

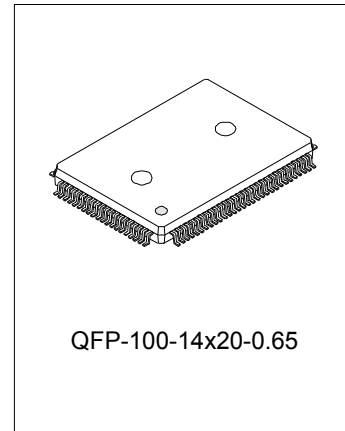
## CD SERVO CONTROLLER WITH MCU (WITH CLOCK AND RADIO FREQUENCY DISPLAY)

### DESCRIPTION

SC9697 is a CD play controller with mature functions. It provides the functions of CD play, DTS, cassette, AUX, electronic volume control, remote control, clock display, alarm clock boot-strap and so on. The circuit includes CD digital servo control, CD signal processor, digital audio DAC output, earphone amplifier and direct drive LCD. It needs only a few external components with low cost.

### FEATURES

- \* CD play
  - Compatible with CD/CD-R/CD-RW
  - Support CD play/pause
  - Support CD previous/ next track
  - Support CD fast forward/fast backward
  - Support CD one track repeat, all tracks repeat play and display
  - Support CD random play display
  - Support CD scan play display
  - CD sync cassette record function
- \* Radio reception
  - Four area wave bands selection(USA, GEN1/2, JAPAN)
  - Support manual up and down adjust
  - Support auto up and down adjust
  - Pre-store broadcasting station (FM: 10, AM/MW: 10, LW:5)
- \* Cassette function
  - Support TAPE display
- \* AUX function
  - Only AUX function
- \* Electronic volume control function
  - CD/radio reception/cassette/AUX sound channel switch
  - Volume adjust control and display
  - Pre-set POP, CLASS, and ROCK three volume modes
  - Support mute control and display
  - Support X-BASS switch control and display
  - Support ENCODER-VOLUME control

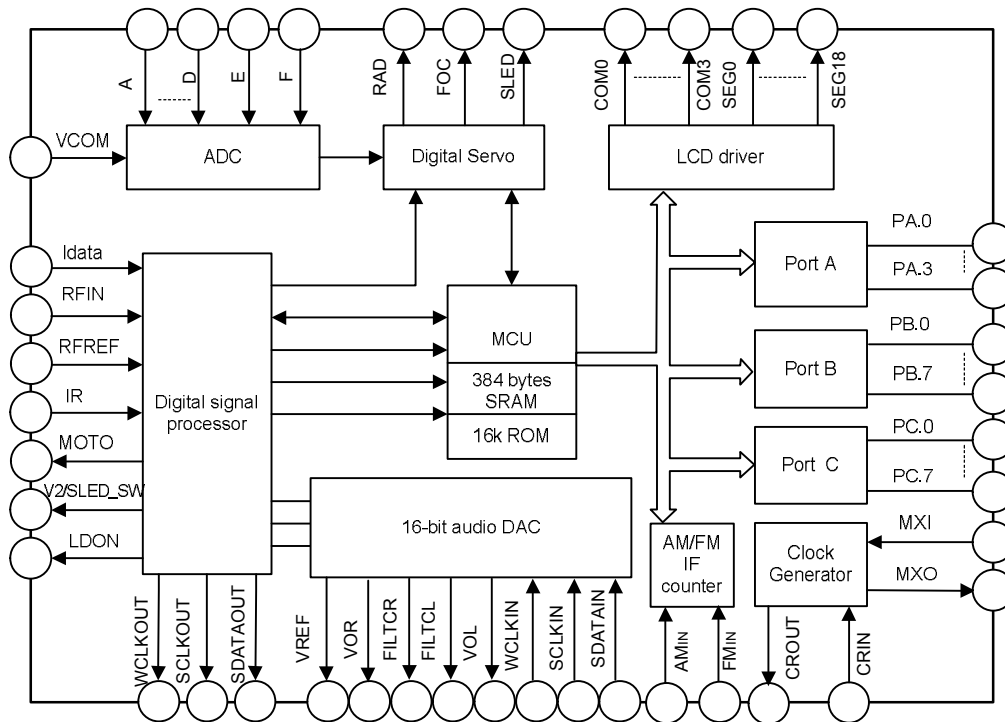


### ORDERING INFORMATION

Device	Package
SC9697	QFP-100-14X20-0.65

- \* Clock function
  - Support clock display adjust
  - Support alarm clock, boot-strap and ring bell selectable.
  - Support nap function
  - Support sleep function

