

# Metal Oxide Varistor : TVA Series



## Disc/Block Type Varistor for Lightning Protection

### ■ Features

1. RoHS compliant
2. Halogen-free series are available
3. Body size:  $\Phi 25\text{mm} \sim \Phi 60\text{mm}$
4. Wide operating voltage range
5. Excellent clamping ratio
6. Bidirectional and symmetrical V/I characteristics
7. Large withstanding surge current capability
8. Excellent thermal stable ability
9. Operating temperature range:  $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$   
Storage temperature range :  $-40^{\circ}\text{C} \sim +110^{\circ}\text{C}$
10. Agency recognition: UL/cUL
11. UL 1449 3<sup>rd</sup> for SPD Type 2 application



### ■ Recommended Applications

1. Power distribution
2. Communication power
3. Antenna
4. New energy
5. Lighting
6. Rail traffic system
7. Industrial equipment

### ■ Part Number Code

$\Phi 25\text{mm} \sim \Phi 60\text{mm}$

T	V	A	3	4	6	2	1	K	Q	K	Q	E				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	

Product Type		Size		Varistor Voltage ( $V_{1mA}$ )		Tolerance of $V_{1mA}$		Structure		Optional Suffix	
TVA	THINKING Varistor TVA Series	25	$\Phi 25\text{mm}$	621	$62 \times 10^1 \text{V} = 620\text{V}$	K	$\pm 10\%$	AAAA~ZZZZ		001~999	RoHS compliant
		32	$\Phi 32\text{mm}$	102	$10 \times 10^2 \text{V} = 1000\text{V}$						
		34	$34 \times 34\text{mm}$								
		40	$\Phi 40\text{mm}$								
		60	$\Phi 60\text{mm}$								

# Metal Oxide Varistor : TVA Series

## Disc/Block Type Varistor for Lightning Protection



### Structures and Dimensions

#### TVA 25 Type

(Unit: mm)

GKGE	BKBL
QAHE	QAEE
QBSE	QCDD
QCDE	QCFE

Note 1: T is the thickness of the product.

Note 2: The specifications of thickness are available upon request.

# Metal Oxide Varistor : TVA Series

## Disc/Block Type Varistor for Lightning Protection



### Structures and Dimensions

#### TVA 25 Type

(Unit: mm)

QCGE	QDBD
QDBE	QEPE
QGKE	QHHD
QHRE	

Note 1: T is the thickness of the product.

Note 2: The specifications of thickness are available upon request.

# Metal Oxide Varistor : TVA Series

## Disc/Block Type Varistor for Lightning Protection



### Structures and Dimensions

#### TVA 32 Type

(Unit: mm)

GKGE	BKBL
QAFE	QBOE
QBSE	QCME
QDDD	QDDE

Note 1: T is the thickness of the product.

Note 2: The specifications of thickness are available upon request.

# Metal Oxide Varistor : TVA Series

## Disc/Block Type Varistor for Lightning Protection



### Structures and Dimensions

#### TVA 32 Type

(Unit: mm)

QDSE	QDWD
QDWE	QFYE
QFZE	QKDE
QKLS	QKVE

Note 1: T is the thickness of the product.

Note 2: The specifications of thickness are available upon request.

# Metal Oxide Varistor : TVA Series

## Disc/Block Type Varistor for Lightning Protection



### Structures and Dimensions

#### TVA 32 Type

(Unit: mm)

QKQE	QKUS
YKYN	

Note 1: T is the thickness of the product.

Note 2: The specifications of thickness are available upon request.

# Metal Oxide Varistor : TVA Series

## Disc/Block Type Varistor for Lightning Protection



### Structures and Dimensions

#### TVA 34 Type

(Unit: mm)

YKYN	QKQE
QKDE	QKQS
QCKE	QDZE
QFQE	QBIE

Note 1: T is the thickness of the product.

Note 2: The specifications of thickness are available upon request.

# Metal Oxide Varistor : TVA Series

## Disc/Block Type Varistor for Lightning Protection



### Structures and Dimensions

#### TVA 34 Type

(Unit: mm)

QCCD	QBYD
QCCE	QBRE
QEHD	QEHE
QEXE	QFSE

Note 1: T is the thickness of the product.

Note 2: The specifications of thickness are available upon request.



# Metal Oxide Varistor : TVA Series

## Disc/Block Type Varistor for Lightning Protection



### Structures and Dimensions

#### TVA 34 Type

(Unit: mm)

QFTE	QHJE
QHCE	QHWD
QBAE	QBAD
QDKE	QHXD

Note 1: T is the thickness of the product.

Note 2: The specifications of thickness are available upon request.

# Metal Oxide Varistor : TVA Series

## Disc/Block Type Varistor for Lightning Protection



### Structures and Dimensions

#### TVA 34 Type

(Unit: mm)

QADE/QADS	QCIE
QKXE	QCLE
QFME	QGCE
QGVE	

Note 1: T is the thickness of the product.

Note 2: The specifications of thickness are available upon request.

# Metal Oxide Varistor : TVA Series

## Disc/Block Type Varistor for Lightning Protection



### Structures and Dimensions

#### TVA 34 Type

(Unit: mm)

QDIE	QFIE
QGUE	QGLE
QFJE	QKUS
BKBL	

Note 1: T is the thickness of the product.

Note 2: The specifications of thickness are available upon request.

# Metal Oxide Varistor : TVA Series

## Disc/Block Type Varistor for Lightning Protection



### Structures and Dimensions

TVA 34-T Type (T is the parallel structure of two discs)

(Unit: mm)

TKTS	TKTS
TATS	THSE
TDXD	TBYE
TDXE	THCE

Note 1: T is the thickness of the product.

Note 2: The specifications of thickness are available upon request.

# Metal Oxide Varistor : TVA Series

## Disc/Block Type Varistor for Lightning Protection



### Structures and Dimensions

TVA 34-T Type (T is the parallel structure of two discs)

(Unit: mm)

THED	TBAE
TBAD	TCLE
TFME	TGCE
TDPE	TGYE

Note 1: T is the thickness of the product.

Note 2: The specifications of thickness are available upon request.

# Metal Oxide Varistor : TVA Series

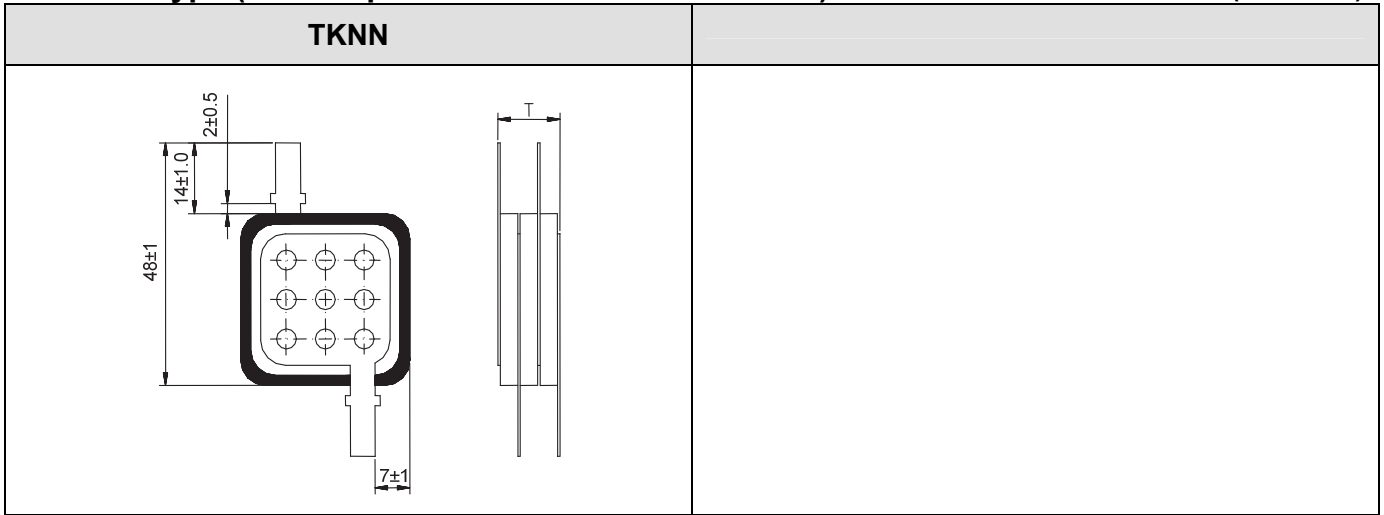
## Disc/Block Type Varistor for Lightning Protection



