

 FUZETEC TECHNOLOGY CO., LTD.	NO.	FMOV-AU Series		
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MOV Varistor Device: FMOV-AU Series (Preliminary)

1. Device Ratings and Characteristics

For 12Vdc System

Part Number	Maximum Operating Voltage	Varistor Voltage (@1mA)	Maximum Clamping Voltage @Test Current (@8/20μs)		Peak Current (@8/20μs)	V jump	Maximum Energy (@10/1000μs)
	DC(V)	Vn(Vdc)	Vc(V)	Ip(A)	(A)	5min(V)	Load dump(J)
FMOV07180-AU	14	18±10%	36	2.5	750	20	12
FMOV10180-AU	14	18±10%	36	5.0	1500	20	25
FMOV14180-AU	14	18±10%	36	10	3000	20	50
FMOV20180-AU	14	18±10%	36	20	6000	20	100
FMOV07220-AU	18	22±10%	43	2.5	750	25	12
FMOV10220-AU	18	22±10%	43	5.0	1500	25	25
FMOV14220-AU	18	22±10%	43	10	3000	25	50
FMOV20220-AU	18	22±10%	43	20	6000	25	100
FMOV07270-AU	22	27±10%	53	2.5	750	30	12
FMOV10270-AU	22	27±10%	53	5.0	1500	30	25
FMOV14270-AU	22	27±10%	53	10	3000	30	50
FMOV20270-AU	22	27±10%	53	20	6000	30	100

NOTE : Specification subject to change without notice.

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For 24Vdc System

Part Number	Maximum Operating Voltage	Varistor Voltage (@1mA)	Maximum Clamping Voltage @Test Current (@8/20μs)		Peak Current (@8/20μs)	V jump	Maximum Energy (@10/1000μs)
	DC(V)	Vn(Vdc)	Vc(V)	Ip(A)	(A)	5min(V)	Load dump(J)
FMOV10330-AU	31	33±10%	65	5	1500	37	25
FMOV14330-AU	31	33±10%	65	10	3000	37	50
FMOV20330-AU	31	33±10%	65	20	6000	37	100
FMOV10390-AU	31	39±10%	77	5	1500	42	25
FMOV14390-AU	31	39±10%	77	10	3000	42	50
FMOV20390-AU	31	39±10%	77	20	6000	42	100
FMOV10470-AU	38	47±10%	93	5	1500	50	25
FMOV14470-AU	38	47±10%	93	10	3000	50	50
FMOV20470-AU	38	47±10%	93	20	6000	50	100

For 42Vdc System

Part Number	Maximum Operating Voltage	Varistor Voltage (@1mA)	Maximum Clamping Voltage @Test Current (@8/20μs)		Peak Current (@8/20μs)	V jump	Maximum Energy (@10/1000μs)
	DC(V)	Vn(Vdc)	Vc(V)	Ip(A)	(A)	5min(V)	Load dump(J)
FMOV10680-AU	56	68±10%	135	5	1500	65	25
FMOV14680-AU	56	68±10%	135	10	3000	65	50
FMOV20680-AU	56	68±10%	135	20	6000	65	100

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2. Agency Approvals

Agency	Agency Approvals	Certificate No.
	UL1449 4 th & cUL	In Process
	IEC 61051-1:2007 IEC 61051-2:1991 IEC 61051-2:1991/AMD1:2009 IEC 61051-2-2:1991 IEC 62368-1:2018/G.8.1 IEC 60950-1:2005/AMD1:2009/AMD2:2013, Annex Q	In Process

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3. Reliability

Characteristics	Standard	Test Conditions	Specifications
High Temperature Exposure(Storage)	MIL-STD-202 Method 108	Test Temp : 125°C+3/-0°C Duration: 1000 h Unpowered Measurement at 24 ± 2 hours after test conclusion.	No visible damage $ \Delta V_{1mA}/V_{1mA} \leq \pm 10\%$ $ \Delta V_{clamp}/V_{clamp} \leq \pm 10\%$
Temperature Cycleing	JESD22 Method JA-104	Lower test temp : -40(+0/-10°C) Upper test temp : 125(+15/-0°C) Dwell Time : 30min transfer time : ≤ 1 min Number of cycles : 1000 Measurement at 24 ± 2 hours after test conclusion.	No visible damage $ \Delta V_{1mA}/V_{1mA} \leq \pm 10\%$ $ \Delta V_{clamp}/V_{clamp} \leq \pm 10\%$
Biased Humidity	MIL-STD-202 Method 103	Test Temp : 85°C Rel.humidity of air : 85% Duration : 1000 h Test Power : Bias at 85%(+5%/-0%) of rated Varistor voltage Measurement at 24 ± 2 hours after test conclusion.	No visible damage $ \Delta V_{1mA}/V_{1mA} \leq \pm 10\%$ $ \Delta V_{clamp}/V_{clamp} \leq \pm 10\%$
Operational Life	MIL-STD-202 Method 108	Test Temp : 85°C Duration: 1000 h Test Power : Bias at 85%(+5%/-0%) of rated Varistor voltage Measurement at 24 ± 2 hours after test conclusion.	No visible damage $ \Delta V_{1mA}/V_{1mA} \leq \pm 10\%$ $ \Delta V_{clamp}/V_{clamp} \leq \pm 10\%$
External Visual	MIL-STD-883 Method 2009	Visual Inspection	No visible damage
Physical Dimension	JESD22 Method JA-100	Verify physical dimensions to the applicable device specification.	Within the specified values
Terminal Strength	MIL-STD-202 Method 211	1. Pull test (2.27kg), 2. Wire-lead bend test (227g) Duration of the applied forces : 10 ± 1sec	No visible damage $ \Delta V_{1mA}/V_{1mA} \leq \pm 10\%$ $ \Delta V_{clamp}/V_{clamp} \leq \pm 10\%$
Resistance to Solvents	MIL-STD-202 Method 215	Note: Add Aqueous wash chemical - OKEM Clean or equivalent. Do not use banned solvents.	No visible damage

