SP8713

1100MHz VERY LOW CURRENT THREE MODULUS DIVIDER

The SP8713 is a switchable divide by 64/65/72 programmable divider which is guaranteed to operate up to 1100MHz. It will operate from a supply of 2.7V to 5.25V and requires typically 4.1mA (including the output current). It also features a power down facility for battery economy.

The RF inputs are internally biased and should be capacitively coupled to the signal source. The output is designed to interface with CMOS synthesisers, such as the NJ88C51.

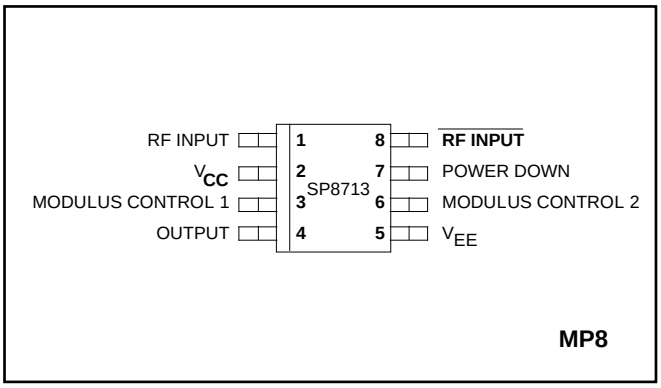


Fig. 1 Pin connections - top view

FEATURES

- Operation to 1100MHz
- Very Low Power
- Single Supply Operation 2.7V to 5.25V
- Power Down Facility for Battery Economy
- Latched Modulus Control Inputs
- Push Pull Output Drive
- ESD Protection on All Pins†

APPLICATIONS

- Cellular Telephones
- Cordless Telephones
- Mobile Radio

† ESD precautions must be observed

ORDERING INFORMATION

SP8713 IG MPAS Industrial Temperature Range
Miniature Plastic DIL Package
SP8713 IG MPAC As above supplied on Tape and Reel