### Structures and Dimensions

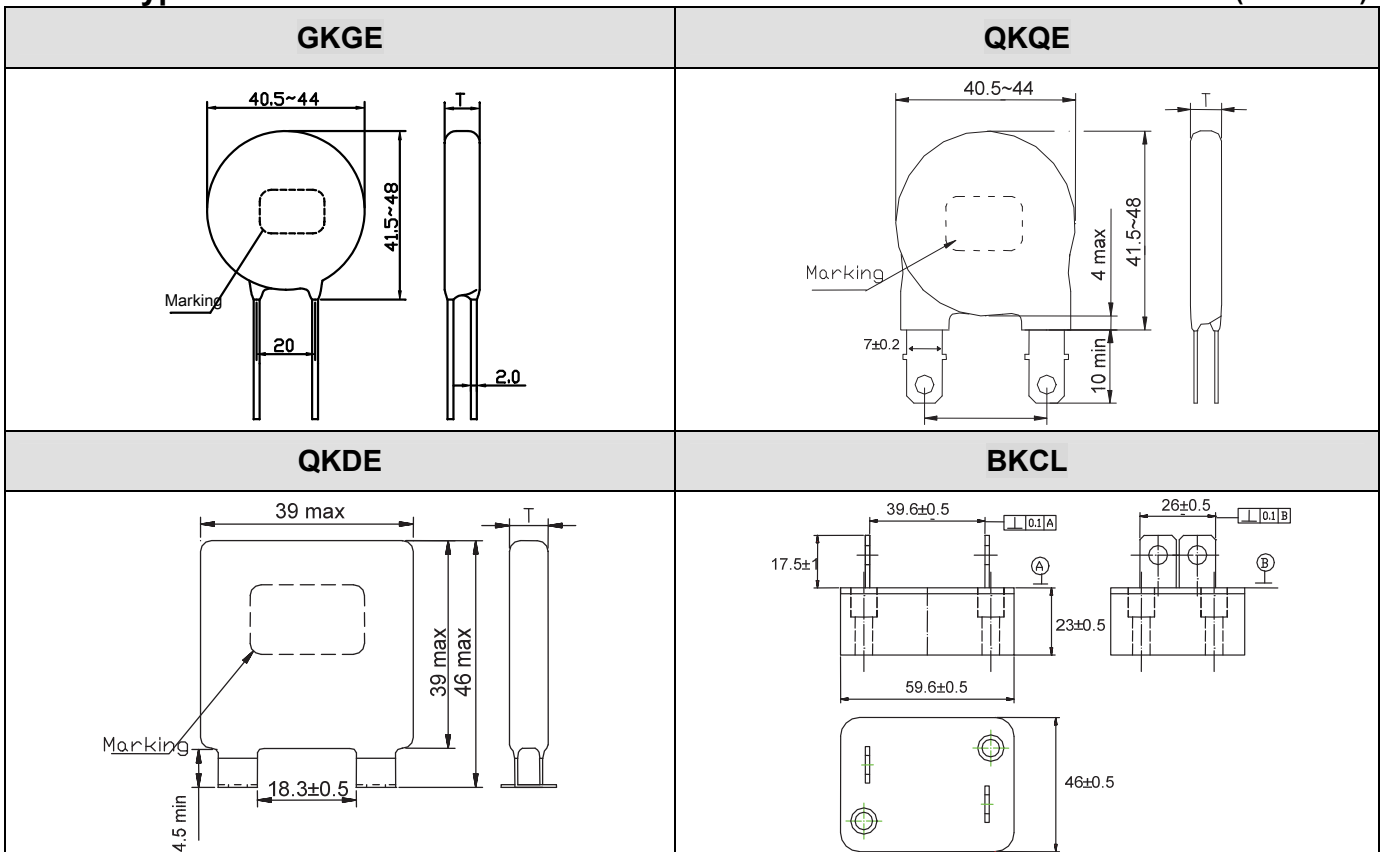
#### TVA 34-T Type (T is the parallel structure of two discs)

(Unit: mm)



#### TVA 40 Type

(Unit: mm)



Note 1: T is the thickness of the product.

Note 2: The specifications of thickness are available upon request.

# Metal Oxide Varistor : TVA Series

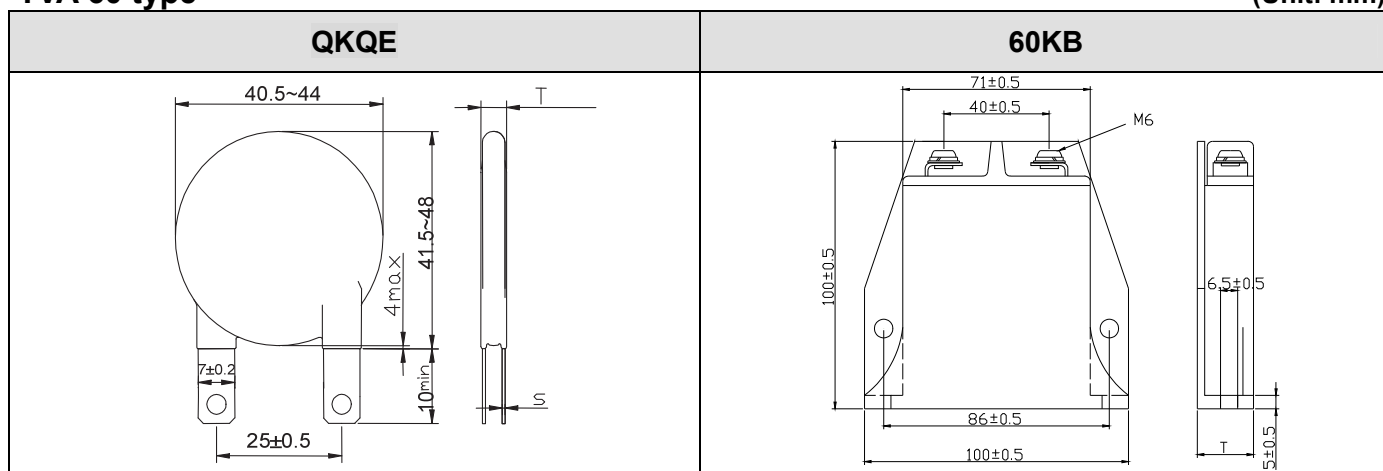
## Disc/Block Type Varistor for Lightning Protection



### Structures and Dimensions

#### TVA 60 type

(Unit: mm)



Note 1: T is the thickness of the product.

Note 2: The specifications of thickness are available upon request.

# Metal Oxide Varistor : TVA Series



## Disc/Block Type Varistor for Lightning Protection

### ■ Electrical Characteristics 25mm Series

Part No.	Varistor Voltage (@ 1mA DC)	Max. Continuous Voltage		Max. Clamping Voltage (8/20μs)		Max. Surge Current <sup>1</sup> (8/20μs)	Surge Operating Duty Test <sup>2</sup> (8/20μs)			Max. Energy (2ms)	Rated Power	Reference Capacitance @1KHz	Safety Approvals	
	V <sub>1mA</sub> (V)	V <sub>AC(rms)</sub> (V)	V <sub>DC</sub> (V)	V <sub>P</sub> (V)	I <sub>P</sub> (A)	I <sub>max</sub> (KA)	I <sub>max</sub> (KA)	I <sub>n</sub> (KA)	W <sub>max</sub> (J)	P (W)	C <sub>p</sub> (pF)	UL 1449 3 <sup>rd</sup> &cUL	UL 1414 & cUL	
TVA25201K□□□□	200(180~220)	130	170	340	150	25	20	10	128	1.0	2200	√	√	
TVA25221K□□□□	220(198~242)	140	180	365	150	25	20	10	135	1.0	2000	√	√	
TVA25241K□□□□	240(216~264)	150	200	395	150	25	20	10	146	1.0	1900	√	√	
TVA25271K□□□□	270(243~297)	175	225	455	150	25	20	10	170	1.0	1600	√	√	
TVA25361K□□□□	360(324~396)	230	300	595	150	25	20	10	190	1.0	1300	√	√	
TVA25391K□□□□	390(351~429)	250	320	650	150	25	20	10	210	1.0	1100	√	√	
TVA25431K□□□□	430(387~473)	275	350	710	150	25	20	10	220	1.0	1000	√	√	
TVA25471K□□□□	470(423~517)	300	385	775	150	25	20	10	225	1.0	950	√	√	
TVA25511K□□□□	510(459~561)	320	415	845	150	25	20	10	230	1.0	900	√	√	
TVA25561K□□□□	560(504~616)	350	450	930	150	25	20	10	235	1.0	800	√	√	
TVA25621K□□□□	620(558~682)	385	505	1025	150	25	20	10	240	1.0	700	√	√	
TVA25681K□□□□	680(612~748)	420	560	1120	150	25	20	10	250	1.0	650	√	√	
TVA25751K□□□□	750(675~825)	460	615	1240	150	25	20	10	275	1.0	600	√	√	
TVA25781K□□□□	780(702~858)	485	640	1290	150	25	20	10	290	1.0	550	√	√	
TVA25821K□□□□	820(738~902)	510	670	1355	150	25	20	10	300	1.0	520	√	√	
TVA25911K□□□□	910(819~1001)	550	745	1500	150	25	20	10	340	1.0	500	√	√	
TVA25951K□□□□	950(855~1045)	575	765	1570	150	25	20	10	355	1.0	450	√	√	
TVA25102K□□□□	1000(900~1100)	625	825	1650	150	25	20	10	375	1.0	430	√	√	
TVA25112K□□□□	1100(990~1210)	680	895	1815	150	25	20	10	390	1.0	400	√	√	
TVA25122K□□□□	1200(1080~1320)	750	980	2000	150	25	20	10	420	1.0	370	√	√	

Note: □□□□ is structure code and please refers to the dimensions.