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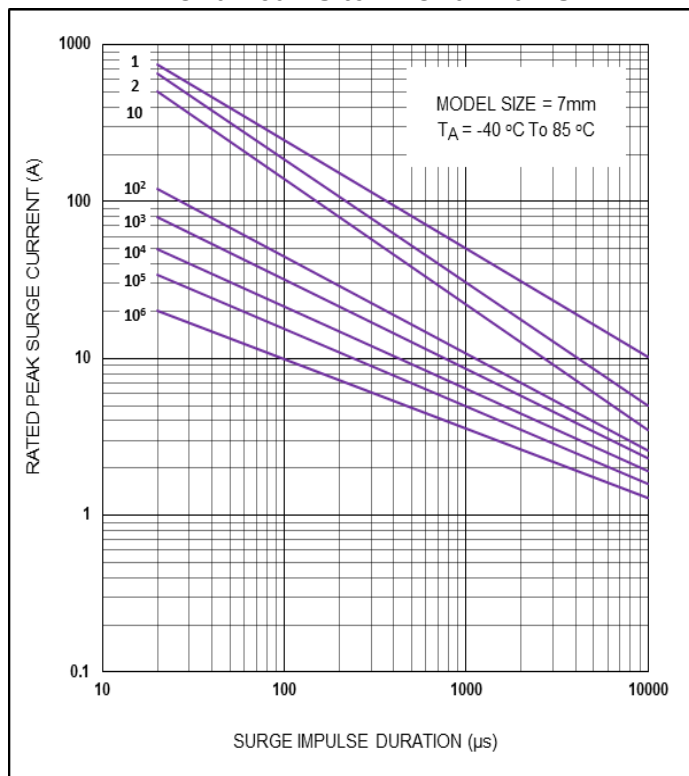
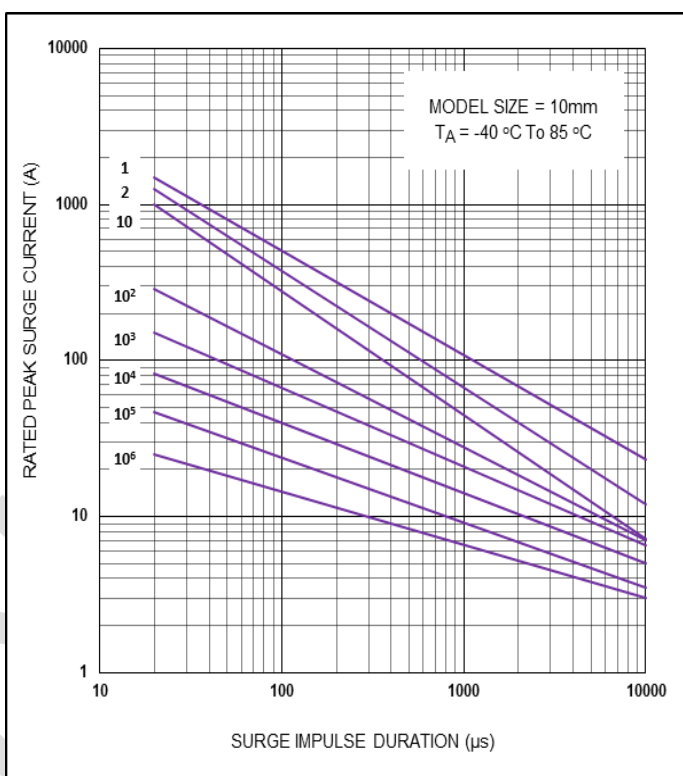
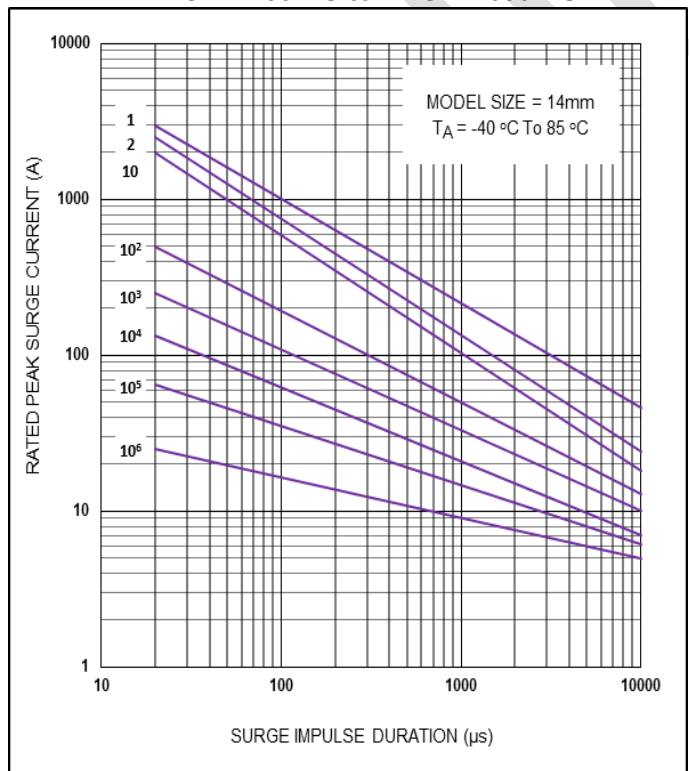
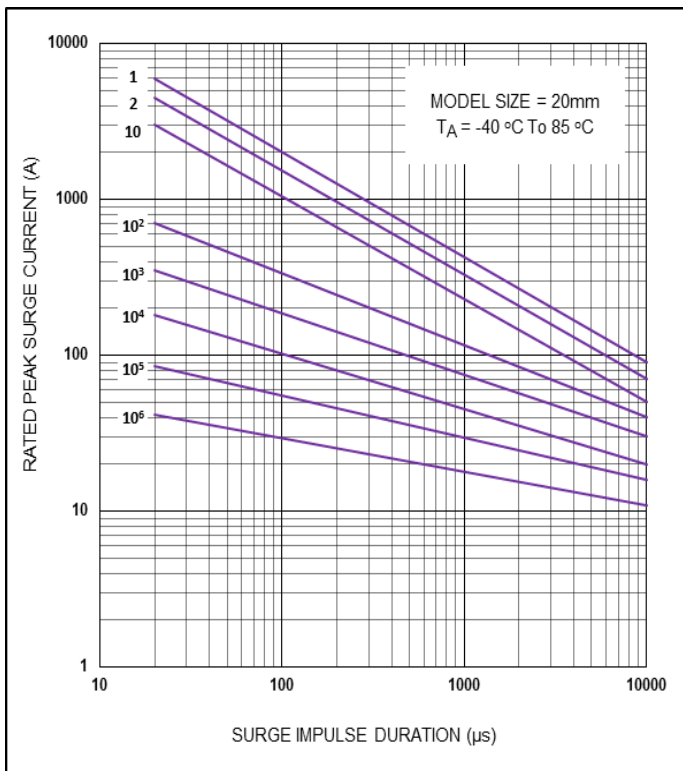
Characteristics	Standard	Test Conditions	Specifications
Mechanical Shock	MIL-STD-202 Method 213	Peak value : 100g's Half sine Waveform Normal duration (D) : 6ms In 3 directions perpendicularly intersecting each other (total 18 times)	No visible damage $ \Delta V_{1mA}/V_{1mA} \leq \pm 10\%$ $ \Delta V_{clamp}/V_{clamp} \leq \pm 10\%$
Solderability	J-STD-002	Steam aging 8hr@93±3°C 235±5°C, 5 +0/-0.5sec	95% of termination wetted
Electrical Characterization	Per Spec.	Varistor voltage and clamping voltage	Meet spec.
Flammability	UL-94	V - 0	UL Certified Coating
Load Dump	ISO-7637-2	Test pulses 5a	No visible damage $ \Delta V_{1mA}/V_{1mA} \leq \pm 15\%$
Vjump	Specification Standard	5 minutes duration , VDC (FMOV**180-Q);Vjump = 20 V (FMOV **220-Q);Vjump = 25 V (FMOV **270-Q);Vjump = 30 V (FMOV **330-Q);Vjump = 36 V (FMOV **390-Q);Vjump = 42 V (FMOV **470-Q);Vjump = 50 V (FMOV **560-Q);Vjump = 59 V (FMOV **680-Q);Vjump = 65 V	No visible damage $ \Delta V_{1mA}/V_{1mA} \leq \pm 15\%$ $ \Delta V_{clamp}/V_{clamp} \leq \pm 10\%$