**BLOCK DIAGRAM**



**ABSOLUTE MAXIMUM RATING (Tamb=25°C)**

Characteristics	Symbol	Value	Unit
Power Supply	VDD	-0.5 ~ +5.5	V
Input Voltage on Pins	VIN	-0.5 ~VDD + 0.5	V
Operating Temperature	Topr	-20 ~ +75	°C

**DC ELECTRICAL CHARACTERISTICS (VDD=4.5~5.5V; VSS=0V; Tamb=-10~+50°C)**

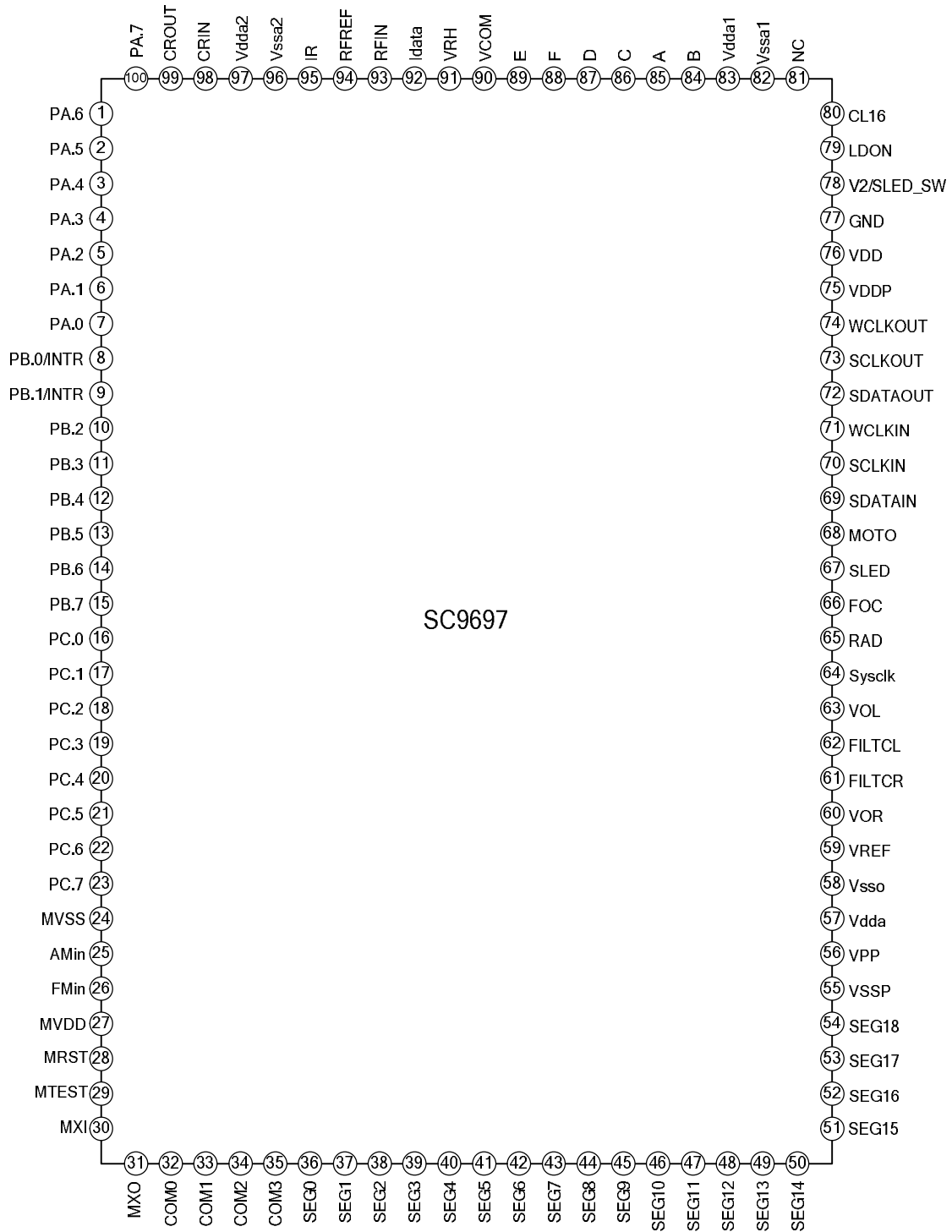
Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Power Supply	VDD		4.5	5.0	5.5	V
Power Dissipation	IDD	5V(When CD is working)	—	50	—	mA
RFIN signal level	VRFIN		—	1	—	V
Reference Voltage	Vlr		—	0.5VDD	—	
Photoelectricity Signal Bias Input	Vcom		—	2.5	—	V
Input Current Of Central Diode 1	ID1		0	—	9	μA
Input Current Of Central Diode 2	ID2		0	—	9	μA
Input Current Of Central Diode 3	ID3		0	—	9	μA
Input Current Of Central Diode 4	ID4		0	—	9	μA
Input Current Of Satellite Diode 1	IR1		0	—	4.5	μA
Input Current Of Satellite Diode 2	IR2		0	—	4.5	μA

