Type 127P

MIL-PRF-19978/13

CQR29

Capacitor,
Fixed,
Plastic dielectric,
Axial-wire terminal,
Tubular (insulated),
Hermetically sealed in metal cases,
Established reliability.

GENERAL CHARACTERISTICS

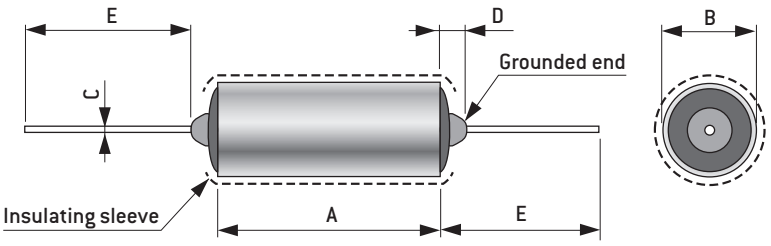
Rated temperature	–65°C to +85°C.
Capacitance range	1 nF to 10 µF
Voltage range	100 V to 1,000 V
Capacitance tolerance	G, J, K
Dissipation factor (DF)	0.6 % max.
Dielectric withstanding voltage (DWV)	Sleeving and Barometric pressure: In accordance with MIL-PRF-19978 Test points: **Circuit diagram 1**: Between terminals and case. **Circuit diagram 3**: Between ungrounded terminal and case.
Insulation resistance (IR)	Sleeving: In accordance with MIL-PRF-19978 Terminal to terminal: **At +25°C**: 0 to 0.68 µF = 100,000 MΩ / >0.68 µF = 68,000 MΩ/µF **At +85°C**: 0 to 0.2 µF = 25,000 MΩ / >0.2 µF = 5,000 MΩ/µF

Full details and most up to date information found at government website.

DIMENSIONS

A	B
See tables on the next pages	

C		D		E	
Inches	(mm)	Inches	(mm)	Inches	(mm)
See note 3		0.172 max	(4.37 max)	1.625 $^{+1}_{-0}$	(41.28 $^{+25.4}_{-0}$)

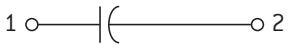


NOTES

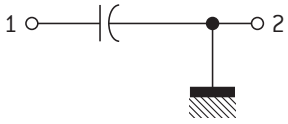
1. Dimensions are in Inches.
2. Metric equivalents are given for general information only.
3. Leads shall be of solder coated solid wire, 0.020" (0,51mm) (No. 24AWG) for cases 0.175" (4,45mm) and 0.312" (7,92mm) in diameter; and 0.032" (0,81mm) (No. 20AWG) for cases 0.400" (10,16mm) diameter and above. Tolerance on all lead wire diameters shall be +0.004" (0,10mm), –0.001" (0,03mm).
4. Capacitors with dimension A of 1.562" (39.67mm) or B of 0.562" (14,27mm) and larger, are not intended to be supported by their leads. These capacitors shall be supported with a supplementary means of mounting, such as a wrap-around band. The supporting device will not be supplied with the capacitor.
5. Lead length may be a minimum of 1" (24,4mm) long for use in tape and reel packaging when specified in the ordering data.

CIRCUIT DIAGRAM

Circuit 1



Circuit 3



HOW TO ORDER

CQR29	A	1	M	C	152	K	1	M
ER Style	Terminal	Circuit	Characteristic	Voltage in code	Capacitance in code	Capacitance tolerance in code	Vibration grade	Failure rate level
CQR = ER style	**A**, **B**, **C**, **D**, **H**, **E** (see page 6)	**1** = Circuit 1 **3** = Circuit 3	**M** (see page 6)	**B** = 100 V **C** = 200 V **E** = 400 V **F** = 600 V **G** = 1,000 V	Examples: **101** = 100pF **472** = 4.7nF **473** = 47nF	**G** = ±2% **J** = ±5% **K** = ±10%	**1** = 10 to 55 Hz inclusive **3** = 10 to 2,000 Hz inclusive (acceleration 15 G)	**M** = 1% /1,000 hours **P** = 0.1% /1,000 hours **R** = 0.01% /1,000 hours

