

Package Thermal Characteristics and Weights

Table 1 • Package Thermal Characteristics and Weights

Package Type	Pin Count	θ_{jC}	θ_{jA}			Unit	
			Still Air	1.0 m/s 200 ft/min	2.5 m/s 500 ft/min		
Ceramic Pin Grid Array (CPGA)	84	6.0	33.0	27.2	24.7	C/W	
	100	5.2	27.0	22.2	20.2	C/W	
	132	4.8	25.0	20.6	18.7	C/W	
	175	4.6	23.0	19.0	17.2	C/W	
	176	4.6	23.0	19.0	17.2	C/W	
	207	3.5	21.0	17.3	15.7	C/W	
	257	2.8	15.0	12.4	11.2	C/W	
Ceramic Quad Flat Package (CQFP)1 - Cavity Up	84	2.0	40.0	33.0	30.0	C/W	
	132	2.0	35.0	28.8	26.2	C/W	
	172	2.0	28.0	23.1	21.0	C/W	
	196	2.0	23.0	19.0	17.2	C/W	
	208	2.0	22.0	19.8	18.0	C/W	
	256	2.0	20.0	16.5	15.0	C/W	
	352	2.0	17.9	16.1	14.7	C/W	
	- Cavity Up with Heatsink	208	0.5	21.0	17.3	15.7	C/W
		256	0.5	19.0	15.7	14.2	C/W
Chip Carrier Land Grid (CCLG)1, 2	256	1.1	12.1	10.0	9.1	C/W	
Ceramic Column Grid Array (CCGA)3	624	6.5	8.9	8.5	8.0	C/W	
Plastic Leaded Chip Carrier (PLCC)	44	16.0	30.0	24.5	22.0	C/W	
	68	13.0	25.0	21.0	19.4	C/W	
	84	12.0	22.5	18.9	17.6	C/W	
Plastic Quad Flat Package (PQFP)	100	12.0	27.8	23.4	21.2	C/W	
	144	10.0	26.2	22.8	21.1	C/W	
	160	10.0	26.2	22.8	21.1	C/W	
	208	8.0	26.1	22.5	20.8	C/W	
	240	8.0	25.6	22.3	20.8	C/W	
PQFP with embedded Heat Spreader	208	3.8	16.2	13.3	11.9	C/W	
	240	3.5	15.9	13.1	11.7	C/W	

1. θ_{jC} for CQFP and CCLG packages refers to the thermal resistance between the junction and the bottom of the package.
2. θ_{jC} for CG624 refers to the thermal resistance between the junction and the top of the package.
3. Thermal resistance from junction to board (θ_{jB}) for CG624 is 3.4 C/W.

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Package Type	Pin Count	θ_{jc}	θ_{ja}			Unit
			Still Air	1.0 m/s 200 ft/min	2.5 m/s 500 ft/min	
Thin Quad Flat Package (TQFP, 1.4mm)	64	12.0	42.4	36.3	34.0	C/W
	100	14.0	33.5	27.4	25.0	C/W
	144	11.0	33.5	28.0	25.7	C/W
	176	11.0	24.7	19.9	18.0	C/W
Very Thin Quad Flat Package (VQFP)	80	12.0	38.2	31.9	29.4	C/W
	100	10.0	35.3	29.4	27.1	C/W
Plastic Power Quad Flat Package (RQFP)	208	0.4	16.5	13.5	10.5	C/W
	240	0.3	16.0	12.5	10.0	C/W
Plastic Ball Grid Array (PBGA)	272	3.0	18.3	14.9	13.9	C/W
	313	3.0	16.6	13.5	12.5	C/W
	329	3.0	17.1	13.8	12.8	C/W
	456	3.0	15.6	12.5	11.6	C/W
	729	2.2	13.7	10.6	9.6	C/W
Fine Pitch Ball Grid Array (FBGA) - peripheral array - full array	144	3.8	26.9	22.9	21.5	C/W
	256	3.8	26.6	22.8	21.5	C/W
	324	3.4	25.8	22.1	18.9	C/W
	484	3.2	18.0	14.7	13.6	C/W
	484	3.2	20.5	17.0	15.9	C/W
	676	3.2	16.4	13.0	12.0	C/W
	896	2.4	13.6	10.4	9.4	C/W
	1152	1.8	12.0	8.9	7.9	C/W
Chip Scale Package (CS)	49		72.2	59.5	54.1	C/W
	128		54.1	44.6	40.6	C/W
	180		57.8	47.6	43.3	C/W
Quad Flat No Lead (QFN)	132	13.2	28.9	24.6	23.1	C/W

1. θ_{jc} for CQFP and CCLG packages refers to the thermal resistance between the junction and the bottom of the package.
2. θ_{jc} for CG624 refers to the thermal resistance between the junction and the top of the package.
3. Thermal resistance from junction to board (θ_{jb}) for CG624 is 3.4 C/W.

Package Weights

The following table gives approximate weights for Actel packages. Actel recommends that you weigh the parts yourself for more accurate values. Package weights may vary from lot to lot.

Table 2 • Package Weights

Package	Weight (grams)
84 CPGA	8.0
132 CPGA	11.0
175 CPGA	19.0
176 CPGA	19.0
207 CPGA	24.5
257 CPGA	27.3
84 CQFP	2.2
132 CQFP	5.8
172 CQFP	8.8
196 CQFP	11.1
208 CQFP	8.8
208 CQFP cavity up with heat sink	18.5
256 CQFP	13.0
256 CQFP cavity up with heat sink	20.2
352 CQFP	27.4
624 CCGA	13.28
256 CCLG	1.64
44 PLCC	2.4
68 PLCC	4.6
84 PLCC	6.8
100 PQFP	1.6
144 PQFP	5.2
160 PQFP	5.3
208 PQFP	5.2
208 PQFP DX	6.4
240 PQFP	7.0
240 PQFP DX	8.4
64 TQFP	0.3
100 TQFP	0.4
144 TQFP	1.3
176 TQFP	1.8
80 VQFP	0.5

Table 2 • Package Weights

Package	Weight (grams)
100 VQFP	0.5
208 RQFP	10.0
240 RQFP	13.0
272 PBGA	2.8
313 PBGA	3.7
329 PBGA	3.4
456 PBGA	4.6
729 PBGA	4.86
144 FBGA	0.3
256 FBGA	0.9
324 FBGA	2.1
484 FBGA	2.7
676 FBGA	3.0
896 FBGA	3.8
1152 FBGA	4.8
49 CSP	0.1
128 CSP	0.3
180 CSP	0.4
132 QFN	0.1

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