

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	Added suggested sources of supply.	11 May 88	D. Moore
B	Suggested source of supply, modified 3.2.2, 3.2.6, and 6.1. Editorial changes throughout.	18 Jan 94	D. Moore
C	Revised sources of supply, made editorial changes, and converted references to MIL-PRF-49467. Moved solderability testing from group A to group B. Updated suggested sources of supply.	10 April 00	Kendall A. Cottongim
D	Removed suggested source of supply. Added note 4 to figure 1. Added capacitor tolerance note to 3.2.9.	16 January 01	Kendall A. Cottongim
E	Added suggested source of supply.	12 September 01	Kendall A. Cottongim
F	Added suggested source of supply.	5 February 02	Kendall A. Cottongim
G	Added CalRamic Technologies as a suggested source of supply.	19 April 2007	Michael A. Radecki

CURRENT DESIGN ACTIVITY CAGE CODE 037Z3
DEFENSE LOGISTICS AGENCY
DEFENSE SUPPLY CENTER COLUMBUS
COLUMBUS, OHIO 43218-3990

Prepared in accordance with [ASME-Y14.100](#)

Selected item drawing

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PMIC N/A	PREPARED BY ROBERT E. GRILLOT		DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OH																
Original date of drawing 24 June 1987	CHECKED BY HERALDINE JOHNSON		TITLE CAPACITORS, CERAMIC, MULTILAYER, HIGH VOLTAGE, X7R, 10,000 V DC																
	APPROVED BY DAVID E. MOORE	SIZE A	CODE IDENT. NO. 14933	DWG NO. 87081															
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1. SCOPE

1.1 Scope. This drawing and [MIL-PRF-49467](#) describe the complete requirements for high voltage multilayer ceramic capacitors.

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 cited in sections 3 and 4 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 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.

DEPARTMENT OF DEFENSE SPECIFICATIONS

[MIL-PRF-49467](#) - Capacitor, Fixed, Ceramic, Multilayer, High Voltage (General Purpose), Established Reliability, General Specification for.

DEPARTMENT OF DEFENSE STANDARDS

[MIL-STD-202](#) - Test Methods Standard Electronics 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://www.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.

3. REQUIREMENTS

3.1 Interface and physical dimensions. The interface and physical dimensions shall be as specified in [MIL-PRF-49467](#) and herein (see [figure 1](#)).

3.1.1 Leads. Leads shall be solder coated. Tin-lead (Sn-Pb) finishes are acceptable provided that the minimum lead content is 3 percent.

3.1.2 Case. Epoxy, conformally coated.

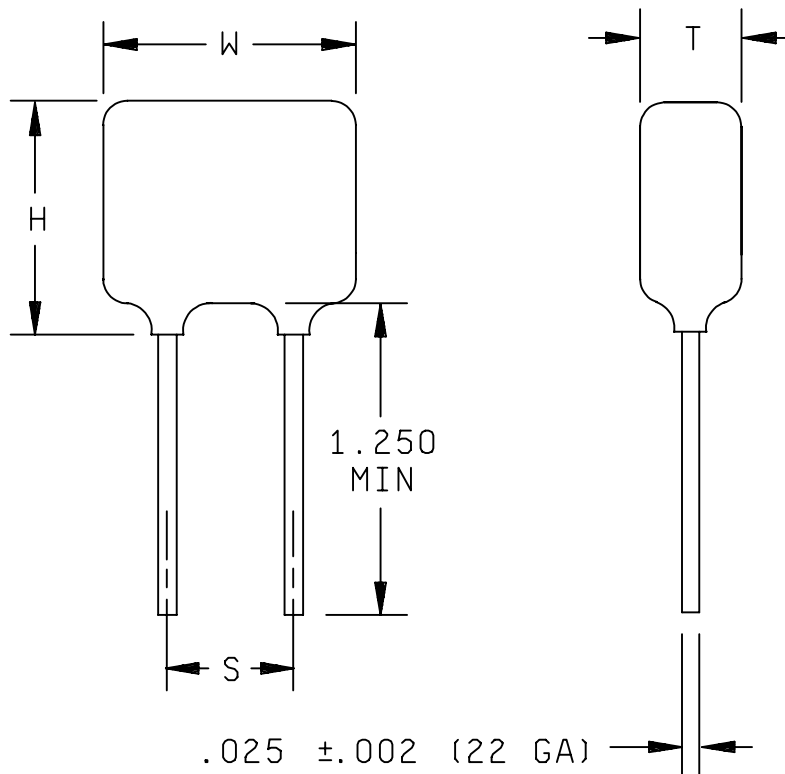
3.1.3 Operating temperature range. The operating temperature range shall be -55°C to +125°C.

