

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	Add cross reference table for DSCC replacement part number for MIL-DTL part number.	19 July 2004	Kendall Cottongim
B	Correction to Dissipation Factor limits.	21 Oct 2004	Kendall Cottongim
C	Correction to Bracket part numbers.	18 Feb 2005	Kendall Cottongim
D	Correction to manufacturer address.	22 Jan 2008	Michael A Radecki

Prepared in accordance with ASME Y14.100-2000

Selected item drawing

REV STATUS OF PAGES	REV	D	D	D	D	D	D	D	D	D	D	D	D	D	D			
	PAGES	1	2	3	4	5	6	7	8	9	10	11	12	13	14			
PMIC N/A	PREPARED BY Ken Bernier					DESIGN ACTIVITY DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OH												
Original date of drawing  20 April 2004	CHECKED BY Ken Bernier					TITLE CAPACITORS, FIXED ELECTROLYTIC (NONSOLID ELECTROLYTE), TANTALUM, (POLARIZED, SINTERED SLUG) 85°C (VOLTAGE DERATED TO 125°C)												
	APPROVED BY Kendall Cottongim																	
	SIZE A	CODE IDENT. NO. 037Z3				DWG NO.  04021												
	SCALE (None)		REV D			PAGE 1 OF 14												

1. SCOPE

1.1 Scope. This drawing and [MIL-DTL-3965](#) describes the complete requirements for capacitors, fixed electrolytic (nonsolid electrolyte), Tantalum, (polarized, sintered slug) 85°C (Voltage derated to 125°C)

1.2 Part or Identifying Number (PIN). The complete PIN shall be as follows:



2. APPLICABLE DOCUMENTS

2.1 General The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents in sections 3 and 4 of this specification, whether or not they are listed.

2.2 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 cited in the solicitation or contract ([see 6.2](#)).

SPECIFICATIONS

DEPARTMENT OF DEFENSE

[MIL-DTL-3965](#) - Capacitors, Fixed, Electrolytic (Nonsolid Electrolyte), Tantalum, General Specification for

