



IC to Probe Guide

2. PACKAGE OUTLINE DRAWINGS

2.1 20-, 28-, 44-, 68-, and 84-Pin PLCC

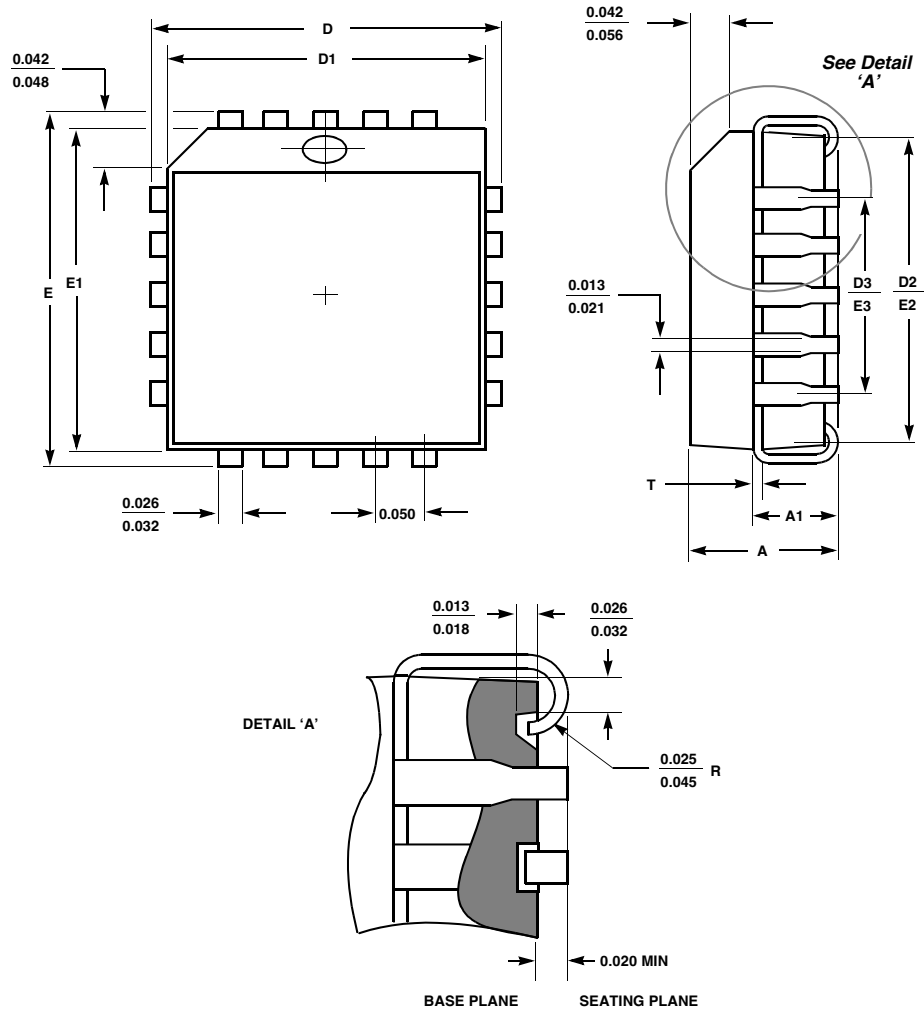
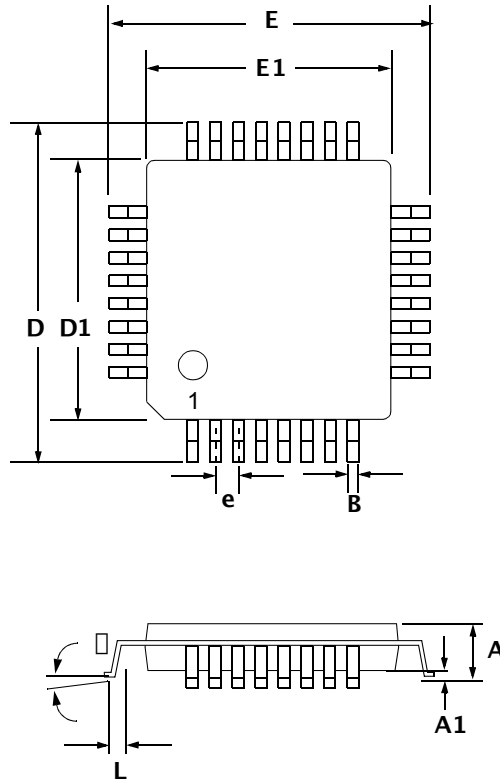


Table 2-1. 20-, 28-, 44-, 68-, and 84-Pin PLCC Package Dimensions

	Number of Pins									
	20		28		44		68		84	
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
A	0.165	0.180	0.165	0.180	0.165	0.180	0.165	0.200	0.165	0.200
A1	0.090	0.120	0.090	0.120	0.090	0.120	0.090	0.130	0.090	0.130
D	0.385	0.395	0.485	0.495	0.685	0.695	0.985	0.995	1.185	1.195
D1	0.350	0.356	0.450	0.456	0.650	0.656	0.950	0.958	1.150	1.158
D2	0.290	0.330	0.390	0.430	0.590	0.630	0.890	0.930	1.090	1.130
D3	0.200 REF		0.300 REF		0.500 REF		0.800 REF		1.000 REF	
E	0.385	0.395	0.485	0.495	0.685	0.695	0.985	0.995	1.185	1.195
E1	0.350	0.356	0.450	0.456	0.650	0.656	0.950	0.958	1.150	1.158
E2	0.290	0.330	0.390	0.430	0.590	0.630	0.890	0.930	1.090	1.130
E3	0.200 REF		0.300 REF		0.500 REF		0.800 REF		1.000 REF	
T	0.007	0.013	0.0077	0.0103	0.0077	0.0103	0.0077	0.0103	0.0077	0.0103

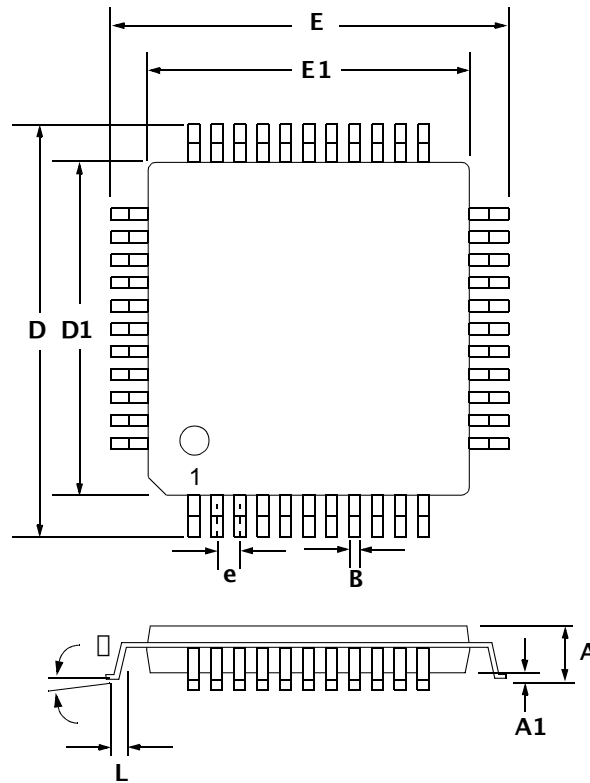
2.2 32-Pin LQFP



DIM	INCHES			MILLIMETERS		
	MIN	NOM	MAX	MIN	NOM	MAX
A	---	0.055	0.063	---	1.40	1.60
A1	0.002	0.004	0.006	0.05	0.10	0.15
B	0.012	0.014	0.018	0.30	0.35	0.45
D	0.343	0.354	0.366	8.70	9.0 BSC	9.30
D1	0.272	0.28	0.280	6.90	7.0 BSC	7.10
E	0.343	0.354	0.366	8.70	9.0 BSC	9.30
E1	0.272	0.28	0.280	6.90	7.0 BSC	7.10
e*	0.028	0.31 BSC	0.035	0.70	0.80 BSC	0.90
L	0.018	0.024	0.030	0.45	0.60	0.75
	0.000°	4°	7.000°	0.00°	4°	7.00°

* Nominal pin pitch is 0.50 mm

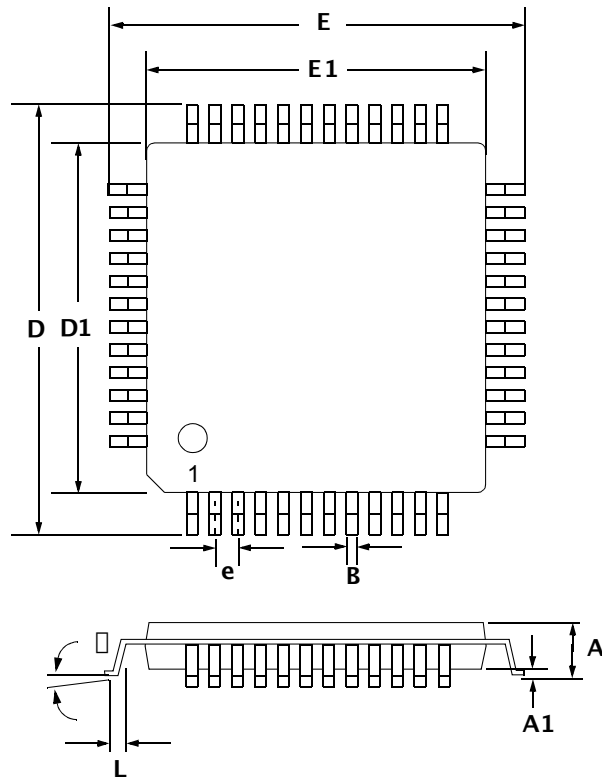
2.3 44-Pin LQFP




DIM	INCHES			MILLIMETERS		
	MIN	NOM	MAX	MIN	NOM	MAX
A	---	0.55	0.065	---	1.40	1.60
A1	0.002	0.004	0.006	0.05	0.10	0.15
B	0.009	0.012	0.015	0.022	0.030	0.038
D	0.478	0.472 BSC	0.502	11.70	12.0 BSC	12.30
D1	0.404	0.393 BSC	0.412	9.90	10.0 BSC	10.10
E	0.478	0.472 BSC	0.502	11.70	12.0 BSC	12.30
E1	0.404	0.393 BSC	0.412	9.90	10.0 BSC	10.10
e*	0.029	0.31 BSC	0.037	0.70	0.80 BSC	0.90
L	0.018	0.024	0.030	0.45	0.60	0.75
	0.000°	4°	7.000°	0.00°	4°	7.00°

* Nominal pin pitch is 0.80 mm

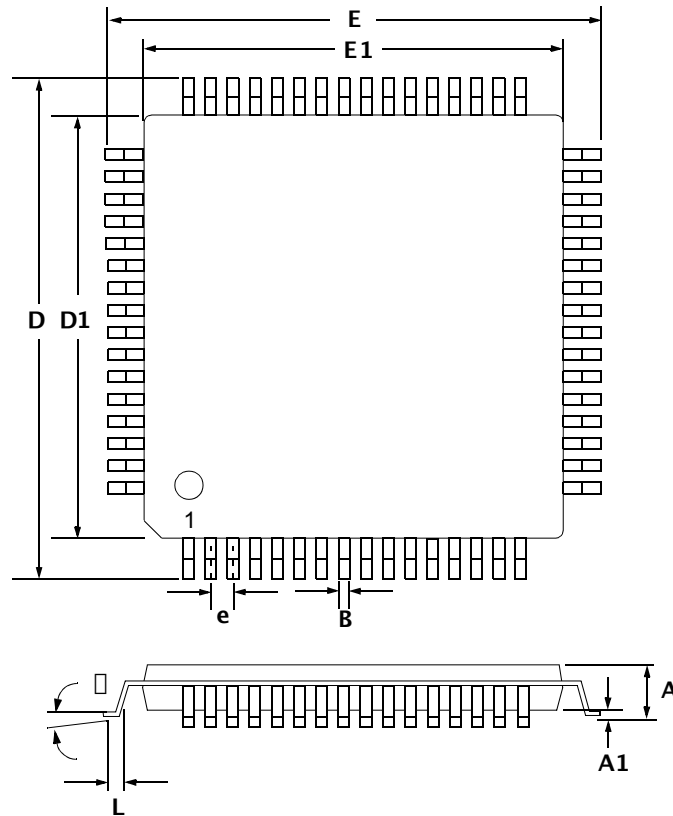
2.4 48-Pin LQFP



DIM	INCHES			MILLIMETERS		
	MIN	NOM	MAX	MIN	NOM	MAX
A	---	0.055	0.063	---	1.40	1.60
A1	0.002	0.004	0.006	0.05	0.10	0.15
B	0.007	0.009	0.011	0.17	0.22	0.27
D	0.343	0.354	0.366	8.70	9.0 BSC	9.30
D1	0.272	0.28	0.280	6.90	7.0 BSC	7.10
E	0.343	0.354	0.366	8.70	9.0 BSC	9.30
E1	0.272	0.28	0.280	6.90	7.0 BSC	7.10
e*	0.016	0.020	0.024	0.40	0.50 BSC	0.60
L	0.018	0.24	0.030	0.45	0.60	0.75
	0.000°	4°	7.000°	0.00°	4°	7.00°

