



CS1622

32 Seg×8 Com LCD Driver and Controller

Product Specification

Specification Revision History:

Version	Data	Description
2010-01-A1	2010-01	New
2012-01-B1	2012-01	Increase in the number and history
2024-07-C1	2024-07	Update the template
2025-02-C2	2025-02	Modify the content



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1、General Description

CS1622 is a 32 Seg×8 Com LCD driver and controller. The circuit has built-in serial communication interface, which can be directly connected with the main control device for function setting.

CS1622 built-in display data RAM, the data in RAM can be mapped to LCD display. The circuit has built-in LCD bias resistance, which can realize the LCD driver function with minimal peripheral. The circuit built-in clock, buzzer, WDT/time base generator and other functions, can be applied to a variety of LCD modules and display subsystems.

Features

- Operating voltage: 2.7V to 5.2V
- Max. 32×8 patterns, 8 commons, 32 segments
- 1/4 bias, 1/8 duty, frame frequency is 64Hz
- Built-in internal resistor type bias generator
- Built-in bias resistance
- VLCD pin to adjust LCD operating voltage
- Built-in LCD display RAM
- Built-in RC oscillator
- 3-wire serial interface
- 8 kinds of time base or WDT selection
- Time base or WDT overflow output
- Two selectable buzzer frequencies (2kHz or 4kHz)
- Support low power consumption standby mode
- Cascade application
- Chip size: 1816×2048 (um×um)
- The IC substrate should be connected to VDD in the PCB layout artwork.
- Package information: LQFP52/QFP64/LQFP64/LQFP44/DIE



Ordering Information:

Tube packing specifications:

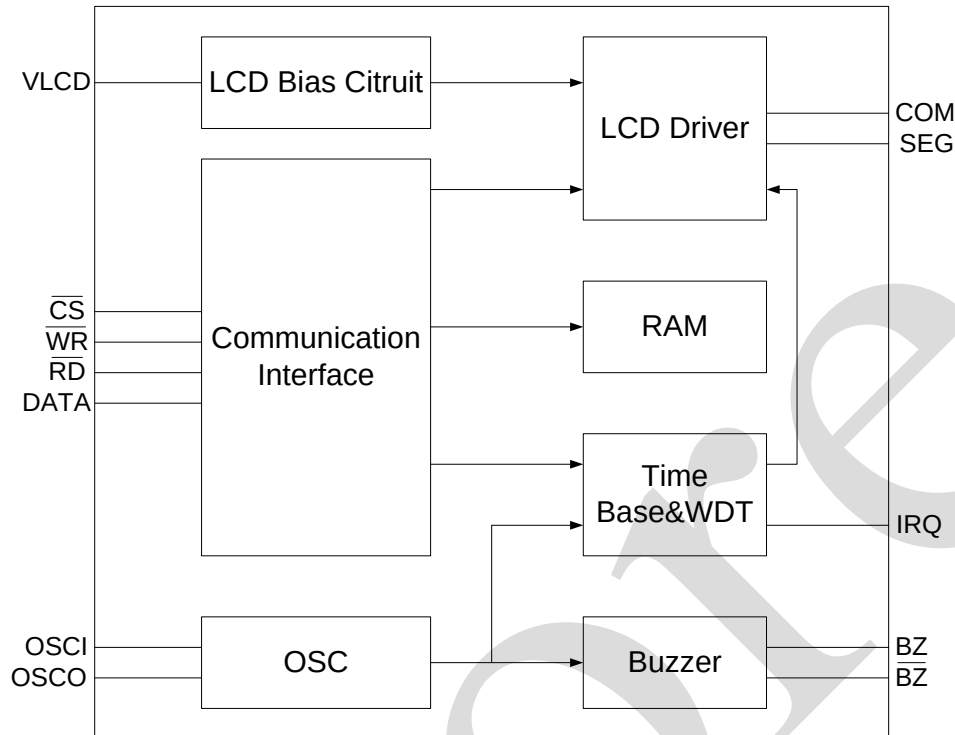
Part number	Packaging form	Marking code	Tube quantity	Boxed tube quantity	Boxed quantity	Notes
CS1622 LD52.TB	LQFP52	CS1622	90 PCS/plate	10 plate/box	900 PCS/box	Dimensions of plastic enclosure: 14.0mm×14.0mm Pin spacing: 1.0mm
CS1622GN NF64.TB	QFP64	CS1622GN	66 PCS/plate	10 plate/box	660 PCS/box	Dimensions of plastic enclosure: 14.0mm×20.0mm Pin spacing: 1.0mm
CS1622 LA64.TB	LQFP64	CS1622	250 PCS/plate	10 plate/box	2500 PCS/box	Dimensions of plastic enclosure: 7.0mm×7.0mm Pin spacing: 0.4mm
CS1622GN LA64.TB		CS1622GN				
CS1622 LB44.TB	LQFP44	CS1622	160 PCS/plate	10 plate/box	1600 PCS/box	Dimensions of plastic enclosure: 10.0mm×10.0mm Pin spacing: 0.8mm
CS1622GN LB44.TB		CS1622GN				

Note: If the physical information is inconsistent with the ordering information, please refer to the actual product.

