

Surface Mount Type

Series: **TG** Type : **V**

■ Features

Endurance: 125°C 1000 to 2000 h
 Miniaturization (40% less than TA Series)
 Low ESR (Low temp)
 Vibration-proof product is available upon request. ($\phi 8 \leq$)
 RoHS directive compliant (Parts No: EEV* $\phi 12.5 \leq$, EEE*)

■ Applications

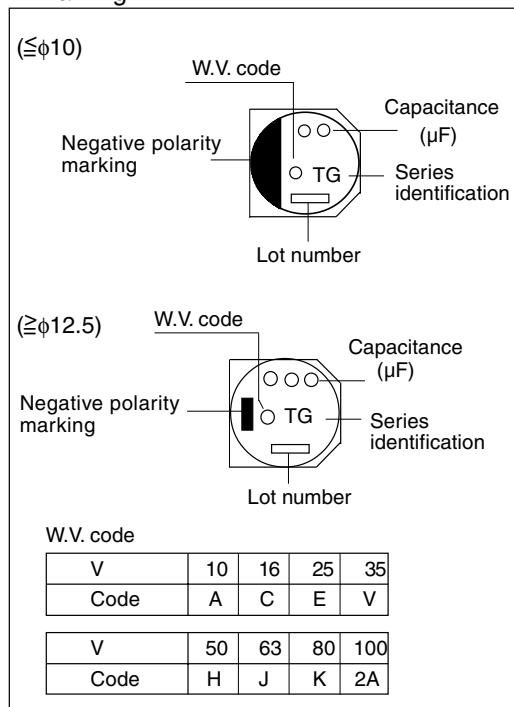
For use near car engines.
 Good for electronically controlled units (ECU, ABS etc).



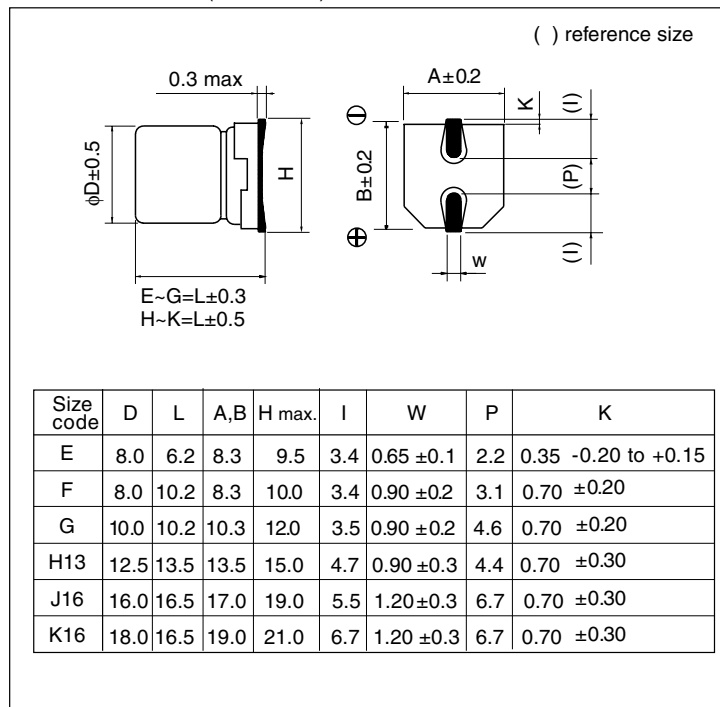
■ Specifications

Category temp. range	-40 to +125°C									
Rated W.V. Range	10 to 100 V .DC									
Nominal Cap. Range	10 to 4700 μ F									
Capacitance Tolerance	±20 % (120Hz/+20°C)									
DC Leakage Current	I ≤ 0.01 CV or 3(μ A) after 2 minutes (Whichever is greater)									
tan δ	Please see the attached standard products list									
Characteristics at Low Temperature	W.V. (V)	10	16	25	35	50	63	80	100	(Impedance ratio at 120Hz)
	-25 / +20 °C	3	2	2	2	2	2	2	2	
	-40 / +20 °C	6	4	4	3	3	3	3	3	
Endurance	After applying rated working voltage for 1000 hours(φ8x6.2), 2000 hours(8x10.2 ≤) at +125 ±2°C and then being stabilized at +20°C, capacitors shall meet the following limits.									
	Capacitance change			±30 % of initial measured value (code U:±35%)						
	tan δ			≤300 % of initial specified value (code U:350%)						
	DC leakage current			≤ initial specified value						
Shelf Life	After storage for 1000 hours at +125±2°C with no voltage applied and then being stabilized at +20°C, capacitors shall meet the limits specified in Endurance.(With voltage treatment)									
Resistance to Soldering Heat	After reflow soldering (Refer to page 86 for recommended temperature profile) and then being stabilized at +20°C, capacitor shall meet the following limits.									
	Capacitance change			±10 % of initial measured value						
	tan δ			≤ initial specified value						
	DC leakage current			≤ initial specified value						

■ Marking



■ Dimensions in mm (not to scale)



