

NOTICE OF  
CHANGE

INCH-POUND

MIL-STD-1835  
NOTICE 1  
30 June 1992

MILITARY STANDARD  
MICROCIRCUIT CASE OUTLINES

TO ALL HOLDERS OF MIL-STD-1835:

1. THE FOLLOWING PAGES OF MIL-STD-1835 HAVE BEEN REVISED AND SUPERSEDE THE PAGES LISTED:

NEW PAGE	DATE	SUPERSEDED PAGE	DATE
13	30 June 1992	13	30 September 1991
14	30 June 1992	14	REPRINTED WITHOUT CHANGE
25	30 June 1992	25	30 September 1991
26	30 June 1992	26	30 September 1991
27	30 June 1992	27	30 September 1991
28	30 June 1992	28	REPRINTED WITHOUT CHANGE
41	30 June 1992	41	REPRINTED WITHOUT CHANGE
42	30 June 1992	42	30 September 1991
43	30 June 1992	43	30 September 1991
44	30 June 1992	44	30 September 1991
51	30 June 1992	51	REPRINTED WITHOUT CHANGE
52	30 June 1992	52	30 September 1991
53	30 June 1992	53	30 September 1991
54	30 June 1992	54	REPRINTED WITHOUT CHANGE
55	30 June 1992	55	30 September 1991
56	30 June 1992	56	30 September 1991
57	30 June 1992	57	30 September 1991
58	30 June 1992	58	30 September 1991
61	30 June 1992	61	30 September 1991
62	30 June 1992	62	REPRINTED WITHOUT CHANGE
107	30 June 1992	107	30 September 1991
108	30 June 1992	108	30 September 1991
108a	30 June 1992	NEW	---
123	30 June 1992	123	30 September 1991
124	30 June 1992	124	30 September 1991

2. MAKE THE FOLLOWING PEN AND INK CHANGES:

PAGE 3

3.1.8, after "leads" add "parallel to base plane".

PAGE 22

FIGURE 10, cavity down: Delete "Q" and substitute "Q1".

PAGE 29

FIGURE 11, symbol column E1, F-2 config. A, B: Delete ".280" and substitute "7.11"; symbol column E1, F-2A config. B: Delete ".290" and substitute "7.37".

PAGE 32

FIGURE 11, symbol column S1, F-6A config. B: Delete ".005" and substitute ".000"; symbol column Ax, F-9 config. A, B, D: Add "14" to note; symbol column E-5, F-8 config. C, D and F-9 config. A, B, D: Add "3" to note.

AMSC N/A

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FSC 5962

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FIGURE 11, symbol column S1, F-6A config. B: Delete "0.13" and substitute "0.00"; symbol column Ax, F-9 config A, B, D: Add "14" to note.

PAGE 36

FIGURE 11, symbol column E3, F-12 config. B: Add "7" to note; symbol column N, F-14 config. A: Delete "1" and substitute "18".

PAGE 37

FIGURE 11, symbol column E3, F-12 config. B: Add "7" to note.

PAGE 38

FIGURE 11, symbol column E3, F-18 config. B: Add "7" to note.

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FIGURE 11, Add the following after footnote 13:

"14. Ax is used instead of A for configuration D only."

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FIGURE 12, symbol column eA, D-4: Delete ".600 BSC" and substitute ".300 BSC"; symbol column eA/2, D-4: Delete ".300 BSC" and substitute ".150 BSC".

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FIGURE 12, symbol column N, D-5: Delete "4" and substitute "40"; symbol column N, D-7: Delete "2" and substitute "22".

PAGE 71

FIGURE 15, symbol column E3, C-11: Delete ".358" and substitute ".558"; symbol column L1, C-12: Delete ".074" and substitute ".045".

PAGE 75

NOTES, footnote 11, line 2: Delete "unprotected" and substitute "unobstructed".

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FIGURE 16, symbol column A, all variations, NOTE: Delete "3,5" and substitute "4,6"; symbol column D1/E1, all variations, NOTE: Delete "6" and substitute "7"; symbol column ND/NE, all variations, NOTE: Delete "1,7" and substitute "1".

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FIGURE 16, symbol column A, all variations, NOTE: Delete "3,5" and substitute "4,6"; symbol column D1/E1, all variations, NOTE: Delete "6" and substitute "7"; symbol column ND/NE, all variations, NOTE: Delete "1,7" and substitute "1".

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NOTES, footnote 9, line 5: Delete " J" (see figure 18) or".

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FIGURE 18, symbol column e1, C-J3: Delete "1.00o BSC" and substitute "1.00 BSC"; symbol column e2, C-J3: Delete "1.11. BSC" and substitute "1.11 BSC". At bottom of table, Note: Delete "9" and substitute "9, 12".

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FIGURE 18, at bottom of table, Note: Delete "9" and substitute "9, 12".

PAGE 91

FIGURE 18, symbol column D2/E2, C-J7: Delete ".456" and substitute ".466"; at bottom of table, Note: Delete "9" and substitute "9, 12".

PAGE 92

FIGURE 18, at bottom of table, Note: Delete "9" and substitute "9, 12".

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NOTES. footnote 2, at the end of the first sentence: Delete "inside of the lead and the body" and substitute "inside of the lead and the top of the body".

PAGE 96

FIGURE 19, symbol column L, C-J6; Delete ".020" and substitute ".005".

PAGE 105

FIGURE 20, symbol column M, all variations, max column: Delete "---" and substitute ".002".

PAGE 111

FIGURE 21, symbol column D/E, P-BL: Delete "1.980" and substitute "1.880"; Delete "Large outline" and substitute "Small outline".

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FIGURE 21: Delete "Large outline" and substitute "Small outline".

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3. RETAIN THIS NOTICE AND INSERT BEFORE TABLE OF CONTENTS.

4. Holders of MIL-STD-1835 will verify that page changes and additions indicated above have been entered. This notice will be retained as a check sheet. This issuance, together with appended pages, is a separate publication. Each notice is to be retained by stocking points until the military standard is completely revised or canceled.

Custodians:

Army - ER  
Navy - EC  
Air Force - 17  
NASA - NA

Preparing activity:

Air Force - 17

Agent:

DLA - ES

Review activities:

Army - AR, MI, PA  
Navy - MC  
Air Force - 19, 85, 99  
DLA - ES

(Project 5962-1268)

User activities:

Army - SM  
Navy - AS, CG, OS, SH

Civil Agency Coordinating Activities:

DOT-FAA(RD-650)

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TABLE VI. Package case outline List - Continued.

Descriptive package type designator	Case outline letter, Figure no., Configuration letter	1/ Dimensions reference letter	2/ $\theta_{JC}$ (°C/W)	Terminal count and row-to-row spacing (inch)	Terminal pitch (inch)	3/ EIA similar package designation
Dual-in-line package style - Continued 4/						
GDIP1-T18 CDIP2-T18	V, 12, A V, 12, C	D-6 D-6	28 "	18, " 18, "	.100 "	none MS-015 AD
GDIP1-T20 CDIP2-T20	R, 12, A R, 12, C	D-8 D-8	" "	20, .300 20, "	" "	none MS-015 AE
GDIP1-T22 CDIP2-T22	W, 12, A W, 12, C	D-7 D-7	" "	22, .400 22, "	" "	none MS-015 BB
GDIP1-T24 CDIP2-T24 GDIP3-T24 CDIP4-T24 GDIP5-T24 CDIP6-T24	J, 12, A J, 12, C L, 12, A L, 12, C 12, A 12, C	D-3 D-3 D-9 D-9 D-11 D-11	" " " " " "	24, .600 " " " .300 " " " .400 " "	" " " " " "	MS-103 AA MS-015 CA MO-058 AA MS-015 AG none MS-015 BC
GDIP1-T28 CDIP2-T28 CDIP3-T28 GDIP4-T28	12, A 12, C 12, C 12, A	D-10 D-10 D-15 D-15	" " " "	28, .600 " " " .300 " "	" " " "	MO-103 AB MS-015 CB MS-015 AH none
GDIP1-T32 CDIP2-T32	12, A 12, C	D-16 D-16	" "	32, .600 32, "	" "	MS-015 CC MO-103 AD
GDIP1-T40 CDIP2-T40	Q, 12, A Q, 12, C	D-5 D-5	" "	40, .600 40, "	" "	MO-103 AC MS-015 CE
GDIP1-T48 CDIP2-T48	12, A 12, C	D-14 D-14	" "	48, " 48, "	" "	none MS-015 CF
GDIP1-T50 CDIP2-T50	12, A 12, C	D-12 D-12	" "	50, .900 50, "	" "	none MS-015 DA
CDIP1-T64	12, C	D-13	"	64, "	"	MS-015 DB
Can style 4/						
MACY1-X8 MACY1-X10 MACY1-X12 MACY1-X3	G, 13 I, 13 13 13	A1 A2 A3 A4	70 65 65	8 10 12 3	$\alpha, \beta$ 45° $\alpha, \beta$ 36° $\alpha, \beta$ 30° $\alpha 45^\circ, \beta 90^\circ$	MO-002 AL MO-006 AF MO-006 AG TO-5, TO-39