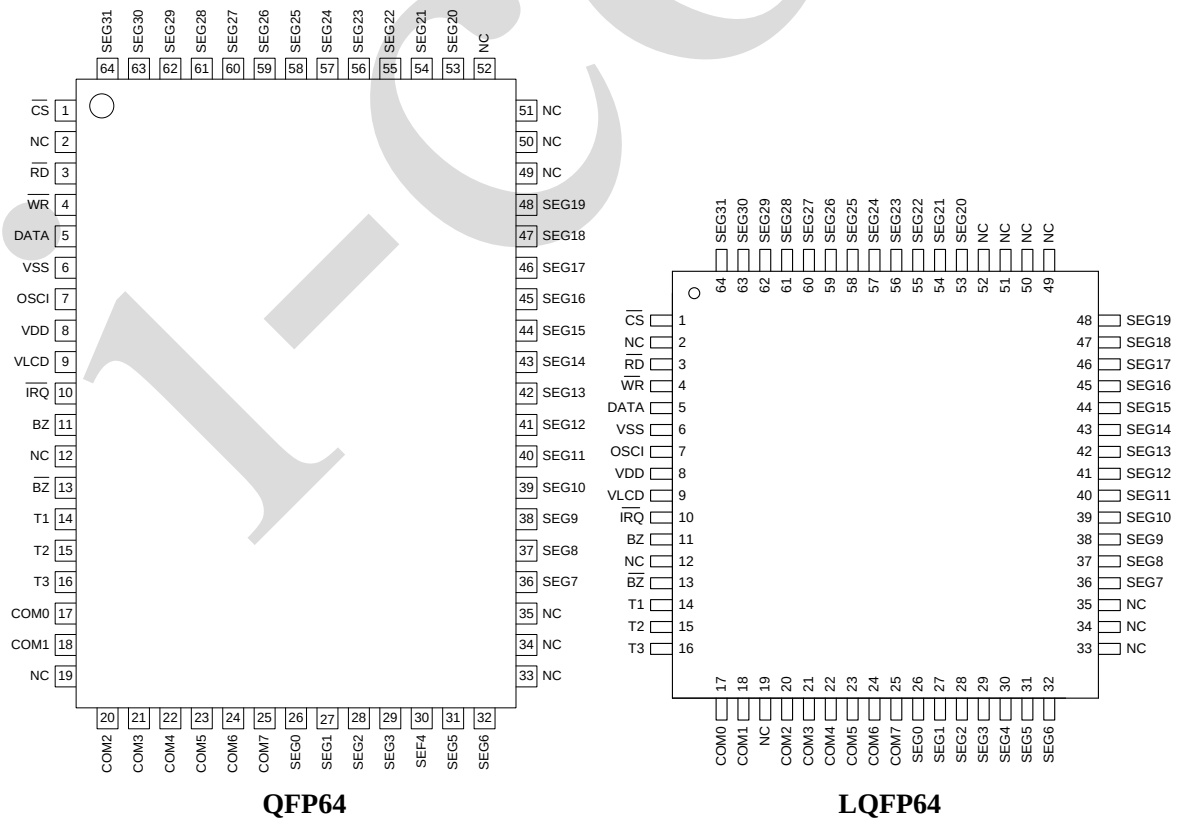


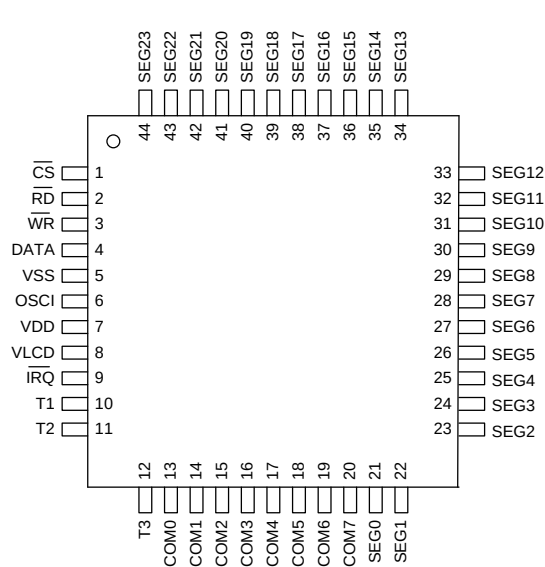
2、Block Diagram And Pin Description

2.1、Block Diagram

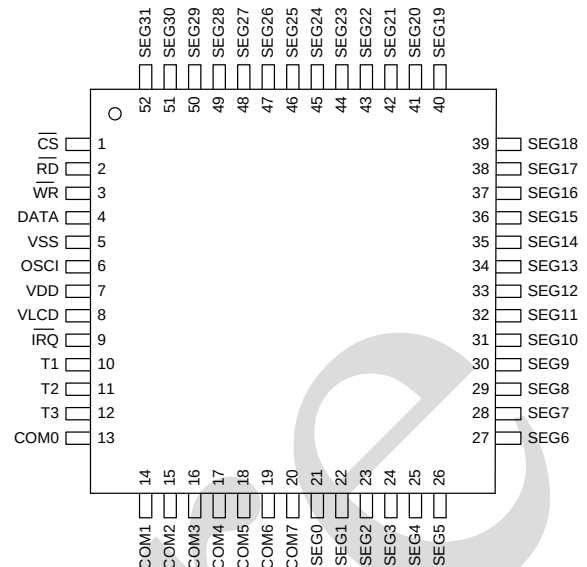


2.2、Pin Configurations





LQFP44



LQFP52

2.3、Pin Description

Pin No.			Pin Name	I/O	Description
LQFP64/ QFP64	LQFP44	LQFP52			
1	1	1	$\overline{\text{CS}}$	I	Chip selection input with Pull-high resistor. When the $\overline{\text{CS}}$ is logic high, the data and command read from or written to the CS1622 are disabled. The serial interface circuit is also reset. But if $\overline{\text{CS}}$ is at logic low level and is input to the $\overline{\text{CS}}$ pad, the data and command transmission between the host controller and the CS1622 are all enabled.
3	2	2	$\overline{\text{RD}}$	I	READ clock input with Pull-high resistor. Data in the RAM of the CS1622 are clocked out on the falling edge of the $\overline{\text{RD}}$ signal.
4	3	3	$\overline{\text{WR}}$	I	WRITE clock input with Pull-high resistor. Data on the DATA line are latched into the CS1622 on the rising edge of the $\overline{\text{WR}}$ signal.
5	4	4	DATA	I/O	Serial data input or output with Pull-high resistor.
6	5	5	VSS	-	Ground
7	6	6	OSCI	I	External clock input



8	7	7	VDD	-	Positive power supply
9	8	8	VLCD	I	LCD operating voltage
10	9	9	$\overline{\text{IRQ}}$	O	Time base or Watchdog Timer overflow flag, NMOS open drain output.
11, 13	-	-	BZ, $\overline{\text{BZ}}$	O	2kHz or 4kHz tone frequency output
14~16	10~12	10~12	T1~T3	I	Not connected
17~18 20~25	13~20	13~20	COM0~COM7	O	LCD common outputs
-	21~44	21~44	SEG0~SEG23	O	LCD segment outputs
26~32 36~48 53~64	-	45~52	SEG0~SEG31	O	LCD segment outputs
2, 12, 19 33~35 49~52	-	-	NC	-	Not connected

3、Electrical Parameter

3.1、Absolute Maximum Ratings

($T_{\text{amb}}=25^{\circ}\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Conditions		Value	Unit
Power Supply Voltage	VDD	-		VSS-0.3 to VSS+5.5	V
Input Voltage	VIN	-		VSS-0.3 to VDD+0.3	V
Ambient Temperature	T_{amb}	-		-40 to 85	$^{\circ}\text{C}$
Storage Temperature	T_{stg}	-		-50 to 125	$^{\circ}\text{C}$
Soldering Temperature	T_{L}	10s	LQFP64/44/52	260	$^{\circ}\text{C}$
			QFP64	245	$^{\circ}\text{C}$



3.2、Electrical Characteristics

3.2.1、DC Characteristics

(T_{amb}=25℃, unless otherwise specified.)