* Nominal pin pitch is 0.50 mm

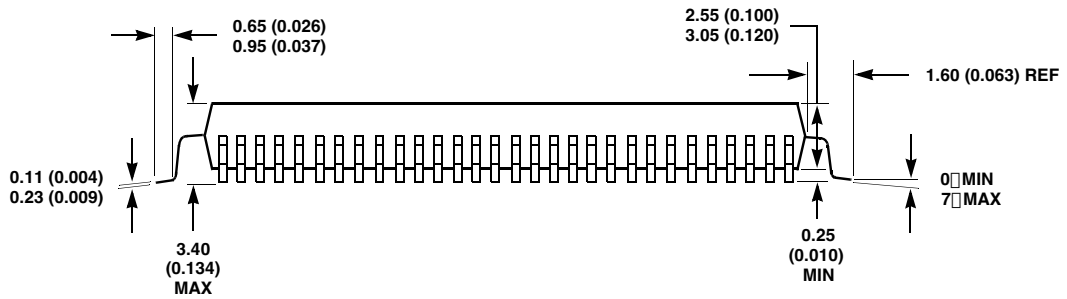
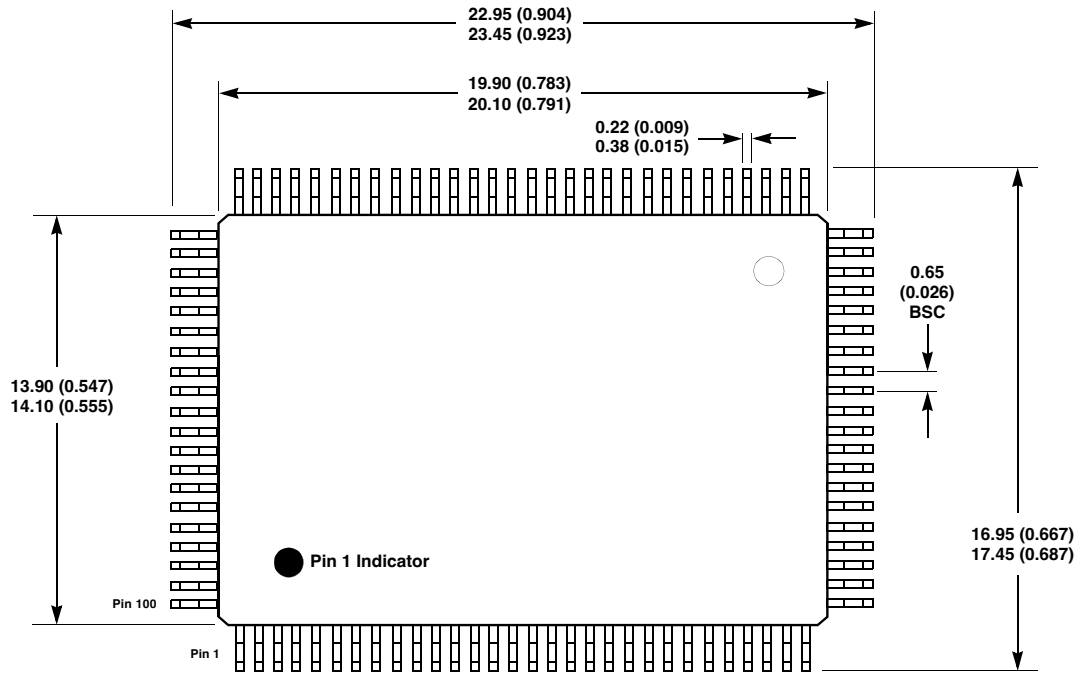
2.5 64-Pin LQFP



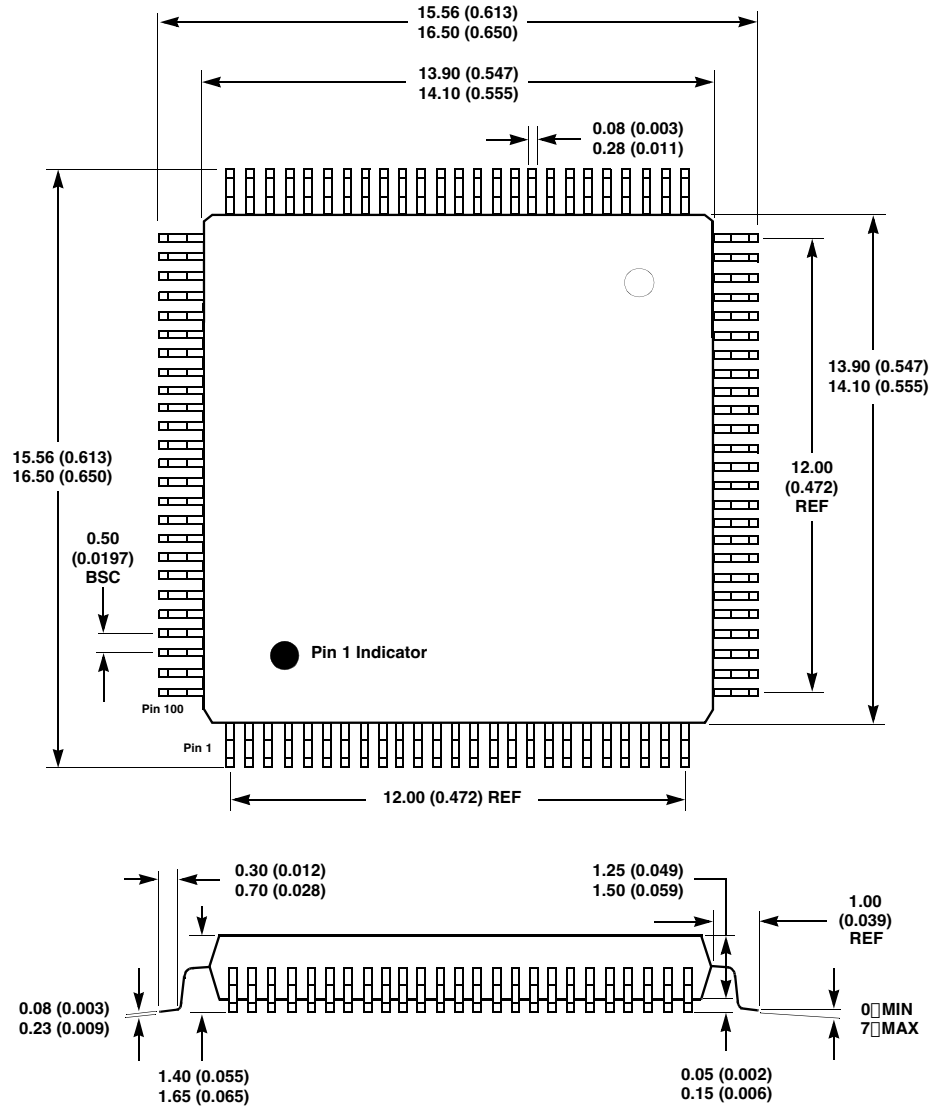
DIM	INCHES			MILLIMETERS		
	MIN	NOM	MAX	MIN	NOM	MAX
A	---	0.55	0.063	---	1.40	1.60
A1	0.002	0.004	0.006	0.05	0.10	0.15
B	0.007	0.008	0.011	0.17	0.20	0.27
D	0.461	0.472 BSC	0.484	11.70	12.0 BSC	12.30
D1	0.390	0.393 BSC	0.398	9.90	10.0 BSC	10.10
E	0.461	0.472 BSC	0.484	11.70	12.0 BSC	12.30
E1	0.390	0.393 BSC	0.398	9.90	10.0 BSC	10.10
e*	0.016	0.020 BSC	0.024	0.40	0.50 BSC	0.60
L	0.018	0.024	0.030	0.45	0.60	0.75
	0.000°	4°	7.000°	0.00°	4°	7.00°

* Nominal pin pitch is 0.50 mm

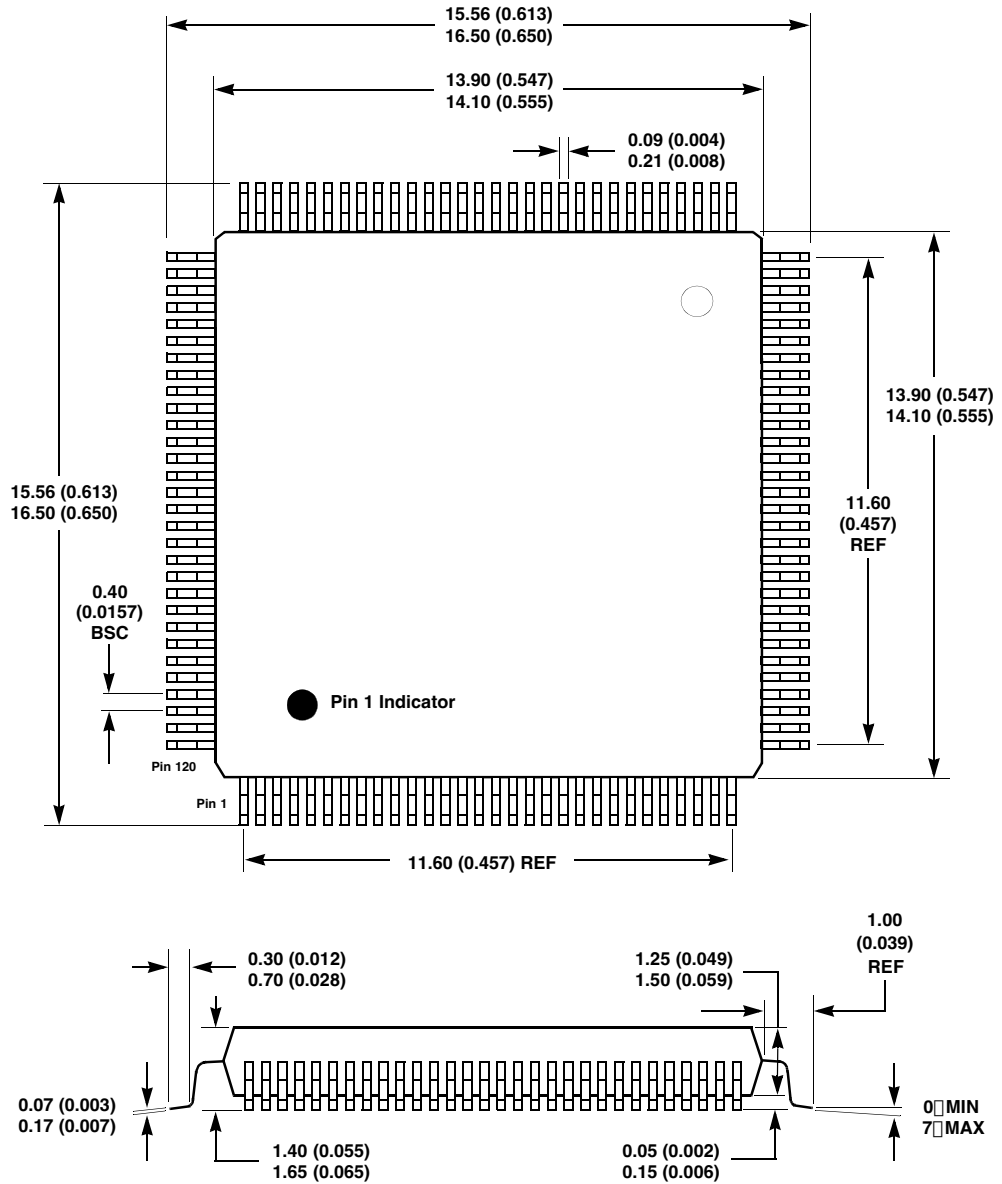
2.7 100-Pin MQFP (14 × 20 × 2.70-mm Body)



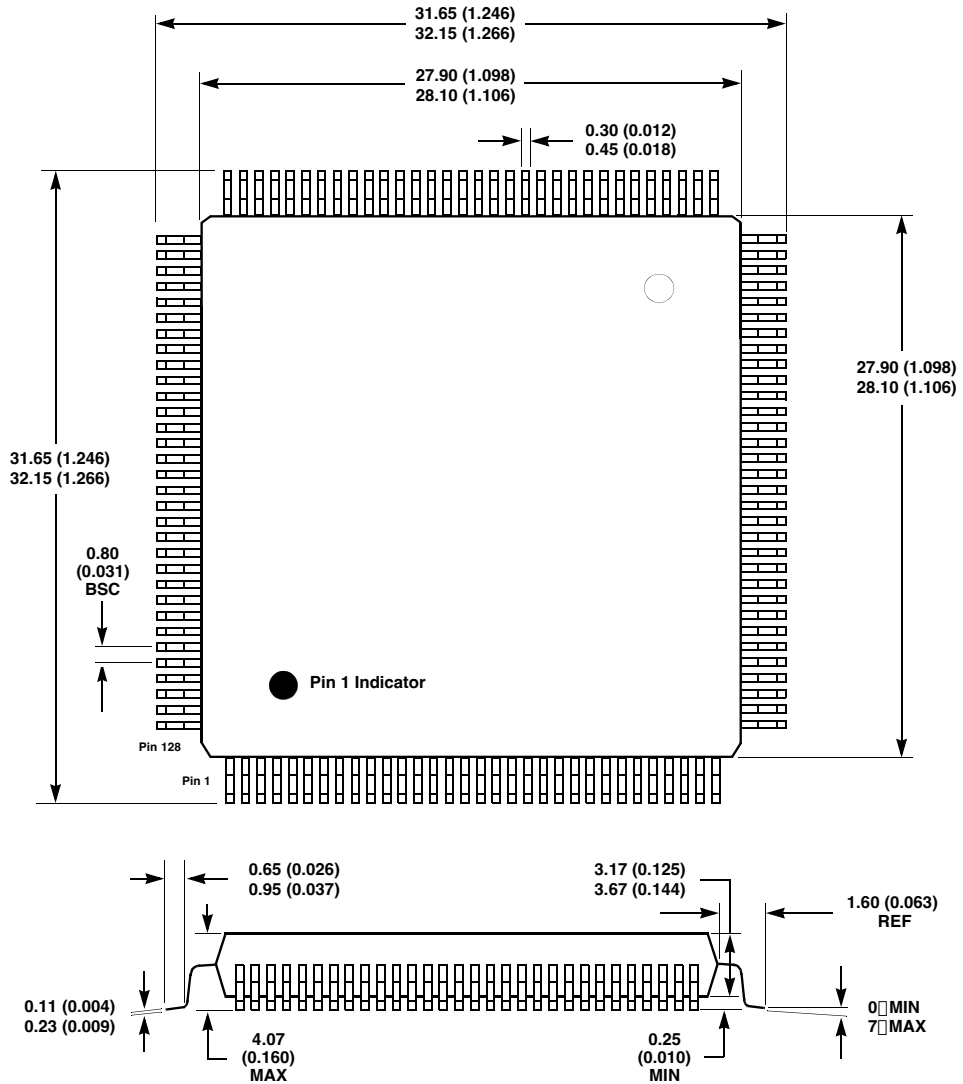
2.8 100-Pin LQFP (14 × 14 × 1.40-mm Body)