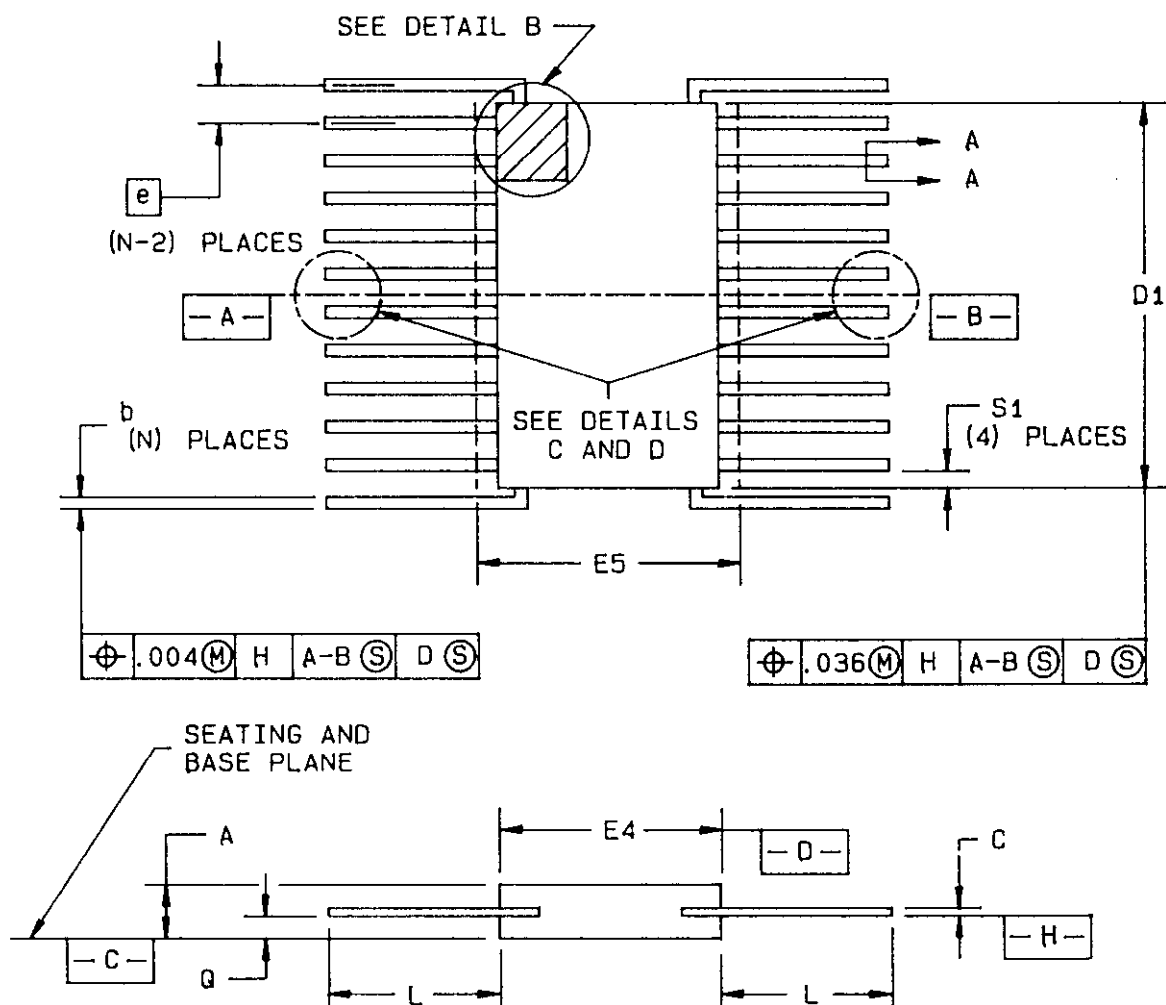
See footnotes at end of table VII.

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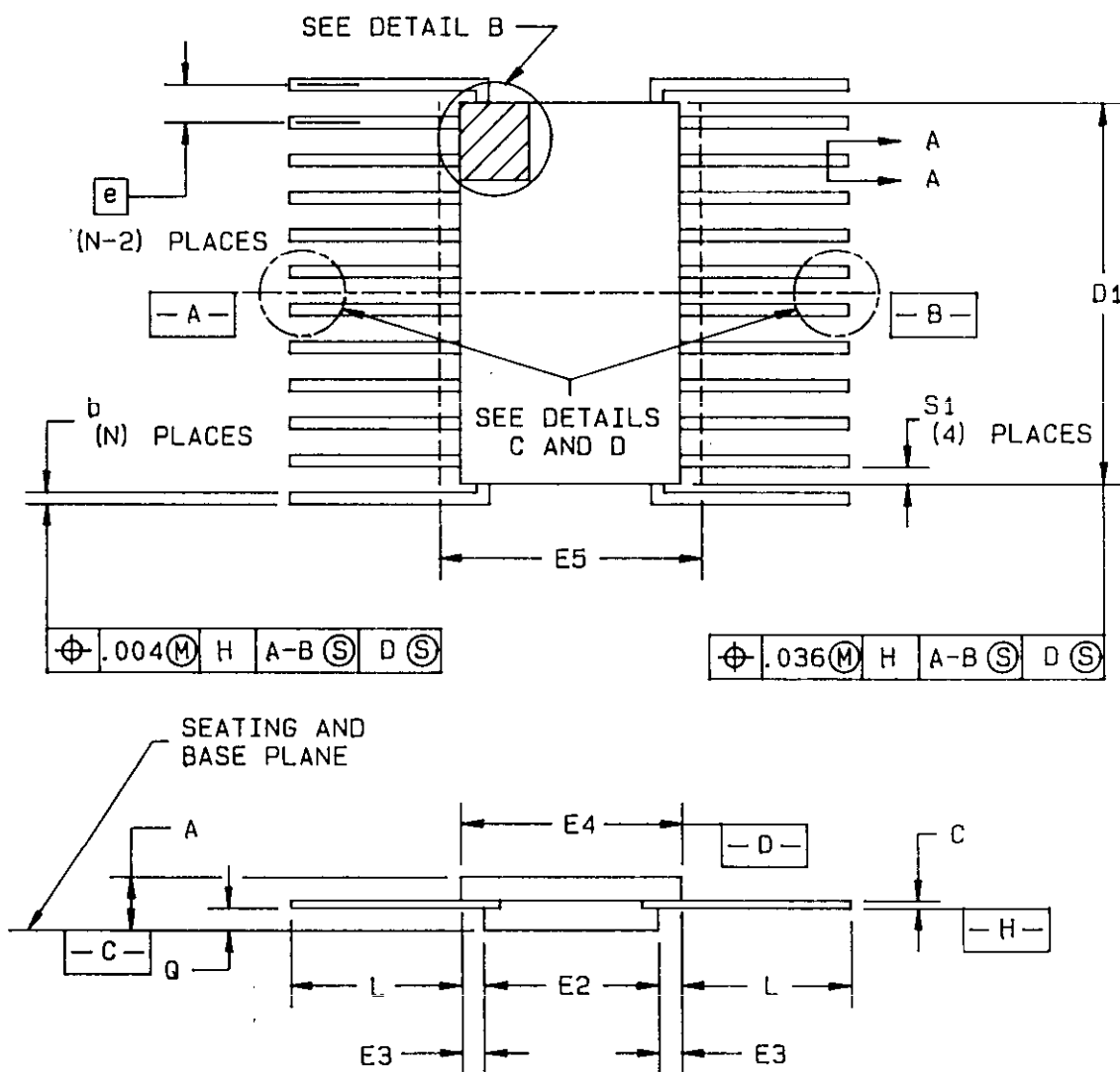
TABLE VI. Package case outline list - Continued.

Descriptive package type designator	Case outline letter, Figure no., Configuration letter	1/ Dimensions reference letter	2/ $\theta_{JC}$ (°C/W)	Terminal count and row-to-row spacing (inch)	Terminal pitch (inch)	3/ EIA similar package designation
Square leadless chip carrier style 4/						
CQCC1-N16 CQCC2-N16	15 "	C-1 C-1A	20 "	16 16	.050 "	MS-004 CA " "
CQCC1-N20 CQCC2-N20	2, " "	C-2 C-2A	" "	20 20	" "	" CB " "
CQCC1-N24 CQCC2-N24	" "	C-3 C-3A	" "	24 24	" "	" CH " "
CQCC1-N28 CQCC2-N28	3, " "	C-4 C-4A	" "	28 28	" "	" CC " "
CQCC1-N44	"	C-5	"	44	"	" CD
CQCC1-N52	"	C-6	"	52	"	" CE
CQCC1-N68	"	C-7	"	68	"	" CF
CQCC1-N84	"	C-8	"	84	"	" CG
Rectangular leadless chip carrier style 4/						
CQCC1-N18 CQCC2-N18 CQCC3-N18 CQCC4-N18	15 " " "	C-9 C-9A C-10 C-10A	20 " " "	18 " " "	.050 " " "	MO-042 AA " " MO-041 AC " "
CQCC3-N20 CQCC4-N20	" "	C-13 C-13A	" "	20 20	" "	" AD " "
CQCC3-N28 CQCC4-N28	" "	C-11 C-11A	" "	28 28	" "	" AA " "
CQCC1-N32 CQCC2-N32	" "	C-12 C-12A	" "	32 32	" "	" AB " "

See footnotes at end of table VII.