Parameter	Symbol	Test Conditions		Min.	Typ.	Max.	Unit
		VDD	Conditions				
Operating Voltage	VDD	-	-	2.7	-	5.2	V
Operating Current	I _{DD1}	3V	No load or LCD ON On-chip RC oscillator	-	80	210	uA
		5V		-	135	415	uA
Operating Current	I _{DD2}	3V	No load or LCD OFF On-chip RC oscillator	-	8	30	uA
		5V		-	20	55	uA
Standby Current	I _{STB}	3V	No load, Power down mode	-	1	8	uA
		5V		-	2	16	uA
Input Low Voltage	V _{IL}	3V	DATA, $\overline{\text{WR}}$, $\overline{\text{CS}}$, $\overline{\text{RD}}$	0	-	0.6	V
		5V		0	-	1.0	V
Input High Voltage	V _{IH}	3V	DATA, $\overline{\text{WR}}$, $\overline{\text{CS}}$, $\overline{\text{RD}}$	2.4	-	3.0	V
		5V		4.0	-	5.0	V
BZ, $\overline{\text{BZ}}$, $\overline{\text{IRQ}}$	I _{OL1}	3V	V _{OL} =0.3V	0.9	1.8	-	mA
		5V	V _{OL} =0.5V	1.7	3	-	mA
BZ, $\overline{\text{BZ}}$, $\overline{\text{IRQ}}$	I _{OH1}	3V	V _{OH} =2.7V	-0.9	-1.8	-	mA
		5V	V _{OH} =4.5V	-1.7	-3	-	mA
DATA	I _{OL1}	3V	V _{OL} =0.3V	200	450	-	uA
		5V	V _{OL} =0.5V	250	500	-	uA
DATA	I _{OH1}	3V	V _{OH} =2.7V	-200	-450	-	uA
		5V	V _{OH} =4.5V	-250	-500	-	uA
LCD Common Sink Current	I _{OL2}	3V	V _{OL} =0.3V	15	40	-	uA
		5V	V _{OL} =0.5V	100	200	-	uA
LCD Common Source Current	I _{OH2}	3V	V _{OH} =2.7V	-15	-30	-	uA
		5V	V _{OH} =4.5V	-45	-90	-	uA
LCD Segment Sink Current	I _{OL3}	3V	V _{OL} =0.3V	15	30	-	uA
		5V	V _{OL} =0.5V	70	150	-	uA
LCD Segment Source Current	I _{OH3}	3V	V _{OH} =2.7V	-6	-13	-	uA
		5V	V _{OH} =4.5V	-20	-40	-	uA
Pull-high Resistor	R _{PH}	3V	DATA, $\overline{\text{WR}}$, $\overline{\text{CS}}$, $\overline{\text{RD}}$	100	200	300	kΩ
		5V		50	100	150	kΩ



3.2.2、AC Characteristics

($T_{amb}=25^{\circ}\text{C}$, unless otherwise specified.)

Parameter	Symbol	Test Conditions		Min.	Typ.	Max.	Unit
		VDD	Conditions				
System Clock	f_{SYS1}	3V	On-chip RC oscillator	22	32	40	kHz
		5V		24	32	40	kHz
System Clock	f_{SYS2}	3V	External clock source	-	32	-	kHz
		5V		-	32	-	kHz
LCD Frame Frequency	f_{LCD1}	3V	On-chip RC oscillator	44	64	80	Hz
		5V		48	64	80	Hz
LCD Frame Frequency	f_{LCD2}	3V	External clock source	-	64	-	Hz
		5V		-	64	-	Hz
LCD Common Period	t_{COM}	-	n: Number of COM	-	n/fLCD	-	s
Serial Data Clock ($\overline{WR}$ pin)	f_{CLK1}	3V	Duty cycle 50%	-	-	150	kHz
		5V		-	-	300	kHz
Serial Data Clock ($\overline{RD}$ pin)	f_{CLK2}	3V	Duty cycle 50%	-	-	75	kHz
		5V		-	-	150	kHz
Serial Interface Reset Pulse Width (Figure 3)	t_{CS}	-	$\overline{CS}$	-	250	-	ns
$\overline{WR}$, $\overline{RD}$ Input Pulse Width (Figure 1)	t_{CLK}	3V	Write mode	3.34	-	-	us
			Read mode	6.67	-	-	
		5V	Write mode	1.67	-	-	us
			Read mode	3.34	-	-	
Rise/Fall Time Serial Data Clock Width (Figure 1)	t_r, t_f	3V	-	-	120	-	ns
		5V					
Setup Time for DATA to $\overline{WR}$, $\overline{RD}$ Clock Width (Figure 2)	t_{SU}	3V	-	-	120	-	ns
		5V					
Hold Time for DATA to $\overline{WR}$, $\overline{RD}$ Clock Width (Figure 2)	t_h	3V	-	-	120	-	ns
		5V					
Setup Time for $\overline{CS}$ to $\overline{WR}$, $\overline{RD}$ Clock Width (Figure 3)	t_{SU1}	3V	-	-	100	-	ns
		5V					
Hold Time for $\overline{CS}$ to $\overline{WR}$, $\overline{RD}$ Clock Width (Figure 3)	t_{h1}	3V	-	-	100	-	ns
		5V					