■ Case size VS Capacitance, ESR and Ripple current

ESR;(Ω/100kHz,+20°C),Ripple current ;(mA r.m.s./100kHz+125°C)

Capacitance (μF)	W.V. (V)	10			16			25			
		size	ESR		size	ESR		size	ESR		Ripple current
			20°C	-40°C		20°C	-40°C		20°C	-40°C	
47								E	1.0	20	100
100		E	1.0	20	100	F	0.5	10	197	(E)	(1.0)
								F	0.5	10	197
220		(E)	(1.0)	(20)	(100)	(F)	(0.5)	(10)	(197)	(F)	(0.5)
		F	0.5	10	197	G	0.3	6.0	270	G	0.3
330		(F)	(0.5)	(10)	(197)	(G)	(0.3)	(6.0)	(270)	(G)	(0.3)
		G	0.3	6.0	270	H13	0.12	1.8	800	H13	0.12
470		(G)	(0.3)	(6.0)	(270)	H13	0.12	1.8	800	H13	0.12
680						H13	0.12	1.8	800	(H13)	(0.12)
										J16	0.08
1000		H13	0.12	1.8	800	(H13)	(0.12)	(1.8)	(800)	(J16)	(0.08)
						J16	0.08	1.2	1100	K16	0.075
1500		(H13)	(0.12)	(1.8)	(800)						
2200		J16	0.08	1.2	1100	(J16)	(0.08)	(1.2)	(1100)	K16	0.075
						K16	0.075	1.1	1300		
3300		(J16)	(0.08)	(1.2)	(1100)	K16	0.075	1.1	1300		
		K16	0.075	1.1	1300						
4700		K16	0.075	1.1	1300						

Capacitance (μF)	W.V. (V)	35			50			63			
		size	ESR		size	ESR		size	ESR		Ripple current
			20°C	-40°C		20°C	-40°C		20°C	-40°C	
10					E	1.6	32	80	E	2.2	55
22					E	1.6	32	80	F	1	25
33		E	1.0	20	100	(E)	(1.6)	(32)	(80)	(F)	(1)
						F	0.75	15	133	G	0.8
47		(E)	(1.0)	(20)	(100)	(F)	(0.75)	(15)	(133)	(F)	(1)
		F	0.5	10	197	G	0.5	10	221	G	0.8
100		(F)	(0.5)	(10)	(197)					(G)	(0.8)
		G	0.3	6.0	270	(G)	(0.5)	(10)	(221)	H13	0.26
220		(G)	(0.3)	(6.0)	(270)	H13	0.23	3.4	600	H13	0.26
330		H13	0.12	1.8	800	H13	0.23	3.4	600	J16	0.18
470		(H13)	(0.12)	(1.8)	(800)	J16	0.15	2.2	900	J16	0.18
		J16	0.08	1.2	1100						
680		(J16)	(0.08)	(1.2)	(1100)	(J16)	(0.15)	(2.2)	(900)		
		K16	0.075	1.1	1300	K16	0.14	2.1	950		
1000		K16	0.075	1.1	1300	K16	0.14	2.1	950		

Capacitance (μF)	W.V. (V)	80			100		
		size	ESR		size	ESR	
			20°C	-40°C		20°C	-40°C
10		F	1.3	32	70	F	1.3
22		(F)	(1.3)	(32)	(70)	(F)	(1.3)
		G	1.0	25	90	G	1.0
33		(F)	(1.3)	(32)	(70)	G	1.0
		G	1.0	25	90		
47		(G)	(1.0)	(25)	(90)	H13	0.42
		H13	0.42	8.4	250		
100		(H13)	(0.42)	(8.4)	(250)	J16	0.3
		J16	0.3	6.0	350		
220		(J16)	(0.3)	(6.0)	(350)	K16	0.28
		K16	0.28	5.6	400		
330		(J16)	(0.3)	(6.0)	(350)	K16	0.28
		K16	0.28	5.6	400		
470		K16	0.28	5.6	400		