1) For "GKGE structure: Max. Surge Current (8/20μs) test condition is 15KA\*1 time.

2) Surge Operating Duty Test is the specification refers to IEC61643-1, class II .

3) UL 1449 3rd / cUL File No. E314979 , UL 1414 & cUL File No. E186499.



# Metal Oxide Varistor : TVA Series

## Disc/Block Type Varistor for Lightning Protection



### 32mm Series

Part No.	Varistor Voltage (@ 1mA DC)	Max. Continuous Voltage		Max. Clamping Voltage (8/20μs)		Max. Surge Current <sup>1</sup> (8/20μs)	Surge Operating Duty Test <sup>2</sup> (8/20μs)		Max. Energy (2ms)	Rated Power	Reference Capacitance @1KHz	Safety Approvals	
	V <sub>1mA</sub> (V)	V <sub>AC(rms)</sub> (V)	V <sub>DC</sub> (V)	V <sub>P</sub> (V)	I <sub>P</sub> (A)	I <sub>max</sub> (KA)	I <sub>max</sub> (KA)	I <sub>n</sub> (KA)	W <sub>max</sub> (J)	P (W)	C <sub>p</sub> (pF)	UL 1449 3 <sup>rd</sup> & cUL	UL 1414 & cUL
TVA32201K□□□□	200(180~220)	130	170	340	200	30	30	15	210	1.2	3900	√	√
TVA32221K□□□□	220(198~242)	140	180	365	200	30	30	15	225	1.2	3500	√	√
TVA32241K□□□□	240(216~264)	150	200	395	200	30	30	15	240	1.2	3300	√	√
TVA32271K□□□□	270(243~297)	175	225	455	200	30	30	15	250	1.2	2800	√	√
TVA32361K□□□□	360(324~396)	230	300	595	200	30	30	15	300	1.2	2200	√	√
TVA32391K□□□□	390(351~429)	250	320	650	200	30	30	15	330	1.2	2000	√	√
TVA32431K□□□□	430(387~473)	275	350	710	200	30	30	15	360	1.2	1800	√	√
TVA32471K□□□□	470(423~517)	300	385	775	200	30	30	15	405	1.2	1700	√	√
TVA32511K□□□□	510(459~561)	320	415	845	200	30	30	15	430	1.2	1600	√	√
TVA32561K□□□□	560(504~616)	350	450	930	200	30	30	15	470	1.2	1400	√	√
TVA32621K□□□□	620(558~682)	385	505	1025	200	30	30	15	550	1.2	1250	√	√
TVA32681K□□□□	680(612~748)	420	560	1120	200	30	30	15	600	1.2	1150	√	√
TVA32751K□□□□	750(675~825)	460	615	1240	200	30	30	15	660	1.2	1100	√	√
TVA32781K□□□□	780(702~858)	485	640	1290	200	30	30	15	680	1.2	1050	√	√
TVA32821K□□□□	820(738~902)	510	670	1355	200	30	30	15	550	1.2	950	√	√
TVA32911K□□□□	910(819~1001)	550	745	1500	200	30	30	15	620	1.2	900	√	√
TVA32951K□□□□	950(855~1045)	575	765	1570	200	30	30	15	660	1.2	850	√	√
TVA32102K□□□□	1000(900~1100)	625	825	1650	200	30	30	15	690	1.2	800	√	√
TVA32112K□□□□	1100(990~1210)	680	895	1815	200	30	30	15	760	1.2	750	√	√
TVA32122K□□□□	1200(1080~1320)	750	980	2000	200	30	30	15	800	1.2	650	√	√
TVA32182K□□□□	1800(1620~1980)	1000	1465	2970	200	25	25	12.5	1200	1.2	450	√	√

Note: □□□□ is structure code and please refers to the dimensions.

1) For "GKGE" structure: Max. Surge Current (8/20μs) test condition is 25KA\*1time.

2) Surge Operating Duty Test is the specification refers to IEC61643-1, class II.

3) UL 1449 3rd / cUL File No. E314979, UL 1414 & cUL File No. E186499.

# Metal Oxide Varistor : TVA Series

## Disc/Block Type Varistor for Lightning Protection



### 34\*34mm Series

Part No.	Varistor Voltage (@ 1mA DC)	Max. Continuous Voltage		Max. Clamping Voltage (8/20μs)		Max. Surge Current (8/20μs)	Surge Operating Duty Test <sup>1</sup> (8/20μs)			Max. Energy (2ms)	Rated Power	Reference Capacitance @1KHz	Safety Approvals		
	V <sub>1mA</sub> (V)	V <sub>AC(rms)</sub> (V)	V <sub>DC</sub> (V)	V <sub>P</sub> (V)	I <sub>P</sub> (A)	I <sub>max</sub> (KA)	I <sub>max</sub> (KA)	I <sub>n</sub> (KA)	W <sub>max</sub> (J)	P (W)	C <sub>p</sub> (pF)	UL 1449 3 <sup>rd</sup> &cUL	UL 1414 &cUL	TUV	
TVA34201K□□□□	200(180~220)	130	170	340	300	50	40	20	310	1.4	5600	√	√	√	
TVA34221K□□□□	220(198~242)	140	180	365	300	50	40	20	340	1.4	5000	√	√	√	
TVA34241K□□□□	240(216~264)	150	200	395	300	50	40	20	360	1.4	4800	√	√	√	
TVA34271K□□□□	270(243~297)	175	225	455	300	50	40	20	400	1.4	4100	√	√	√	
TVA34361K□□□□	360(324~396)	230	300	595	300	50	40	20	460	1.4	3200	√	√	√	
TVA34391K□□□□	390(351~429)	250	320	650	300	50	40	20	490	1.4	2800	√	√	√	
TVA34431K□□□□	430(387~473)	275	350	710	300	50	40	20	550	1.4	2600	√	√	√	
TVA34471K□□□□	470(423~517)	300	385	775	300	50	40	20	595	1.4	2400	√	√	√	
TVA34511K□□□□	510(459~561)	320	415	845	300	50	40	20	640	1.4	2300	√	√	√	
TVA34561K□□□□	560(504~616)	350	450	930	300	50	40	20	710	1.4	2000	√	√	√	
TVA34621K□□□□	620(558~682)	385	505	1025	300	50	40	20	800	1.4	1800	√	√	√	
TVA34681K□□□□	680(612~748)	420	560	1120	300	50	40	20	910	1.4	1700	√	√	√	
TVA34751K□□□□	750(675~825)	460	615	1240	300	50	40	20	1000	1.4	1600	√	√	√	
TVA34781K□□□□	780(702~858)	485	640	1290	300	50	40	20	1030	1.4	1500	√	√	√	
TVA34821K□□□□	820(738~902)	510	670	1355	300	50	40	20	860	1.4	1400	√	√	√	
TVA34911K□□□□	910(819~1001)	550	745	1500	300	50	40	20	960	1.4	1300	√	√	√	
TVA34951K□□□□	950(855~1045)	575	765	1570	300	50	40	20	1000	1.4	1200	√	√	√	
TVA34102K□□□□	1000(900~1100)	625	825	1650	300	50	40	20	1050	1.4	1150	√	√	√	
TVA34112K□□□□	1100(990~1210)	680	895	1815	300	50	40	20	1200	1.4	1050	√	√	√	
TVA34122K□□□□	1200(1080~1320)	750	980	2000	300	50	40	20	1310	1.4	950	√	√	√	
TVA34182K□□□□	1800(1620~1980)	1000	1465	2970	300	40	30	15	1800	1.4	700	√	√	√	

Note: □□□□ is structure code and please refers to the dimensions.