* (According to customer requirements to meet the test items)



4. Impulse Life Time Rating Curves

FMOV-AU Series

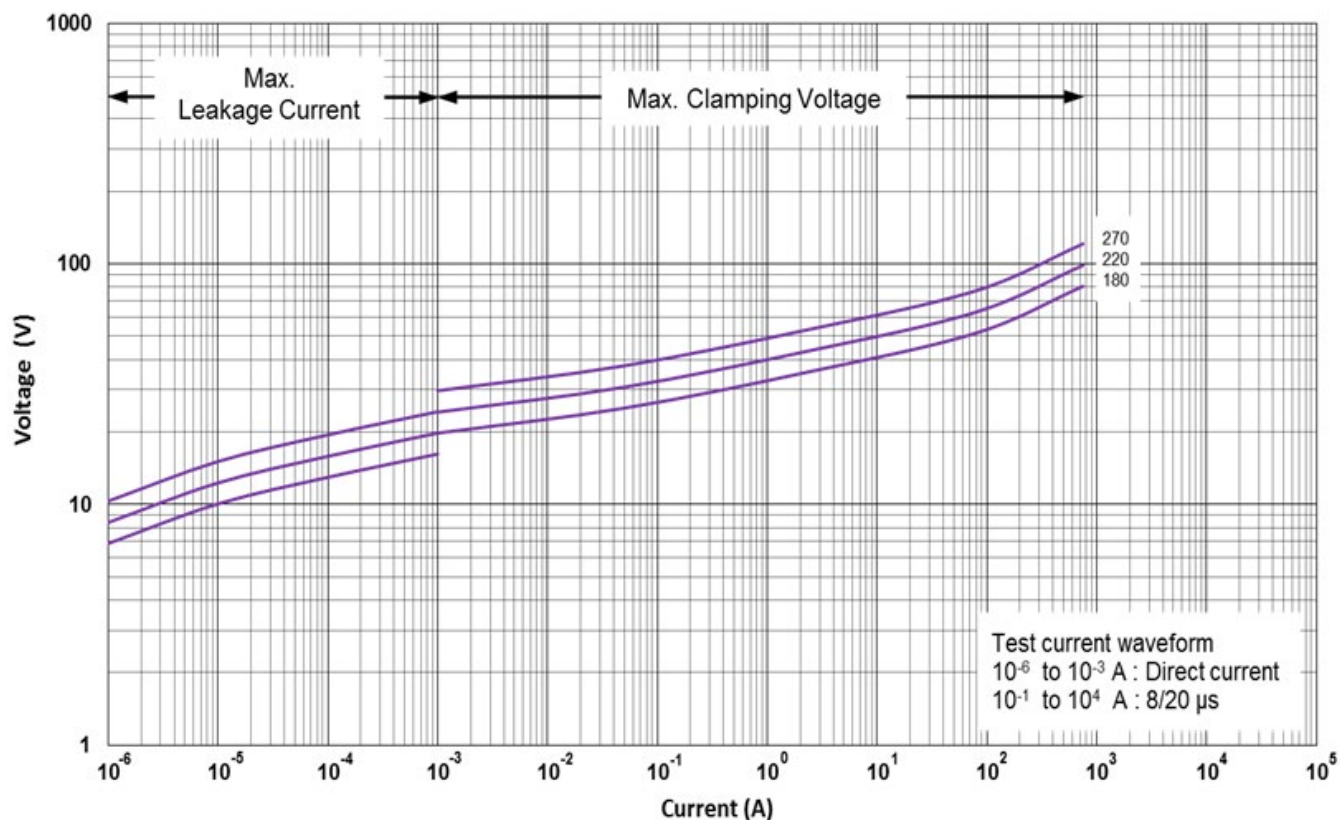
FMOV07180-AU to FMOV07270-AU**FMOV10180-AU to FMOV10680-AU****FMOV14180-AU to FMOV14680-AU****FMOV20180-AU to FMOV20680-AU**

NOTE : Specification subject to change without notice.