ELECTRICAL CHARACTERISTICS

Part or Identifying Number (PIN)*	Nominal capacitance (µF)	Capacitance Tolerance (in code)	Failure rate Level (in code)	Dimensions							
				Circuit 1				Circuit 3			
				A ±0.031 (±0.79mm)		B +0.015/–0.005 (+0.38/–0.13mm)		A ±0.031 (±0.79mm)		B +0.015/–0.005 (+0.38/–0.13mm)	
				Inches	(mm)	Inches	(mm)	Inches	(mm)	Inches	(mm)
Rated voltage 100 V_{DC}											
CQR29A-MB185-3-	1.8	G, J, K	M, P, R	1.625	(41.28)	0.670	(17.02)	1.531	(38.89)	0.670	(17.02)
CQR29A-MB225-3-	2.2	G, J, K	M, P, R	1.875	(47.63)	0.750	(19.05)	1.781	(45.24)	0.750	(19.05)
CQR29A-MB275-3-	2.7	G, J, K	M, P, R	2.125	(53.98)	0.750	(19.05)	2.031	(51.59)	0.750	(19.05)
CQR29A-MB335-3-	3.3	G, J, K	M, P, R	2.375	(60.33)	0.750	(19.05)	2.281	(57.94)	0.750	(19.05)
CQR29A-MB395-3-	3.9	G, J, K	M, P, R	1.875	(47.63)	1.000	(25.40)	1.781	(45.24)	1.000	(25.40)
CQR29A-MB475-3-	4.7	G, J, K	M, P, R	2.125	(53.98)	1.000	(25.40)	2.031	(51.59)	1.000	(25.40)
CQR29A-MB565-3-	5.6	G, J, K	M, P, R	2.375	(60.33)	1.000	(25.40)	2.281	(57.94)	1.000	(25.40)
CQR29A-MB685-3-	6.8	G, J, K	M, P, R	2.625	(66.68)	1.000	(25.40)	2.531	(64.29)	1.000	(25.40)
Rated voltage 200 V_{DC}											
CQR29A-MC102-3-	0.0010	G, J, K	M, P, R	0.750	(19.05)	0.175	(4.45)	0.656	(16.66)	0.175	(4.45)
CQR29A-MC122-3-	0.0012	G, J, K	M, P, R	0.750	(19.05)	0.175	(4.45)	0.656	(16.66)	0.175	(4.45)
CQR29A-MC152-3-	0.0015	G, J, K	M, P, R	0.750	(19.05)	0.175	(4.45)	0.656	(16.66)	0.175	(4.45)
CQR29A-MC182-3-	0.0018	G, J, K	M, P, R	0.750	(19.05)	0.175	(4.45)	0.656	(16.66)	0.175	(4.45)
CQR29A-MC222-3-	0.0022	G, J, K	M, P, R	0.750	(19.05)	0.175	(4.45)	0.656	(16.66)	0.175	(4.45)
CQR29A-MC272-3-	0.0027	G, J, K	M, P, R	0.750	(19.05)	0.175	(4.45)	0.656	(16.66)	0.175	(4.45)
CQR29A-MC332-3-	0.0033	G, J, K	M, P, R	0.750	(19.05)	0.175	(4.45)	0.656	(16.66)	0.175	(4.45)
CQR29A-MC392-3-	0.0039	G, J, K	M, P, R	0.750	(19.05)	0.175	(4.45)	0.656	(16.66)	0.175	(4.45)
CQR29A-MC472-3-	0.0047	G, J, K	M, P, R	0.750	(19.05)	0.175	(4.45)	0.656	(16.66)	0.175	(4.45)
CQR29A-MC562-3-	0.0056	G, J, K	M, P, R	0.750	(19.05)	0.175	(4.45)	0.656	(16.66)	0.175	(4.45)
CQR29A-MC682-3-	0.0068	G, J, K	M, P, R	0.750	(19.05)	0.175	(4.45)	0.656	(16.66)	0.175	(4.45)
CQR29A-MC822-3-	0.0082	G, J, K	M, P, R	0.750	(19.05)	0.175	(4.45)	0.656	(16.66)	0.175	(4.45)
CQR29A-MC103-3-	0.010	G, J, K	M, P, R	0.750	(19.05)	0.175	(4.45)	0.656	(16.66)	0.175	(4.45)
CQR29A-MC123-3-	0.012	G, J, K	M, P, R	0.719	(18.26)	0.195	(4.95)	0.625	(15.88)	0.195	(4.95)
CQR29A-MC153-3-	0.015	G, J, K	M, P, R	0.719	(18.26)	0.195	(4.95)	0.625	(15.88)	0.195	(4.95)
CQR29A-MC183-3-	0.018	G, J, K	M, P, R	0.719	(18.26)	0.235	(5.97)	0.625	(15.88)	0.235	(5.97)
CQR29A-MC223-3-	0.022	G, J, K	M, P, R	0.719	(18.26)	0.235	(5.97)	0.625	(15.88)	0.235	(5.97)
CQR29A-MC273-3-	0.027	G, J, K	M, P, R	0.719	(18.26)	0.235	(5.97)	0.625	(15.88)	0.235	(5.97)
CQR29A-MC333-3-	0.033	G, J, K	M, P, R	0.719	(18.26)	0.235	(5.97)	0.625	(15.88)	0.235	(5.97)