() Shows miniaturized size
Suffix : U

■ Standard Products

Standard Products												
W.V.	Cap (±20%)	Case Size			Specification			Part No. (RoHS: not compliant)		Part No. (RoHS: compliant)		Min. Packaging Q'ty
		Dia.	Length	Size code	Ripple current (100kHz) (+125°C) (mA)	ESR (100kHz) (+20°C) (Ω)	tan δ (120Hz) (+20°C)		Reflow		Reflow	Taping (pcs)
(V)	(μF)	(mm)	(mm)									
10	100	8	6.2	E	100	1.0	0.30	EEVTG1A101P	(2)	EEETG1A101P	(5)	1000
	220	(8)	(6.2)	(E)	(100)	(1.0)	0.30	EEVTG1A221UP	(2)	EEETG1A221UP	(5)	1000
		8	10.2	F	197	0.5	0.30	EEVTG1A221P	(2)	EEETG1A221P	(5)	500
	330	(8)	(10.2)	(F)	(197)	(0.5)	0.30	EEVTG1A331UP	(2)	EEETG1A331UP	(5)	500
		10	10.2	G	270	0.3	0.30	EEVTG1A331P	(2)	EEETG1A331P	(5)	500
	470	(10)	(10.2)	(G)	(270)	(0.3)	0.30	EEVTG1A471UP	(2)	EEETG1A471UP	(5)	500
	1000	12.5	13.5	H13	800	0.12	0.30			EEVTG1A102Q	(2)	200
	1500	(12.5)	(13.5)	(H13)	(800)	(0.12)	0.30			EEVTG1A152UQ	(2)	200
	2200	16	16.5	J16	1100	0.08	0.32			EEVTG1A222M	(2)	125
	3300	(16)	(16.5)	(J16)	(1100)	(0.08)	0.34			EEVTG1A332UM	(2)	125
		18	16.5	K16	1300	0.075	0.34			EEVTG1A332M	(2)	125
4700	18	16.5	K16	1300	0.075	0.36			EEVTG1A472M	(2)	125	
16	100	8	10.2	F	197	0.5	0.23	EEVTG1C101P	(2)	EEETG1C101P	(5)	500
	220	(8)	(10.2)	(F)	(197)	(0.5)	0.23	EEVTG1C221UP	(2)	EEETG1C221UP	(5)	500
		10	10.2	G	270	0.3	0.23	EEVTG1C221P	(2)	EEETG1C221P	(5)	500
	330	(10)	(10.2)	(G)	(270)	(0.3)	0.23	EEVTG1C331UP	(2)	EEETG1C331UP	(5)	500
		12.5	13.5	H13	800	0.12	0.23			EEVTG1C331Q	(2)	200
	470	12.5	13.5	H13	800	0.12	0.23			EEVTG1C471Q	(2)	200
	680	12.5	13.5	H13	800	0.12	0.23			EEVTG1C681Q	(2)	200
	1000	(12.5)	(13.5)	(H13)	(800)	(0.12)	0.23			EEVTG1C102UQ	(2)	200
		16	16.5	J16	1100	0.08	0.23			EEVTG1C102M	(2)	125
	2200	(16)	(16.5)	(J16)	(1100)	(0.08)	0.25			EEVTG1C222UM	(2)	125
		18	16.5	K16	1300	0.075	0.25			EEVTG1C222M	(2)	125
3300	18	16.5	K16	1300	0.075	0.27			EEVTG1C332M	(2)	125	
25	47	8	6.2	E	100	1.0	0.18	EEVTG1E470P	(2)	EEETG1E470P	(5)	1000
	100	(8)	(6.2)	(E)	(100)	(1.0)	0.18	EEVTG1E101UP	(2)	EEETG1E101UP	(5)	1000
		8	10.2	F	197	0.5	0.18	EEVTG1E101P	(2)	EEETG1E101P	(5)	500
	220	(8)	(10.2)	(F)	(197)	(0.5)	0.18	EEVTG1E221UP	(2)	EEETG1E221UP	(5)	500
		10	10.2	G	270	0.3	0.18	EEVTG1E221P	(2)	EEETG1E221P	(5)	500
	330	(10)	(10.2)	(G)	(270)	(0.3)	0.18	EEVTG1E331UP	(2)	EEETG1E331UP	(5)	500
		12.5	13.5	H13	800	0.12	0.18			EEVTG1E331Q	(2)	200
	470	12.5	13.5	H13	800	0.12	0.18			EEVTG1E471Q	(2)	200
	680	(12.5)	(13.5)	(H13)	(800)	(0.12)	0.18			EEVTG1E681UQ	(2)	200
		16	16.5	J16	1100	0.08	0.18			EEVTG1E681M	(2)	125
	1000	(16)	(16.5)	(J16)	(1100)	(0.08)	0.18			EEVTG1E102UM	(2)	125
18		16.5	K16	1300	0.075	0.18			EEVTG1E102M	(2)	125	
2200	18	16.5	K16	1300	0.075	0.20			EEVTG1E222M	(2)	125	
35	33	8	6.2	E	100	1.0	0.16	EEVTG1V330P	(2)	EEETG1V330P	(5)	1000
	47	(8)	(6.2)	(E)	(100)	(1.0)	0.16	EEVTG1V470UP	(2)	EEETG1V470UP	(5)	1000
		8	10.2	F	197	0.5	0.16	EEVTG1V470P	(2)	EEETG1V470P	(5)	500
	100	(8)	(10.2)	(F)	(197)	(0.5)	0.16	EEVTG1V101UP	(2)	EEETG1V101UP	(5)	500
		10	10.2	G	270	0.3	0.16	EEVTG1V101P	(2)	EEETG1V101P	(5)	500
	220	(10)	(10.2)	(G)	(270)	(0.3)	0.16	EEVTG1V221UP	(2)	EEETG1V221UP	(5)	500
	330	12.5	13.5	H13	800	0.12	0.16			EEVTG1V331Q	(2)	1000

An explanation of the taping dimensions can be found on page 84.

Reflow profiles can be found on page 86.