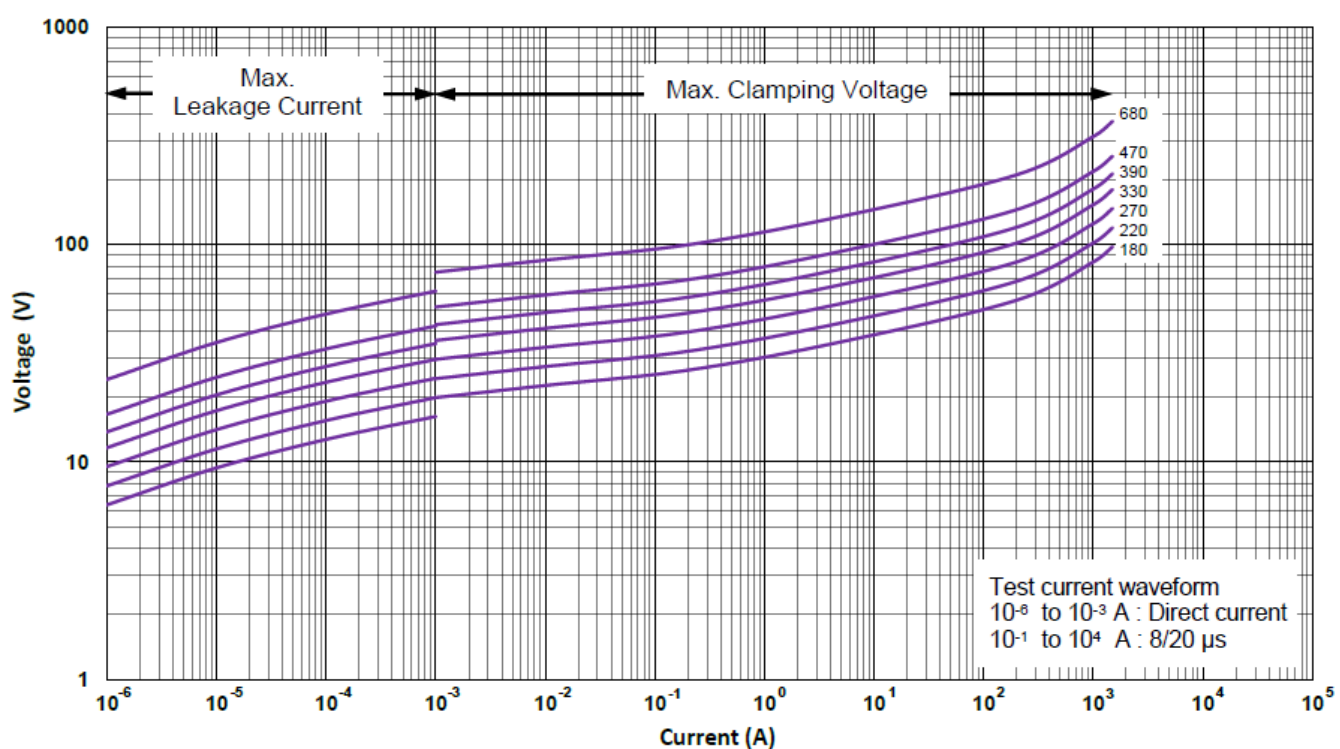


5. V-I Curves

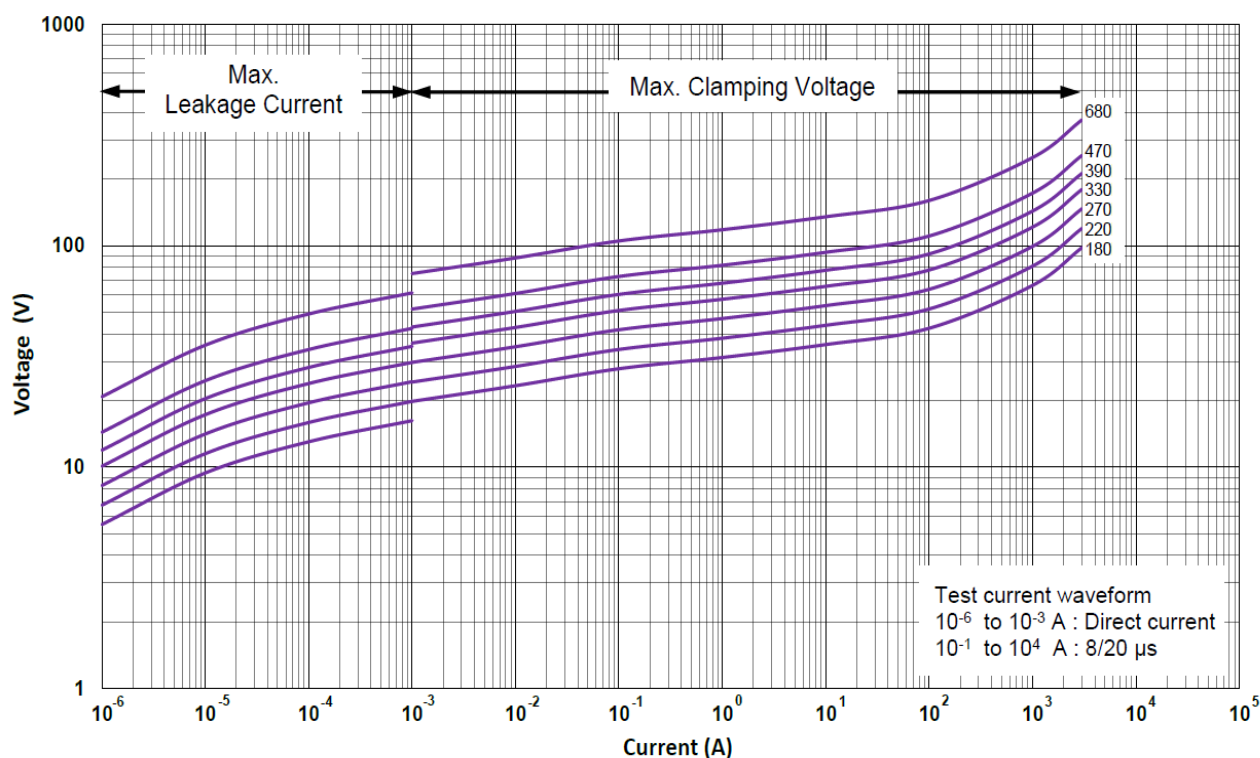
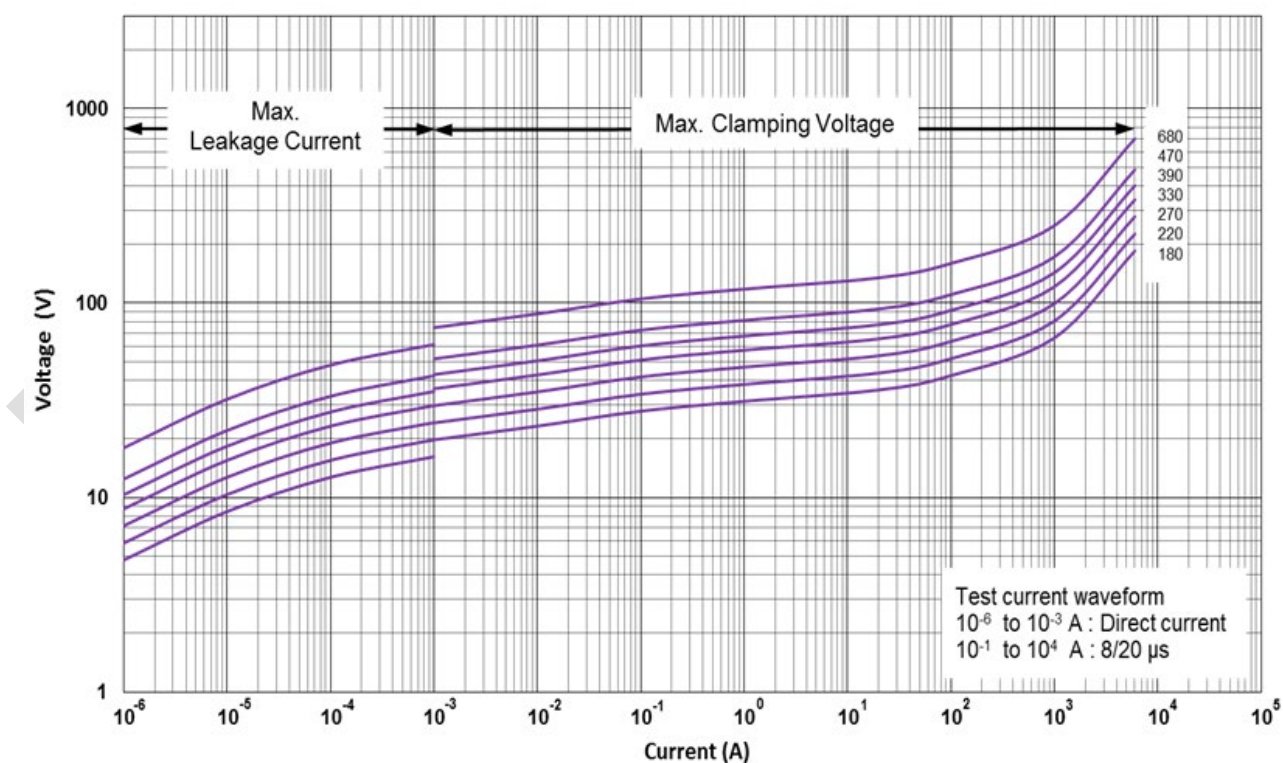
(FMOV07180-AU to FMOV07270-AU)



