

R SERIES**FEATURES**

- **High Temperature Durability**

No solder is used in connecting the cathode terminal to the tantalum pellet. Consequently, users can apply direct soldering (wave soldering) and reflow soldering.

- **High Adaptability of Automatic Assembly**

Tape and reel packaging is available in all product lines.

Precise dimensions due to transfer molded encapsulation provides excellent adaptability to automatic placement machines. 8 mm width carrier tape packaging, which is used extensively in most machines, is available for capacitors up to 150 μ F (B2 Case).

The A Case has the same dimensions (3.2 mm \times 1.6 mm) as chip resistors and ceramic capacitors.

The A2 Case has the same dimensions (3.2 mm \times 1.6 mm \times 1.2 mm MAX.) as mini mold Tr.

- **Wide Operating Temperature Range**

The R Series operating temperature range is -55°C to $+125^{\circ}\text{C}$.

PERFORMANCE CHARACTERISTICS

Item		Specification									Test Method	
Operating Temperature Range		-55 to +125°C										
Rated Voltage		2.5	4	6.3	10	16	20	25	35	50	Vdc	Temperature: 85°C
Surge Voltage		3.3	5.2	8	13	20	26	33	46	65	Vdc	Temperature: 85°C
Category Voltage		1.6	2.5	4	6.3	10	13	16	22	32	Vdc	Temperature: 125°C (*1)
Capacitance Range		0.047 to 470 μ F									Frequency: 120 Hz	
Capacitance Tolerance		\pm 20% (\pm 10%)										
Leakage Current (L.C.)		0.01 CV (μ A) or 0.5 μ A whichever is greater									5 min, after rated voltage applied	
Tangent of Loss Angle (tan δ)	Standard	0.047 to 4.7 μ F : 0.04 max. 6.8 to 68 μ F : 0.06 max.									Frequency: 120 Hz	
	Extended	2.5 to 10 V : 0.08 max. 16 to 35 V : 0.06 max. (*2)										
Equivalent Series Resistance (ESR)		Refer to standard ratings									Frequency: 100 kHz	
Surge Voltage Rest		Δ C/C : \pm 5% (*3) tan δ : Initial Requirement L.C. : Initial Requirement									Temperature: 85°C Surge Voltage for 30 sec. Series Resistance: 1 k Ω Discharging Voltage for 5 min. 30 sec. 1000 cycles	
Characteristics at High and Low Temperature	Temp.	-55°C			+85°C			+125°C			Step 1: 20°C Step 2: -55°C Step 3: 20°C Step 4: 85°C Step 5: 125°C Step 6: 20°C	
	Δ C/C	0, -12%			+12, 0%			+15, 0%				
	tan δ	[Standard] (*4) 0.47 to 4.7 μ F: 0.08 max. 6.8 to 68 μ F: 0.1 max. [Extended] (*5) 2.5 to 10 V: 0.12 max. 16 to 35 V: 0.1 max.			Initial Requirement			[Standard] 0.47 to 4.7 μ F: 0.06 max. 6.8 to 68 μ F: 0.08 max. [Extended] (*6) 2.5 to 10 V: 0.1 max. 16 to 35 V: 0.08 max.				
	L.C.	-			0.1CV or 5 μ A whichever is greater			0.125CV or 6.25 μ A whichever is greater				
Rapid Change of Temperature		Δ C/C : \pm 5% (*3) tan δ : Initial Requirement L.C. : Initial Requirement									-55 to +125°C 5 cycles	
Resistance to Soldering Heat		Δ C/C : \pm 5% (*3) tan δ : Initial Requirement L.C. : Initial Requirement									Fully immersion to solder, 260°C, 5 sec.	
Damp Heat, Steady State		Δ C/C : \pm 5% (*3) tan δ : Initial Requirement \times 1.5 L.C. : Initial Requirement									Temperature: 40°C 90 to 95% RH 500 hours	
Endurance		Δ C/C : \pm 10% (*3) tan δ : Initial Requirement L.C. : Initial Requirement \times 1.25									Temperature: 85°C Rated voltage applied Temperature: 125°C Category voltage applied for 2000 hours	
Failure Rate		$\lambda_0 = 1\%/1000H$										

LEGEND

CV : Product of capacitance in μ F and voltage in V Δ C/C: Capacitance change ratio

*1: Category voltage at 85°C or more is calculated by following expression.

$$U_T = U_R - \frac{U_R - U_C}{40} (T - 85)$$

U_R : rated voltage

U_C : category voltage at 125°C

*2: tan δ of the specific products of R Series Extended is shown in the following table.

Product	tan δ
A case : 4 V/33 μF, 6.3 V/22 μF C case : 4 V/150 μF, 6.3 V/100 μF D2 case : 6.3 V/150 μF, 10 V/100 μF D case : 10 V/150 μF, 16 V/100 μF	0.10 max.
A2 case : 2.5 V/15 μF, 22 μF, 4 V/10 μF, 15 μF A case : 2.5 V/47 μF B3 case : 2.5 V/47 μF, 4 V/33 μF, 6.3 V/22 μF C case : 2.5 V/220 μF D2 case : 4 V/220 μF D case : 6.3 V/220 μF	0.12 max.
D2 case : 2.5 V/330 μF D case : 2.5 V/470 μF, 4 V/330 μF	0.14 max.

*3: The specific products of R series Extended in the following table are applied to capacitance change of ±12% or ±15% .

ΔC/C	Case Code	Product
±12%	A2	2.5 V/4.7 μF to 22 μF, 4 V/4.7 μF, 6.3 V/3.3 μF to 10 μF, 10 V/2.2 μF to 4.7 μF, 16 V/1.5 μF, 2.2 μF, 20 V/1 μF, 1.5 μF
	A	2.5 V/15 μF to 47 μF, 4 V/10 μF to 33 μF, 6.3 V/6.8 μF to 22 μF, 10 V/4.7 μF to 10 μF, 16 V/3.3 μF to 6.8 μF, 20 V/2.2 μF to 4.7 μF, 25 V/1.5 μF, 2.2 μF, 35 V/1 μF, 1.5 μF
	B2	2.5 V/33 μF to 100 μF
	C	2.5 V/220 μF, 4 V/150 μF, 6.3 V/100 μF, 10 V/68 μF, 16 V/47 μF
	D2	2.5 V/330 μF, 4 V/220 μF, 6.3 V/150 μF, 10 V/100 μF
	D	2.5 V/470 μF, 4 V/330 μF, 6.3 V/220 μF, 10 V/150 μF, 16 V/100 μF
±15%	B3	All Items

*4: The following products of R-series Standard are applied to tan δ of 0.12

4 V/3.3 μF, 4.7 μF, 10 μF, 22 μF, 33 μF, 68 μF, 6.3 V/3.3 μF, 10 V/2.2 μF

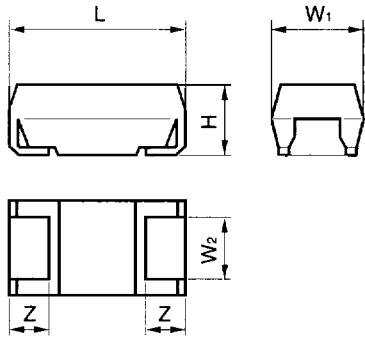
*5 : $\tan \delta$ of the specific products of R-series Extended is shown in the following table

Product	$\tan \delta$
A case : 4 V/33 μ F, 6.3 V/22 μ F, 10 V/15 μ F B2 case : 2.5 V/100 μ F C case : 4 V/150 μ F, 6.3 V/100 μ F D2 case : 6.3 V/150 μ F, 10 V/100 μ F	0.14 max.
A2 case : 2.5 V/15 μ F, 4 V/10 μ F C case : 2.5 V/ 220 μ F	0.16 max.
B3 case : 2.5 V/47 μ F, 4 V/33 μ F, 6.3 V/22 μ F D2 case : 2.5 V/330 μ F, 4 V/220 μ F D case : 2.5 V/470 μ F, 4 V/330 μ F, 6.3 V/220 μ F, 10 V/150 μ F, 16 V/100 μ F	0.18 max.
A2 case : 4 v/15 μ F	0.20 max.
A2 case : 2.5 V/22 μ F A case : 2.5 V/47 μ F	0.22 max.

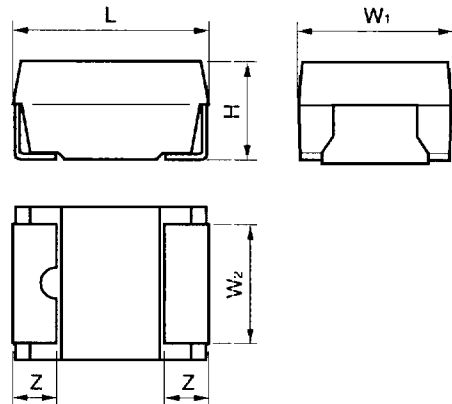
*6 : $\tan \delta$ of the specific products of R Series Extended is shown in the following table

Product	$\tan \delta$
A case : 4 V/33 μ F, 6.3 V/22 μ F C case : 4 V/150 μ F, 6.3 V/100 μ F D2 case : 6.3 V/150 μ F, 10 V/100 μ F D case : 10 V/150 μ F, 16 V/100 μ F	0.12 max.
A2 case : 2.5V/15 μ F, 4 V/10 μ F, 4 V/15 μ F C case : 2.5 V/220 μ F D2 case : 4 V/220 μ F D case : 6.3 V/220 μ F	0.14 max.
B3 case : 2.5 V/47 μ F, 4 V/33 μ F, 6.3 V/22 μ F	0.15 max.
A case : 2.5 V/22 μ F A case : 2.5 V/47 μ F D2 case : 2.5 V/330 μ F D case : 2.5 V/470 μ F, 4 V/330 μ F	0.16 max.

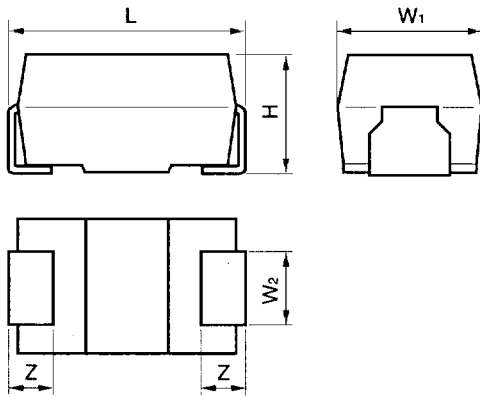
OUTLINE DRAWINGS AND DIMENSIONS



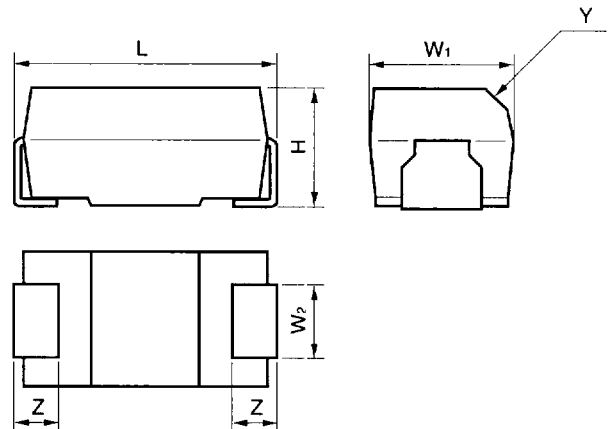
[A2, A & B3 cases]



[B2 case]



[D2 case]



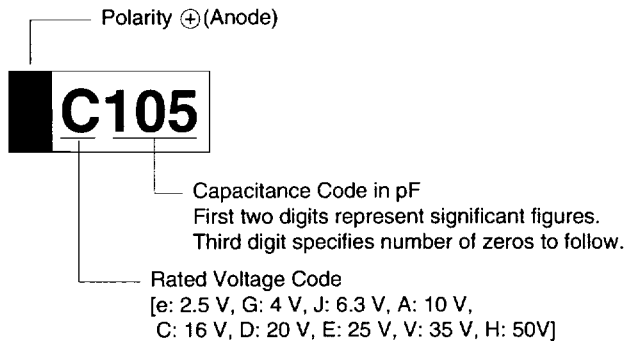
[B, C & D cases]

Unit : mm (inch)

