

NOTICE OF CHANGE

INCH-POUND

MIL-STD-1835B
NOTICE 4
3 March 2000

DEPARTMENT OF DEFENSE

INTERFACE STANDARD FOR
MICROCIRCUIT CASE OUTLINES

TO ALL HOLDERS OF MIL-STD-1835B:

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

NEW PAGE	DATE	SUPERSEDED PAGE	DATE
iii	3 September 1996	iii	Reprinted without change
iv	3 March 2000	iv	26 February 1997
v	3 March 2000	v	26 February 1997
1	3 September 1996	1	Reprinted without change
2	3 March 2000	2	12 April 1999
5	3 March 2000	5	12 April 1999
6	3 September 1996	6	Reprinted without change
11	3 September 1996	11	Reprinted without change
12	3 March 2000	12	12 April 1999
23	3 March 2000	23	3 September 1996
24	12 April 1999	24	Reprinted without change
151	3 March 2000	151	26 February 1997
152	3 March 2000	152	26 February 1997
153	3 March 2000	153	26 February 1997
154	3 March 2000	154	26 February 1997
155	3 March 2000	155	26 February 1997
156	3 March 2000	156	26 February 1997
157	3 March 2000	157	26 February 1997
158	3 March 2000	158	26 February 1997
159	3 March 2000	159	26 February 1997
160	3 March 2000	NEW	
161	3 March 2000	NEW	
162	3 March 2000	NEW	
163	3 March 2000	NEW	
164	3 March 2000	NEW	
165	3 March 2000	NEW	

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

3. Holders of MIL-STD-1835B 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 standard is completely revised or canceled.

CONCLUDING MATERIAL

Custodians:

Army - CR
Navy - EC
Air Force - 11
NASA - NA
DLA - CC

Preparing activity:

DLA - CC

Review activities:

Army - AR, HD, MI, SM
Navy - AS, CG, MC, OS, SH
Air Force - 19, 99

(Project 5962-1863)

MIL-STD-1835B
NOTICE 4

CONTENTS

<u>PARAGRAPH</u>	<u>PAGE</u>
1. SCOPE	1
1.1 Scope	1
1.2 Purpose	1
1.2.1 Tailoring	1
1.2.2 Classification.....	1
1.2.3 Package case outline presentation	1
2. APPLICABLE DOCUMENTS	2
2.1 Government documents.....	2
2.1.1 Specifications, standards, and handbooks	2
2.2 Non-Government publications	2
2.3 Order of precedence	2
3. DEFINITIONS	3
3.1 Definitions	3
3.1.1 Microelectronic device case outline (package)	3
3.1.2 Configuration	3
3.1.3 Package style	3
3.1.4 Package type	3
3.1.5 Chip carrier (CC) package	3
3.1.6 Can package	3
3.1.7 In-line package (IP).....	3
3.1.8 Flat package (FP)	3
3.1.9 Grid array (GA) package.....	3
3.1.10 Index.....	3
3.1.11 Index area.....	3
3.1.12 Base plane	3
3.1.13 Seating plane	3
3.1.14 Coplanarity	3
3.1.15 Dimension	4
3.1.16 Reference dimension	4
3.1.17 Basic dimension (BSC).....	4
3.1.18 True position	4
3.1.19 Datum	4
3.1.20 Land	4
3.1.21 Land pattern	4
3.1.22 Lead position overlay	4
3.1.23 Cavity-up, cavity-down	4
3.1.24 Tailoring.....	4
4. GENERAL REQUIREMENTS	5
4.1 Package design	5
4.2 Package terminal identification	5
4.3 Package index implementation	5
4.4 Package dimensions and symbols.....	5
4.5 Dimension verification.....	5
4.6 Package material characteristics	5
4.7 Package descriptive designation system	5
4.7.1 Case outline letter/ Part or Identifying Number (PIN) designator	5
4.8 Inactive for new design	5

Reprinted without change.

MIL-STD-1835B
NOTICE 4

PARAGRAPH	CONTENTS	PAGE
5.	DETAIL REQUIREMENTS	20
5.1	Package styles and package types	20
5.2	Unique package features	20
5.2.1	Flat pack end leads	20
5.2.2	Glass sealed flat pack minimum S1 dimensions.....	20
5.2.3	DIP lead row center dimension eA	21
5.2.4	DIP dimensions L and Q	21
5.2.5	DIP end variations dimension S1	22
5.2.6	Leadless chip carrier (LCC) castellation irregularities	22
5.2.7	Coplanarity deviation	23
5.2.8	Package cavity orientation	23
5.2.9	Package drawings	23
* 6.	NOTES	157
* 6.1	Intended use	157
* 6.2	Tailoring guidance for contractual application.....	157
* 6.3	Subject term (key word) listing	157
* 6.4	Package cross-reference list.....	158
* 6.5	Plastic encapsulated microcircuit packages.....	160
* 6.6	Changes from previous issue	161
 FIGURES		
1	Package descriptive designation system	6
2	Example of a (scope) page from a military detail specification showing the identification/specification of case outlines (packages)	11
3	Lead bend angle	20
4	Lead space from package end	20
5	Lead row center dimension	21
6	DIP standoff dimension Q	21
7	DIP package end variations.....	22
8	Measurement and alignment of LCC castellation	22
9	Coplanarity deviation	23
10	Package cavity orientation	23
11	Flat pack style	24
12	Dual-in-line package style	44
13	Can style	58
14	Ceramic, metal-sealed, single-in-line package style	62
15	Ceramic, square and rectangular leadless chip carrier styles	64
16	Ceramic, glass-sealed, gullwing-lead, chip carrier style	79
17	Ceramic, metal-sealed, gullwing-lead, chip carrier style	85
18	Ceramic, glass-sealed, "J" lead, chip carrier style	90
19	Ceramic, metal-sealed, "J" lead, chip carrier style.....	97
20	Ceramic, metal-sealed, unformed-lead, chip carrier style	104
21	Ceramic, pin-grid-array style	111
22	Metal base flange mount style	119
23	Dual leadless chip carrier style	126
24	Ceramic, quad leaded chip carrier style with non-conductive tie bar	132
25	Ceramic, zig-zag in-line package style	142
26	Ceramic, staggered pin grid array style	144
* 27	Dual flat pack style with gullwing leads.....	151

Supersedes page iv of Notice 1 to MIL-STD-1835B.