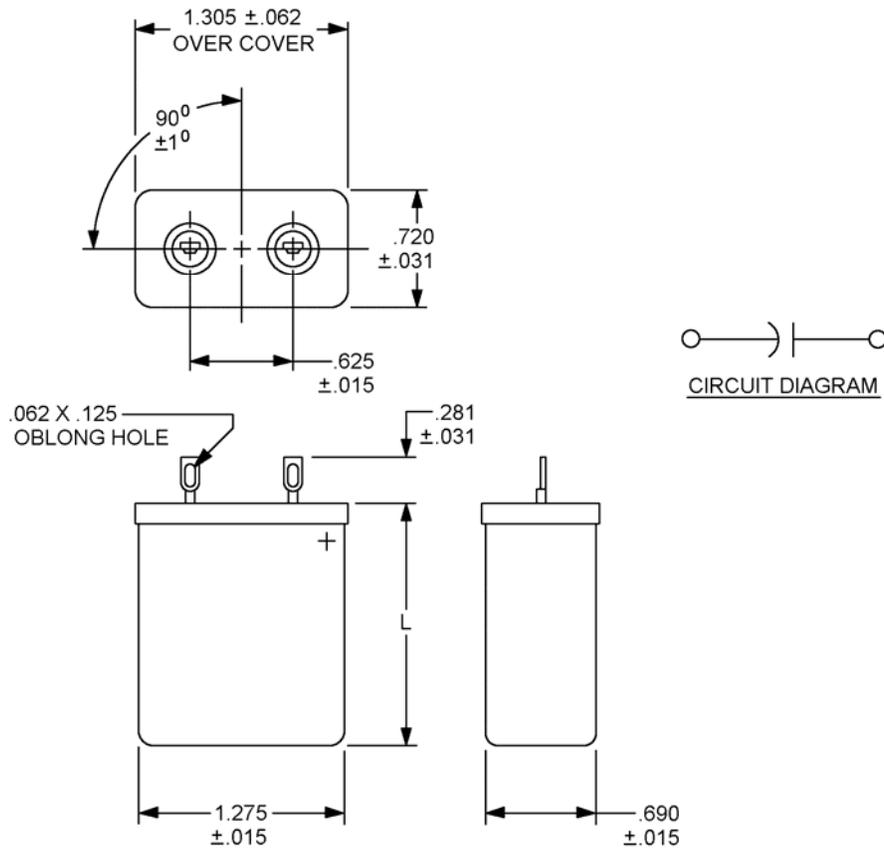
STANDARDS

[MIL-STD 202](#) Test methods for Electronic and Electrical Component Parts.  
[MIL-STD-1285](#) Marking of Electrical and Electronic Parts.

( Copies of these documents are available online at <http://assist.daps.dla.mil/quicksearch/> or <http://assist.daps.dla.mil/> or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

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.

<b>DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OHIO</b>	<b>SIZE A</b>	<b>CODE IDENT NO. 037Z3</b>	<b>DWG NO. 04021</b>
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	Dimensions	
	L $\pm .031$ (.79)	
	Inches	mm
A1	1.062	26.97
A2	1.375	34.93
A3	1.625	41.28
A4	2.000	50.80
A5	2.500	63.50

Inches	mm
.015	.38
.031	.79
.062	1.57
.125	3.18
.281	7.14
.625	15.88
.690	17.53
.720	18.29
1.275	32.39
1.305	33.15

NOTES:

1. All dimensions in inches.
2. Metric equivalents are given for general information only.

FIGURE 1. Dimensions and configuration.

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TABLE I. Capacitor characteristics.

DSCC drawing 04021	Voltage			Capacitance	DC leakage (max)		Impedance (max)	Case size
	Rated (85°C)	Derated (125°C)	Surge (85°C)		25°C	85°C & 125°C		
	<u>volts, dc</u>	<u>volts, dc</u>	<u>volts, dc</u>	<u>μF</u>	<u>μA</u>	<u>μA</u>	<u>ohms</u>	
01	15	10	17.2	960	7	58	3.10	A1
02	15	10	17.2	1200	9	72	2.30	A2
03	15	10	17.2	1400	11	84	1.70	A3
04	15	10	17.2	2100	16	126	1.30	A4
05	15	10	17.2	2400	18	144	1.15	A5
06	30	20	34.5	520	8	63	5.30	A1
07	30	20	34.5	660	10	80	4.20	A2
08	30	20	34.5	820	13	99	2.90	A3
09	30	20	34.5	1200	18	144	2.30	A4
10	30	20	34.5	1300	20	156	2.10	A5
11	50	30	57.5	400	10	80	7.20	A1
12	50	30	57.5	430	10	78	6.40	A1
13	50	30	57.5	500	13	100	5.60	A2
14	50	30	57.5	600	15	120	4.10	A3
15	50	30	57.5	800	20	160	3.10	A4
16	50	30	57.5	1000	23	180	2.80	A5
17	75	50	86.2	270	9	81	8.50	A1
18	75	50	86.2	330	12	99	7.00	A2
19	75	50	86.2	400	15	119	5.00	A3
20	75	50	86.2	600	23	180	3.65	A4
21	75	50	86.2	660	25	198	3.50	A5
22	100	65	115.0	170	9	68	15.00	A1
23	100	65	115.0	220	11	88	11.60	A2
24	100	65	115.0	260	13	104	8.00	A3
25	100	65	115.0	350	18	140	6.50	A4
26	100	65	115.0	440	22	176	5.80	A5
27	150	100	172.0	70	6	42	28.80	A1
28	150	100	172.0	90	7	54	22.40	A2
29	150	100	172.0	100	8	60	16.40	A3
30	150	100	172.0	140	11	84	12.40	A4
31	150	100	172.0	180	14	104	11.20	A5