(To be continued)

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Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Low-level Output Current at PA port	IOL(A)		—	10	—	mA
High-level Output Current at PA port	IOH(A)		—	10	—	mA
Low-level Output Current at PB port	IOL(B)		—	10	—	mA
High-level Output Current at PB port	IOH(B)		—	10	—	mA
Low-level Output Current at PC port	IOL(C)		—	10	—	mA
High-level Output Current at PC port	IOH(C)		—	10	—	mA
LDON Low-level Output Current	ILDON		0	—	2	mA
Load Resistance DAC	RL	Left channel is the same as the right.	5	—	—	KΩ
Full-Scale DAC Output Voltage	VFS	Left channel is the same as the right.	0.9	1.1	1.2	V
RAD Current	IRAD	High level is the same as the low level.	0	1	—	mA
FOC Current	IFOC	High level is the same as the low level.	0	1	—	mA
SLED Current	ISLED	High level is the same as the low level.	0	1	—	mA
MOTO Current	IMOTO	High level is the same as the low level.	0	5	10	mA
Low Level Output Voltage	VOLDRIVE1	RAD, FOC, SELD	0	—	0.4	V
High Level Output Voltage	VOHDRIVE1	RAD, FOC, SELD	VDD-0.4	—	VDD	V
Moto Low Level Output Voltage	VOLmoto		0	—	1.0	V
Moto High Level Output Voltage	VOHmoto		VDD-1	—	VDD	V
High impedance output current of driver	IZODRIVE	RAD, FOC, SELD, MOTO	-10	0	+10	μA
DAC Total Harmonic Distortion Plus Noise	(THD+N)/S		60	65	70	dB
DA Filter Attenuation	Filter_DA	0 to 19 kHz	-	-	0.001	dB
		19 to 20 kHz	1	-	2	dB
		24KHz	25	-	-	dB
		25 to 35 KHz	40	-	-	dB
		35 to 64 KHz	50	-	-	dB
		64 to 68 KHz	31	-	-	dB
		68KHz	35	-	-	dB
69 to 88KHz	40	-	-	dB		
OSC Frequency	Fsystem		—	8.4672	—	MHZ

PIN CONFIGURATION



**PIN DESCRIPTIONS**

Pin no.	Pin name	I/O	Functions
1	PA.6	I/O	MCU general purpose I/O and the detail function can be defined by the program.
2	PA.5	I/O	
3	PA.4	I/O	
4	PA.3	I/O	
5	PA.2	I/O	
6	PA.1	I/O	
7	PA.0	I/O	
8	PB.0/INTR	I/O	
9	PB.1/INTR	I/O	
10	PB.2	I/O	
11	PB.3	I/O	
12	PB.4	I/O	
13	PB.5	I/O	
14	PB.6	I/O	
15	PB.7	I/O	
16	PC.0	I/O	
17	PC.1	I/O	
18	PC.2	I/O	
19	PC.3	I/O	
20	PC.4	I/O	
21	PC.5	I/O	
22	PC.6	I/O	
23	PC.7	I/O	
24	MVSS	I	Ground of MCU and periphery module.
25	AMin	I	AM frequency counting signal input.
26	FMin	I	FM frequency counting signal input.
27	MVDD	I	Power supply of MCU and periphery module.
28	MRST	I	MCU reset pin.
29	MTEST	I	MCU test pin.
30	MXI	I	MCU clock input pin.
31	MXO	O	MCU clock output pin.
32	COM0	O	LCD COM0 port.
33	COM1	O	LCD COM1 port.
34	COM2	O	LCD COM2 port.
35	COM3	O	LCD COM3 port.
36	SEG0	O	LCD SEG0 port.
37	SEG1	O	LCD SEG1 port.
38	SEG2	O	LCD SEG2 port.
39	SEG3	O	LCD SEG3 port.