3.2 Electrical characteristics.

3.2.1 Rated voltage. The rated voltage shall be 10,000 volts dc.

3.2.2 Dielectric type. X7R.

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Case code	Sizes (max.)			Lead spacing $\pm .030$ (S)
	Width (W)	Height (H)	Thickness (T)	
A	1.050	.500	.270	.900
B	1.250	.600	.270	1.100
C	1.450	.720	.270	1.300

Inches	mm	Inches	mm
.002	0.05	.900	22.86
.025	0.64	1.050	26.67
.030	0.76	1.100	27.94
.270	6.86	1.250	31.75
.500	12.70	1.300	33.02
.600	15.24	1.450	36.83
.720	18.29		

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. H dimension includes meniscus.
4. S dimension shall be maintained from chip body to end of leads.

FIGURE 1. Case dimensions and configuration.

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- 3.2.3 Temperature coefficient. ± 15 percent. (For MIL-PRF-49467 group B voltage temperature limits use step a through step d only.)
- 3.2.4 Capacitance. See table I. Measured in accordance with method 305 of MIL-STD-202, 1 kHz at 1.0 V rms at +25°C.
- 3.2.5 Dissipation factor (+25°C). 2.5 percent maximum (measured under the same conditions as capacitance).
- 3.2.6 Insulation resistance. Measured in accordance with method 302 of MIL-STD-202. At +25°C, 500 V dc: 100,000 megohms or 1,000 megohms microfarad, whichever is less. At +125°C, 500 V dc: 10,000 megohms or 100 megohms microfarad, whichever is less.
- 3.2.7 Dielectric withstanding voltage. 1.2 times rated voltage.
- 3.2.8 Aging rate. -2.0 percent maximum per decade-hour.
- 3.2.9 Capacitance tolerance. K = ± 10 percent, M = ± 20 percent. K tolerance parts may be substituted for M tolerance parts, with procuring activity approval.
- 3.3 Solderability of terminals. In accordance with MIL-PRF-49467.
- 3.4 Vibration. In accordance with MIL-PRF-49467.
- 3.5 Shock. In accordance with MIL-PRF-49467.
- 3.6 Immersion cycling. In accordance with MIL-PRF-49467.
- 3.7 Moisture resistance. In accordance with MIL-PRF-49467.
- 3.8 Life. One hundred percent of rated voltage applied at +125°C for 1,000 hours. Resistors with a high value such as 1 megohm may be used in series with each part under test in lieu of fuses.
- 3.9 Thermal shock. Method 107, MIL-STD-202, test condition B except low temperature is -55°C.
- 3.10 Voltage conditioning. In accordance with MIL-PRF-49467, 100 percent of rated voltage. Resistors with a high value such as 1 megohm may be used in series with each part under test in lieu of fuses.
- 3.11 Terminal strength. In accordance with MIL-PRF-49467.
- 3.12 Marking. Marking shall be in accordance with MIL-STD-1285 except the capacitors shall be marked with the PIN as specified in 1.2, the manufacturer's name or Commercial and Government Entity (CAGE) code, and date lot code as a minimum.
- 3.13 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.
- 3.14 Certificate of compliance. A certificate of compliance shall be required from manufacturers requesting to be a suggested source of supply.
- 3.15 Workmanship. Capacitors shall be uniform in quality and free from any defects that will affect life, serviceability, or appearance.

4. VERIFICATION

- 4.1 Qualification inspection. Qualification inspection is not required.
- 4.2 Conformance inspection.

