E ·) (Fatice Semiconductor Corporation - ISPLSI 5512VA-110LQ208 Datasheet



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Understanding <u>Embedded - CPLDs (Complex</u> <u>Programmable Logic Devices)</u>

Embedded - CPLDs, or Complex Programmable Logic Devices, are highly versatile digital logic devices used in electronic systems. These programmable components are designed to perform complex logical operations and can be customized for specific applications. Unlike fixedfunction ICs, CPLDs offer the flexibility to reprogram their configuration, making them an ideal choice for various embedded systems. They consist of a set of logic gates and programmable interconnects, allowing designers to implement complex logic circuits without needing custom hardware.

Applications of Embedded - CPLDs

Details

Product Status	Obsolete
Programmable Type	In System Programmable
Delay Time tpd(1) Max	8.5 ns
Voltage Supply - Internal	3V ~ 3.6V
Number of Logic Elements/Blocks	16
Number of Macrocells	512
Number of Gates	24000
Number of I/O	144
Operating Temperature	0°C ~ 70°C (TA)
Mounting Type	Surface Mount
Package / Case	208-BFQFP
Supplier Device Package	208-PQFP (28x28)
Purchase URL	https://www.e-xfl.com/product-detail/lattice-semiconductor/isplsi-5512va-110lq208

Email: info@E-XFL.COM

Address: Room A, 16/F, Full Win Commercial Centre, 573 Nathan Road, Mongkok, Hong Kong



16-Ball WLCS Package Option 2: iCE40 UltraLite[™]

Dimensions in Millimeters







NOTES:

- 1. ALL DIMENSIONS AND TOLERANCE PER ASME Y 14.5M 1994.
- 2. ALL DIMENSIONS ARE IN MILLIMETERS.
- ▲ DIMENSION "b" IS MEASURES AT THE MAXIMUM BUMP DIAMETER PARALLEL TO PRIMARY DATUM C.
- \bigtriangleup primary datum c and seating plane are defined by the spherical crowns of the solder bumps.
- \bigtriangleup BILATERAL TOLERANCE ZONE IS APPLIED TO EACH SIDE OF THE PACKAGE BODY.

REF.	Min.	Nom.	Max.	
Α	0.413	0.452	0.491	
A1	0.122	0.152	0.182	
b	0.188	0.218	0.248	
D	1.	409 BS	С	
E	1.	409 BS	С	
D1		L.05 BSC)	
E1		1.05 BSC)	
e	().35 BSC	2	
S	-	0.180	-	
sbD	0.067	0.071	0.072	
sbE	0.067 0.071 0.072			
ممم	0.03			
CCC	0.03			
ddd	0.050			
eee		0.015		



24-Pin QFNS Package

Dimensions in Millimeters



- 1. DIMENSIONS AND TOLERANCES PER ANSI Y14.5M.
- 2. ALL DIMENSIONS ARE IN MILLIMETERS.
- 3. DRAWING CONFORMS TO JEDEC MO-220, VARIATION VGGD-9.
- EXACT SHAPE AND SIZE OF THIS FEATURE IS OPTIONAL.
- DIMENSION & APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM TERMINAL TIP.
- $\sqrt{6}$ APPLIES TO EXPOSED PORTION OF TERMINALS.

A	0.80	0.90	1.00
A1	0.00	0.02	0.05
A3		0.2 REF	
D			
D2	1.05	-	2.45
Е	4.0 BSC		
E2	1.05	-	2.45
b	0.18	0.25	0.30
е	0.50 BSC		
L	0.45	0.50	0.55



25-Ball WLCS Package (0.35 mm Pitch)

Dimensions in Millimeters



SIDE VIEW

Notes:

- 1 ALL DIMENSIONS AND TOLERANCE PER ASME Y 14.5M 1994.
- 2 ALL DIMENSIONS ARE IN MILLIMETERS.
- △ DIMENSION "b" IS MEASURED AT THE MAXIMUM BUMP DIAMETER PARALLEL TO PRIMARY DATUM C.
- A PRIMARY DATUM C AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE SOLDER BUMPS.
- ▲ BILATERAL TOLERANCE ZONE IS APPLIED TO EACH SIDE OF THE PACKAGE BODY.