(To be continued)

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Pin no.	Pin name	I/O	Functions
40	SEG4	O	LCD SEG4 port.
41	SEG5	O	LCD SEG5 port.
42	SEG6	O	LCD SEG6 port.
43	SEG7	O	LCD SEG7 port.
44	SEG8	O	LCD SEG8 port.
45	SEG9	O	LCD SEG9 port.
46	SEG10	O	LCD SEG10 port.
47	SEG11	O	LCD SEG11 port.
48	SEG12	O	LCD SEG12 port.
49	SEG13	O	LCD SEG13 port.
50	SEG14	O	LCD SEG14 port.
51	SEG15	O	LCD SEG15 port.
52	SEG16	O	LCD SEG16 port.
53	SEG17	O	LCD SEG17 port.
54	SEG18	O	LCD SEG18 port.
55	VSSP	I	Ground, also can be open.
56	VPP	I	OTP program voltage.
57	Vdda	I	DAC power supply.
58	VSSO	I	DAC ground.
59	VREF	O	Internal reference voltage output, and typical value is 0.5VDD
60	VOR	O	DAC right channel audio output.
61	FILTCR	O	DAC right channel filter capacitor.
62	FILTCL	O	DAC left channel filter capacitor.
63	VOL	O	DAC left channel audio output.
64	Sysclk	I	DAC system clock input pin.
65	RAD	O	Tracking drive output.
66	FOC	O	Focus drive output.
67	SLED	O	Sled motor drive output.
68	MOTO	O	Motor drive output.
69	SDATAIN	I	DAC data input.
70	SCLKIN	I	DAC bit clock input.
71	WCLKIN	I	DAC word clock input.
72	SDATAOUT	O	CD data output.
73	SCLKOUT	O	CD bit clock output.
74	WCLKOUT	O	CD word clock output.
75	VDDP	I	I/O port power supply.
76	VDD	I	CD power supply.
77	GND	I	CD ground, I/O ground.
78	V2/SLED_SW	I	Sled motor position monitor signal input. Built-in pull-up resistor.

(To be continued)

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Pin no.	Pin name	I/O	Functions
79	LDON	O	Laser control signal output with built-in pull up resistor.
80	CL16	O	16.9344M clock output
81	NC		No connection.
82	Vssa1	I	Analog ground of servo module ADC.
83	Vdda1	I	Analog power of servo module ADC.
84	B	I	Central diode current signal input 1
85	A	I	Central diode current signal input 2
86	C	I	Central diode current signal input 3
87	D	I	Central diode current signal input 4
88	F	I	Satellite diode current signal input 1
89	E	I	Satellite diode current signal input 2
90	VCOM	I	Photoelectricity signal bias input.
91	VRH	O	ADC reference voltage output.
92	Idata	O	Data feedback current output.
93	RFIN	I	CD data pick up signal input.
94	RFREF	I	CD data pick up signal level.
95	IR	I	Reference current output pin.
96	Vssa2	I	Analog ground of HF and PLL.
97	Vdda2	I	Analog power supply of HF and PLL.
98	CRIN	I	8.4672MHz input pin.
99	CROUT	O	8.4672MHz output pin.
100	PA.7	I/O	MCU general purpose I/O, and the detail function can be defined by the program.

## FUNCTION DESCRIPTIONS

### 1. MCU

8-bit MCU is the core of SC9697 which includes 384 bytes memory and 16K program space. Its abundant IO ports resource can be configured flexibly according to the requirements.

### 2. CD servo decoder

CD servo decoder is the main block of SC9697 which will finish the CD servo and decoder function. Support single and dual speed switch function, and compatible with CD/CD-R/CD-RW.