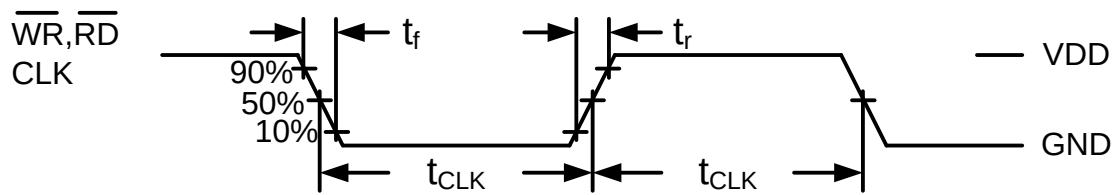


Figure 1

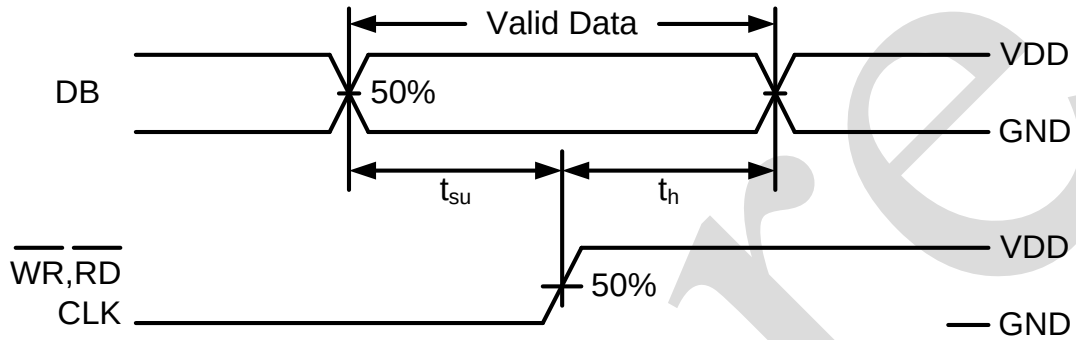


Figure 2

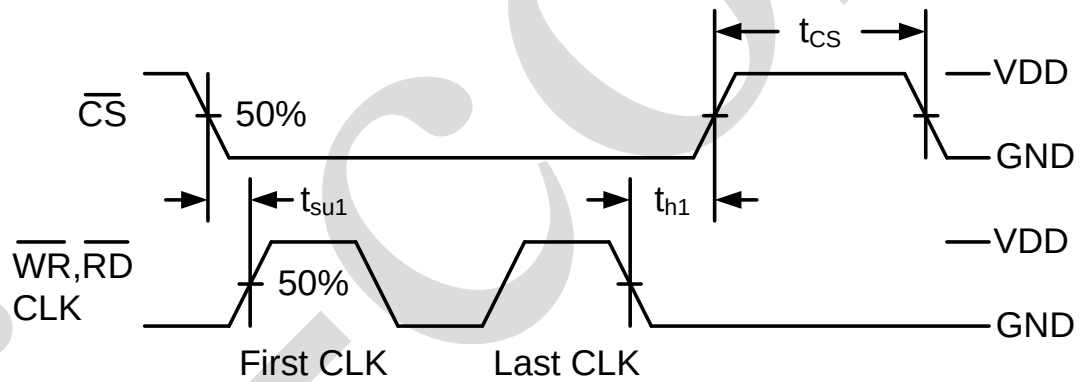
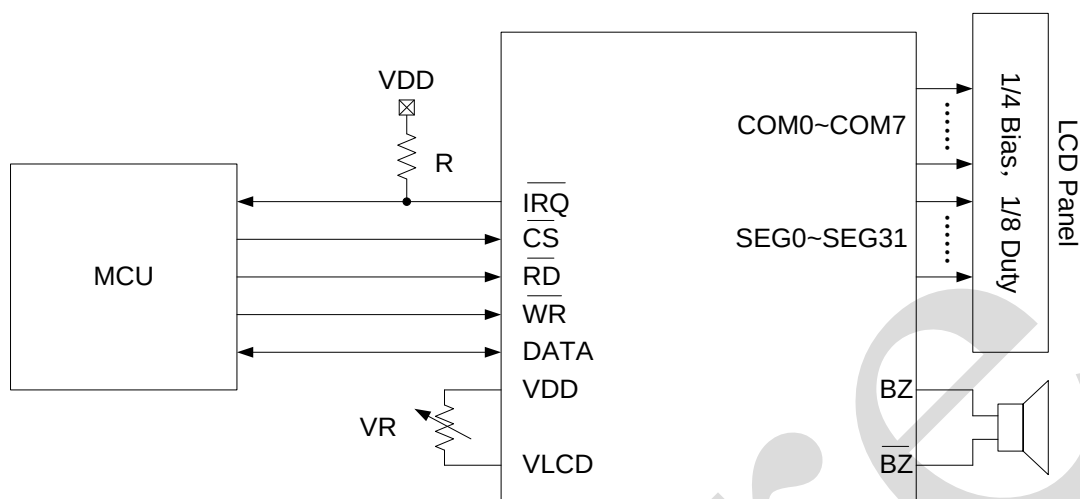


Figure 3

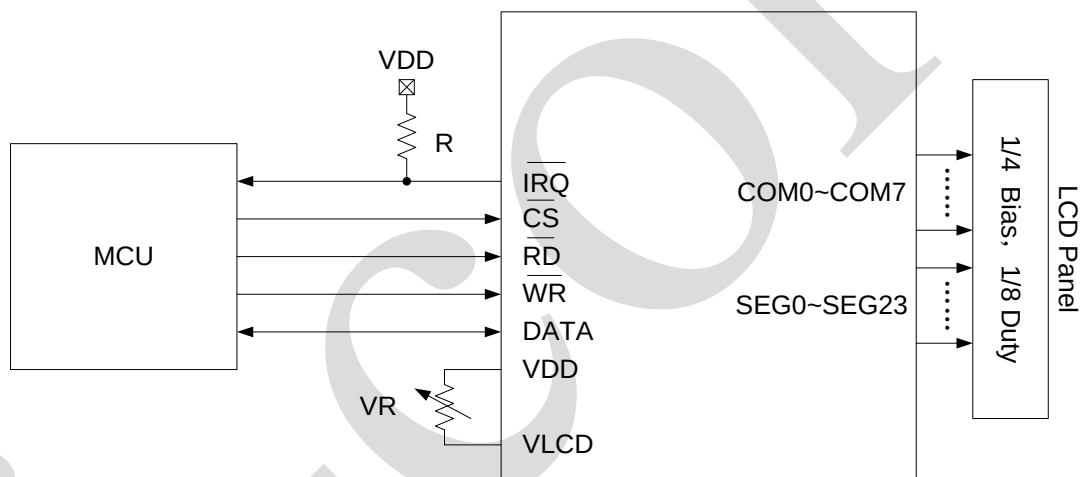


4、Typical Application Circuit And Application Note

4.1、Application Circuit



LQFP64/QFP64 application circuit image



LQFP44 application circuit image

Note:

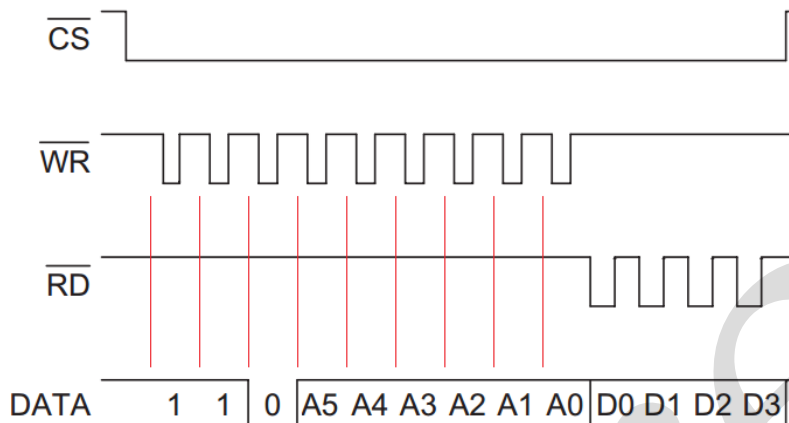
1. The connection of $\overline{\text{IRQ}}$ and $\overline{\text{RD}}$ pin can be selected depending on the requirement of the MCU.
2. The voltage applied to VLCD pin must be lower than VDD .
3. Adjust VR to fit LCD display, at $\text{VDD}=5\text{V}$, $\text{VLCD}=4\text{V}$, $\text{VR}=15\text{k}\Omega \pm 20\%$.
4. Adjust R (external pull-high resistance) to fit user's time base clock.



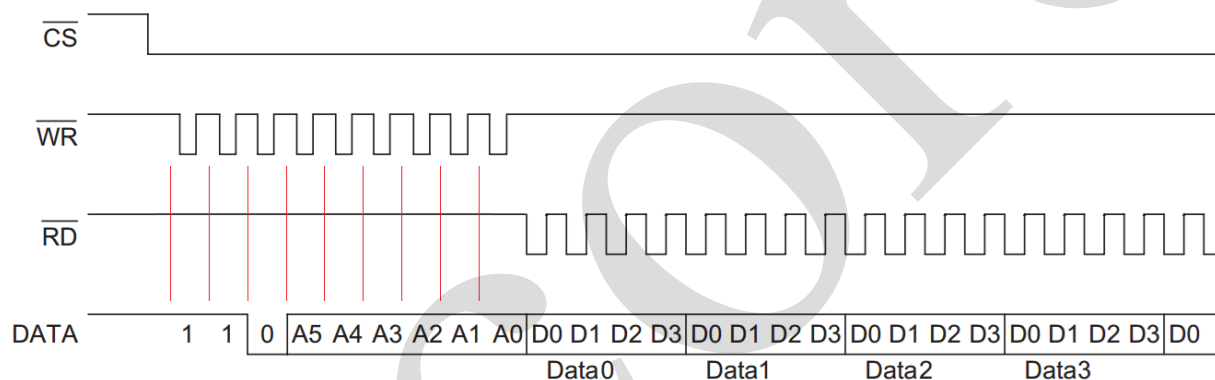
4.2、Command Format

Timing Diagrams

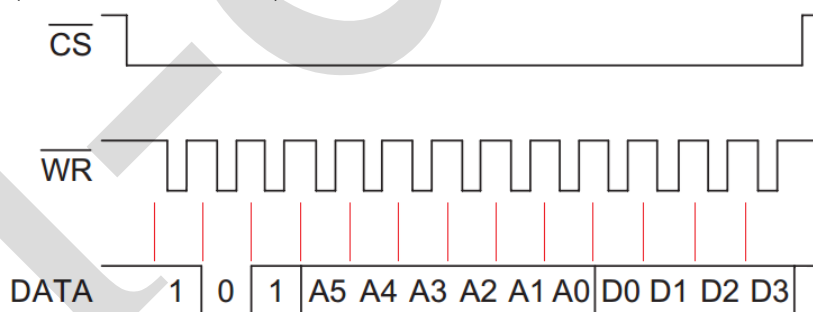
1. READ Mode (Command Code: 110)



