A. ECAD Design Information

This appendix contains information that supports the development of the PCB ECAD model for this device. It is intended to be used by PCB designers.

A.1 Part Number Indexing

Orderable Part Number	Number of Pins	Package Type	Package Code/POD Number
R5F212A7SNFA#V2	64	LQFP	PLQP0064GA-A
R5F212A7SNFP#V2	64	LFQFP	PLQP0064KB-A
R5F212A7SNFP#X6	64	LFQFP	PLQP0064KB-A
R5F212A8SNFA#V2	64	LQFP	PLQP0064GA-A
R5F212A8SNFP#V2	64	LFQFP	PLQP0064KB-A
R5F212AASNFA#V2	64	LQFP	PLQP0064GA-A
R5F212AASNFP#V2	64	LFQFP	PLQP0064KB-A
R5F212ACSNFA#V2	64	LQFP	PLQP0064GA-A
R5F212ACSNFP#V2	64	LFQFP	PLQP0064KB-A
R5F212ACSNFP#X6	64	LFQFP	PLQP0064KB-A
R5F212B7SNFA#V2	64	LQFP	PLQP0064GA-A
R5F212B7SNFP#V2	64	LFQFP	PLQP0064KB-A
R5F212B8SNFA#V2	64	LQFP	PLQP0064GA-A
R5F212B8SNFP#V2	64	LFQFP	PLQP0064KB-A
R5F212BASNFA#V2	64	LQFP	PLQP0064GA-A
R5F212BASNFP#V2	64	LFQFP	PLQP0064KB-A
R5F212BASNFP#X6	64	LFQFP	PLQP0064KB-A
R5F212BCSNFP#V2	64	LFQFP	PLQP0064KB-A
R5F212BCSNFP#X6	64	LFQFP	PLQP0064KB-A
R5F212A7SDFP#V2	64	LFQFP	PLQP0064KB-A
R5F212A8SDFP#V2	64	LFQFP	PLQP0064KB-A
R5F212AASDFP#V2	64	LFQFP	PLQP0064KB-A
R5F212ACSDFP#V2	64	LFQFP	PLQP0064KB-A
R5F212B7SDFP#V2	64	LFQFP	PLQP0064KB-A
R5F212B8SDFP#V2	64	LFQFP	PLQP0064KB-A
R5F212BASDFP#V2	64	LFQFP	PLQP0064KB-A
R5F212BCSDFA#V2	64	LQFP	PLQP0064GA-A
R5F212BCSDFP#V2	64	LFQFP	PLQP0064KB-A

A.2 Symbol Pin Information

A.2.1 64-LFQFP

Pin Number	Primary Pin Name	Primary Electrical Type	Alternate Pin Name(s)
1	P3_3	I/O	SSI
2	SDA	I/O	P3_4/SCS
3	MODE	Input	-
4	XCIN	Input	P4_3
5	XCOUT	Output	P4_4
6	\RESET	Input	-
7	XOUT	Output	P4_7
8	VSS	Power	AVSS
9	XIN	Input	P4_6
10	VCC	Power	AVCC
11	P5_4	I/O	TRCIOD
12	P5_3	I/O	TRCIOC
13	P5_2	I/O	TRCIOB
14	P5_1	I/O	TRCIOA/TRCTRG
15	P5_0	I/O	TRCCLK
16	P2_7	I/O	TRDIOD1
17	P2_6	I/O	TRDIOC1