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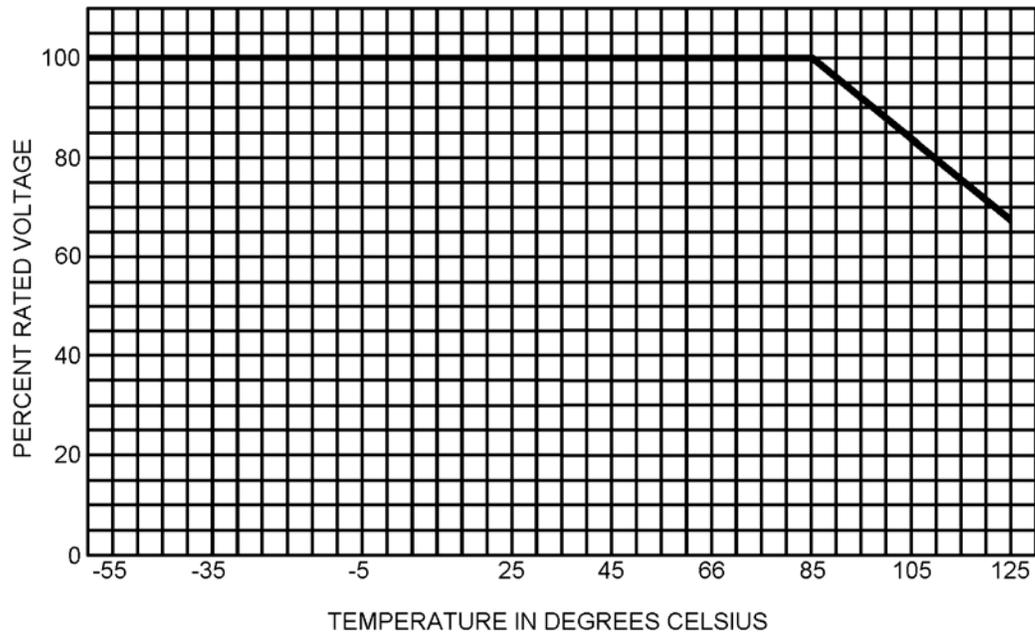
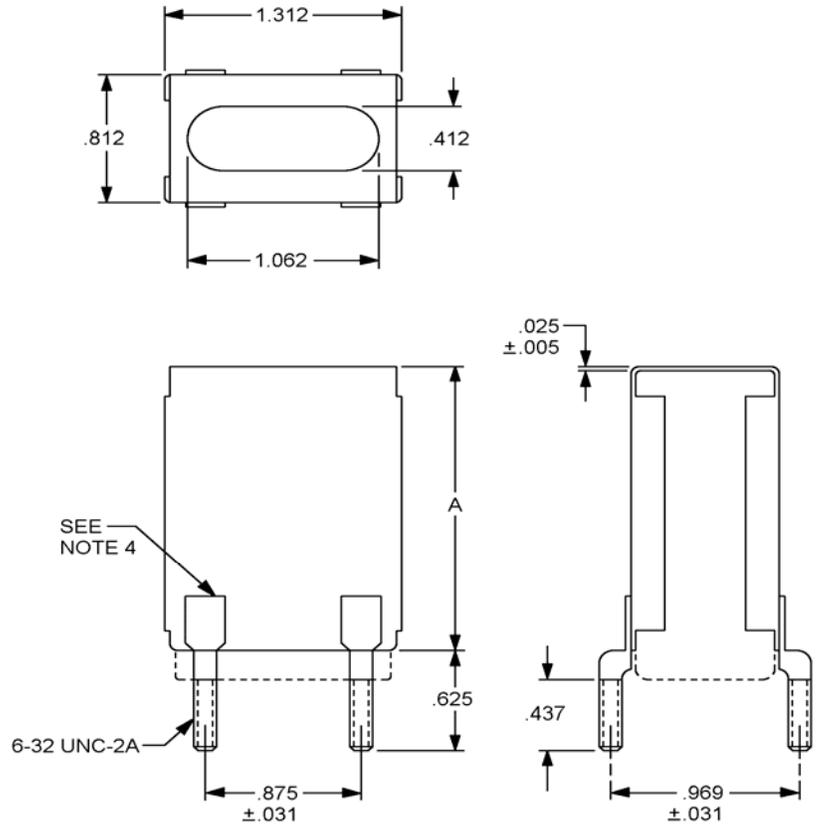


FIGURE 2. Voltage derating with temperature.

