

## Surface Mount Type

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



### Features

- Endurance : 125 °C 1000 h to 2000 h
- Miniaturization (40 % less than TA Series)
- Low ESR (Low temp)
- Vibration-proof product is available upon request. ( $\phi 8$  mm and larger)
- RoHS compliant (Parts No  $\phi 8$  to  $\phi 10$  : **EEE\***,  $\phi 12.5$  to  $\phi 18$  : **EEV\***)

### Specifications

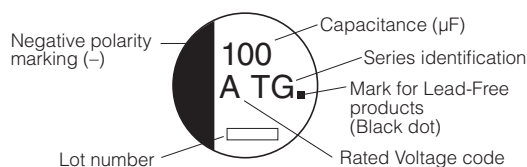
Category temperature range	-40 °C to +125 °C									
Rated voltage range	10 V.DC to 100 V.DC									
Capacitance range	10 $\mu$ F to 4700 $\mu$ F									
Capacitance tolerance	$\pm 20$ % (120 Hz/+20 °C)									
Leakage current	$I \leq 0.01$ CV After 2 minutes									
Dissipation factor (tan $\delta$ )	Please see the attached characteristics list									
Characteristics at low temperature	V.DC	10	16	25	35	50	63	80	100	(Impedance ratio at 120 Hz)
	Z(-25 °C)/Z(+20 °C)	3	2	2	2	2	2	2	2	
	Z(-40 °C)/Z(+20 °C)	6	4	4	3	3	3	3	3	
Endurance	After applying rated working voltage for 1000 hours ( $\phi 8 \times 6.2$ ), 2000 hours ( $\phi 8 \times 10.2 \leq$ ) at +125 °C $\pm 2$ °C and then being stabilized at +20 °C, capacitors shall meet the following limits.									
	Capacitance change	Within $\pm 30$ % of the initial value (code U : $\pm 35$ %)								
	tan $\delta$	$\leq 300$ % of the initial limit (code U : $\pm 350$ %)								
Shelf life	After storage for 1000 hours at +125 °C $\pm 2$ °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance (With voltage treatment)									
	After reflow soldering and then being stabilized at +20 °C, capacitors shall meet the following limits.									
Resistance to soldering heat	Capacitance change	Within $\pm 10$ % of the initial value								
	tan $\delta$	Within the initial limit								
	DC leakage current	Within the initial limit								
AEC-Q200	AEC-Q200 compliant									

### Frequency correction factor for ripple current

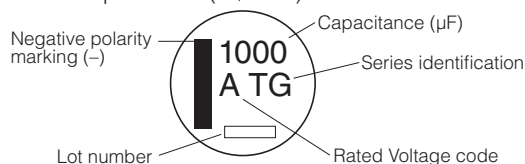
Frequency (Hz)	120	1 k	10 k	100 k to
Correction factor	0.65	0.85	0.95	1.00

### Marking

Example : 10 V.DC 100  $\mu$ F, 10 V.DC 1000  $\mu$ F  
 Marking color : BLACK  
 Lead-Free products ( $\leq \phi 10$ )

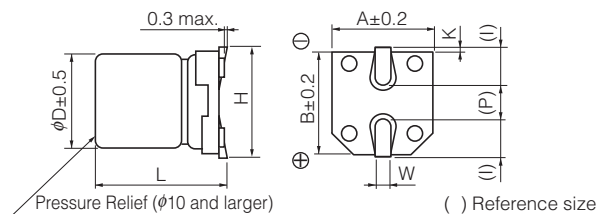


Lead-Free products ( $\geq \phi 12.5$ )



R. Voltage (V.DC)	10	16	25	35	50	63	80	100
Code	A	C	E	V	H	J	K	2A

### Dimensions



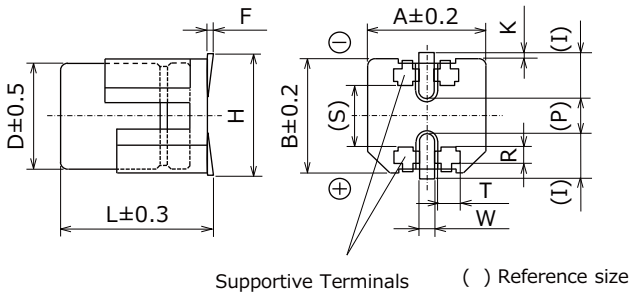
(Unit : mm)