CQR29A-MC393-3-	0.039	G, J, K	M, P, R	0.719	(18.26)	0.312	(7.92)	0.625	(15.88)	0.312	(7.92)
CQR29A-MC473-3-	0.047	G, J, K	M, P, R	0.719	(18.26)	0.312	(7.92)	0.625	(15.88)	0.312	(7.92)
CQR29A-MC563-3-	0.056	G, J, K	M, P, R	0.844	(21.44)	0.312	(7.92)	0.750	(19.05)	0.312	(7.92)
CQR29A-MC683-3-	0.068	G, J, K	M, P, R	0.844	(21.44)	0.312	(7.92)	0.750	(19.05)	0.312	(7.92)
CQR29A-MC823-3-	0.082	G, J, K	M, P, R	0.844	(21.44)	0.312	(7.92)	0.750	(19.05)	0.312	(7.92)
CQR29A-MC104-3-	0.10	G, J, K	M, P, R	0.844	(21.44)	0.312	(7.92)	0.750	(19.05)	0.312	(7.92)
CQR29A-MC124-3-	0.12	G, J, K	M, P, R	0.812	(20.62)	0.400	(10.16)	0.718	(18.24)	0.400	(10.16)
CQR29A-MC154-3-	0.15	G, J, K	M, P, R	0.812	(20.62)	0.400	(10.16)	0.718	(18.24)	0.400	(10.16)
CQR29A-MC184-3-	0.18	G, J, K	M, P, R	1.062	(26.97)	0.400	(10.16)	0.969	(24.61)	0.400	(10.16)
CQR29A-MC224-3-	0.22	G, J, K	M, P, R	1.062	(26.97)	0.400	(10.16)	0.969	(24.61)	0.400	(10.16)
CQR29A-MC274-3-	0.27	G, J, K	M, P, R	1.250	(31.75)	0.400	(10.16)	1.156	(29.36)	0.400	(10.16)
CQR29A-MC334-3-	0.33	G, J, K	M, P, R	1.250	(31.75)	0.400	(10.16)	1.156	(29.36)	0.400	(10.16)
CQR29A-MC394-3-	0.39	G, J, K	M, P, R	1.188	(30.18)	0.500	(12.70)	1.094	(27.79)	0.500	(12.70)
CQR29A-MC474-3-	0.47	G, J, K	M, P, R	1.188	(30.18)	0.500	(12.70)	1.094	(27.79)	0.500	(12.70)
CQR29A-MC564-3-	0.56	G, J, K	M, P, R	1.375	(34.93)	0.562	(14.27)	1.281	(32.54)	0.562	(14.27)
CQR29A-MC684-3-	0.68	G, J, K	M, P, R	1.375	(34.93)	0.562	(14.27)	1.281	(32.54)	0.562	(14.27)
CQR29A-MC824-3-	0.82	G, J, K	M, P, R	1.875	(47.63)	0.562	(14.27)	1.781	(45.24)	0.562	(14.27)
CQR29A-MC105-3-	10.0	G, J, K	M, P, R	1.875	(47.63)	0.562	(14.27)	1.781	(45.24)	0.562	(14.27)
Rated voltage 400 V_{DC}											
CQR29A-ME102-3-	0.0010	G, J, K	M, P, R	0.812	(20.62)	0.235	(5.97)	0.718	(18.24)	0.235	(5.97)
CQR29A-ME122-3-	0.0012	G, J, K	M, P, R	0.812	(20.62)	0.235	(5.97)	0.718	(18.24)	0.235	(5.97)
CQR29A-ME152-3-	0.0015	G, J, K	M, P, R	0.812	(20.62)	0.235	(5.97)	0.718	(18.24)	0.235	(5.97)
CQR29A-ME182-3-	0.0018	G, J, K	M, P, R	0.812	(20.62)	0.235	(5.97)	0.718	(18.24)	0.235	(5.97)
CQR29A-ME222-3-	0.0022	G, J, K	M, P, R	0.812	(20.62)	0.235	(5.97)	0.718	(18.24)	0.235	(5.97)
CQR29A-ME272-3-	0.0027	G, J, K	M, P, R	0.812	(20.62)	0.235	(5.97)	0.718	(18.24)	0.235	(5.97)
CQR29A-ME332-3-	0.0033	G, J, K	M, P, R	0.812	(20.62)	0.235	(5.97)	0.718	(18.24)	0.235	(5.97)
CQR29A-ME392-3-	0.0039	G, J, K	M, P, R	0.812	(20.62)	0.235	(5.97)	0.718	(18.24)	0.235	(5.97)
CQR29A-ME472-3-	0.0047	G, J, K	M, P, R	0.812	(20.62)	0.235	(5.97)	0.718	(18.24)	0.235	(5.97)
CQR29A-ME562-3-	0.0056	G, J, K	M, P, R	0.938	(23.83)	0.312	(7.92)	0.844	(21.44)	0.312	(7.92)
CQR29A-ME682-3-	0.0068	G, J, K	M, P, R	0.938	(23.83)	0.312	(7.92)	0.844	(21.44)	0.312	(7.92)
CQR29A-ME822-3-	0.0082	G, J, K	M, P, R	0.938	(23.83)	0.312	(7.92)	0.844	(21.44)	0.312	(7.92)
CQR29A-ME103-3-	0.010	G, J, K	M, P, R	0.938	(23.83)	0.312	(7.92)	0.844	(21.44)	0.312	(7.92)