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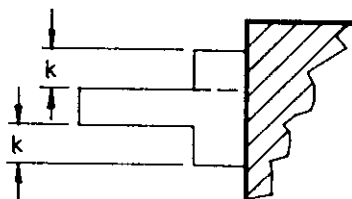
Configuration C  
Ceramic, glass-sealed, spider leads  
FIGURE 11. Flat pack style - Continued.

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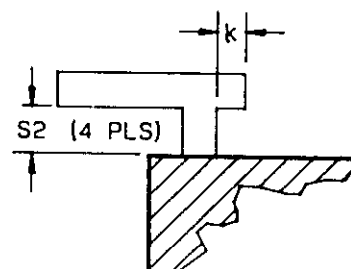
Configuration D  
Ceramic, metal-sealed, bottom-brazed spider leads

FIGURE 11. Flat pack style - Continued.

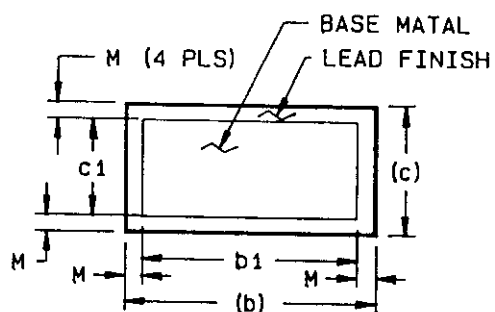


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DETAIL A



DETAIL B



SECTION A-A

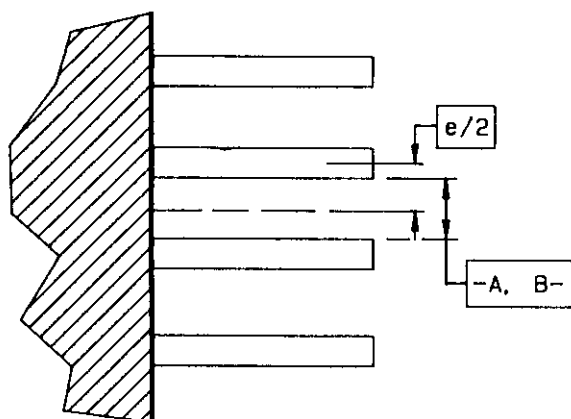
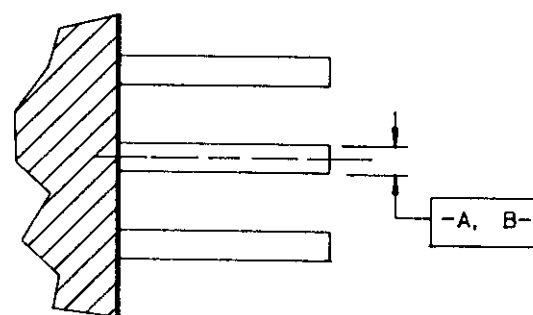
EVEN NUMBER OF LEADS PER SIDE  
DETAIL CODD NUMBER OF LEADS PER SIDE  
DETAIL D

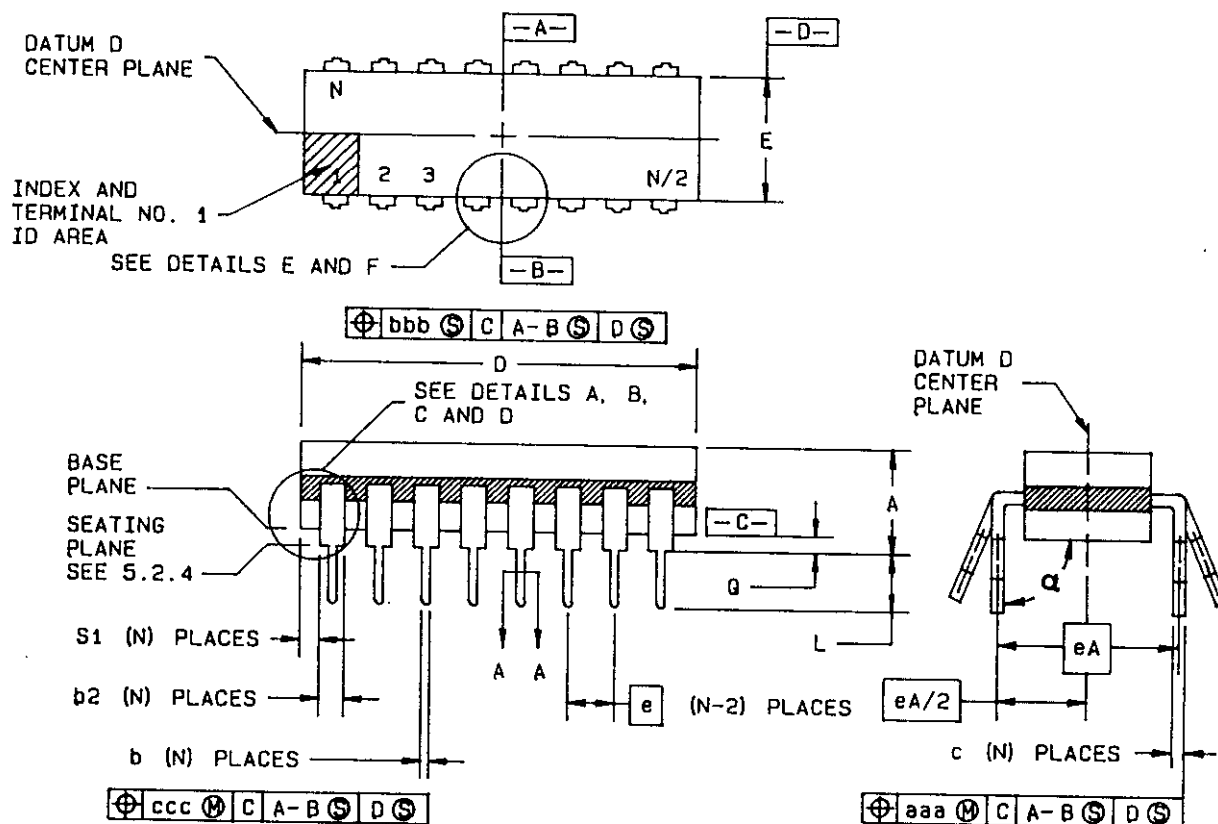
FIGURE 11. Flat pack style - Continued.

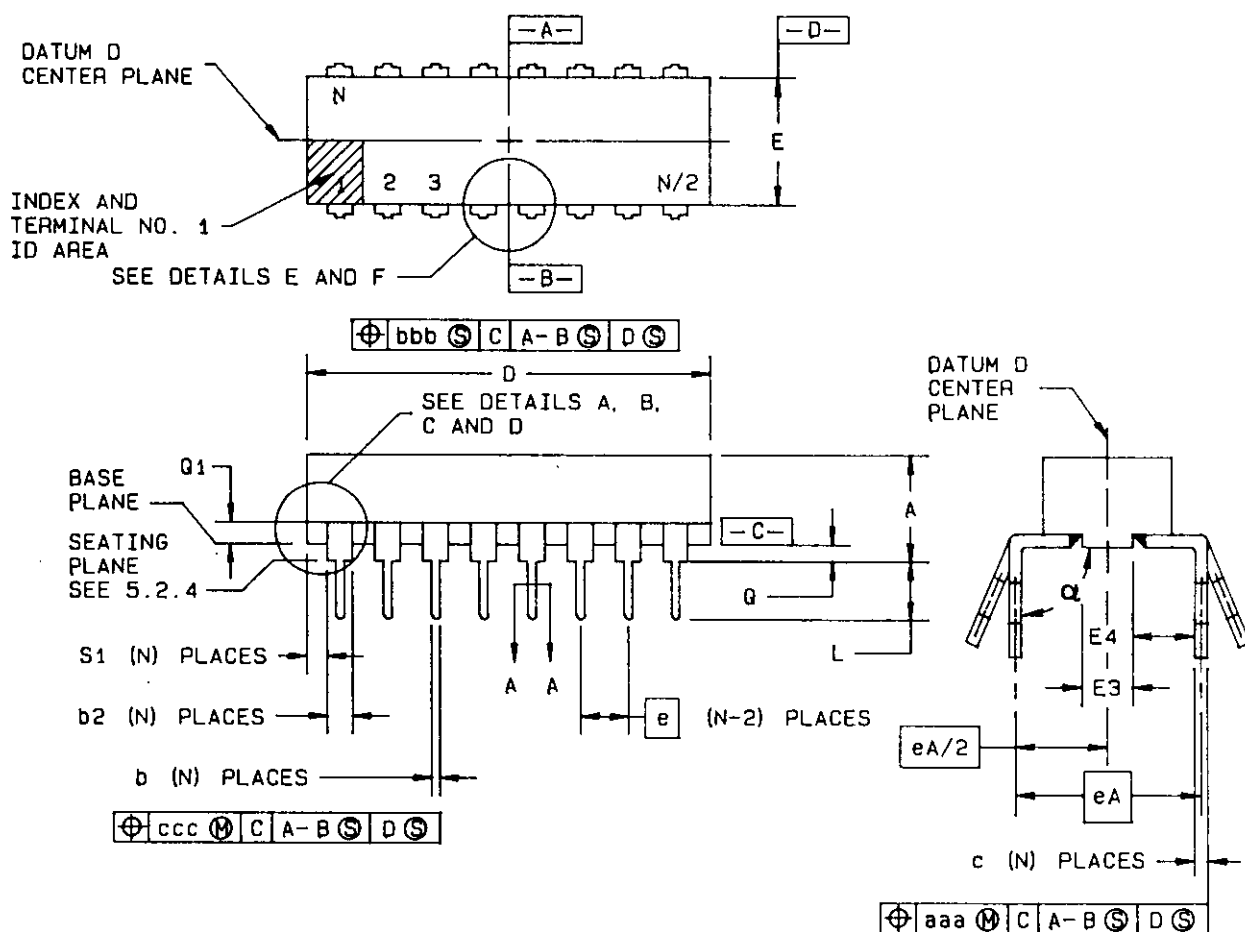
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S Y M B O L	Variations (all dimensions shown in inches)											
	F-1 Config. C,D		N O T E	F-2 Config. A,B		N O T E	F-2A Config. B		N O T E	F-3 Config. C		N O T E
	Min	Max		Min	Max		Min	Max		Min	Max	
A	.030	.085		.045	.085		.045	.115		.030	.070	
b	.010	.022		.010	.022		.015	.022		.010	.022	
b1	.010	.019		.010	.019		.015	.019		.010	.019	
c	.004	.009		.004	.009		.004	.009		.004	.009	
c1	.004	.006		.004	.006		.004	.006		.004	.006	
D				---	.390	3	---	.390	3			
D1	---	.280	3							---	.280	3
E				.235	.260		.235	.260				
E1				---	.280	3	---	.290	3			
E2	.125	---		.125	---		.125	---				
E3	.030	---	7	.030	---	7	.030	---	7			
E4	.240	.260								.120	.200	
E5	---	.280	3							---	.220	3
e	.050 BSC			.050 BSC			.050 BSC			.050 BSC		
k	.008	.015	2	.008	.015	2	.008	.015	2	.008	.015	2
L	.250	.370		.250	.370		.270	.370		.165	.390	
Q	.026	.045	11	.026	.045	11	.026	.045	11	.026	.045	11
S1	.005	---	6	.005	---	6	.005	---	6	.005	---	6
S2	.004	---	9							.004	---	9
α	30°	90°	10							30°	90°	10
M	---	.0015		---	.0015		---	.0015		---	.0015	
N	14			14			14			14		
Note	1, 12, 13											