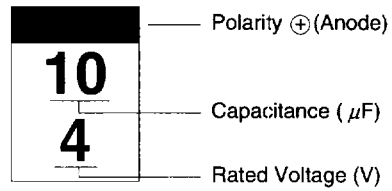
Case Size (Case Code)	EIA Code	L	W ₁	W ₂	H	Z	Y
A2 (U)	3216L	3.2±0.2 (0.126±0.008)	1.6±0.2 (0.063±0.008)	1.2±0.1 (0.047±0.004)	1.2 MAX. (0.047 MAX.)	0.8±0.3 (0.031±0.012)	—
A	3216	3.2±0.2 (0.126±0.008)	1.6±0.2 (0.063±0.008)	1.2±0.1 (0.047±0.004)	1.6±0.2 (0.063±0.008)	0.8±0.3 (0.031±0.012)	—
B3 (W)	3528L	3.5±0.2 (0.138±0.008)	2.8±0.2 (0.110±0.008)	2.2±0.1 (0.087±0.004)	1.2 MAX. (0.047 MAX.)	0.8±0.3 (0.031±0.012)	—
B2 (S)	3528	3.5±0.2 (0.138±0.008)	2.8±0.2 (0.110±0.008)	2.3±0.1 (0.091±0.004)	1.9±0.2 (0.075±0.008)	0.8±0.3 (0.031±0.012)	—
B	—	4.7±0.3 (0.185±0.012)	2.6±0.3 (0.102±0.012)	1.4±0.1 (0.055±0.004)	2.1±0.3 (0.083±0.012)	0.8±0.3 (0.031±0.012)	C0.4 (0.016)
C	6032	6.0±0.3 (0.236±0.012)	3.2±0.3 (0.126±0.012)	2.2±0.1 (0.087±0.004)	2.5±0.3 (0.098±0.012)	1.3±0.3 (0.051±0.012)	C0.4 (0.016)
D2 (T)	—	5.8±0.3 (0.228±0.012)	4.6±0.2 (0.181±0.012)	2.4±0.1 (0.094±0.004)	3.2±0.3 (0.126±0.012)	1.3±0.3 (0.051±0.012)	—
D	7343	7.3±0.2 (0.287±0.012)	4.3±0.2 (0.169±0.008)	2.4±0.1 (0.094±0.004)	2.8±0.3 (0.110±0.012)	1.3±0.3 (0.051±0.012)	C0.5 (0.020)

MARKING

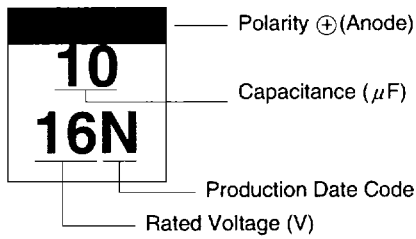
[A2 & A Case]



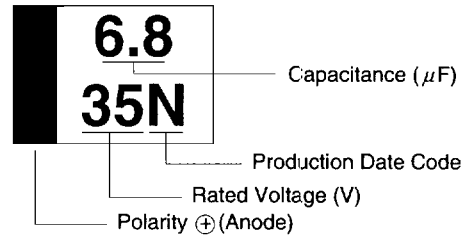
[B Case]



[C & D Case]



[B3, B2 & D2 Case]



[Marking of Production Date Code]

Month Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1998	N	P	Q	R	S	T	U	V	W	X	Y	Z
1999	a	b	c	d	e	f	g	h	j	k	l	m
2000	n	p	q	r	s	t	u	v	w	x	y	z
2001	A	B	C	D	E	F	G	H	J	K	L	M

Date code will resume beginning in 2002.

PRODUCT LINE-UP AND CASE SIZE

R SERIES STANDARD

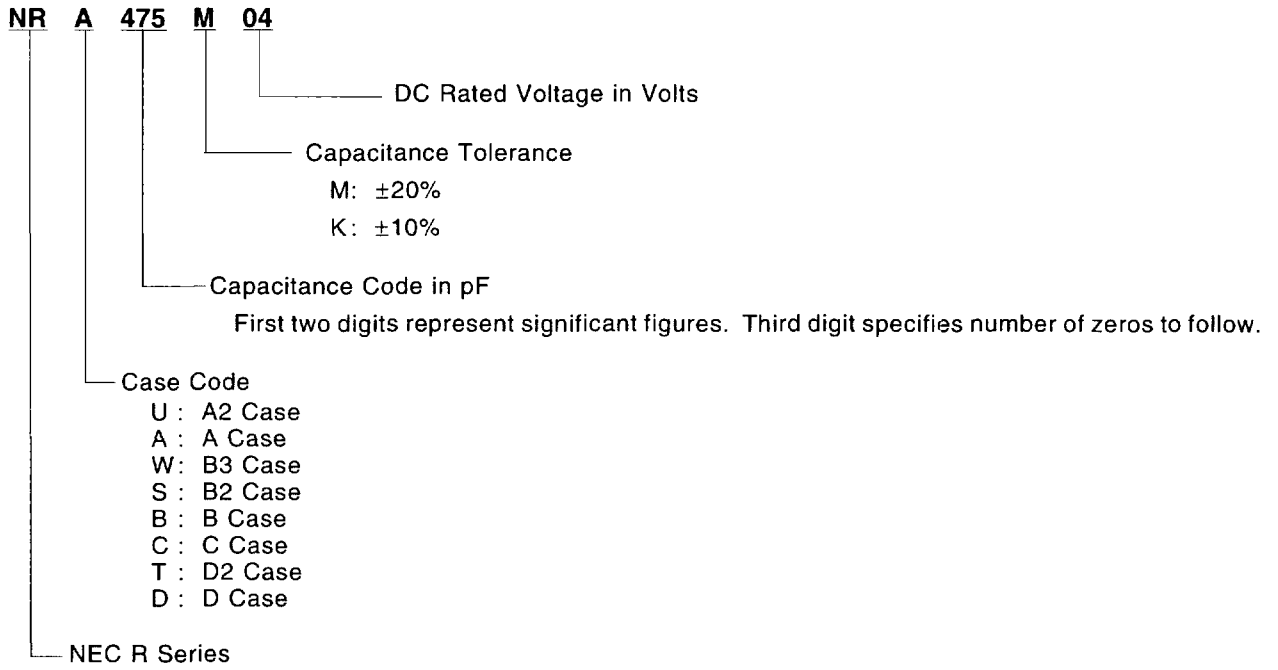
Rated Voltage (Vdc) / Capacitance (μ F)	4	6.3	10	16	20	25	35	50
0.010								
0.015								
0.022								
0.033								
0.047							A	
0.068							A	
0.10							A	A
0.15							A	A
0.22							A	B2
0.33							A	B2
0.47						A	B2 B	B2
0.68					A		B2 B	C
1.0				A			B2 B	C
1.5			A	A		B2 B	C	C
2.2		A	A		B2 B		C	D
3.3	A	A		B2 B		C	C D	D2 D
4.7	A		B2 B		C	C	D2 D	D
6.8		B2 B		C	C	D2 D	D2 D	
10	B2 B		C	C	D2 D	D2 D		
15		C	C	D2 D	D2 D			
22	C	C	D2 D	D2 D				
33	C	D2 D	D2 D					
47	D2 D	D2 D						
68	D2 D							

R SERIES EXTENDED

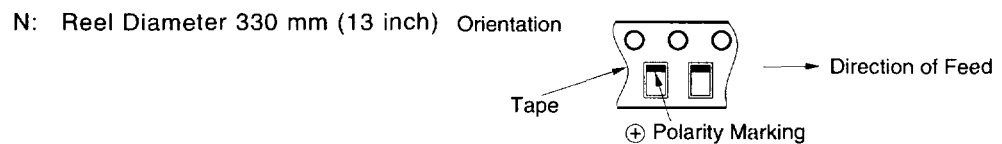
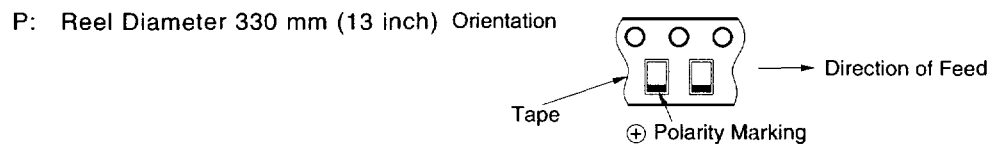
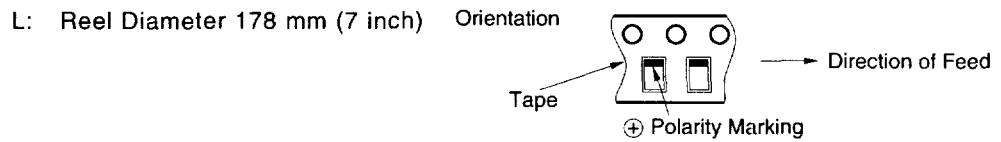
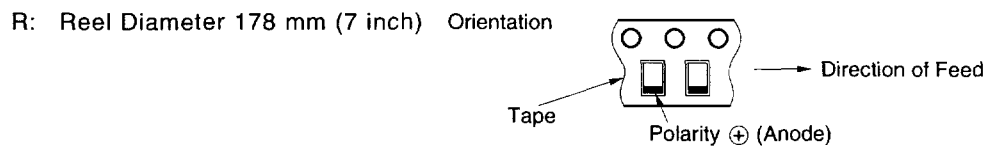
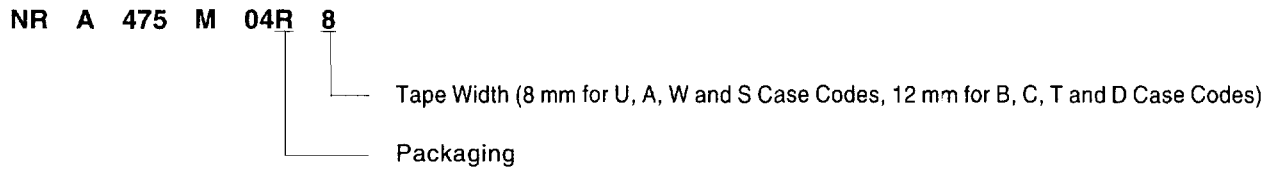
Rated Voltage (Vdc) Capacitance (μF)	2.5	4	6.3	10	16	20	25	35
0.1						A2		
0.15						A2		
0.22						A2		
0.33						A2		
0.47						A2		A
0.68					A2	A2	A	A
1				A2	A2	A2 A	A	A
1.5			A2	A2	A2	A2 A	A	A B2 B
2.2		A2	A2	A2	A2 A	A	A B2	B2 B
3.3		A2	A2	A2 A	A	A B2	B2 B	B2
4.7	A2	A2	A2 A	A2 A	A B2	A B2 B	B2	C
6.8	A2	A2 A	A2 A	A B2	A B3 B2 B	B2	C	C
10	A2	A2 A	A2 A B2	A B3 B2 B	B2	B2 C	C	D2 D
15	A2 A	A2 A B2	A B3 B2 B	B2	B2 C	C	D2 D	D
22	A2 A	A B3 B2 B	A B3 B2	B2 C	B2 C	C D2 D	D	
33	A B3 B2	A B3 B2	B2 C	B2 C	C D2 D	D2 D		
47	A B3 B2	B2 C	B2 C	C D2 D	C D2 D	D		
68	B2	B2 C	B2 C D2 D	C D2 D	D			
100	B2	B2 C D2 D	C D2 D	D2 D	D			
150	B2	C D2 D	D2 D	D				
220	C	D2 D	D					
330	D2	D						
470	D							

PART NUMBERING SYSTEM

— Bulk —



— Tape and Reel —



RATINGS

STANDARD

DC Rated Voltage @85°C (125°C) V	Capacitance @20°C, 120 Hz μF	Case Size (Case Code)	Part Number	Leakage Current @20°C μA Max.	tan δ @20°C, 120 Hz % Max.	ESR @20°C, 100 kHz Ω Max.
4 (2.5)	3.3	A	NRA335M04	0.5	4	8.0
	4.7	A	NRA475M04	0.5	4	7.5
	10	B2(S)	NRS106M04	0.5	6	3.5
	10	B	NRB106M04	0.5	6	3.5
	22	C	NRC226M04	0.8	6	1.8
	33	C	NRC336M04	1.3	6	1.8
	47	D2(T)	NRT476M04	1.9	6	1.2
	47	D	NRD476M04	1.9	6	1.2
	68	D2(T)	NRT686M04	2.7	6	0.8
	68	D	NRD686M04	2.7	6	0.8
6.3 (4)	2.2	A	NRA225M06	0.5	4	8.0
	3.3	A	NRA335M06	0.5	4	7.0
	6.8	B2(S)	NRS685M06	0.5	6	3.5
	6.8	B	NRB685M06	0.5	6	3.5
	15	C	NRC156M06	0.9	6	1.8
	22	C	NRC226M06	1.4	6	1.8
	33	D2(T)	NRT336M06	2.0	6	1.5
	33	D	NRD336M06	2.0	6	1.5
	47	D2(T)	NRT476M06	3.0	6	1.1
	47	D	NRD476M06	3.0	6	0.8
10 (6.3)	1.5	A	NRA155M10	0.5	4	8.0
	2.2	A	NRA225M10	0.5	4	7.0
	4.7	B2(S)	NRS475M10	0.5	4	3.5
	4.7	B	NRB475M10	0.5	4	3.5
	10	C	NRC106M10	1.0	6	1.8
	15	C	NRC156M10	1.5	6	1.8
	22	D2(T)	NRT226M10	2.2	6	1.5
	22	D	NRD226M10	2.2	6	1.5
	33	D2(T)	NRT336M10	3.3	6	1.1
	33	D	NRD336M10	3.3	6	0.8
16 (10)	1	A	NRA105M16	0.5	4	10
	1.5	A	NRA155M16	0.5	4	8.0
	3.3	B2(S)	NRS335M16	0.5	4	3.5
	3.3	B	NRB335M16	0.5	4	4.5
	6.8	C	NRC685M16	1.0	6	1.9
	10	C	NRC106M16	1.6	6	1.8
	15	D2(T)	NRT156M16	2.4	6	1.5
	15	D	NRD156M16	2.4	6	1.5
	22	D2(T)	NRT226M16	3.5	6	1.1
	22	D	NRD226M16	3.5	6	0.8

Note Part numbers in the tables above are for products with a capacitance tolerance of $\pm 20\%$. For products with a capacitance tolerance of $\pm 10\%$, change the letter "M" to "K".