MIL-STD-1835B
NOTICE 4

CONTENTS

<u>TABLES</u>	<u>PAGE</u>
I. Predominant package body material prefixes	7
II. Terminal location prefixes	7
III. Package outline style codes	8
IV. Lead-form (or terminal shape) suffixes	9
V. Package design options	10
VI. Package case outline list	12
VII. Inactive package case outline list	18
* VIII. Package cross-reference list	158
* IX. Plastic encapsulated microcircuit packages	160
 <u>APPENDIX</u>	
* 10 SCOPE	162
* 10.1 Scope	162
* 20 APPLICABLE DOCUMENTS	162
* 30 DEFINITIONS	162
* 30.1 Dimensioning symbols	162
 <u>INDEX</u>	
* INDEX	164

Supersedes page v of Notice 1 to MIL-STD-1835B.

This page intentionally blank

MIL-STD-1835B
NOTICE 4

1. SCOPE

1.1 Scope. This standard establishes and maintains a compilation of microelectronic package case outlines and should be useful to all levels of manufacturing that culminate in the production of reliable and logistically supportable military electronic equipment.

1.2 Purpose. The purpose of this standard is to assure complete mechanical interchangeability of all microelectronic package case outlines of a particular style and type, regardless of source, commensurate with the requirements of high density military electronic equipment manufacturing.

1.2.1 Tailoring. Some tailoring of package case outlines is to be accomplished by users of this standard. Details for tailoring are presented with each style of package case outline (when required, see 3.1.3 and 6.2).

1.2.2 Classification. Microelectronic package case outlines are of the styles and types identified in accordance with the descriptive designation system used herein (see 4.7). A cross-reference is included in section 6 indicating the relationship between old designations from MIL-M-38510 appendix C and the new designations used herein.

1.2.3 Package case outline presentation. All package case outlines presented in this standard are drawn in orthogonal projections. Dimensions are as shown, presented in both inch and meter units of measurement. The dimensions are labeled with the symbols listed in the appendix, (see 4.4). The drawings are intended only as illustrations of a package style. In some instances, the drawings show added detail for emphasis; in most instances, the drawings are distorted by intent.

Reprinted without change.

MIL-STD-1835B
NOTICE 4

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation.

SPECIFICATIONS

DEPARTMENT OF DEFENSE

MIL-M-38510 - Microcircuits, General Specification for.
MIL-PRF-38534 - Hybrid Microcircuits, General Specification for.
MIL-PRF-38535 - Integrated circuits (Microcircuits)
Manufacturing, General Specification for.

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.2 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are indicated as DoD adopted are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the documents cited in the solicitation.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME Y14.5M-1994 - Dimensioning and Tolerancing. (DoD adopted)

(Application for copies should be addressed to the American Society of Mechanical Engineers, 345 East 47th Street, New York, NY 10017-2392).

* ELECTRONIC INDUSTRIES ALLIANCE (EIA)

JEDEC Publication 95 - Registered and Standard Outlines for Solid State Products.

* (Application for copies should be addressed to the Electronic Industries Alliance, 2500 Wilson Boulevard, Arlington, VA 22201-3834.)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

Supersedes page 2 of Notice 3 to MIL-STD-1835B.

MIL-STD-1835B
NOTICE 4

4. GENERAL REQUIREMENTS

4.1 Package design. Package design shall be in accordance with this standard.

4.2 Package terminal identification. Package terminal identification shall be in accordance with the applicable military detail specification.

4.3 Package index implementation. A permanent index shall be clearly visible on the top and, as an added option, bottom of a package. The index shall be used for locating terminal 1. The location of the index shall be as specified on the figures for each package style (see table VI).

4.4 Package dimensions and symbols. The package dimensions shall be in accordance with this standard. All dimensions shall apply to assembled sealed packages. Symbols and tolerances shall be interpreted in accordance with ASME Y14.5M-1994 and this standard. Unless otherwise specified, the package design controlling dimension shall be the inch. For all new package designs after January 1, 1992, it shall be the meter.

4.5 Dimension verification. Unless otherwise specified, dimensions identified by a single symbol, which are repeated at more than 15 package locations may be verified by measurement at 15 randomly selected locations on the package. All package dimensions may be verified using calibrated gauges, overlays, or other comparative dimension verification devices. These devices shall be designed to the limits of size and relative location of package features. These devices and their application shall be subject to the approval of the qualifying activity. Recorded variables data for out of tolerance package features shall be available for review by the qualifying activity.

4.6 Package material characteristics. Package material characteristics, including internal elements that contribute to the uniqueness of a package type, shall be in accordance with the requirements of the military detail specification.

4.7 Package descriptive designation system. This standard uses a descriptive designation system to communicate package identification (see figure 1). This system describes materials, terminal location, package case outline style, lead form, terminal count, and options. A type designator has been constructed, using this system, for all packages in this standard (see tables VI and VII). The type designators for packages selected from this standard shall be referenced in applicable military detail specifications. See the example on figure 2.

4.7.1 Case outline letter/Part or Identifying Number (PIN) designator. The PIN case outline letter designator shall be as specified herein and shall be referenced in applicable military detail specifications. The case outline designator may include numbers or letters with the following limitations:

- a. The letters "I" and "O" shall not be used.
- b. The numbers "0", and "1" shall not be used.
- * c. The letters X, Y, Z, U, T, M, N, and the numbers 4, 5, 6, 7, and 8 are undedicated "wildcards"; they may be used repeatedly, but only one time in a single military detail specification, see the example using the letter "X" on figure 2.
- d. Blank spaces are not permitted.

4.8 Inactive for new design. The packages in table VII are inactive for new design. They are acceptable only for use in equipment designed or redesigned on or before the date indicated in the applicable footnote in table VII.

Supersedes page 5 of Notice 3 to MIL-STD-1835B.