<b>DEFENSE SUPPLY CENTER, COLUMBUS</b> <b>COLUMBUS, OHIO</b>	SIZE <b>A</b>	CODE IDENT NO. <b>037Z3</b>	DWG NO. <b>04021</b>
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Inches	mm
.025	0.64
.412	10.46
.437	11.10
.625	15.88
.812	20.62
.875	22.23
.969	24.61
1.062	26.97
1.312	33.32



BRACKET FOR TYPE A CASE

Type designation	Case size	Dim	Dimensions				
			Inches			mm	
			Min	Nom	Max	Min	Max
A13	A1	A	.846	.862	.878	21.49	22.30
	A2	A	1.159	1.175	1.191	29.44	30.25
A33	A3	A	1.409	1.425	1.441	35.79	36.60
	A4	A	1.784	1.800	1.816	45.31	46.13
	A5	A	2.284	2.300	2.316	58.01	58.82

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Spade lugs shall be rigid (either double welded, double riveted, single riveted and soldered, or single riveted and welded to the bracket).
4. Unless otherwise specified, tolerance is  $\pm .062$  (1.157 mm).

FIGURE 3.

<b>DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OHIO</b>	<b>SIZE A</b>	<b>CODE IDENT NO. 037Z3</b>	<b>DWG NO. 04021</b>
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### 3. REQUIREMENTS

#### 3.1 Design and construction:

##### 3.1.1 Dimensions and configuration:

3.1.1.1 Capacitors: See [figure 1](#).

3.1.1.2 Brackets: See [figure 3](#).

3.1.2 Case type: Rectangular, uninsulated.

3.1.3 Seal type: Hermetic (symbol G). (Glass-to-metal)

3.1.4 Terminals: See [figure 1](#).

3.1.5 Rated temperature: -55°C to +85°C, voltage derated to +125°C (see [figure 2](#)).

3.1.6 Rated voltage: See [table I](#).

3.1.7 Capacitance (cap) (nom): See [table I](#).

3.1.8 Capacitance tolerance: Symbol M ( $\pm 20$  percent).

3.1.10 Dissipation factor (DF) (max): 15% ( $\leq 50V$ ) or 12% ( $> 50V$ )

3.1.9 DC leakage (DCL) (max) (at +25°C): See [table I](#).

3.2 Seal: In accordance with [MIL-DTL-3965](#).

#### 3.3 Dielectric withstanding voltage (DWV):

a. Sleeving to case (min): Not applicable.

b. Terminal to case (min): 300 volts.

#### 3.4 Insulation resistance:

a. Sleeving to case (min): Not applicable.

b. Terminal to case (min): 100 megohms.

#### 3.5 Temperature cycling:

a. DCL (max): 125 percent of 25°C value of [table I](#).

b.  $\Delta$ Cap: Within  $\pm 5$  percent of initial measurement.

c. DF (max): 115 percent of initial requirement.

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3.6 Solderability: In accordance with [method 208 of MIL-STD-202](#).

3.7 Surge voltage: See [table I](#).

3.8 Moisture resistance:

- a. DCL (max): 125 percent of 25°C value of [table I](#).
- b. ΔCap: Within ±8 percent of initial measurement.
- c. DF (max): 115 percent of initial requirement.

3.9 Low temperature (storage):

- a. DCL (max): See [table I](#) (25°C).
- b. ΔCap: Within ±5 percent of initial measurement.
- c. DF (max): Shall not exceed initial requirement.

3.10 Stability at low and high temperature:

3.10.1 Step 1 (+25°C):

- a. DCL (max): See [table I](#).
- b. Cap: Within tolerance of [table I](#) value.
- c. DF (max): Shall not exceed initial requirement.

3.10.2 Step 2 (-55°C):

- a. Impedance: See [table I](#).
- b. ΔCap (max): -35 percent of step 1 value.

3.10.3 Step 3 (+25°C):

- a. DCL (max): See [table I](#).
- b. ΔCap: Within ±5 percent of step 1 value.
- c. DF (max): Shall not exceed initial requirement.