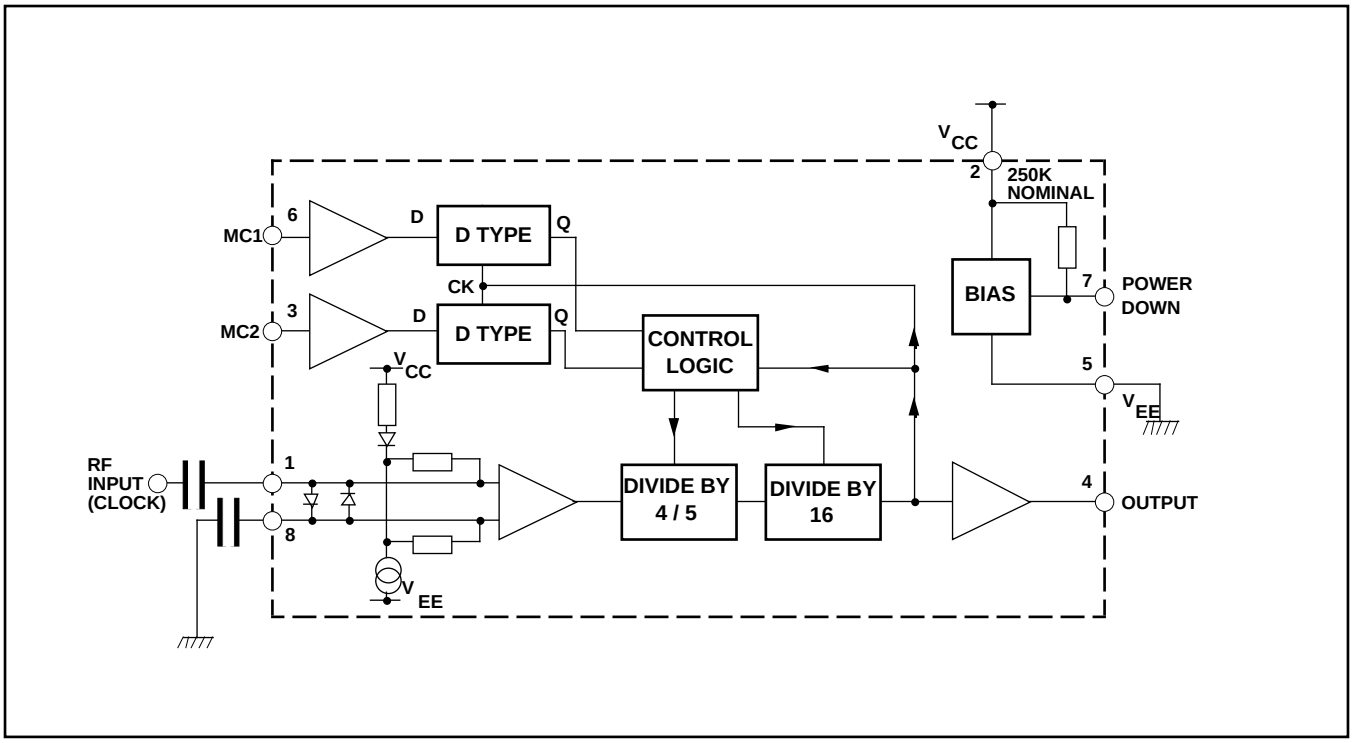


Fig. 2 Block diagram

ABSOLUTE MAXIMUM RATINGS

Supply voltage (V_{EE}=0V)	(note 1)	-0.5V to 7V
Control and RF inputs, RF output (V_{EE} =0V)	(note 1)	-0.5V to V_{CC}+0.5V
RF input current	(note 1)	10mA
Operating temperature		-40°C to +85°C
Storage temperature range		-55°C to +150°C
Maximum junction temperature		+150°C

NOTE 1. Duration <2 minutes.

ELECTRICAL CHARACTERISTICS

Guaranteed over the following conditions (unless otherwise stated):

V_{CC}=+2.7V to +5.25V (with respect to V_{EE}), Output load (pin 4) = 10pF, T_{amb} = -40°C to +85°C (note 2)

Characteristic		Value			Units	Conditions
		Min.	Typ.	Max.		
Supply current	(note 3)		4.1	4.7	mA	Power down input low
Supply current	(note 3)		8	50	µA	Power down input high
Power down high		V_{CC}-0.5		V_{CC}	V	
Power down low		0		V_{CC}-2.0	V	
Modulus control 1 high	(note 4)	0.6V_{CC}		V_{CC}	V	Divide by 64 or 72
Modulus control 1 low	(note 4)	0		0.4V_{CC}	V	Divide by 65 or 72
Modulus control 2 high	(note 4)	0.6V_{CC}		V_{CC}	V	Divide by 72
Modulus control 2 select low	(note 4)	0		0.4V_{CC}	V	Divide by 64 or 65
Max. sinewave input frequency		1100			MHz	See Figure 5
Min. sinewave input frequency				200	MHz	See Figure 5
Min. RF input voltage				50	mV RMS	RF input 200MHz to 1100MHz. See Figure 5
Max. RF input voltage		200			mV RMS	RF input 200MHz to 1100MHz. See Figure 5
Output level (pin 4)		500	600		mV p-p	
Modulus set-up time, t_s	(notes 5,6,8)	20			ns	RF input = 1GHz
Modulus hold time, t_h	(notes 6,8)			1	ns	RF input = 1GHz
Power down time, t_{pd}	(notes 7,8)			10	µs	See Figure 9
Power down recovery time, t_{pu}	(notes 7,8)			6	µs	See Figure 9

NOTES
2. All electrical testing is performed at +85°C.
3. Typical values are measured at +25°C and V_{CC} = +5V.
4. Modulus Control and Ratio Select are high impedance inputs which can be driven directly by standard CMOS outputs.
5. Modulus control is latched at the end of the previous cycle.
6. See Figure 4.
7. See Figure 8.
8. These parameters are not tested but are guranteed by design.

OPERATING NOTES

The RF inputs are biased internally and are normally coupled to the signal source with suitable capacitors.

The output stage has a novel design and is intended to drive a CMOS synthesiser input. External pull-down resistors or circuits are not required. The SP8713 is not suitable for driving TTL or similar devices.

The device will operate down to DC frequencies for non-sinusoidal signals provided that the input slew rate is better than 100V/µs.

POWER DOWN (pin 7) is connected internally to a pull-up resistor. If the battery economy facility is not used, pin 7 should be connected to V_{EE}.