MIL-STD-1835B
NOTICE 4

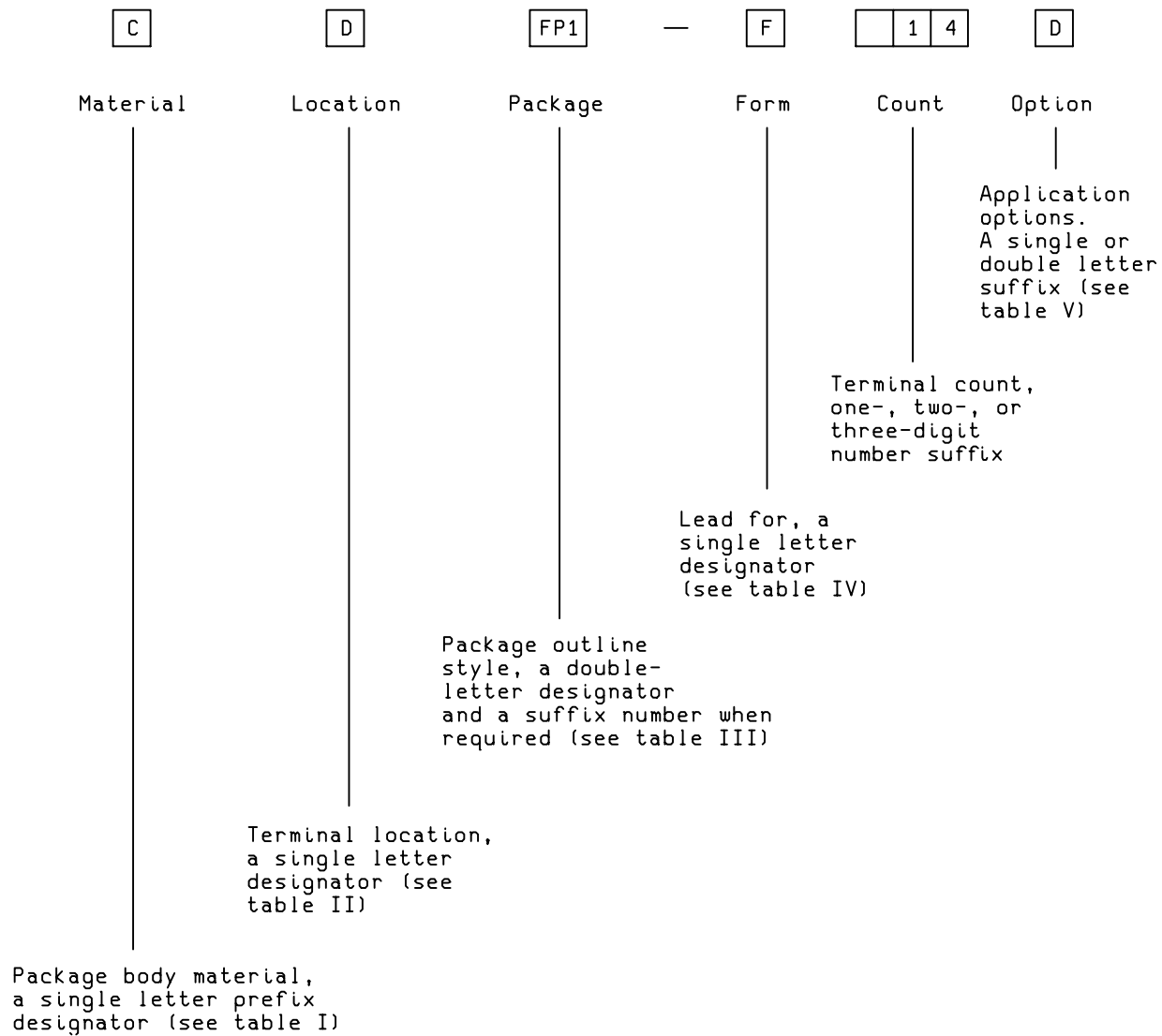


FIGURE 1. Package descriptive designation system.

Reprinted without change.

MIL-STD-1835B
NOTICE 4TABLE VI. Package case outline list.

Descriptive package type designator	Case outline letter, Figure no., Configuration letter	<u>1/</u> Dimensions reference letter	<u>2/</u> θ_{JC} (°C/W)	Terminal count and row-to-row spacing (inch)	Terminal pitch (inch)	<u>3/</u> EIA similar package designation	
Flat pack style <u>4/</u>							
GDFP1-F10	H, 11, A	F-4	22	10	.050	MS-033 AA	*
CDFP2-F10	H, 11, B	F-4	"	10	"	none	
CDFP3-F10	11, B	F-4A	"	10	"	MO-098 AA	
GDFP1-F14	D, 11, A	F-2	"	14	"	MS-033 AB	*
CDFP2-F14	D, 11, B	F-2	"	14	"	none	
CDFP3-F14	11, B	F-2A	"	14	"	MO-098 AB	
GDFP1-F16	11, A	F-13	"	16	"	MO-070 AA	*
GDFP2-F16	F, 11, A	F-5	"	16	"	MS-033 AC	
CDFP3-F16	F, 11, B	F-5	"	16	"	none	
CDFP4-F16	11, B	F-5A	"	16	"	MO-098 AC	
GDFP1-F18	11, A	F-14	"	18	"	MO-070 AB	
GDFP2-F18	11, A	F-10	"	18	"	MO-092 AD	
GDFP1-F20	11, A	F-15	"	20	"	MO-070 AC	
GDFP2-F20	S, 11, A	F-9	"	20	"	MS-033 AD	*
CDFP3-F20	S, 11, B	F-9	"	20	"	none	
CDFP4-F20	11, B	F-9A	"	20	"	"	
GDFP1-F24	11, A	F-16	"	24	"	MO-070 AD	
GDFP2-F24	K, 11, A	F-6	"	24	"	MS-033 AE	*
CDFP3-F24	K, 11, B	F-6	"	24	"	none	
CDFP4-F24	11, B	F-6A	"	24	"	"	
GDFP1-F28	11, A	F-17	"	28	"	MO-070 AE	
GDFP2-F28	11, A	F-11	"	28	"	MS-033 AF	*
CDFP3-F28	11, B	F-11A	"	28	"	none	
CDFP4-F28	11, B	F-12	"	28	"	"	
CDFP1-F32	11, B	F-18	"	32	"	MO-115 AA	
GDFP1-F48	11, A	F-19	"	48	.025	MO-146 AA	
GDFP1-F56	11, A	F-20	"	56	"	MO-146 AB	
Flat pack style with gull wing leads <u>4/</u>							*
GDFP1-G10	27	FG-1	22	10	.050	None	*
GDFP1-G14	27	FG-2	"	14	"	"	*
GDFP1-G16	27	FG-3	"	16	"	"	*
GDFP1-G20	27	FG-4	"	20	"	"	*

See footnotes at end of table VII.

Supersedes page 12 of Notice 3 to MIL-STD-1835B.

MIL-STD-1835B
NOTICE 4

5.2.7 Coplanarity deviation. The coplanarity deviation of all terminal contact points, as defined by the device seating plane, shall be determined for surface mounted devices. Measurements shall be made from the device seating plane (see figure 9). Regardless of package size, any device with one or more terminals that exceed the specified coplanarity deviations shall constitute a failure.