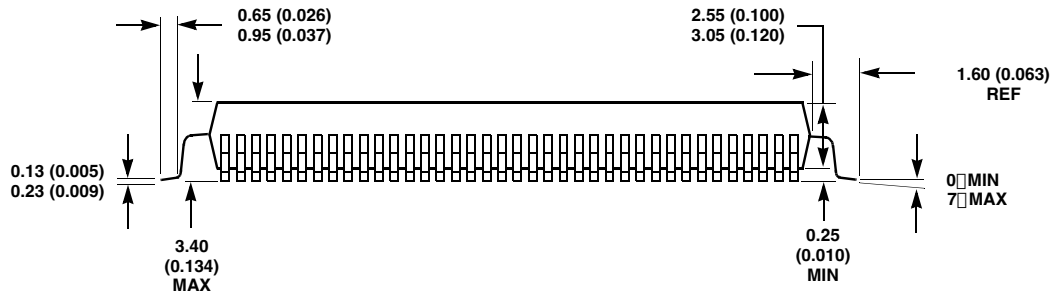
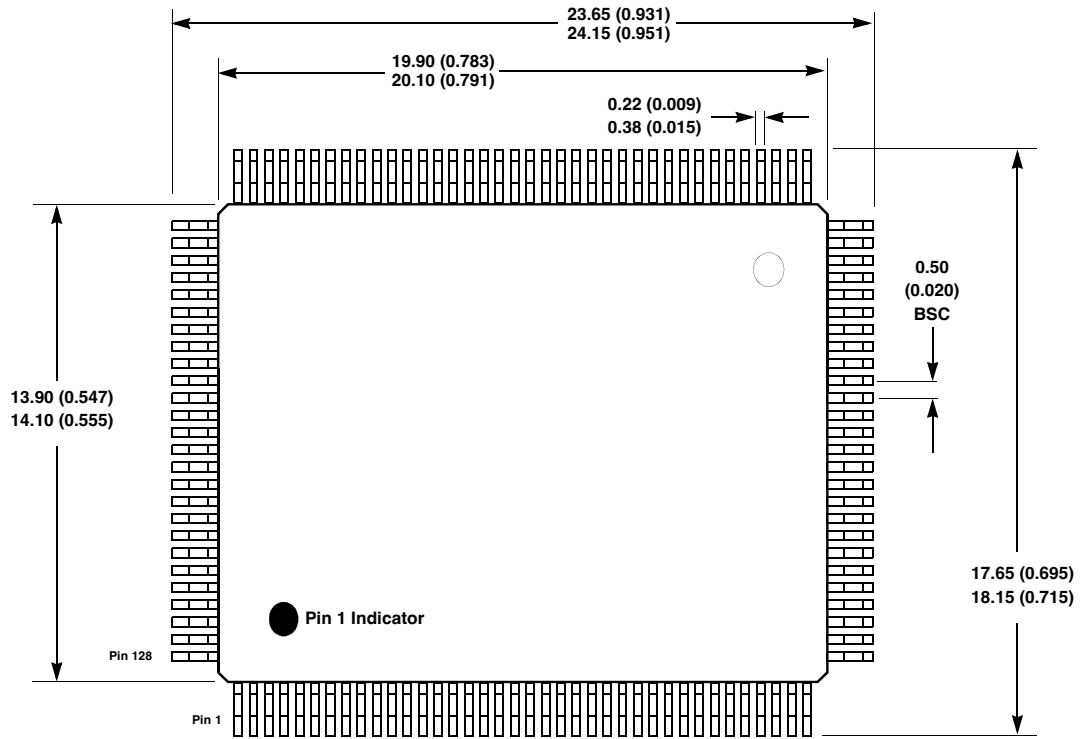
2.9 120-Pin LQFP (14 × 14 × 1.40-mm Body)



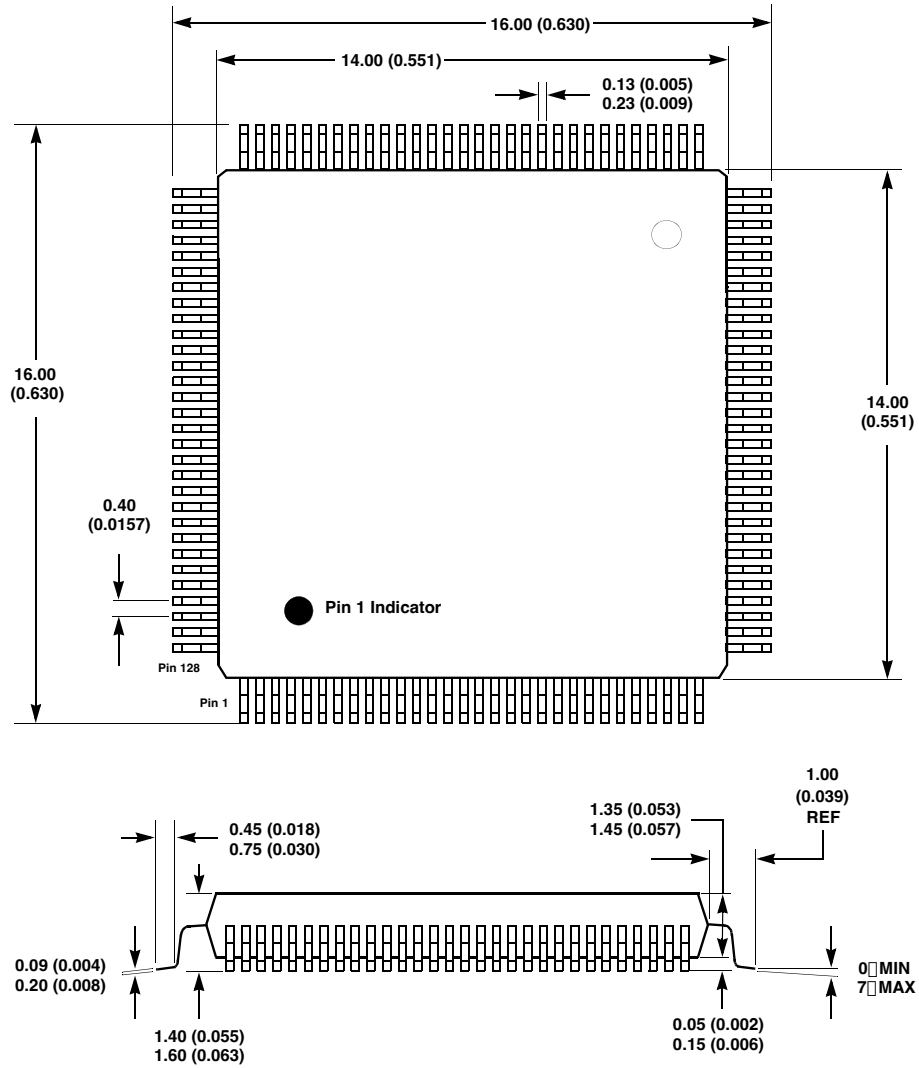
2.10 128-Pin MQFP (28 × 28 × 3.50-mm Body)



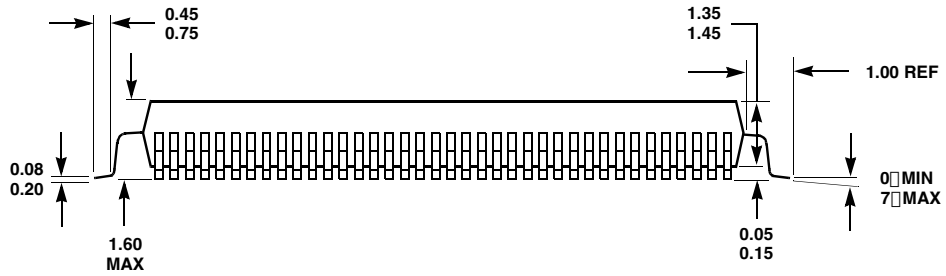
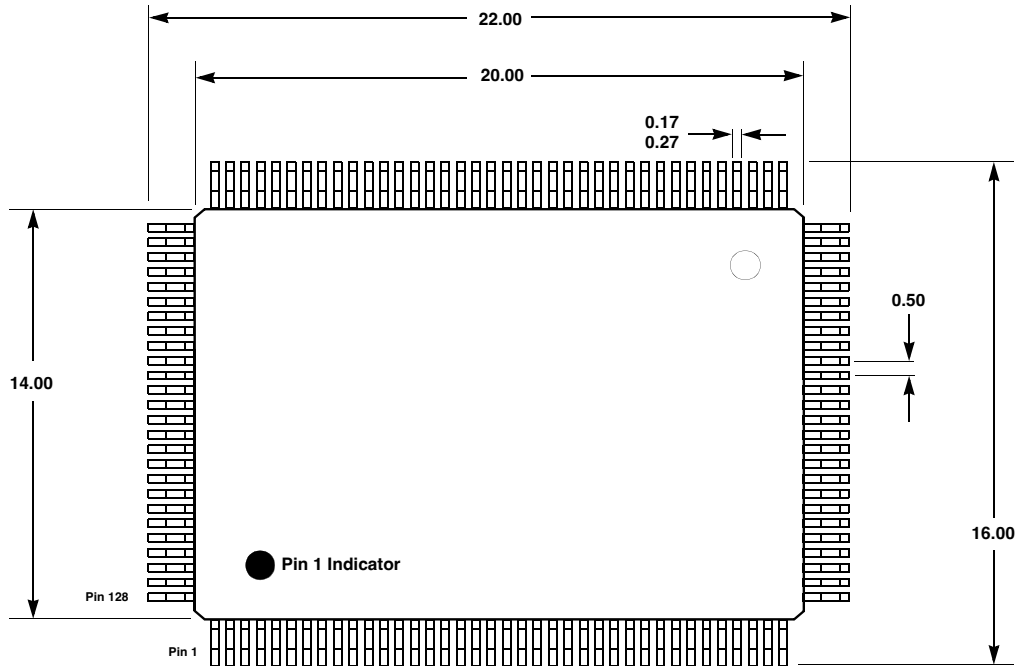
2.11 128-Pin MQFP (14 × 20 × 2.70-mm Body)



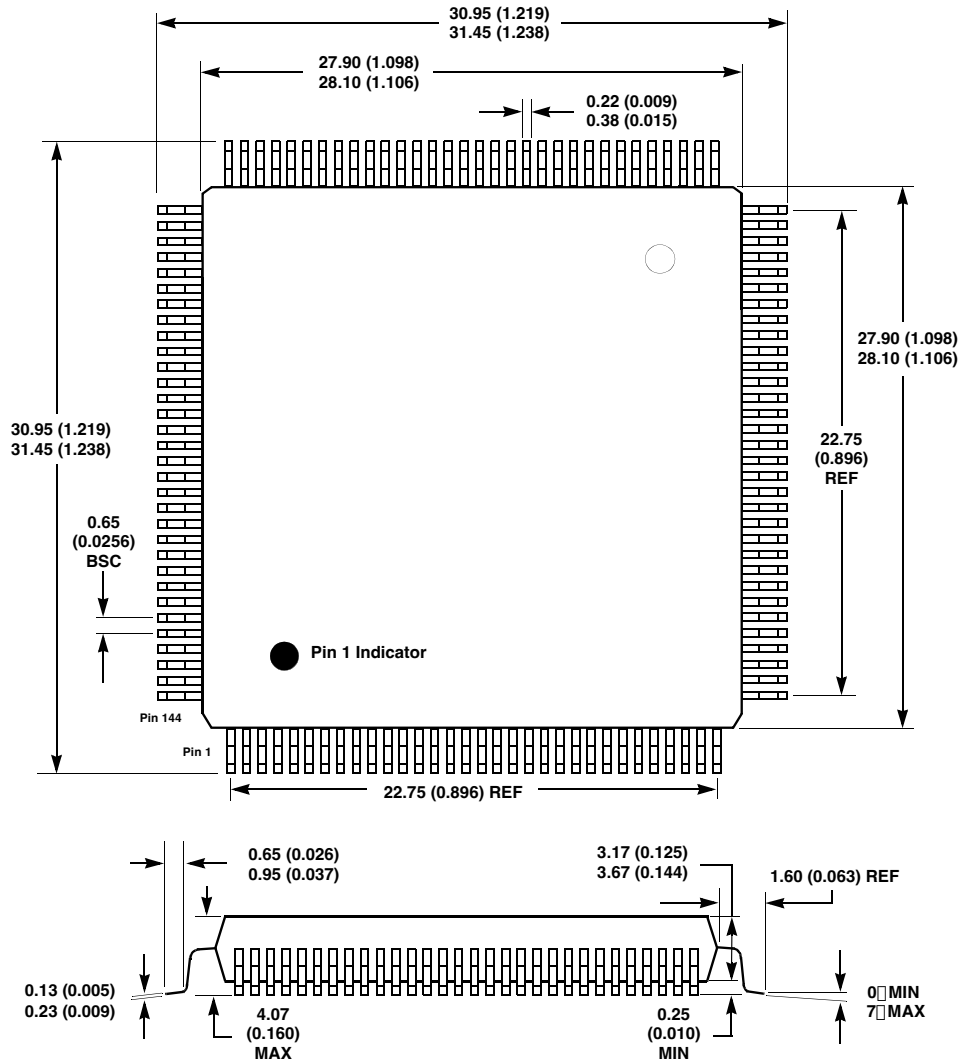
2.12 128-Pin LQFP (14 × 14 × 1.40-mm Body)



