Type 325/326, –55 ºC to 125 ºC Long-Life, Switching Power Grade Radial

High Temperature and Ultra-Low ESR



Type 325


Type 326

The Types 325 and 326 are the ultra-wide-temperature, low-ESR capacitors for switching power-supply outputs and automotive applications. The 125 °C capability and exceptionally low ESRs enable high ripple-current capability. With series inductance of 12 to 16 nH and ripple currents to 27 amps one of these capacitors can save by replacing eight to ten of the 12.5 mm diameter capacitors routinely at the output of switching power supplies. Type 325 has three leads for rugged, reverse-proof mounting, and Type 326 has two leads.

Highlights

- 2000 hour life test at 125 °C
- Ripple Current to 27 amps
- ESRs to 5 mΩ
- > 90% capacitance at –40 °C
- Replaces multiple capacitors

Regulatory Information

Specifications

Operating Temperature: –55 °C to 125 °C

Rated Voltage: 6.3 to 63 Vdc –

Capacitance: 880 µF to 46,000 µF

Capacitance Tolerance: –10 +75%

Leakage Current: ≤0.5 $\sqrt{CV}$ µA, 4 mA max, 5 minutes

Cold Impedance: –55 °C multiple of 25 °C Z ≤2.5 @ 120 Hz
≤20 from 20–100 kHz

Ripple Current Multipliers:

Ambient Temperature

45ºC	55ºC	65ºC	75ºC	85ºC	95ºC	105ºC	115ºC	125ºC
1.39	1.3	1.21	1.11	1.00	0.88	0.73	0.55	0.26

Frequency

120 Hz	360 Hz	400 Hz	1 kHz	20-100 kHz
see ratings	0.76	0.77	0.85	1.00

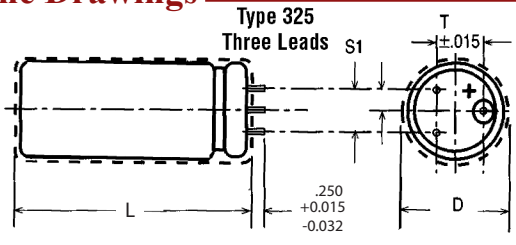
Life Test: 2000 h with rated voltage at 125 °C
Δ capacitance ± 10%
ESR 125 % of limit
DCL 100 % of limit

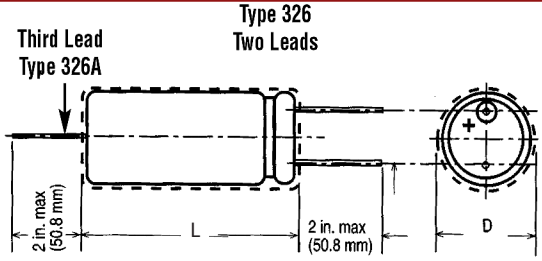
Load Life: 4000 h at full load at 85 °C
Δ capacitance ± 10%
ESR 200 % of limit
DCL 100 % of limit

Shelf Life: 500 h at 105 °C,
Δ capacitance ± 10%,
ESR 110% of limit,
DCL 200% of limit