1/ Symbols in this column that are not on a configuration drawing are not applicable to that configuration; this is further noted when a line is blank in the MIN MAX columns.

FIGURE 11. Flat pack style - Continued.

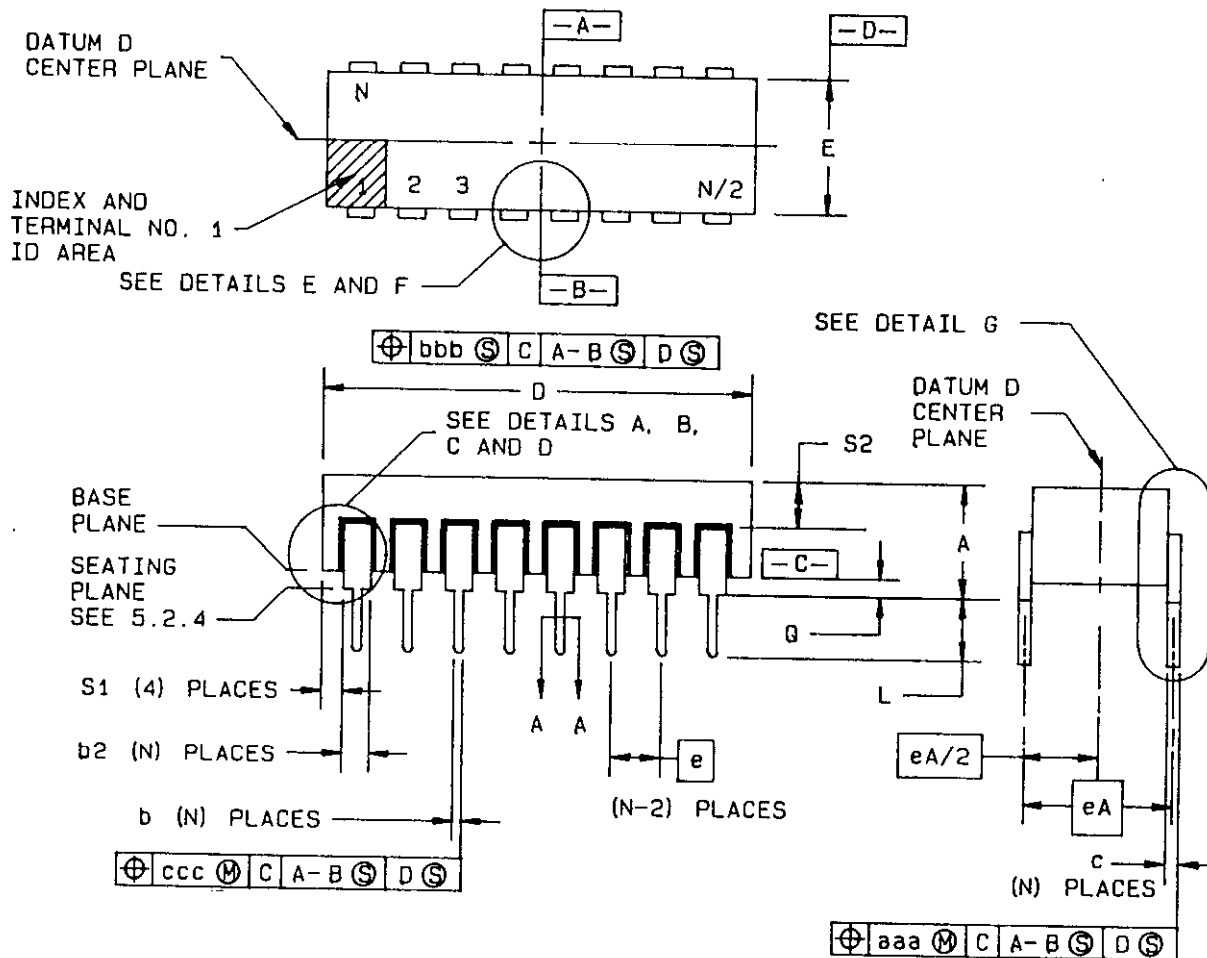
MIL-STD-1835  
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Ceramic, glass-sealedFIGURE 12. Dual-in-line package style.

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Configuration B  
Ceramic, metal-sealed, bottom-brazed leads

FIGURE 12. Dual-in-line package style - Continued.

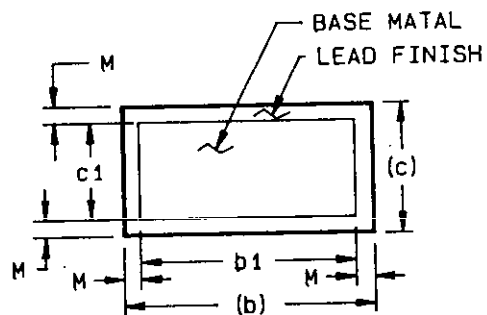
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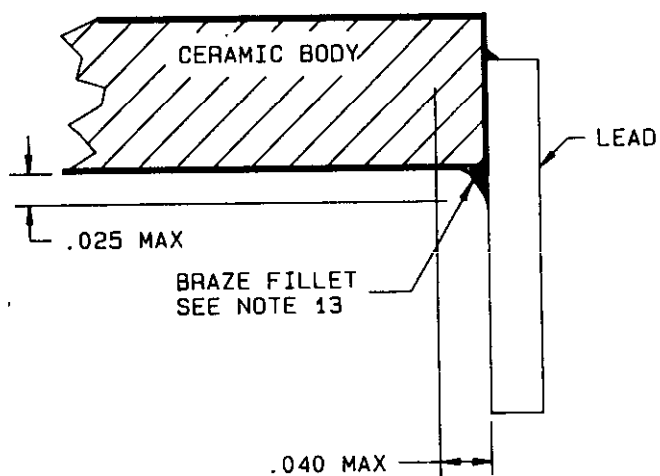
Configuration C  
Ceramic, metal-sealed, side-brazed leads

FIGURE 12. Dual-in-line package style - Continued.

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SECTION A-A



DETAIL G

FIGURE 12. Dual-in-line package style - Continued.