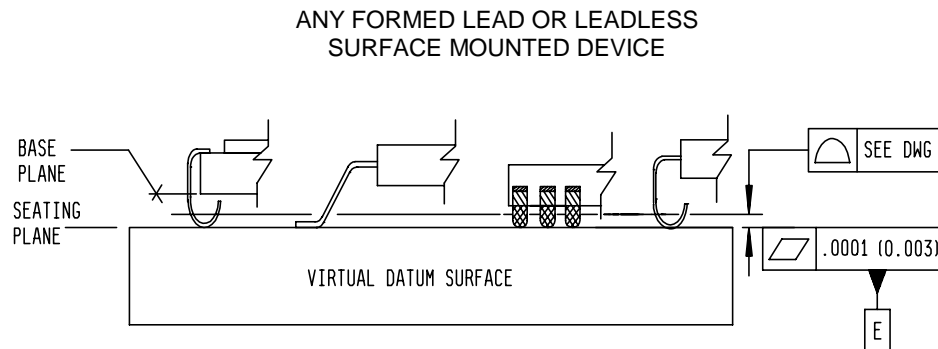


FIGURE 9. Coplanarity deviation.

5.2.8 Package cavity orientation. Unless otherwise specified herein, for most packages, cavity orientation (see figure 10) is standard in the "cavity-up" position. When a particular package style includes optional cavity orientation, such as cavity-down, the cavity-down option shall be specified by adding a suffix D to the terminal- count part of the descriptive type designator (see figure 1).

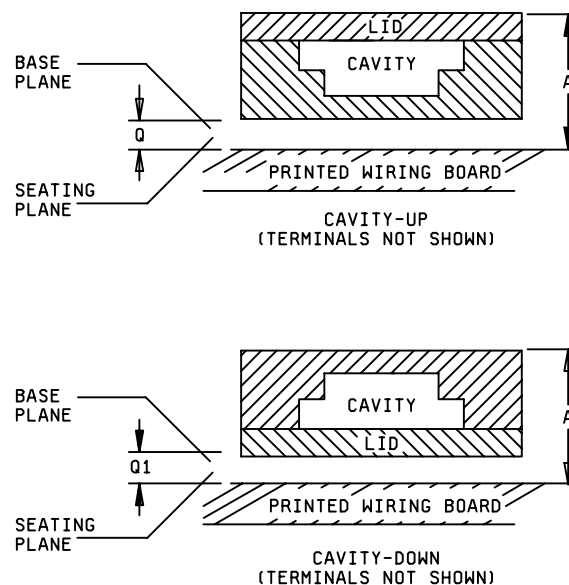
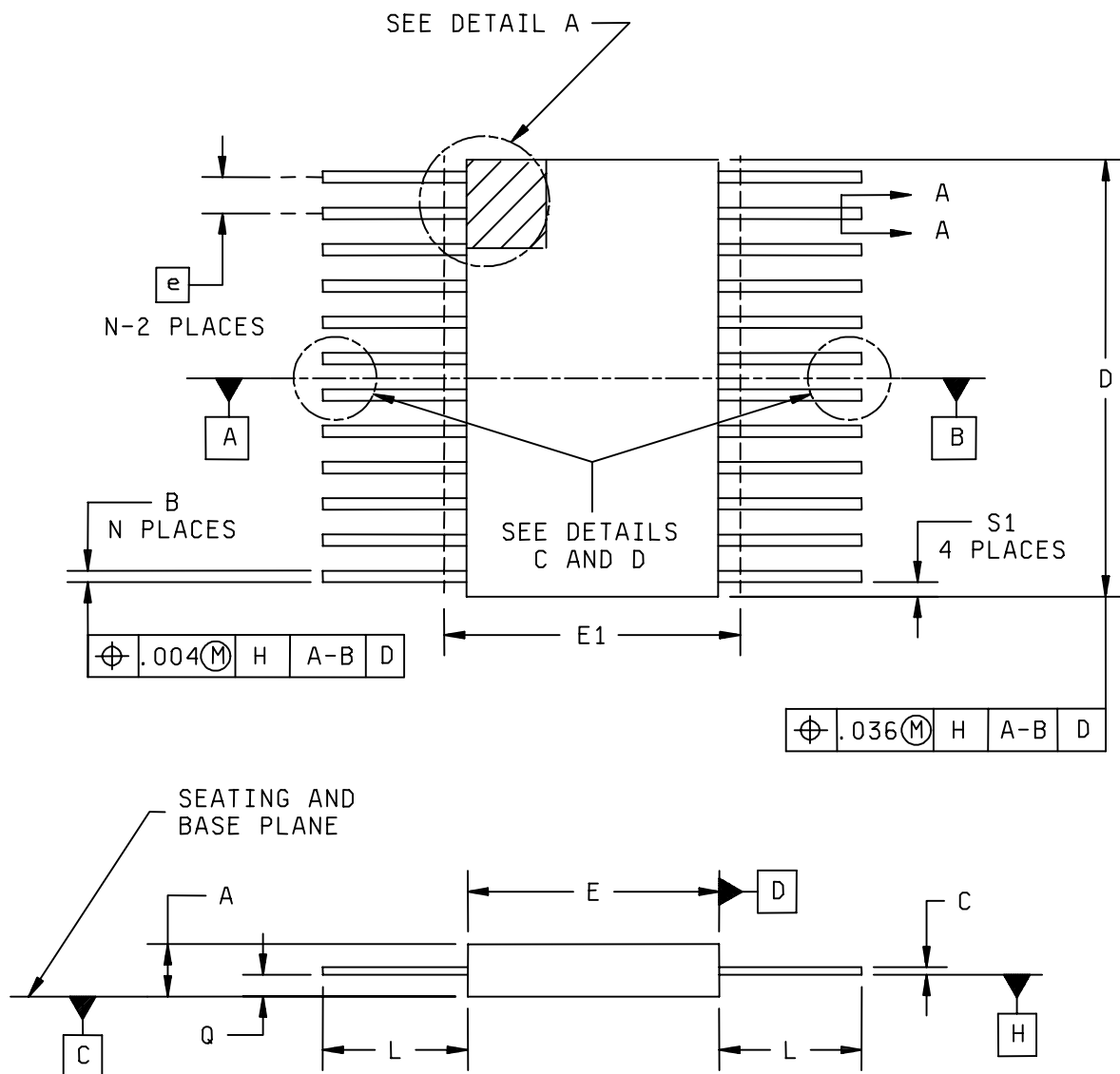


FIGURE 10. Package cavity orientation.