1) Surge Operating Duty Test is the specification refers to IEC61643-1, class II .

2) UL 1449 3rd / cUL File No. E314979 , UL 1414 & cUL File No. E186499 , TUV File No. J 50182629.

# Metal Oxide Varistor : TVA Series

## Disc/Block Type Varistor for Lightning Protection



### 34-T mm Series (T is the parallel structure of two discs)

Part No.	Varistor Voltage (@ 1mA DC)	Max. Continuous Voltage		Max. Clamping Voltage (8/20 $\mu$ s)		Max. Surge Current (8/20 $\mu$ s)	Surge Operating Duty Test <sup>1</sup> (8/20 $\mu$ s)			Max. Energy (2ms)	Rated Power	Reference Capacitance @1KHz	Safety Approvals	
	V <sub>1mA</sub> (V)	V <sub>AC(rms)</sub> (V)	V <sub>DC</sub> (V)	V <sub>P</sub> (V)	I <sub>P</sub> (A)	I <sub>max</sub> (KA)	I <sub>max</sub> (KA)	I <sub>n</sub> (KA)	W <sub>max</sub> (J)	P (W)	C <sub>p</sub> (pF)	UL1449 3 <sup>rd</sup> &cUL	UL 1414 &cUL	
TVA34201KT□□□	200(180~220)	130	170	340	500	80	70	40	410	1.6	14040	√		
TVA34221KT□□□	220(198~242)	140	180	365	500	80	70	40	451	1.6	12760	√		
TVA34241KT□□□	240(216~264)	150	200	395	500	80	70	40	490	1.6	11700	√		
TVA34271KT□□□	270(243~297)	175	225	455	500	80	70	40	550	1.6	10400	√		
TVA34361KT□□□	360(324~396)	230	300	595	500	80	70	40	730	1.6	7800	√		
TVA34391KT□□□	390(351~429)	250	320	650	500	80	70	40	800	1.6	7200	√	√	
TVA34431KT□□□	430(387~473)	275	350	710	500	80	70	40	860	1.6	6600	√	√	
TVA34471KT□□□	470(423~517)	300	385	775	500	80	70	40	950	1.6	6100	√	√	
TVA34511KT□□□	510(459~561)	320	415	845	500	80	70	40	1000	1.6	5800	√	√	
TVA34561KT□□□	560(504~616)	350	450	930	500	80	70	40	1100	1.6	5100	√	√	
TVA34621KT□□□	620(558~682)	385	505	1025	500	80	70	40	1200	1.6	4600	√	√	
TVA34681KT□□□	680(612~748)	420	560	1120	500	80	70	40	1500	1.6	4300	√	√	
TVA34751KT□□□	750(675~825)	460	615	1240	500	80	70	40	1650	1.6	4100	√	√	
TVA34781KT□□□	780(702~858)	485	640	1290	500	80	70	40	1700	1.6	3800	√	√	
TVA34821KT□□□	820(738~902)	510	670	1355	500	80	70	40	1350	1.6	3600	√	√	
TVA34911KT□□□	910(819~1001)	550	745	1500	500	80	70	40	1500	1.6	3300	√	√	
TVA34951KT□□□	950(855~1045)	575	765	1570	500	80	70	40	1560	1.6	3000	√	√	
TVA34102KT□□□	1000(900~1100)	625	825	1650	500	80	70	40	1650	1.6	2900	√	√	
TVA34112KT□□□	1100(990~1210)	680	895	1815	500	80	70	40	1800	1.6	2700	√	√	
TVA34122KT□□□	1200(1080~1320)	750	980	2000	500	80	70	40	2000	1.6	2500	√	√	

Note: □□□□ is structure code and please refers to the dimensions.

1) Surge Operating Duty Test is the specification refers to IEC61643-1, class II.

2) UL 1449 3rd / cUL File No. E314979, UL 1414 & cUL File No. E186499.

# Metal Oxide Varistor : TVA Series

## Disc/Block Type Varistor for Lightning Protection



### 40mm Series

Part No.	Varistor Voltage (@ 1mA DC)	Max. Continuous Voltage		Max. Clamping Voltage (8/20μs)		Max. Surge Current <sup>1</sup> (8/20μs)	Surge Operating Duty Test <sup>2</sup> (8/20μs)			Max. Energy (2ms)	Rated Power	Reference Capacitance @1KHz	Safety Approvals	
	V <sub>1mA</sub> (V)	V <sub>AC(rms)</sub> (V)	V <sub>DC</sub> (V)	V <sub>P</sub> (V)	I <sub>P</sub> (A)	I <sub>max</sub> (KA)	I <sub>max</sub> (KA)	I <sub>n</sub> (KA)	W <sub>max</sub> (J)	P (W)	C <sub>p</sub> (pF)	UL1449 3 <sup>rd</sup> &cUL	UL 1414 &cUL	
TVA40201K□□□□	200(180~220)	130	170	340	300	50	40	20	310	1.4	6000	√	√	
TVA40221K□□□□	220(198~242)	140	180	365	300	50	40	20	340	1.4	5500	√	√	
TVA40241K□□□□	240(216~264)	150	200	395	300	50	40	20	360	1.4	5000	√	√	
TVA40271K□□□□	270(243~297)	175	225	455	300	50	40	20	400	1.4	4500	√	√	
TVA40361K□□□□	360(324~396)	230	300	595	300	50	40	20	460	1.4	3500	√	√	
TVA40391K□□□□	390(351~429)	250	320	650	300	50	40	20	490	1.4	3000	√	√	
TVA40431K□□□□	430(387~473)	275	350	710	300	50	40	20	550	1.4	2800	√	√	
TVA40471K□□□□	470(423~517)	300	385	775	300	50	40	20	595	1.4	2600	√	√	
TVA40511K□□□□	510(459~561)	320	415	845	300	50	40	20	640	1.4	2500	√	√	
TVA40561K□□□□	560(504~616)	350	450	930	300	50	40	20	710	1.4	2200	√	√	
TVA40621K□□□□	620(558~682)	385	505	1025	300	50	40	20	800	1.4	2000	√	√	
TVA40681K□□□□	680(612~748)	420	560	1120	300	50	40	20	910	1.4	1800	√	√	
TVA40751K□□□□	750(675~825)	460	615	1240	300	50	40	20	1000	1.4	1700	√	√	
TVA40781K□□□□	780(702~858)	485	640	1290	300	50	40	20	1030	1.4	1600	√	√	
TVA40821K□□□□	820(738~902)	510	670	1355	300	50	40	20	860	1.4	1500	√	√	
TVA40911K□□□□	910(819~1001)	550	745	1500	300	50	40	20	960	1.4	1400	√	√	
TVA40951K□□□□	950(855~1045)	575	765	1570	300	50	40	20	1000	1.4	1300	√	√	
TVA40102K□□□□	1000(900~1100)	625	825	1650	300	50	40	20	1050	1.4	1200	√	√	
TVA40112K□□□□	1100(990~1210)	680	895	1815	300	50	40	20	1200	1.4	1100	√	√	
TVA40122K□□□□	1200(1080~1320)	750	980	2000	300	50	40	20	1310	1.4	1000	√	√	
TVA40182K□□□□	1800(1620~1980)	1000	1465	2970	300	40	30	15	1800	1.4	750	√	√	

Note: □□□□ is structure code and please refers to the dimensions.

1) For "GKGE" structure: Max. Surge Current (8/20μs) test condition is 40KA\*1time.

2) Surge Operating Duty Test is the specification refers to IEC61643-1, class II.

3) UL 1449 3rd / cUL File No. E314979, UL 1414 & cUL File No. E186499.