Modulus Control 1 (Pin 3)	Modulus Control 2 (Pin 6)	Division Ratio
L	L	65
H	L	64
H	H	72
L	H	72

Table 1 Truth table

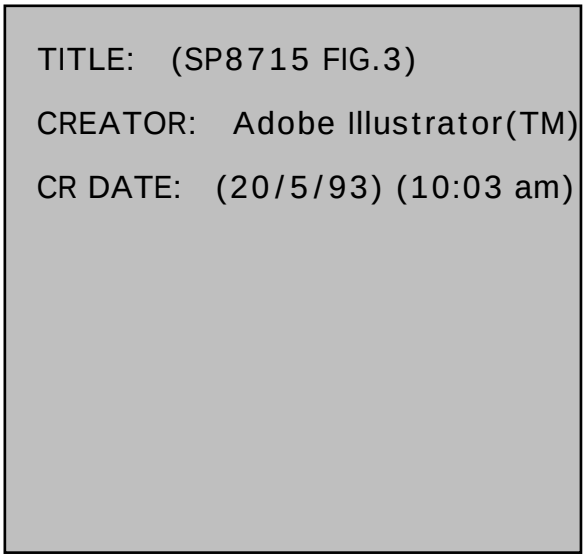


Fig. 3 Typical input characteristics

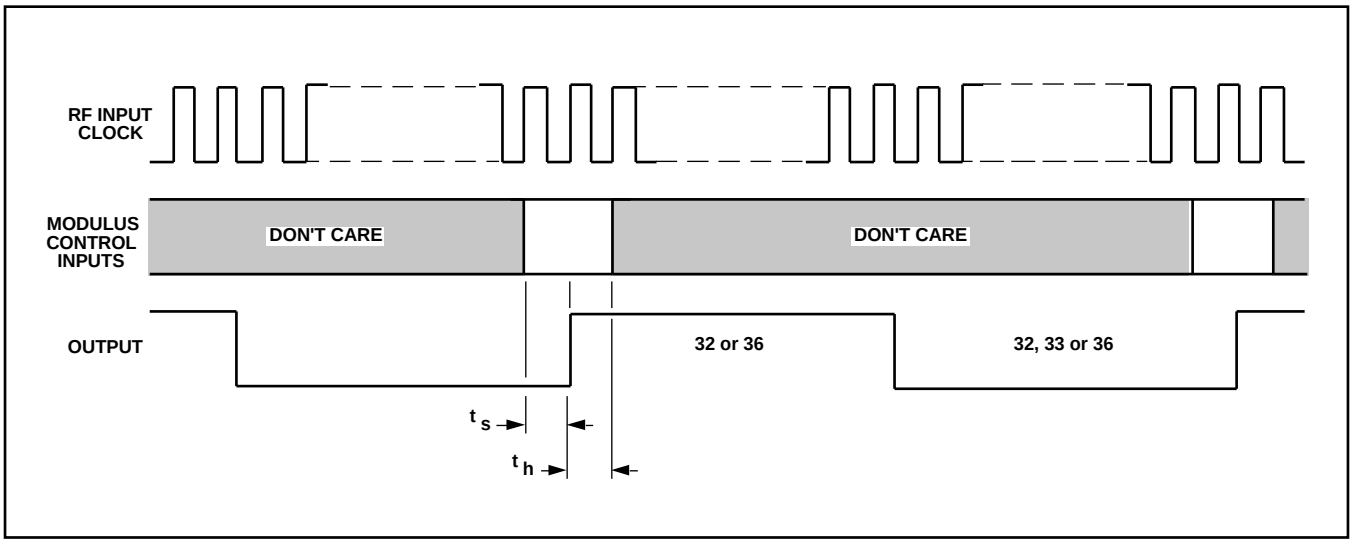


Fig. 4 Modulus control timing diagram

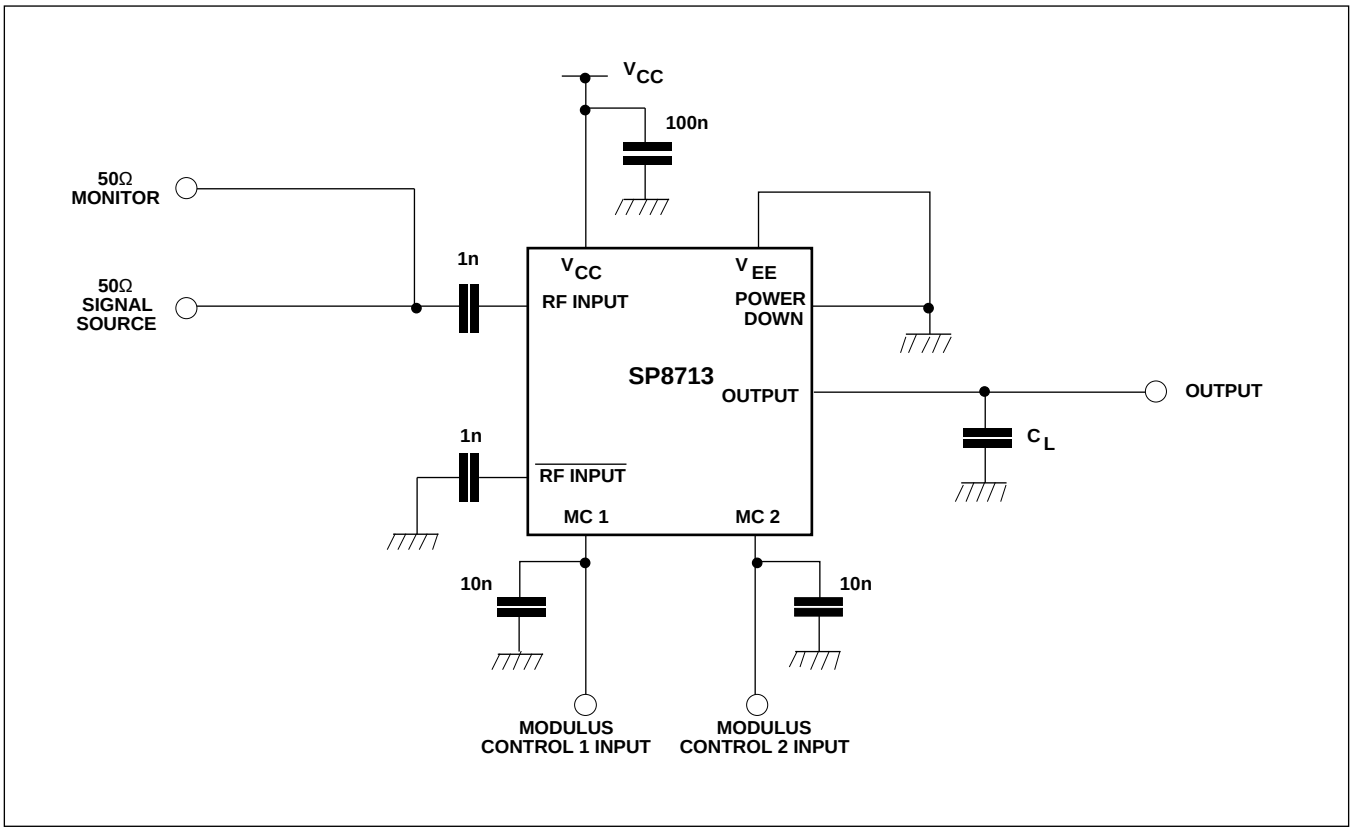


Fig. 5 Toggle frequency test circuit

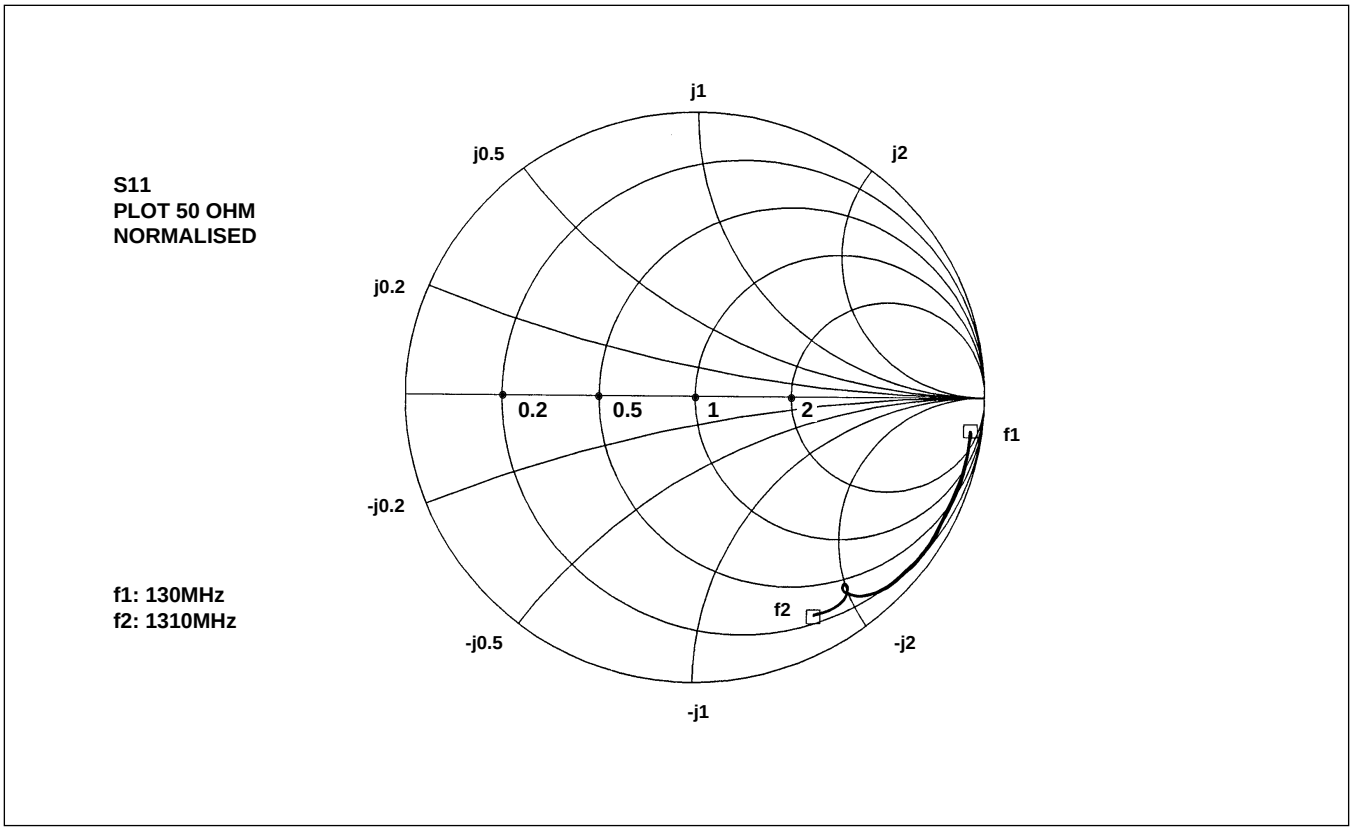


Fig. 6 Typical S11 parameter for pin 1. V_{CC} = +5.0V