Endurance: 125°C 1000h - 2000h

■ Standard Products

W.V. (V)	Cap ($\pm 20\%$) (μF)	Case Size			Specification			Part No. (RoHS: not compliant)	Reflow	Part No. (RoHS: compliant)	Reflow	Min. Packaging Q'ty Taping (pcs)
		Dia. (mm)	Length (mm)	Size code	Ripple current (100kHz) (+125°C) (mA)	ESR (100kHz) (+20°C) (Ω)	$\tan \delta$ (120Hz) (+20°C)					
35	470	12.5	13.5	(H13)	(800)	(0.12)	0.16			EEVTG1V471UQ	(2)	200
		16	16.5	J16	1100	0.08	0.16			EEVTG1V471M	(2)	125
	680	(16)	(16.5)	(J16)	(1100)	(0.08)	0.16			EEVTG1V681UM	(2)	125
		18	16.5	K16	1300	0.075	0.16			EEVTG1V681M	(2)	125
	1000	18	16.5	K16	1300	0.075	0.16			EEVTG1V102M	(2)	125
50	10	8	6.2	E	80	1.6	0.14	EEVTG1H100P	(2)	EEETG1H100P	(5)	1000
	22	8	6.2	E	80	1.6	0.14	EEVTG1H220P	(2)	EEETG1H220P	(5)	1000
	33	(8)	(6.2)	(E)	(80)	(1.6)	0.14	EEVTG1H330UP	(2)	EEETG1H330UP	(5)	1000
		8	10.2	F	133	0.75	0.14	EEVTG1H330P	(2)	EEETG1H330P	(5)	500
	47	(8)	(10.2)	(F)	(133)	(0.75)	0.14	EEVTG1H470UP	(2)	EEETG1H470UP	(5)	500
		10	10.2	G	221	0.5	0.14	EEVTG1H470P	(2)	EEETG1H470P	(5)	500
	100	(10)	(10.2)	(G)	(221)	(0.5)	0.14	EEVTG1H101UP	(2)	EEETG1H101UP	(5)	500
	220	12.5	13.5	H13	600	0.23	0.14			EEVTG1H221Q	(2)	200
	330	12.5	13.5	H13	600	0.23	0.14			EEVTG1H331Q	(2)	200
	470	16	16.5	J16	900	0.15	0.14			EEVTG1H471M	(2)	125
	680	(16)	(16.5)	(J16)	(900)	(0.15)	0.14			EEVTG1H681UM	(2)	125
		18	16.5	K16	950	0.14	0.14			EEVTG1H681M	(2)	125
	1000	18	16.5	K16	950	0.14	0.14			EEVTG1H102M	(2)	125
63	10	8	6.2	E	55	2.2	0.12	EEVTG1J100P	(2)	EEETG1J100P	(5)	1000
	22	8	10.2	F	100	1	0.12	EEVTG1J220P	(2)	EEETG1J220P	(5)	500
	33	(8)	(10.2)	(F)	(100)	(1)	0.12	EEVTG1J330UP	(2)	EEETG1J330UP	(5)	500
		10	10.2	G	150	0.8	0.12	EEVTG1J330P	(2)	EEETG1J330P	(5)	500
	47	(8)	(10.2)	(F)	(100)	(1)	0.12	EEVTG1J470UP	(2)	EEETG1J470UP	(5)	500
		10	10.2	G	150	0.8	0.12	EEVTG1J470P	(2)	EEETG1J470P	(5)	500
	100	(10)	(10.2)	(G)	(150)	(0.8)	0.12	EEVTG1J101UP	(2)	EEETG1J101UP	(5)	500
		12.5	13.5	H13	350	0.26	0.12			EEVTG1J101Q	(2)	200
	220	12.5	13.5	H13	350	0.26	0.12			EEVTG1J221Q	(2)	200
	330	16	16.5	J16	500	0.18	0.12			EEVTG1J331M	(2)	125
	470	16	16.5	J16	500	0.18	0.12			EEVTG1J471M	(2)	125
80	10	8	10.2	F	70	1.3	0.12	EEVTG1K100P	(2)	EEETG1K100P	(5)	500
	22	(8)	(10.2)	(F)	(70)	(1.3)	0.12	EEVTG1K220UP	(2)	EEETG1K220UP	(5)	500
		10	10.2	G	90	1.0	0.12	EEVTG1K220P	(2)	EEETG1K220P	(5)	500
	33	(8)	(10.2)	(F)	(70)	(1.3)	0.12	EEVTG1K330UP	(2)	EEETG1K330UP	(5)	500
		10	10.2	G	90	1.0	0.12	EEVTG1K330P	(2)	EEETG1K330P	(5)	500
	47	(10)	(10.2)	(G)	(90)	(1.0)	0.12	EEVTG1K470UP	(2)	EEETG1K470UP	(5)	500
		12.5	13.5	H13	250	0.42	0.12			EEVTG1K470Q	(2)	200
	100	(12.5)	(13.5)	(H13)	(250)	(0.42)	0.12			EEVTG1K101UQ	(2)	200
		16	16.5	J16	350	0.3	0.12			EEVTG1K101M	(2)	125
	220	(16)	(16.5)	(J16)	(350)	(0.3)	0.12			EEVTG1K221UM	(2)	125
		18	16.5	K16	400	0.28	0.12			EEVTG1K221M	(2)	125
	330	(16)	(16.5)	(J16)	(350)	(0.3)	0.12			EEVTG1K331UM	(2)	125
		18	16.5	K16	400	0.28	0.12			EEVTG1K331M	(2)	125
	470	18	16.5	K16	400	0.28	0.12			EEVTG1K471M	(2)	125

An explanation of the taping dimensions can be found on page 84.