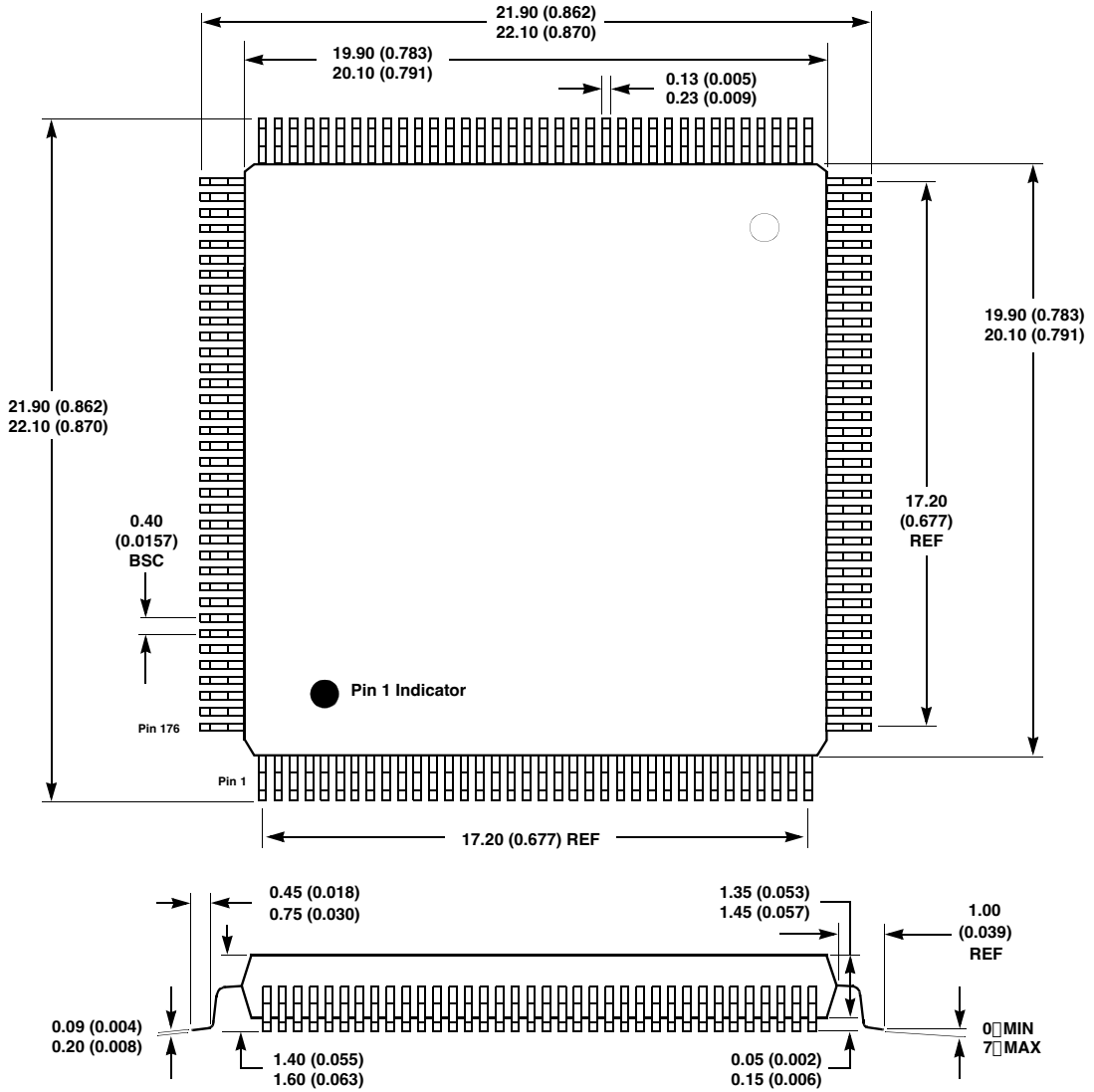
2.13 128-Pin LQFP (14 × 20 × 1.40-mm Body)



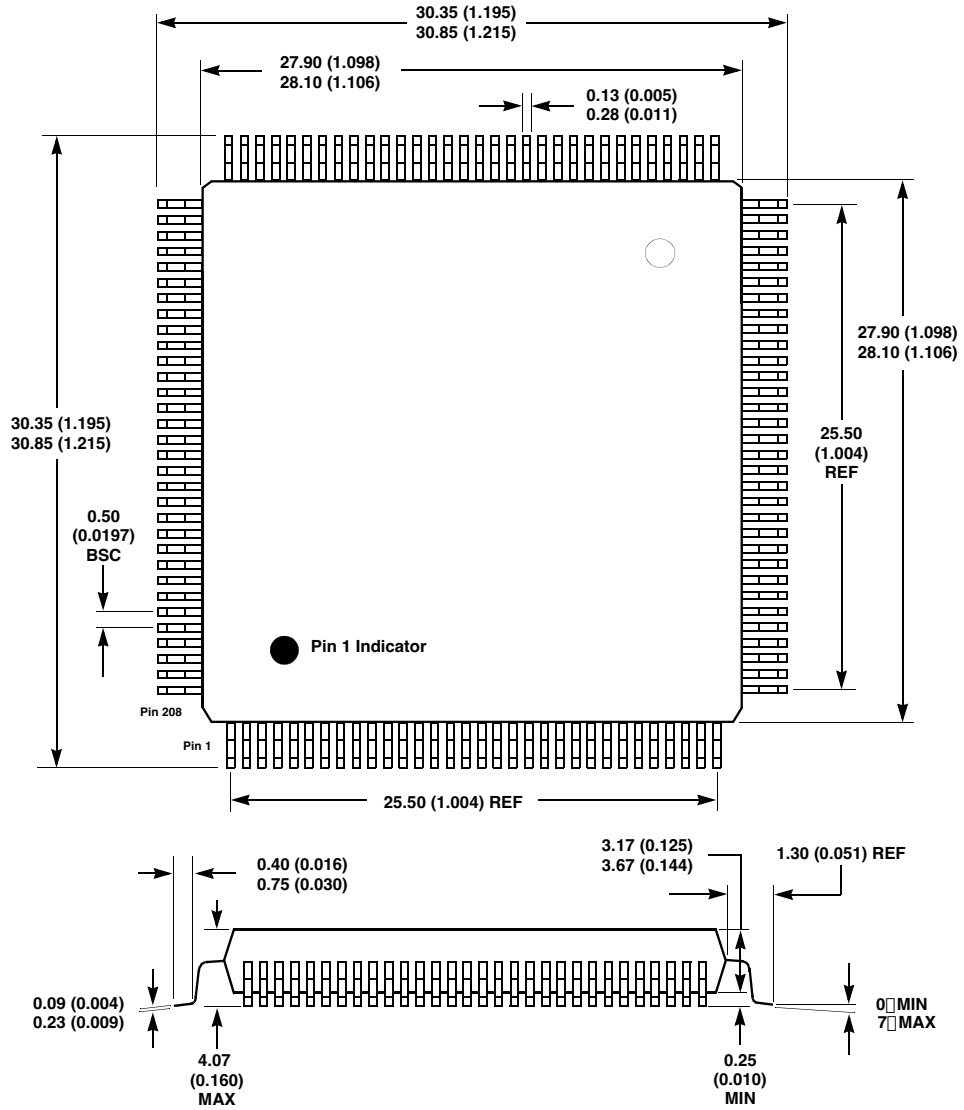
2.14 144-Pin MQFP (28 × 28 × 3.50-mm Body)



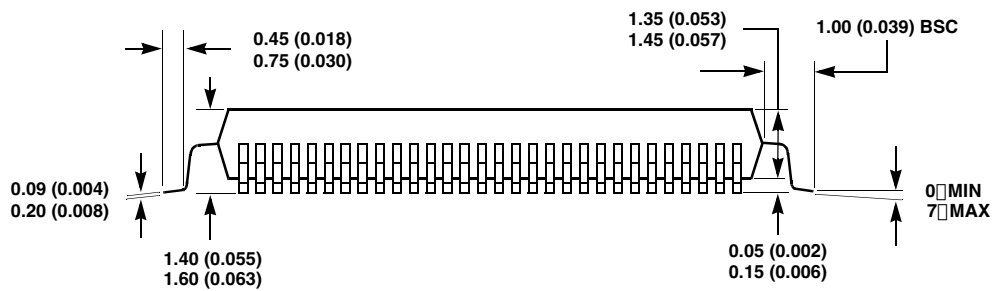
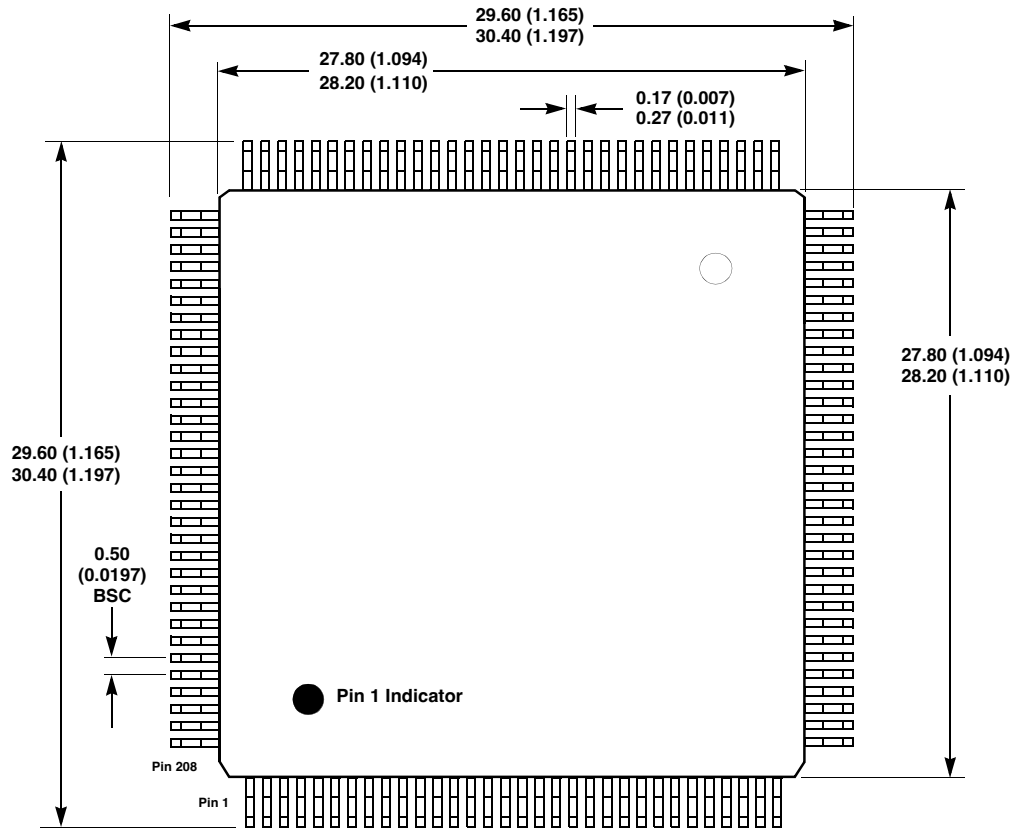
2.17 176-Pin LQFP (20 × 20 × 1.40-mm Body)



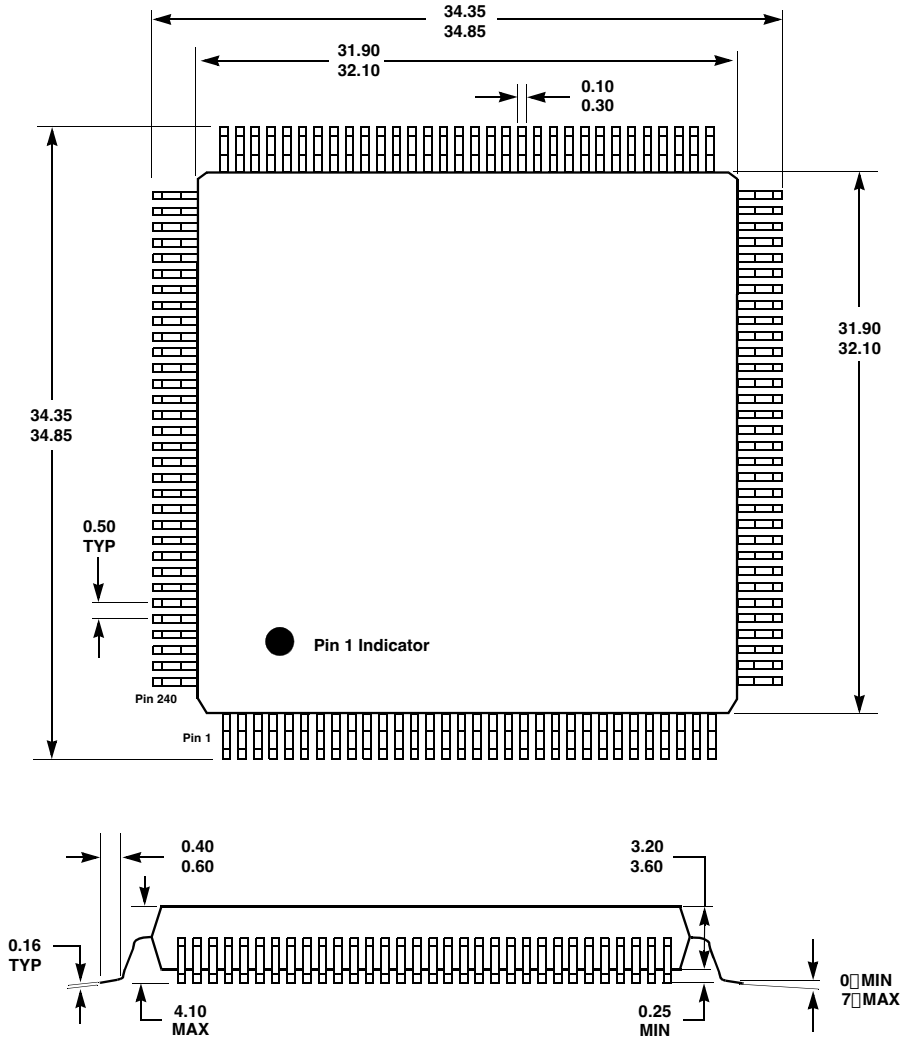
2.20 208-Pin MQFP (28 × 28 × 3.50-mm Body)