Use the letters "S" and "T" in part numbers for the case code "B2" and "D2".

Please refer to page 41 for the detail of part numbering system.

DC Rated Voltage @85°C (125°C) V	Capacitance @20°C, 120 Hz μF	Case Size (Case Code)	Part Number	Leakage Current @20°C μA Max.	tan δ @20°C, 120 Hz % Max.	ESR @20°C, 100 kHz Ω Max.
20 (13)	0.68	A	NRA684M20	0.5	4	12
	2.2	B2(S)	NRS225M20	0.5	4	3.5
	2.2	B	NRB225M20	0.5	4	5
	4.7	C	NRC475M20	0.9	4	2.4
	6.8	C	NRC685M20	1.4	6	1.9
	10	D2(T)	NRT106M20	2.0	6	1.5
	10	D	NRD106M20	2.0	6	1.3
	15	D2(T)	NRT156M20	3.0	6	1.1
	15	D	NRD156M20	3.0	6	1.0
25 (16)	0.47	A	NRA474M25	0.5	4	14
	1.5	B2(S)	NRS155M25	0.5	4	4.6
	1.5	B	NRB155M25	0.5	4	10
	3.3	C	NRC335M25	0.8	4	2.5
	4.7	C	NRC475M25	1.1	4	2.4
	6.8	D2(T)	NRT685M25	1.7	6	1.5
	6.8	D	NRD685M25	1.7	6	1.4
	10	D2(T)	NRT106M25	2.5	6	1.2
	10	D	NRD106M25	2.5	6	1.2
35 (22)	0.047	A	NRA473M35	0.5	4	40
	0.068	A	NRA683M35	0.5	4	40
	0.1	A	NRA104M35	0.5	4	18
	0.15	A	NRA154M35	0.5	4	18
	0.22	A	NRA224M35	0.5	4	18
	0.33	A	NRA334M35	0.5	4	15
	0.47	B2(S)	NRS474M35	0.5	4	8.0
	0.47	B	NRB474M35	0.5	4	12
	0.68	B2(S)	NRS684M35	0.5	4	5.4
	0.68	B	NRB684M35	0.5	4	10
	1	B2(S)	NRS105M35	0.5	4	4.8
	1	B	NRB105M35	0.5	4	10
	1.5	C	NRC155M35	0.5	4	3.0
	2.2	C	NRC225M35	0.7	4	3.0
	3.3	C	NRC335M35	1.2	4	2.5
	3.3	D	NRD335M35	1.2	4	2.0
	4.7	D2(T)	NRT475M35	1.6	4	1.5
	4.7	D	NRD475M35	1.6	4	1.5
6.8	D2(T)	NRT685M35	2.3	6	1.3	
	6.8	D	NRD684M35	2.3	6	1.3
50 (32)	0.1	A	NRA104M50	0.5	4	20
	0.15	A	NRA154M50	0.5	4	19
	0.22	B2(S)	NRS224M50	0.5	4	14
	0.33	B2(S)	NRS334M50	0.5	4	10
	0.47	B2(S)	NRS474M50	0.5	4	9.0
	0.68	C	NRC684M50	0.5	4	7.0
	1	C	NRC105M50	0.5	4	5.5
	1.5	C	NRC155M50	0.7	4	4.0
	2.2	D	NRD225M50	1.1	4	2.0
	3.3	D2(T)	NRT335M50	1.6	4	2.0
	3.3	D	NRD335M50	1.6	4	1.8
4.7	D	NRD475M50	2.3	4	1.4	

Note Part numbers in the tables above are for products with a capacitance tolerance of ±20%. For products with a capacitance tolerance of ±10%, change the letter "M" to "K".

Use the letters "S" and "T" in part numbers for the case code "B2" and "D2".

Please refer to page 41 for the detail of part numbering system.

EXTENDED

DC Rated Voltage @85°C (125°C) V	Capacitance @20°C, 120 Hz μF	Case Size (Case Code)	Part Number	Leakage Current @20°C μA Max.	tan δ @20°C, 120 Hz % Max.	ESR @20°C, 100 kHz Ω Max.
2.5 (1.6)	4.7	A2(U)	NRU475M02	0.5	8	18
	6.8	A2(U)	NRU685M02	0.5	8	16
	10	A2(U)	NRU106M02	0.5	8	15
	15	A2(U)	NRU156M02	0.5	12	10
	15	A	NRA156M02	0.5	8	5.0
	22	A2(U)	NRU226M02	0.5	12	10
	22	A	NRA226M02	0.5	8	4
	33	A	NRA336M02	0.8	8	3.5
	33	B3(W)	NRW336M02	0.8	8	—
	33	B2(S)	NRS336M02	0.8	8	3.0
	47	A	NRA476M02	1.1	12	4.5
	47	B3(W)	NRW476M02	1.1	12	—
	47	B2(S)	NRS476M02	1.1	8	2.4
	68	B2(S)	NRS686M02	1.7	8	2.0
	100	B2(S)	NRS107M02	2.5	8	2.0
	150	B2(S)	NRS157M02	3.7	16	—
	220	C	NRC227M02	5.5	12	1.0
	330	D2(T)	NRT337M02	8.2	14	0.7
	470	D	NRD477M02	11.7	14	0.7
	4 (2.5)	2.2	A2(U)	NRU225M04	0.5	8
3.3		A2(U)	NRA335M04	0.5	8	18
4.7		A2(U)	NRU475M04	0.5	8	10
6.8		A2(U)	NRU685M04	0.5	8	8.0
6.8		A	NRA685M04	0.5	8	6.0
10		A2(U)	NRU106M04	0.5	12	8.0
10		A	NRA106M04	0.5	8	5.0
15		A2(U)	NRU156M04	0.6	12	8.0
15		A	NRA156M04	0.6	8	4.0
15		B2(S)	NRS156M04	0.6	8	3.0
22		A	NRA226M04	0.8	8	3.5
22		B3(W)	NRW226M04	0.8	8	—
22		B2(S)	NRS226M04	0.8	8	2.8
22		B	NRB226M04	0.8	8	3.0
33		A	NRA336M04	1.3	10	4.5
33		B3(W)	NRW336M04	1.3	12	—
33		B2(S)	NRS336M04	1.3	8	2.4
47		B2(S)	NRS476M04	1.8	8	2.0
47		C	NRC476M04	1.8	8	1.8
68		B2(S)	NRS686M04	2.7	8	2.0
68		C	NRC686M04	2.7	8	1.6
100		B2(S)	NRS107M04	4.0	12	—
100		C	NRC107M04	4.0	8	1.2
100		D2(T)	NRT107M04	4.0	8	0.9
100		D	NRD107M04	4.0	8	0.8
150		C	NRC157M04	6.0	10	1.0
150		D2(T)	NRT157M04	6.0	8	0.7
150		D	NRD157M04	6.0	8	0.7
220		D2(T)	NRT227M04	8.8	12	0.7
220		D	NRD227M04	8.8	8	0.7
330	D	NRD337M04	13.2	14	0.7	

Note Part numbers in the tables above are for products with a capacitance tolerance of ±20%. For products with a capacitance tolerance of ±10%, change the letter "M" to "K".

Use the letters "U", "W", "S" and "T" in part numbers for the case code "A2", "B3", "B2" and "D2".

Please refer to page 41 for the detail of part numbering system.

DC Rated Voltage @85°C (125°C) V	Capacitance @20°C, 120 Hz μF	Case Size (Case Code)	Part Number	Leakage Current @20°C μA Max.	tan δ @20°C, 120 Hz % Max.	ESR @20°C, 100 kHz Ω Max.	
6.3 (4)	1.5	A2(U)	NRU155M06	0.5	8	25	
	2.2	A2(U)	NRU225M06	0.5	8	18	
	3.3	A2(U)	NRU335M06	0.5	8	9.0	
	4.7	A2(U)	NRU475M06	0.5	8	7.5	
	4.7	A	NRA475M06	0.5	8	6.0	
	6.8	A2(U)	NRU685M06	0.5	8	7.5	
	6.8	A	NRA685M06	0.5	8	5.0	
	10	A2(U)	NRU106M06	0.6	8	10	
	10	A	NRA106M06	0.6	8	4.0	
	10	B2(S)	NRS106M06	0.6	8	3.0	
	15	A	NRA156M06	0.9	8	3.5	
	15	B3(W)	NRW156M06	0.9	8	—	
	15	B2(S)	NRS156M06	0.9	8	2.5	
	15	B	NRB156M06	0.9	8	3.0	
	22	A	NRA226M06	1.4	10	4.5	
	22	B3(W)	NRW226M06	1.4	12	—	
	22	B2(S)	NRS226M06	1.4	8	2.3	
	33	B2(S)	NRS336M06	2.0	8	2.0	
	33	C	NRC336M06	2.0	8	1.8	
	47	B2(S)	NRS476M06	3.0	8	2.0	
	47	C	NRC476M06	3.0	8	1.6	
	68	B2(S)	NRS686M06	4.2	10	—	
	68	C	NRC686M06	4.2	8	1.2	
	68	D2(T)	NRT686M06	4.2	8	0.9	
	68	D	NRD686M06	4.2	8	0.8	
	100	C	NRC107M06	6.3	10	0.9	
	100	D2(T)	NRT107M06	6.3	8	0.8	
	100	D	NRD107M06	6.3	8	0.8	
	150	D2(T)	NRT157M06	9.4	10	0.8	
	150	D	NRD157M06	9.4	8	0.8	
	220	D	NRD227M06	13.8	12	0.8	
	10 (6.3)	1	A2(U)	NRU105M10	0.5	8	25
		1.5	A2(U)	NRU155M10	0.5	8	20
2.2		A2(U)	NRU225M10	0.5	8	12	
3.3		A2(U)	NRU335M10	0.5	8	12	
3.3		A	NRA335M10	0.5	8	5.5	
4.7		A2(U)	NRU475M10	0.5	8	8.0	
4.7		A	NRA475M10	0.5	8	5.0	
6.8		A	NRA685M10	0.6	8	4.5	
6.8		B2(S)	NRS685M10	0.6	8	3.0	
10		A	NRA106M10	1.0	8	3.2	
10		B3(W)	NRW106M10	1.0	8	—	
10		B2(S)	NRS106M10	1.0	8	2.5	
10		B	NRB106M10	1.0	8	3.0	
15		B2(S)	NRS156M10	1.5	8	2.5	
22		B2(S)	NRS226M10	2.2	8	2.4	
22		C	NRC226M10	2.2	8	1.8	
33		B2(S)	NRS336M10	3.3	8	2.0	
33		C	NRC336M10	3.3	8	1.6	

Note Part numbers in the tables above are for products with a capacitance tolerance of ±20%. For products with a capacitance tolerance of ±10%, change the letter “M” to “K”.
Use the letters “U”, “W”, “S” and “T” in part numbers for the case code “A2”, “B3”, “B2” and “D2”.
Please refer to page 41 for the detail of part numbering system.