# Metal Oxide Varistor : TVA Series

## Disc/Block Type Varistor for Lightning Protection



### 60mm Series

Part No.	Varistor Voltage (@ 1mA DC)	Max. Continuous Voltage		Max. Clamping Voltage (8/20μs)		Max. Surge Current (8/20μs)		Surge Operating Duty Test <sup>1</sup> (8/20μs)		Max. Energy (2ms)	Rated Power	Reference Capacitance @1KHz	Safety Approvals	
	V <sub>1mA</sub> (V)	V <sub>AC(rms)</sub> (V)	V <sub>DC</sub> (V)	V <sub>P</sub> (V)	I <sub>P</sub> (A)	I <sub>max</sub> (KA)	I <sub>max</sub> (KA)	I <sub>n</sub> (KA)	W <sub>max</sub> (J)	P (W)	C <sub>p</sub> (pF)	UL1449 3 <sup>rd</sup> & cUL	UL 1414 &cUL	
TVA60431K□□□□	430(387~473)	275	350	710	500	80	70	35	860	1.6	6600		√	
TVA60471K□□□□	470(423~517)	300	385	775	500	80	70	35	950	1.6	6100		√	
TVA60511K□□□□	510(459~561)	320	415	845	500	80	70	35	1000	1.6	5800		√	
TVA60561K□□□□	560(504~616)	350	450	930	500	80	70	35	1100	1.6	5100		√	
TVA60621K□□□□	620(558~682)	385	505	1025	500	80	70	35	1200	1.6	4600	√	√	
TVA60681K□□□□	680(612~748)	420	560	1120	500	80	70	35	1500	1.6	4300		√	
TVA60751K□□□□	750(675~825)	460	615	1240	500	80	70	35	1650	1.6	4100		√	
TVA60781K□□□□	780(702~858)	485	640	1290	500	80	70	35	1700	1.6	3800		√	
TVA60821K□□□□	820(738~902)	510	670	1355	500	80	70	35	1350	1.6	3600		√	
TVA60911K□□□□	910(819~1001)	550	745	1500	500	80	70	35	1500	1.6	3300		√	
TVA60951K□□□□	950(855~1045)	575	765	1570	500	80	70	35	1560	1.6	3000		√	
TVA60102K□□□□	1000(900~1100)	625	825	1650	500	80	70	35	1650	1.6	2900		√	
TVA60112K□□□□	1100(990~1210)	680	895	1815	500	80	70	35	1800	1.6	2700		√	
TVA60122K□□□□	1200(1080~1320)	750	980	2000	500	80	70	35	2000	1.6	2500		√	
TVA60182K□□□□	1800(1620~1980)	1000	1465	2970	500	70	60	30	3000	1.6	1800		√	

Note: □□□□ is structure code and please refers to the dimensions.

1) Surge Operating Duty Test is the specification refers to IEC61643-1, class II

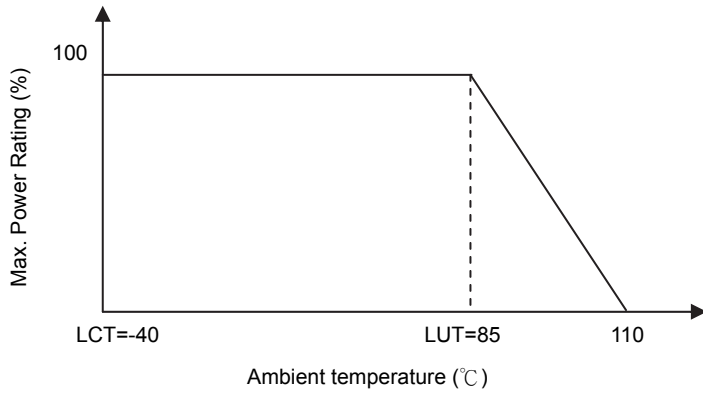
2) UL 1449 3rd / cUL File No. E314979 , UL 1414 & cUL File No. E186499.

# Metal Oxide Varistor : TVA Series

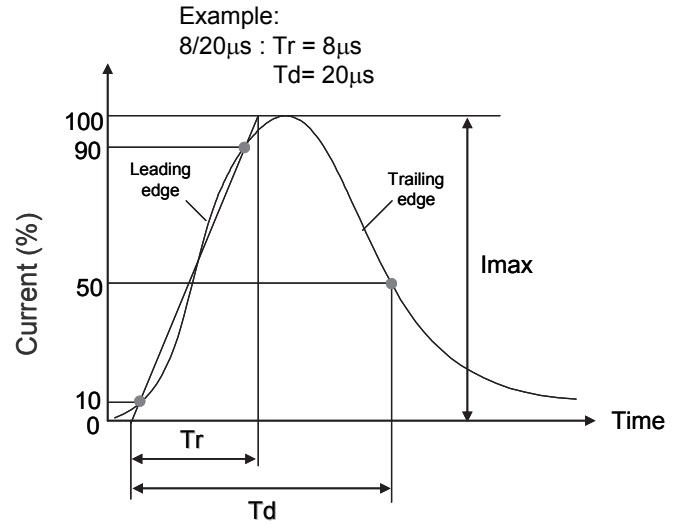
## Disc/Block Type Varistor for Lightning Protection