2. READ Mode (Successive Address Reading)

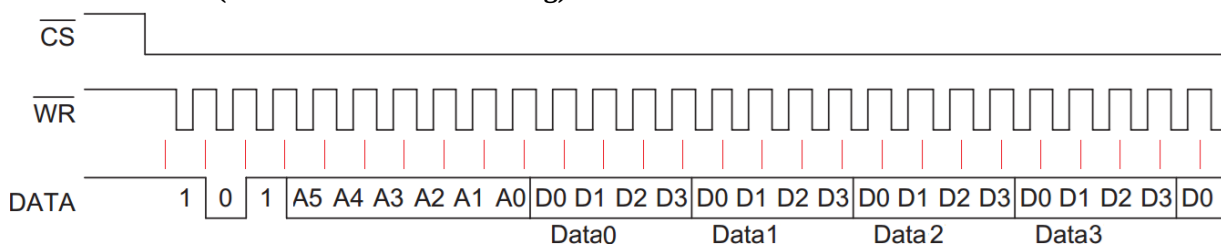


3. WRITE Mode (Command Code: 101)

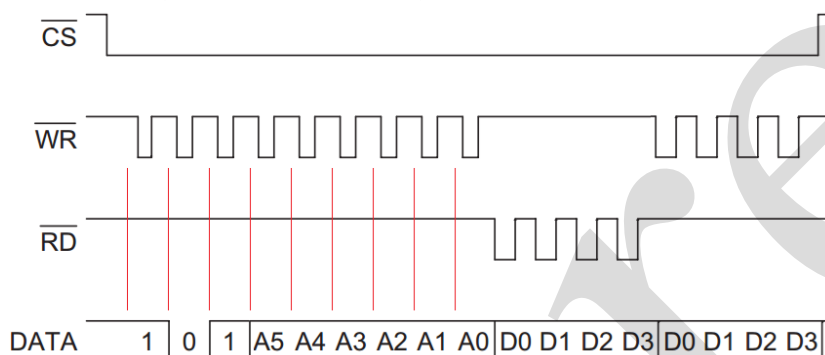




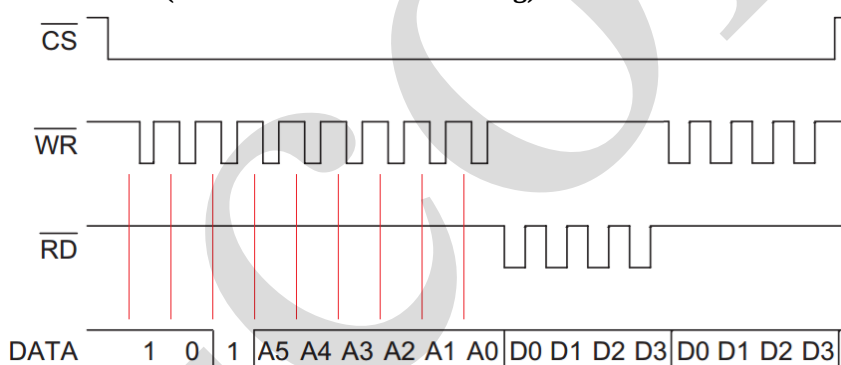
4. WRITE Mode (Successive Address Writing)



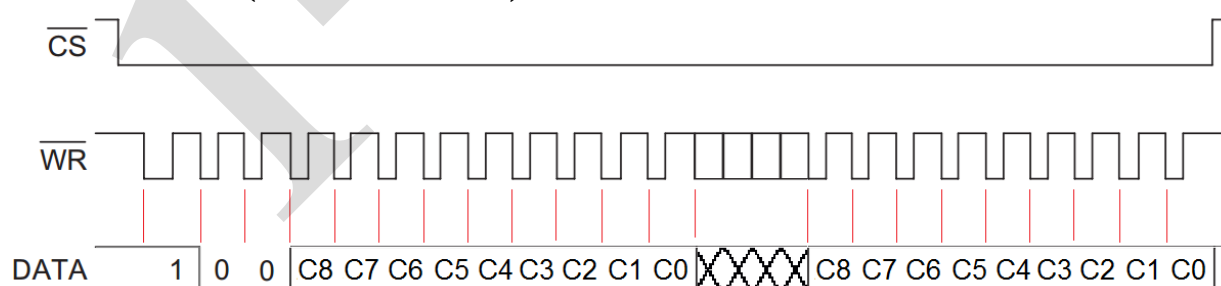
5. Read-Modify-Write Mode (Command Code: 101)



6. Read-Modify-Write Mode (Successive Address Accessing)



7. Command Mode (Command Code: 100)





Command Summary

Name	ID	Command Code	Function	Def.	
RAM Operation	READ	110	A5A4A3A2A1A0D0D1D2D3	Read data from the RAM	-
	WRITE	101	A5A4A3A2A1A0D0D1D2D3	Write data to the RAM	-
	READ-MODIFY-WRITE	101	A5A4A3A2A1A0D0D1D2D3	Read, Modify and Write data to the RAM	-
System Enable	SYS DIS	100	000-0000-X	Turn off both system oscillator and LCD bias generator	Yes
	SYS EN	100	0000-0001-X	Turn on system oscillator	-
Display ON/OFF	LCD OFF	100	0000-0010-X	Turn off LCD display	Yes
	LCD ON	100	0000-0011-X	Turn on LCD display	-
Time Base Control	TIMER DIS	100	0000-0100-X	Disable time base output	Yes
	TIMER EN	100	0000-0110-X	Enable time base output	-
	CLR TIMER	100	0000-1101-X	Clear the contents of the time base generator	-
Watch Dog Control	WDT DIS	100	0000-0101-X	Disable WDT time-out flag output	Yes
	WDT EN	100	0000-0111-X	Enable WDT time-out flag output	-
	CLR WDT	100	0000-1111-X	Clear the contents of WDT	-
Buzzer Control	TONE OFF	100	0000-1000-X	Turn off tone outputs	Yes
	TONE 4K	100	010X-XXXX-X	Tone frequency output:4KHz	-
	TONE 2K	100	0110-XXXX-X	Tone frequency output:2KHz	-
Clock Source Selection	RC 32K	100	0001-10XX-X	System clock source, on-chip RC oscillator	Yes
	EXT 32K	100	0001-11XX-X	System clock source, external clock source	-
IRQ Control	$\overline{\text{IRQ}}$ DIS	100	100X-0XXX-X	Disable $\overline{\text{IRQ}}$ output	Yes
	$\overline{\text{IRQ}}$ EN	100	100X-1XXX-X	Enable $\overline{\text{IRQ}}$ output	-
Frequency Selection	F1	100	101X-0000-X	Time base clock output: 1Hz The WDT time-out flag after :4s	-
	F2	100	101X-0001-X	Time base clock output: 2Hz The WDT time-out flag after :2s	-
	F4	100	101X-0010-X	Time base clock output: 4Hz The WDT time-out flag after :1s	-
	F8	100	101X-0011-X	Time base clock output: 8Hz The WDT time-out flag after :1/2s	-
	F16	100	101X-0100-X	Time base clock output: 16Hz The WDT time-out flag after :1/4s	-
	F32	100	101X-0101-X	Time base clock output: 32Hz The WDT time-out flag after :1/8s	-
	F64	100	101X-0110-X	Time base clock output: 64Hz The WDT time-out flag after :1/16s	-
	F128	100	101X-0111-X	Time base clock output: 128Hz The WDT time-out flag after :1/32s	Yes
Mode	TEST	100	1110-0000-X	Test mode, user don't use.	-