Reflow profiles can be found on page 86.

Endurance: 125°C 1000h - 2000h

■ Standard Products

W.V. (V)	Cap (±20%) (μF)	Case Size			Specification			Part No. (RoHS: not compliant)	Reflow	Part No. (RoHS: compliant)	Reflow	Min. Packaging Q'ty
		Dia. (mm)	Length (mm)	Size code	Ripple current (100kHz) (+125°C) (mA)	ESR (100kHz) (+20°C) (Ω)	tan δ (120Hz) (+20°C)					Taping (pcs)
100	10	8	10.2	F	70	1.3	0.1	EEVTG2A100P	(2)	EEETG2A100P	(5)	500
	22	(8)	(10.2)	(F)	(70)	(1.3)	0.1	EEVTG2A220UP	(2)	EEETG2A220UP	(5)	500
		10	10.2	G	90	1.0	0.1	EEVTG2A220P	(2)	EEETG2A220P	(5)	500
	33	10	10.2	G	90	1.0	0.1	EEVTG2A330P	(2)	EEETG2A330P	(5)	500
	47	12.5	13.5	H13	250	0.42	0.1			EEVTG2A470Q	(2)	200
	100	16	16.5	J16	350	0.3	0.1			EEVTG2A101M	(2)	125
	220	18	16.5	K16	400	0.28	0.1			EEVTG2A221M	(2)	125
	330	18	16.5	K16	400	0.28	0.1			EEVTG2A331M	(2)	125

An explanation of the taping dimensions can be found on page 84.

Reflow profiles can be found on page 86.

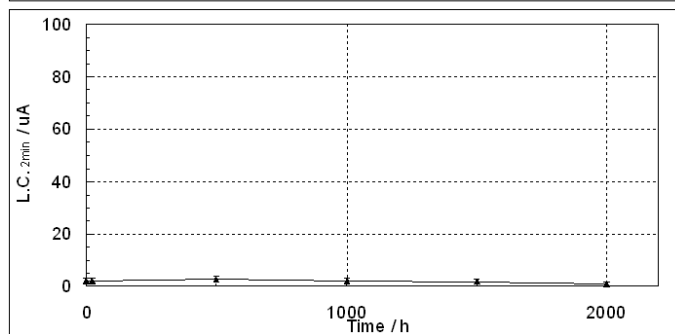
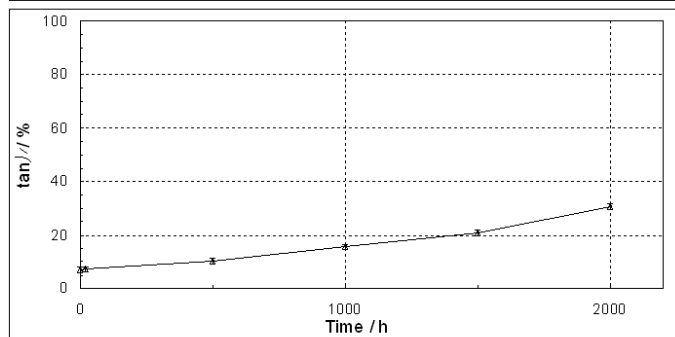
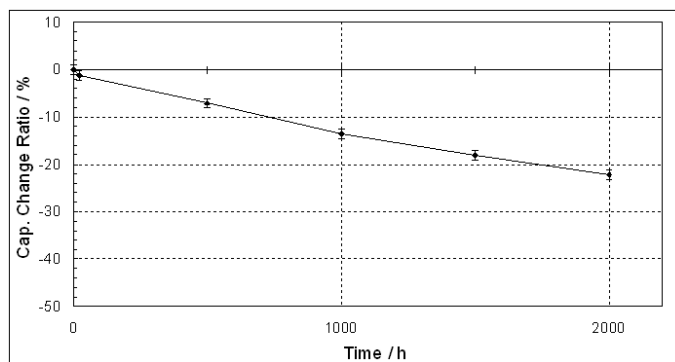
Endurance: 125°C 1000h - 2000h