Vibration: 10 to 55 Hz, 0.06" and 10 g max, 2 h each plane

Outline Drawings





Type 325/326,–55 ºC to 125 ºC Long-Life, Switching Power Grade Radial

Case Code	Insulated D ± 0.015 (0.4 mm) L ± 0.062 (1.6 mm) D x L	Epoxy endseal L Max	Bare Can D ± 0.015 (0.4 mm) L ± 0.030 (0.8 mm) D x L	Lead Spacing Type 325 S1 ±0.020(0.5 mm)	Lead Spacing Type 325 T ±0.020(0.5 mm)	Lead Spacing Type 326 S2	Lead Diameter dia.	Lead Diameter AWG
Case Dimensions in Inches								
GE	.765 x 1.150	1.212	0.750 x 1.125	0.200	0.300	0.300	0.040	18
GJ	.765 x 1.650	1.712	0.750 x 1.625	0.200	0.300	0.300	0.040	18
GL	.765 x 2.150	2.212	0.750 x 2.125	0.200	0.300	0.300	0.040	18
GP	.765 x 2.650	2.712	0.750 x 2.625	0.200	0.300	0.300	0.040	18
GS	.765 x 3.150	3.212	0.750 x 3.125	0.200	0.300	0.300	0.040	18
GT	.765 x 3.650	3.712	0.750 x 3.625	0.200	0.300	0.300	0.040	18
HE	.890 x 1.150	1.212	0.875 x 1.125	0.300	0.400	0.300	0.040	18
HJ	.890 x 1.650	1.712	0.875 x 1.625	0.300	0.400	0.300	0.040	18
HL	.890 x 2.150	2.212	0.875 x 2.125	0.300	0.400	0.300	0.040	18
HP	.890 x 2.650	2.712	0.875 x 2.625	0.300	0.400	0.300	0.040	18
HS	.890 x 3.150	3.212	0.875 x 3.125	0.300	0.400	0.300	0.040	18
HT	.890 x 3.650	3.712	0.875 x 3.625	0.300	0.400	0.300	0.040	18
JE	1.015 x 1.150	1.212	1.000 x 1.125	0.300	0.400	0.400	0.040	18
JJ	1.015 x 1.650	1.712	1.000 x 1.625	0.300	0.400	0.400	0.040	18
JL	1.015 x 2.150	2.212	1.000 x 2.125	0.300	0.400	0.400	0.040	18
JP	1.015 x 2.650	2.712	1.000 x 2.625	0.300	0.400	0.400	0.040	18
JS	1.015 x 3.150	3.212	1.000 x 3.125	0.300	0.400	0.400	0.040	18
JT	1.015 x 3.650	3.712	1.000 x 3.625	0.300	0.400	0.400	0.040	18
Case Dimensions in Millimeters								
GE	19.4 x 29.2	30.8	19.1 x 28.6	5.08	7.62	7.62	1.02	18
GJ	19.4 x 41.9	43.5	19.1 x 41.3	5.08	7.62	7.62	1.02	18
GL	19.4 x 54.6	56.2	19.1 x 54.0	5.08	7.62	7.62	1.02	18
GP	19.4 x 67.3	68.9	19.1 x 66.7	5.08	7.62	7.62	1.02	18
GS	19.4 x 80.0	81.6	19.1 x 79.4	5.08	7.62	7.62	1.02	18
GT	19.4 x 92.7	94.3	19.1 x 92.1	5.08	7.62	7.62	1.02	18
HE	22.6 x 29.2	30.8	22.2 x 28.6	7.62	10.16	7.62	1.02	18
HJ	22.6 x 41.9	43.5	22.2 x 41.3	7.62	10.16	7.62	1.02	18
HL	22.6 x 54.6	56.2	22.2 x 54.0	7.62	10.16	7.62	1.02	18
HP	22.6 x 67.3	68.9	22.2 x 66.7	7.62	10.16	7.62	1.02	18
HS	22.6 x 80.0	81.6	22.2 x 79.4	7.62	10.16	7.62	1.02	18
HT	22.6 x 92.7	94.3	22.2 x 92.1	7.62	10.16	7.62	1.02	18
JE	25.8 x 29.2	30.8	25.4 x 28.6	7.62	10.16	10.16	1.02	18
JJ	25.8 x 41.9	43.5	25.4 x 41.3	7.62	10.16	10.16	1.02	18
HL	25.8 x 54.6	56.2	25.4 x 54.0	7.62	10.16	10.16	1.02	18
JP	25.8 x 67.3	68.9	25.4 x 66.7	7.62	10.16	10.16	1.02	18
JS	25.8 x 80.0	81.6	25.4 x 79.4	7.62	10.16	10.16	1.02	18
JT	25.8 x 92.7	94.3	25.4 x 92.1	7.62	10.16	10.16	1.02	18

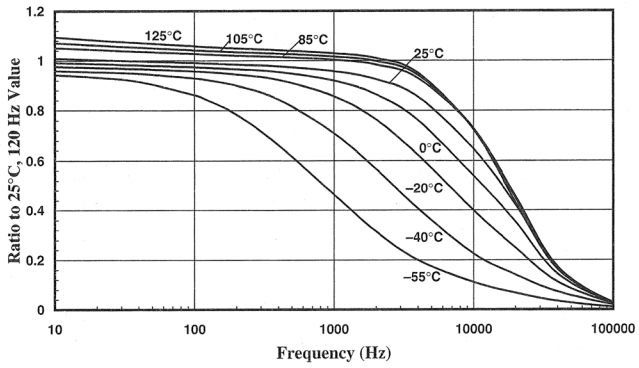
Part Numbering System

325	393	U	6R3	JS	1	E
Type	**Capacitance**	**Tolerance**	**Voltage**	**Case Code**	**Insulation**	**Epoxy**
325 - 3 leads	**152**=1500 µF	**M** = 20%	**6R3**=6.3 V	See	**0** = bare can	(**blank**) =no epoxy
326 - 2 leads	**393**=39000 µF	**T** = 10% + 50%	**035**=35 V	Ratings	**1** = polyester	**E** = Epoxy endseal
326A - 3 leads, laydown		**U** = 10% + 75%				