Selection	NORMAL	100	1110-0011-X	Normal mode	Yes
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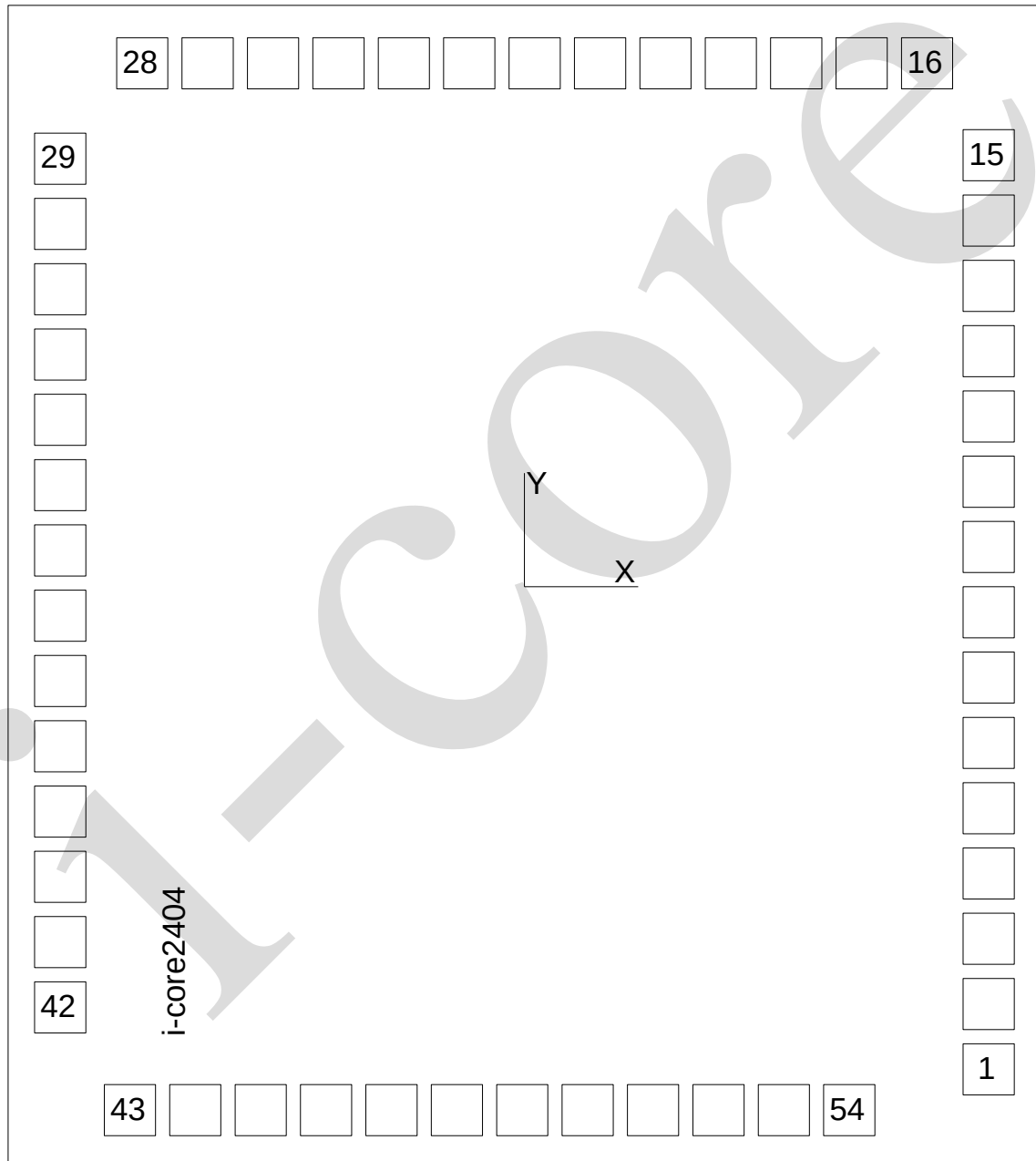
Note: X : Don't care

A5~A0 : RAM addresses

D3~D0 : RAM data

5、Pad Diagram And Pad Location

5.1、Pad Diagram



Chip Size: 1816×2048(um×um)

PAD Size: 90×90(um×um)