Pin Number	Primary Pin Name	Primary Electrical Type	Alternate Pin Name(s)
18	P2_5	I/O	TRDIOB1
19	P2_4	I/O	TRDIOA1
20	P2_3	I/O	TRDIOD0
21	P2_2	I/O	TRDIOC0
22	P2_1	I/O	TRDIOB0
23	P2_0	I/O	TRDIOA0/TRDCLK
24	P1_7	I/O	INT1#/TRAIO
25	P1_6	I/O	CLK0
26	P1_5	I/O	(INT1)/(TRAIO)/RXD0
27	P1_4	I/O	TXD0
28	P8_6	I/O	-
29	P8_5	I/O	TRFO12
30	P8_4	I/O	TRFO11
31	P8_3	I/O	TRFO10/TRFI
32	P8_2	I/O	TRFO02
33	P8_1	I/O	TRFO01
34	P8_0	I/O	TRFO00
35	P6_0	I/O	TREO
36	P4_5	I/O	INT0#/INT0#
37	P6_6	I/O	INT2#/TXD1
38	P6_7	I/O	INT3#/RXD1
39	P6_5	I/O	(CLK1)/CLK2
40	P6_4	I/O	RXD2
41	P6_3	I/O	TXD2
42	P3_1	I/O	TRBO
43	P3_0	I/O	TRAO
44	P3_6	I/O	(INT1)
45	P3_2	I/O	(INT2)
46	P1_3	I/O	KI3#/AN11
47	P1_2	I/O	KI2#/AN10
48	P1_1	I/O	KI1#/AN9
49	P1_0	I/O	KI0#/AN8
50	P0_0	I/O	AN7
51	P0_1	I/O	AN6
52	P0_2	I/O	AN5
53	P0_3	I/O	AN4
54	P0_4	I/O	AN3
55	P6_2	I/O	-
56	P6_1	I/O	-
57	P0_5	I/O	CLK1/AN2
58	P0_6	I/O	AN1/DA0
59	VSS	Power	AVSS
60	P0_7	I/O	AN0/DA1
61	VREF	Input	-
62	VCC	Power	AVCC
63	P3_7	I/O	SSO
64	SCL	I/O	P3_5/SSCK

A.2.2 64-LQFP

Pin Number	Primary Pin Name	Primary Electrical Type	Alternate Pin Name(s)
1	P3_3	I/O	SSI
2	SDA	I/O	P3_4/SCS
3	MODE	Input	-
4	XCIN	Input	P4_3
5	XCOUT	Output	P4_4
6	\RESET	Input	-
7	XOUT	Output	P4_7
8	VSS	Power	AVSS
9	XIN	Input	P4_6
10	VCC	Power	AVCC
11	P5_4	I/O	TRCIOD

Pin Number	Primary Pin Name	Primary Electrical Type	Alternate Pin Name(s)
12	P5_3	I/O	TRCIOC
13	P5_2	I/O	TRCIOB
14	P5_1	I/O	TRCIOA/TRCTRG
15	P5_0	I/O	TRCCLK
16	P2_7	I/O	TRDIOD1
17	P2_6	I/O	TRDIOC1
18	P2_5	I/O	TRDIOB1
19	P2_4	I/O	TRDIOA1
20	P2_3	I/O	TRDIOD0
21	P2_2	I/O	TRDIOC0
22	P2_1	I/O	TRDIOB0
23	P2_0	I/O	TRDIOA0/TRDCLK
24	P1_7	I/O	INT1#/TRAIO
25	P1_6	I/O	CLK0
26	P1_5	I/O	(INT1)/(TRAIO)/RXD0
27	P1_4	I/O	TXD0
28	P8_6	I/O	-
29	P8_5	I/O	TRFO12
30	P8_4	I/O	TRFO11
31	P8_3	I/O	TRFO10/TRFI
32	P8_2	I/O	TRFO02
33	P8_1	I/O	TRFO01
34	P8_0	I/O	TRFO00
35	P6_0	I/O	TREO
36	P4_5	I/O	INT0#/INT0#
37	P6_6	I/O	INT2#/TXD1
38	P6_7	I/O	INT3#/RXD1
39	P6_5	I/O	(CLK1)/CLK2
40	P6_4	I/O	RXD2
41	P6_3	I/O	TXD2
42	P3_1	I/O	TRBO
43	P3_0	I/O	TRAO
44	P3_6	I/O	(INT1)
45	P3_2	I/O	(INT2)
46	P1_3	I/O	KI3#/AN11
47	P1_2	I/O	KI2#/AN10
48	P1_1	I/O	KI1#/AN9
49	P1_0	I/O	KI0#/AN8
50	P0_0	I/O	AN7
51	P0_1	I/O	AN6
52	P0_2	I/O	AN5
53	P0_3	I/O	AN4
54	P0_4	I/O	AN3
55	P6_2	I/O	-
56	P6_1	I/O	-
57	P0_5	I/O	CLK1/AN2
58	P0_6	I/O	AN1/DA0
59	VSS	Power	AVSS
60	P0_7	I/O	AN0/DA1
61	VREF	Input	-
62	VCC	Power	AVCC
63	P3_7	I/O	SSO
64	SCL	I/O	P3_5/SSCK