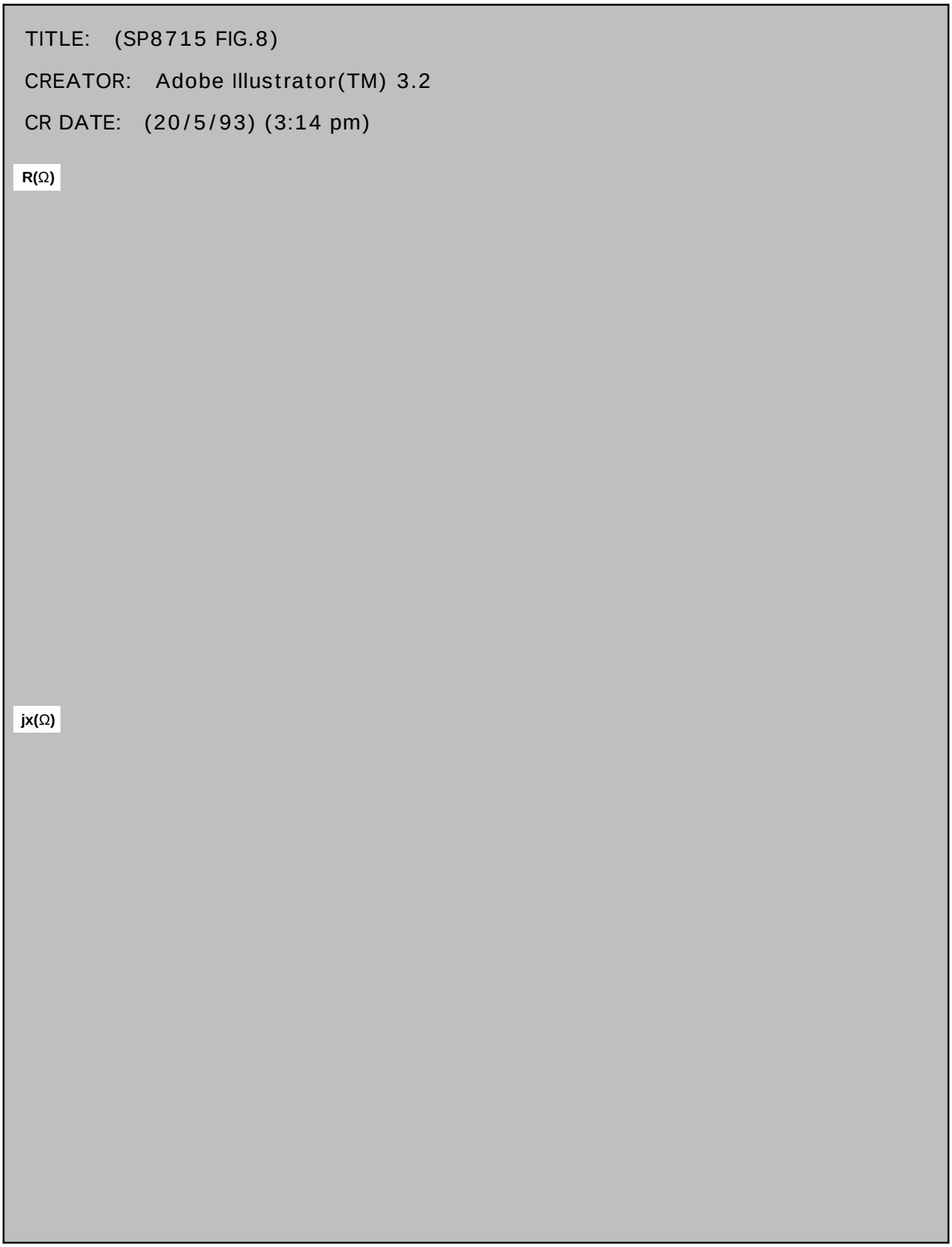


Fig. 7 Typical input impedance v. frequency

FREQ-MHZ	R (Ω)	jx (Ω)
130.000	255.068	-733.538
153.600	153.362	-688.623
177.200	153.330	-583.339
200.800	115.187	-545.839
224.400	88.649	-482.377
248.000	80.815	-441.798
271.600	71.050	-411.502
295.200	56.207	-369.645
318.800	39.526	-346.620
342.400	41.338	-323.129
366.000	38.779	-304.804
389.600	39.210	-280.556
413.200	23.809	-269.674
436.800	21.221	-255.279
460.400	27.545	-245.161
484.000	23.333	-234.680
507.600	22.227	-224.572
531.200	19.931	-211.375
554.800	17.767	-203.241
578.400	17.636	-194.613
602.000	14.607	-186.545
625.600	12.479	-182.049
649.200	13.075	-174.839
672.800	12.891	-168.320
696.400	12.583	-160.468
720.000	11.250	-156.267
743.600	10.213	-149.642
767.200	10.187	-145.328
790.800	11.269	-143.144
814.400	11.081	-137.557
838.000	10.509	-132.750
861.600	10.063	-129.254
885.200	10.172	-124.495
908.800	10.745	-120.568
932.400	10.841	-118.100
956.000	10.884	-113.395
979.600	12.260	-109.552
1003.20	12.984	-105.975
1026.80	14.508	-103.110
1050.40	16.625	-99.886
1074.00	19.260	-98.149
1097.60	22.799	-98.605
1121.20	23.285	-99.907
1144.80	21.149	-100.925
1168.40	18.956	-99.639
1192.00	16.434	-98.425
1215.60	14.377	-95.033
1239.20	13.743	-92.553
1262.80	12.711	-89.249
1286.40	12.776	-86.081
1310.00	12.598	-82.581