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4.2.1 Inspection of product for delivery. Inspection of product for delivery shall consist of all tests specified in group A and group B inspections of MIL-PRF-49467, provided they are listed in this drawing. PPM testing and calculation is not applicable. Solderability testing shall be performed as a separate subgroup of group B inspection with a sample size of 3 units and 0 defectives permitted.

4.2.2 Certification. The procuring activity, at its discretion, may accept a certificate of compliance with group B requirements in lieu of performing group B tests (see 6.2d).

TABLE I. Electrical characteristics

DSCC drawing 87081-	Capacitance	Capacitance tolerance	Case code	DSCC drawing 87081-	Capacitance	Capacitance tolerance	Case code
01	470 pF	K	A	18	2200 pF	M	A
02	470 pF	M	A	19	2700 pF	K	A
03	560 pF	K	A	20	2700 pF	M	A
04	560 pF	M	A	21	3300 pF	K	A
05	680 pF	K	A	22	3300 pF	M	A
06	680 pF	M	A	23	3900 pF	K	B
07	820 pF	K	A	24	3900 pF	M	B
08	820 pF	M	A	25	4700 pF	K	B
09	1000 pF	K	A	26	4700 pF	M	B
10	1000 pF	M	A	27	5600 pF	K	C
11	1200 pF	K	A	28	5600 pF	M	C
12	1200 pF	M	A	29	6800 pF	K	C
13	1500 pF	K	A	30	6800 pF	M	C
14	1500 pF	M	A	31	8200 pF	K	C
15	1800 pF	K	A	32	8200 pF	M	C
16	1800 pF	M	A	33	.01 μF	K	C
17	2200 pF	K	A	34	.01 μF	M	C

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. Capacitors conforming to this drawing are intended for use when military specifications do not exist and qualified military devices that will perform the required function are not available for original equipment manufacturer application. This drawing is intended exclusively to prevent the proliferation of unnecessary duplicate specifications, drawings, and stock catalog listings. When a military specification exists and the product covered by this drawing has been qualified for listing, this drawing becomes obsolete and will not be used for new design.

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

- a. Complete PIN (see 1.2).
- b. Requirements for delivery of one copy of the conformance inspection data or certificate of compliance that parts have passed conformance inspection with each shipment of parts by the manufacturer.
- c. Requirements for packaging and packing.
- d. Whether the manufacturer performs the group B tests or provides certification of compliance with group B requirements.

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e. Requirements for notification of change of product to procuring activity, if applicable.

6.3 Replaceability. Capacitors covered by this drawing will replace the same commercial device covered by contractor prepared specification or drawing.

6.4 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 43218-3990 or e-mailed to capacitorfilter@dscclia.mil also by telephone (614) 692-4709 or DSN 850-4709.

6.5 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@dscclia.mil also by telephone (614) 692-4709 or DSN 850-4709.