A.3 Symbol Parameters

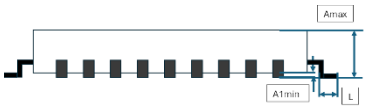
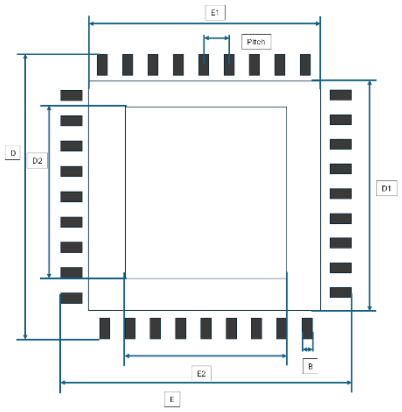
Orderable Part Number	Min Input Voltage	Max Input Voltage	Max Output Frequency	Min Operating Temperature	Max Operating Temperature	RAM Size	Memory Size	Interface	Number of ADC Channels	Number of I2C Channels	Number of SPI Channels	Number of UART Channels	Number of Timers/Counters
R5F212A7SNFA#V2	2.2 V	5.5 V	20 MHz	-20 °C	+85 °C	2.5 KB	48 KB	UART,I2C,LIN,SSU	10-bit X 12-Ch	1	0	3	8-bit X 3-Ch, 16-bit X 4-Ch
R5F212A7SNFP#V2	2.2 V	5.5 V	20 MHz	-20 °C	+85 °C	2.5 KB	48 KB	UART,I2C,LIN,SSU	10-bit X 12-Ch	1	0	3	8-bit X 3-Ch, 16-bit X 4-Ch
R5F212A7SNFP#X6	2.2 V	5.5 V	20 MHz	-20 °C	+85 °C	2.5 KB	48 KB	UART,I2C,LIN,SSU	10-bit X 12-Ch	1	0	3	8-bit X 3-Ch, 16-bit X 4-Ch
R5F212A8SNFA#V2	2.2 V	5.5 V	20 MHz	-20 °C	+85 °C	3 KB	64 KB	UART,I2C,LIN,SSU	10-bit X 12-Ch	1	0	3	8-bit X 3-Ch, 16-bit X 4-Ch
R5F212A8SNFP#V2	2.2 V	5.5 V	20 MHz	-20 °C	+85 °C	3 KB	64 KB	UART,I2C,LIN,SSU	10-bit X 12-Ch	1	0	3	8-bit X 3-Ch, 16-bit X 4-Ch
R5F212AASNFA#V2	2.2 V	5.5 V	20 MHz	-20 °C	+85 °C	7 KB	96 KB	UART,I2C,LIN,SSU	10-bit X 12-Ch	1	0	3	8-bit X 3-Ch, 16-bit X 4-Ch
R5F212AASNFP#V2	2.2 V	5.5 V	20 MHz	-20 °C	+85 °C	7 KB	96 KB	UART,I2C,LIN,SSU	10-bit X 12-Ch	1	0	3	8-bit X 3-Ch, 16-bit X 4-Ch