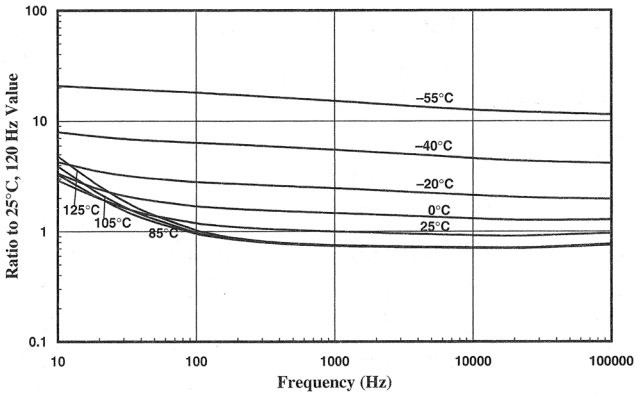
Type 325/326, –55 ºC to 125 ºC Long-Life, Switching Power Grade Radial

Typical Performance Curves

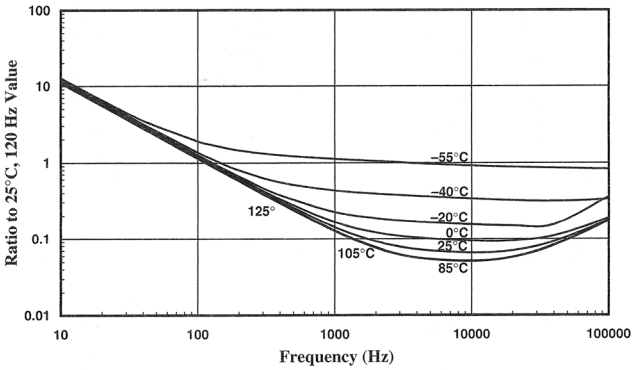
Type 325 Capacitance vs Temperature & Frequency, 10000 µF, 16 V



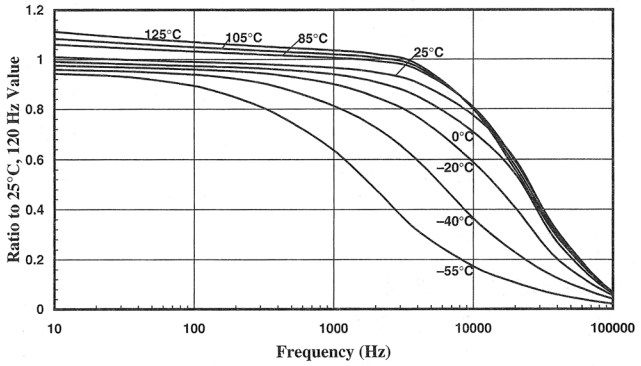
Type 325 ESR vs Temperature and Frequency, 10000 µF, 16 V



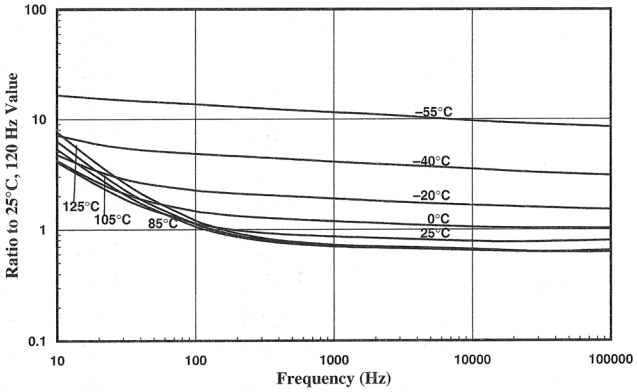
Type 325 Impedance vs Temperature and Frequency, 10000 µF, 16 V