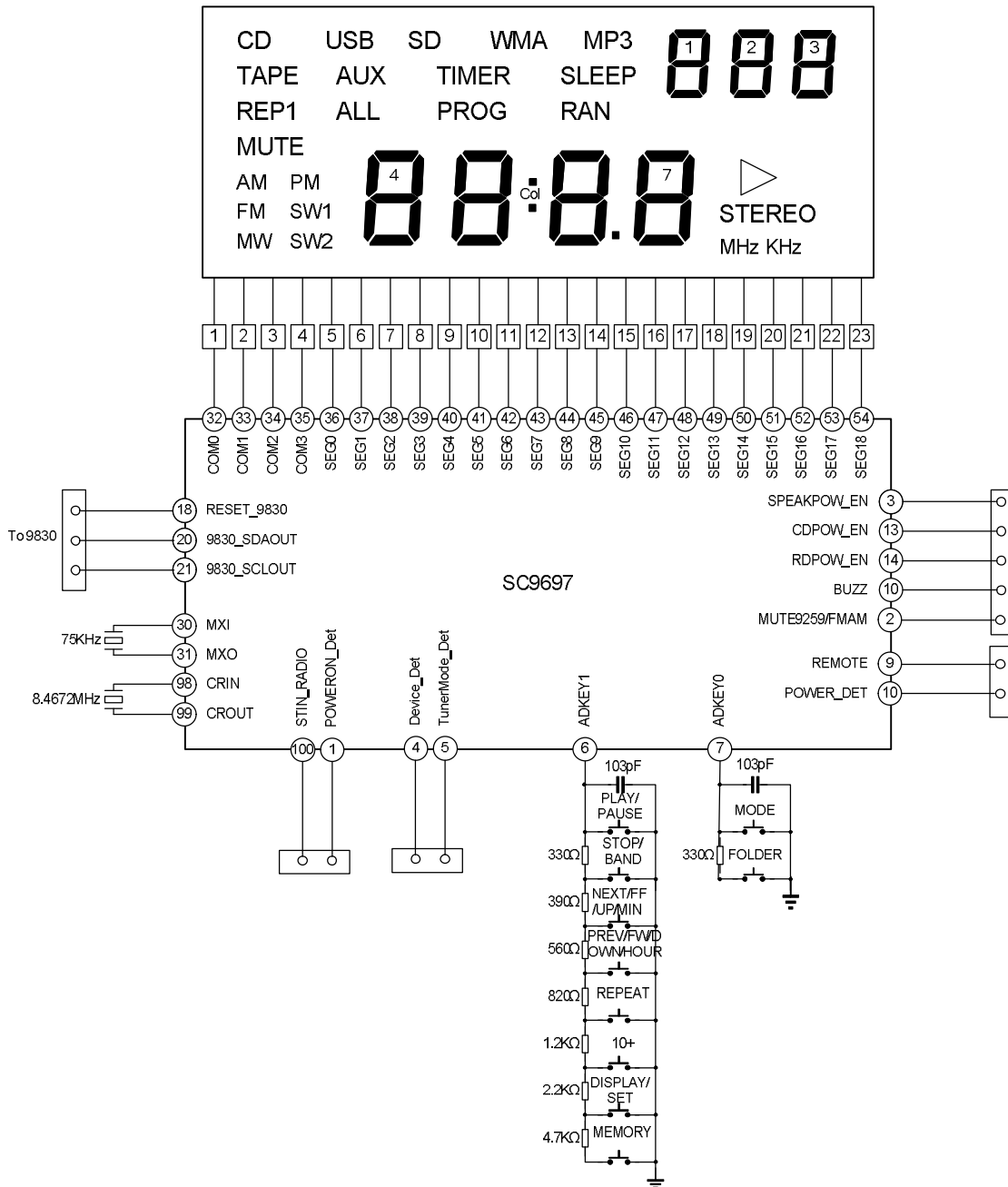
### 3. 16-bit audio DAC

Support maximum word length of 20-bit I<sup>2</sup>S data input (f<sub>sys</sub>=256fs) and word length of 16, 18, and 20 bits EIAJ data input (f<sub>sys</sub>=384fs) .