R5F212ACSNFA#V2	2.2 V	5.5 V	20 MHz	-20 °C	+85 °C	7.5 KB	128 KB	UART,I2C,LIN,SSU	10-bit X 12-Ch	1	0	3	8-bit X 3-Ch, 16-bit X 4-Ch
R5F212ACSNFP#V2	2.2 V	5.5 V	20 MHz	-20 °C	+85 °C	7.5 KB	128 KB	UART,I2C,LIN,SSU	10-bit X 12-Ch	1	0	3	8-bit X 3-Ch, 16-bit X 4-Ch
R5F212ACSNFP#X6	2.2 V	5.5 V	20 MHz	-20 °C	+85 °C	7.5 KB	128 KB	UART,I2C,LIN,SSU	10-bit X 12-Ch	1	0	3	8-bit X 3-Ch, 16-bit X 4-Ch
R5F212B7SNFA#V2	2.2 V	5.5 V	20 MHz	-20 °C	+85 °C	2.5 KB	48 KB	UART,I2C,LIN,SSU	10-bit X 12-Ch	1	0	3	8-bit X 3-Ch, 16-bit X 4-Ch
R5F212B7SNFP#V2	2.2 V	5.5 V	20 MHz	-20 °C	+85 °C	2.5 KB	48 KB	UART,I2C,LIN,SSU	10-bit X 12-Ch	1	0	3	8-bit X 3-Ch, 16-bit X 4-Ch
R5F212B8SNFA#V2	2.2 V	5.5 V	20 MHz	-20 °C	+85 °C	3 KB	64 KB	UART,I2C,LIN,SSU	10-bit X 12-Ch	1	0	3	8-bit X 3-Ch, 16-bit X 4-Ch
R5F212B8SNFP#V2	2.2 V	5.5 V	20 MHz	-20 °C	+85 °C	3 KB	64 KB	UART,I2C,LIN,SSU	10-bit X 12-Ch	1	0	3	8-bit X 3-Ch, 16-bit X 4-Ch
R5F212BASNFA#V2	2.2 V	5.5 V	20 MHz	-20 °C	+85 °C	7 KB	96 KB	UART,I2C,LIN,SSU	10-bit X 12-Ch	1	0	3	8-bit X 3-Ch, 16-bit X 4-Ch
R5F212BASNFP#V2	2.2 V	5.5 V	20 MHz	-20 °C	+85 °C	7 KB	96 KB	UART,I2C,LIN,SSU	10-bit X 12-Ch	1	0	3	8-bit X 3-Ch, 16-bit X 4-Ch
R5F212BASNFP#X6	2.2 V	5.5 V	20 MHz	-20 °C	+85 °C	7 KB	96 KB	UART,I2C,LIN,SSU	10-bit X 12-Ch	1	0	3	8-bit X 3-Ch, 16-bit X 4-Ch