CalRamic

1/ DSCC drawing PIN 87081-	Vendor A similar vendor type	Vendor B similar vendor type	Vendor C similar vendor type	Vendor D similar vendor type	Vendor E similar vendor type	Vendor F similar vendor type
01	SV10RC471KHA	8840CX471KA103	PCI1561-01	9040B471K103LEXH	HQHBR471KB	100HV14B471KM
02	SV10RC471MHA	8840CX471MA103	PCI1561-02	9040B471M103LEXH	HQHBR471MB	100HV14B471MM
03	SV10RC561KHA	8840CX561KA103	PCI1561-03	9040B561K103LEXH	HQHBR561KB	100HV14B561KM
04	SV10RC561MHA	8840CX561MA103	PCI1561-04	9040B561M103LEXH	HQHBR561MB	100HV14B561MM
05	SV10RC681KHA	8840CX681KA103	PCI1561-05	9040B681K103LEXH	HQHBR681KB	100HV14B681KM
06	SV10RC681MHA	8840CX681MA103	PCI1561-06	9040B681M103LEXH	HQHBR681MB	100HV14B681MM
07	SV10RC821KHA	8840CX821KA103	PCI1561-07	9040B821K103LEXH	HQHBR821KB	100HV14B821KM
08	SV10RC821MHA	8840CX821MA103	PCI1561-08	9040B821M103LEXH	HQHBR821MB	100HV14B821MM
09	SV10RC102KHA	8840CX102KA103	PCI1561-09	9040B102K103LEXH	HQHBR102KB	100HV14B102KM
10	SV10RC102MHA	8840CX102MA103	PCI1561-10	9040B102M103LEXH	HQHBR102MB	100HV14B102MM
11	SV10RC122KHA	8840CX122KA103	PCI1561-11	9040B122K103LEXH	HQHBR122KB	100HV14B122KM
12	SV10RC122MHA	8840CX122MA103	PCI1561-12	9040B122M103LEXH	HQHBR122MB	100HV14B122MM
13	SV10RC152KHA	8840CX152KA103	PCI1561-13	9040B152K103LEXH	HQHBR152KB	100HV14B152KM
14	SV10RC152MHA	8840CX152MA103	PCI1561-14	9040B152M103LEXH	HQHBR152MB	100HV14B152MM
15	SV10RC182KHA	8840CX182KA103	PCI1561-15	9040B182K103LEXH	HQHBR182KB	100HV14B182KM
16	SV10RC182MHA	8840CX182MA103	PCI1561-16	9040B182M103LEXH	HQHBR182MB	100HV14B182MM
17	SV10RC222KHA	8840CX222KA103	PCI1561-17	9040B222K103LEXH	HQHBR222KB	100HV14B222KM
18	SV10RC222MHA	8840CX222MA103	PCI1561-18	9040B222M103LEXH	HQHBR222MB	100HV14B222MM
19	SV10RC272KHA	8840CX272KA103	PCI1561-19	9040B272K103LEXH	HQHBR272KB	100HV14B272KM
20	SV10RC272MHA	8840CX272MA103	PCI1561-20	9040B272M103LEXH	HQHBR272MB	100HV14B272MM
21	SV10RC332KHA	8840CX332KA103	PCI1561-21	9040B332K103LEXH	HQHBR332KB	100HV14B332KM
22	SV10RC332MHA	8840CX332MA103	PCI1561-22	9040B332M103LEXH	HQHBR332MB	100HV14B332MM
23	SV11RC392KHA	11050CX392KA103	PCI1561-23	11050B392K103LEXH	HQJBR392KB	100HV15B392KM
24	SV11RC392MHA	11050CX392MA103	PCI1561-24	11050B392M103LEXH	HQJBR392MB	100HV15B392MM
25	SV11RC472KHA	11050CX472KA103	PCI1561-25	11050B472K103LEXH	HQJBR472KB	100HV15B472KM
26	SV11RC472MHA	11050CX472MA103	PCI1561-26	11050B472M103LEXH	HQJBR472MB	100HV15B472MM
27	SV12RC562KHA	13060CX562KA103	PCI1561-27	13060B562K103LEXH	HQKBR562KB	100HV16B562KM
28	SV12RC562MHA	13060CX562MA103	PCI1561-28	13060B562M103LEXH	HQKBR562MB	100HV16B562MM
29	SV12RC682KHA	13060CX682KA103	PCI1561-29	13060B682K103LEXH	HQKBR682KB	100HV16B682KM
30	SV12RC682MHA	13060CX682MA103	PCI1561-30	13060B682M103LEXH	HQKBR682MB	100HV16B682MM
31	SV12RC822KHA	13060CX822KA103	PCI1561-31	13060B822K103LEXH	HQKBR822KB	100HV16B822KM
32	SV12RC822MHA	13060CX822MA103	PCI1561-32	13060B822M103LEXH	HQKBR822MB	100HV16B822MM
33	SV12RC103KHA	13060CX103KA103	PCI1561-33	13060B103K103LEXH	HQKBR103KB	100HV16B103KM
34	SV12RC103MHA	13060CX103MA103	PCI1561-34	13060B103M103LEXH	HQKBR103MB	100HV16B103MM

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

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