* Complete part number shall include additional symbols to indicate circuit, capacitance tolerance and failure rate level as applicable.

** Dimensions are for basic case; sleeving shall extend 0.016" (0.41mm) minimum and 0.062" (1,57mm) maximum, beyond each end of the capacitor body; however, if a shrink-fitted insulation is used for the sleeving, it shall lap over the ends of the capacitor body. Add 0.047" (1,19mm) maximum to the nominal for capacitance diameter.

Type 127P

MIL-PRF-19978/13

CQR29

ELECTRICAL CHARACTERISTICS

Part or Identifying Number (PIN)*	Nominal capacitance (µF)	Capacitance Tolerance (in code)	Failure rate Level (in code)	Dimensions							
				Circuit 1				Circuit 3			
				A ±0.031 (±0.79mm)		B +0.015/–0.005 (+0.38/–0.13mm)		A ±0.031 (±0.79mm)		B +0.015/–0.005 (+0.38/–0.13mm)	
				Inches	(mm)	Inches	(mm)	Inches	(mm)	Inches	(mm)
Rated voltage 400 V_{DC}											
CQR29A-ME123-3-	0.012	G, J, K	M, P, R	0.938	(23.83)	0.312	(7.92)	0.844	(21.44)	0.312	(7.92)
CQR29A-ME153-3-	0.015	G, J, K	M, P, R	0.938	(23.83)	0.312	(7.92)	0.844	(21.44)	0.312	(7.92)
CQR29A-ME183-3-	0.018	G, J, K	M, P, R	1.062	(26.97)	0.312	(7.92)	0.969	(24.61)	0.312	(7.92)
CQR29A-ME223-3-	0.022	G, J, K	M, P, R	1.062	(26.97)	0.312	(7.92)	0.969	(24.61)	0.312	(7.92)
CQR29A-ME273-3-	0.027	G, J, K	M, P, R	0.938	(23.83)	0.400	(10.16)	0.844	(21.44)	0.400	(10.16)
CQR29A-ME333-3-	0.033	G, J, K	M, P, R	0.938	(23.83)	0.400	(10.16)	0.844	(21.44)	0.400	(10.16)
CQR29A-ME393-3-	0.039	G, J, K	M, P, R	1.062	(26.97)	0.400	(10.16)	0.969	(24.61)	0.400	(10.16)
CQR29A-ME473-3-	0.047	G, J, K	M, P, R	1.062	(26.97)	0.400	(10.16)	0.969	(24.61)	0.400	(10.16)
CQR29A-ME563-3-	0.056	G, J, K	M, P, R	1.250	(31.75)	0.400	(10.16)	1.156	(29.36)	0.400	(10.16)
CQR29A-ME683-3-	0.068	G, J, K	M, P, R	1.250	(31.75)	0.400	(10.16)	1.156	(29.36)	0.400	(10.16)
CQR29A-ME823-3-	0.082	G, J, K	M, P, R	1.562	(39.67)	0.400	(10.16)	1.469	(37.31)	0.400	(10.16)
CQR29A-ME104-3-	0.10	G, J, K	M, P, R	1.562	(39.67)	0.400	(10.16)	1.469	(37.31)	0.400	(10.16)
CQR29A-ME124-3-	0.12	G, J, K	M, P, R	1.281	(32.54)	0.562	(14.27)	1.188	(30.18)	0.562	(14.27)
CQR29A-ME154-3-	0.15	G, J, K	M, P, R	1.281	(32.54)	0.562	(14.27)	1.188	(30.18)	0.562	(14.27)
CQR29A-ME184-3-	0.18	G, J, K	M, P, R	1.531	(38.89)	0.562	(14.27)	1.438	(36.53)	0.562	(14.27)
CQR29A-ME224-3-	0.22	G, J, K	M, P, R	1.531	(38.89)	0.562	(14.27)	1.438	(36.53)	0.562	(14.27)
CQR29A-ME274-3-	0.27	G, J, K	M, P, R	1.906	(48.41)	0.562	(14.27)	1.812	(46.02)	0.562	(14.27)
CQR29A-ME334-3-	0.33	G, J, K	M, P, R	1.906	(48.41)	0.562	(14.27)	1.812	(46.02)	0.562	(14.27)
CQR29A-ME394-3-	0.39	G, J, K	M, P, R	1.906	(48.41)	0.670	(17.02)	1.812	(46.02)	0.670	(17.02)
CQR29A-ME474-3-	0.47	G, J, K	M, P, R	1.906	(48.41)	0.670	(17.02)	1.812	(46.02)	0.670	(17.02)
CQR29A-ME564-3-	0.56	G, J, K	M, P, R	2.156	(54.76)	0.750	(19.05)	2.062	(52.37)	0.750	(19.05)
CQR29A-ME684-3-	0.68	G, J, K	M, P, R	2.156	(54.76)	0.750	(19.05)	2.062	(52.37)	0.750	(19.05)
CQR29A-ME824-3-	0.82	G, J, K	M, P, R	2.656	(67.46)	0.750	(19.05)	2.562	(65.07)	0.750	(19.05)
CQR29A-ME105-3-	10.0	G, J, K	M, P, R	2.656	(67.46)	0.750	(19.05)	2.562	(65.07)	0.750	(19.05)
Rated voltage 600 V_{DC}											
CQR29A-MF102-3-	0.0010	G, J, K	M, P, R	0.812	(20.62)	0.235	(5.97)	0.718	(18.24)	0.235	(5.97)