Size code	$\phi D$	L	A, B	H	I	W	P	K
E	8.0	6.2 $\pm 0.3$	8.3	9.5 max.	3.4	0.65 $\pm 0.1$	2.2	0.35 $^{+0.15}_{-0.20}$
F	8.0	10.2 $\pm 0.3$	8.3	10.0 max.	3.4	0.90 $\pm 0.2$	3.1	0.70 $\pm 0.20$
G	10.0	10.2 $\pm 0.3$	10.3	12.0 max.	3.5	0.90 $\pm 0.2$	4.6	0.70 $\pm 0.20$
H13	12.5	13.5 $\pm 0.5$	13.5	15.0 max.	4.7	0.90 $\pm 0.3$	4.4	0.70 $\pm 0.30$
J16	16.0	16.5 $\pm 0.5$	17.0	19.0 max.	5.5	1.20 $\pm 0.3$	6.7	0.70 $\pm 0.30$
K16	18.0	16.5 $\pm 0.5$	19.0	21.0 max.	6.7	1.20 $\pm 0.3$	6.7	0.70 $\pm 0.30$

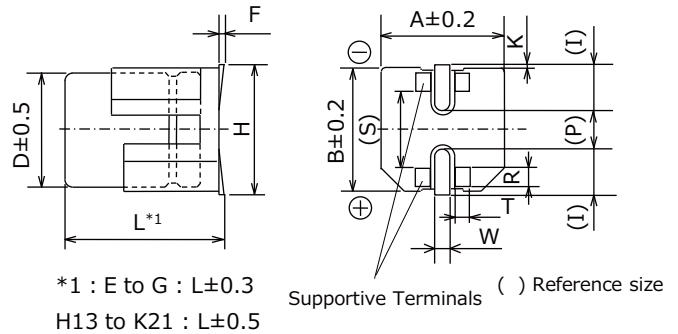
### Dimensions (Vibration-proof products)

\* The size and shape are different from standard products. Please inquire details of our company.

< Size code : D, D8 >



< Size code : E, F, G, H13, J16, K16, K21 >



\*1 : E to G : L±0.3  
H13 to K21 : L±0.5

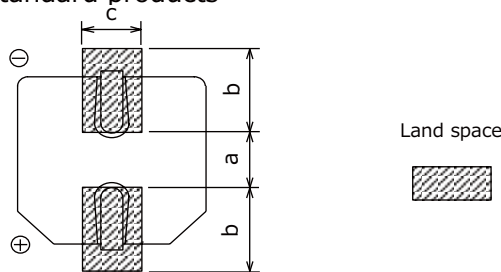
Unit : mm

Size code	φD	L	A, B	H max.	F	I	W	P	K	R	S	T
D	6.3	6.1	6.6	7.8	0 to +0.15	2.4	0.65±0.1	2.2	0.35 <sup>+0.15</sup> <sub>-0.20</sub>	1.1±0.2	3.3±0.2	1.05±0.2
D8	6.3	8.0	6.6	7.8	0 to +0.15	2.4	0.65±0.1	2.2	0.35 <sup>+0.15</sup> <sub>-0.20</sub>	1.1±0.2	3.3±0.2	1.05±0.2
E	8.0	6.5	8.3	9.5	0 to +0.15	3.4	0.7±0.1	2.2	0.35 <sup>+0.15</sup> <sub>-0.20</sub>	0.70±0.2	5.3±0.2	1.7±0.2
F	8.0	10.5	8.3	10.0	0 to +0.15	3.4	1.2±0.2	3.1	0.70±0.2	0.70±0.2	5.3±0.2	1.3±0.2
G	10.0	10.5	10.3	12.0	0 to +0.15	3.5	1.2±0.2	4.6	0.70±0.2	0.70±0.2	6.9±0.2	1.3±0.2
H13	12.5	13.8	13.5	15.0	-0.1 to +0.15	4.7	1.2±0.2	4.4	0.70±0.3	2.2±0.2	7.1±0.2	2.4±0.2
J16	16.0	16.8	17.0	19.0	-0.1 to +0.15	5.5	1.4±0.2	6.7	0.70±0.3	3.0±0.2	9.0±0.2	1.9±0.2
K16	18.0	16.8	19.0	21.0	-0.1 to +0.15	6.7	1.4±0.2	6.7	0.70±0.3	3.0±0.2	11.0±0.2	1.9±0.2
K21	18.0	21.8	19.0	21.0	-0.1 to +0.15	6.7	1.4±0.2	6.7	0.70±0.3	3.0±0.2	11.0±0.2	1.9±0.2

### Land / Pad pattern

The circuit board land/pad pattern size for chip capacitors is specified in the following table. The land pitch influences installation strength and consider it.