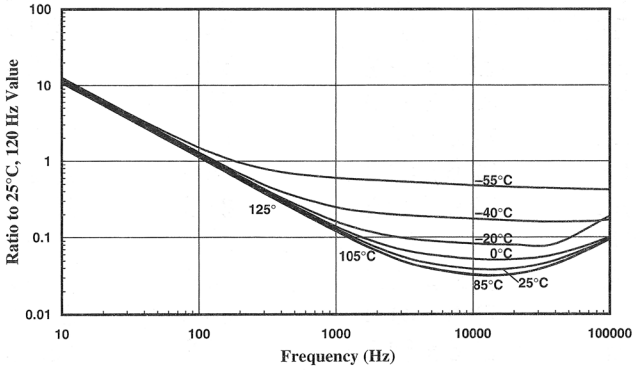
Type 325 Capacitance vs Temperature & Frequency, 5600 µF, 25 V



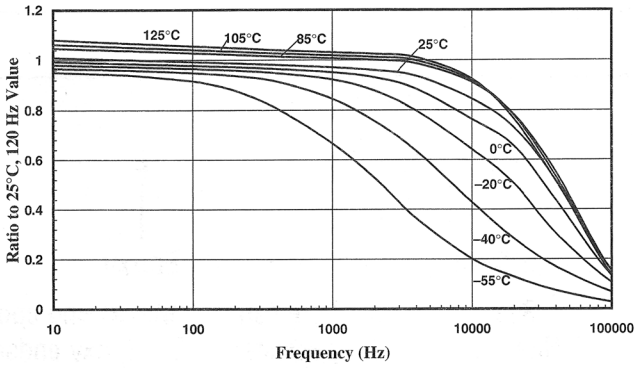
Type 325 ESR vs Temperature and Frequency, 5600 µF, 25 V



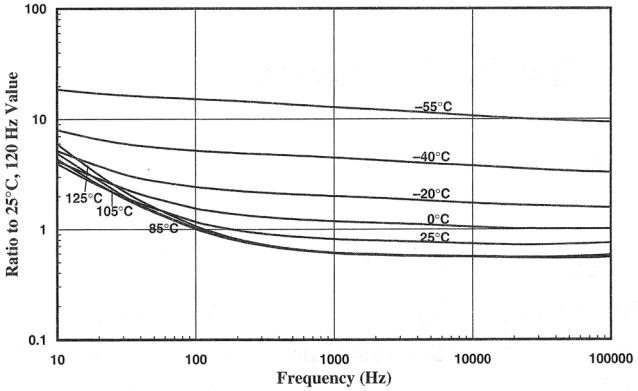
Type 325 Impedance vs Temperature and Frequency, 5600 µF, 25 V