REF.	Min.	Nom. Ma	ax.
A	0.413	0.452	0.491
A1	0.122	0.152	0.182
b	0.188	0.218	0.248
D		1.71 BS	SC
E		1.71 BS	SC
D1		1.40 BS	SC
E1		1.40 BS	SC
e		0.35 BS	SC
aaa		0.03	
ccc		0.03	
S	-	0.015	-



28-Pin SSOP Package

Dimensions in Millimeters



M B	DIMENSIONS				
0 L	MIN.	NOM.	MAX.		
А			2.0		
A ₁	0.05				
\mathbf{A}_{2}	1.65	1.75	1.85		
b	0.22	-	0.38		
b ₁	0.22	0.30	0.33		
С	0.09		0.25		
C ₁	0.09	0.15	0.21		
D	9.90	10.20	10.50		
E1	5.00	5.30	5.60		
е		0.65 BSC			
Е	7.40	7.80	8.20		
L	0.55	0.75	0.95		
L1	1.25 REF.				
N	28				
oc	0	0 4 8			
R1	0.09	0.09			

NOTES:

- 1. CONTROLLING DIMENSION: MILLIMETERS.
- 2. DIMENSIONING & TOLERANCES PER ANSI.Y14.5M-1982.
- A. "D" & "E1" DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS, BUT DO INCLUDE MOLD MISMATCH AND ARE MEASURED AT THE PARTING LINE. MOLD FLASH OR PROTRUSIONS SHALL NOT EXCEED 0.20mm PER SIDE.
- 4. TO BE DETERMINED AT THE SEATING PLANE



DETAIL 'A'



- DIMENSION b DOES NOT INCLUDE DAMBAR PROTRUSION/INTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.13mm TOTAL IN EXCESS OF b DIMENSION AT MAXIMUM MATERIAL CONDITION. DAMBAR INTRUSION SHALL NOT REDUCE DIMENSION b BY MORE THAN 0.07mm AT LEAST MATERIAL CONDITION.
- THESE DIMENSIONS APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN 0.10 & 0.25mm FROM THE LEAD TIP
- 7. "N" IS THE NUMBER OF TERMINAL POSITIONS



44-Pin TQFP Package (1.0 mm thick)

Dimensions in Millimeters



NOTES:

- 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5 1982.
- 2. ALL DIMENSIONS ARE IN MILLIMETERS.
- $/_3$ datums a, b and d to be determined at datum plane H.
- 4. DIMENSIONS D1 AND E1 DO NOT INCLUDE MOLD PROTRUSION. ALLOWABLE MOLD PROTRUSION IS 0.254 MM ON D1 AND E1 DIMENSIONS.
- 5. THE TOP OF PACKAGE MAY BE SMALLER THAN THE BOTTOM OF THE PACKAGE BY 0.15 MM.
- 6. SECTION B-B: THESE DIMENSIONS APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN 0.10 AND 0.25 MM FROM THE LEAD TIP.
- 7. A1 IS DEFINED AS THE DISTANCE FROM THE SEATING PLANE TO THE LOWEST POINT ON THE PACKAGE BODY.
- /8 EXACT SHAPE OF EACH CORNER IS OPTIONAL.

SYMBOL	MIN.	NOM.	MAX.
A	-	-	1.20
Al	0.05	-	0.15
A2	.95	1.00	1.05
D		12.00 BSC	
D1		10.00 BSC	
E	12.00 BSC		
El	10.00 BSC		
L	0.45	0.60	0.75
N	44		
е	0.80 BSC		
b	0.30	0.37	0.45
bl	0.30	0.35	0.40
С	0.09	0.15	0.20
cl	0.09	0.13	0.16



Dimensions in Millimeters



SIDE VIEW

NOTES:	UNLESS	OTHERWISE	SPECIFIED	

1. DIMENSIONS AND TOLERANCES PER ANSI Y14.5M.

2.

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4

ALL DIMENSIONS ARE IN MILLIMETERS.

DIMENSION "b" IS MEASURED AT THE MAXIMUM SOLDER BALL DIAMETER, PARALLEL TO PRIMARY DATUM C

PRIMARY DATUM C AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE SOLDER BALLS.

BILATERAL TOLERANCE ZONE IS APPLIED TO EACH SIDE OF THE PACKAGE BODY.