#### ● Standard products



(Table of board land size vs. capacitor size)

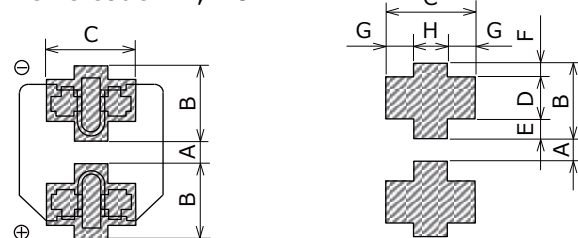
Size code	a	b	c
B (φ4)	1.0	2.5	1.6
C (φ5)	1.5	2.8	1.6
D (φ6.3)	1.8	3.2	1.6
D8 (φ6.3x7.7L)	1.8	3.2	1.6
E (φ8x6.2L)	2.2	4.0	1.6
F (φ8x10.2L)	3.1	4.0	2.0
G (φ10x10.2L)	4.6	4.1	2.0
H (φ12.5)	4.0	5.7	2.0
J (φ16)	6.0	6.5	2.5
K (φ18)	6.0	7.5	2.5

Unit : mm

When size "a" is wide, back fillet can be made, decreasing fitting strength.

#### ● Vibration-proof products

< Size code : D, D8 >



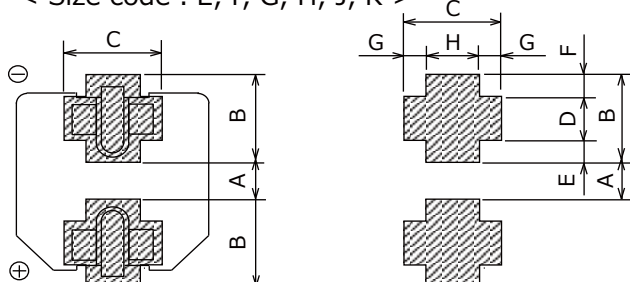
(Table of board land size vs. capacitor size)

Size code	A	B	C	D	E	F	G	H
D (φ6.3xL6.1)	1.2	3.6	3.2	2.0	0.95	0.65	1.0	1.2
D8 (φ6.3xL8.0)	1.2	3.6	3.2	2.0	0.95	0.65	1.0	1.2
E (φ8x6.5L)	1.8	4.2	5.0	1.3	1.5	1.4	1.5	2.0
F (φ8x10.5L)	2.7	4.0	4.7	1.3	1.0	1.7	1.1	2.5
G (φ10)	3.9	4.4	4.7	1.3	1.2	1.9	1.1	2.5
H (φ12.5)	3.9	6.0	6.9	2.8	1.3	1.9	2.2	2.5
J (φ16)	5.8	6.8	6.2	3.6	1.3	1.9	1.7	2.8
K (φ18)	5.8	7.3	6.2	3.6	1.8	1.9	1.7	2.8

Unit : mm

When size "A" is wide, back fillet can be made, decreasing fitting strength.

< Size code : E, F, G, H, J, K >



\* Take mounting conditions, solderability and fitting strength into consideration when selecting parts for your company's design.

\* The vibration-proof capacitors of size φ6.3 has support terminals extending from the bottom side to the lead edge. Then, make sure to find appropriate soldering conditions to form fillet on the support terminals if required for appearance inspection.