DC Rated Voltage @85°C (125°C) V	Capacitance @20°C, 120 Hz μF	Case Size (Case Code)	Part Number	Leakage Current @20°C μA Max.	tan δ @20°C, 120 Hz % Max.	ESR @20°C, 100 kHz Ω Max.
10 (6.3)	47	C	NRC476M10	4.7	8	1.6
	47	D2(T)	NRT476M10	4.7	8	0.9
	47	D	NRD476M10	4.7	8	0.8
	68	C	NRC686M10	6.8	8	1.2
	68	D2(T)	NRT686M10	6.8	8	0.8
	68	D	NRD686M10	6.8	8	0.8
	100	D2(T)	NRT107M10	10	10	0.8
	100	D	NRD107M10	10	8	0.7
	150	D	NRD157M10	15	10	0.7
16 (10)	0.68	A2(U)	NRU684M16	0.5	6	25
	1	A2(U)	NRU105M16	0.5	6	16
	1.5	A2(U)	NRU155M16	0.5	6	13
	2.2	A2(U)	NRU225M16	0.5	6	13
	2.2	A	NRA225M16	0.5	6	6.0
	3.3	A	NRA335M16	0.5	6	5.0
	4.7	A	NRA475M16	0.7	6	5.0
	4.7	B2(S)	NRS475M16	0.7	6	3.0
	6.8	A	NRA685M16	1.0	6	5.0
	6.8	B3(W)	NRW685M16	1.0	6	—
	6.8	B2(S)	NRS685M16	1.0	6	2.5
	6.8	B	NRB685M16	1.0	6	3.5
	10	B2(S)	NRS106M16	1.6	6	2.4
	15	B2(S)	NRS156M16	2.4	6	2.5
	15	C	NRC156M16	2.4	6	1.8
	22	B2(S)	NRS226M16	3.5	6	2.5
	22	C	NRC226M16	3.5	6	1.6
	33	C	NRC336M16	5.2	6	1.2
	33	D2(T)	NRT336M16	5.2	6	0.9
	33	D	NRD336M16	5.2	6	0.8
	47	C	NRC476M16	7.5	6	1.2
	47	D2(T)	NRT476M16	7.5	6	0.8
	47	D	NRD476M16	7.5	6	0.8
	68	D	NRD686M16	10.8	6	0.7
100	D	NRD107M16	16	10	—	
20 (13)	0.1	A2(U)	NRU104M20	0.5	6	40
	0.15	A2(U)	NRU154M20	0.5	6	35
	0.22	A2(U)	NRU224M20	0.5	6	35
	0.33	A2(U)	NRU334M20	0.5	6	30
	0.47	A2(U)	NRU474M20	0.5	6	27
	0.68	A2(U)	NRU684M20	0.5	6	15
	1	A2(U)	NRU105M20	0.5	6	13
	1	A	NRA105M20	0.5	6	9.0
	1.5	A2(U)	NRU155M20	0.5	6	13
	1.5	A	NRA155M20	0.5	6	6.5
	2.2	A	NRA225M20	0.5	6	6.0
	3.3	A	NRA335M20	0.6	6	5.0
	3.3	B2(S)	NRS335M20	0.6	6	3.0
	4.7	A	NRA475M20	0.9	6	5.0
	4.7	B2(S)	NRS475M20	0.9	6	3.0

Note Part numbers in the tables above are for products with a capacitance tolerance of ±20%. For products with a capacitance tolerance of ±10%, change the letter “M” to “K”.
Use the letters “U”, “W”, “S” and “T” in part numbers for the case code “A2”, “B3”, “B2” and “D2”.
Please refer to page 41 for the detail of part numbering system.

DC Rated Voltage @85°C (125°C) V	Capacitance @20°C, 120 Hz μF	Case Size (Case Code)	Part Number	Leakage Current @20°C μA Max.	tan δ @20°C, 120 Hz % Max.	ESR @20°C, 100 kHz Ω Max.
20 (13)	4.7	B	NRB475M20	0.9	6	4.0
	6.8	B2(S)	NRS685M20	1.4	6	2.8
	10	B2(S)	NRS106M20	2.0	6	2.5
	10	C	NRC106M20	2.0	6	1.8
	15	C	NRC156M20	3.0	6	1.7
	22	C	NRC226M20	4.4	6	1.5
	22	D2(T)	NRT226M20	4.4	6	0.9
	22	D	NRD226M20	4.4	6	0.8
	33	D2(T)	NRT336M20	6.6	6	0.8
	33	D	NRD336M20	6.6	6	0.8
	47	D	NRD476M20	9.4	6	0.8
25 (16)	0.68	A	NRA684M25	0.5	6	10
	1	A	NRA105M25	0.5	6	8.0
	1.5	A	NRA155M25	0.5	6	8.0
	2.2	A	NRS225M25	0.5	6	8.0
	2.2	B2(S)	NRS225M25	0.5	6	4.0
	3.3	B2(S)	NRS335M25	0.8	6	3.5
	3.3	B	NRB335M25	0.8	6	4.5
	4.7	B2(S)	NRS475M25	1.1	6	3.0
	6.8	C	NRC685M25	1.7	6	1.9
	10	C	NRC106M25	2.5	6	1.8
	15	D2(T)	NRT156M25	3.7	6	1.2
	15	D	NRD156M25	3.7	6	1.0
	22	D	NRD226M25	5.5	6	0.8
35 (22)	0.47	A	NRA474M35	0.5	6	12
	0.68	A	NRA684M35	0.5	6	9.0
	1	A	NRA105M35	0.5	6	8.0
	1.5	A	NRA155M35	0.5	6	8.0
	1.5	B2(S)	NRS155M35	0.5	6	4.8
	1.5	B	NRB155M35	0.5	6	5.0
	2.2	B2(S)	NRS225M35	0.7	6	4.2
	2.2	B	NRB225M35	0.7	6	5.0
	3.3	B2(S)	NRS335M35	1.1	6	4.0
	4.7	C	NRC475M35	1.6	6	2.2
	6.8	C	NRC685M35	2.3	6	1.9
	10	D2(T)	NRT106M35	3.5	6	1.2
	10	D	NRD106M35	3.5	6	1.0
	15	D	NRD156M35	5.2	6	0.9

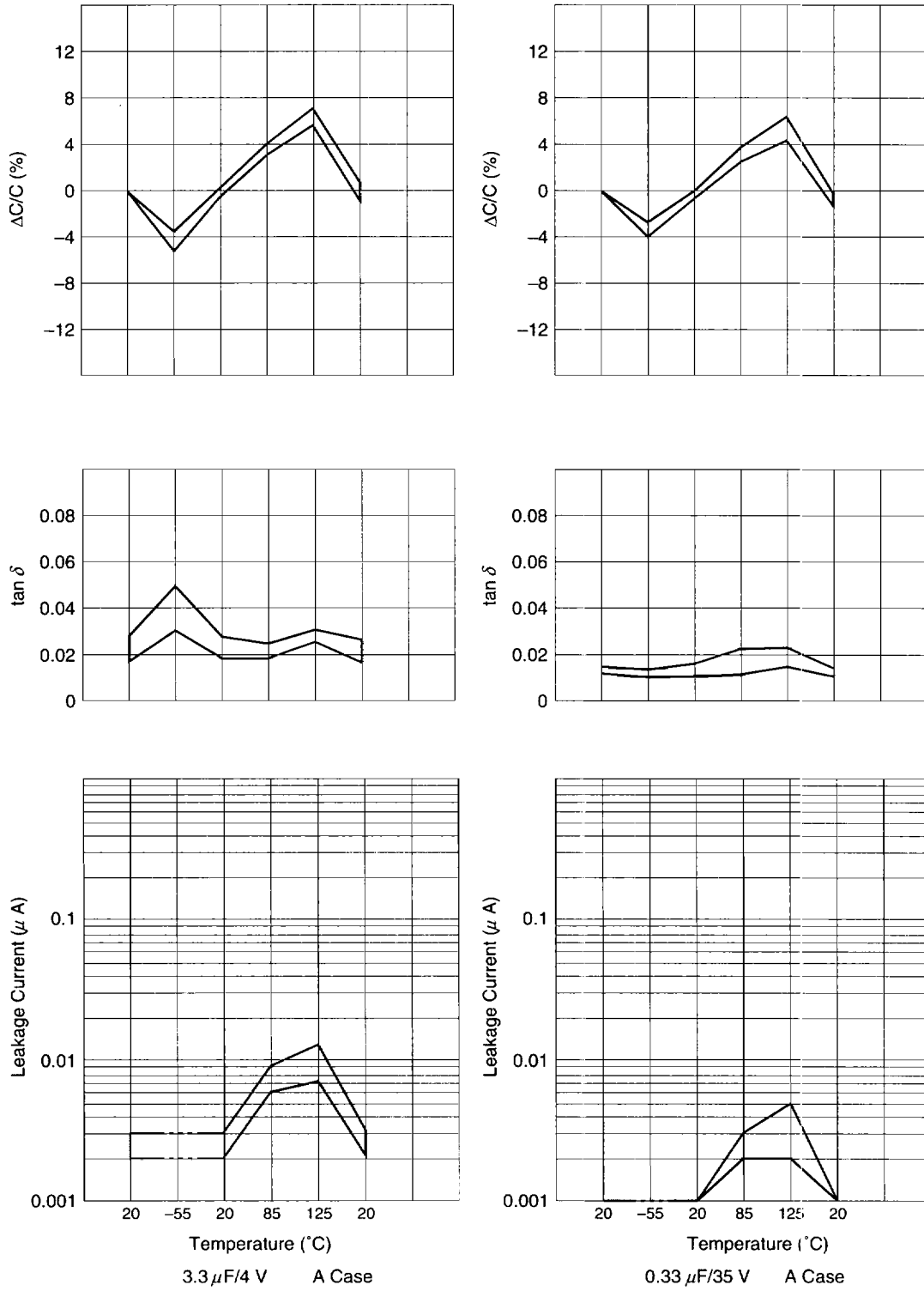
Note Part numbers in the tables above are for products with a capacitance tolerance of ±20%. For products with a capacitance tolerance of ±10%, change the letter "M" to "K".

Use the letters "U", "W", "S" and "T" in part numbers for the case code "A2", "B3", "B2" and "D2".

Please refer to page 41 for the detail of part numbering system.

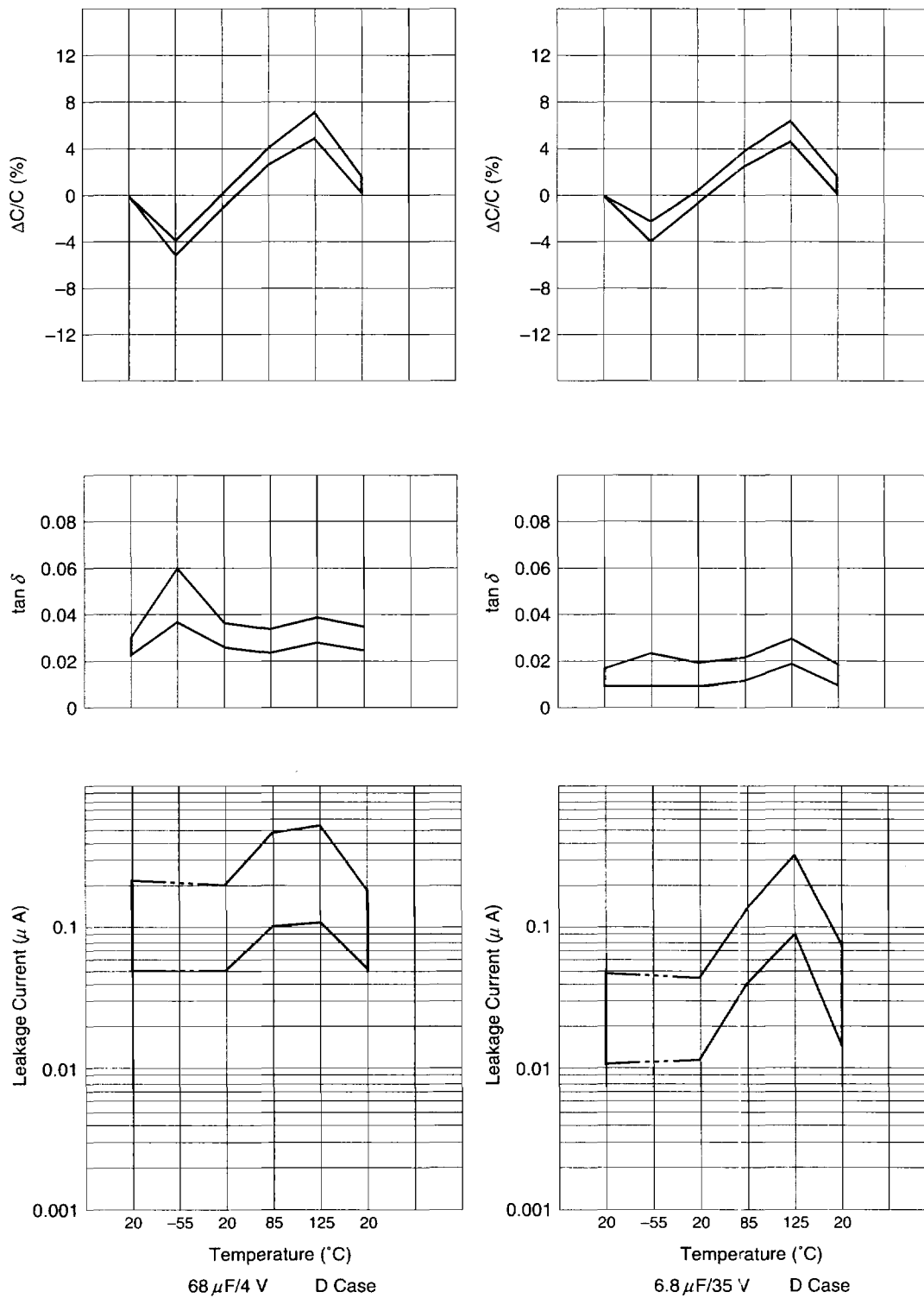
- R Series (Standard)