### Power Derating Curve

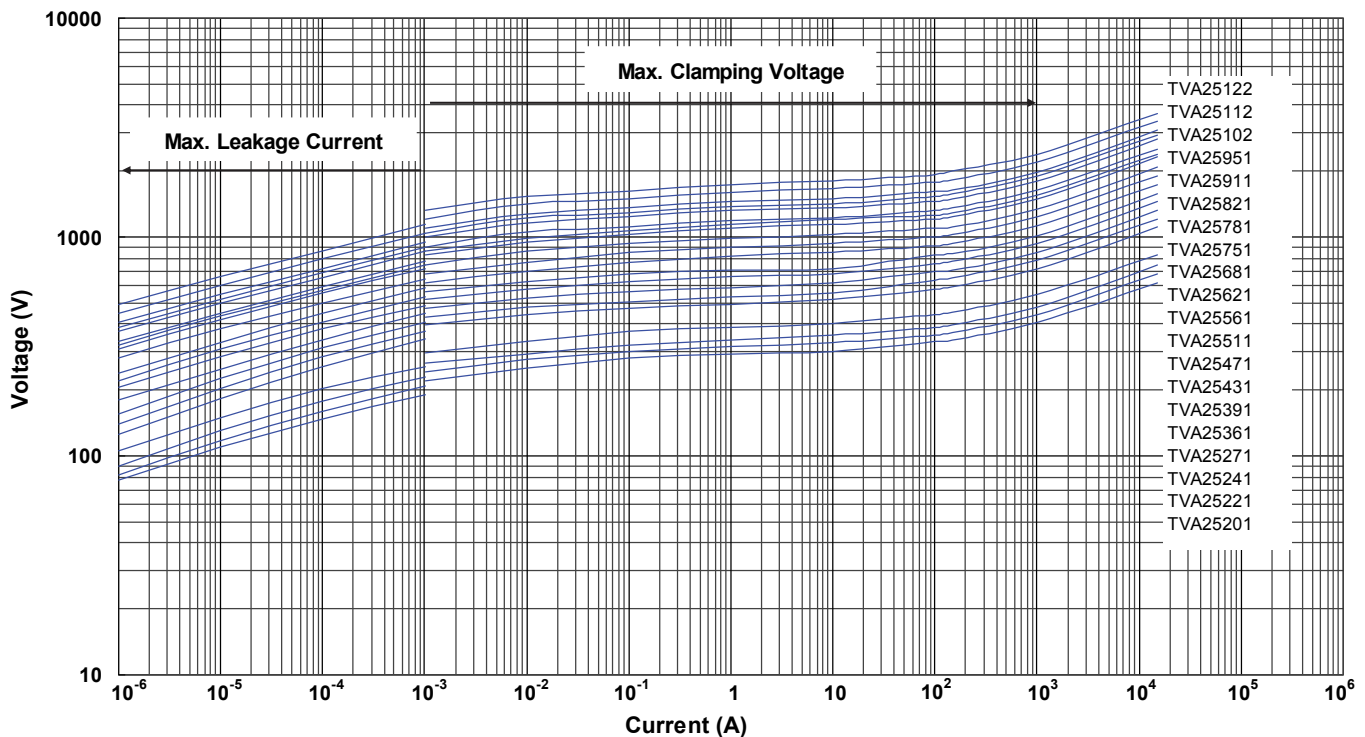


### Surge Current Standard Waveform



### Max. Leakage Current and Max. Clamping Voltage Curves

**Max. Leakage Current and Max. Clamping Voltage Curves (TVA25201 ~ TVT25122)**



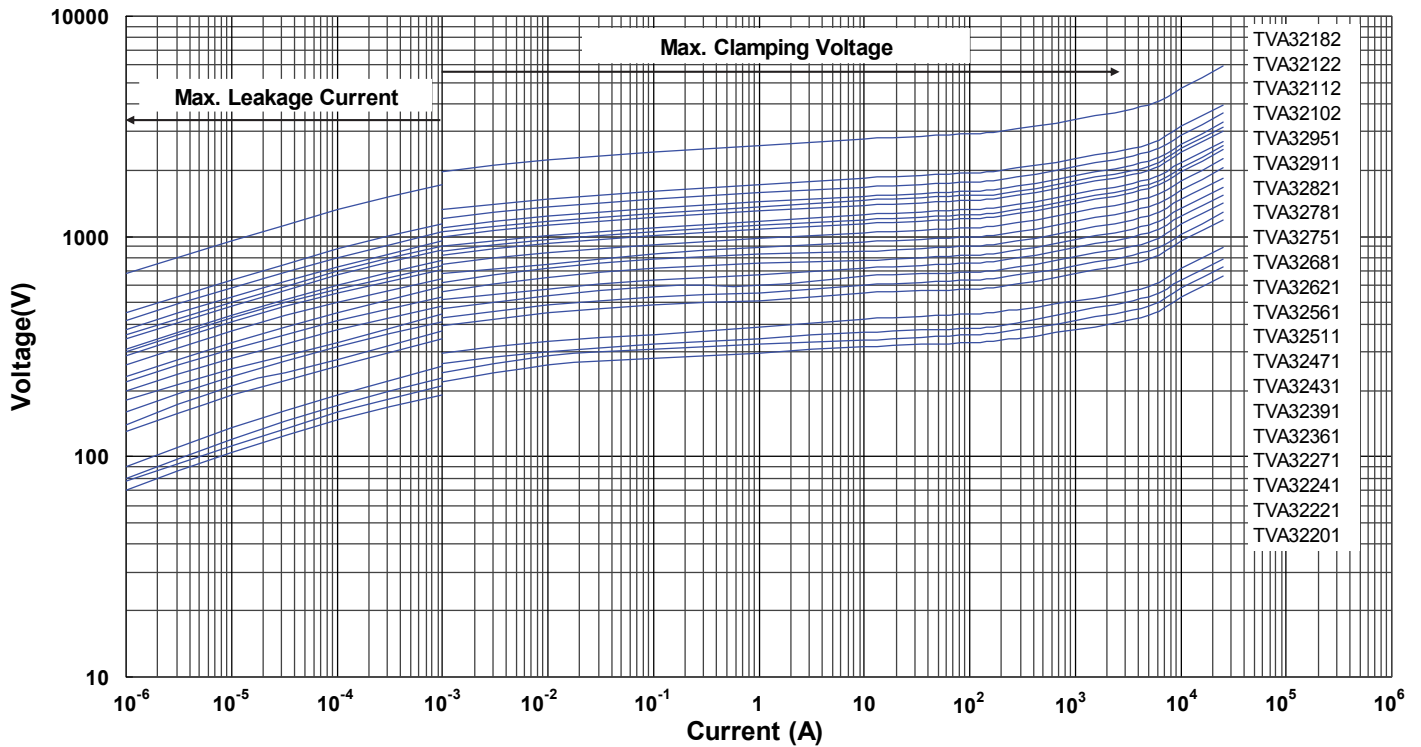
# Metal Oxide Varistor : TVA Series

## Disc/Block Type Varistor for Lightning Protection

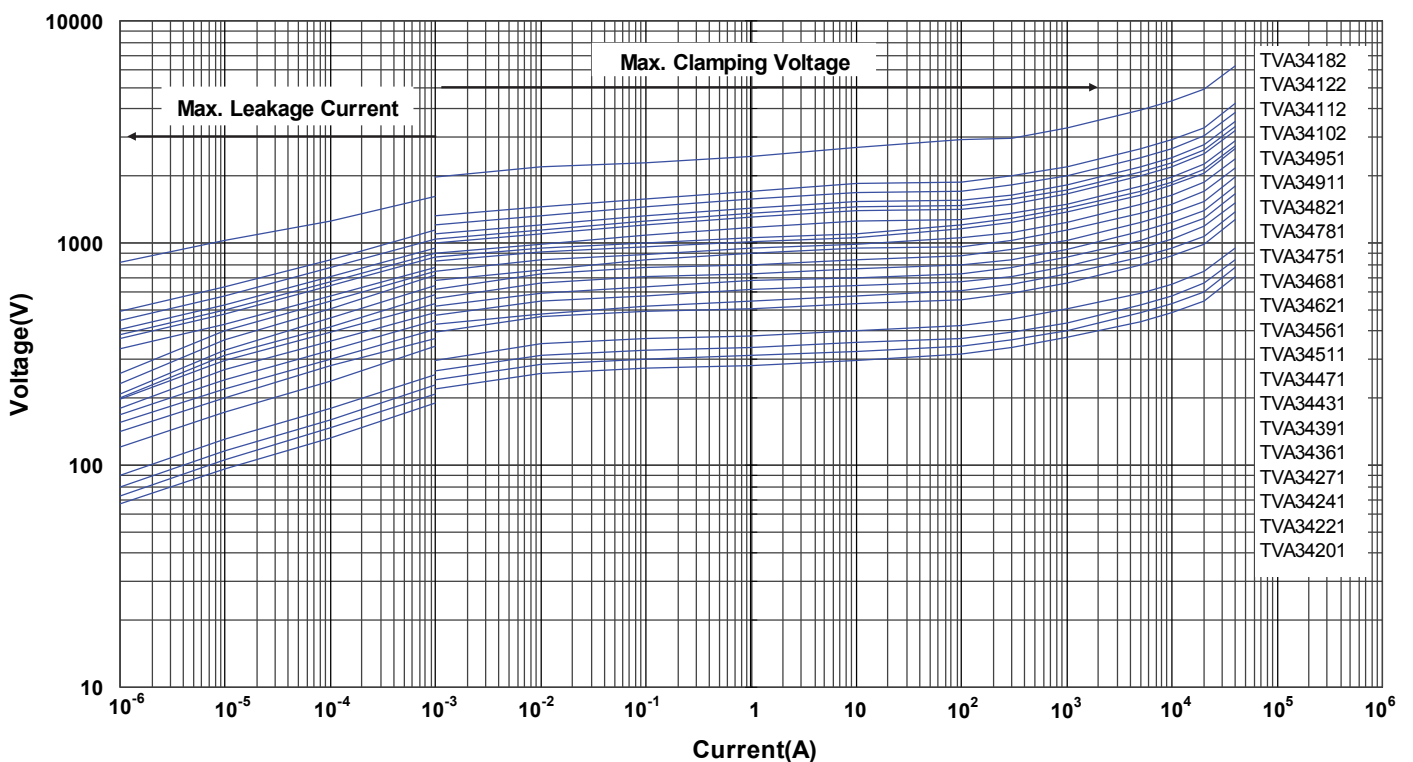


### ■ Max. Leakage Current and Max. Clamping Voltage Curves

**Max. Leakage Current and Max. Clamping Voltage Curves (TVA32201 ~ TVT32182)**



**Max. Leakage Current and Max. Clamping Voltage Curves (TVA34201 ~ TVT34182)**



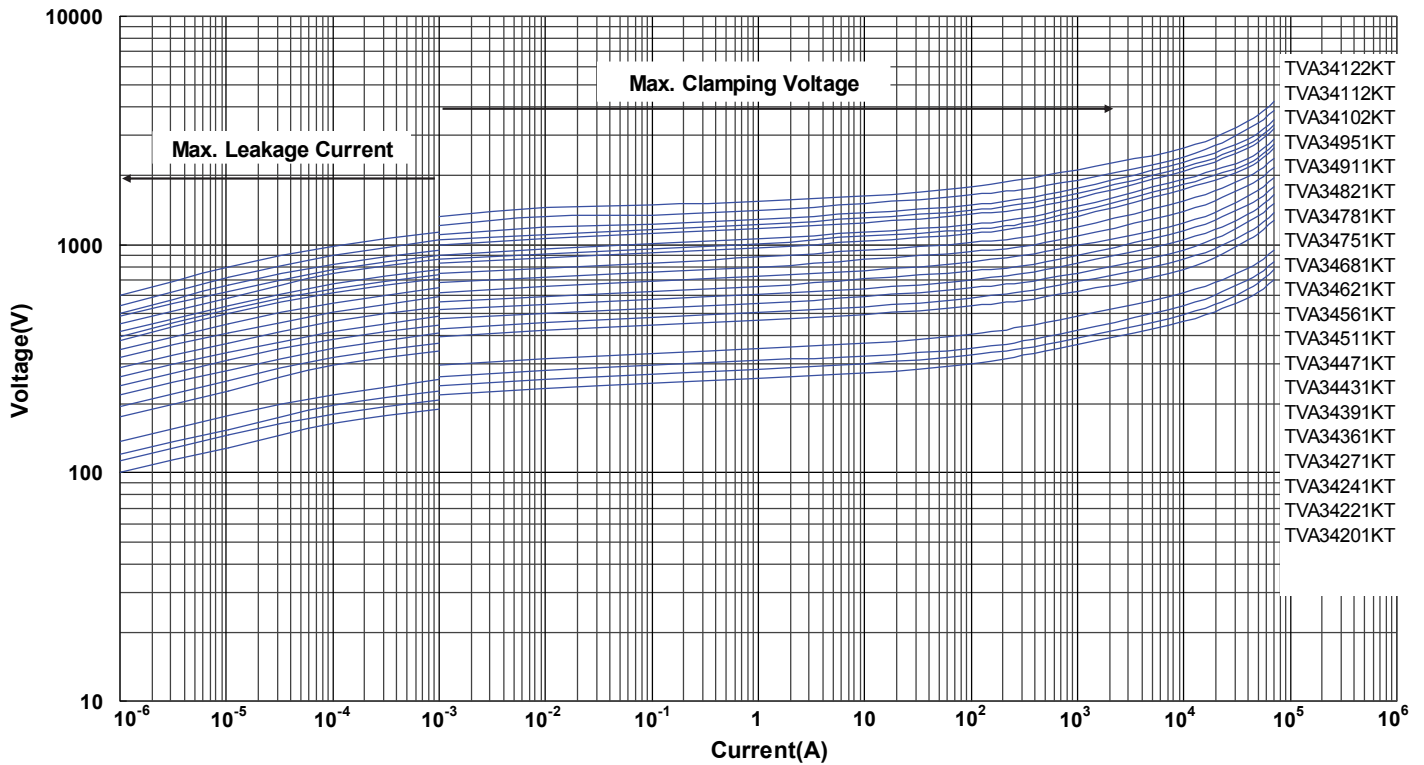
# Metal Oxide Varistor : TVA Series

## Disc/Block Type Varistor for Lightning Protection

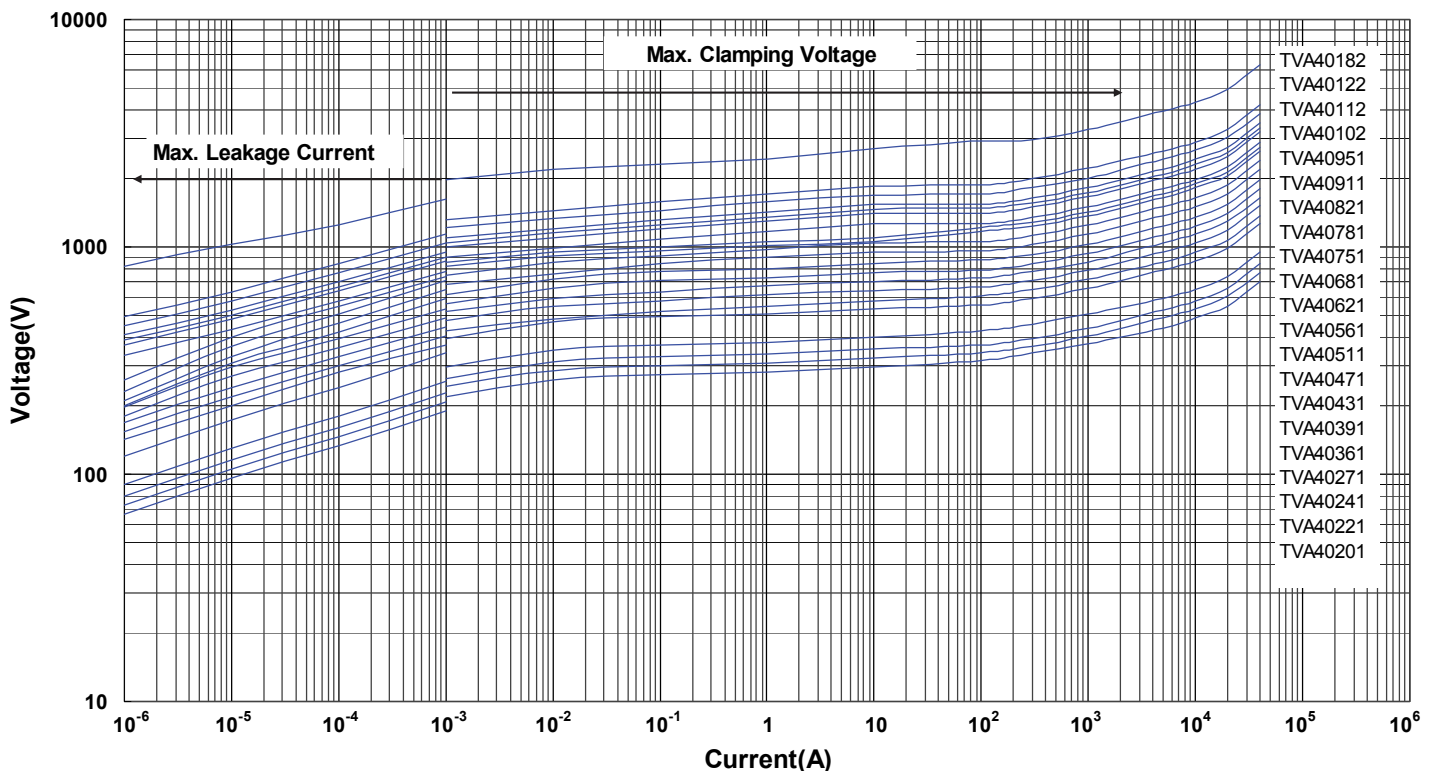


### Max. Leakage Current and Max. Clamping Voltage Curves

**Max. Leakage Current and Max. Clamping Voltage Curves (TVA34201KT ~ TVT34122KT)**



**Max. Leakage Current and Max. Clamping Voltage Curves (TVA40201 ~ TVT40182)**





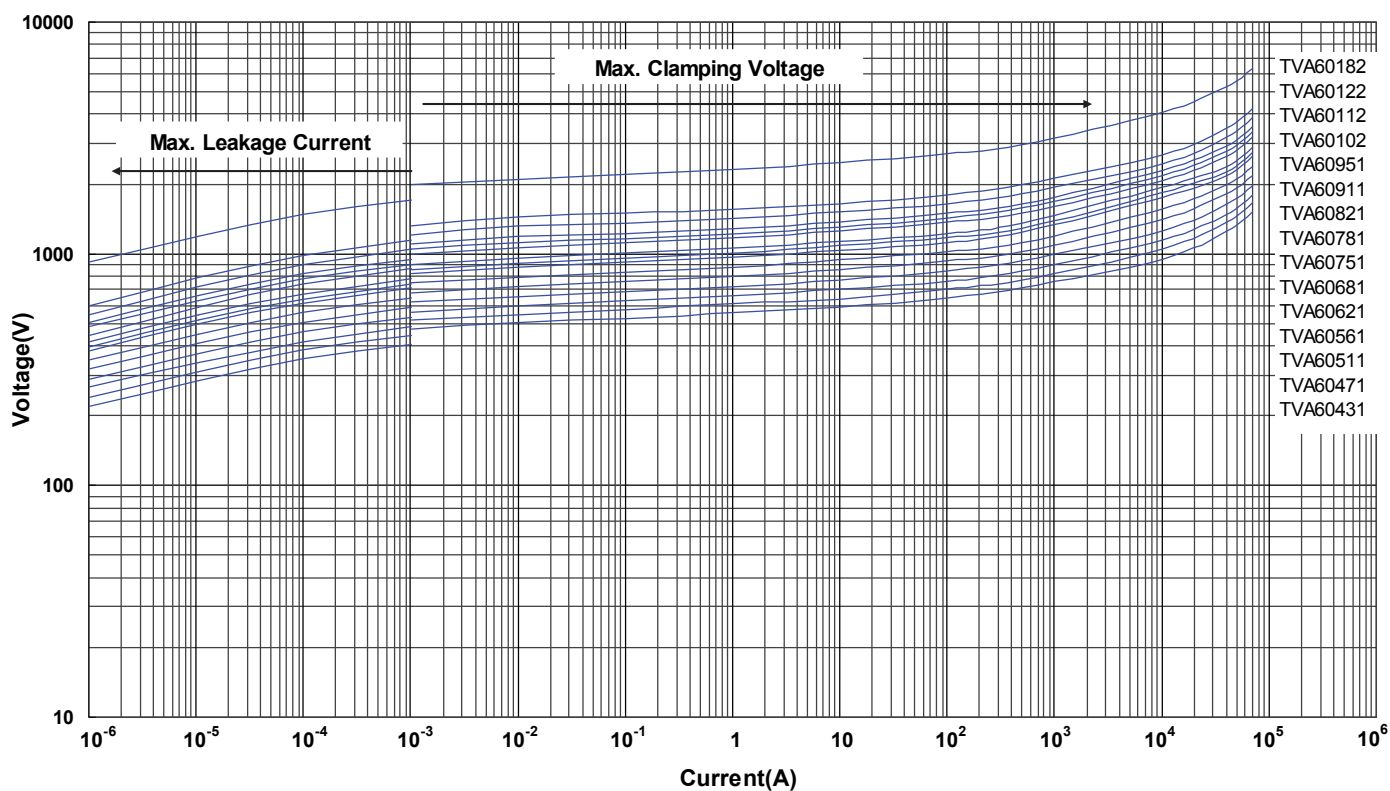
# Metal Oxide Varistor : TVA Series

## Disc/Block Type Varistor for Lightning Protection



### ■ Max. Leakage Current and Max. Clamping Voltage Curves

**Max. Leakage Current and Max. Clamping Voltage Curves (TVA60431 ~ TVT60182)**



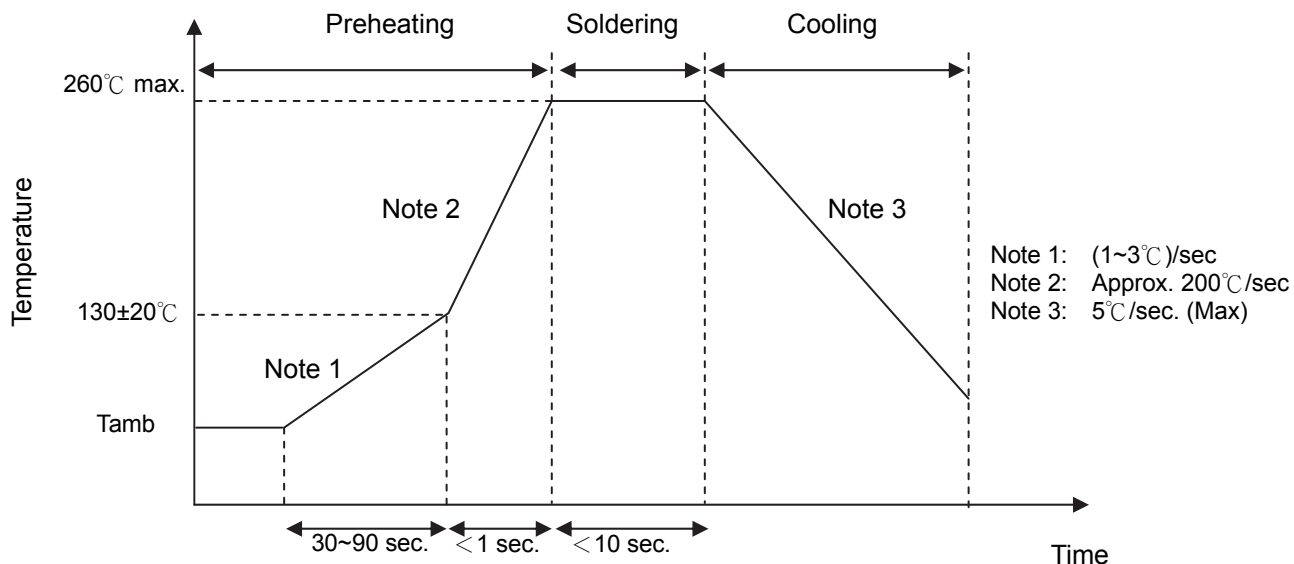
# Metal Oxide Varistor : TVA Series

## Disc/Block Type Varistor for Lightning Protection



### ■ Soldering Recommendation

#### ● Wave Soldering Profile



#### ● Recommended Reworking Conditions with Soldering Iron

Item	Conditions
Temperature of Soldering Iron-tip	$360^\circ\text{C}$ (max.)
Soldering Time	3 sec (max.)
Distance from Varistor	2 mm (min.)

# Metal Oxide Varistor : TVA Series

## Disc/Block Type Varistor for Lightning Protection



### ■ Reliability

Item	Standard	Test conditions / Methods	Specifications															