* 5.2.9 Package drawings. Detailed package drawings and dimensional requirements shall be as specified on figures 11 through 27.

Supersedes page 23 of MIL-STD-1835B.

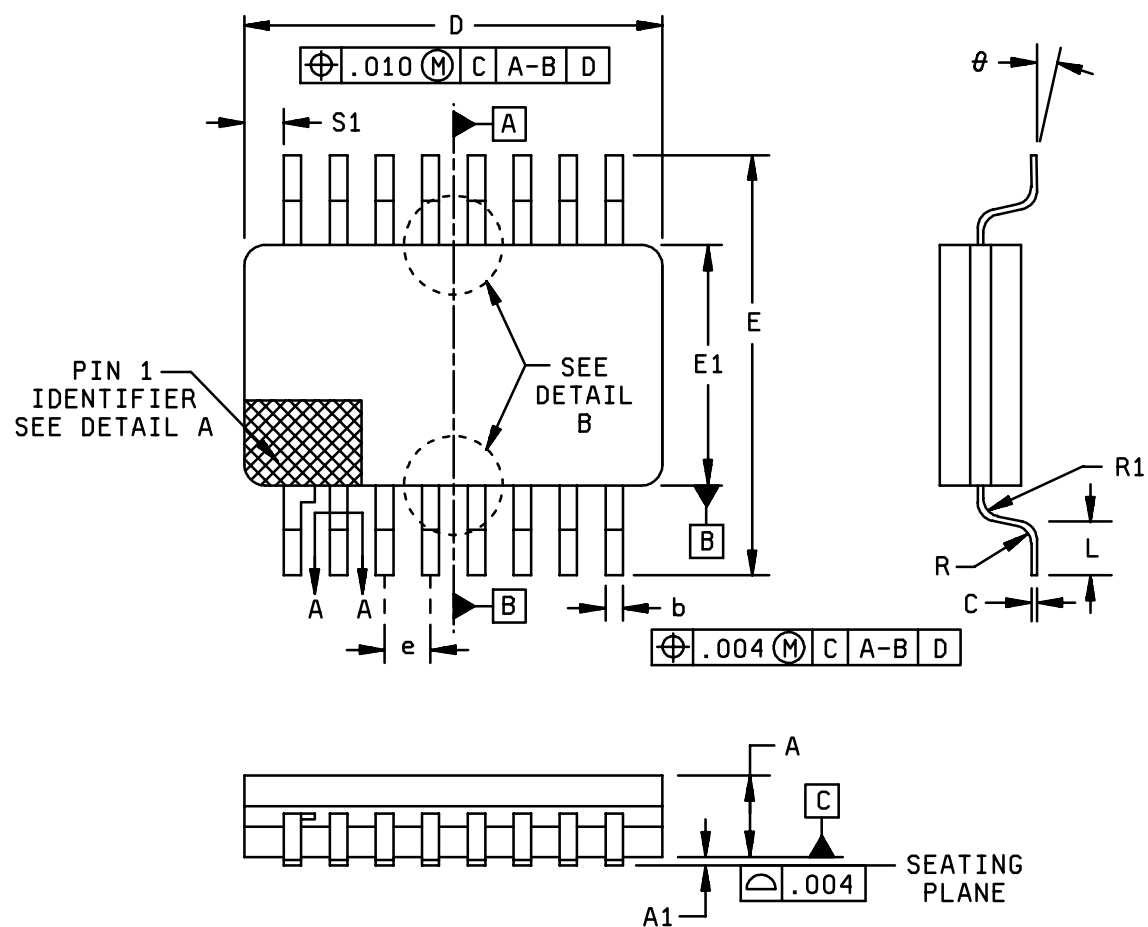
MIL-STD-1835B
NOTICE 4



Configuration A
Ceramic, glass sealed

FIGURE 11. Flat pack style.

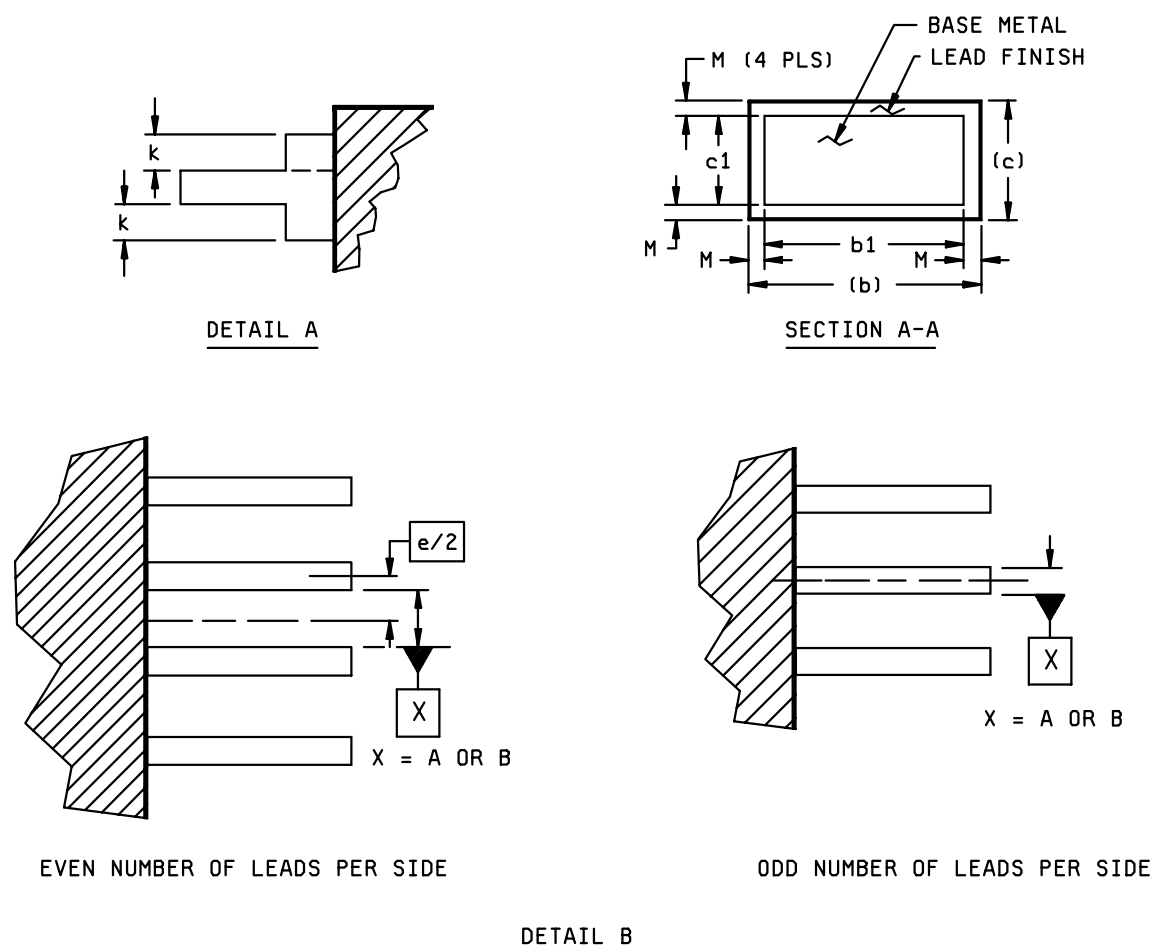
Reprinted without change.