Characteristics at High and Low Temperature



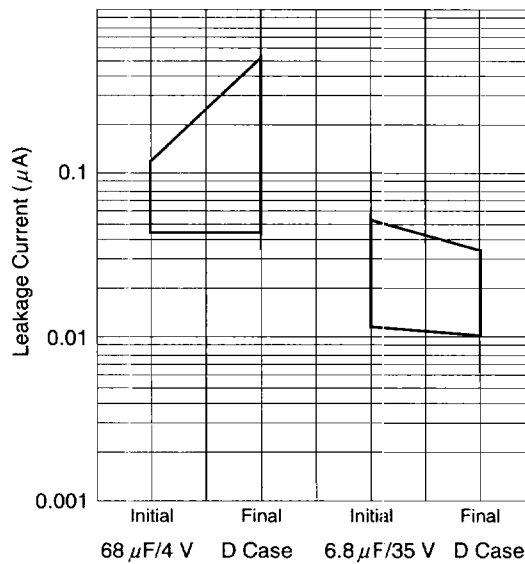
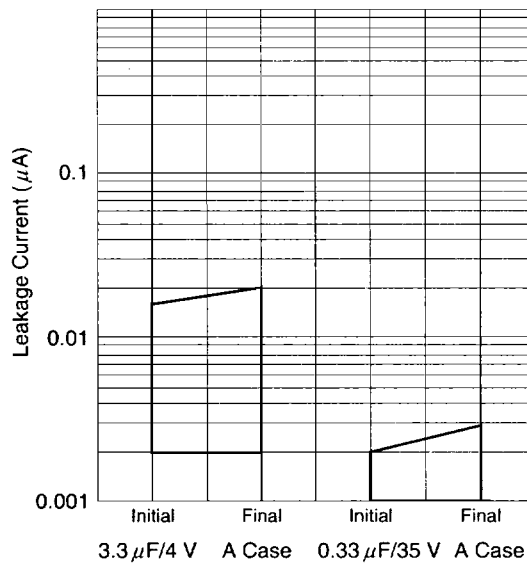
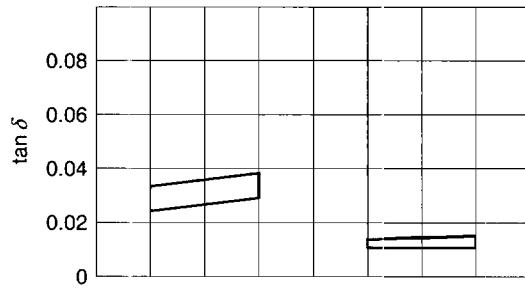
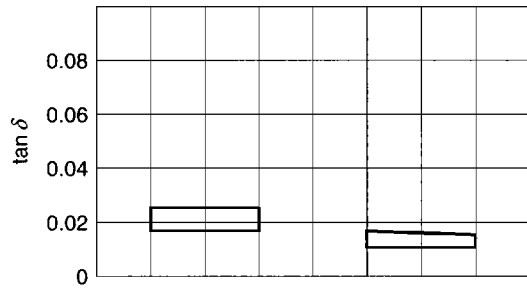
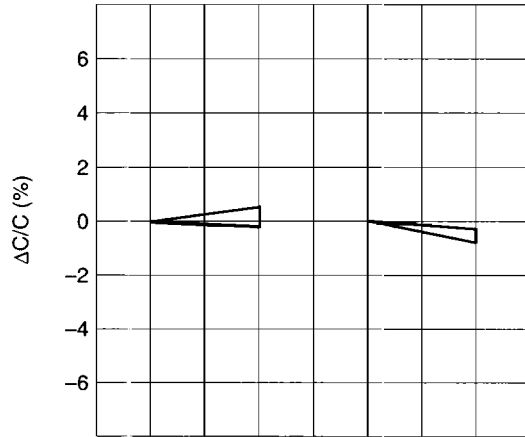
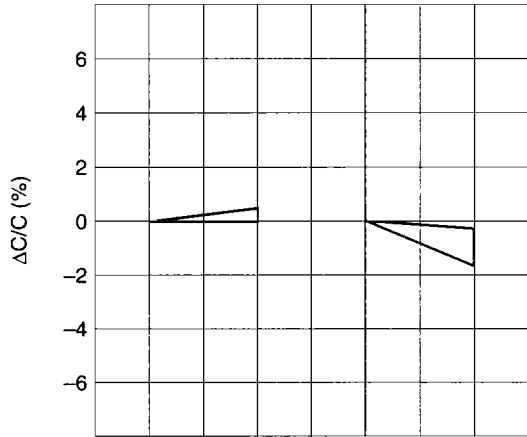
- R Series (Standard)

Characteristics at High and Low Temperature



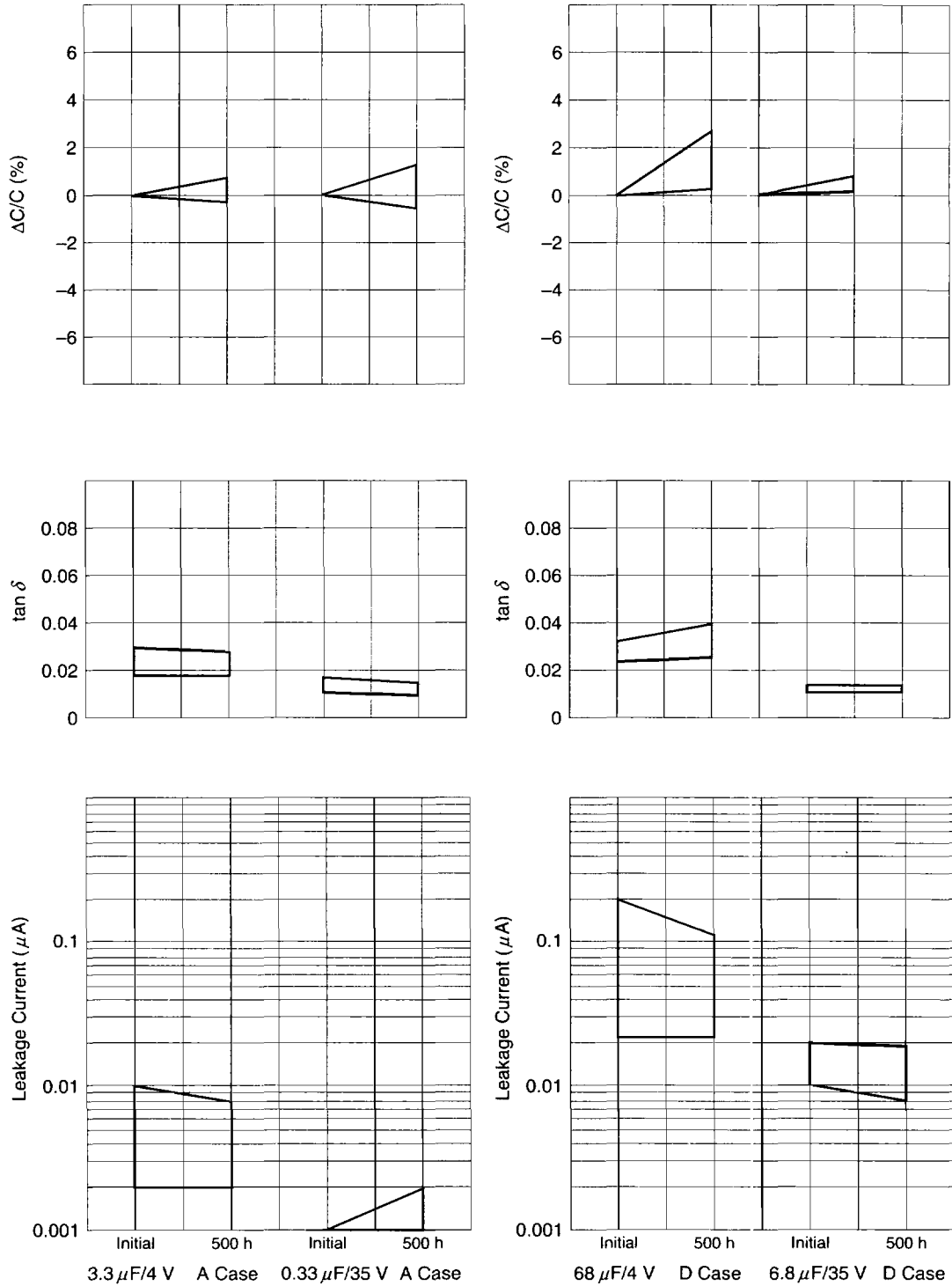
- R Series (Standard)

Resistance to Soldering Heat (Immersing for 10 sec. at 260 °C)



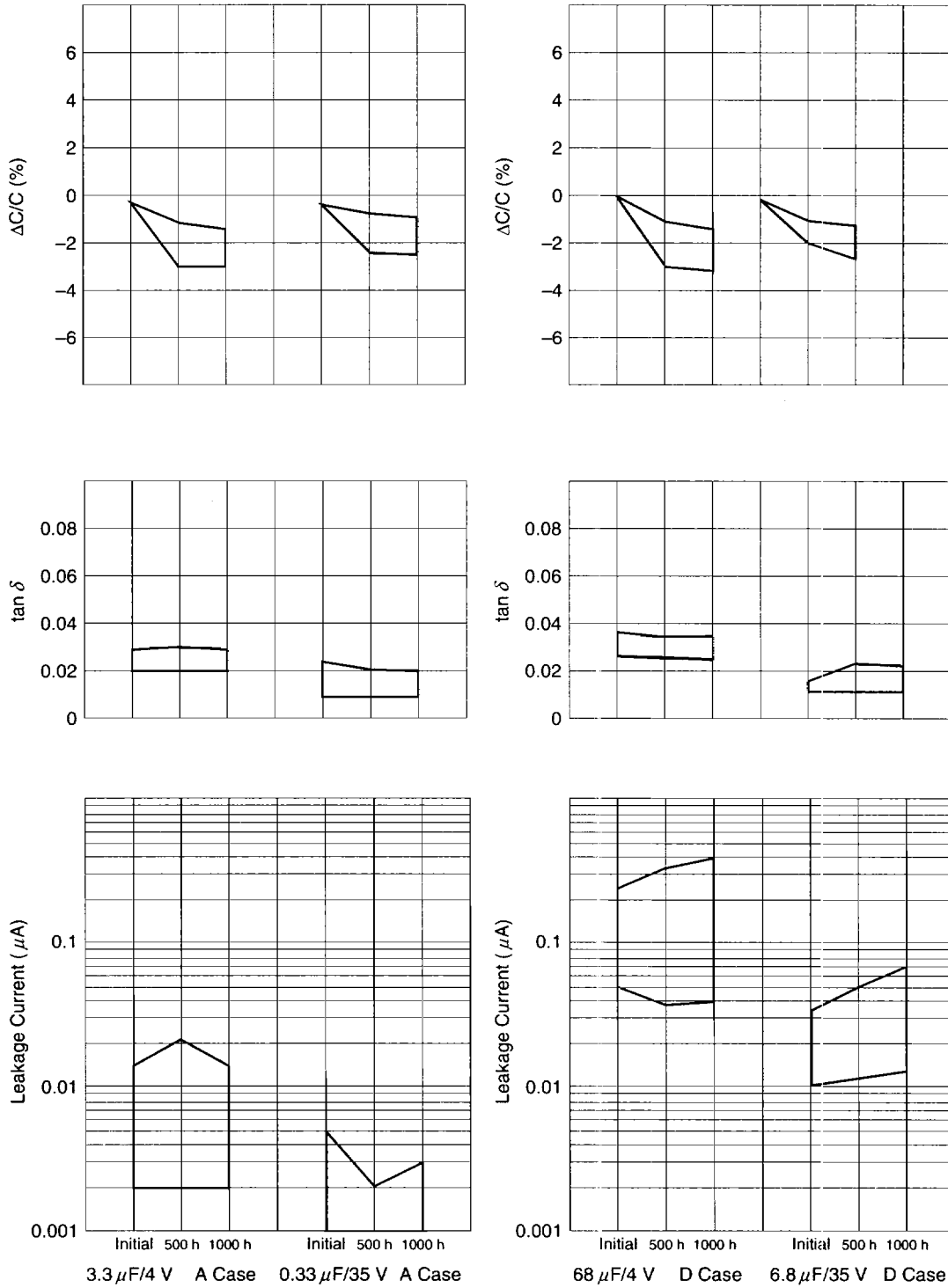
- R Series (Standard)

Damp Heat, Steady State (40°C, 90 to 95%RH)