■ Frequency Correction Factor of Rated Ripple Current

	Frequency (Hz)			
	120	1k	10k	100k~
coefficient	0.65	0.85	0.95	1.00

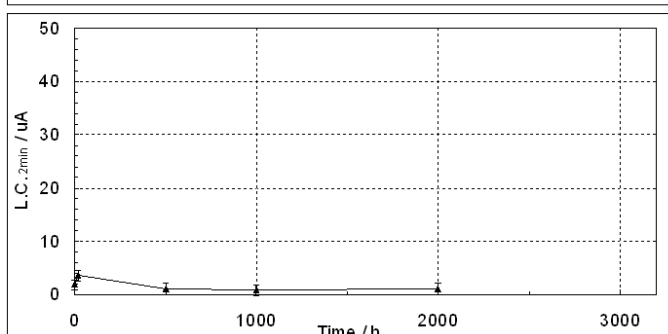
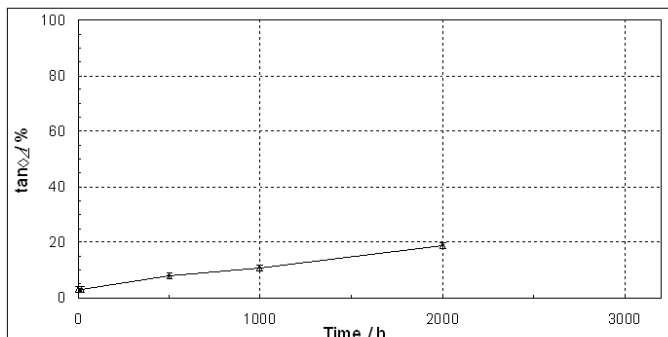
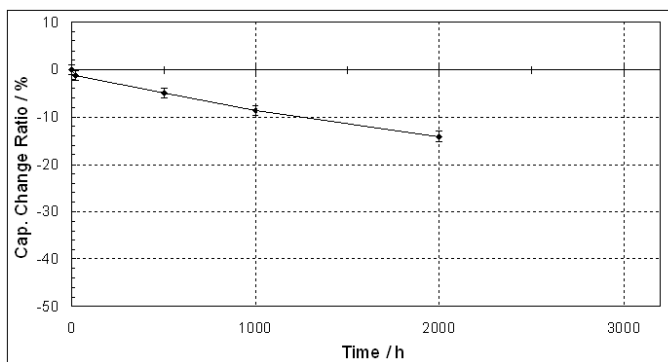
■ Endurance

EEETG1E221UP (25V220uF, Dia.8x10)



At 125C
Applied W.V.
n=10 each

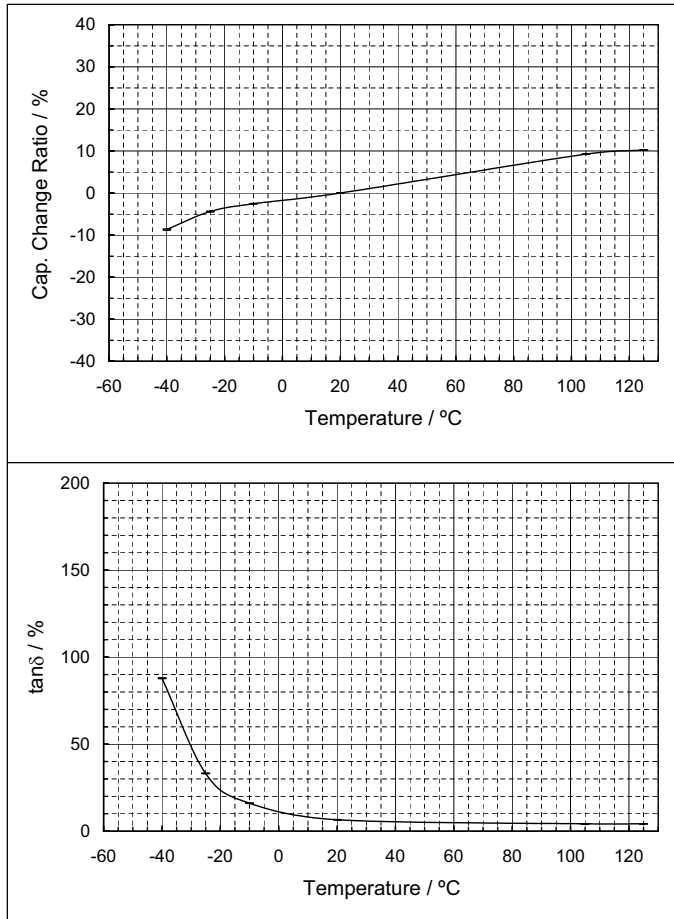
EEVTG1V101P (35V100uF, Dia.10x10.2)