CQR29A-MF122-3-	0.0012	G, J, K	M, P, R	0.812	(20.62)	0.235	(5.97)	0.718	(18.24)	0.235	(5.97)
CQR29A-MF152-3-	0.0015	G, J, K	M, P, R	0.812	(20.62)	0.235	(5.97)	0.718	(18.24)	0.235	(5.97)
CQR29A-MF182-3-	0.0018	G, J, K	M, P, R	0.812	(20.62)	0.235	(5.97)	0.718	(18.24)	0.235	(5.97)
CQR29A-MF222-3-	0.0022	G, J, K	M, P, R	0.812	(20.62)	0.235	(5.97)	0.718	(18.24)	0.235	(5.97)
CQR29A-MF272-3-	0.0027	G, J, K	M, P, R	0.812	(20.62)	0.235	(5.97)	0.718	(18.24)	0.235	(5.97)
CQR29A-MF332-3-	0.0033	G, J, K	M, P, R	0.938	(23.83)	0.312	(7.92)	0.844	(21.44)	0.312	(7.92)
CQR29A-MF392-3-	0.0039	G, J, K	M, P, R	0.938	(23.83)	0.312	(7.92)	0.844	(21.44)	0.312	(7.92)
CQR29A-MF472-3-	0.0047	G, J, K	M, P, R	0.938	(23.83)	0.312	(7.92)	0.844	(21.44)	0.312	(7.92)
CQR29A-MF562-3-	0.0056	G, J, K	M, P, R	0.938	(23.83)	0.312	(7.92)	0.844	(21.44)	0.312	(7.92)
CQR29A-MF682-3-	0.0068	G, J, K	M, P, R	0.938	(23.83)	0.312	(7.92)	0.844	(21.44)	0.312	(7.92)
CQR29A-MF822-3-	0.0082	G, J, K	M, P, R	1.062	(26.97)	0.312	(7.92)	0.969	(24.61)	0.312	(7.92)
CQR29A-MF103-3-	0.010	G, J, K	M, P, R	1.062	(26.97)	0.312	(7.92)	0.969	(24.61)	0.312	(7.92)
CQR29A-MF123-3-	0.012	G, J, K	M, P, R	0.938	(23.83)	0.400	(10.16)	0.844	(21.44)	0.400	(10.16)
CQR29A-MF153-3-	0.015	G, J, K	M, P, R	0.938	(23.83)	0.400	(10.16)	0.844	(21.44)	0.400	(10.16)
CQR29A-MF183-3-	0.018	G, J, K	M, P, R	1.062	(26.97)	0.400	(10.16)	0.969	(24.61)	0.400	(10.16)
CQR29A-MF223-3-	0.022	G, J, K	M, P, R	1.062	(26.97)	0.400	(10.16)	0.969	(24.61)	0.400	(10.16)
CQR29A-MF273-3-	0.027	G, J, K	M, P, R	1.312	(33.32)	0.400	(10.16)	1.219	(30.96)	0.400	(10.16)
CQR29A-MF333-3-	0.033	G, J, K	M, P, R	1.312	(33.32)	0.400	(10.16)	1.219	(30.96)	0.400	(10.16)
CQR29A-MF393-3-	0.039	G, J, K	M, P, R	1.562	(39.67)	0.400	(10.16)	1.469	(37.31)	0.400	(10.16)
CQR29A-MF473-3-	0.047	G, J, K	M, P, R	1.562	(39.67)	0.400	(10.16)	1.469	(37.31)	0.400	(10.16)
CQR29A-MF563-3-	0.056	G, J, K	M, P, R	1.250	(31.75)	0.562	(14.27)	1.156	(29.36)	0.562	(14.27)
CQR29A-MF683-3-	0.068	G, J, K	M, P, R	1.250	(31.75)	0.562	(14.27)	1.156	(29.36)	0.562	(14.27)
CQR29A-MF823-3-	0.082	G, J, K	M, P, R	1.500	(38.10)	0.562	(14.27)	1.406	(35.71)	0.562	(14.27)
CQR29A-MF104-3-	0.10	G, J, K	M, P, R	1.500	(38.10)	0.562	(14.27)	1.406	(35.71)	0.562	(14.27)
CQR29A-MF124-3-	0.12	G, J, K	M, P, R	1.875	(47.63)	0.562	(14.27)	1.781	(45.24)	0.562	(14.27)
CQR29A-MF154-3-	0.15	G, J, K	M, P, R	1.875	(47.63)	0.562	(14.27)	1.781	(45.24)	0.562	(14.27)
CQR29A-MF184-3-	0.18	G, J, K	M, P, R	1.875	(47.63)	0.670	(17.02)	1.781	(45.24)	0.670	(17.02)
CQR29A-MF224-3-	0.22	G, J, K	M, P, R	1.875	(47.63)	0.670	(17.02)	1.781	(45.24)	0.670	(17.02)
CQR29A-MF274-3-	0.27	G, J, K	M, P, R	2.125	(53.98)	0.750	(19.05)	2.031	(51.59)	0.750	(19.05)
CQR29A-MF334-3-	0.33	G, J, K	M, P, R	2.125	(53.98)	0.750	(19.05)	2.031	(51.59)	0.750	(19.05)
CQR29A-MF394-3-	0.39	G, J, K	M, P, R	2.625	(66.68)	0.750	(19.05)	2.531	(64.29)	0.750	(19.05)
CQR29A-MF474-3-	0.47	G, J, K	M, P, R	2.625	(66.68)	0.750	(19.05)	2.531	(64.29)	0.750	(19.05)
CQR29A-MF564-3-	0.56	G, J, K	M, P, R	2.125	(53.98)	1.000	(25.40)	2.031	(51.59)	1.000	(25.40)
CQR29A-MF684-3-	0.68	G, J, K	M, P, R	2.125	(53.98)	1.000	(25.40)	2.031	(51.59)	1.000	(25.40)

* Complete part number shall include additional symbols to indicate circuit, capacitance tolerance and failure rate level as applicable.