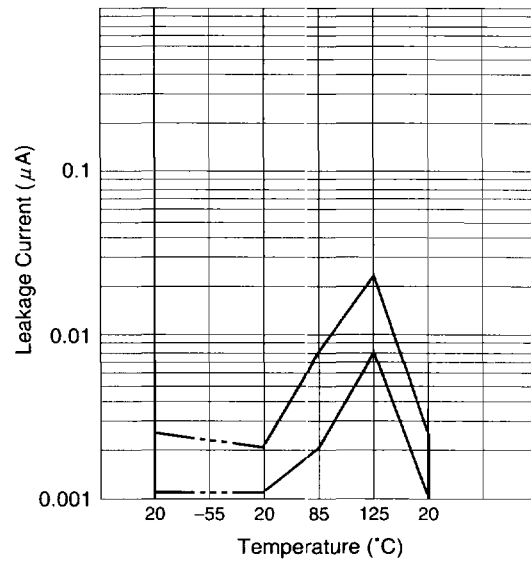
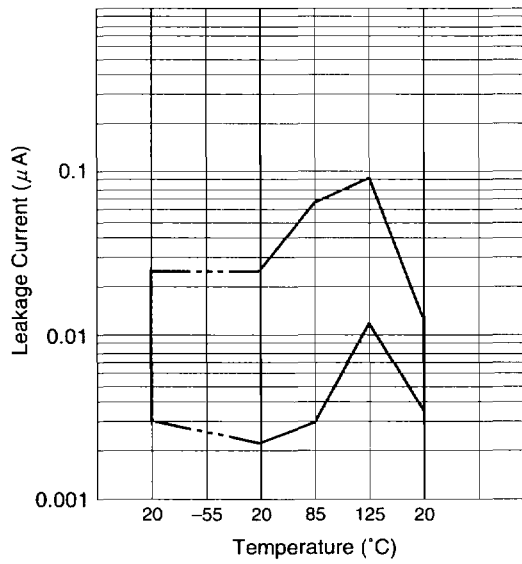
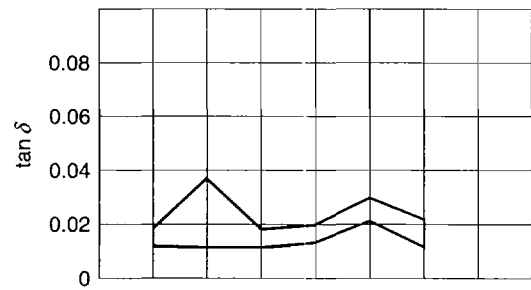
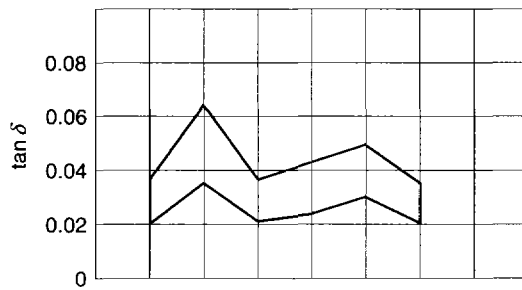
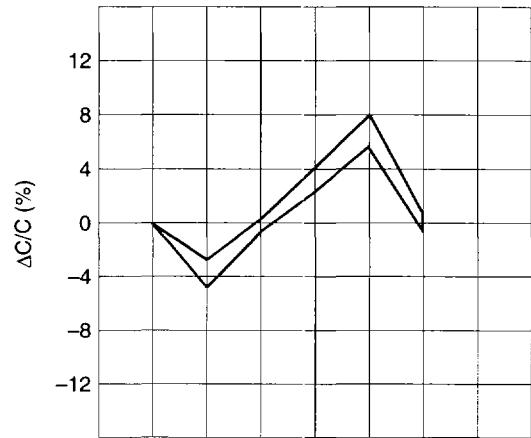
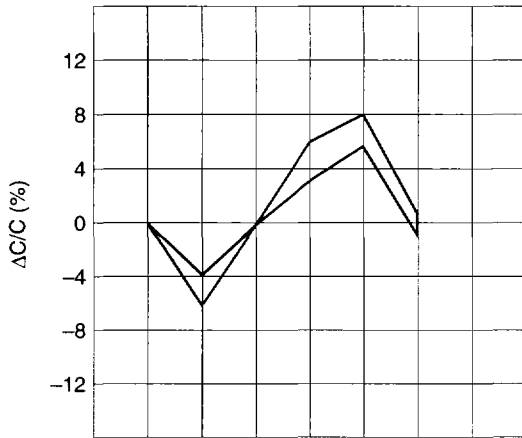
- R Series (Standard)

Endurance (85°C, Rated Voltage Applied)



- R Series (Extended)

Characteristics at High and Low Temperature

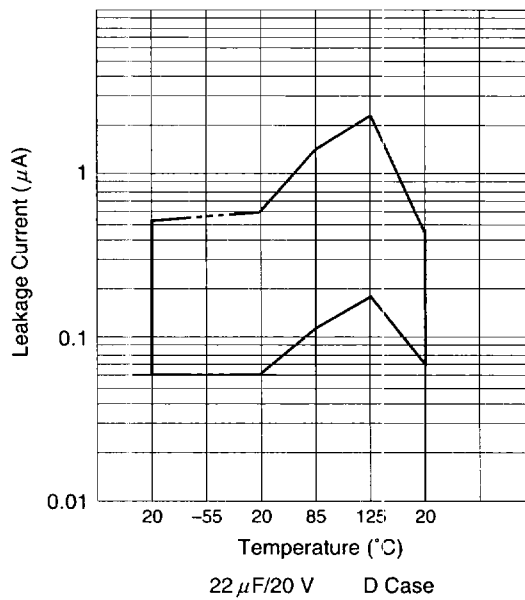
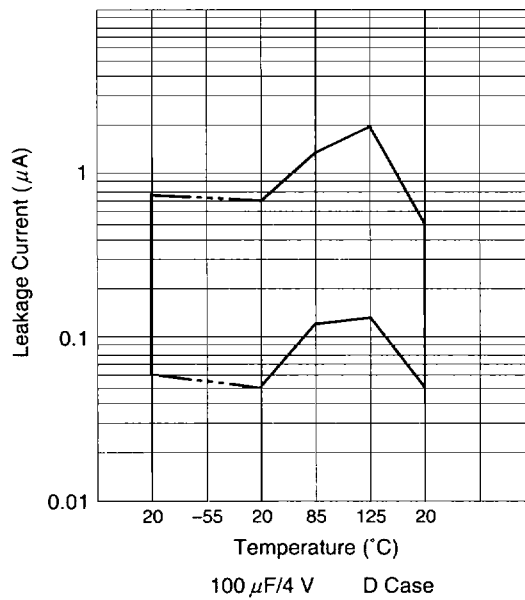
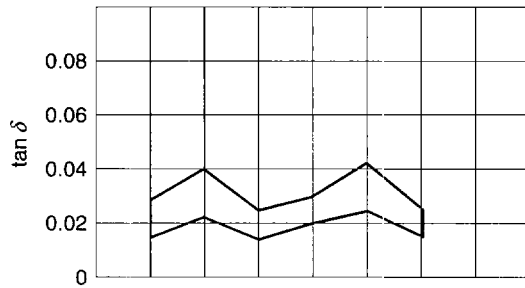
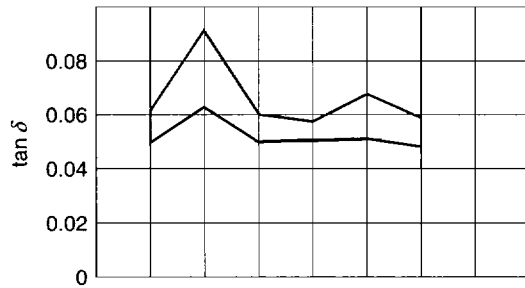
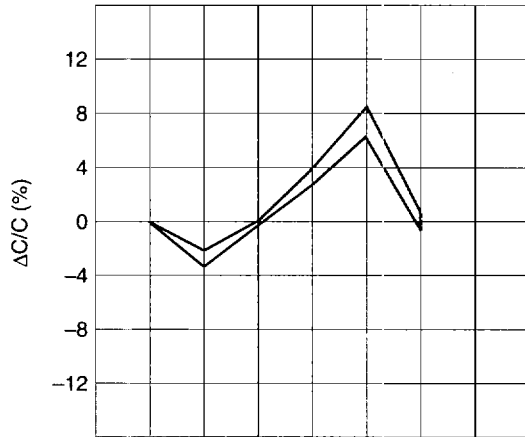
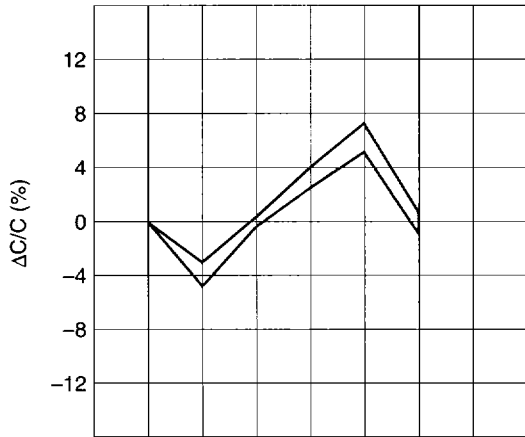


6.8 $\mu F/4 V$ A Case

0.68 $\mu F/35 V$ A Case

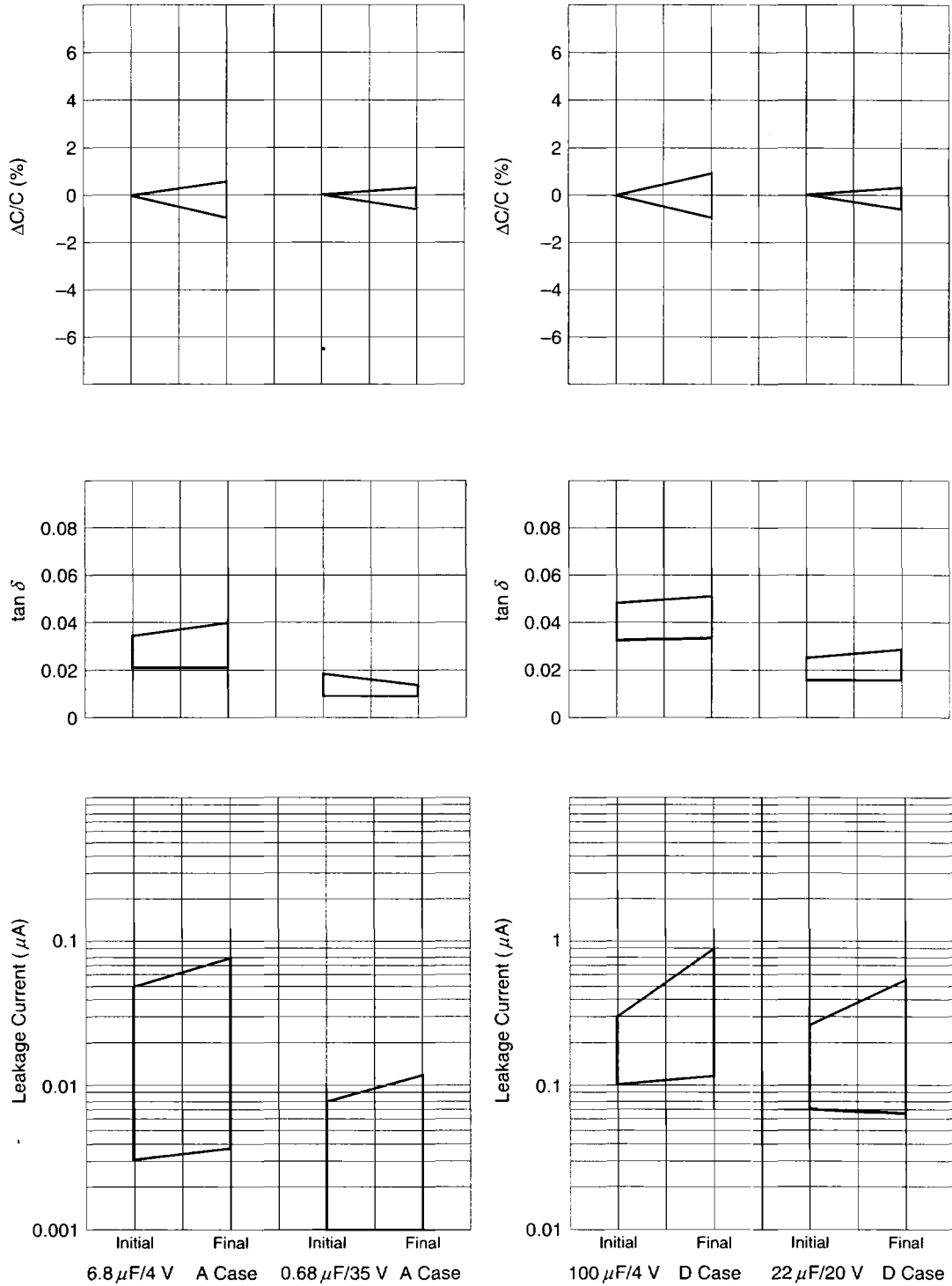
- R Series (Extended)