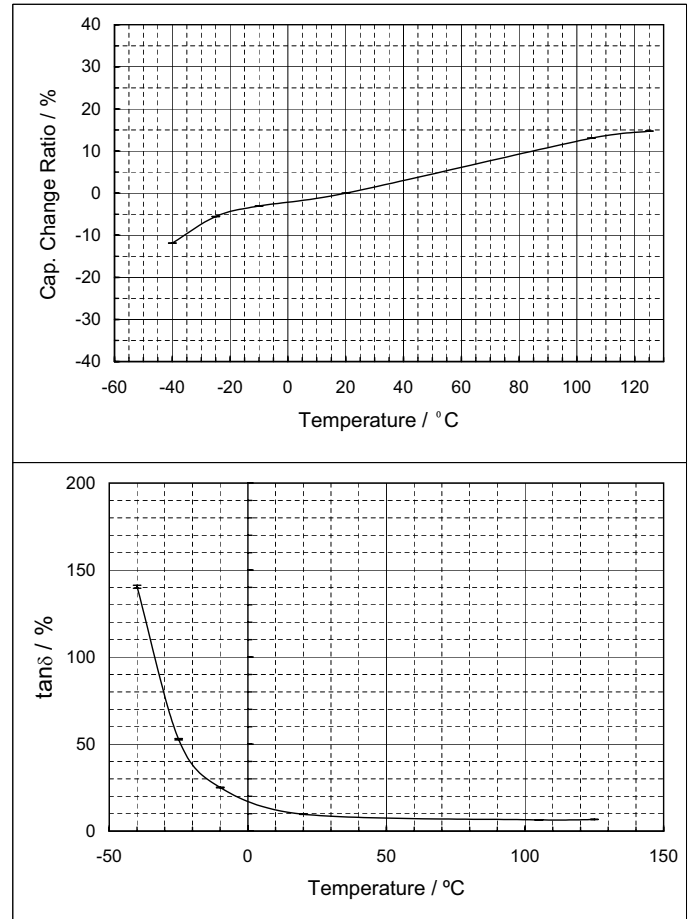
At 125C
Applied W.V.
n=10 each

■ Temperature Characteristics

EEVTG1A101P (10V, 100 μ F, Dia. 8 x 6.2) $n = 3$

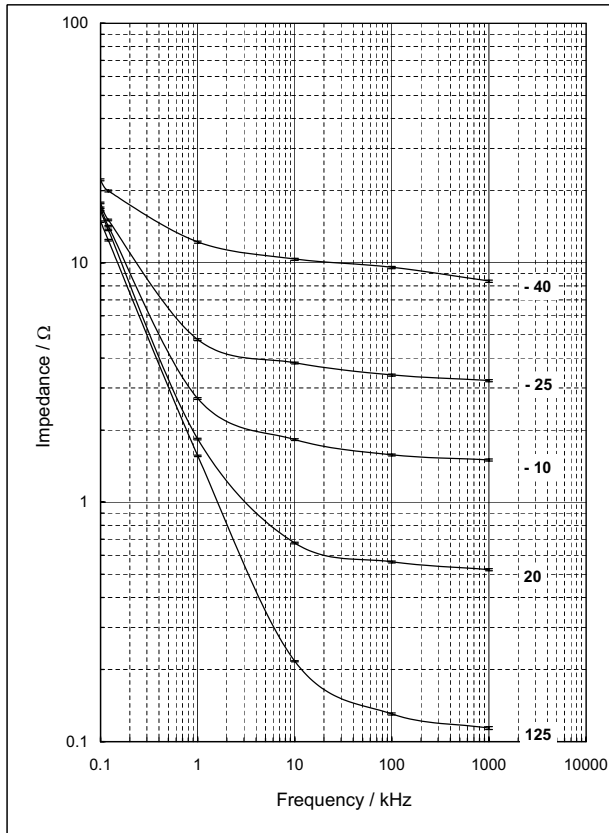


EEVTG1A471P (10V, 470 μ F, Dia. 10 x 10.2) $n = 3$

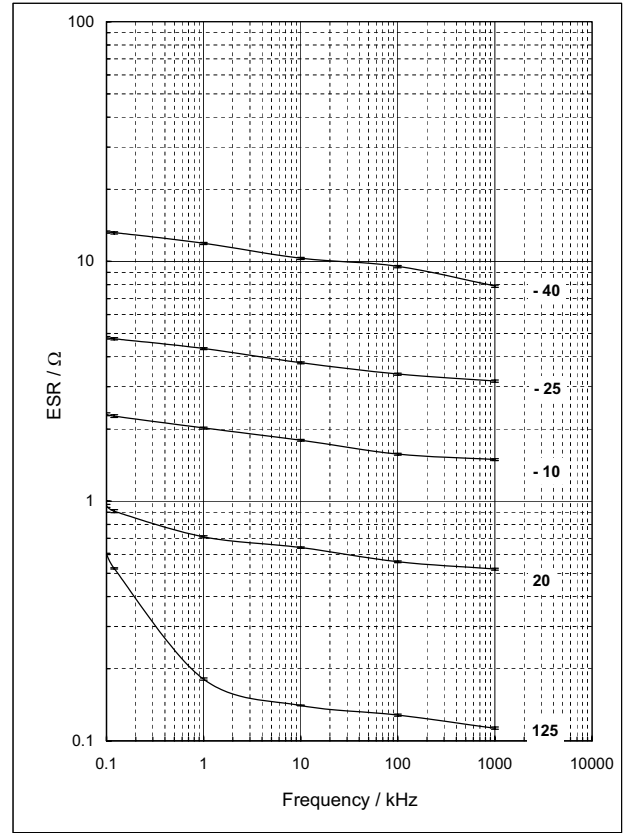


■ Temperature Characteristics

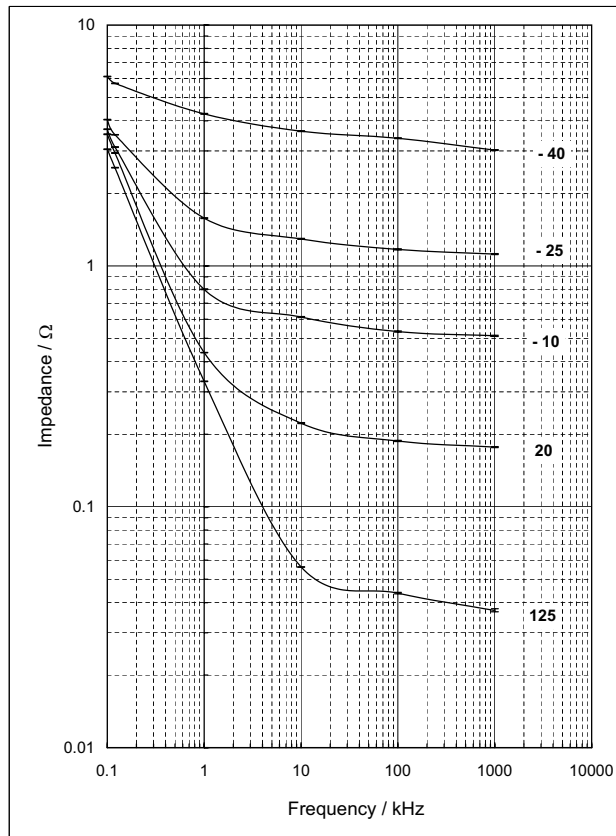
EEVTGK1A101P (10V, 100 μ F, Dia. 8 x 6.2) $n=3$



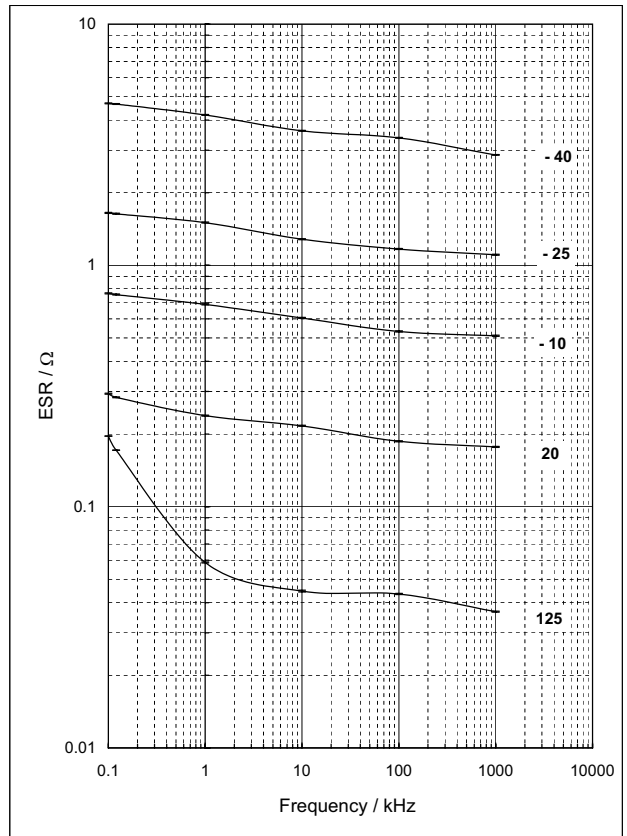
EEVTGK1A101P (10V, 100 μ F, Dia. 8 x 6.2) $n=3$



EEVTG1A101P (10V, 100 μ F, Dia. 8 x 6.2) $n=3$



EEVTGK1A101P (10V, 100 μ F, Dia. 8 x 6.2) $n=3$



Pre-fix	Suffix	Case Diameter	RoHS Compliant	Terminal Finish	Reflow Condition		Reflow Chart
					Peak Temperature	Time above 200	