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3.10.3 Step 4 (+85°C):

- a. DCL (max): See [table I](#).
- b. ΔCap (max): +25 percent of step 1 value.
- c. DF (max): Shall not exceed initial requirement.

3.10.4 Step 5 (+125°C):

- a. DCL (max): See [table I](#).
- b. ΔCap (max): +25 percent of step 1 value.
- c. DF (max): Shall not exceed initial requirement.

3.10.5 Step 6 (+25°C):

- a. DCL (max): See [table I](#).
- b. ΔCap: Within ±5 percent of initial measurement.
- c. DF (max): Shall not exceed initial requirement.

3.11 Reverse voltage: Not applicable

3.12 Life at +85°C:

3.12.1 2,000-hour (qualification):

- a. DCL (max): See [table I](#) (25°C).
- b. ΔCap: Within ±25 percent of initial measurement.
- c. DF (max): 130 percent of initial requirement.

3.12.2 240-hour (group B):

- a. DCL (max): See [table I](#) (25°C).
- b. ΔCap: Within ±10 percent of initial measurement.
- c. DF (max): 130 percent of initial requirement.

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3.12.3 1,760-hour (group C):

- a. DCL (max): See [table I](#) (25°C).
- b. ΔCap: Within ±25 percent of initial measurement.
- c. DF (max): 130 percent of initial requirement.

3.13 Barometric pressure: Not applicable.

3.14 Life at +125°C:

- a. DCL (max): See [table I](#) (25°C).
- b. ΔCap: Within ±25 percent of initial measurement.
- c. DF (max): 130 percent of initial requirement.

3.15 Marking: Capacitors shall be marked as shown in the following example:

Example:

04021-01: Part or Identifying Number (PIN).

12345 0344: Source and date code.

960 μF 15 V dc: Capacitance and rated voltage (at 85°C).

3.16 Polarity: Plug (+) symbol near positive terminal (see [figure 1](#)).

3.17 Changes to product. The manufacturer shall notify the acquiring activity of any changes to the product that may affect the form, fit or function of the device. Such notification shall be given prior to shipment of any device incorporating the identified change.

3.18 Certificate of compliance. A certificate of compliance shall be required from manufacturers requesting to be a suggested source of supply.

3.19 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

3.20 Workmanship. The capacitor shall be uniform in quality and free from any defects that will affect life, serviceability, or appearance.

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#### 4. VERIFICATION

Qualification inspection: In accordance with [MIL-DTL-3965](#) not required.

Verification of qualification: In accordance with [MIL-DTL-3965](#) not required.

Conformance inspection: In accordance with [MIL-DTL-3965](#) not required.

Periodic inspection: In accordance with [MIL-DTL-3965](#) not required.

#### 5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the military service's system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

#### 6. NOTES

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

6.1 Intended use. These capacitors are primarily intended for use in filter, by-pass, and energy storage applications requiring large capacitance values, but where close tolerances are not an important factor and where the alternating current (ac) component of voltage is small compared to the direct current (dc) rated voltage.

6.2 Ordering data. The contract or purchase order should specify the following:

- a. Complete PIN ([see 1.2](#)).
- b. Requirements for delivery and one copy of the quality conformance inspection data or certificate of compliance that parts have passed quality conformance inspection with each shipment of parts by the manufacturer.
- c. Requirements for packaging and packing.

6.3 Users of record. Coordination of this document for future revisions are coordinated only with the suggested sources of supply and the users of record of this document. Requests to be added as a recorded user of this drawing should be in writing to: Defense Supply Center, Columbus, ATTN: DSCC/VAT, Post Office Box 3990, Columbus, OH 43216-5000 or e-mailed to [capacitorfilter@dsc.dla.mil](mailto:capacitorfilter@dsc.dla.mil) also by telephone (614) 692-0563 or DSN 850-0563.