## Characteristics list

Endurance : 125 °C 1000 h ( $\phi 8 \times 10.2 \leq$  : 2000 h)

Rated voltage (V.DC)	Cap. ( $\pm 20\%$ ) ( $\mu\text{F}$ )	Case size (mm)		Size* code	Specification			Part No.	Reflow	Min. Packaging Qty	
		$\phi\text{D}$	L		Ripple current (100 kHz) (+125 °C) (mA r.m.s.)	ESR (100 kHz) (+20 °C) ( $\Omega$ )	$\tan \delta$ (120 Hz) (+20 °C)			Taping (pcs)	
10	100	8	6.2	E	100	1.00	0.30	EEETG1A101P	(2)	1000	
	220	8	6.2	(E)	100	1.00	0.30	EEETG1A221UP	(2)	1000	
		8	10.2	F	197	0.50	0.30	EEETG1A221P	(2)	500	
	330	8	10.2	(F)	197	0.50	0.30	EEETG1A331UP	(2)	500	
		10	10.2	G	270	0.30	0.30	EEETG1A331P	(2)	500	
	470	10	10.2	(G)	270	0.30	0.30	EEETG1A471UP	(2)	500	
	1000	12.5	13.5	H13	800	0.12	0.30	EEVTG1A102Q	(3)	200	
	1500	12.5	13.5	(H13)	800	0.12	0.30	EEVTG1A152UQ	(3)	200	
	2200	16	16.5	J16	1100	0.08	0.32	EEVTG1A222M	(3)	125	
	3300	16	16.5	(J16)	1100	0.08	0.34	EEVTG1A332UM	(3)	125	
18		16.5	K16	1300	0.075	0.34	EEVTG1A332M	(3)	125		
4700	18	16.5	K16	1300	0.075	0.36	EEVTG1A472M	(3)	125		
16	100	8	10.2	F	197	0.50	0.23	EEETG1C101P	(2)	500	
	220	8	10.2	(F)	197	0.50	0.23	EEETG1C221UP	(2)	500	
		10	10.2	G	270	0.30	0.23	EEETG1C221P	(2)	500	
	330	10	10.2	(G)	270	0.30	0.23	EEETG1C331UP	(2)	500	
		12.5	13.5	H13	800	0.12	0.23	EEVTG1C331Q	(3)	200	
	470	12.5	13.5	H13	800	0.12	0.23	EEVTG1C471Q	(3)	200	
	680	12.5	13.5	H13	800	0.12	0.23	EEVTG1C681Q	(3)	200	
	1000	12.5	13.5	(H13)	800	0.12	0.23	EEVTG1C102UQ	(3)	200	
		16	16.5	J16	1100	0.08	0.23	EEVTG1C102M	(3)	125	
	2200	16	16.5	(J16)	1100	0.08	0.25	EEVTG1C222UM	(3)	125	
18		16.5	K16	1300	0.075	0.25	EEVTG1C222M	(3)	125		
3300	18	16.5	K16	1300	0.075	0.27	EEVTG1C332M	(3)	125		
25	47	8	6.2	E	100	1.00	0.18	EEETG1E470P	(2)	1000	
	100	8	6.2	(E)	100	1.00	0.18	EEETG1E101UP	(2)	1000	
		8	10.2	F	197	0.50	0.18	EEETG1E101P	(2)	500	
	220	8	10.2	(F)	197	0.50	0.18	EEETG1E221UP	(2)	500	
		10	10.2	G	270	0.30	0.18	EEETG1E221P	(2)	500	
	330	10	10.2	(G)	270	0.30	0.18	EEETG1E331UP	(2)	500	
		12.5	13.5	H13	800	0.12	0.18	EEVTG1E331Q	(3)	200	
	470	12.5	13.5	H13	800	0.12	0.18	EEVTG1E471Q	(3)	200	
	680	12.5	13.5	(H13)	800	0.12	0.18	EEVTG1E681UQ	(3)	200	
		16	16.5	J16	1100	0.08	0.18	EEVTG1E681M	(3)	125	
1000	16	16.5	(J16)	1100	0.08	0.18	EEVTG1E102UM	(3)	125		
	18	16.5	K16	1300	0.075	0.18	EEVTG1E102M	(3)	125		
2200	18	16.5	K16	1300	0.075	0.20	EEVTG1E222M	(3)	125		
35	33	8	6.2	E	100	1.00	0.16	EEETG1V330P	(2)	1000	
	47	8	6.2	(E)	100	1.00	0.16	EEETG1V470UP	(2)	1000	
		8	10.2	F	197	0.50	0.16	EEETG1V470P	(2)	500	
	100	8	10.2	(F)	197	0.50	0.16	EEETG1V101UP	(2)	500	
		10	10.2	G	270	0.30	0.16	EEETG1V101P	(2)	500	
	220	10	10.2	(G)	270	0.30	0.16	EEETG1V221UP	(2)	500	
	330	12.5	13.5	H13	800	0.12	0.16	EEVTG1V331Q	(3)	200	
		12.5	13.5	(H13)	800	0.12	0.16	EEVTG1V471UQ	(3)	200	
	470	16	16.5	J16	1100	0.08	0.16	EEVTG1V471M	(3)	125	
		16	16.5	(J16)	1100	0.08	0.16	EEVTG1V681UM	(3)	125	
680	18	16.5	K16	1300	0.075	0.16	EEVTG1V681M	(3)	125		
	1000	18	16.5	K16	1300	0.075	0.16	EEVTG1V102M	(3)	125	