MIL-STD-1835B
NOTICE 4

* FIGURE 27. Dual flat pack style with gullwing leads.

Supersedes page 151 of Notice 1 to MIL-STD-1835B.

MIL-STD-1835B
NOTICE 4



* FIGURE 27. Dual flat pack style with gullwing leads – Continued.

Supersedes page 152 of Notice 1 to MIL-STD-1835B.

MIL-STD-1835B
NOTICE 4

Variations (all dimensions shown in inches)								
Symbol	FG-1				FG-2			
	Min	Nom	Max	Note	Min	Nom	Max	Note
A	.050	---	.080		.050	---	.080	
A1	.004	---	.012		.004	---	.012	
b	.015	---	.022		.015	---	.022	
b1	.015	.017	.019	4	.015	.017	.019	4
c	.004	.006	.009		.004	.006	.009	
c1	.004	.005	.006	4	.004	.005	.006	4
D	.235	.240	.280	3	.370	.390	.405	3
E	.400	.410	.420		.400	.410	.420	
E1	.235	.240	.260	3	.245	.250	.270	3
e	.050 BSC				.050 BSC			
k	.008	---	.015	1, 2	.008	---	.015	1, 2
L	.037	.040	.043		.037	.040	.043	
R	.013	.015	.017		.013	.015	.017	
R1	.013	.015	.017		.013	.015	.017	
S1	.005	---	---		.005	---	---	
θ	0°	---	7°		0°	---	7°	
M	---	---	.0015	4	---	---	.0015	4
N	10			5	14			5
Note	6							

* FIGURE 27. Dual flat pack style with gullwing leads – Continued.

Supersedes page 153 of Notice 1 to MIL-STD-1835B.

MIL-STD-1835B
NOTICE 4

Variations (all dimensions shown in millimeters)										
Symbol	FG-1				FG-2					
	Min	Nom	Max	Note	Min	Nom	Max	Note		
A	1.27	---	2.03	4	1.27	---	2.03	4		
A1	0.10	---	0.30		0.10	---	0.30			
b	0.38	---	0.56		0.38	---	0.56			
b1	0.38	0.43	0.48		0.38	0.43	0.48			
c	0.10	0.15	0.23	4	0.10	0.15	0.23	4		
c1	0.10	0.13	0.15		0.10	0.13	0.15			
D	5.97	6.10	7.11		3	9.40	9.91		10.29	3
E	10.16	10.41	10.67		10.16	10.41	10.67			
E1	5.97	6.10	6.60	3	6.22	6.35	6.86	3		
e	1.27 BSC			1, 2	1.27 BSC			1, 2		
k	0.20	---	0.38		0.20	---	0.38			
L	0.94	1.02	1.09		0.94	1.02	1.09			
R	0.33	0.38	0.43		0.33	0.38	0.43			
R1	0.33	0.38	0.43		0.33	0.38	0.43			
S1	0.13	---	---		0.13	---	---			
θ	0°	---	7°		0°	---	7°			
M	---	---	0.04		4	---	---		0.04	4
N	10			5	14			5		
Note	6									

* FIGURE 27. Dual flat pack style with gullwing leads – Continued.

Supersedes page 154 of Notice 1 to MIL-STD-1835B.

MIL-STD-1835B
NOTICE 4

Variations (all dimensions shown in inches)										
Symbol	FG-3				FG-4					
	Min	Nom	Max	Note	Min	Nom	Max	Note		
A	.050	---	.080	4	.060	---	.090	4		
A1	.004	---	.012		.004	---	.012			
b	.015	---	.022		.015	---	.022			
b1	.015	.017	.019		.015	.017	.019			
c	.004	.006	.009	4	.004	.006	.009	4		
c1	.004	.005	.006		.004	.005	.006			
D	.370	.390	.405		3	.495	.500		.540	3
E	.400	.410	.420		.400	.410	.420			
E1	.245	.265	.285	3	.260	.265	.285	3		
e	.050 BSC				.050 BSC					
k	.008	---	.015	1, 2	.008	---	.015	1, 2		
L	.037	.040	.043		.037	.040	.043			
R	.013	.015	.017		.013	.015	.017			
R1	.013	.015	.017		.013	.015	.017			
S1	.005	---	---	4	.005	---	---	4		
θ	0°	---	7°		0°	---	7°			
M	---	---	.0015		---	---	.0015			
N	16				5	20			5	
Note	6									

* FIGURE 27. Dual flat pack style with gullwing leads – Continued.

Supersedes page 155 of Notice 1 to MIL-STD-1835B.