5.2、PAD Location

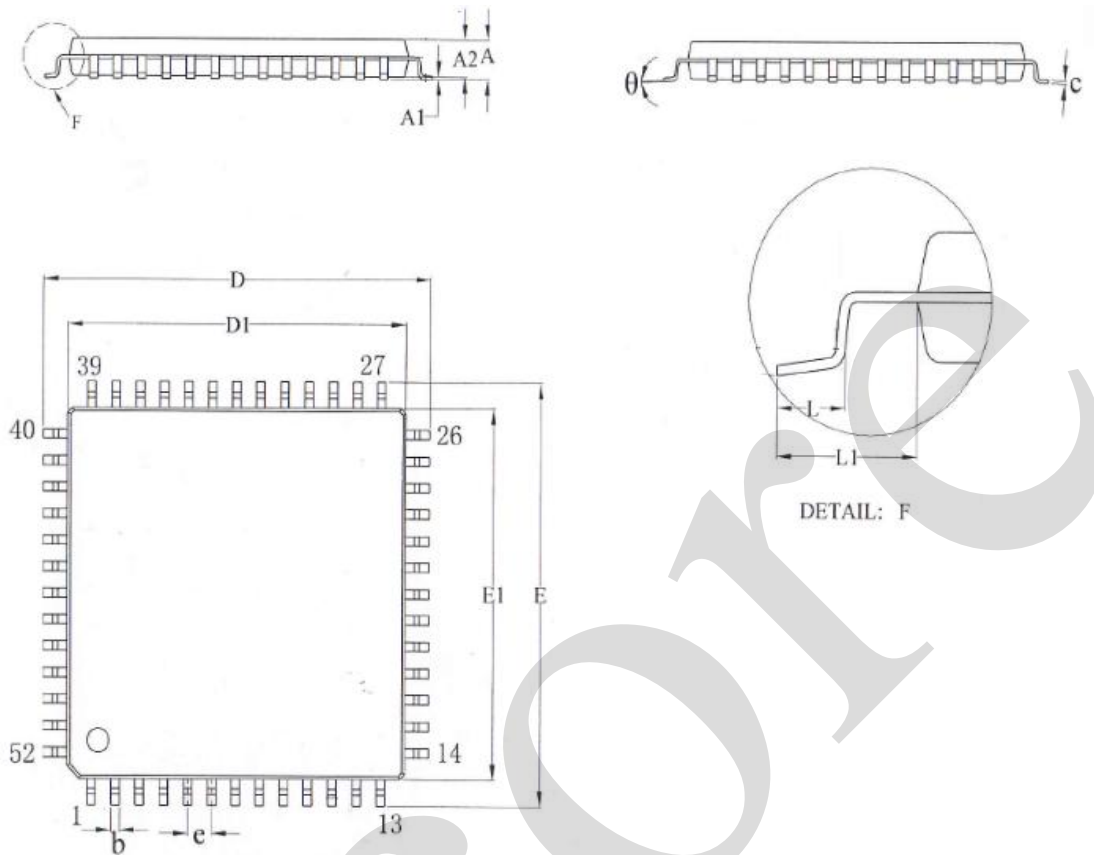
PAD No.	PAD Name	coordinate		PAD No.	PAD Name	coordinate	
		X	Y			X	Y
1	$\overline{\text{CS}}$	816.350	-850.075	28	SEG5	-672.050	922.025
2	$\overline{\text{RD}}$	816.350	-735.075	29	SEG6	-816.350	753.925
3	$\overline{\text{WR}}$	816.350	-620.075	30	SEG7	-816.350	638.925
4	DATA	816.350	-505.075	31	SEG8	-816.350	523.925
5	VSS	816.350	-390.075	32	SEG9	-816.350	408.925
6	OSCI	816.350	-275.075	33	SEG10	-816.350	293.925
7	VDD	816.350	-160.075	34	SEG11	-816.350	178.925
8	VLCD	816.350	-45.075	35	SEG12	-816.350	63.925
9	$\overline{\text{IRQ}}$	816.350	69.925	36	SEG13	-816.350	-51.075
10	BZ	816.350	184.925	37	SEG14	-816.350	-166.075
11	$\overline{\text{BZ}}$	816.350	299.925	38	SEG15	-816.350	-281.075
12	T1	816.350	414.925	39	SEG16	-816.350	-396.075
13	T2	816.350	529.925	40	SEG17	-816.350	-511.075
14	T3	816.350	644.925	41	SEG18	-816.350	-626.075
15	COM0	816.350	759.925	42	SEG19	-816.350	-741.075
16	COM1	707.950	922.025	43	SEG20	-693.800	-922.025
17	COM2	592.950	922.025	44	SEG21	-578.800	-922.025
18	COM3	477.950	922.025	45	SEG22	-463.800	-922.025
19	COM4	362.950	922.025	46	SEG23	-348.800	-922.025
20	COM5	247.950	922.025	47	SEG24	-233.800	-922.025
21	COM6	132.950	922.025	48	SEG25	-118.800	-922.025
22	COM7	17.950	922.025	49	SEG26	-3.800	-922.025
23	SEG0	-97.050	922.025	50	SEG27	111.200	-922.025
24	SEG1	-212.050	922.025	51	SEG28	226.200	-922.025
25	SEG2	-327.050	922.025	52	SEG29	341.200	-922.025
26	SEG3	-442.050	922.025	53	SEG30	456.200	-922.025
27	SEG4	-557.050	922.025	54	SEG31	571.200	-922.025

(Unit:um)



6、Package Information

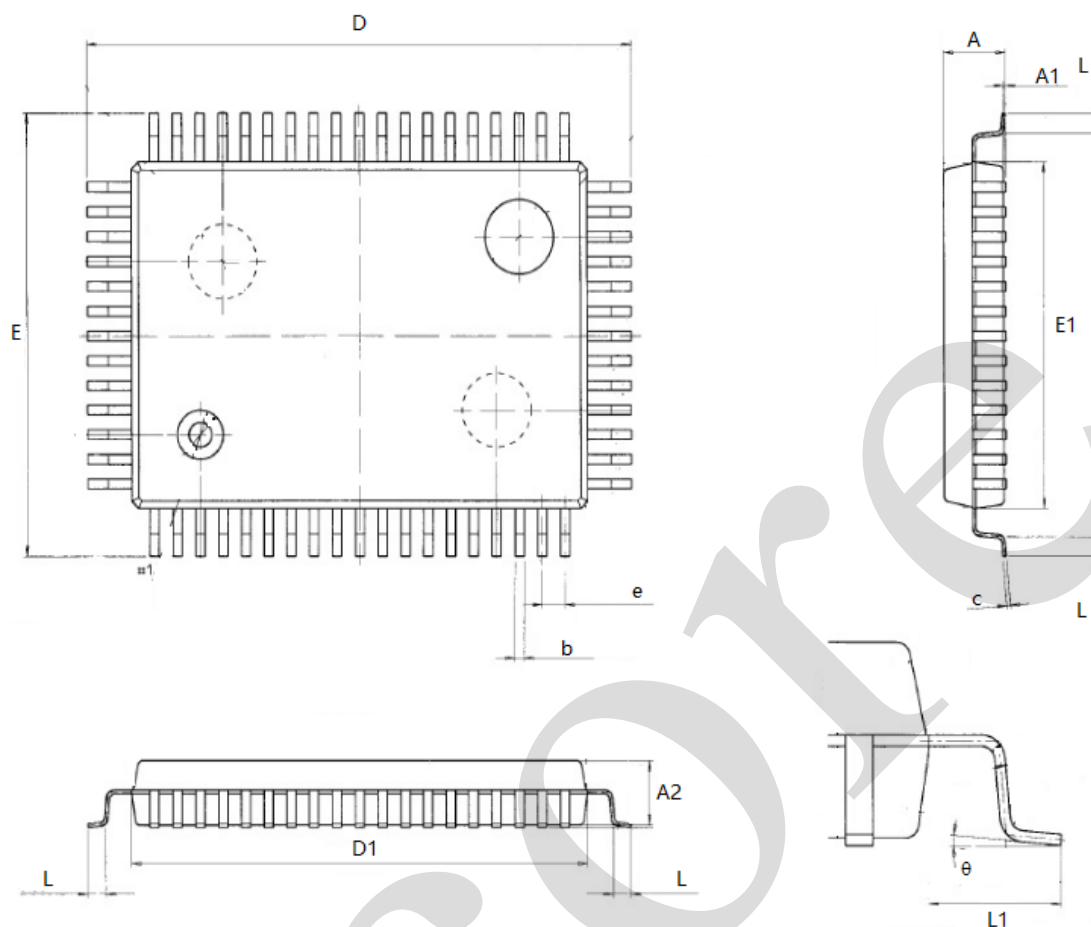
6.1、LQFP52



2023/12/A	Dimensions In Millimeters	
Symbol	Min	Max
A	—	1.60
A1	0.05	0.15
A2	1.35	1.45
b	0.38	0.46
c	0.13	0.17
D	15.80	16.20
D1	13.90	14.10
E	15.80	16.20
E1	13.90	14.10
e	1.00	
L	0.45	0.75
L1	1.00	
θ	0°	7°