** Dimensions are for basic case; sleeving shall extend 0.016" (0.41mm) minimum and 0.062" (1,57mm) maximum, beyond each end of the capacitor body; however, if a shrink-fitted insulation is used for the sleeving, it shall lap over the ends of the capacitor body. Add 0.047" (1,19mm) maximum to the nominal for capacitance diameter.

ELECTRICAL CHARACTERISTICS

Part or Identifying Number (PIN)*	Nominal capacitance (µF)	Capacitance Tolerance (in code)	Failure rate Level (in code)	Dimensions **							
				Circuit 1				Circuit 3			
				A ±0.031 (±0.79mm)		B +0.015/–0.005 (+0.38/–0.13mm)		A ±0.031 (±0.79mm)		B +0.015/–0.005 (+0.38/–0.13mm)	
				Inches	(mm)	Inches	(mm)	Inches	(mm)	Inches	(mm)
Rated voltage 1,000 V_{DC}											
CQR29A-MG102-3-	0.0010	G, J, K	M, P, R	0.938	(23.83)	0.312	(7.92)	0.844	(21.44)	0.312	(7.92)
CQR29A-MG122-3-	0.0012	G, J, K	M, P, R	0.938	(23.83)	0.312	(7.92)	0.844	(21.44)	0.312	(7.92)
CQR29A-MG152-3-	0.0015	G, J, K	M, P, R	0.938	(23.83)	0.312	(7.92)	0.844	(21.44)	0.312	(7.92)
CQR29A-MG182-3-	0.0018	G, J, K	M, P, R	0.938	(23.83)	0.312	(7.92)	0.844	(21.44)	0.312	(7.92)
CQR29A-MG222-3-	0.0022	G, J, K	M, P, R	0.938	(23.83)	0.312	(7.92)	0.844	(21.44)	0.312	(7.92)
CQR29A-MG272-3-	0.0027	G, J, K	M, P, R	0.938	(23.83)	0.312	(7.92)	0.844	(21.44)	0.312	(7.92)
CQR29A-MG332-3-	0.0033	G, J, K	M, P, R	0.938	(23.83)	0.312	(7.92)	0.844	(21.44)	0.312	(7.92)
CQR29A-MG392-3-	0.0039	G, J, K	M, P, R	0.938	(23.83)	0.400	(10.16)	0.844	(21.44)	0.400	(10.16)
CQR29A-MG472-3-	0.0047	G, J, K	M, P, R	0.938	(23.83)	0.400	(10.16)	0.844	(21.44)	0.400	(10.16)
CQR29A-MG562-3-	0.0056	G, J, K	M, P, R	1.062	(26.97)	0.400	(10.16)	0.969	(24.61)	0.400	(10.16)
CQR29A-MG682-3-	0.0068	G, J, K	M, P, R	1.062	(26.97)	0.400	(10.16)	0.969	(24.61)	0.400	(10.16)
CQR29A-MG822-3-	0.0082	G, J, K	M, P, R	1.312	(33.32)	0.400	(10.16)	1.219	(30.96)	0.400	(10.16)
CQR29A-MG103-3-	0.010	G, J, K	M, P, R	1.312	(33.32)	0.400	(10.16)	1.219	(30.96)	0.400	(10.16)
CQR29A-MG123-3-	0.012	G, J, K	M, P, R	1.562	(39.67)	0.400	(10.16)	1.469	(37.31)	0.400	(10.16)
CQR29A-MG183-3-	0.018	G, J, K	M, P, R	1.250	(31.75)	0.562	(14.27)	1.156	(29.36)	0.562	(14.27)
CQR29A-MG223-3-	0.022	G, J, K	M, P, R	1.250	(31.75)	0.562	(14.27)	1.156	(29.36)	0.562	(14.27)
CQR29A-MG273-3-	0.027	G, J, K	M, P, R	1.250	(31.75)	0.562	(14.27)	1.156	(29.36)	0.562	(14.27)
CQR29A-MG333-3-	0.033	G, J, K	M, P, R	1.500	(38.10)	0.562	(14.27)	1.406	(35.71)	0.562	(14.27)
CQR29A-MG393-3-	0.039	G, J, K	M, P, R	1.875	(47.63)	0.562	(14.27)	1.781	(45.24)	0.562	(14.27)
CQR29A-MG473-3-	0.047	G, J, K	M, P, R	1.875	(47.63)	0.562	(14.27)	1.781	(45.24)	0.562	(14.27)
CQR29A-MG563-3-	0.056	G, J, K	M, P, R	1.875	(47.63)	0.670	(17.02)	1.781	(45.24)	0.670	(17.02)
CQR29A-MG683-3-	0.068	G, J, K	M, P, R	1.875	(47.63)	0.670	(17.02)	1.781	(45.24)	0.670	(17.02)
CQR29A-MG823-3-	0.082	G, J, K	M, P, R	2.125	(53.98)	0.750	(19.05)	2.031	(51.59)	0.750	(19.05)
CQR29A-MG104-3-	0.10	G, J, K	M, P, R	2.125	(53.98)	0.750	(19.05)	2.031	(51.59)	0.750	(19.05)
CQR29A-MG124-3-	0.12	G, J, K	M, P, R	1.875	(47.63)	1.000	(25.40)	1.781	(45.24)	1.000	(25.40)
CQR29A-MG154-3-	0.15	G, J, K	M, P, R	1.875	(47.63)	1.000	(25.40)	1.781	(45.24)	1.000	(25.40)
CQR29A-MG184-3-	0.18	G, J, K	M, P, R	2.375	(60.33)	1.000	(25.40)	2.281	(57.94)	1.000	(25.40)
CQR29A-MG224-3-	0.22	G, J, K	M, P, R	2.375	(60.33)	1.000	(25.40)	2.281	(57.94)	1.000	(25.40)