(FMOV10180-AU to FMOV10680-AU)



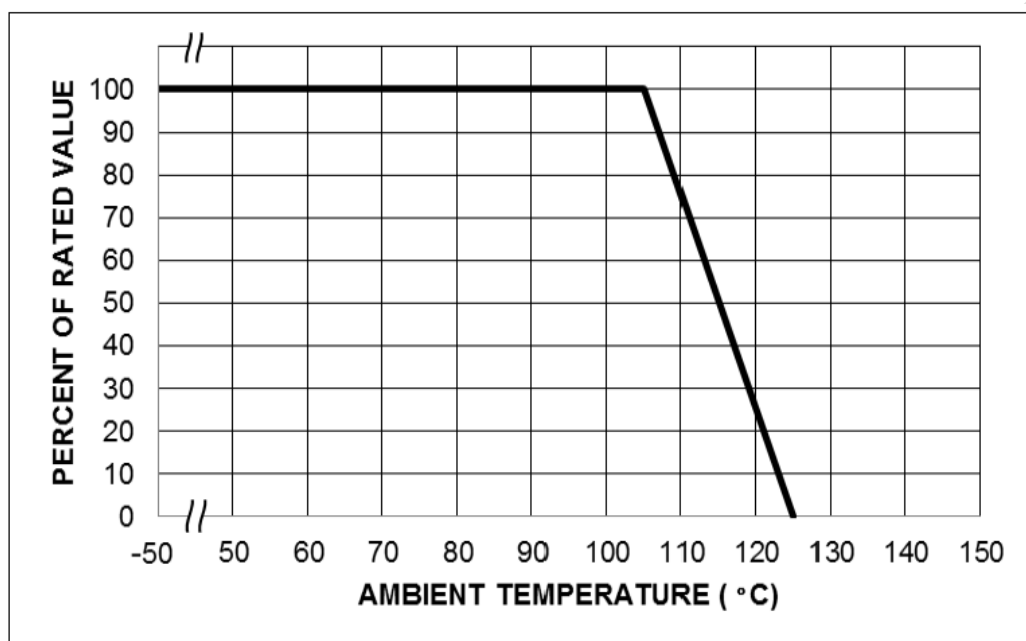
NOTE : Specification subject to change without notice.

**(FMOV14180-AU to FMOV14680-AU)****(FMOV20180-AU to FMOV20680-AU)**

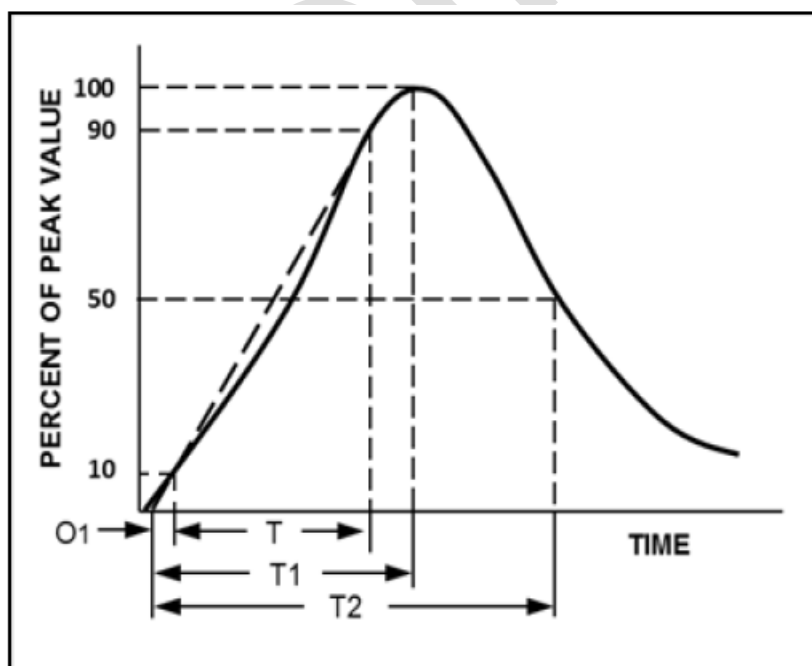


6. Power Derating Curve

Should transients occur in rapid succession, the average power dissipation is the energy (watt-seconds) per pulse times the number of pulses per second. The power so developed must be with the specifications shown on the Device Ratings and Specifications Table for the specific device. The operating values of a MOV need to be derated at high temperatures as shown above. Because varistors only dissipate a relatively small amount of average power they are not suitable for repetitive applications that involve substantial amounts of average power dissipation.



7. Surge Current Standard Waveform



O1 = Virtual Origin of Wave

T = Time from 10% to 90% of Peak

T1 = Rise Time = $1.25 \times T$

T2 = Decay Time

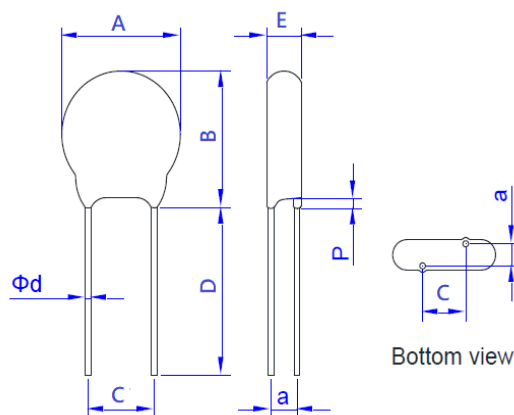
Example - For an 8/20 μ s Current Waveform:

8μ s = T1 = Rise Time

20μ s = T2 = Decay Time

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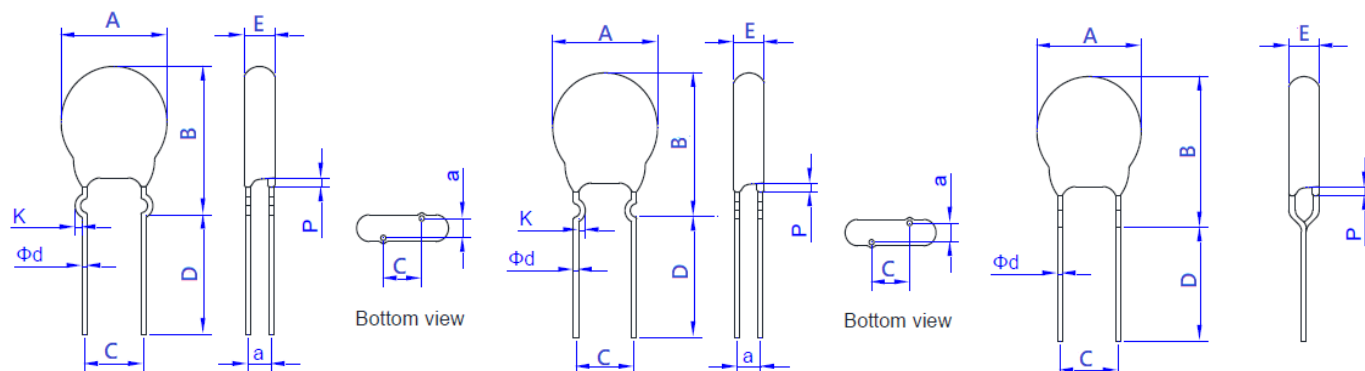
8. Dimension of Component for Standard Product



Straight Lead Type (S)

Part Number	A		B	C	D	E	P	a	Φd
	Min.	Max.	Max.	±1.0	Typ.	Max.	Max.	±1.0	±0.05
FMOV07180-AU	7.5	9.0	12.0	5.0	25.0	3.5	3.0	1.6	0.60
FMOV10180-AU	10.5	14.0	17.0	7.5	25.0	3.8	3.0	1.6	0.80
FMOV14180-AU	13.5	17.5	20.5	7.5	25.0	3.9	3.0	1.6	0.80
FMOV20180-AU	19.5	25.0	28.0	10.0	25.0	4.1	3.0	1.6	1.00
FMOV07220-AU	7.5	9.0	12.0	5.0	25.0	3.6	3.0	1.7	0.60
FMOV10220-AU	10.5	14.0	17.0	7.5	25.0	3.9	3.0	1.7	0.80
FMOV14220-AU	13.5	17.5	20.5	7.5	25.0	4.0	3.0	1.7	0.80
FMOV20220-AU	19.5	25.0	28.0	10.0	25.0	4.3	3.0	1.7	1.00
FMOV07270-AU	7.5	9.0	12.0	5.0	25.0	3.7	3.0	1.8	0.60
FMOV10270-AU	10.5	14.0	17.0	7.5	25.0	4.0	3.0	1.8	0.80
FMOV14270-AU	13.5	17.5	20.5	7.5	25.0	4.1	3.0	1.8	0.80
FMOV20270-AU	19.5	25.0	28.0	10.0	25.0	4.4	3.0	1.8	1.00
FMOV10330-AU	10.5	14.0	17.0	7.5	25.0	3.6	3.0	1.0	0.80
FMOV14330-AU	13.5	17.5	20.5	7.5	25.0	3.6	3.0	1.0	0.80
FMOV20330-AU	19.5	25.0	28.0	10.0	25.0	3.9	3.0	1.0	1.00
FMOV10390-AU	10.5	14.0	17.0	7.5	25.0	4.2	3.0	1.9	0.80
FMOV14390-AU	13.5	17.5	20.5	7.5	25.0	4.3	3.0	1.9	0.80
FMOV20390-AU	19.5	25.0	28.0	10.0	25.0	4.6	3.0	1.9	1.00
FMOV10470-AU	10.5	14.0	17.0	7.5	25.0	4.5	3.0	2.1	0.80
FMOV14470-AU	13.5	17.5	20.5	7.5	25.0	4.6	3.0	2.1	0.80
FMOV20470-AU	19.5	25.0	28.0	10.0	25.0	4.8	3.0	2.1	1.00
FMOV10680-AU	10.5	14.0	17.0	7.5	25.0	5.1	3.0	2.6	0.80
FMOV14680-AU	13.5	17.5	20.5	7.5	25.0	5.2	3.0	2.6	0.80
FMOV20680-AU	19.5	25.0	28.0	10.0	25.0	5.3	3.0	2.6	1.00

Unit: mm


Outside Kink Lead (O)
Inside Kink Lead (K)
In Line Kink Lead (I)

Part Number	A		B	C	D	E	P	K		a	Φd
	Min.	Max.	Max.	±1.0	Typ.	Max.	Max.	Min.	Max.	±1.0	±0.05
FMOV07180-AU	7.5	9.0	15.0	5.0	25.0	3.5	3.0	0.8	1.6	1.6	0.60
FMOV10180-AU	10.5	14.0	19.5	7.5	25.0	3.8	3.0	1.0	1.8	1.6	0.80
FMOV14180-AU	13.5	17.5	22.5	7.5	25.0	3.9	3.0	1.0	1.8	1.6	0.80
FMOV20180-AU	19.5	25.0	30.0	10.0	25.0	4.1	3.0	1.0	1.8	1.6	1.00
FMOV07220-AU	7.5	9.0	15.0	5.0	25.0	3.6	3.0	0.8	1.6	1.7	0.60
FMOV10220-AU	10.5	14.0	19.5	7.5	25.0	3.9	3.0	1.0	1.8	1.7	0.80
FMOV14220-AU	13.5	17.5	22.5	7.5	25.0	4.0	3.0	1.0	1.8	1.7	0.80
FMOV20220-AU	19.5	25.0	30.0	10.0	25.0	4.3	3.0	1.0	1.8	1.7	1.00
FMOV07270-AU	7.5	9.0	15.0	5.0	25.0	3.7	3.0	0.8	1.6	1.8	0.60
FMOV10270-AU	10.5	14.0	19.5	7.5	25.0	4.0	3.0	1.0	1.8	1.8	0.80
FMOV14270-AU	13.5	17.5	22.5	7.5	25.0	4.1	3.0	1.0	1.8	1.8	0.80
FMOV20270-AU	19.5	25.0	30.0	10.0	25.0	4.4	3.0	1.0	1.8	1.8	1.00
FMOV10330-AU	10.5	14.0	19.5	7.5	25.0	3.6	3.0	1.0	1.8	1.6	0.80
FMOV14330-AU	13.5	17.5	22.5	7.5	25.0	3.6	3.0	1.0	1.8	1.6	0.80
FMOV20330-AU	19.5	25.0	30.0	10.0	25.0	3.9	3.0	1.0	1.8	1.6	1.00
FMOV10390-AU	10.5	14.0	19.5	7.5	25.0	4.2	3.0	1.0	1.8	1.9	0.80
FMOV14390-AU	13.5	17.5	22.5	7.5	25.0	4.3	3.0	1.0	1.8	1.9	0.80
FMOV20390-AU	19.5	25.0	30.0	10.0	25.0	4.6	3.0	1.0	1.8	1.9	1.00
FMOV10470-AU	10.5	14.0	19.5	7.5	25.0	4.5	3.0	1.0	1.8	2.1	0.80
FMOV14470-AU	13.5	17.5	22.5	7.5	25.0	4.6	3.0	1.0	1.8	2.1	0.80
FMOV20470-AU	19.5	25.0	30.0	10.0	25.0	4.8	3.0	1.0	1.8	2.1	1.00
FMOV10680-AU	10.5	14.0	19.5	7.5	25.0	5.1	3.0	1.0	1.8	2.6	0.80
FMOV14680-AU	13.5	17.5	22.5	7.5	25.0	5.2	3.0	1.0	1.8	2.6	0.80
FMOV20680-AU	19.5	25.0	30.0	10.0	25.0	5.3	3.0	1.0	1.8	2.6	1.00