Table.2 Coefficients for Fig.7

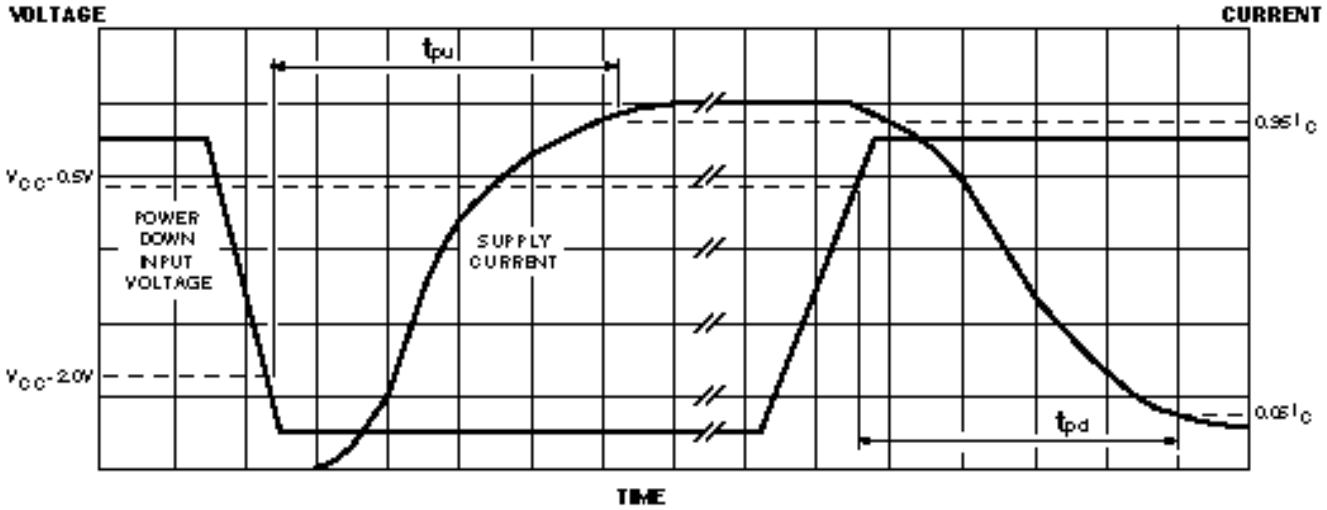


Fig. 8 Power up and power down

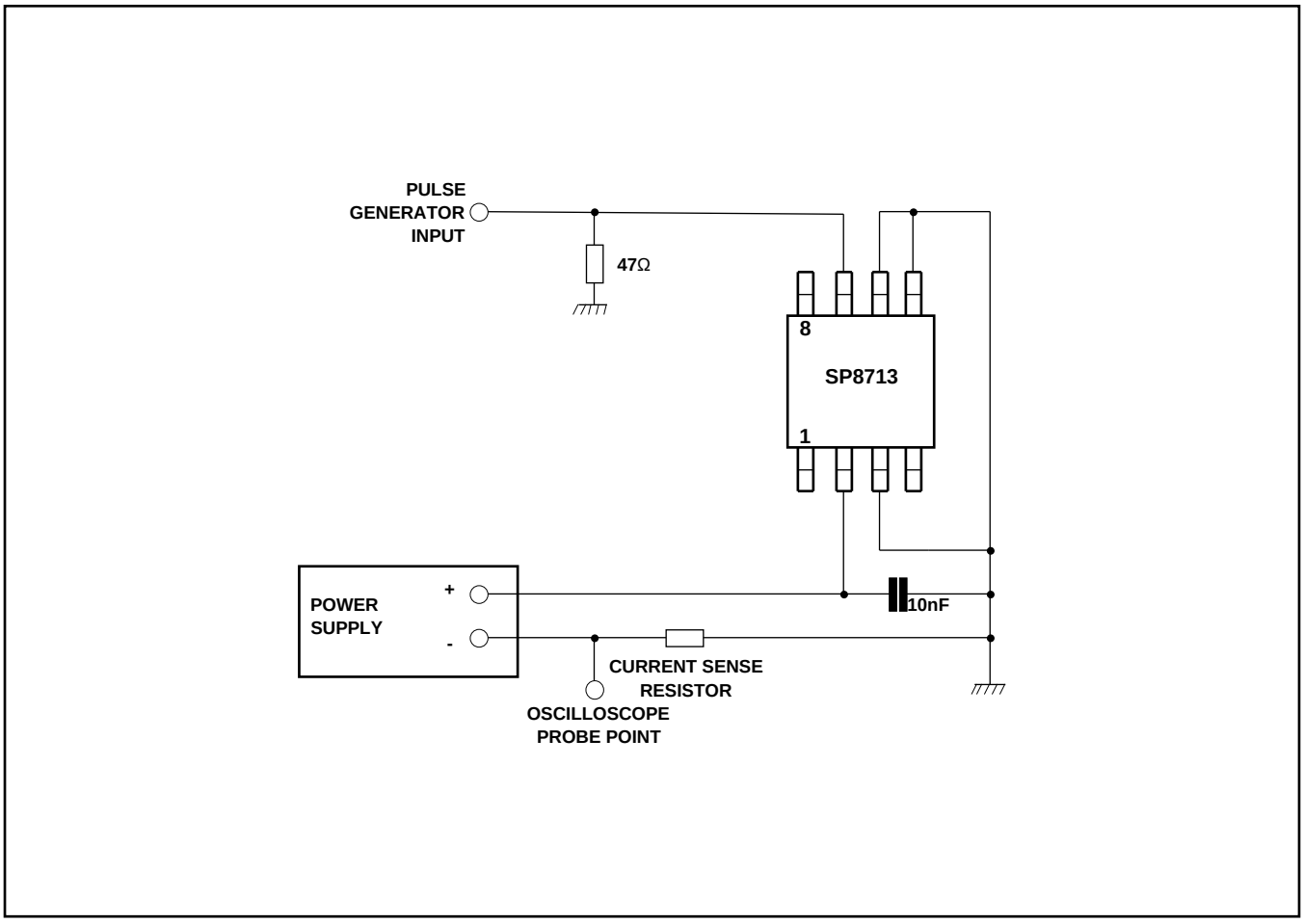
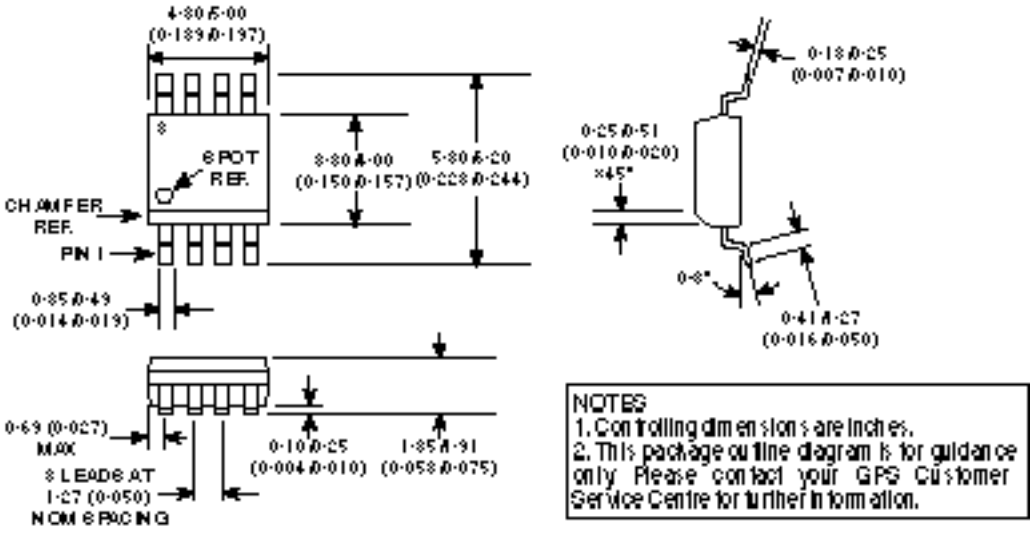


Fig. 9 Power-down time test circuit

PACKAGE DETAILS

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



8-LEAD MINIATURE PLASTIC DIL - MP8

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