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S Y M B O L	Variations (all dimensions shown in millimeters) 2/											
	D-9		N O T E	D-10		N O T E	D-11 Config. A,C		N O T E	D-12 Config. A,C		N O T E
	Min	Max		Min	Max		Min	Max		Min	Max	
A	---	5.08		---	5.92		---	5.72		---	5.72	
b	0.36	0.66	2	0.36	0.66	2	0.36	0.66	2	0.36	0.66	2
b1	0.36	0.58	3	0.36	0.58	3	0.36	0.58	3	0.36	0.58	3
b2	1.14	1.65	4	1.14	1.65	4	1.14	1.65	4	1.14	1.65	4
b3	0.58	1.14	5	0.58	1.14	5	0.58	1.14	5	0.58	1.14	5
c	0.20	0.46	2	0.20	0.46	2	0.20	0.46	2	0.20	0.46	2
c1	0.20	0.38	3	0.20	0.38	3	0.20	0.38	3	0.20	0.38	3
D	---	32.51	6	---	37.85	6	---	31.75	6	---	64.52	6
E	5.59	7.87	6	12.70	15.49	6	8.89	10.41	6	22.10	23.37	6
E2	2.54	---		6.86	---							
E3	1.27	---	7	1.27	---	7						
e	2.54 BSC			2.54 BSC			2.54 BSC			2.54 BSC		
eA	7.62 BSC			15.24 BSC			10.16 BSC			22.86 BSC		
eA/2	3.81 BSC			7.62 BSC			5.08 BSC			11.83 BSC		
L	3.18	5.08	8	3.18	5.08	8	3.18	5.08	8	3.18	5.08	8
Q	0.38	1.52	9	0.38	1.52	9	0.38	1.52	9	0.38	1.78	9
Q1	0.51	---		0.51	---							
S1	0.13	---	10	0.13	---	10	0.13	---	10	0.13	---	10
S2	0.13	---	11	0.13	---	11	0.13	---	11	0.13	---	11
α	90°	105°		90°	105°		90°	105°		90°	105°	
aaa	---	0.38		---	0.38		---	0.38		---	0.38	
bbb	---	0.76		---	0.76		---	0.76		---	0.76	
ccc	---	0.25		---	0.25		---	0.25		---	0.25	
M	---	0.038	2	---	0.038	2	---	0.038	2	---	0.038	2
N	24		12	28		12	24		12	50		12
Note	1, 14											

1/ Symbols in this column that are not on a configuration drawing are not applicable to that configuration; this is further noted when a line is blank in the MIN MAX columns.

2/ All configurations except as noted.

FIGURE 12. Dual-in-line package styles - Continued.

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1/  Symbol	Variations (all dimensions shown in inches)											
	D-13 Config. C		Note	D-14 Config. A,C		Note	D-15 Config. A,C		Note	D-16 Config. A,C		Note
	Min	Max		Min	Max		Min	Max		Min	Max	
A	---	.225		---	.225		---	.225		---	.225	
b	.014	.026	2	.014	.026	2	.014	.026	2	.014	.026	2
b1	.014	.023	3	.014	.023	3	.014	.023	3	.014	.023	3
b2	.045	.065	4	.045	.065	4	.045	.065	4	.045	.065	4
b3	.023	.045	5	.023	.045	5	.023	.045	5	.023	.045	5
c	.008	.018	2	.008	.018	2	.008	.018	2	.008	.018	2
c1	.008	.015	3	.008	.015	3	.008	.015	3	.008	.015	3
D	---	3.24	6	---	2.435	6	---	1.485	6	---	1.680	6
E	.870	.920	6	.510	.620	6	.240	.310	6	.510	.620	6
E2												
E3												
e	.100 BSC			.100 BSC			.100 BSC			.100 BSC		
eA	.900 BSC			.600 BSC			.300 BSC			.600 BSC		
eA/2	.450 BSC			.300 BSC			.150 BSC			.300 BSC		
L	.125	.200	8	.125	.200	8	.125	.200	8	.125	.200	8
Q	.015	.070	9	.015	.070	9	.015	.070	9	.015	.070	9
Q1												
S1	.005	---	10	.005	---	10	.005	---	10	.005	---	10
S2	.005	---	11	.005	---	11	.005	---	11	.005	---	11
α				90°	105°		90°	105°		90°	105°	
aaa	---	.015		---	.015		---	.015		---	.015	
bbb	---	.030		---	.030		---	.030		---	.030	
ccc	---	.010		---	.010		---	.010		---	.010	
M	---	.0015	2	---	.0015	2	---	.0015	2	---	.0015	2
N	64		12	48		12	28		12	32		12
Note	1, 14											

1/ Symbols in this column that are not on a configuration drawing are not applicable to that configuration; this is further noted when a line is blank in the MIN MAX columns.

2/ All configurations except as noted.

FIGURE 12. Dual-in-line package styles - Continued.



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1/ Symbol	Variations (all dimensions shown in millimeters)											
	D-13 Config. C		Note	D-14 Config. A,C		Note	D-15 Config. A,C		Note	D-16 Config. A,C		Note
	Min	Max		Min	Max		Min	Max		Min	Max	
A	---	5.72		---	5.72		---	5.72		---	5.72	
b	0.36	0.66	2	0.36	0.66	2	0.36	0.66	2	0.36	0.66	2
b1	0.36	0.58	3	0.36	0.58	3	0.36	0.58	3	0.36	0.58	3
b2	1.14	1.65	4	1.14	1.65	4	1.14	1.65	4	1.14	1.65	4
b3	0.58	1.14	5	0.58	1.14	5	0.58	1.14	5	0.58	1.14	5
c	0.20	0.46	2	0.20	0.46	2	0.20	0.46	2	0.20	0.46	2
c1	0.20	0.38	3	0.20	0.38	3	0.20	0.38	3	0.20	0.38	3
D	---	82.30	6	---	61.85	6	---	37.72	6	---	42.67	6
E	22.10	23.37	6	12.95	15.75	6	6.10	7.87	6	12.95	15.75	6
E2												
E3												
e	2.54 BSC			2.54 BSC			2.54 BSC			2.54 BSC		
eA	22.86 BSC			15.24 BSC			7.62 BSC			15.24 BSC		
eA/2	11.43 BSC			7.62 BSC			3.81 BSC			7.62 BSC		
L	3.18	5.08	8	3.18	5.08	8	3.18	5.08	8	3.18	5.08	8
Q	0.38	1.78	9	0.38	1.78	9	0.38	1.78	9	0.38	1.78	9
Q1												
S1	0.13	---	10	0.13	---	10	0.13	---	10	0.13	---	10
S2	0.13	---	11	0.13	---	11	0.13	---	11	0.13	---	11
α				90°	105°		90°	105°		90°	105°	
aaa	---	0.38		---	0.38		---	0.38		---	0.38	
bbb	---	0.76		---	0.76		---	0.76		---	0.76	
ccc	---	0.25		---	0.25		---	0.25		---	0.25	
M	---	0.038	2	---	0.038	2	---	0.038	2	---	0.038	2
N	64		12	48		12	28		12	32		12
Note	1, 14											

1/ Symbols in this column that are not on a configuration drawing are not applicable to that configuration; this is further noted when a line is blank in the MIN MAX columns.

2/ All configurations except as noted.

FIGURE 12. Dual-in-line package styles - Continued.

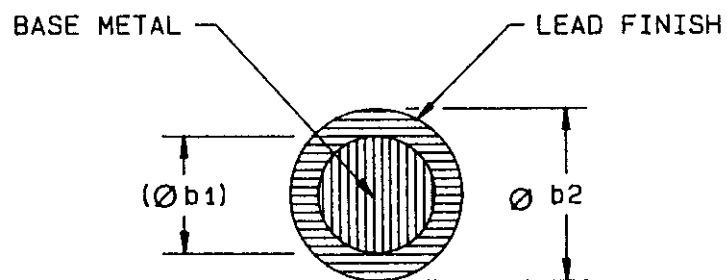
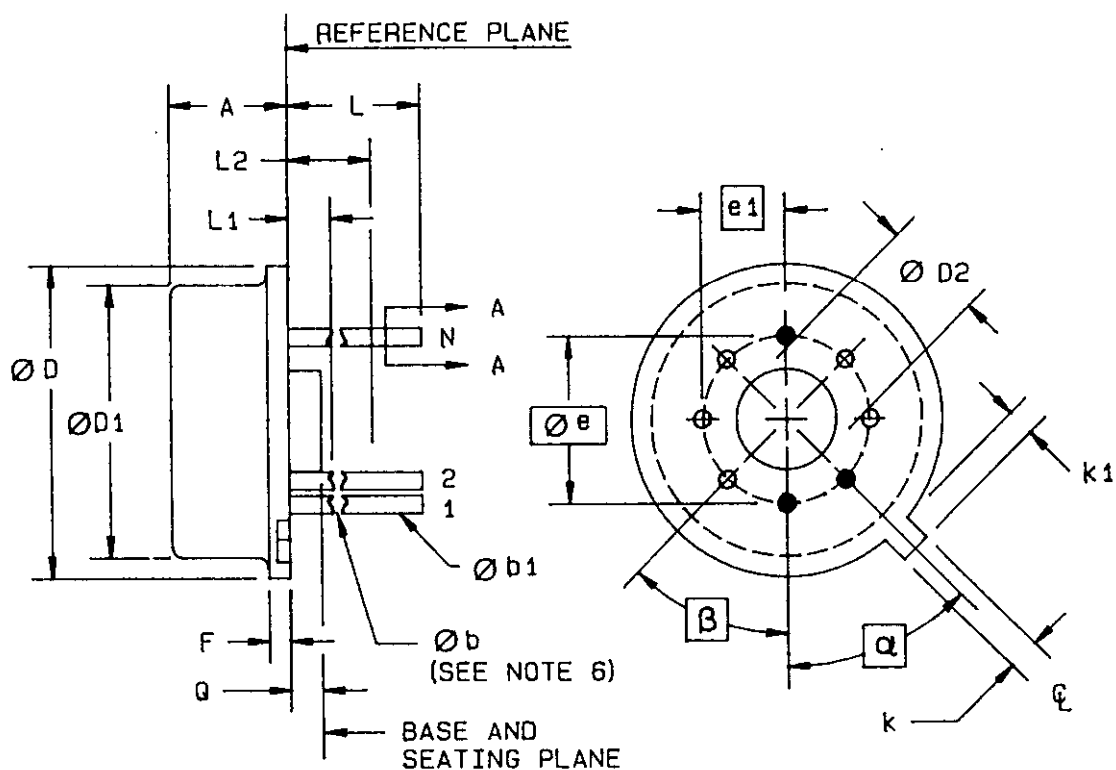
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## NOTES:

1. Index area: A notch or a pin one identification mark shall be located adjacent to pin one and shall be located within the shaded area shown. The manufacturer's identification shall not be used as a pin one identification mark.
2. The maximum limits of lead dimensions b and c or M shall be measured at the centroid of the finished lead surfaces, when solder dip or tin plate lead finish is applied.
3. Dimensions b1 and c1 apply to lead base metal only. Dimension M applies to lead plating and finish thickness.
4. The b2 minimum dimension of .045 inch (1.14 mm) shall be implemented one year from the date of this standard. Until that date, a minimum dimension of .038 (0.97 mm) is acceptable. See 5.2.4
5. Corner leads (1, N, N/2, and N/2+1) may be configured as shown in detail A. For this configuration dimension b3 replaces dimension b1.
6. This dimension allows for off-center lid, meniscus, and glass overrun.
7. For configuration B, no organic or polymeric materials shall be molded to the bottom of the package to cover the leads.
8. Pointed or rounded lead tips as shown in details B and C are preferred to ease insertion, but are not mandatory.
9. Dimension Q shall be measured from the seating plane to the base plane.
10. Measure dimension S1 at all four corners, see 5.2.5.
11. Measure dimension S2 from the top of the ceramic body to the nearest metallization or lead
12. N is the maximum number of terminal positions.
13. Braze fillet shall be concave. The maximum dimensions of this fillet include solder dip or tin plate lead finish, if applied.
14. See tables VI and VII for descriptive type designators.

FIGURE 12. Dual-in-line package style - Continued.

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SECTION A-A

FIGURE 13. Can style.

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Symbol	Variations (all dimensions shown in inches)											
	A1		Note	A2		Note	A3		Note	A4		Note
	Min	Max		Min	Max		Min	Max		Min	Max	
A	.165	.185		.165	.185		.165	.185		.240	.260	
φb	.016	.019	1	.016	.019	1	.016	.019	1	.016	.019	1
φb1	.016	.021	1	.016	.021	1	.016	.021	1	.016	.021	1
φb2	.016	.024		.016	.024		.016	.024		.016	.024	
φD	.335	.375		.335	.375		.335	.375		.350	.370	
φD1	.305	.335		.305	.335		.305	.335		.315	.335	
φD2	.110	.160		.110	.160		.110	.160				2
e	.200 BSC			.230 BSC			.230 BSC			.200 BSC		
e1	.100 BSC			.115 BSC			.115 BSC			.100 BSC		
F	---	.040		---	.040		---	.040		.009	.125	
k	.027	.034		.027	.034		.027	.034		.027	.034	
k1	.027	.045	3	.027	.045	3	.027	.045	3	.029	.040	3
L	.500	.750	1	.500	.750	1	.500	.750	1	.500	.750	1
L1	---	.050	1	---	.050	1	---	.050	1	---	.050	1
L2	.250	---	1	.250	---	1	.250	---	1	.250	---	1
Q	.010	.045		.010	.045		.010	.045				2
α	45° BSC		4	36° BSC		4	30° BSC		4	45° BSC		4
β	45° BSC		4	36° BSC		4	30° BSC		4	90° BSC		4
N	8		5	10		5	12		5	3		5
Notes	6, 7, 8											

FIGURE 13. Can style - Continued.

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Symbol	Variations (all dimensions shown in millimeters)											
	A1		Note	A2		Note	A3		Note	A4		Note
	Min	Max		Min	Max		Min	Max		Min	Max	
A	4.19	4.70		4.19	4.70		4.19	4.70		6.10	6.60	
$\phi b$	0.41	0.48	1	0.41	0.48	1	0.41	0.48	1	0.41	0.48	1
$\phi b1$	0.41	0.53	1	0.41	0.53	1	0.41	0.53	1	0.41	0.53	1
$\phi b2$	0.41	0.61		0.41	0.61		0.41	0.61		0.41	0.61	
$\phi D$	8.51	9.52		8.51	9.52		8.51	9.52		8.89	9.40	
$\phi D1$	7.75	8.51		7.75	8.51		7.75	8.51		8.00	8.51	
$\phi D2$	2.79	4.06		2.79	4.06		2.79	4.06				2
e	5.08 BSC			5.84 BSC			5.84 BSC			5.08 BSC		
e1	2.54 BSC			2.92 BSC			2.92 BSC			2.54 BSC		
F	---	1.02		---	1.02		---	1.02		---	1.02	
k	0.69	0.86		0.69	0.86		0.69	0.86		0.69	0.86	
k1	0.69	1.14	3	0.69	1.14	3	0.69	1.14	3	0.69	1.14	3
L	12.70	19.05	1	12.70	19.05	1	12.70	19.05	1	12.70	19.05	1
L1	---	1.27	1	---	1.27	1	---	1.27	1	---	1.27	1
L2	6.35	---	1	6.35	---	1	6.35	---	1	6.35	---	1
Q	0.25	1.14		0.25	1.14		0.25	1.14				2
$\alpha$	45° BSC		4	36° BSC		4	30° BSC		4	45° BSC		4
$\beta$	45° BSC		4	36° BSC		4	30° BSC		4	90° BSC		4
N	8		5	10		5	12		5	3		5
Notes	6, 7, 8											

FIGURE 13. Can style - Continued.

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## NOTES:

1. (All leads)  $\phi b$  applies between L1 and L2.  $\phi b1$  applies between L2 and .500 from the reference plane. Diameter is uncontrolled in L1 and beyond .500 from the reference plane.
2. The package feature described by dimension symbols  $\phi 02$  and Q does not exist for variation A4; therefore the reference, base, and seating planes are the same for this variation.
3. Measured from maximum diameter of the product.
4.  $\alpha$  is the basic spacing from the centerline of the tab to terminal 1 and  $\beta$  is the basic spacing of each lead or lead position (N -1 places) from  $\alpha$ , looking at the bottom of the package.
5. N is the maximum number of terminal positions.
6. Leads having a maximum diameter .019 inches measured in gauging plane .054 +.001 -.000 inches below the base plane of the product shall be within .007 of their true position relative to a maximum width tab.
7. This style package may be measured by direct methods or by gauge.
8. See table VI for descriptive type designators.

FIGURE 13. Can style - Continued.

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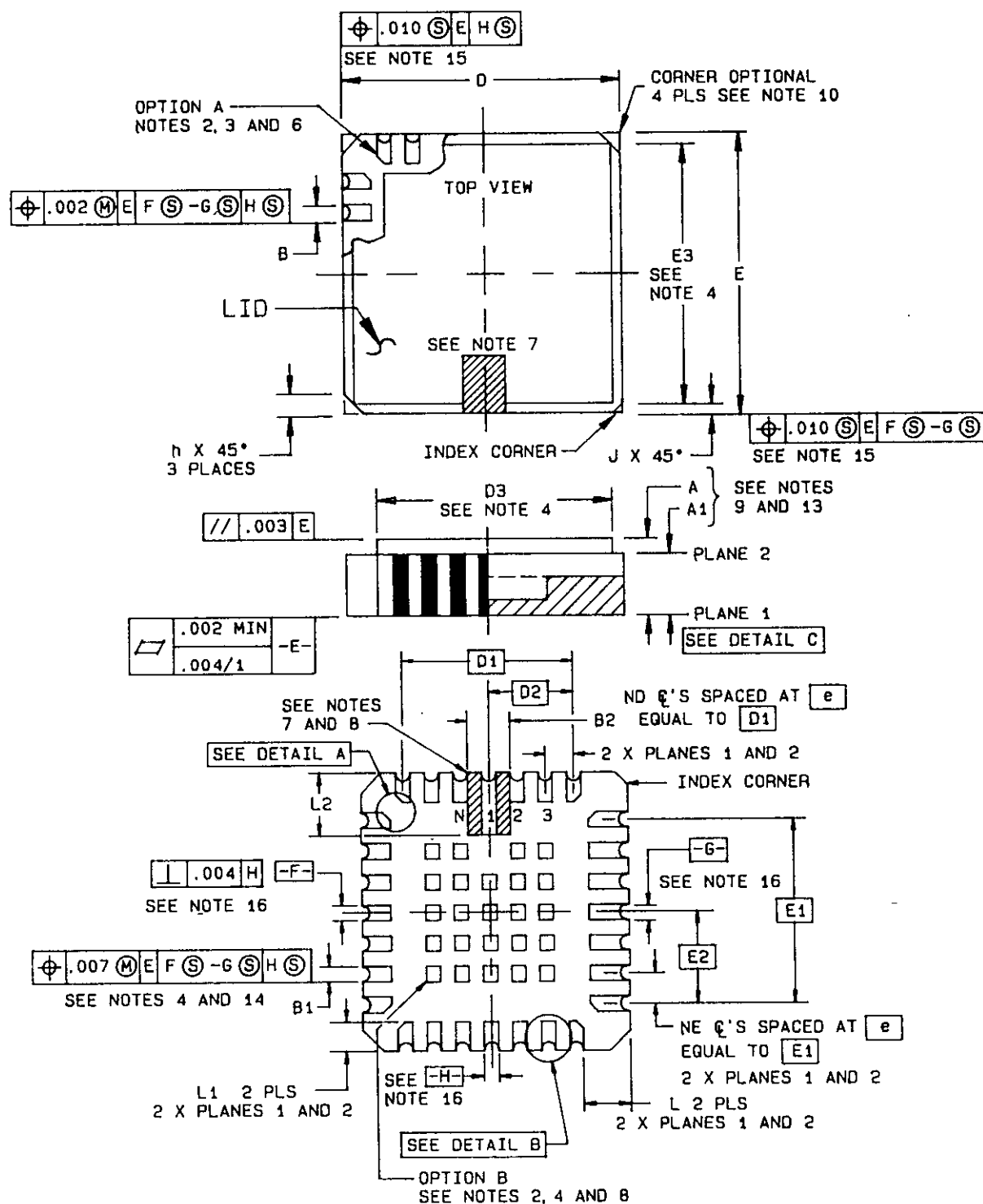