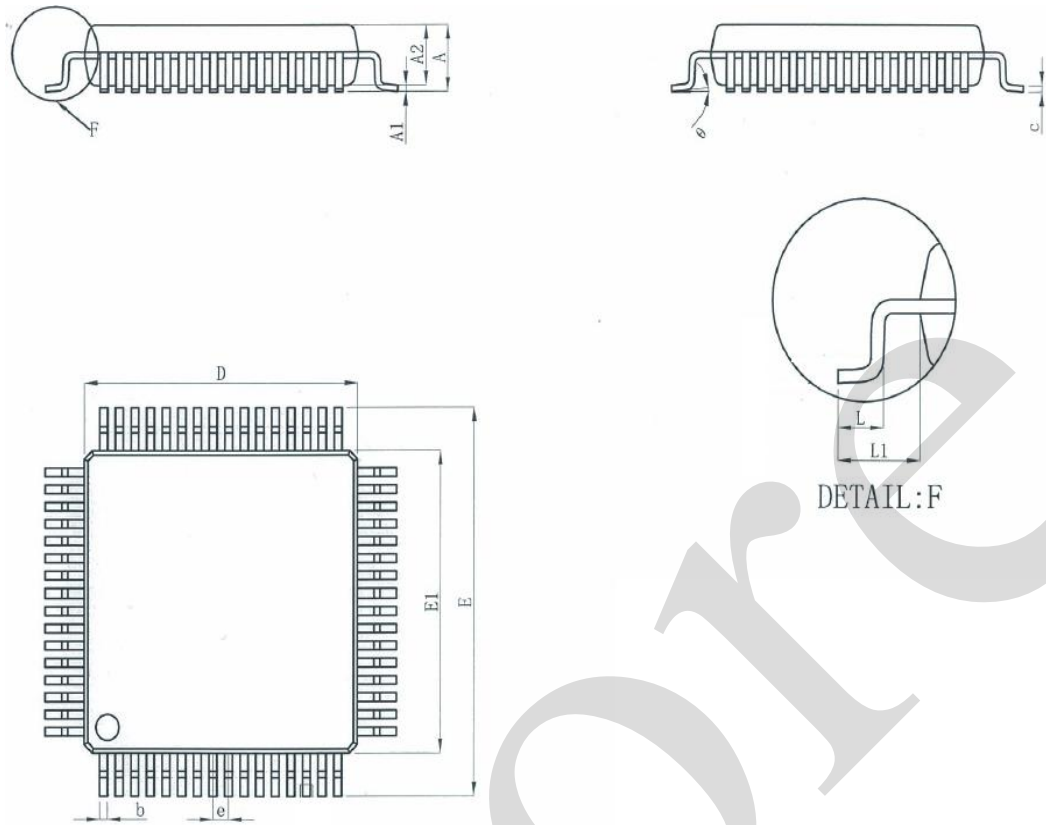
6.2、QFP64



2023/12/A	Dimensions In Millimeters	
Symbol	Min	Max
A	—	3.00
A1	0.05	—
A2	2.55	2.75
b	0.35	0.50
c	0.10	0.25
D	23.60	24.20
D1	19.80	20.20
E	17.60	18.20
E1	13.80	14.20
e	1.00	
L	0.60	1.00
L1	1.95	
θ	0°	8°



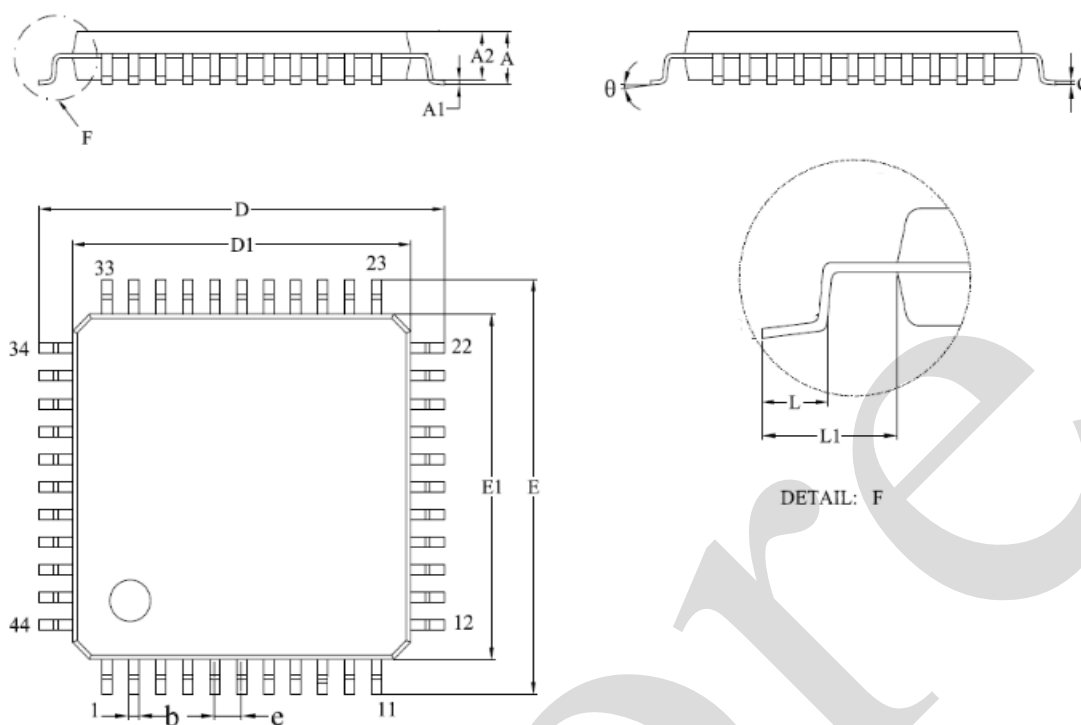
6.3、LQFP64



2023/12/A	Dimensions In Millimeters	
Symbol	Min	Max
A	1.45	1.65
A1	0.05	0.20
A2	1.30	1.50
b	0.13	0.24
c	0.09	0.20
D	6.90	7.10
E	8.80	9.20
E1	6.90	7.10
e	0.40	
L	0.43	0.75
L1	0.95	1.15
θ	0°	10°



6.4、LQFP44



2023/12/A	Dimensions In Millimeters	
Symbol	Min	Max
A	1.45	1.65
A1	0.05	0.20
A2	1.30	1.50
b	0.28	0.36
c	0.13	0.18
D	11.80	12.20
D1	9.90	10.10
E	11.80	12.20
E1	9.90	10.10
e	0.80	
L	0.42	0.75
L1	0.95	1.15
θ	0°	10°



7、Statements And Notes

7.1、The name and content of Hazardous substances or Elements in the product

Part name	Hazardous substances or Elements									
	Lead and lead compounds	Mercury and mercury compounds	Cadmium and cadmium compounds	Hexavalent chromium compounds	Polybrominated biphenyls	Polybrominated biphenyl ethers	Dibutyl phthalate	Butylbenzyl phthalate	Di-2-ethylhexyl phthalate	Diisobutyl phthalate
Lead frame	○	○	○	○	○	○	○	○	○	○
Plastic resin	○	○	○	○	○	○	○	○	○	○
Chip	○	○	○	○	○	○	○	○	○	○
The lead	○	○	○	○	○	○	○	○	○	○
Plastic sheet installed	○	○	○	○	○	○	○	○	○	○
explanation	○: Indicates that the content of hazardous substances or elements in the detection limit of the following the SJ/T11363-2006 standard. ×: Indicates that the content of hazardous substances or elements exceeding the SJ/T11363-2006 Standard limit requirements.									

7.2、Notes

We recommend you to read this chapter carefully before using this product.

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