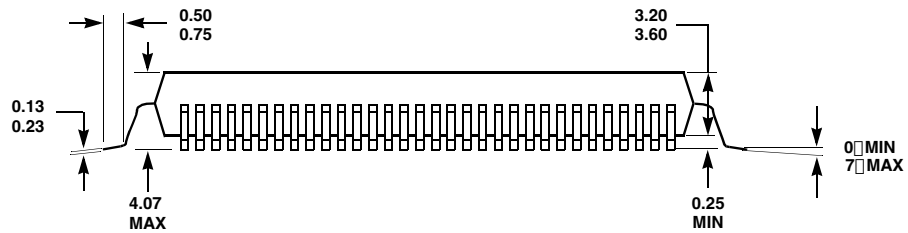
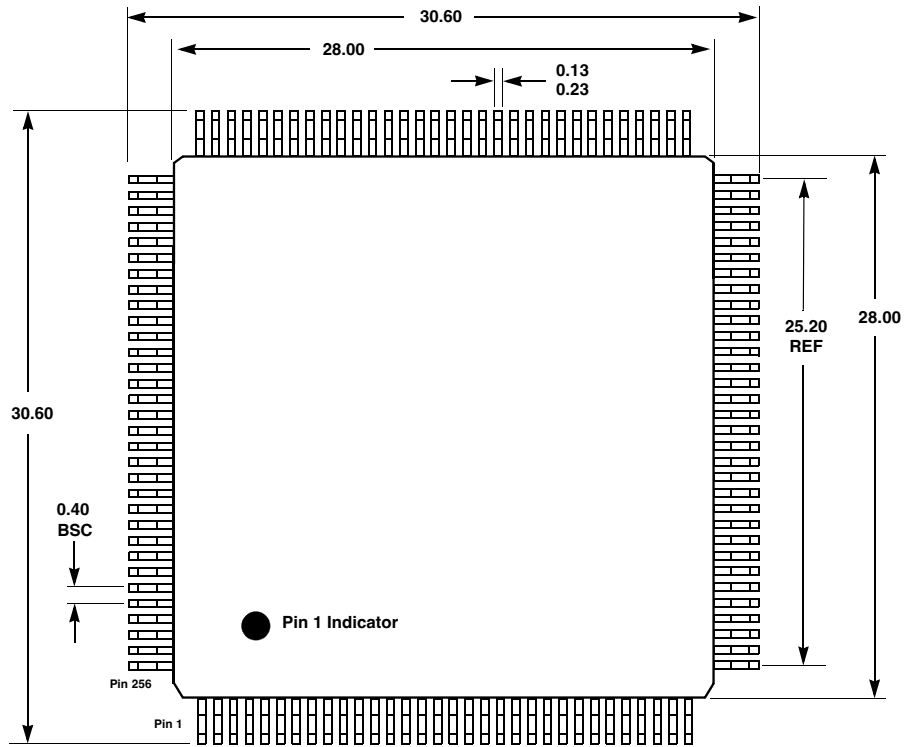
2.21 208-Pin LQFP (28 × 28 × 1.40-mm Body)



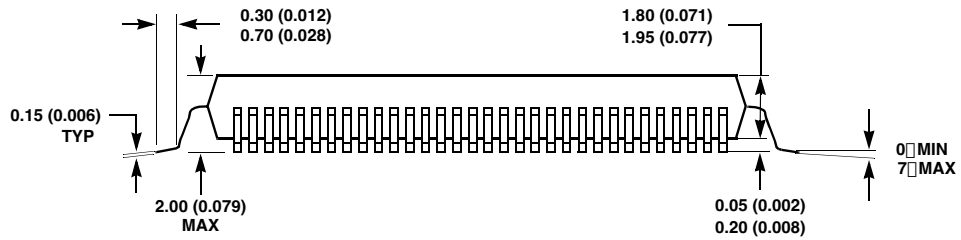
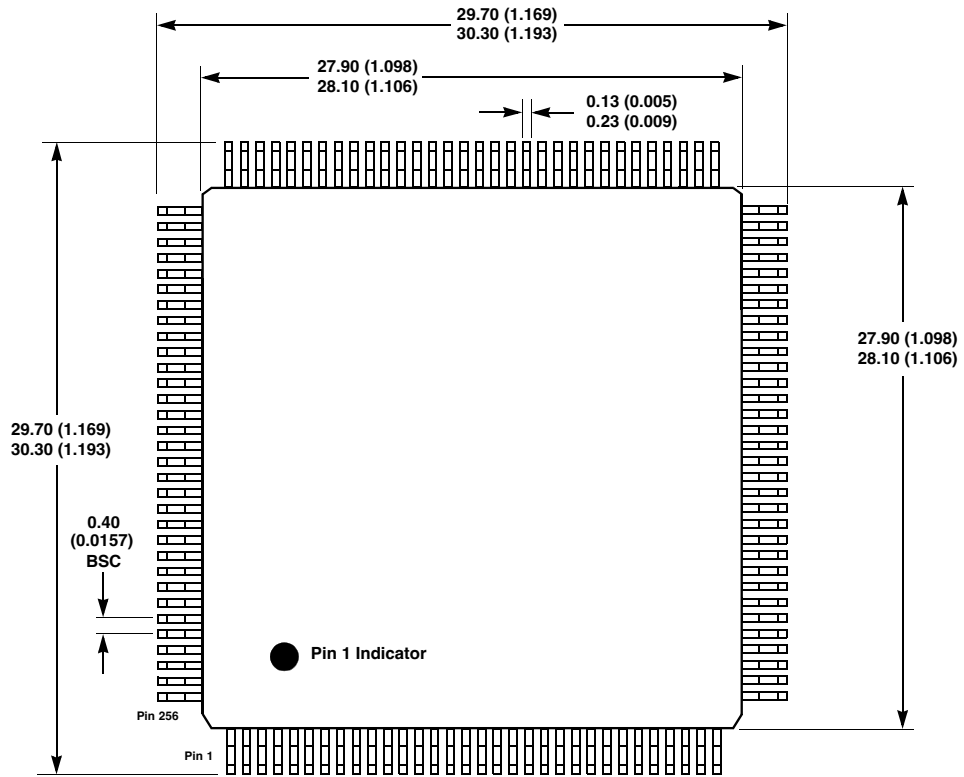
2.22 240-Pin MQFP 32 □ 32 □ 3.50-mm Body)



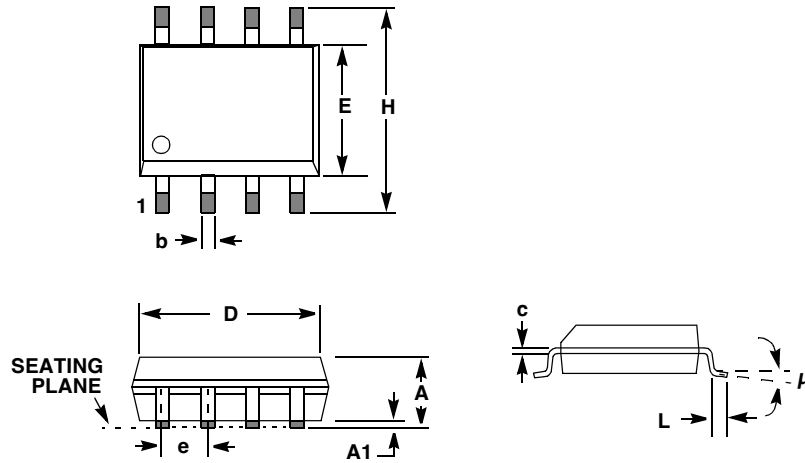
2.23 256-Pin MQFP (28 × 28 × 3.50-mm Body)



2.24 256-Pin LQFP (28 × 28 × 2.00-mm Body)

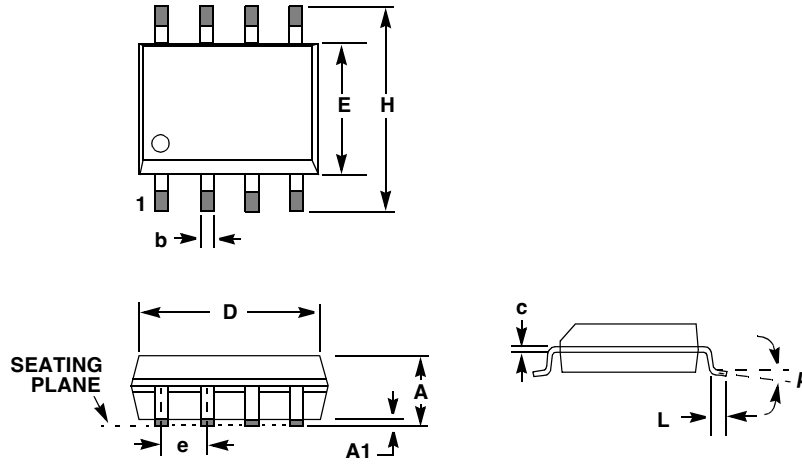


3.10 8-Pin SOIC (150-mm Body)



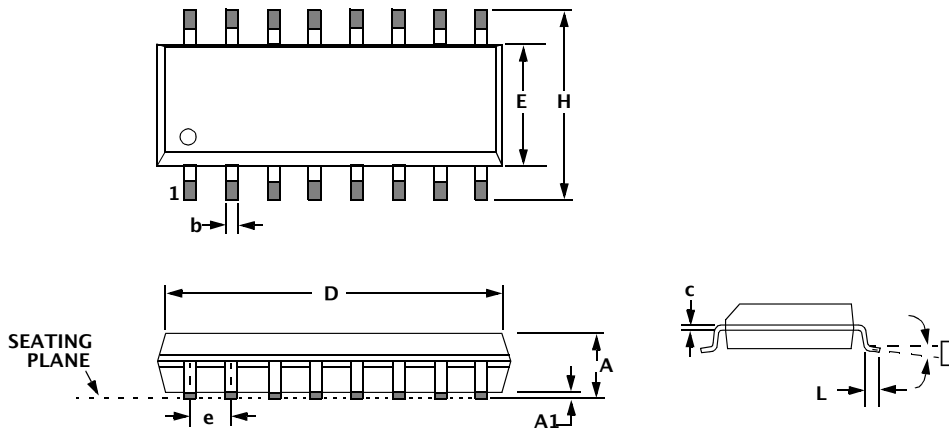
Dimension	Inches		Millimeters	
	MIN	MAX	MIN	MAX
A	0.053	0.069	1.35	1.75
A1	0.004	0.010	0.10	0.25
b	0.013	0.020	0.33	0.51
c	0.007	0.010	0.19	0.25
D	0.189	0.197	4.80	5.00
E	0.150	0.157	3.80	4.00
e	0.040	0.060	1.02	1.52
H	0.228	0.244	5.80	6.20
L	0.016	0.050	0.40	1.27
μ	0°	8°	0°	8°

3.11 8-Pin SOIC (209-mm Body)



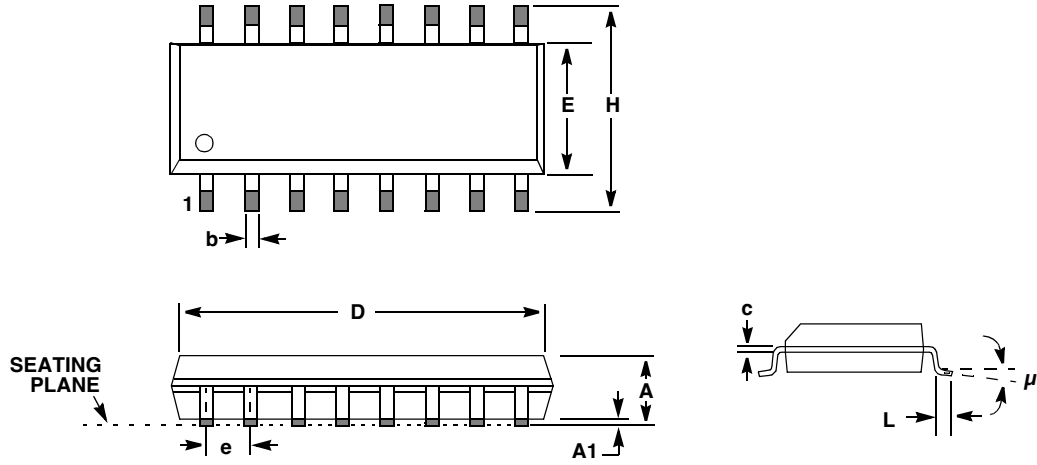
Dimension	Inches		Millimeters	
	MIN	MAX	MIN	MAX
A	0.076	0.084	1.93	2.13
A1	0.004	0.010	0.10	0.25
b	0.013	0.020	0.33	0.51
c	0.006	0.010	0.15	0.25
D	0.206	0.210	5.23	5.33
E	0.204	0.212	5.18	5.38
e	0.040	0.060	1.02	1.52
H	0.302	0.318	7.67	8.08
L	0.019	0.030	0.48	0.76
μ	0°	8°	0°	8°

3.12 16-Pin SOIC (150-mm Body)



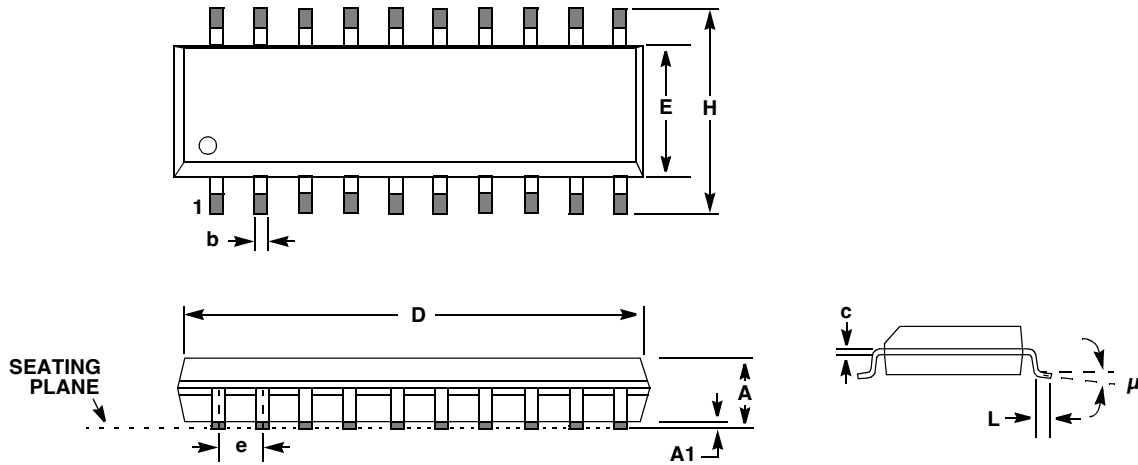
DIM	INCHES			MILLIMETERS		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.053	0.064	0.069	1.35	1.63	1.75
A1	0.004	0.006	0.010	0.10	0.15	0.25
b	0.013	0.016	0.020	0.33	0.41	0.51
C	0.0075	0.008	0.010	0.19	0.20	0.25
D	0.386	0.390	0.394	9.80	9.91	10.00
E	0.150	0.154	0.157	3.80	3.90	4.00
e	0.040	0.050	0.060	1.02	1.27	1.52
H	0.228	0.236	0.244	5.80	6.0	6.20
L	0.016	0.025	0.050	0.40	0.64	1.27
□	0°	4°	8°	0°	4°	8°

3.13 16-Pin SOIC (300-μm Body)