SYMBOL	MIN.	NOM.	MAX.
А	1.30	1.40	1.50
A1	0.31	0.36	0.41
A2	0.99	1.04	1.09
D/E	7.	00 BSC	
M/N	4.80 BSC		
s	0 BSC		
b	0.40	0.46	0.52
е	0.80 BSC		
aaa	-	-	0.10
bbb	-	-	0.10
ddd	-	-	0.12



64-Pin QFNS Package

Dimensions in Millimeters



NOTES:	UNLESS	OTHERWISE	SPECIFIED

- 1. DIMENSIONS AND TOLERANCES PER ANSI Y14.5M.
- 2. ALL DIMENSIONS ARE IN MILLIMETERS.
- A EXACT SHAPE AND SIZE OF THIS FEATURE IS OPTIONAL.
- DIMENSION & APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM TERMINAL TIP.
- 5 APPLIES TO EXPOSED PORTION OF TERMINALS.

SYMBOL	MIN.	NOM.	MAX.
A	0.80	0.90	1.00
A1	0.00	0.02	0.05
A3		0.2 REF	
D		9.0 BSC	
D2	5.00	-	7.50
Е	9.0 BSC		
E2	5.00	-	7.50
b	0.18	0.24	0.30
е	0.50 BSC		
L	0.30	0.40	0.50



Dimensions in Millimeters



SIDE VIEW

NOTES:	UNLESS OTHERWISE SPECIFIED
1.	DIMENSIONS AND TOLERANCES PER ANSI Y14.5M.
2.	ALL DIMENSIONS ARE IN MILLIMETERS.
3	DIMENSION "b" IS MEASURED AT THE MAXIMUM SOLDER BALL DIAMETER, PARALLEL TO PRIMARY DATUM C
4	PRIMARY DATUM C AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE SOLDER BALLS.
5	BILATERAL TOLERANCE ZONE IS APPLIED TO EACH SIDE OF THE PACKAGE BODY.
6	EXACT SHAPE AND SIZE OF THIS FEATURE IS OPTIONAL.

SYMBOL	MIN.	NOM.	MAX.
A	-	-	1.00
A1	0.10	-	-
A2	_	-	0.90
D/E	5.00 BSC		
M/N	4.00 BSC		
b	0.20	0.25	0.30
e	0.50 BSC		
aaa	-	-	0.10
bbb	-	-	0.10
ddd	-	-	0.10



84-Pin CPGA Package

Dimensions in Inches



NOTES:

- 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M.
- 2. ALL DIMENSIONS ARE IN INCHES.
- <u>J</u>. DIMENSIONS D AND E MAY HAVE MATERIAL PROTRUSION OF .006 INCHES MAXIMUM ABOVE THE DIMENSION SHOWN NOT TO EXCEED .003 INCHES MAXIMUM PER SIDE.



132-Ball csBGA Package Option 2: iCE40

Dimensions in Millimeters



NOTES: UNLESS OTHERWISE SPECIFIED

- DIMENSIONS AND TOLERANCES PER ANSI Y14.5M.
- 2. ALL DIMENSIONS ARE IN MILLIMETERS.



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DIMENSION "b" IS MEASURED AT THE MAXIMUM SOLDER BALL DIAMETER, PARALLEL TO PRIMARY DATUM C

PRIMARY DATUM C AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE SOLDER BALLS.

BILATERAL TOLERANCE ZONE IS APPLIED TO EACH SIDE OF THE PACKAGE BODY.

SYMBOL	MIN.	NOM.	MAX.
А	_	-	1.00
A1	0.15	-	-
A2	-	-	0.85
D/E	8.00 BSC		
M/N	6.50 BSC		
S	0.25 BSC		
b	0.25	0.30	0.35
е	0.50 BSC		
aaa			0.10
bbb	-	-	0.10
ddd	-	-	0.08



Dimensions in Millimeters



bbb

ddd

_

_

_

_

0.10

0.08

BILATERAL TOLERANCE ZONE IS APPLIED

EXACT SHAPE AND SIZE OF THIS FEATURE

TO EACH SIDE OF THE PACKAGE BODY.

IS OPTIONAL.

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6



133-Pin CPGA Package

Dimensions in Inches



NOTES:

- 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M.
- 2. ALL DIMENSIONS ARE IN INCHES.
- DIMENSIONS D AND E MAY HAVE MATERIAL PROTRUSION OF .006 INCHES MAXIMUM ABOVE THE DIMENSION SHOWN NOT TO EXCEED .003 INCHES MAXIMUM PER SIDE.