MIL-STD-1835B
NOTICE 4

Variations (all dimensions shown in millimeters)								
Symbol	FG-3				FG-4			
	Min	Nom	Max	Note	Min	Nom	Max	Note
A	1.27	---	2.03		1.53	---	2.29	
A1	0.10	---	0.30		0.10	---	0.30	
b	0.38	---	0.56		0.38	---	0.56	
b1	0.38	0.43	0.48	4	0.38	0.43	0.48	4
c	0.10	0.15	0.23	4	0.10	0.15	0.23	4
c1	0.10	0.13	0.15		0.10	0.13	0.15	
D	9.40	9.91	10.29		3	12.57	12.70	
E	10.16	10.41	10.67	3	10.16	10.41	10.67	3
E1	6.22	6.73	7.24		6.61	6.73	7.24	
e	1.27 BSC				1.27 BSC			
k	0.20	---	0.38	1, 2	0.20	---	0.38	1, 2
L	0.94	1.02	1.09		0.94	1.02	1.09	
R	0.33	0.38	0.43		0.33	0.38	0.43	
R1	0.33	0.38	0.43		0.33	0.38	0.43	
S1	0.13	---	---		0.13	---	---	
θ	0°	---	7°		0°	---	7°	
M	---	---	0.04	4	---	---	0.04	4
N	16			5	20			5
Note	6							

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. Alternately, a tab (dimension k) may be used to identify pin one. This tab may be located on either side of terminal one as shown in detail A.
2. If a pin one identification mark is used in addition to a tab, the limits of dimension k do not apply.
3. This dimension allows for off-center lid, meniscus, and glass overrun.
4. Dimensions b1 and c1 apply to lead base metal only. Dimension M applies to lead plating and finish thickness. The maximum limits of lead dimensions b and c or M shall be measured at the centroid of the finished lead surface, when solder dip or tin plate lead finish is applied.
5. N is the maximum number of terminal positions.
6. See tables VI and VII for descriptive type designators.

* FIGURE 27. Dual flat pack style with gullwing leads – Continued.

Supersedes page 156 of Notice 1 to MIL-STD-1835B.

MIL-STD-1835B
NOTICE 4

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. Packages conforming to the requirements of this standard are intended for use in military electronic equipment.

6.2 Tailoring guidance for contractual application. For purposes of this standard, tailoring refers to the selection of optional package features when they are specified on the drawing figures. For example, one may select top and bottom terminals and thermal conduction pads on certain chip carrier packages.

6.3 Subject term (key word) listing.

ANSI
Basic dimension
Ceramic
Classification
EIA
Gullwing
Interchangeability
Lead position overlay
Package style
Quad
Tailoring
Type designator

Supersedes page 157 of Notice 1 to MIL-STD-1835B.

MIL-STD-1835B
NOTICE 4

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

Supersedes page 158 of Notice 1 to MIL-STD-1835B.

MIL-STD-1835B
NOTICE 4TABLE VIII. Package cross-reference list - Continued.

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
F-10,1	GDFP1-F18	P-AC	CMGA3-PN
F-11,1	GDFP2-F28	P-AD	CMGA4-PN
F-11A,2	CDFP3-F28	P-AE	CMGA5-PN
F-12,2	CDFP4-F28	P-AF	CMGA6-PN
F-13,1	GDFP1-F16	P-AG	CMGA7-PN
F-14,1	GDFP2-F18	P-AH	CMGA8-PN
F-15,1	GDFP1-F20	P-AJ	CMGA9-PN
F-16,1	GDFP2-F24	P-AK	CMGA10-PN
F-17,1	GDFP1-F28	P-AL	CMGA11-PN
F-2,1	GDFP1-F14	P-AM	CMGA12-PN
F-2,2	GDFP2-F14	P-BA	CMGA13-PN
F-2A,2	CDFP3-F14	P-BB	CMGA14-PN
F-4,1	GDFP1-F10	P-BC	CMGA15-PN
F-4,2	CDFP2-F10	P-BD	CMGA16-PN
F-4A,2	CDFP3-F10	P-BE	CMGA17-PN
F-5,1	GDFP2-F16	P-BF	CMGA18-PN
F-5,2	CDFP3-F16	P-BG	CMGA19-PN
F-5A,2	CDFP4-F16	P-BH	CMGA20-PN
F-9,1	GDFP2-F20	P-BJ	CMGA21-PN
F-9,2	CDFP3-F20	P-BK	CMGA22-PN
F-9A,2	CDFP4-F20	P-BL	CMGA23-PN
P-AA	CMGA1-PN	P-BM	CMGA24-PN
P-AB	CMGA2-PN		

INACTIVE	
D-1,2	<u>CDIP3-T14</u>
D-10,2	<u>CDIP4-T28</u>
D-11,2	<u>CDIP9-T24</u>
D-12,2	<u>CDIP3-T50</u>
D-2,2	<u>CDIP3-T16</u>
D-3,2	<u>CDIP7-T24</u>
D-4,2	<u>CDIP3-T8</u>
D-5,2	<u>CDIP3-T40</u>
D-6,2	<u>CDIP3-T18</u>
D-7,2	<u>CDIP3-T22</u>
D-8,2	<u>CDIP3-T20</u>
D-9,2	<u>CDIP8-T24</u>

INACTIVE	
F-1,4	<u>CDFP6-F14</u>
F-1,3	<u>GDFP5-F14</u>
F-3,3	<u>GDFP4-F14</u>
F-6,4	<u>CDFP6-F24</u>
F-6,3	<u>GDFP5-F24</u>
F-8,4	<u>CDFP8-F24</u>
F-8,3	<u>GDFP7-F24</u>
F-9,4	<u>CDFP5-F20</u>

MIL-STD-1835B
NOTICE 4

6.5 Plastic encapsulated microcircuit packages. The plastic encapsulated microcircuit packages listed in Table IX are recommended for use in those DoD systems that are using plastic packages. The dimensions and tolerances for the plastic packages listed in table IX are available for use in the JEP-95 outline shown and should be directly invoked from that document.

TABLE IX. Plastic encapsulated microcircuit packages.

Descriptive package type designator	Terminal count	Row-to-row spacing/body width	Terminal pitch	EIA JEP-95 standard outline and variation
Dual-in-line package				
PDIP-T	8	.300"	.100"	MS-001 BA
PDIP-T	14	.300"	"	MS-001 AA
PDIP-T	16	.300"	"	MS-001 BB
PDIP-T	18	.300"	"	MS-001 BC
PDIP-T	20	.300"	"	MS-001 AD
PDIP-T	22	.400"	"	MS-010 AA
PDIP-T	24	.300"	"	MS-001 AF
PDIP-T	24	.600"	"	MS-011 AA
PDIP-T	28	.300"	"	MS-001 BF
PDIP-T	28	.600"	"	MS-011 AB
PDIP-T	40	.600"	"	MS-011 AC
PDIP-T	48	.600"	"	MS-011 AD
Dual small outline package, gullwing lead				
PDSO-G	8	3.75 MM	1.27 MM	MS-012 AA
PDSO-G	14	3.75 MM	"	MS-012 AB
PDSO-G	16	3.75 MM	"	MS-012 AC
PDSO-G	16	7.50 MM	"	MS-013 AA
PDSO-G	18	7.50 MM	"	MS-013 AB
PDSO-G	20	7.50 MM	"	MS-013 AC
PDSO-G	24	7.50 MM	"	MS-013 AD
PDSO-G	28	7.50 MM	"	MS-013 AE
Dual small outline package, J-bend lead				
PDSO-J	20 <u>1</u> /	.300 "	.050 "	MS-023 AB
PDSO-J	24 <u>1</u> /	.300 "	"	MS-023 AC
PDSO-J	28	.300 "	"	MS-023 AD
PDSO-J	40	.400 "	"	MS-027 AF

MIL-STD-1835B
NOTICE 4

TABLE IX. Plastic encapsulated microcircuit packages - Continued.