Unit: mm



9. Tape and Reel Specifications

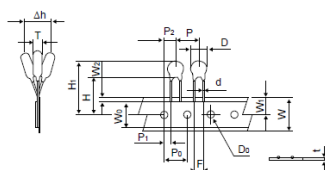


Figure: A

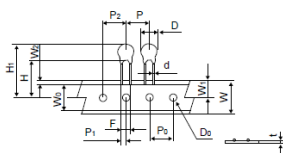


Figure: B

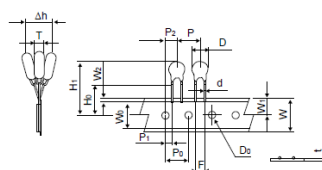


Figure: C

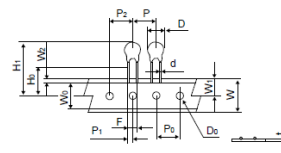


Figure: D

Straight Leads

Inline Kink Leads

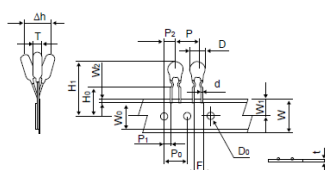


Figure: E

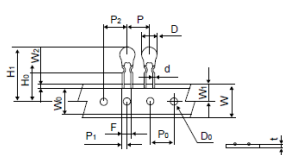


Figure: F

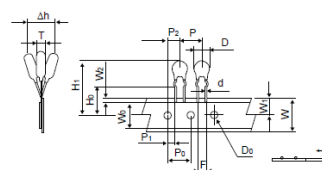


Figure: G

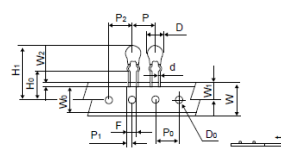


Figure: H

Inside Kink Leads

Outside Kink Leads

Symbol	Parameter	FMOV-AU Series		
		FMOV07-AU	FMOV10-AU	FMOV14-AU
P	Pitch of Component	12.7±1.0	12.7±1.0	25.4±1.0
P0	Feed Hole Pitch	12.7±0.2	12.7±0.2	12.7±0.2
P1	Feed Hole Center Lead	3.85±0.7	3.85±0.7	8.95±0.7
P2	Hole center to Component Center	6.35±0.7	6.35±0.7	12.7±0.7
F	Lead to Lead Distance	7.5±0.8	7.5±0.8	7.5±0.8
Δh	Component Alignment	2.0 Max	2.0max	2.0max
W	Tape Width	18.0+1.0 -0.5	18.0+1.0 -0.5	18.0+1.0 -0.5
W0	Hold Down Tape Width	5.0 Min	5.0 Min.	5.0 Min.
W1	Hole Position	9.0+0.75 -0.50	9.0+0.75 -0.50	9.0+0.75 -0.50
W2	Hold Down Tape Position	3.0 Max	3.0 Max	3.0 Max
H	Height from Tape Center to Component Base	18.0+2.0 -0	18.0+2.0 -0	18.0+2.0 -0
H0	Seating Plane Height	16.0±0.5	16.0±0.5	16.0±0.5
H1	Component Height	36.0 Max	36.0 Max.	40.0 Max.
D0	Feed Hole Diameter	4.0±0.2	4.0±0.2	4.0±0.2
t	Total Tape Thickness	0.7±0.2	0.7±0.2	0.7±0.2
L	Length of Clipped Lead	11.0 Max	11.0 Max	11.0 Max
Figure		ACEG	ACEG	ACEG

Unit: mm

NOTE : Specification subject to change without notice.

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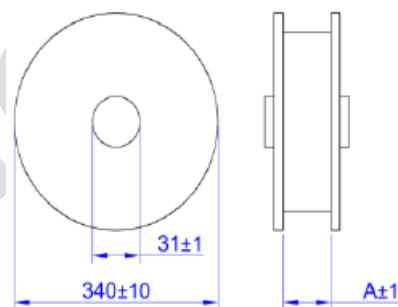
10. Packaging Specifications

Bulk Product Packing

Series	Straight Lead Type Quantity (pcs/bag)	Outside Kink Lead Type Quantity (pcs/bag)	Inside Kink Lead Type Quantity (pcs/bag)	In Line Kink Lead Type Quantity (pcs/bag)
FMOV07-AU Series	1000	1000	1000	1000
FMOV10-AU Series	500	500	500	500
FMOV14-AU Series	500	500	500	500
FMOV20-AU Series	250	250	250	250

Tape & Reel Product Packing

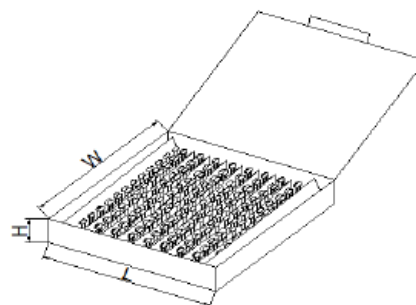
Series	A (mm)	Quantity (pcs/reel)
FMOV07(180~270)-AU-T-	43	2000
FMOV10(180~680)-AU-T-	56	1000
FMOV14(180~680)-AU-T-		800



Box Product Packing

Series	Quantity (pcs/reel)
FMOV07(180~270)-AU-T-	1000
FMOV10(180~680)-AU-T-	1000
FMOV14(180~680)-AU-T-	500