Dimensions in Millimeters



NOTES:	UNLESS OTHERWISE SPECIFIED
1.	DIMENSIONS AND TOLERANCES PER ANSI Y14.5M.
2.	ALL DIMENSIONS ARE IN MILLIMETERS.
3	DIMENSION "b" IS MEASURED AT THE MAXIMUM SOLDER BALL DIAMETER, PARALLEL TO PRIMARY DATUM C
4	PRIMARY DATUM C AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE SOLDER BALLS.
5	BILATERAL TOLERANCE ZONE IS APPLIED TO EACH SIDE OF THE PACKAGE BODY.
6	EXACT SHAPE AND SIZE OF THIS FEATURE IS OPTIONAL.

SYMBOL	MIN.	NOM.	MAX.
А	0.90	1.00	1.10
A1	0.15	-	-
A2	-	-	0.85
D/E	7.00 BSC		
M/N	5.50 BSC		
S	0.25 BSC		
b	0.25	0.30	0.35
е	0.50 BSC		
aaa	-	-	0.10
bbb	-	-	0.10
ddd	-	-	0.08



Dimensions in Millimeters



NOTES:	UNLESS OTHERWISE SPECIFIED
1.	DIMENSIONS AND TOLERANCES PER ANSI Y14.5M.
2.	ALL DIMENSIONS ARE IN MILLIMETERS.
3	DIMENSION "b" IS MEASURED AT THE MAXIMUM SOLDER BALL DIAMETER, PARALLEL TO PRIMARY DATUM C
4	PRIMARY DATUM C AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE SOLDER BALLS.
5	BILATERAL TOLERANCE ZONE IS APPLIED TO EACH SIDE OF THE PACKAGE BODY.

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SYMBOL	MIN.	NOM.	MAX.
A	1.20	1.35	1.50
Al	0.16	_	-
A2	-	-	1.34
D/E	8.00 BSC		
M/N	6.50 BSC		
	0.25 BSC		
S	0	.25 BSC	
S b	0.25	.25 BSC	0.35
S b e	0 0.25 0	.25 BSC 0.30).50 BSC	0.35
S b e aaa	0 0.25 -	.25 BSC 0.30 0.50 BSC -	0.35
S b e aaa bbb	0 0.25 - -	.25 BSC 0.30 0.50 BSC - -	0.35 0.10 0.10



Dimensions in Millimeters



NOTES: UNLESS OTHERWISE SPECIFIED DIMENSIONS AND TOLERANCES 1. PER ANSI Y14.5M. 2. ALL DIMENSIONS ARE IN MILLIMETERS. DIMENSION "b" IS MEASURED AT THE MAXIMUM SOLDER BALL DIAMETER 3 PARALLEL TO PRIMARY DATUM C PRIMARY DATUM C AND SEATING PLANE ARE DEFINED BY THE SPHERICAL 4 CROWNS OF THE SOLDER BALLS. BILATERAL TOLERANCE ZONE IS APPLIED 5 TO EACH SIDE OF THE PACKAGE BODY.

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SYMBOL	MIN.	NOM.	MAX.
А	_	_	1.00
A1	0.15	-	-
A2	-	-	0.85
D/E	12.00 BSC		
M/N	10.50 BSC		
S	0.25 BSC		
b	0.25	0.31	0.37
е	0.50 BSC		
aaa			0.10
bbb	-	-	0.10
ddd	-	-	0.08



Dimensions in Millimeters



NOTES: UNLESS OTHERWISE SPECIFIED

- 1. DIMENSIONS AND TOLERANCES PER ANSI Y14.5M.
- 2. ALL DIMENSIONS ARE IN MILLIMETERS.
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DIMENSION "b" IS MEASURED AT THE MAXIMUM SOLDER BALL DIAMETER, PARALLEL TO PRIMARY DATUM C.

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PRIMARY DATUM C AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE SOLDER BALLS.

BILATERAL TOLERANCE ZONE IS APPLIED TO EACH SIDE OF THE PACKAGE BODY.