ECE-V	R	3mm to 5mm	No	Sn-Pb	240 for 5 seconds	20 seconds	(1) Fig.1
	P	6mm	No	Sn-Pb	240 for 5 seconds	20 seconds	(1) Fig.1
	P	8mm to 10mm	No	Sn-Pb	230 for 5 seconds	20 seconds	(2) Fig.2
EEV-	R	4mm to 5mm	No	Sn-Pb	240 for 5 seconds	20 seconds	(1) Fig.1
	P	6mm	No	Sn-Pb	240 for 5 seconds	20 seconds	(1) Fig.1
	P	8mm to 10mm	No	Sn-Pb	230 for 5 seconds	20 seconds	(2) Fig.2
	Q	12.5mm	Yes	Sn	230 for 5 seconds	20 seconds	(2) Fig.2 (Except for EB series) (3) Fig.3 (EB series only)
	M	16mm to 18mm	Yes	Sn	230 for 5 seconds	20 seconds	(2) Fig.2 (Except for EB series)
							(3) Fig.3 (EB series only)
EEE-	R	3mm to 5mm	Yes	Sn-Bi	250 for 5 seconds	60 seconds	(4) Fig.4
	P	6mm	Yes	Sn-Bi	250 for 5 seconds	60 seconds	(4) Fig.4
	P	8mm to 10mm	Yes	Sn-Bi	235 for 5 seconds	60 seconds	(5) Fig.5