* Complete part number shall include additional symbols to indicate circuit, capacitance tolerance and failure rate level as applicable.

** Dimensions are for basic case; sleeving shall extend 0.016" (0.41mm) minimum and 0.062" (1,57mm) maximum, beyond each end of the capacitor body; however, if a shrink-fitted insulation is used for the sleeving, it shall lap over the ends of the capacitor body. Add 0.047" (1,19mm) maximum to the nominal for capacitance diameter.

Technical Informations

TERMINAL

The terminal is identified by a single letter in accordance with table below.

Symbol	Type of terminal
A	Axial wire lead
B	Solder lug (nonremovable)
C	Threaded stud and nuts
D and H	Pillar insulator for use at altitudes up to 7,500 feet (22.8 inches of mercury)
E	Pillar insulator for use at altitudes up to 50,000 feet (3.4 inches of mercury)
R	Radial wire-lead
L	Lugs

CHARACTERISTIC

The characteristic is identified by a single letter in accordance with table below.

Characteristic	Values of characteristics								
	E	F	G	K [2]	M	P	Q [4]	T	V
High ambient test temperature ±3°C [1]	+85°C	+85°C	+85°C	+125°C	+85°C	+65°C	+125°C	+170°C	+125°C
Low ambient test temperature +0°C, −5°C	−65°C	−55°C	−55°C	−65°C	−65°C	−65°C	−55°C	−65°C	−55°C

Life-test dc voltage, percent of the dc voltage rating: Watt-second group:									
I (0.5 watt-second and less)	140	140	140	140	140	140	150	140	150
II (0.5+ to 5 watt-seconds)	140	130	130	140 [3]	–	–	–	–	–
III (5+ to 50 watt-seconds)	140	110	110	140	–	–	–	–	–
IV (greater than 50 watt-seconds)	140	90	90	140	–	–	–	–	–
Flashpoint of impregnant of filling compound (°C)	+142°C	+135°C	+135°C	+142°C	+142°C	+142°C	+142°C	+217°C	+142°C

[1] For characteristic K, voltage derating may be necessary at the high ambient test temperature.
[2] For tubular units of characteristic K rated at 1,000 volts dc, life test voltage is 1,200 volts.
[3] For tubular units of characteristic K in watt-seconds group II, use 130 percent of the dc voltage at +40°C for the life-test dc voltage.
[4] Characteristic Q capacitors are no longer available

Characteristic	Construction		Operating temperature range
	Dielectric material	Electrode	
K	Polypropylene	Foil	−55°C to +105°C
L	Polypropylene	Metallized polypropylene	−55°C to +105°C
M	Polyethylene terephthalate	Foil	−55°C to +85°C
N	Polyethylene terephthalate	Metallized polyethylene terephthalate	−55°C to +85°C
Q	Polycarbonate	Foil	−55°C to +125°C [1]
R	Polycarbonate	Metallized polycarbonate	−55°C to +125°C [1]
U	Polyphenylene sulfide	Metallized polyphenylene sulfide	−55°C to +125°C [1]
V	Polyphenylene sulfide	Foil	−55°C to +125°C [1]

[1] For operation at +125°C, characteristics Q, R, U and V capacitors are voltage derated (see table below)

Symbol	DC voltage rating at +85°C [1]	Characteristics Q and V DC voltage rating at +125°C	Characteristics R and U DC voltage rating at +125°C
A	50 V	33.3 V	25 V
B	100 V	66.7 V	50 V
C	200 V	133.3 V	100 V
D	300 V	200.0 V	150 V
E	400 V	266.7 V	200 V
F	600 V	400.0 V	300 V
G	75 V	50.0 V	37.5 V
H	150 V	100.0 V	75 V
J	25 V	16.7 V	12.5 V
K	250 V	166.7 V	125 V
L	800 V	533.3 V	400 V

[1] DC voltage rating for characteristics K and L at +105°C are the same as those at +85°C.

VOLTAGE

The dc voltage rating for continuous operation at the high ambient test temperature specified in table III (except for characteristic K which is for +85°C operation), is identified by a single letter in accordance with table below.