SYMBOL	MIN.	NOM.	MAX.
A	-	-	1.30
A1	0.15	-	-
A2	-	-	1.00
D/E	1	0.00 BSC	
M/N	8.50 BSC		
S	0.25 BSC		
b	0.25	0.30	0.35
e	0.50 BSC		
aaa	0.10		
bbb	0.10		
ccc	0.08		
ddd	0.15		
eee	0.05		



Dimensions in Millimeters



NOTES: UNLESS OTHERWISE SPECIFIED

- 1. DIMENSIONS AND TOLERANCES PER ANSI Y14.5M.
- 2. ALL DIMENSIONS ARE IN MILLIMETERS.



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DIMENSION "b" IS MEASURED AT THE MAXIMUM SOLDER BALL DIAMETER, PARALLEL TO PRIMARY DATUM C.

PRIMARY DATUM C AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE SOLDER BALLS.

BILATERAL TOLERANCE ZONE IS APPLIED TO EACH SIDE OF THE PACKAGE BODY.

SYMBOL	MIN.	NOM.	MAX.
А	-	-	1.00
A1	0.15	0.24	_
A2	_	0.66	-
D/E	1	0.00 BSC	
M/N		8.50 BSC	
S	0.25 BSC		
b	0.25	0.30	0.35
е	0.50 BSC		
aaa	0.10		
bbb	0.10		
CCC	0.08		
ddd	0.15		
	0.05		



Dimensions in Millimeters



NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS AND TOLERANCES PER ANSI Y14.5M.

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- 2. ALL DIMENSIONS ARE IN MILLIMETERS.
 - DIMENSION "b" IS MEASURED AT THE MAXIMUM SOLDER BALL DIAMETER, PARALLEL TO PRIMARY DATUM C
 - PRIMARY DATUM C AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE SOLDER BALLS.
 - BILATERAL TOLERANCE ZONE IS APPLIED TO EACH SIDE OF THE PACKAGE BODY.
 - EXACT SHAPE AND SIZE OF THIS FEATURE IS OPTIONAL.

SYMBOL	MIN.	NOM.	MAX.
А	-	-	2.00
A1	0.25	-	-
A2	0.65	-	-
D/E	17.0 BSC		
M/N	15.2 BSC		
S	0.40 BSC		
b	0.40	0.45	0.50
е	0.80 BSC		
aaa	-	-	0.15
bbb	_	-	0.20
ddd	_	-	0.20



Dimensions in Millimeters



NOTES: UNLESS OTHERWISE SPECIFIED

- 1. DIMENSIONS AND TOLERANCES PER ANSI Y14.5M.
- 2. ALL DIMENSIONS ARE IN MILLIMETERS.
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DIMENSION "b" IS MEASURED AT THE MAXIMUM SOLDER BALL DIAMETER, PARALLEL TO PRIMARY DATUM C

PRIMARY DATUM C AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE SOLDER BALLS.

BILATERAL TOLERANCE ZONE IS APPLIED TO EACH SIDE OF THE PACKAGE BODY.

SYMBOL	MIN.	NOM.	MAX.
A	-	-	1.76
Al	0.25	0.30	0.35
A2	0.80	-	-
D/E	23.0 BSC		
M/N	20.0 BSC		
S	0.40 BSC		
b	0.35	0.40	0.45
е	0.80 BSC		
aaa	0.1		0.15
bbb	_	-	0.20
ddd	-	-	0.12



1156-Ball fpBGA Package

Dimensions in Millimeters



NOTES: UNLESS OTHERWISE SPECIFIED

- 1. DIMENSIONS AND TOLERANCES PER ANSI Y14.5M.
- 2. ALL DIMENSIONS ARE IN MILLIMETERS.



DIMENSION "b" IS MEASURED AT THE MAXIMUM SOLDER BALL DIAMETER, PARALLEL TO PRIMARY DATUM C



6

PRIMARY DATUM C AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE SOLDER BALLS.

BILATERAL TOLERANCE ZONE IS APPLIED TO EACH SIDE OF THE PACKAGE BODY.

SYMBOL	MIN.	NOM.	MAX.
A	1.90	2.25	2.60
A1	0.30	0.50	0.70
A2	0.40	0.60	0.80
B/C	29.80	30.30	30.80
D/E	35.00 BSC		
M/N	33.00 BSC		
S	0.50 BSC		
b	0.50	0.60	0.70
е	1.00 BSC		
aaa	-	-	0.20
bbb	-	-	0.25
ccc	_	_	0.35