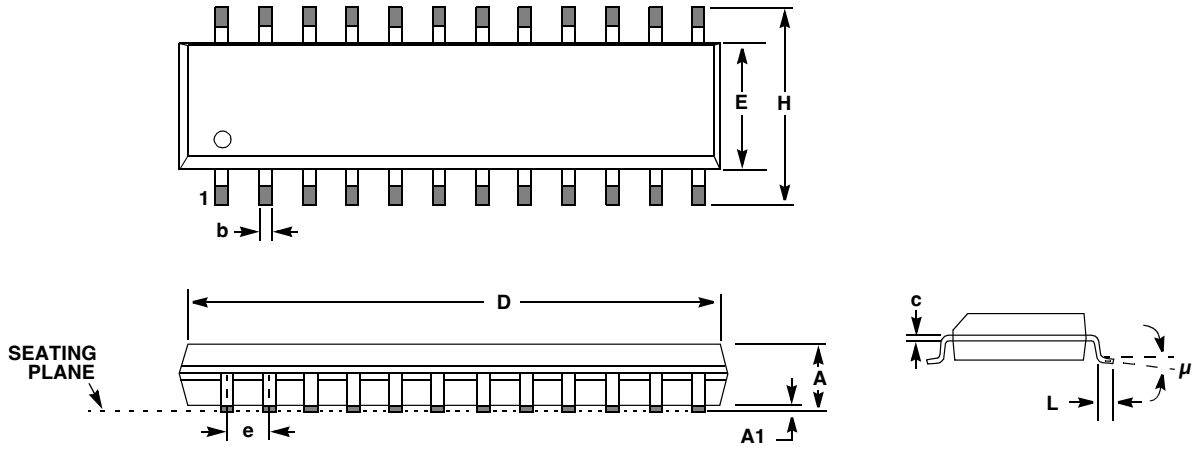
Dimension	Inches		Millimeters	
	MIN	MAX	MIN	MAX
A	0.093	0.104	2.35	2.65
A1	0.004	0.012	0.10	0.30
b	0.013	0.020	0.33	0.51
c	0.009	0.013	0.23	0.32
D	0.398	0.413	10.10	10.50
E	0.291	0.299	7.40	7.60
e	0.040	0.060	1.02	1.52
H	0.394	0.419	10.00	10.65
L	0.016	0.050	0.40	1.27
μ	0°	8°	0°	8°

3.14 20-Pin SOIC (300-mm Body)



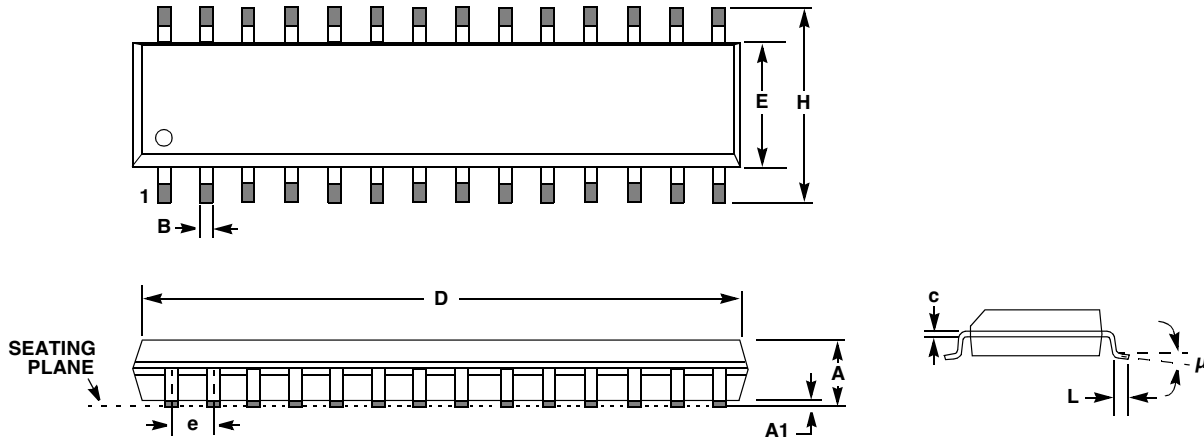
Dimension	Inches		Millimeters	
	MIN	MAX	MIN	MAX
A	0.093	0.104	2.35	2.65
A1	0.004	0.012	0.10	0.30
b	0.013	0.020	0.33	0.51
c	0.009	0.013	0.23	0.32
D	0.496	0.512	12.60	13.00
E	0.291	0.299	7.40	7.60
e	0.040	0.060	1.02	1.52
H	0.394	0.419	10.00	10.65
L	0.016	0.050	0.40	1.27
μ	0°	8°	0°	8°

3.15 24-Pin SOIC (300-mm Body)



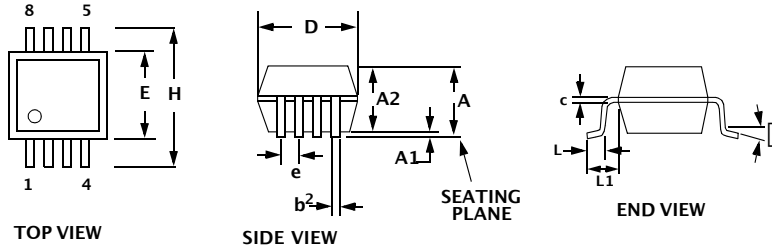
Dimension	Inches		Millimeters	
	MIN	MAX	MIN	MAX
A	0.093	0.104	2.35	2.65
A1	0.004	0.012	0.10	0.30
b	0.013	0.020	0.33	0.51
c	0.009	0.013	0.23	0.32
D	0.598	0.614	15.20	15.60
E	0.291	0.299	7.40	7.60
e	0.040	0.060	1.02	1.52
H	0.394	0.419	10.00	10.65
L	0.016	0.050	0.40	1.27
μ	0°	8°	0°	8°

3.16 28-Pin SOIC (300-mm Body)



Dimension	Inches		Millimeters	
	MIN	MAX	MIN	MAX
A	0.093	0.104	2.35	2.65
A1	0.004	0.012	0.10	0.30
b	0.013	0.020	0.33	0.51
c	0.009	0.013	0.23	0.32
D	0.697	0.713	17.70	18.10
E	0.291	0.299	7.40	7.60
e	0.040	0.060	1.02	1.52
H	0.394	0.419	10.00	10.65
L	0.016	0.050	0.40	1.27
μ	0°	8°	0°	8°

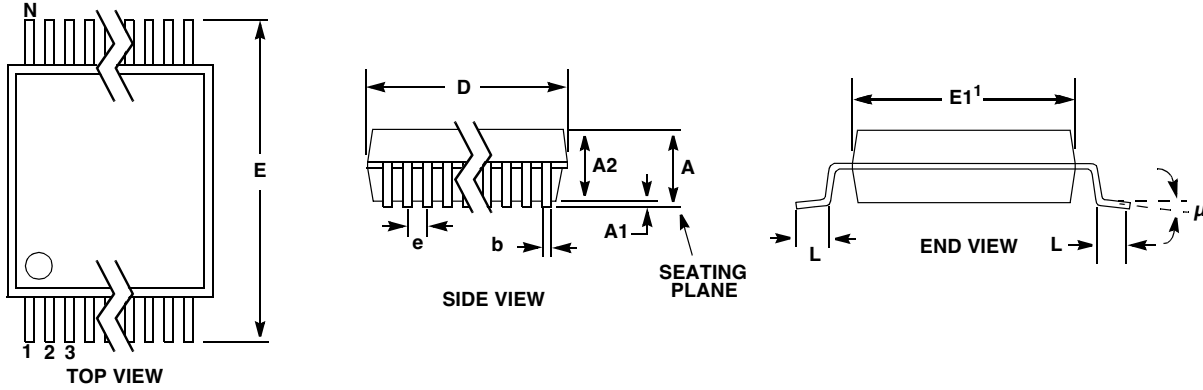
3.17 8-Pin SSOP



DIM	INCHES			MILLIMETERS			NOTE
	MIN	NOM	MAX	MIN	NOM	MAX	
A	0.053		0.069	1.35		1.75	
A1	0.004		0.010	0.10		0.25	
A2	0.051		0.059	1.30		1.50	
b	0.013		0.020	0.33		0.51	2,3
c	0.007		0.010	0.19		0.25	
D	0.189		0.197	4.80		5.00	1
E	0.150		0.157	3.80		4.00	
e	--		0.050	--		1.27	
H	0.228		0.244	5.80		6.20	
L	0.016		0.050	0.40		1.27	
L1	--		0.042	--		1.07	
□	0°		8°	0°		8°	

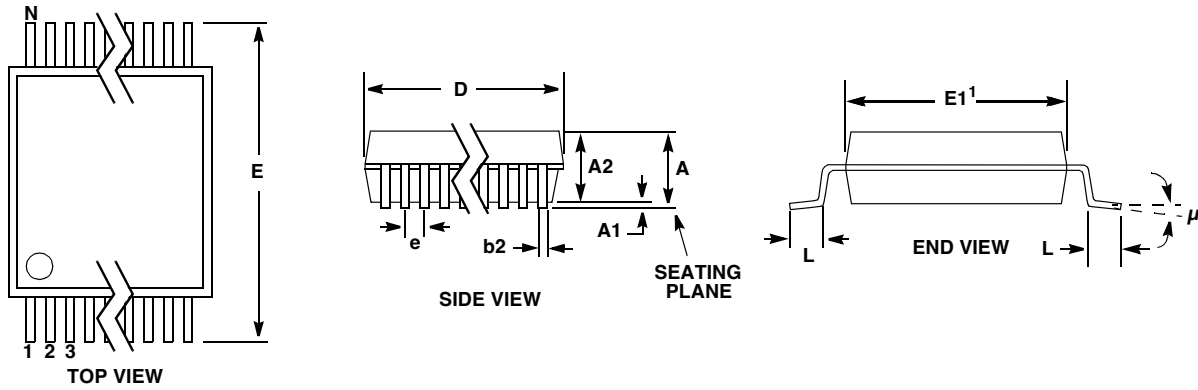
- Notes:
1. "D" and "E1" are reference datums and do not include mold flash or protrusions, but do include mold mismatch and are measured at the parting line, mold flash or protrusions shall not exceed 0.20 mm per side.
 2. Dimension "b" does not include dambar protrusion/intrusion. Allowable dambar protrusion shall be 0.13 mm total in excess of "b" dimension at maximum material condition. Dambar intrusion shall not reduce dimension "b" by more than 0.07 mm at least material condition.
 3. These dimensions apply to the flat section of the lead between 0.10 and 0.25 mm from lead tips.

3.18 16-Pin SSOP



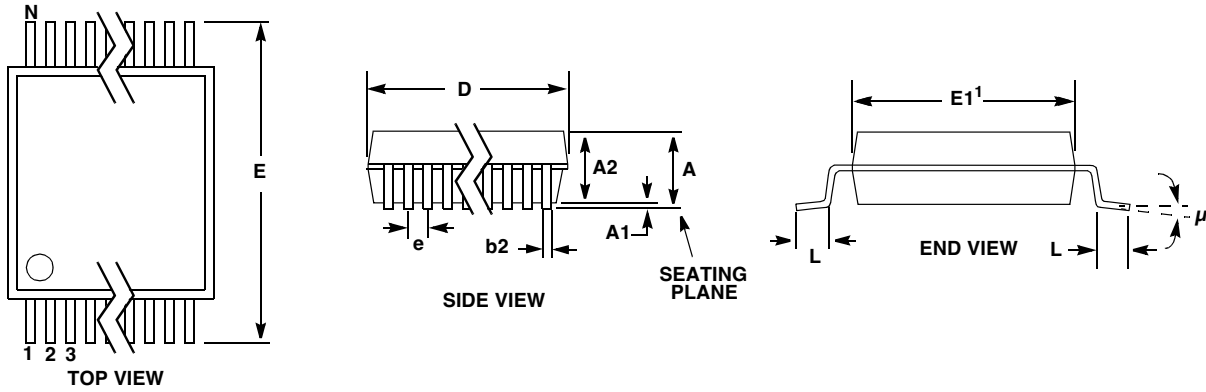
Dimension	Inches		Millimeters		Note
	MIN	MAX	MIN	MAX	
A	–	0.084	–	2.13	
A1	0.002	0.010	0.05	0.25	
A2	0.064	0.074	1.62	1.88	
b	0.009	0.015	0.22	0.38	2,3
D	0.232	0.256	5.90	6.50	1
E	0.291	0.323	7.40	8.20	
E1	0.197	0.220	5.00	5.60	1
e	0.022	0.030	0.55	0.75	
L	0.025	0.041	0.63	1.03	
μ	0°	8°	0°	8°	

3.19 20-Pin SSOP



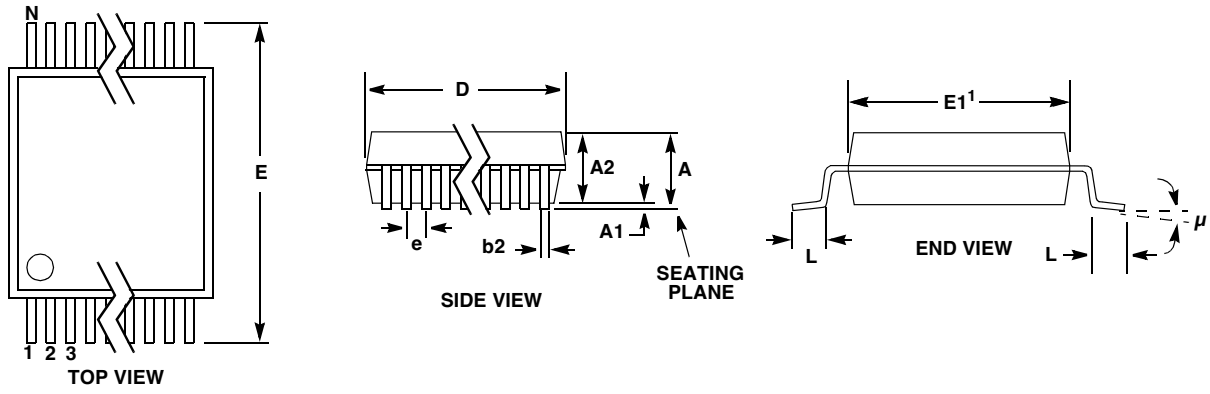
Dimension	Inches		Millimeters		Note
	MIN	MAX	MIN	MAX	
A	-	0.084	-	2.13	
A1	0.002	0.010	0.05	0.25	
A2	0.064	0.074	1.62	1.88	
b	0.009	0.015	0.22	0.38	2,3
D	0.272	0.295	6.90	7.50	1
E	0.291	0.323	7.40	8.20	
E1	0.197	0.220	5.00	5.60	1
e	0.022	0.030	0.55	0.75	
L	0.025	0.041	0.63	1.03	
μ	0°	8°	0°	8°	

