV
Output resistance		R_o	–	50	–	Ω

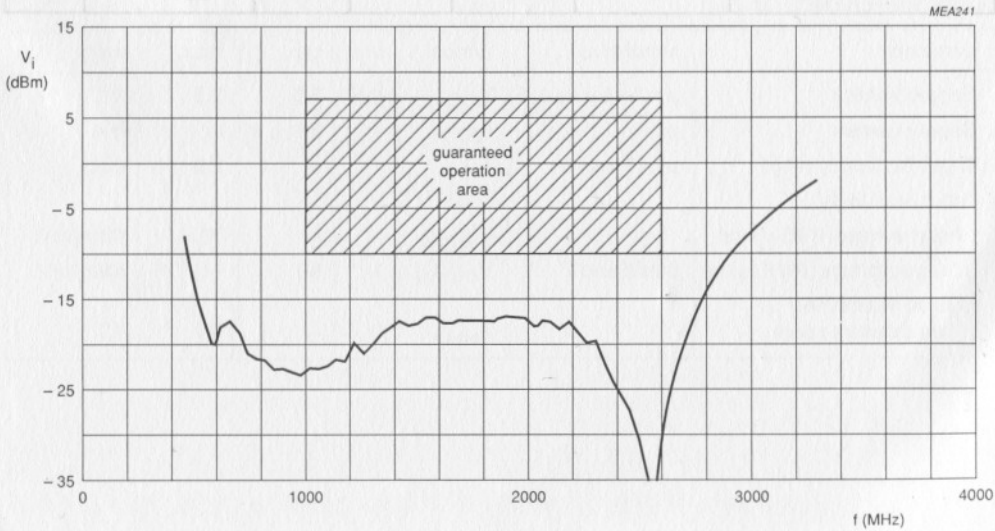


Fig.3 Typical input sensitivity curve: V_{CC} = 5 V; T_{amb} = 25 °C.

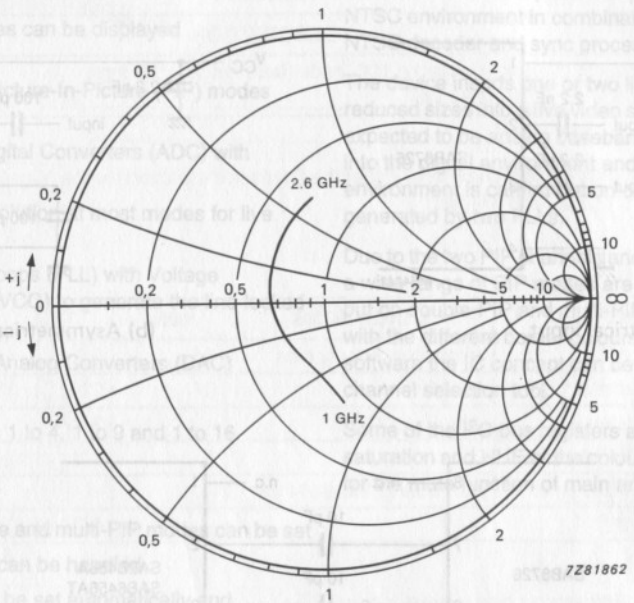
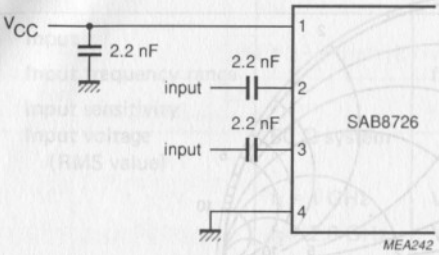
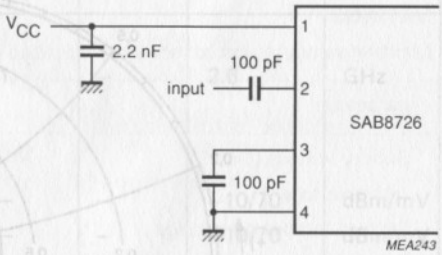


Fig. 4 Smith chart of typical input impedance: input level = −10 dBm; V_{CC} = 5 V; reference value = 50 Ω.

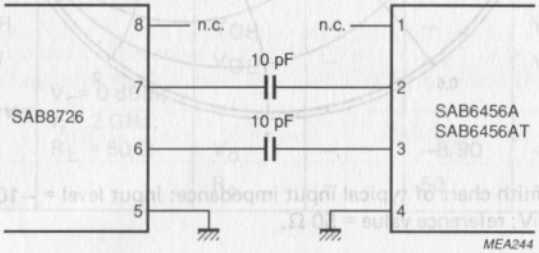
APPLICATION INFORMATION



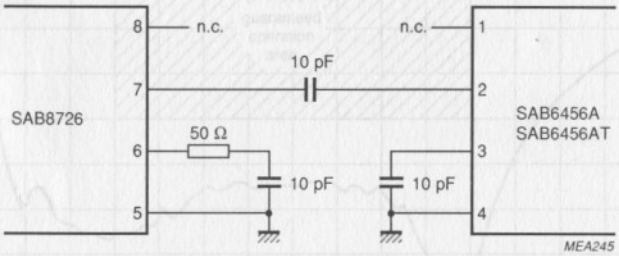
(a) Symmetrical input.



(b) Asymmetrical input.



(c) Symmetrical output.



(d) Asymmetrical output.

Fig. 5 Pin configurations for symmetrical/asymmetrical input and output.

Note to Fig. 5

To minimize possible harmonics the symmetrical output is preferred.