### 4. IF counter

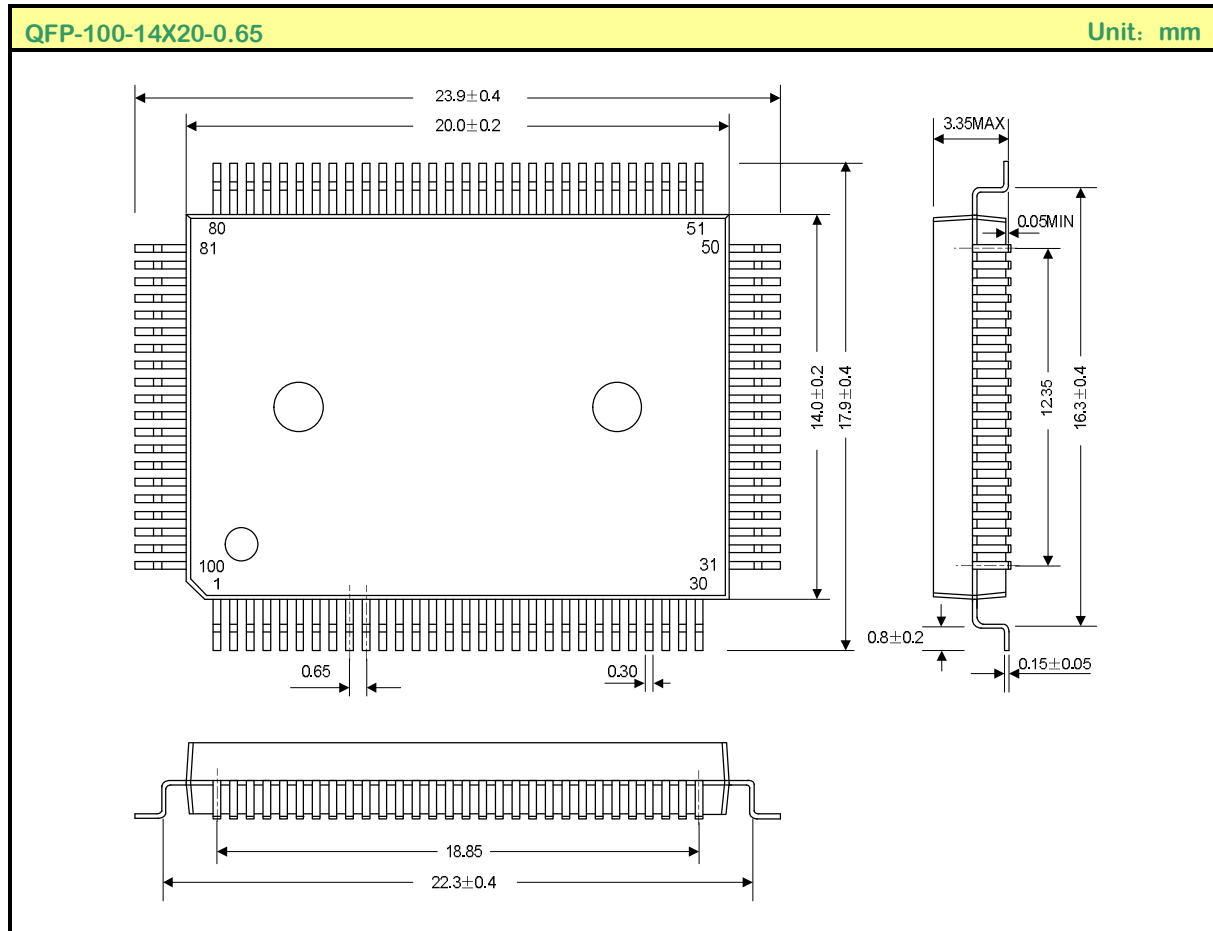
IF counting circuit mainly includes a 16-bit counter which will count for IF signal in fixed gating time.

TYPICAL APPLICATION CIRCUIT





PACKAGE OUTLINE



**HANDLING MOS DEVICES:**

Electrostatic charges can exist in many things. All of our MOS devices are internally protected against electrostatic discharge but they can be damaged if the following precautions are not taken:

- Persons at a work bench should be earthed via a wrist strap.
- Equipment cases should be earthed.
- All tools used during assembly, including soldering tools and solder baths, must be earthed.
- MOS devices should be packed for dispatch in antistatic/conductive containers.

Note: Silan reserves the right to make changes without notice in this specification for the improvement of the design and performance. Silan will supply the best possible product for customers.