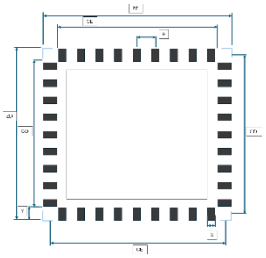
Orderable Part Number	Min Input Voltage	Max Input Voltage	Max Output Frequency	Min Operating Temperature	Max Operating Temperature	RAM Size	Memory Size	Interface	Number of ADC Channels	Number of I2C Channels	Number of SPI Channels	Number of UART Channels	Number of Timers/Counters
R5F212BCSNFP#V2	2.2 V	5.5 V	20 MHz	-20 °C	+85 °C	7.5 KB	128 KB	UART,I2C,LIN,SSU	10-bit X 12-Ch	1	0	3	8-bit X 3-Ch, 16-bit X 4-Ch
R5F212BCSNFP#X6	2.2 V	5.5 V	20 MHz	-20 °C	+85 °C	7.5 KB	128 KB	UART,I2C,LIN,SSU	10-bit X 12-Ch	1	0	3	8-bit X 3-Ch, 16-bit X 4-Ch
R5F212A7SDFP#V2	2.2 V	5.5 V	20 MHz	-40 °C	+85 °C	2.5 KB	48 KB	UART,I2C,LIN,SSU	10-bit X 12-Ch	1	0	3	8-bit X 3-Ch, 16-bit X 4-Ch
R5F212A8SDFP#V2	2.2 V	5.5 V	20 MHz	-40 °C	+85 °C	3 KB	64 KB	UART,I2C,LIN,SSU	10-bit X 12-Ch	1	0	3	8-bit X 3-Ch, 16-bit X 4-Ch
R5F212AASDFP#V2	2.2 V	5.5 V	20 MHz	-40 °C	+85 °C	7 KB	96 KB	UART,I2C,LIN,SSU	10-bit X 12-Ch	1	0	3	8-bit X 3-Ch, 16-bit X 4-Ch
R5F212ACSDFP#V2	2.2 V	5.5 V	20 MHz	-40 °C	+85 °C	7.5 KB	128 KB	UART,I2C,LIN,SSU	10-bit X 12-Ch	1	0	3	8-bit X 3-Ch, 16-bit X 4-Ch
R5F212B7SDFP#V2	2.2 V	5.5 V	20 MHz	-40 °C	+85 °C	2.5 KB	48 KB	UART,I2C,LIN,SSU	10-bit X 12-Ch	1	0	3	8-bit X 3-Ch, 16-bit X 4-Ch
R5F212B8SDFP#V2	2.2 V	5.5 V	20 MHz	-40 °C	+85 °C	3 KB	64 KB	UART,I2C,LIN,SSU	10-bit X 12-Ch	1	0	3	8-bit X 3-Ch, 16-bit X 4-Ch
R5F212BASDFP#V2	2.2 V	5.5 V	20 MHz	-40 °C	+85 °C	7 KB	96 KB	UART,I2C,LIN,SSU	10-bit X 12-Ch	1	0	3	8-bit X 3-Ch, 16-bit X 4-Ch
R5F212BCSDFA#V2	2.2 V	5.5 V	20 MHz	-40 °C	+85 °C	7.5 KB	128 KB	UART,I2C,LIN,SSU	10-bit X 12-Ch	1	0	3	8-bit X 3-Ch, 16-bit X 4-Ch
R5F212BCSDFP#V2	2.2 V	5.5 V	20 MHz	-40 °C	+85 °C	7.5 KB	128 KB	UART,I2C,LIN,SSU	10-bit X 12-Ch	1	0	3	8-bit X 3-Ch, 16-bit X 4-Ch