FIGURE 15. Ceramic, metal-sealed, square and rectangular leadless chip carrier styles.

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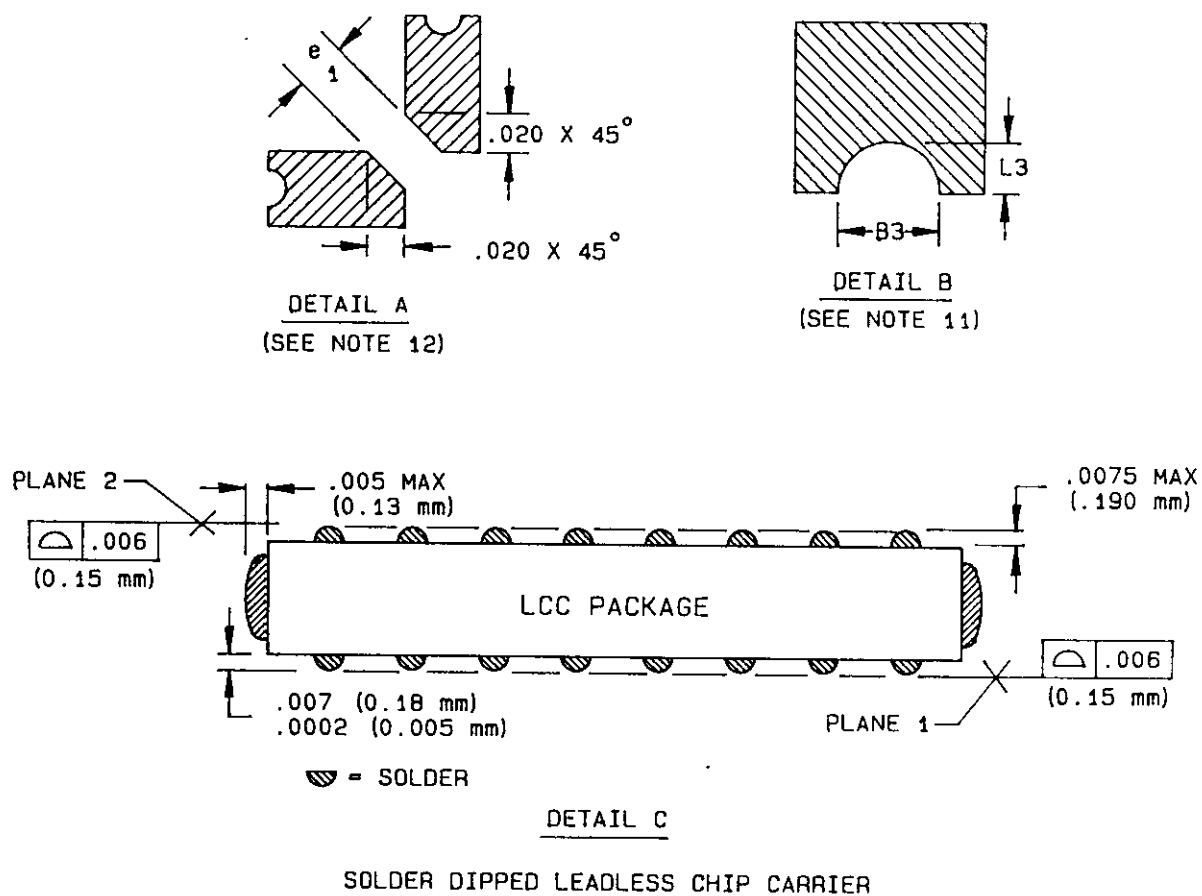


FIGURE 15. Ceramic, metal-sealed, square and rectangular leadless chip carrier styles - Continued.

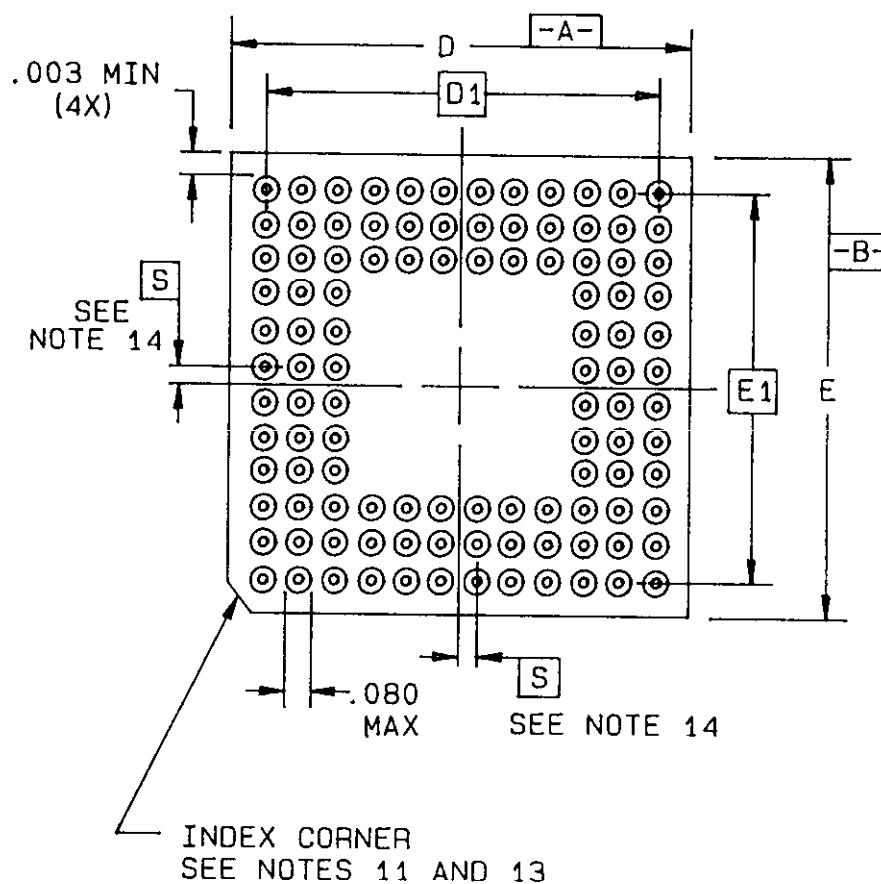


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NOTICE 1

## NOTES:

1. A terminal 1 identification mark shall be located at the index corner in the shaded area shown. Terminal 1 is located immediately adjacent to and counterclockwise from the index corner. Terminal numbers increase in a counterclockwise direction when viewed as shown.
2. Generic lead attach dogleg depiction. May be flat lead configuration.
3. Includes lead attach dogleg height and lid height, whichever is greater.
4. Corner shapes (square, notch, radius, etc.) may vary from that shown on the drawing. The index corner shall be clearly unique.
5. Dimension N: Number of terminals.
6. Dimension ND/NE: Number of terminals per package edge.
7. Regardless of the virtual length, the .002 limit ensures an accurate square trim for subsequent lead forming tool registration.
8. Lead coplanarity shall be .004 inch (0.10 mm) within .050 inch (1.27 mm) from package body.
9. No overhang of the lead on the braze pad is allowed.
10. Dimensions b1 and c1 apply to base metal only. Dimension M applies to plating thickness.
11. The leads on this package style shall be protected from mechanical distortion and damage such that dimensions pertaining to relative lead/body "true positions" and lead "coplanarity" are always maintained until the next higher level package attachment process is complete. Package lead protection mechanisms (tie bars, carriers, etc.) are not shown on the drawing, however when microcircuit devices contained in this package style are shipped for use in Government equipment, or shipped directly to the Government as spare parts or mechanical qualification samples, lead "true position" and "coplanarity" protection shall be in place.
12. The lead tip location may be determined with the use of the lead position gauge shown. Each lead tip and the body shall simultaneously reside within defined areas of the gauge.
13. Lead tip coplanarity shall be .030 inch (0.76 mm) at minimum lead length.
14. See table VI for descriptive type designator.
15. The lead tip-to-tip profile is specified by this feature control frame.