Type 325 Capacitance vs Temperature & Frequency, 3900 µF, 35 V



Type 325 ESR vs Temperature and Frequency, 3900 µF, 35 V



Type 325/326,–55 ºC to 125 ºC Long-Life, Switching Power Grade Radial

Ratings

Cap. (µF)	Catalog Part Number	ESR MAX @ 25°C 120 Hz 20 kHz (mΩ)		Ripple MAX @ 85ºC 120 Hz 20 kHz (A)		Nom Size Insulated D X L (in)
6.3 Vdc (8 Vdc Surge)						
4400	325442U6R3GE1	65.7	36.2	3.95	5.31	0.77 X 1.15
5800	325582U6R3HE1	42.8	26.0	5.37	6.89	0.89 X 1.15
7100	325712U6R3GJ1	41.9	23.5	5.68	7.59	0.77 X 1.65
7700	325772U6R3JE1	28.5	17.2	7.16	9.22	1.02 X 1.15
11000	325113U6R3GL1	29.5	16.2	7.56	10.21	0.77 X 2.15
12000	325123U6R3HJ1	26.5	14.7	7.81	10.51	0.89 X 1.65
14000	325143U6R3GP1	20.9	13.6	9.85	12.21	0.77 X 2.65
15000	325153U6R3JJ1	16.2	11.1	10.88	13.13	1.02 X 1.65
17000	325173U6R3HL1	18.7	11.0	10.46	13.60	0.89 X 2.15
18000	325183U6R3GS1	18.1	11.6	11.42	14.23	0.77 X 3.15
21000	325213U6R3GT1	16.5	10.6	12.75	15.94	0.77 X 3.65
23000	325233U6R3HP1	14.3	8.6	13.02	16.81	0.89 X 2.65
23000	325233U6R3JL1	14.3	8.7	12.86	16.51	1.02 X 2.15
29000	325293U6R3HS1	10.5	7.4	16.40	19.48	0.89 X 3.15
31000	325313U6R3JP1	10.5	7.3	16.40	19.61	1.02 X 2.65
35000	325353U6R3HT1	10.1	6.2	17.75	22.70	0.89 X 3.65
39000	325393U6R3JS1	9.5	6.3	18.55	22.89	1.02 X 3.15
46000	325463U6R3JT1	8.3	5.2	21.23	26.70	1.02 X 3.65
10 Vdc (13 Vdc Surge)						
3300	325332U010GE1	75.5	36.2	3.68	5.31	0.77 X 1.15
4700	325472U010HE1	42.8	26.0	5.37	6.89	0.89 X 1.15
5400	325542U010GJ1	42.7	23.5	5.63	7.59	0.77 X 1.65
6400	325642U010JE1	36.7	17.2	6.30	9.22	1.02 X 1.15
8000	325802U010GL1	31.4	16.2	7.33	10.21	0.77 X 2.15
9300	325932U010HJ1	25.7	14.7	7.95	10.51	0.89 X 1.65
11000	325113U010GP1	20.9	13.6	9.85	12.21	0.77 X 2.65
13000	325133U010GS1	19	11.6	11.13	14.23	0.77 X 3.15
13000	325133U010JJ1	22.9	11.1	9.16	13.13	1.02 X 1.65
14000	325143U010HL1	17.3	11.0	10.86	13.60	0.89 X 2.15
16000	325163U010GT1	17	10.4	12.57	16.08	0.77 X 3.65
19000	325193U010HP1	14.2	8.6	13.04	16.81	0.89 X 2.65
19000	325193U010JL1	16.2	8.7	12.10	16.51	1.02 X 2.15
23000	325233U010HS1	11.4	7.4	15.73	19.48	0.89 X 3.15
26000	325263U010JP1	11.4	7.3	15.73	19.61	1.02 X 2.65
28000	325283U010HT1	10.1	6.2	17.75	22.70	0.89 X 3.6
32000	325323U010JS1	10.5	6.3	17.69	22.89	1.02 X 3.15
38000	325383U010JT1	8.7	5.2	20.67	26.70	1.02 X 3.65
16 Vdc (20 Vdc Surge)						
2000	325202U016GE1	92.6	35.0	3.33	5.41	0.77 X 1.15
2800	325282U016HE1	63.8	26.0	4.40	6.89	0.89 X 1.15
3200	325322U016GJ1	50.4	23.5	5.18	7.59	0.77 X 1.65
3800	325382U016JE1	48.6	17.2	5.48	9.22	1.02 X 1.15
4800	325482U016GL1	35.3	16.2	6.92	10.21	0.77 X 2.15
5600	325562U016HJ1	32.2	14.7	7.09	10.51	0.89 X 1.65
6400	325642U016GP1	26.6	13.6	8.73	12.21	0.77 X 2.65
7700	325772U016JJ1	24.8	11.1	8.79	13.13	1.02 X 1.65
8000	325802U016GS1	22.8	11.6	10.17	14.23	0.77 X 3.15
8400	325842U016HL1	22.1	11.0	9.61	13.60	0.89 X 2.15
9600	325962U016GT1	24.8	10.1	10.41	16.28	0.77 X 3.65
11000	325113U016HP1	17.2	8.6	11.87	16.81	0.89 X 2.65
12000	325123U016JL1	17.2	8.7	11.74	16.51	1.02 X 2.15
14000	325143U016HS1	14.3	7.4	14.05	19.48	0.89 X 3.15
15000	325153U016JP1	13.3	7.3	14.55	19.61	1.02 X 2.65
17000	325173U016HT1	14.9	6.2	14.59	22.60	0.89 X 3.65
19000	325193U016JS1	11.4	6.3	16.92	22.89	1.02 X 3.15
23000	325233U016JT1	9.5	5.2	19.82	26.70	1.02 X 3.65
25 Vdc (32 Vdc Surge)						
1300	325132U025GE1	109.0	35.0	3.07	5.41	0.77 X 1.15
1800	325182U025HE1	70.8	26.0	4.17	6.89	0.89 X 1.15
2100	325212U025GJ1	55.1	23.5	4.96	7.59	0.77 X 1.65
2500	325252U025JE1	52.5	17.2	5.27	9.22	1.02 X 1.15
3100	325312U025GL1	38.0	16.2	6.66	10.21	0.77 X 2.15
3600	325362U025HJ1	35.0	14.7	6.80	10.51	0.89 X 1.65
4100	325412U025GP1	28.6	13.6	8.42	12.21	0.77 X 2.65
4900	325492U025JJ1	26.6	11.1	8.49	13.13	1.02 X 1.65
5100	325512U025GS1	24.8	11.6	9.76	14.23	0.77 X 3.15
5400	325542U025HL1	24.0	11.0	9.22	13.60	0.89 X 2.15
6200	325622U025GT1	24.8	10.1	10.41	16.28	0.77 X 3.65
7200	325722U025HP1	19.1	8.6	11.26	16.81	0.89 X 2.65
7400	325742U025JL1	19.1	8.7	11.13	16.51	1.02 X 2.15
8900	325892U025HS1	15.2	7.4	13.60	19.48	0.89 X 3.15
9800	325982U025JP1	15.3	7.3	13.60	19.61	1.02 X 2.65
11000	325113U025HT1	14.9	6.2	14.59	22.60	0.89 X 3.65
12000	325123U025JS1	12.4	6.3	16.27	22.89	1.02 X 3.15
15000	325153U025JT1	9.5	5.2	19.82	26.7	1.02 X 3.65
35 Vdc (44 Vdc Surge)						
880	325881U035GE1	124.0	35.0	2.88	5.41	0.77 X 1.15
1100	325112U035HE1	85.6	26.0	3.79	6.89	0.89 X 1.15
1500	325152U035GJ1	66.6	23.5	4.51	7.59	0.77 X 1.65
1700	325172U035JE1	63.8	17.2	4.78	9.22	1.02 X 1.15
2200	325222U035HJ1	42.8	14.7	6.15	10.51	0.89 X 1.65
2200	325222U035GL1	45.7	16.2	6.08	10.21	0.77 X 2.15
3000	325302U035GP1	35.2	13.6	7.59	12.21	0.77 X 2.65
3300	325332U035HL1	29.7	11.0	8.28	13.60	0.89 X 2.15
3400	325342U035JJ1	32.4	11.1	7.70	13.13	1.02 X 1.65
3700	325372U035GS1	28.6	11.6	9.09	14.23	0.77 X 3.15
4300	325432U035GT1	24.8	10.1	10.41	16.28	0.77 X 3.65
4400	325442U035HP1	22.9	8.6	10.28	16.81	0.89 X 2.65
5100	325512U035JL1	21.9	8.7	10.39	16.51	1.02 X 2.15
5500	325552U035HS1	18.1	7.4	12.47	19.48	0.89 X 3.15
6300	325632U035HT1	14.9	6.2	14.59	22.60	0.89 X 3.65
6800	325682U035JP1	17.1	7.3	12.83	19.61	1.02 X 2.65
8500	325852U035JS1	14.3	6.3	15.15	22.89	1.02 X 3.15
10000	325103U035JT1	12.4	5.2	17.37	26.70	1.02 X 3.65