Tensile Strength of Terminals	IEC 60068-2-21	Gradually apply the specified force and keep the unit fixed for 10±1 sec.  Terminal cross-sectional area (mm <sup>2</sup> )      Terminal diameter (mm)      Force (Kg) <hr/> 0.5<S≤1.2      0.8<d≤1.25      2.0 1.2<S      1.25<d      4.0	$ \Delta V_{1mA} / V_{1mA}  \leq 5\%$ No visible damage															
Vibration (Optional)	IEC 60068-2-6	Frequency range: 10~55Hz Amplitude: 0.75mm or 98m/s <sup>2</sup> Direction: 3 mutually perpendicular directions, 2 hrs each.	$ \Delta V_{1mA} / V_{1mA}  \leq 5\%$ No visible damage															
Solderability	IEC 60068-2-20	245±3°C, 3±0.3 sec (For Lead wire structure)	At least 95% of terminal electrode is covered by new solder															
Resistance to Soldering Heat	IEC 60068-2-20	260±3°C, 10±1 sec	$ \Delta V_{1mA} / V_{1mA}  \leq 5\%$ No visible damage															
High Temperature Storage	IEC 60068-2-2	110±5°C x 1000±24 hrs	$ \Delta V_{1mA} / V_{1mA}  \leq 5\%$ No visible damage															
Damp Heat, Steady State	IEC 60068-2-78	a. 40±2°C, 90 ~ 95 % RH, 1344 hrs b. 40±2°C, 90 ~ 95 % RH, at 10%Vdc, 1344 hrs	$ \Delta V_{1mA} / V_{1mA}  \leq 5\%$ No visible damage Insulation Resistance ≥ 100MΩ															
Rapid Change of Temperature (optional)	IEC 60068-2-14	The conditions shown below shall be repeated 5 cycles <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Step</th> <th>Temperature (°C)</th> <th>Period (minutes)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-40±3</td> <td>30±3</td> </tr> <tr> <td>2</td> <td>Room temperature</td> <td>15±3</td> </tr> <tr> <td>3</td> <td>85±2</td> <td>30±3</td> </tr> <tr> <td>4</td> <td>Room temperature</td> <td>15±3</td> </tr> </tbody> </table>	Step	Temperature (°C)	Period (minutes)	1	-40±3	30±3	2	Room temperature	15±3	3	85±2	30±3	4	Room temperature	15±3	$ \Delta V_{1mA} / V_{1mA}  \leq 5\%$ No visible damage