A.4 Footprint Design Information

A.4.1 64-LFQFP

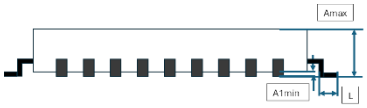
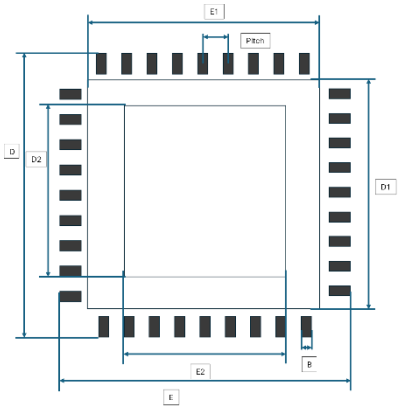
IPC Footprint Type	Package Code/ POD number	Number of Pins
QFP	PLQP0064KB-A	64

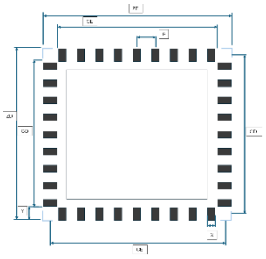
Description	Dimension	Value (mm)	Diagram
Minimum lead span (vertical side)	Dmin	12.2	
Maximum lead span (vertical side)	Dmax	12.2	
Minimum lead span (horizontal side)	Emin	12.2	
Maximum lead span (horizontal side)	Emax	12.2	
Minimum body span (vertical side)	D1min	10.1	
Maximum body span (vertical side)	D1max	10.1	
Minimum body span (horizontal side)	E1min	10.1	
Maximum body span (horizontal side)	E1max	10.1	
Minimum Lead Width	Bmin	0.15	
Maximum Lead Width	Bmax	0.25	
Minimum Lead Length	Lmin	0.35	
Maximum Lead Length	Lmax	0.65	
Maximum Height	Amax	-	
Minimum Standoff Height	A1min	-	
Minimum Lead Thickness	cmin	0.09	
Maximum Lead Thickness	cmax	0.2	
Number of pins (vertical side)	PinCountD	16	
Number of pins (horizontal side)	PinCountE	16	
Distance between the center of any two adjacent pins	Pitch	0.5	
Location of pin 1; S2 = corner of D side, C1 = center of E side	Pin1	S2	
Minimum thermal pad size (vertical side)	D2min	-	
Maximum thermal pad size (vertical side)	D2max	-	
Minimum thermal pad size (horizontal side)	E2min	-	
Maximum thermal pad size (horizontal side)	E2max	-	

Recommended Land Pattern (NSMD Design)			
Description	**Dimension**	**Value (mm)**	**Diagram**
Distance between left pad toe to right pad toe (horizontal side)	ZE	-	
Distance between top pad toe to bottom pad toe (vertical side)	ZD	-	
Distance between left pad heel to right pad heel (horizontal side)	GE	-	
Distance between top pad heel to bottom pad heel (vertical side)	GD	-	
Pad Width	X	-	
Pad Length	Y	-	

A.4.1 **64-LQFP**

IPC Footprint Type	Package Code/ POD number	Number of Pins
QFP	PLQP0064GA-A	64

Description	Dimension	Value (mm)	Diagram
Minimum lead span (vertical side)	Dmin	15.8	
Maximum lead span (vertical side)	Dmax	16.2	
Minimum lead span (horizontal side)	Emin	15.8	
Maximum lead span (horizontal side)	Emax	16.2	
Minimum body span (vertical side)	D1min	14.1	
Maximum body span (vertical side)	D1max	14.1	
Minimum body span (horizontal side)	E1min	14.1	
Maximum body span (horizontal side)	E1max	14.1	
Minimum Lead Width	Bmin	0.32	
Maximum Lead Width	Bmax	0.45	
Minimum Lead Length	Lmin	0.3	
Maximum Lead Length	Lmax	0.7	
Maximum Height	Amax	1.7	
Minimum Standoff Height	A1min	0	
Minimum Lead Thickness	cmin	-	
Maximum Lead Thickness	cmax	-	
Number of pins (vertical side)	PinCountD	16	
Number of pins (horizontal side)	PinCountE	16	
Distance between the center of any two adjacent pins	Pitch	0.8	
Location of pin 1; S2 = corner of D side, C1 = center of E side	Pin1	S2	
Minimum thermal pad size (vertical side)	D2min	-	
Maximum thermal pad size (vertical side)	D2max	-	
Minimum thermal pad size (horizontal side)	E2min	-	
Maximum thermal pad size (horizontal side)	E2max	-	

Recommended Land Pattern (NSMD Design)			
Description	**Dimension**	**Value (mm)**	**Diagram**
Distance between left pad toe to right pad toe (horizontal side)	ZE	-	
Distance between top pad toe to bottom pad toe (vertical side)	ZD	-	
Distance between left pad heel to right pad heel (horizontal side)	GE	-	
Distance between top pad heel to bottom pad heel (vertical side)	GD	-	
Pad Width	X	-	
Pad Length	Y	-	