Descriptive package type designator	Terminal count	Row-to-row spacing/body width	Terminal pitch	EIA JEP-95 standard outline and variation
Quad chip carrier package, J-bend lead				
PQCC-J	20	.353 "	.050 "	MS-018 AA
PQCC-J	28	.453 "	"	MS-018 AB
PQCC-J	32	.450"x .550"	"	MS-016 AE
PQCC-J	44	.653 "	"	MS-018 AC
PQCC-J	68	.954 "	"	MS-018 AE
PQCC-J	84	1.154 "	"	MS-018 AF
Quad flatpack, gullwing lead				
PQFP-G	44	10 MM	0.80 MM	MS-022 AB
PQFP-G	64	14 MM	0.80 MM	MS-022 BE
PQFP-G	80	20 x 14 MM	0.80 MM	MS-022 GB-1
PQFP-G	100	20 x 14 MM	0.65 MM	MS-022 GC-1
PQFP-G	120	28 MM	0.80 MM	MS-022 DA-1
PQFP-G	128	28 MM	0.80 MM	MS-022 DB-1
PQFP-G	144	28 MM	0.65 MM	MS-022 DC-1
PQFP-G	160	28 MM	0.65 MM	MS-022 DD-1

1/ Depopulated from a 26 terminal dimensioned packaged.

6.6 Changes from previous issue. The margin of this standard is marked with asterisks to indicate where changes (additions, modifications, corrections, deletions) from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

MIL-STD-1835B
NOTICE 4

APPENDIX
DIMENSIONING SYMBOLS






10. SCOPE

10.1 Scope. This appendix lists and defines the dimensioning symbols used in this standard. This appendix is not a mandatory part of this standard. The information contained herein is intended for guidance only.

20. APPLICABLE DOCUMENTS. This section is not applicable to this appendix.

30. DEFINITIONS







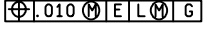
30.1 Dimensioning symbols. The dimensioning symbols used are as follows:

- A: Body dimensions.
- ϕb : Terminal lead diameters.
- b: Terminal lead widths.
- c: Terminal lead thicknesses.
- ϕD : Body diameters.
- D: Body lengths.
- E: Body widths.
- e: Terminal lead spacings.
- F: Flange dimensions.
- k: Index dimensions, length.
- L: Terminal lead lengths.
- Q: Standoff height. The height from the seating plane to the base plane or a reference plane parallel to the seating plane.
- S: Distance between terminal leads and the body end or body center lines.
- α : Angular dimensions.
- h: Chamfered corner dimension.
- R: Radius Dimensions.
-  : Straightness.
-  : Flatness.
-  : Profile of a line.
-  : Profile of a surface.
-  : Perpendicularity.

MIL-STD-1835B
NOTICE 4

APPENDIX

DIMENSIONING SYMBOLS - Continued

	:	Position.
	:	At maximum material condition.
	:	At least material condition.
	:	Projected tolerance zone.
ϕ	:	Diameter.
	:	Basic dimension.
REF	:	Reference dimension.
	:	Datum feature.
	:	Feature control frame.

MIL-STD-1835B
NOTICE 4

INDEX

	Paragraph	Page
APPLICABLE DOCUMENTS	2	2
Base plane	3.1.12	3
Basic dimension	3.1.17	4
Can	3.1.6	3
Case outline letter/PIN designator	4.7.1	5
Cavity-up, cavity-down	3.1.23	4
Chip carrier (CC)	3.1.5	3
Classification	1.2.2	1
Configuration	3.1.2	3
Coplanarity	3.1.14	3
Coplanarity deviation	5.2.7	23
Datum	3.1.19	4
DEFINITIONS	3	3
DETAIL REQUIREMENTS	5	20
Dimension	3.1.15	4
Dimension verification	4.5	5
DIP lead row center dimension E1	5.2.3	21
DIP dimensions L and Q	5.2.4	21
DIP end variations dimension S1 (glass sealed)	5.2.5	22
Flat pack (FP)	3.1.8	3
Flat pack end leads	5.2.1	20
Flat pack minimum S1 dimension	5.2.2	20
GENERAL REQUIREMENTS	4	5
Government documents	2.1	2
Grid array (GA)	3.1.9	3
Inactive for new design	4.8	5
Index	3.1.10	3
Index area	3.1.11	3
In-line package (IP)	3.1.7	3
* Intended use	6.1	157
Land	3.1.20	4
Land pattern	3.1.21	4
Lead position overlay	3.1.22	4
Leadless chip carrier (LCC) castellation irregularities	5.2.6	22
Microelectronic device case outline	3.1.1	3
Non-Government publications	2.2	2
* NOTES	6	157
Order of precedence	2.3	2
Package case outline presentation	1.2.3	1
* Package cross-reference list	6.4	158
Package descriptive designation system	4.7	5
Package design	4.1	5
Package dimensions and symbols	4.4	5
Package index implementation	4.3	5
Package material characteristics	4.6	5
Package style	3.1.3	3
Package styles and package types	5.1	20
Package terminal identification	4.2	5
Package type	3.1.4	3
* Plastic encapsulated microcircuit packages	6.5	160
Purpose	1.2	1
Reference dimension	3.1.16	4
SCOPE	1	1
Seating plane	3.1.13	3
Specifications, standards, and handbooks	2.1.1	2
* Subject term (key word) listing	6.3	157
Tailoring	1.2.1	1
* Tailoring guidance for contractual application	6.2	157
True position	3.1.18	4
Unique package features	5.2	20

MIL-STD-1835B
NOTICE 4

CONCLUDING MATERIAL

Custodians:

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

Preparing activity:

DLA - ES

Review activities:

Army - AR, MI, SM
Navy - AS, CG, MC, OS, SH
Air Force - 19, 85, 99

(Project 5962-1652)

Civil Agency Coordinating Activities:

DOT-FAA(RD-650)