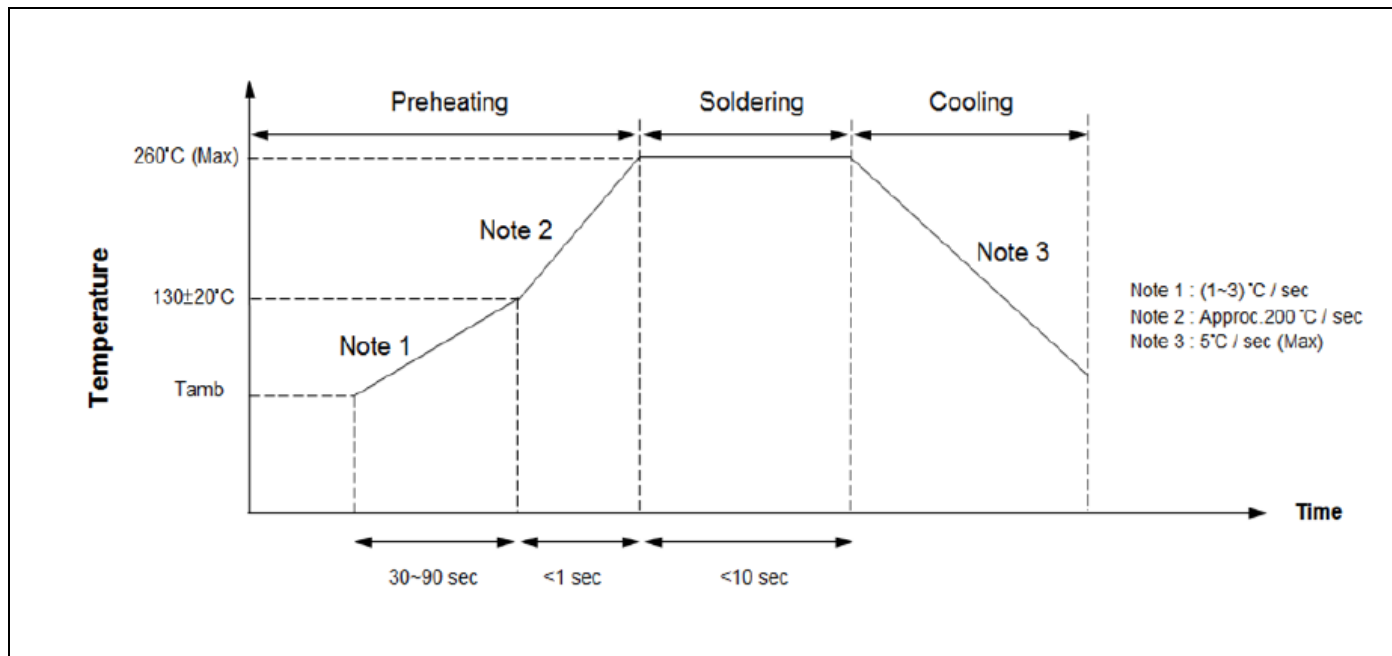
Series	L±5	W±5	H±5
FMOV07-AU Series	340	245	45
FMOV10-AU Series	340	245	50
FMOV14-AU Series	340	245	50



NOTE : Specification subject to change without notice.



11. Solder Recommendation



Recommendation Reworking Conditions with Soldering Iron

Item	Conditions
Temperature of soldering Iron-tip	360°C (Max)
Soldering Time	3 sec (Max)
Distance from Varistor	2mm (Min)

RoHS Compliant Declaration

We hereby declare that the components delivered to your company are compliant with RoHS Directive 2002/95/EC

Storage Conditions of Products

(I) Storage Conditions:

- Storage Temperature: -10°C ~ +40°C
- Relative Humidity: ≤ 75%RH
- Keep away from corrosive atmosphere and sunlight
- Solvent Resistance: MIL-STD-202, Method 215F
- Moisture Sensitivity: Level 1, J-STD-020

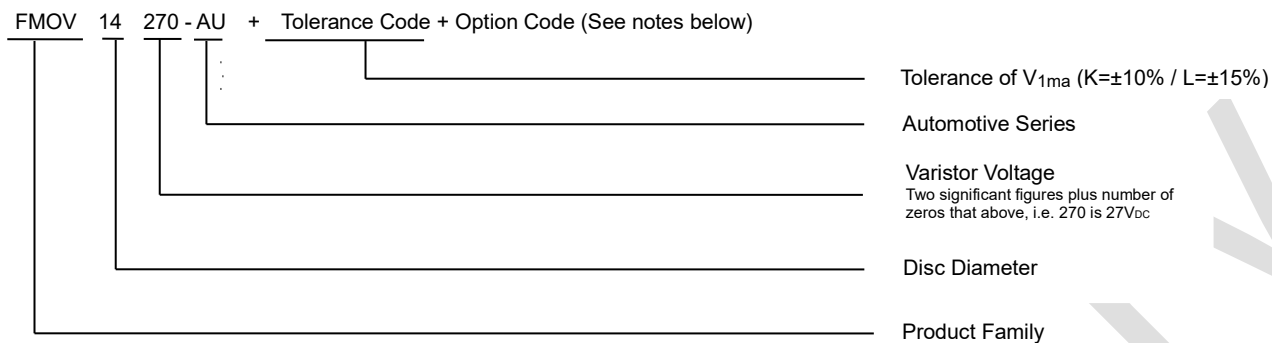
(II) Period of Storage: 1 year

NOTE : Specification subject to change without notice.

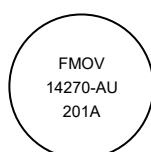


12. Part Numbering and Marking System

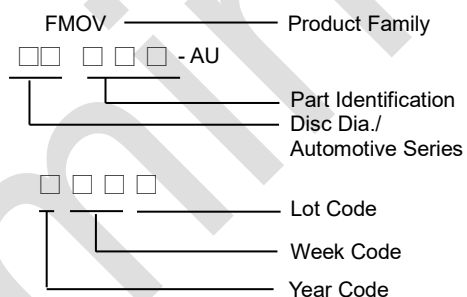
Part Numbering System



Marking System



Example



 FUZETEC TECHNOLOGY CO., LTD.	NO.	FMOV-AU Series		
Product Specification and Approval Sheet	Version	P1	Page	16/16

13. Order Notes:

Main Part Code:

Part No + Tolerance Code + Packaging + Lead Type Designators + Option Code

Ordering examples:

Straight Lead Bulk Pack (Standard)	Straight Lead (Short Cut) Bulk Pack	Straight Lead Tape & Reel Pack	Straight Lead Flat Box Pack
FMOV14270-AUKBS	FMOV14270-AUKBSXXX	FMOV14270-AUKTS	FMOV14270-AUKAS

Outside Kink Lead Bulk Pack	Outside Kink Lead (Short Cut) Bulk Pack	Outside Kink Lead Tape & Reel Pack	Outside Kink Lead Flat Box Pack
FMOV14270-AUKBO	FMOV14270-AUKBOXXX	FMOV14270-AUKTO	FMOV14270-AUKAO

Inside Kink Lead Bulk Pack	Inside Kink Lead (Short Cut) Bulk Pack	Inside Kink Lead Tape & Reel Pack	Inside Kink Lead Flat Box Pack
FMOV14270-AUKBK	FMOV14270-AUKBKXXX	FMOV14270-AUKTK	FMOV14270-AUKAK

In Line Kink Lead Bulk Pack	In Line Kink Lead (Short Cut) Bulk Pack	In Line Kink Lead Tape& Reel Pack	In Line Kink Lead Flat Box Pack
FMOV14270-AUKBI	FMOV14270-AUKBIXXX	FMOV14270-AUKTI	FMOV14270-AUKAI