Notice and Disclaimer: All product drawings, descriptions, specifications, statements, information and data (collectively, the "Information") in this datasheet or other publication are subject to change. The customer is responsible for checking, confirming and verifying the extent to which the Information contained in this datasheet or other publication is applicable to an order at the time the order is placed. All Information given herein is believed to be accurate and reliable, but it is presented without any guarantee, warranty, representation or responsibility of any kind, expressed or implied. Statements of suitability for certain applications are based on the knowledge that the Cornell Dubilier company providing such statements ("Cornell Dubilier") has of operating conditions that such Cornell Dubilier company regards as typical for such applications, but are not intended to constitute any guarantee, warranty or representation regarding any such matter – and Cornell Dubilier specifically and expressly disclaims any guarantee, warranty or representation concerning the suitability for a specific customer application, use, storage, transportation, or operating environment. The Information is intended for use only by customers who have the requisite experience and capability to determine the correct products for their application. Any technical advice inferred from this Information or otherwise provided by Cornell Dubilier with reference to the use of any Cornell Dubilier products is given gratis (unless otherwise specified by Cornell Dubilier), and Cornell Dubilier assumes no obligation or liability for the advice given or results obtained. Although Cornell Dubilier strives to apply the most stringent quality and safety standards regarding the design and manufacturing of its products, in light of the current state of the art, isolated component failures may still occur. Accordingly, customer applications which require a high degree of reliability or safety should employ suitable designs or other safeguards (such as installation of protective circuitry or redundancies or other appropriate protective measures) in order to ensure that the failure of an electrical component does not result in a risk of personal injury or property damage. Although all product-related warnings, cautions and notes must be observed, the customer should not assume that all safety measures are indicated in such warnings, cautions and notes, or that other safety measures may not be required.