3.20 24-Pin SSOP



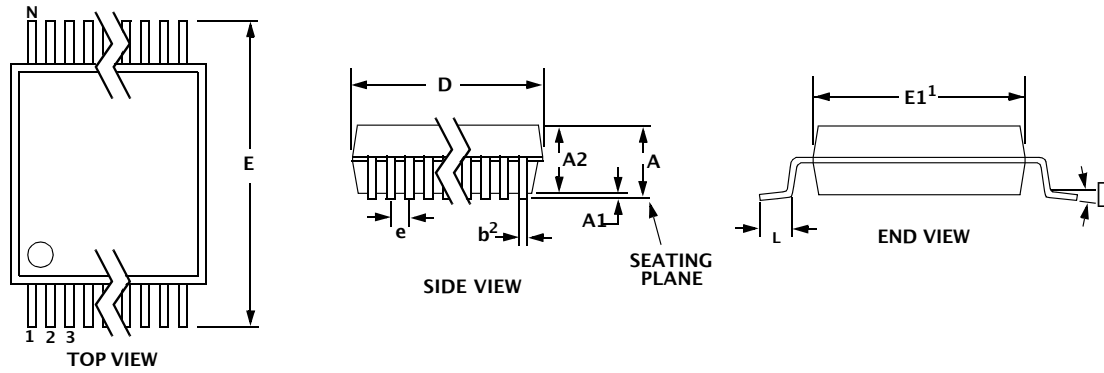
Dimension	Inches		Millimeters		Note
	MIN	MAX	MIN	MAX	
A	—	0.084	—	2.13	
A1	0.002	0.010	0.05	0.25	
A2	0.064	0.074	1.62	1.88	
b	0.009	0.015	0.22	0.38	2,3
D	0.311	0.335	7.90	8.50	1
E	0.291	0.323	7.40	8.20	
E1	0.197	0.220	5.00	5.60	1
e	0.022	0.030	0.55	0.75	
L	0.025	0.041	0.63	1.03	
μ	0°	8°	0°	8°	

3.21 28-Pin SSOP



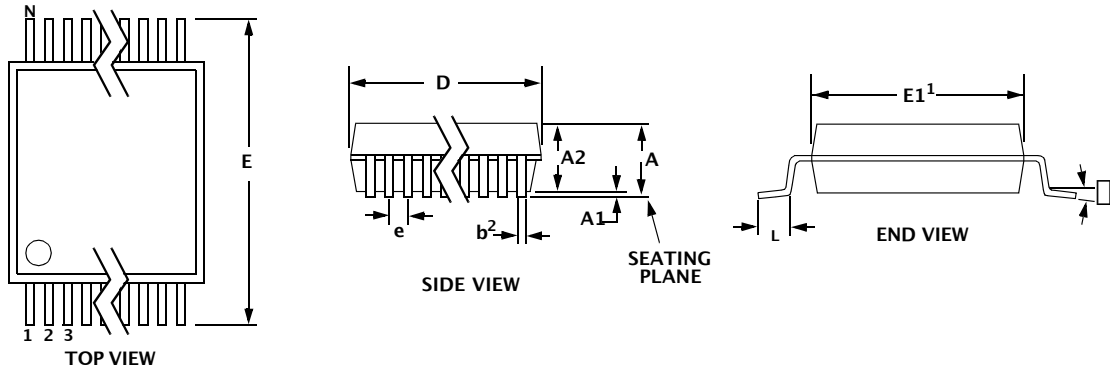
Dimension	Inches		Millimeters		Note
	MIN	MAX	MIN	MAX	
A	—	0.084	—	2.13	
A1	0.002	0.010	0.05	0.25	
A2	0.064	0.074	1.62	1.88	
b	0.009	0.015	0.22	0.38	2,3
D	0.390	0.413	9.90	10.50	1
E	0.291	0.323	7.40	8.20	
E1	0.197	0.220	5.00	5.60	1
e	0.022	0.030	0.55	0.75	
L	0.025	0.041	0.63	1.03	
μ	0°	8°	0°	8°	

3.22 16L TSSOP (4.4-mm Body)



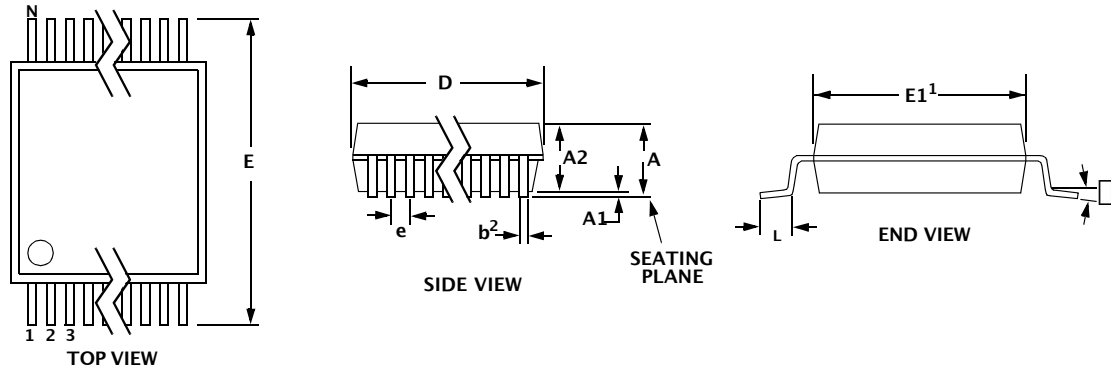
DIM	INCHES			MILLIMETERS			NOTE
	MIN	NOM	MAX	MIN	NOM	MAX	
A	--	--	0.043	--	--	1.10	
A1	0.002	0.004	0.006	0.05	--	0.15	
A2	0.03346	0.0354	0.037	0.85	0.90	0.95	
b	0.00748	0.0096	0.012	0.19	0.245	0.30	2,3
D	0.193	0.1969	0.201	4.90	5.00	5.10	1
E	0.248	0.2519	0.256	6.30	6.40	6.50	
E1	0.169	0.1732	0.177	4.30	4.40	4.50	1
e	--	0.026 BSC	--	--	0.065 BSC	--	
L	0.020	0.024	0.028	0.50	0.60	0.70	
□	0°	4°	8°	0°	4°	8°	

3.23 20L TSSOP (4.4-mm Body)



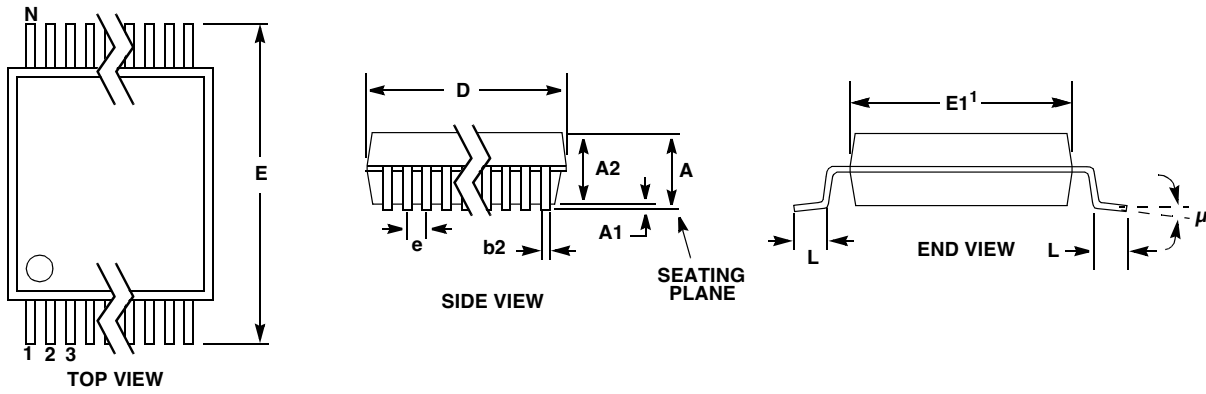
DIM	INCHES			MILLIMETERS			NOTE
	MIN	NOM	MAX	MIN	NOM	MAX	
A	--	--	0.043	--	--	1.10	
A1	0.002	0.004	0.006	0.05	--	0.15	
A2	0.03346	0.0354	0.037	0.85	0.90	0.95	
b	0.00748	0.0096	0.012	0.19	0.245	0.30	2,3
D	0.252	0.256	0.259	6.40	6.50	6.60	1
E	0.248	0.2519	0.256	6.30	6.40	6.50	
E1	0.169	0.1732	0.177	4.30	4.40	4.50	1
e	--	--	0.026	--	--	0.65	
L	0.020	0.024	0.028	0.50	0.60	0.70	
□	0°	4°	8°	0°	4°	8°	

3.23 20L TSSOP (4.4-mm Body)



DIM	INCHES			MILLIMETERS			NOTE
	MIN	NOM	MAX	MIN	NOM	MAX	
A	--	--	0.043	--	--	1.10	
A1	0.002	0.004	0.006	0.05	--	0.15	
A2	0.03346	0.0354	0.037	0.85	0.90	0.95	
b	0.00748	0.0096	0.012	0.19	0.245	0.30	2,3
D	0.252	0.256	0.259	6.40	6.50	6.60	1
E	0.248	0.2519	0.256	6.30	6.40	6.50	
E1	0.169	0.1732	0.177	4.30	4.40	4.50	1
e	--	--	0.026	--	--	0.65	
L	0.020	0.024	0.028	0.50	0.60	0.70	
□	0°	4°	8°	0°	4°	8°	

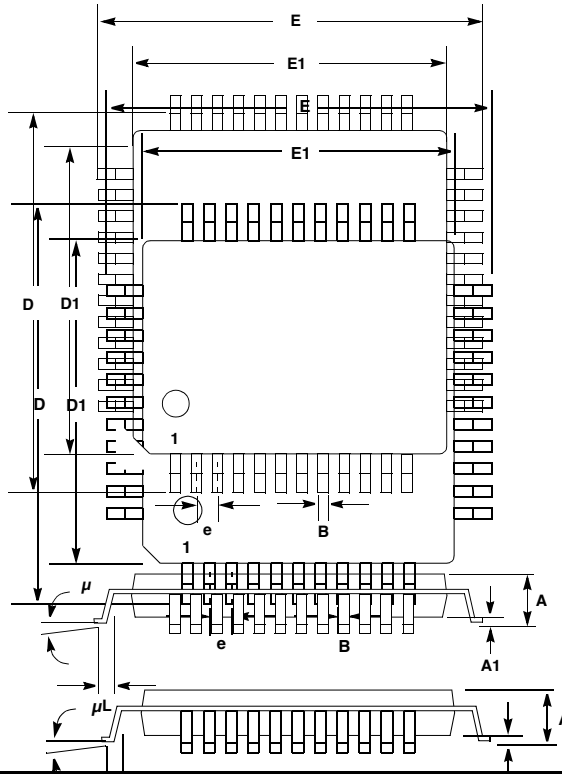
3.25 48-Pin TSSOP (6.1-mm Body)



Dimension	Inches		Millimeters		Note
	MIN	MAX	MIN	MAX	
A	–	0.047	–	1.20	
A1	0.002	0.006	0.05	0.15	
A2	0.031	0.041	0.80	1.05	
b	0.007	0.011	0.17	0.27	2,3
D	0.488	0.496	12.40	12.60	1
E	0.313	0.325	7.95	8.25	
E1	0.236	0.244	6.00	6.20	1
e	0.016	0.024	0.40	0.60	
L	0.018	0.030	0.45	0.75	
μ	0°	8°	0°	8°	

3.27 48-Pin TQFP

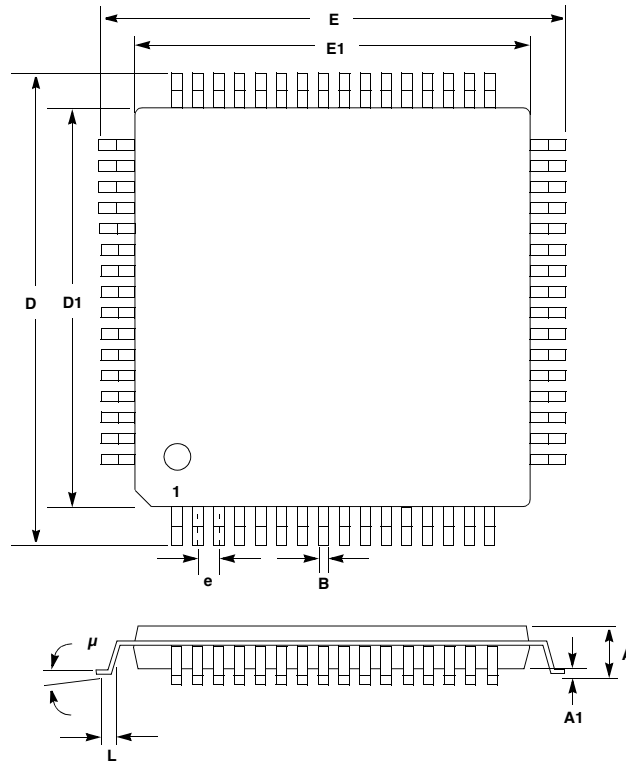
3.26 44-Pin TQFP



Dimension	Inches		Millimeters	
	MIN	MAX	MIN	MAX
A	0.000	0.063	0.00	1.60
A1	0.002	0.006	0.05	0.15
B	0.007	0.011	0.17	0.27
D	0.343	0.366	8.70	9.30
D1	0.272	0.280	6.90	7.10
E	0.000	0.065	0.00	1.60
E1	0.002	0.006	0.05	0.15
e	0.043	0.066	0.70	0.90
mu	0.012	0.018	0.30	0.45
muL	0.272	0.280	6.90	7.10
L	0.478	0.502	11.70	12.30
L	0.015	0.024	0.40	0.60
L	0.018	0.030	0.45	0.75
L	0.404	0.412	9.90	10.10
L	0.478	0.502	11.70	12.30
L	0.404	0.412	9.90	10.10
L	0.029	0.037	0.70	0.90
L	0.018	0.030	0.45	0.75
L	0°	7°	0°	7°