\* Size code( ) : Miniaturization product

· Please refer to the page of "Reflow Profile" and "The Taping Dimensions".

· When requesting vibration-proof product, please put the last "V" instead to "P", "Q", or "M"

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.

Should a safety concern arise regarding this product, please be sure to contact us immediately.

## Characteristics list

Endurance : 125 °C 1000 h ( $\phi 8 \times 10.2 \leq$  : 2000 h)

Rated voltage (V.DC)	Cap. ( $\pm 20\%$ ) ( $\mu\text{F}$ )	Case size (mm)		Size* code	Specification			Part No.	Reflow	Min. Packaging Qty	
		$\phi\text{D}$	L		Ripple current (100 kHz) (+125 °C) (mA r.m.s.)	ESR (100 kHz) (+20 °C) ( $\Omega$ )	$\tan \delta$ (120 Hz) (+20 °C)			Taping (pcs)	
50	10	8	6.2	E	80	1.60	0.14	EEETG1H100P	(2)	1000	
	22	8	6.2	E	80	1.60	0.14	EEETG1H220P	(2)	1000	
	33	8	6.2	(E)	80	1.60	0.14	EEETG1H330UP	(2)	1000	
		8	10.2	F	133	0.75	0.14	EEETG1H330P	(2)	500	
	47	8	10.2	(F)	133	0.75	0.14	EEETG1H470UP	(2)	500	
		10	10.2	G	221	0.50	0.14	EEETG1H470P	(2)	500	
	100	10	10.2	(G)	221	0.50	0.14	EEETG1H101UP	(2)	500	
	220	12.5	13.5	H13	600	0.23	0.14	EEVTG1H221Q	(3)	200	
	330	12.5	13.5	H13	600	0.23	0.14	EEVTG1H331Q	(3)	200	
	470	16	16.5	J16	900	0.15	0.14	EEVTG1H471M	(3)	125	
680	16	16.5	(J16)	900	0.15	0.14	EEVTG1H681UM	(3)	125		
	18	16.5	K16	950	0.14	0.14	EEVTG1H681M	(3)	125		
1000	18	16.5	K16	950	0.14	0.14	EEVTG1H102M	(3)	125		
63	10	8	6.2	E	55	2.20	0.12	EEETG1J100P	(2)	1000	
	22	8	10.2	F	100	1.00	0.12	EEETG1J220P	(2)	500	
	33	8	10.2	(F)	100	1.00	0.12	EEETG1J330UP	(2)	500	
		10	10.2	G	150	0.80	0.12	EEETG1J330P	(2)	500	
	47	8	10.2	(F)	100	1.00	0.12	EEETG1J470UP	(2)	500	
		10	10.2	G	150	0.80	0.12	EEETG1J470P	(2)	500	
	100	10	10.2	(G)	150	0.80	0.12	EEETG1J101UP	(2)	500	
		12.5	13.5	H13	350	0.26	0.12	EEVTG1J101Q	(3)	200	
	220	12.5	13.5	H13	350	0.26	0.12	EEVTG1J221Q	(3)	200	
	330	16	16.5	J16	500	0.18	0.12	EEVTG1J331M	(3)	125	
470	16	16.5	J16	500	0.18	0.12	EEVTG1J471M	(3)	125		
80	10	8	10.2	F	70	1.30	0.12	EEETG1K100P	(2)	500	
	22	8	10.2	(F)	70	1.30	0.12	EEETG1K220UP	(2)	500	
		10	10.2	G	90	1.00	0.12	EEETG1K220P	(2)	500	
	33	8	10.2	(F)	70	1.30	0.12	EEETG1K330UP	(2)	500	
		10	10.2	G	90	1.00	0.12	EEETG1K330P	(2)	500	
	47	10	10.2	(G)	90	1.00	0.12	EEETG1K470UP	(2)	500	
		12.5	13.5	H13	250	0.42	0.12	EEVTG1K470Q	(3)	200	
	100	12.5	13.5	(H13)	250	0.42	0.12	EEVTG1K101UQ	(3)	200	
		16	16.5	J16	350	0.30	0.12	EEVTG1K101M	(3)	125	
	220	16	16.5	(J16)	350	0.30	0.12	EEVTG1K221UM	(3)	125	
18		16.5	K16	400	0.28	0.12	EEVTG1K221M	(3)	125		
330	16	16.5	(J16)	350	0.30	0.12	EEVTG1K331UM	(3)	125		
	18	16.5	K16	400	0.28	0.12	EEVTG1K331M	(3)	125		
470	18	16.5	K16	400	0.28	0.12	EEVTG1K471M	(3)	125		
100	10	8	10.2	F	70	1.30	0.10	EEETG2A100P	(2)	500	
	22	8	10.2	(F)	70	1.30	0.10	EEETG2A220UP	(2)	500	
		10	10.2	G	90	1.00	0.10	EEETG2A220P	(2)	500	
	33	10	10.2	G	90	1.00	0.10	EEETG2A330P	(2)	500	
	47	12.5	13.5	H13	250	0.42	0.10	EEVTG2A470Q	(3)	200	
	100	16	16.5	J16	350	0.30	0.10	EEVTG2A101M	(3)	125	
	220	18	16.5	K16	400	0.28	0.10	EEVTG2A221M	(3)	125	
330	18	16.5	K16	400	0.28	0.10	EEVTG2A331M	(3)	125		