Symbol	DC voltage rating (Volts)	Symbol	DC voltage rating (Volts)
Z	30 V	K	2,500 V
A	50 V	L	3,000 V
B	100 V	M	4,000 V
C	200 V	N	5,000 V
D	300 V	P	6,000 V
E	400 V	R	7,500 V
F	600 V	S	10,000 V
G	1,000 V	T	12,500 V
H	1,500 V	U	15,000 V
J	2,000 V		

CAPACITANCE TOLERANCE

The capacitance tolerance in percent is identified by a single letter in accordance with table below.

Symbol	Capacitance tolerance
C	±0.25%
D	±0.5%
F	±1%
G	±2%
J	±5%
K	±10%
M	±20%

CIRCUIT AND VOLTAGE CODES

Code	Circuit	Voltage (V)
A	1	50
B	3	50
C	1	100
D	3	100
E	1	200
F	3	200
G	1	400
H	3	400
J	1	600
K	3	600
L	1	300
M	3	300

Government Documents

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).

FEDERAL STANDARDS

FED-STD-H28 - Screw-Thread Standards for Federal Services

DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-C-18312 - Capacitors, Fixed, Metallized (Paper, Paper-Plastic, or Plastic Film) Dielectric, Direct Current (Hermetically Sealed in Metal Cases), General Specification for

MIL-PRF-83421/1 - Capacitors, Fixed, Metallized, Plastic Film Dielectric, DC and AC, Hermetically Sealed In Metal Cases, Established Reliability,

MIL-PRF-83421/2 - Capacitor, Fixed, Metallized Plastic Film, Dielectric, (DC, AC, or DC and AC), Hermetically Sealed in Metal Cases, Established Reliability,

MIL-PRF-83421/6 - Capacitor, Fixed, Metallized Plastic Film Dielectric, DC and AC, Hermetically Sealed in Metal Cases, Established Reliability,

MIL-PRF-11693/7 - Capacitors, Feed Through, Radio-Interference Reduction, DC (Hermetically Sealed in Metal Cases), Established and Non-Established Reliability,

MIL-PRF-83421/6 - Capacitors, Fixed, Metallized Plastic Film Dielectric, DC and AC, Hermetically Sealed In Metal Cases, Established Reliability.

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-202 - Test Methods Standard Electronic and Electrical Component Parts
MIL-STD-202-101 - Method 101, Salt Atmosphere (Corrosion)
MIL-STD-202-104 - Method 104, Immersion
MIL-STD-202-105 - Method 105, Barometric Pressure (Reduced)
MIL-STD-202-106 - Method 106, Moisture Resistance
MIL-STD-202-107 - Method 107, Thermal Shock
MIL-STD-202-108 - Method 108, Life (at Elevated Ambient Temperature)
MIL-STD-202-112 - Method 112, Seal
MIL-STD-202-201 - Method 201, Vibration
MIL-STD-202-204 - Method 204, Vibration, High Frequency
MIL-STD-202-208 - Method 208, Solderability
MIL-STD-202-209 - Method 209, Radiographic Inspection
MIL-STD-202-210 - Method 210, Resistance to Soldering Heat
MIL-STD-202-211 - Method 211, Terminal Strength
MIL-STD-202-213 - Method 213, Shock (Specified Pulse)
MIL-STD-202-214 - Method 214, Random Vibration
MIL-STD-202-215 - Method 215, Resistance to Solvents
MIL-STD-202-301 - Method 301, Dielectric Withstanding Voltage
MIL-STD-202-302 - Method 302, Insulation Resistance
MIL-STD-202-305 - Method 305, Capacitance
MIL-STD-220 - Method of Insertion Loss Measurement
MIL-STD-690 - Failure Rate Sampling Plans and Procedures
MIL-STD-790 - Standard Practice for Established Reliability and High Reliability Qualified Products List (QPL) Systems for Electrical, Electronic, and Fiber Optic Parts Specifications
MIL-STD-810 - Environmental Engineering Considerations and Laboratory Tests
MIL-STD-1276 - Leads for Electronic Component Parts
MIL-STD-1285 - Marking of Electrical and Electronic Parts

Government Documents

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 are those listed in the solicitation or contract.

ASTM INTERNATIONAL (ASTM)

ASTM D92 - Standard Test Method for Flash and Fire Points by Cleveland Open Cup Tester

SAE INTERNATIONAL (SAE)

SAE EIA-554-1 - Assessment of Average Outgoing Quality Levels in Parts Per Million (PPM)

ASSOCIATION CONNECTING ELECTRONICS INDUSTRIES (IPC)

IPC/JEDEC J-STD-002 - Solderability Tests for Component Leads, Terminations, Lugs, Terminals and Wires

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

ISO/IEC 17025 - General Requirements for the Competence of Testing and Calibration laboratories

ISO 10012 - Measurement Management Systems - Requirements for Measurement Processes and Measuring Equipment

NATIONAL CONFERENCE OF STANDARDS LABORATORIES (NCSL)

NCSL Z540.3 - Requirements for the Calibration of Measuring and Test Equipment

SAE INTERNATIONAL (SAE)

SAE EIA-554-1 - Assessment of Average Outgoing Quality Levels in Parts per Million (PPM)

SOLID STATE TECHNOLOGY ASSOCIATION (JEDEC)

JEDEC JESD557 - Statistical Process Control Systems

Order of precedence.
Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein (except for related specification sheets), the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.