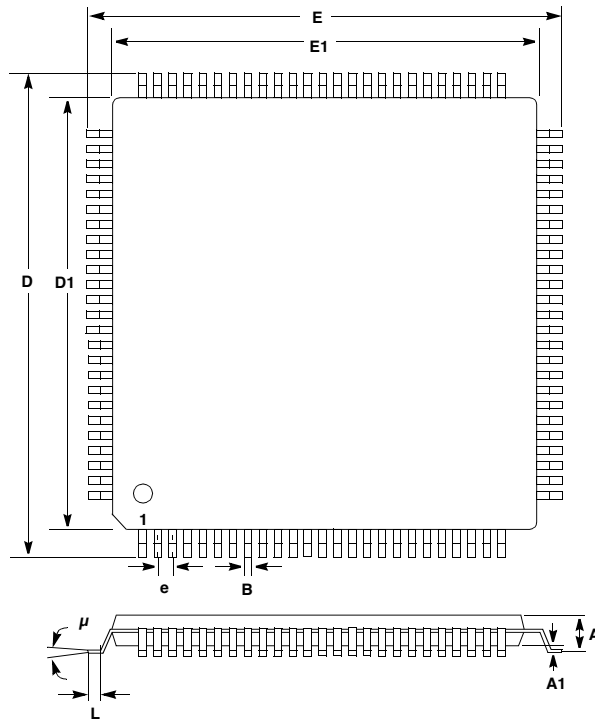


3.28 64-Pin TQFP



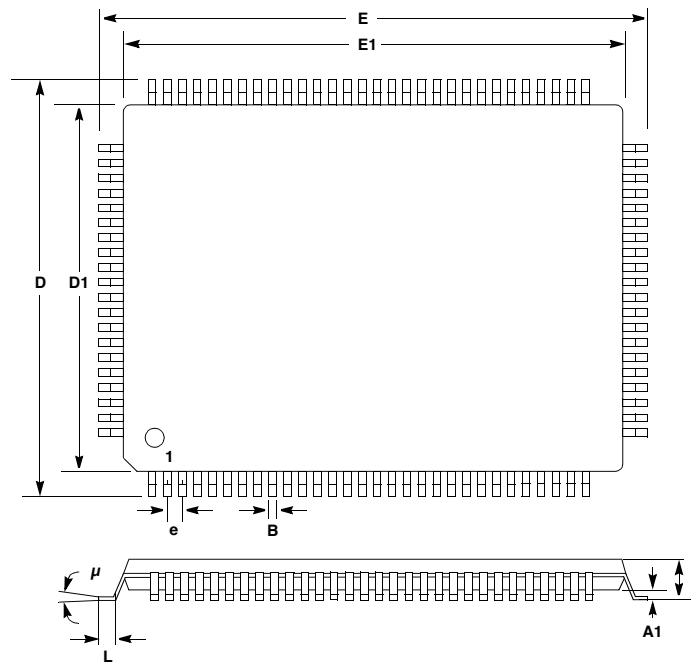
Dimension	Inches		Millimeters	
	MIN	MAX	MIN	MAX
A	0.000	0.063	0.00	1.60
A1	0.002	0.006	0.05	0.15
B	0.007	0.011	0.17	0.27
D	0.461	0.484	11.70	12.30
D1	0.390	0.398	9.90	10.10
E	0.461	0.484	11.70	12.30
E1	0.390	0.398	9.90	10.10
e	0.016	0.024	0.40	0.60
L	0.018	0.030	0.45	0.75
μ	0°	7°	0°	7°

3.29 100-Pin TQFP



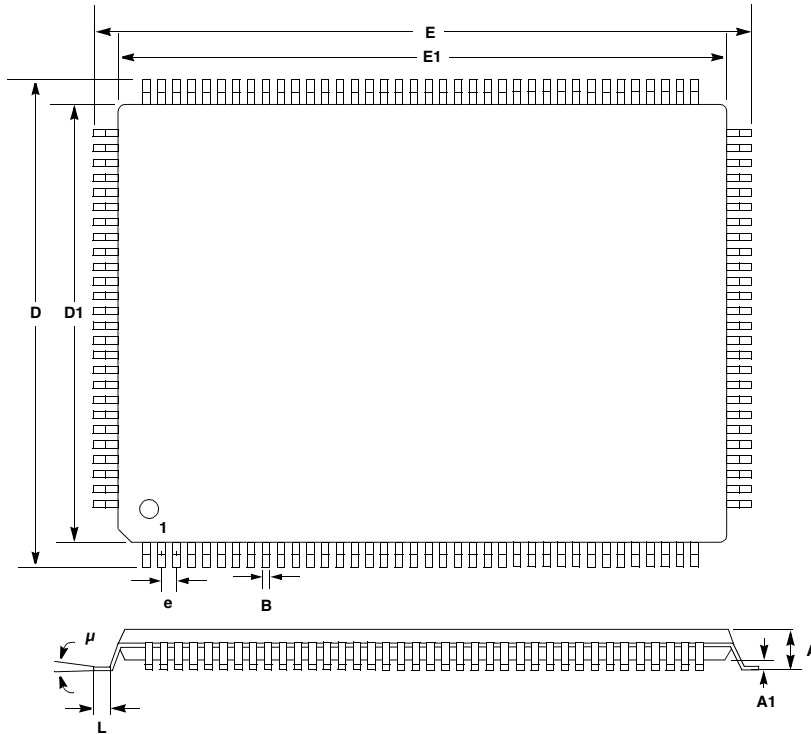
Dimension	Inches		Millimeters	
	MIN	MAX	MIN	MAX
A	0.000	0.063	0.00	1.60
A1	0.002	0.006	0.05	0.15
B	0.007	0.011	0.17	0.27
D	0.618	0.642	15.70	16.30
D1	0.547	0.555	13.90	14.10
E	0.618	0.642	15.70	16.30
E1	0.547	0.555	13.90	14.10
e	0.016	0.024	0.40	0.60
L	0.018	0.030	0.45	0.75
μ	0°	7°	0°	7°

3.30 100-Pin MQFP



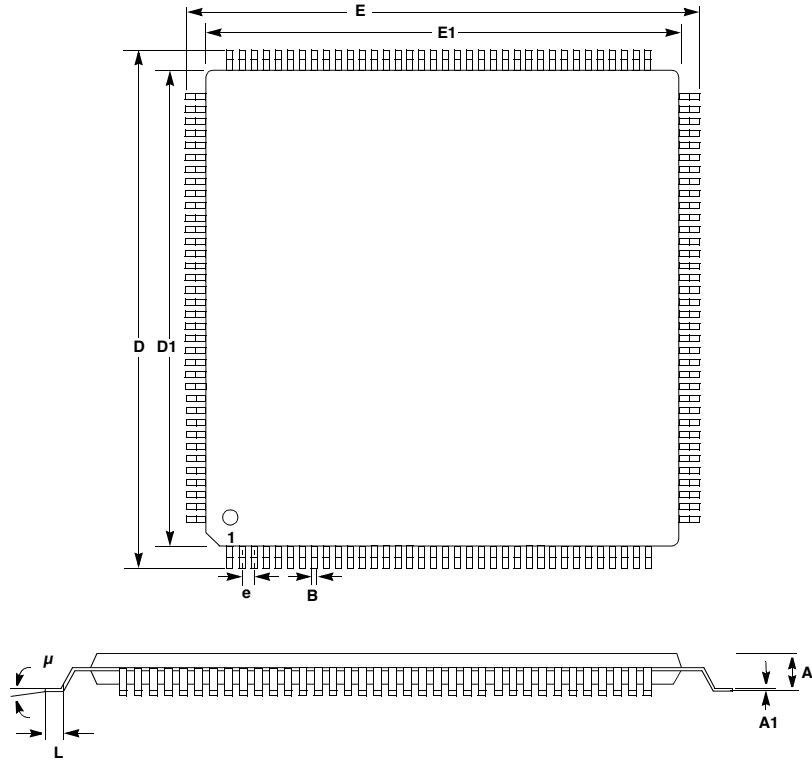
Dimension	Inches		Millimeters	
	MIN	MAX	MIN	MAX
A	0.000	0.134	0.000	3.400
A1	0.010	0.014	0.250	0.350
B	0.009	0.015	0.220	0.380
D	0.667	0.687	16.950	17.450
D1	0.547	0.555	13.900	14.100
E	0.904	0.923	22.950	23.450
E1	0.783	0.791	19.900	20.100
e	0.022	0.030	0.550	0.750
μ	0°	7°	0°	7°
L	0.018	0.030	0.450	0.750

3.31 128-Pin TQFP



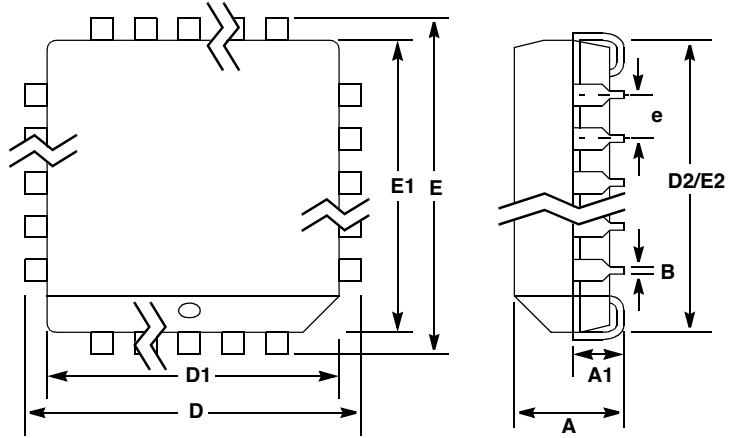
Dimension	Inches		Millimeters	
	MIN	MAX	MIN	MAX
A	0.000	0.063	0.000	1.600
A1	0.002	0.006	0.050	0.150
B	0.007	0.011	0.170	0.270
D	0.626	0.634	15.900	16.100
D1	0.547	0.555	13.900	14.100
E	0.862	0.870	21.900	22.100
E1	0.783	0.791	19.900	20.100
e	0.016	0.024	0.400	0.600
μ	0°	7°	0°	7°
L	0.018	0.030	0.450	0.750

3.32 144-Pin TQFP



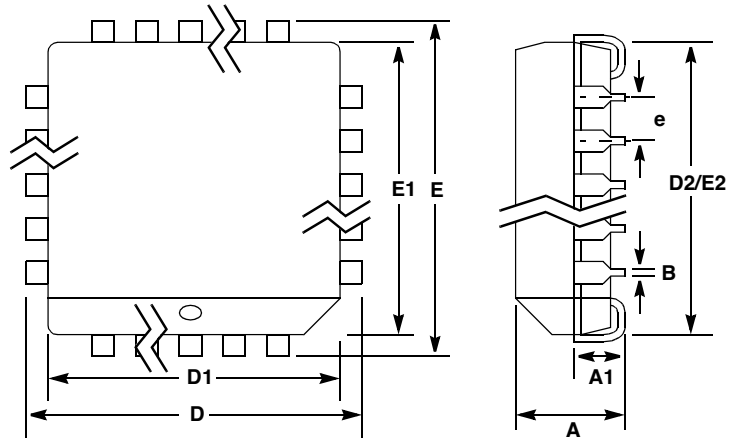
Dimension	Inches		Millimeters	
	MIN	MAX	MIN	MAX
A	0.000	0.063	0.00	1.60
A1	0.002	0.006	0.05	0.15
B	0.007	0.011	0.17	0.27
D	0.854	0.878	21.70	22.30
D1	0.783	0.791	19.90	20.10
E	0.854	0.878	21.70	22.30
E1	0.783	0.791	19.90	20.10
e	0.016	0.024	0.40	0.60
L	0.018	0.030	0.45	0.75
μ	0°	7°	0°	7°

3.33 28-Pin PLCC



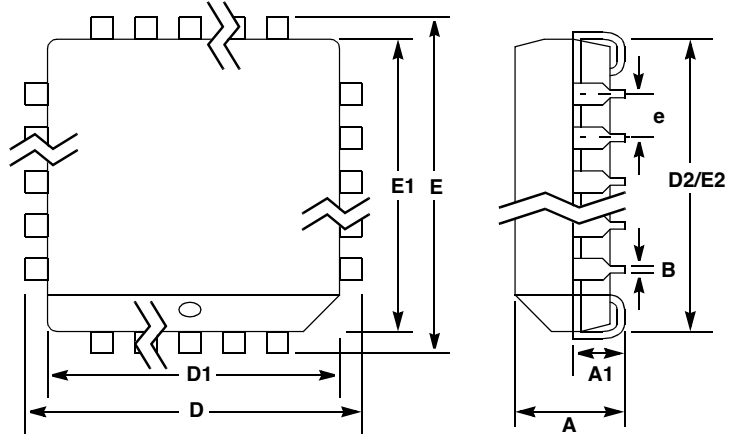
Dimension	Inches		Millimeters	
	MIN	MAX	MIN	MAX
A	0.165	0.180	4.043	4.572
A1	0.090	0.120	2.205	3.048
B	0.013	0.021	0.319	0.533
D	0.485	0.495	11.883	12.573
D1	0.450	0.456	11.025	11.582
D2	0.390	0.430	9.555	10.922
E	0.485	0.495	11.883	12.573
E1	0.450	0.456	11.025	11.582
E2	0.390	0.430	9.555	10.922
e	0.040	0.060	0.980	1.524

3.34 44-Pin PLCC



Dimension	Inches		Millimeters	
	MIN	MAX	MIN	MAX
A	0.165	0.180	4.043	4.572
A1	0.090	0.120	2.205	3.048
B	0.013	0.021	0.319	0.533
D	0.685	0.695	16.783	17.653
D1	0.650	0.656	15.925	16.662
D2	0.590	0.630	14.455	16.002
E	0.685	0.695	16.783	17.653
E1	0.650	0.656	15.925	16.662
E2	0.590	0.630	14.455	16.002
e	0.040	0.060	0.980	1.524

3.35 68-Pin PLCC



Dimension	Inches		Millimeters	
	MIN	MAX	MIN	MAX
A	0.165	0.180	4.043	4.572
A1	0.090	0.120	2.205	3.048
B	0.013	0.021	0.319	0.533
D	0.985	0.995	24.133	25.273
D1	0.950	0.958	23.275	24.333
D2	0.890	0.930	21.805	23.622
E	0.985	0.995	24.133	25.273
E1	0.950	0.958	23.275	24.333
E2	0.890	0.930	21.805	23.622
e	0.040	0.060	0.980	1.524