Step	Temperature (°C)	Period (minutes)																
1	-40±3	30±3																
2	Room temperature	15±3																
3	85±2	30±3																
4	Room temperature	15±3																
High Temp. Load	MIL-STD-202 Method 108	85±2°C, 1000±24 hrs at V <sub>DC</sub> or V <sub>rms</sub> (Max. Continuous Voltage)	$ \Delta V_{1mA} / V_{1mA}  \leq 10\%$ No visible damage															
8/20μs Surge Operating Duty Test	IEC 61643-11	a. Measured limiting voltage @ 0.1In, 0.2In, 0.5In, 1.0In, I <sub>max</sub> b. Operating duty test: In*15 times	$ \Delta V_{1mA} / V_{1mA}  \leq 10\%$ No visible damage															
Climatic Sequence	IEC 61051-1	a. dry heat at 85°C, 16hrs b. damp heat, 1st cycle: 55°C, 95RH, 24hrs (IEC60068-2-30) c. cold, -40°C, 2 hrs d. damp heat, additional 5 cycles, 120 hrs	$ \Delta V_{1mA} / V_{1mA}  \leq 10\%$ No visible damage Insulation Resistance ≥ 100MΩ															
Voltage Proof	IEC 61051-1	Metal balls method, 2500 V <sub>ac</sub> 1 min	No visible damage															

# Metal Oxide Varistor : TVA Series

## Disc/Block Type Varistor for Lightning Protection



### ■ Packaging

Note: Packaging quantity varies with product structure. Please contact THINKING sales rep for detailed information.

#### ● Bulk Packing (For Lead Wire Structure)

Series	Part No.	Quantity (pcs/bag)
TVA25, Lead Structure	TVA25201~561	50
	TVA25621~122	40
TVA32, Lead Structure	TVA32201~561	25
	TVA32621~182	20

#### ● Box Packing (For Plastic Housing Structure)

Structure	Code	Quantity (pcs/box)
Plastic Housing	KB	60
	KC	28

### ■ Warehouse Storage Conditions of Products

- Storage Conditions:
  1. Storage Temperature:  $-10^{\circ}\text{C} \sim +40^{\circ}\text{C}$
  2. Relative Humidity:  $\leq 75\% \text{RH}$
  3. Keep away from corrosive atmosphere and sunlight.
- Period of Storage: 1 year