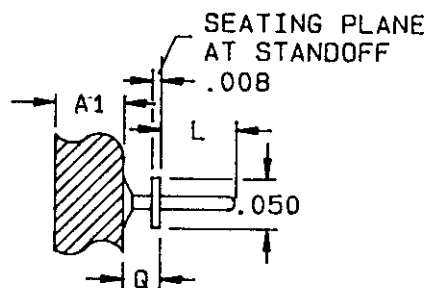
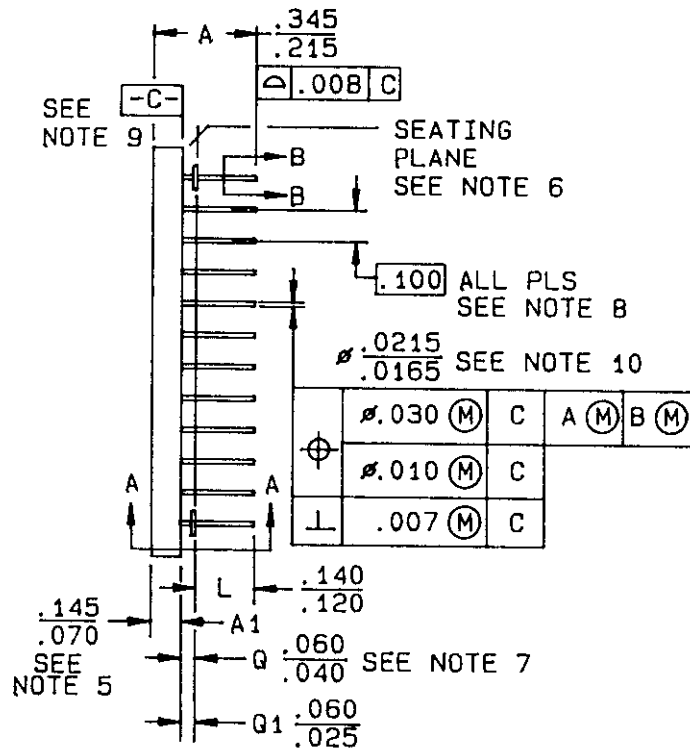
FIGURE 20. Ceramic, metal-sealed, unformed-lead chip carrier style - Continued.

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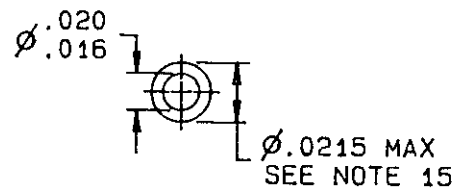
Inches	mm
.003	0.08
.007	0.18
.010	0.25
.016	0.41
.020	0.51
.025	0.64
.030	0.76
.040	1.02
.060	1.52
.070	1.78
.080	2.03
.100	2.54
.120	3.05
.140	3.56
.145	3.68

FIGURE 21. Ceramic, pin-grid-array style.

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SECTION A-A



SECTION B-B

FIGURE 21. Ceramic, pin-grid-array style - Continued.

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6.4 Package cross-reference list. The following table provides a cross-references of package type numbers (and configuration numbers where applicable) that were listed in appendix C of MIL-M-38510, to the package descriptive type designators listed in this standard. Packages were deleted from appendix C of MIL-M-38510 with the publication of this standard. The appendix C numbers are in alphanumeric sequence; underlined descriptive type designators are inactive (see table VIII).

TABLE VIII. Package cross-reference list.

Old MIL-M-38510 appendix C type no./ config. no.	New descriptive package type designator	Old MIL-M-38510 appendix C type no./ config. no.	New descriptive package type designator
A1	MACY1-X8	C-J8	GQCC1-J52
A2	MACY1-X10	C-J9	CQCC2-J28
A3	MACY1-X12	C-U1	CQCC1-F84
C-1	CQCC1-N16	C-U2	CQCC1-F100
C-10	CQCC3-N18	C-U3	CQCC1-F132
C-10A	CQCC4-N18	C-U4	CQCC1-F144
C-11	CQCC3-N28	C-U5	CQCC1-F172
C-11A	CQCC4-N28	C-U6	CQCC1-F196
C-12	CQCC1-N32	D-1, 3	CDIP2-T14
C-12A	CQCC2-N32	D-1, 1	GDIP1-T14
C-13	CQCC3-N20	D-10, 3	CDIP2-T28
C-13A	CQCC4-N20	D-10, 1	GDIP1-T28
C-1A	CQCC2-N16	D-11, 3	CDIP6-T24
C-2	CQCC1-N20	D-11, 1	GDIP5-T24
C-2A	CQCC2-N20	D-12, 3	CDIP2-T50
C-3	CQCC1-N24	D-12, 1	GDIP1-T50
C-3A	CQCC2-N24	D-13, 3	CDIP1-T64
C-4	CQCC1-N28	D-14, 3	CDIP2-T48
C-4A	CQCC2-N28	D-14, 1	GDIP1-T48
C-5	CQCC1-N44	D-15, 3	CDIP3-T28
C-6	CQCC1-N52	D-15, 1	GDIP4-T28
C-7	CQCC1-N68	D-2, 3	CDIP2-T16
C-8	CQCC1-N84	D-2, 1	GDIP1-T16
C-9	CQCC1-N18	D-3, 3	CDIP2-T24
C-9A	CQCC2-N18	D-3, 1	GDIP1-T24
C-G1	GQCC1-G44	D-4, 3	CDIP2-T8
C-G2	GQCC1-G68	D-4, 1	GDIP1-T8
C-G3	GQCC1-G84	D-5, 3	CDIP2-T40
C-G7	CQCC1-G132	D-5, 1	GDIP1-T40
C-J1	GQCC1-J44	D-6, 3	CDIP2-T18
C-J10	CQCC2-J52	D-6, 1	GDIP1-T18
C-J2	GQCC1-J68	D-7, 3	CDIP2-T22
C-J3	GQCC1-J84	D-7, 1	GDIP1-T22
C-J4	CQCC2-J44	D-8, 3	CDIP2-T20
C-J5	CQCC2-J68	D-8, 1	GDIP1-T20
C-J6	CQCC2-J84	D-9, 3	CDIP4-T24
C-J7	GQCC1-J28	D-9, 1	GDIP3-T24

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TABLE VIII. Package cross-reference List - Continued.

Old MIL-M-38510 appendix C type no./ config. no.	New descriptive package type designator
F-10, 1	GDFP1-F18
F-11, 1	GDFP2-F28
F-11A, 2	CDFP3-F28
F-12, 2	CDFP4-F28
F-13, 1	GDFP1-F16
F-14, 1	GDFP2-F18
F-15, 1	GDFP1-F20
F-16, 1	GDFP2-F24
F-17, 1	GDFP1-F28
F-2, 1	GDFP1-F14
F-2, 2	GDFP2-F14
F-2A, 2	CDFP3-F14
F-4, 1	GDFP1-F10
F-4, 2	CDFP2-F10
F-4A, 2	CDFP3-F10
F-5, 1	GDFP2-F16
F-5, 2	CDFP3-F16

Old MIL-M-38510 appendix C type no./ config. no.	New descriptive package type designator
F-5A, 2	CDFP4-F16
F-9, 1	GDFP2-F20
F-9, 2	CDFP3-F20
F-9A, 2	CDFP4-F20
P-AA	CMGA1-PN
P-AB	CMGA2-PN
P-AC	CMGA3-PN
P-AD	CMGA4-PN
P-AE	CMGA5-PN
P-AF	CMGA6-PN
P-AG	CMGA7-PN
P-AH	CMGA8-PN
P-AJ	CMGA9-PN
P-AK	CMGA10-PN
P-AL	CMGA11-PN
P-AM	CMGA12-PN

INACTIVE	
D-1, 2	CDIP3-T14
D-10, 2	CDIP4-T28
D-11, 2	CDIP9-T24
D-12, 2	CDIP3-T50
D-2, 2	CDIP3-T16
D-3, 2	CDIP7-T24
D-4, 2	CDIP3-T8
D-5, 2	CDIP3-T40
D-6, 2	CDIP3-T18
D-7, 2	CDIP3-T22
D-8, 2	CDIP3-T20
D-9, 2	CDIP8-T24
F-1, 4	CDFP6-F14
F-1, 3	GDFP5-F14
F-3, 3	GDFP4-F14
F-6, 4	CDFP6-F24

INACTIVE	
F-6, 3	GDFP5-F24
F-8, 4	CDFP8-F24
F-8, 3	GDFP7-F24
F-9, 4	CDFP5-F20
P-BA	CMGA13-PN
P-BB	CMGA14-PN
P-BC	CMGA15-PN
P-BD	CMGA16-PN
P-BE	CMGA17-PN
P-BF	CMGA18-PN
P-BG	CMGA19-PN
P-BH	CMGA20-PN
P-BJ	CMGA21-PN
P-BK	CMGA22-PN
P-BL	CMGA23-PN
P-BM	CMGA24-PN

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<b>3. DOCUMENT TITLE</b> Microcircuit Case Outlines			
<b>4. NATURE OF CHANGE</b> (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)			
<b>5. REASON FOR RECOMMENDATION</b>			
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