6.4 Suggested sources of supply. Suggested sources of supply are listed herein. Additional sources will be added as they become available. For assistance in the use of this drawing, contact Defense Supply Center, Columbus, ATTN: DSCC-VAT, Post Office Box 3990, Columbus, OH 43218-3990 or e-mailed to [capacitorfilter@dsc.dla.mil](mailto:capacitorfilter@dsc.dla.mil) also by telephone (614) 692-0563 or DSN 850-0563.

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Table II Manufacturer part numbers.

DSCC DWG 04021- <u>1/</u>	Vendor "A" type	Vendor "B" type
01	202D967X0015A1	AA961M015A1
02	202D128X0015A2	AA122M015A2
03	202D148X0015A3	AA142M015A3
04	202D218X0015A4	AA212M015A4
05	202D248X0015A5	AA242M015A5
06	202D527X0030A1	AA521M030A1
07	202D667X0030A2	AA661M030A2
08	202D827X0030A3	AA821M030A3
09	202D128X0030A4	AA122M030A4
10	202D138X0030A5	AA132M030A5
11	202D407X0050A1	AA401M050A1
12	202D437X0050A1	AA431M050A1
13	202D507X0050A2	AA501M050A2
14	202D607X0050A3	AA601M050A3
15	202D807X0050A4	AA801M050A4
16	202D108X0050A5	AA102M050A5
17	202D277X0075A1	AA271M075A1
18	202D337X0075A2	AA331M075A2
19	202D407X0075A3	AA401M075A3
20	202D607X0075A4	AA601M075A4
21	202D667X0075A5	AA661M075A5
22	202D177X0100A1	AA171M100A1
23	202D227X0100A2	AA221M100A2
24	202D267X0100A3	AA261M100A3
25	202D357X0100A4	AA351M100A4
26	202D447X0100A5	AA441M100A5
27	202D706X0150A1	AA700M150A1
28	202D906X0150A2	AA901M150A2
29	202D107X0150A3	AA101M150A3
30	202D147X0150A4	AA141M150A4
31	202D187X0150A5	AA181M150A5

1/ Parts must be purchased to this DSCC PIN to assure all performance and tests are met.

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Table III Cross reference table between DSCC drawing and MIL-DTL part numbers

DSCC drawing 04021 Part Number	MIL-DTL-3965/21 Part Number
01	CL55BE961MPG
02	CL55BE122MPG
03	CL55BE142MPG
04	CL55BE212MPG
05	CL55BE242MPG
06	CL55BH521MPG
07	CL55BH661MPG
08	CL55BH821MPG
09	CL55BH122MPG
10	CL55BH132MPG
11	CL55BJ401MPG
12	CL55BJ431MPG
13	CL55BJ501MPG
14	CL55BJ601MPG
15	CL55BJ801MPG
16	CL55BJ102MPG
17	CL55BL271MPG
18	CL55BL331MPG
19	CL55BL401MPG
20	CL55BL601MPG
21	CL55BL661MPG
22	CL55BN171MPG
23	CL55BN221MPG
24	CL55BN261MPG
25	CL55BN351MPG
26	CL55BN441MPG
27	CL55BQ700MPG
28	CL55BQ900MPG
29	CL55BQ101MPG
30	CL55BQ141MPG
31	CL55BQ181MPG

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Table IV Brackets

Vendor A type	Vendor B type	Case size
TE0554SA1	CL050SA13	A1
TE0554SA2	CL050SD13	A2
TE0554SA3	CL050SA33	A3
TE0554SA4	CL050SD23	A4
TE0554SA5	CL050SD33	A5

Table V Cross reference between DSCC drawing and MIL-DTL bracket part numbers.

DSCC drawing 04021 Case Size	MIL-DTL-3965/21 Part Number
A1	CL050SA13
A2	CL050SD13
A3	CL050SA33
A4	CL050SD23
A5	CL050SD33

Vendor A	Vendor CAGE <u>Number</u>  05079	Vendor name <u>and address</u>  Vishay Transitor P.O. Box 230 West Road Bennington, VT 05201-5017
Vendor B	Vendor CAGE <u>Number</u>  1RUZ5	Vendor name <u>and address</u>  Palm Beach Components Inc. 5401 N. Haverhill Rd Unit 101 West Palm Beach, FL 33407

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