\* Size code( ) : Miniaturization product

· Please refer to the page of "Reflow Profile" and "The Taping Dimensions".

· When requesting vibration-proof product, please put the last "V" instead to "P", "Q", or "M"

## Guidelines and precautions regarding the technical information and use of our products described in this online catalog.

- If you want to use our products described in this online catalog for applications requiring special qualities or reliability, or for applications where the failure or malfunction of the products may directly jeopardize human life or potentially cause personal injury (e.g. aircraft and aerospace equipment, traffic and transportation equipment, combustion equipment, medical equipment, accident prevention, anti-crime equipment, and/or safety equipment), it is necessary to verify whether the specifications of our products fit to such applications. Please ensure that you will ask and check with our inquiry desk as to whether the specifications of our products fit to such applications use before you use our products.
- The quality and performance of our products as described in this online catalog only apply to our products when used in isolation. Therefore, please ensure you evaluate and verify our products under the specific circumstances in which our products are assembled in your own products and in which our products will actually be used.
- If you use our products in equipment that requires a high degree of reliability, regardless of the application, it is recommended that you set up protection circuits and redundancy circuits in order to ensure safety of your equipment.
- The products and product specifications described in this online catalog are subject to change for improvement without prior notice. Therefore, please be sure to request and confirm the latest product specifications which explain the specifications of our products in detail, before you finalize the design of your applications, purchase, or use our products.
- The technical information in this online catalog provides examples of our products' typical operations and application circuits. We do not guarantee the non-infringement of third party's intellectual property rights and we do not grant any license, right, or interest in our intellectual property.
- If any of our products, product specifications and/or technical information in this online catalog is to be exported or provided to non-residents, the laws and regulations of the exporting country, especially with regard to security and export control, shall be observed.

## <Regarding the Certificate of Compliance with the EU RoHS Directive/REACH Regulations>



- The switchover date for compliance with the RoHS Directive/REACH Regulations varies depending on the part number or series of our products.
- When you use the inventory of our products for which it is unclear whether those products are compliant with the RoHS Directive/REACH Regulation, please select "Sales Inquiry" in the website inquiry form and contact us.

**We do not take any responsibility for the use of our products outside the scope of the specifications, descriptions, guidelines and precautions described in this online catalog.**

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## Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

-  [View EEV-TG2A221M on WIN SOURCE](#)
-  [Panasonic Information](#)

## Optimize Your Supply Chain with WIN SOURCE Solutions

-  Global Sourcing Solution
-  Obsolete Management
-  Cost Control Management
-  Shortage Management
-  Alternative Solution
-  Excess Inventory Management