Characteristics at High and Low Temperature



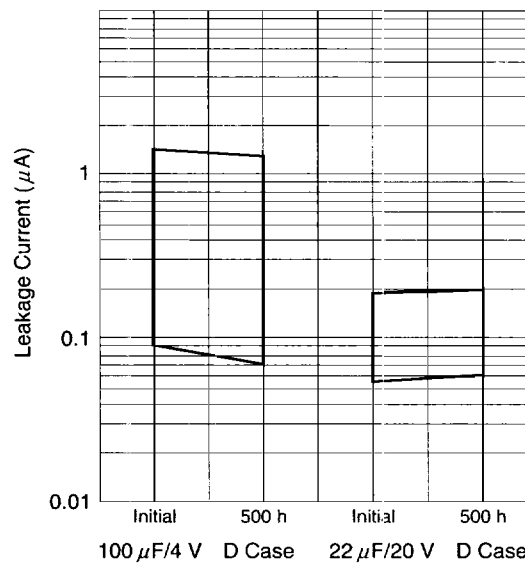
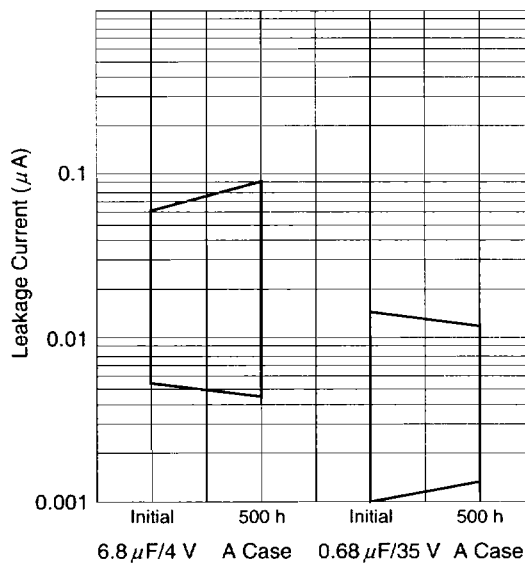
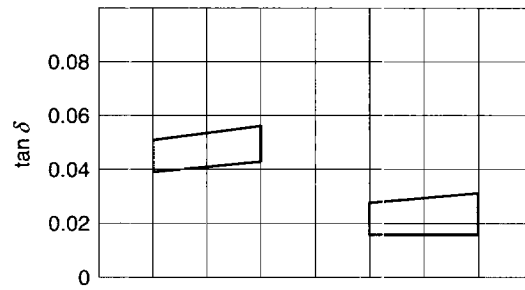
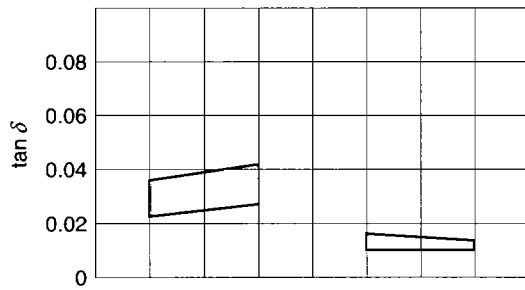
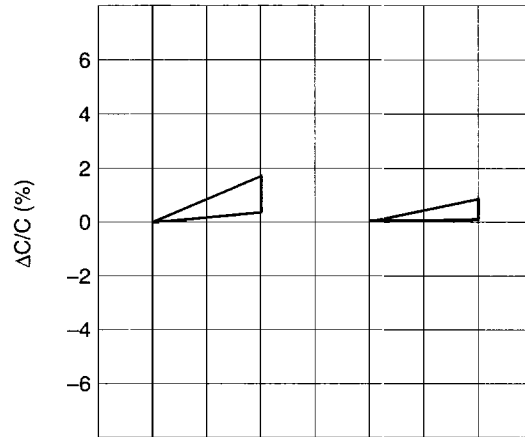
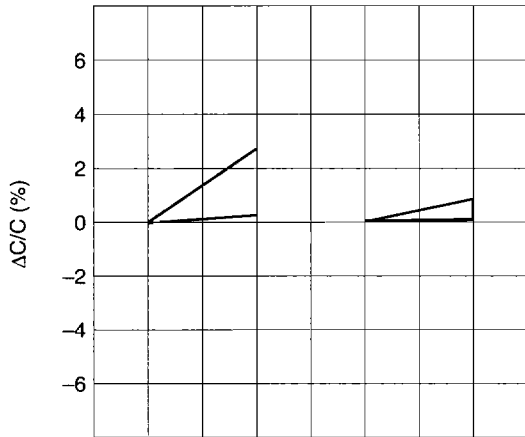
- R Series (Extended)

Resistance to Soldering Heat (Immersing for 10 sec. at 260°C)



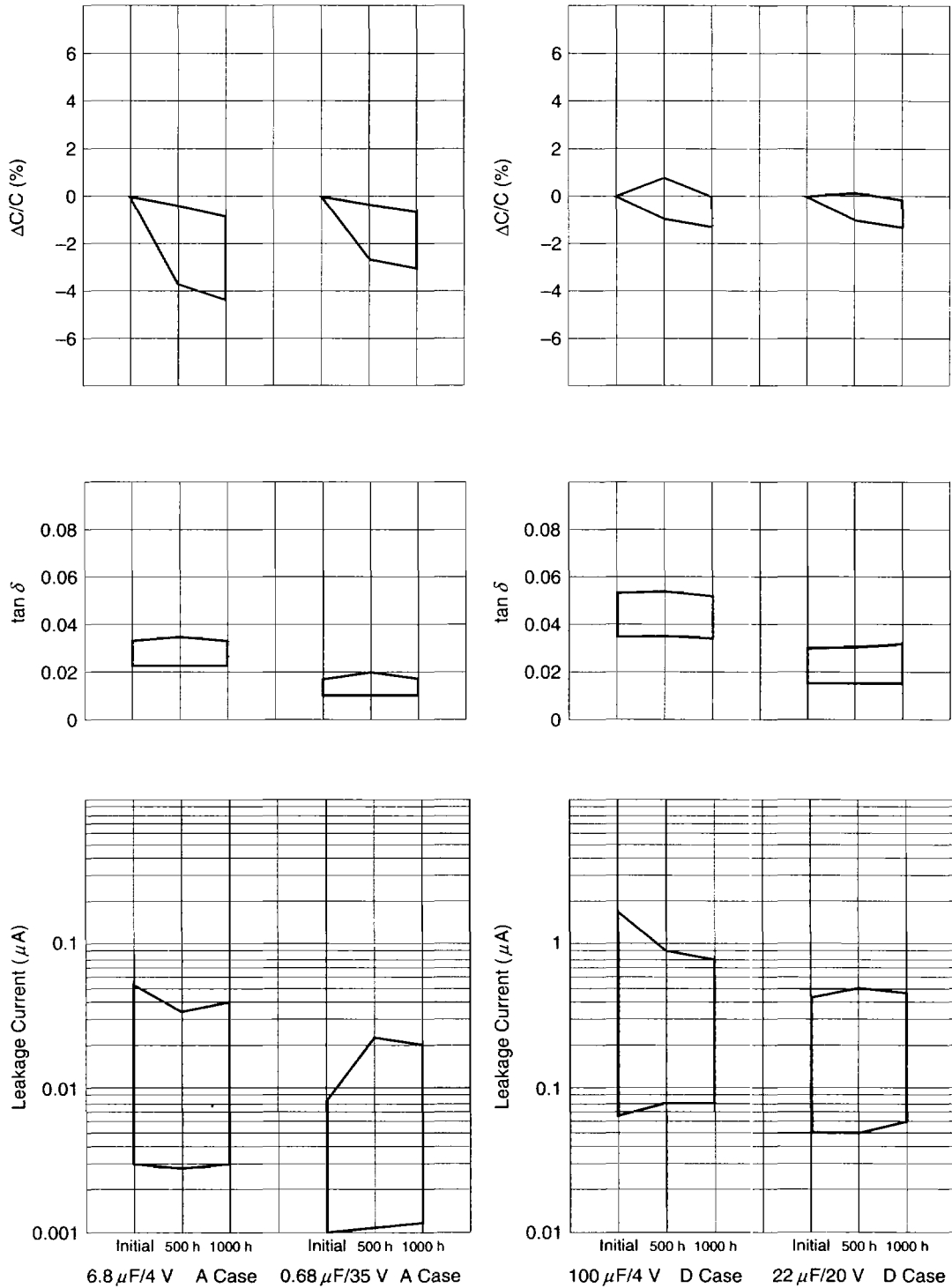
- R Series (Extended)

Damp Heat, Steady State (40°C, 90 to 95% RH)



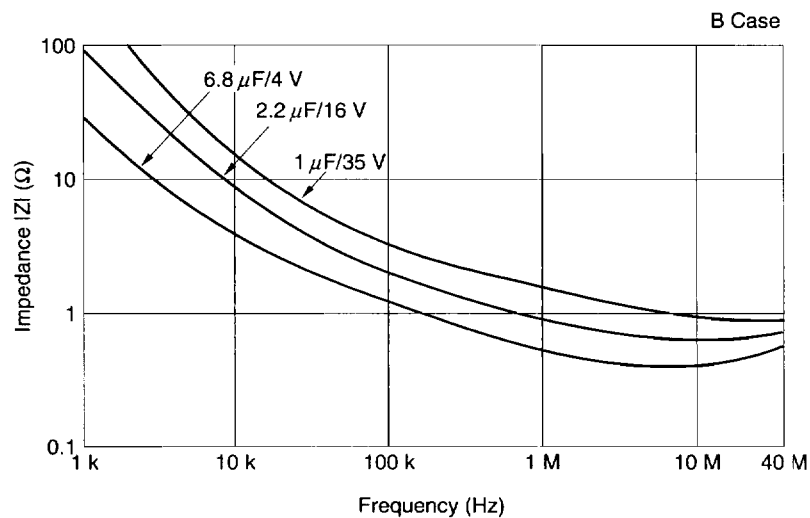
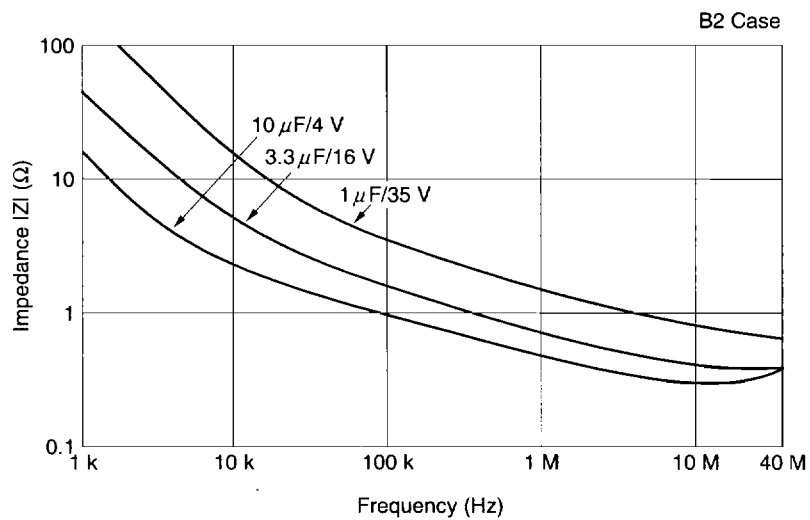
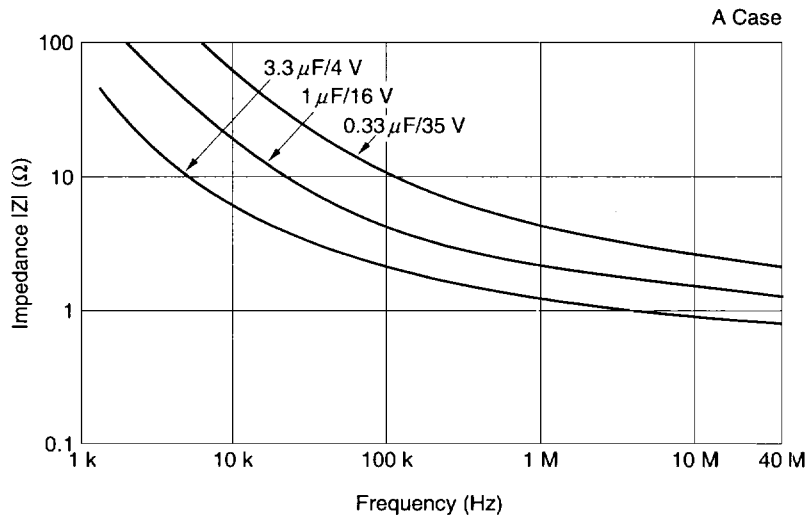
- R Series (Extended)

Endurance (85°C, Rated Voltage Applied)



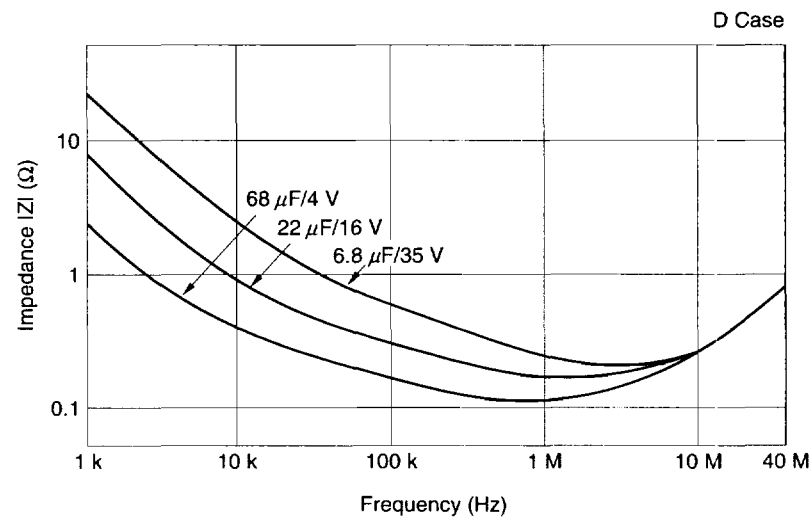
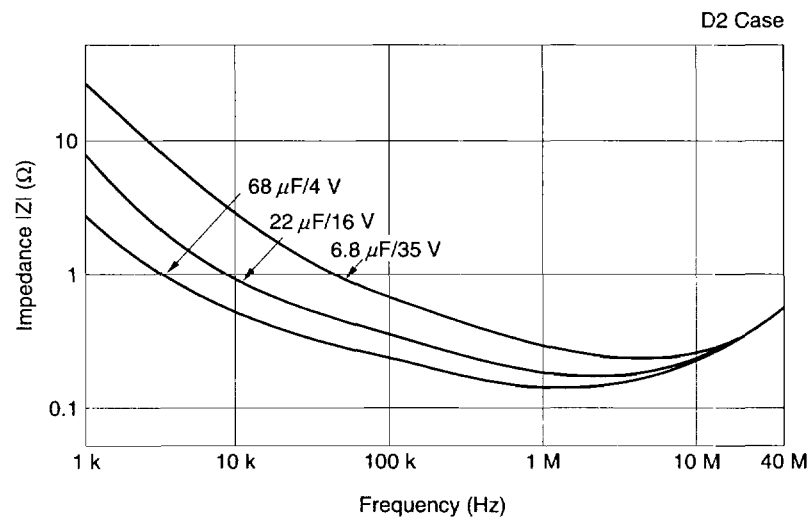
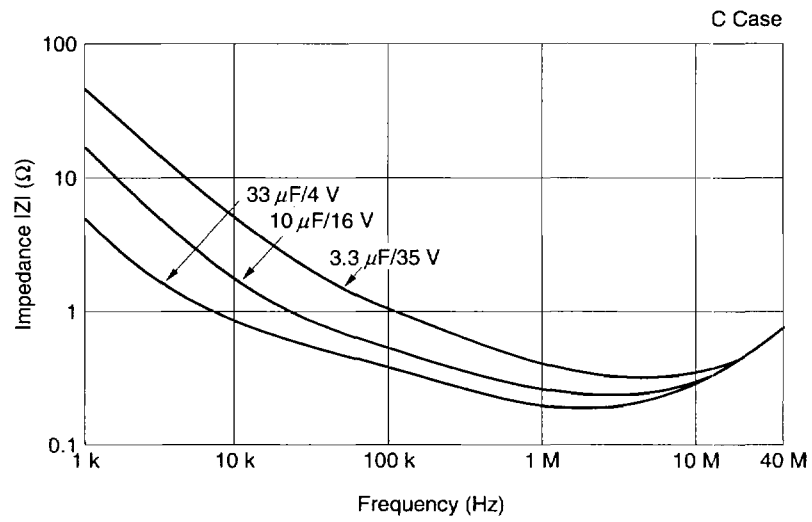
R Series (Standard)

Impedance – Frequency Characteristics



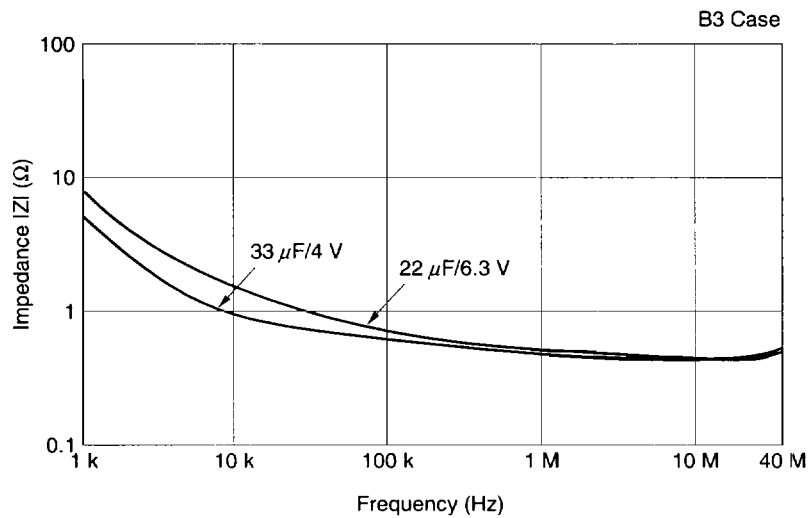
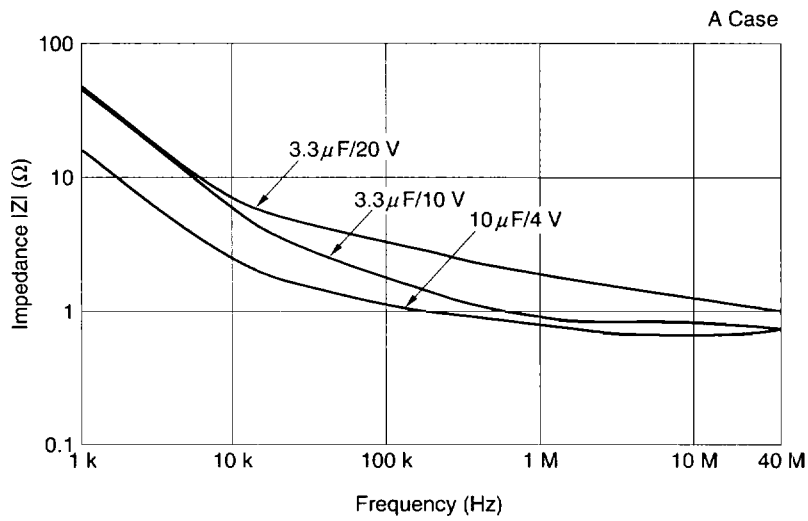
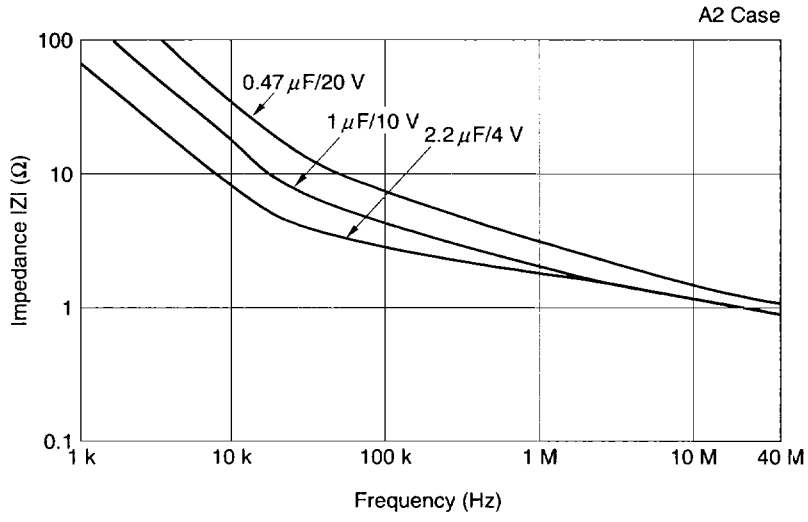
R Series (Standard)

Impedance – Frequency Characteristics



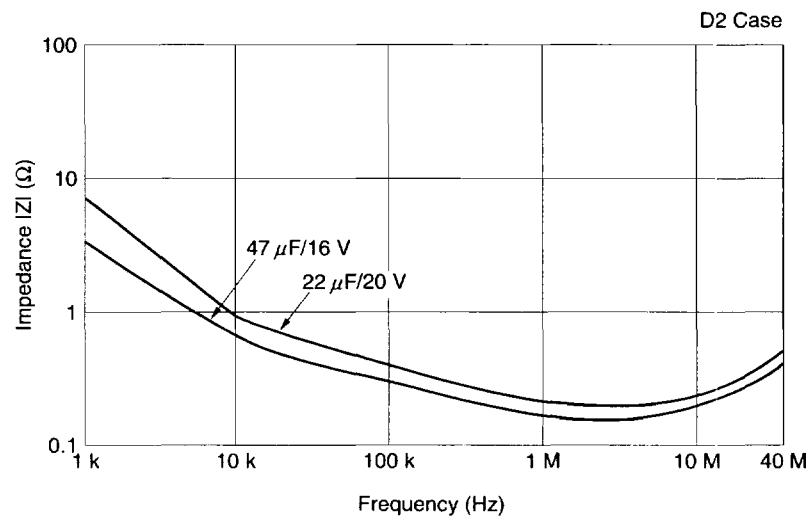
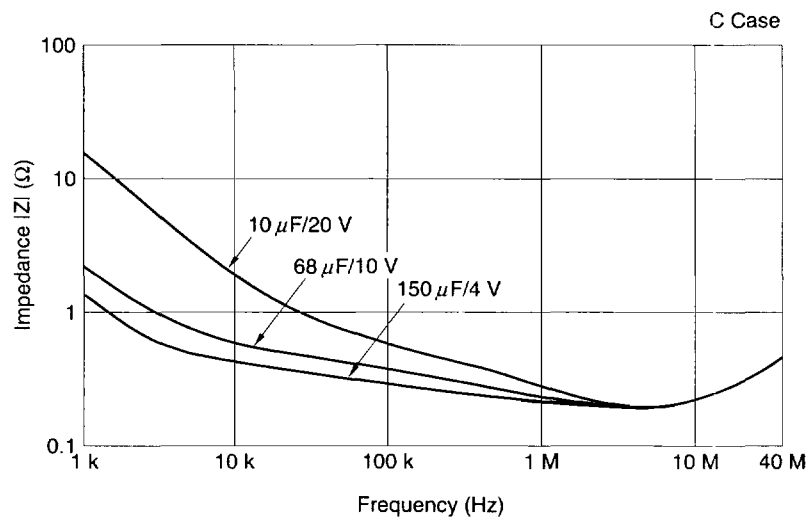
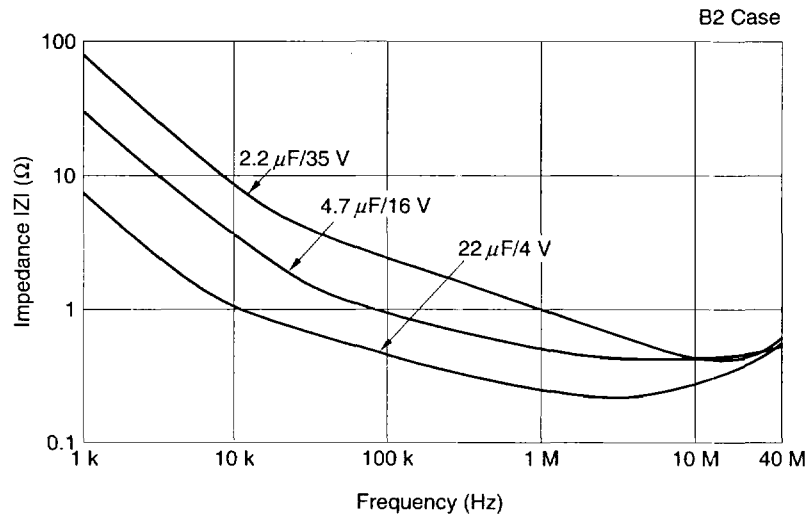
R Series (Extended)

Impedance – Frequency Characteristics



R Series (Extended)

Impedance – Frequency Characteristics



R Series (Extended)

Impedance – Frequency Characteristics

