

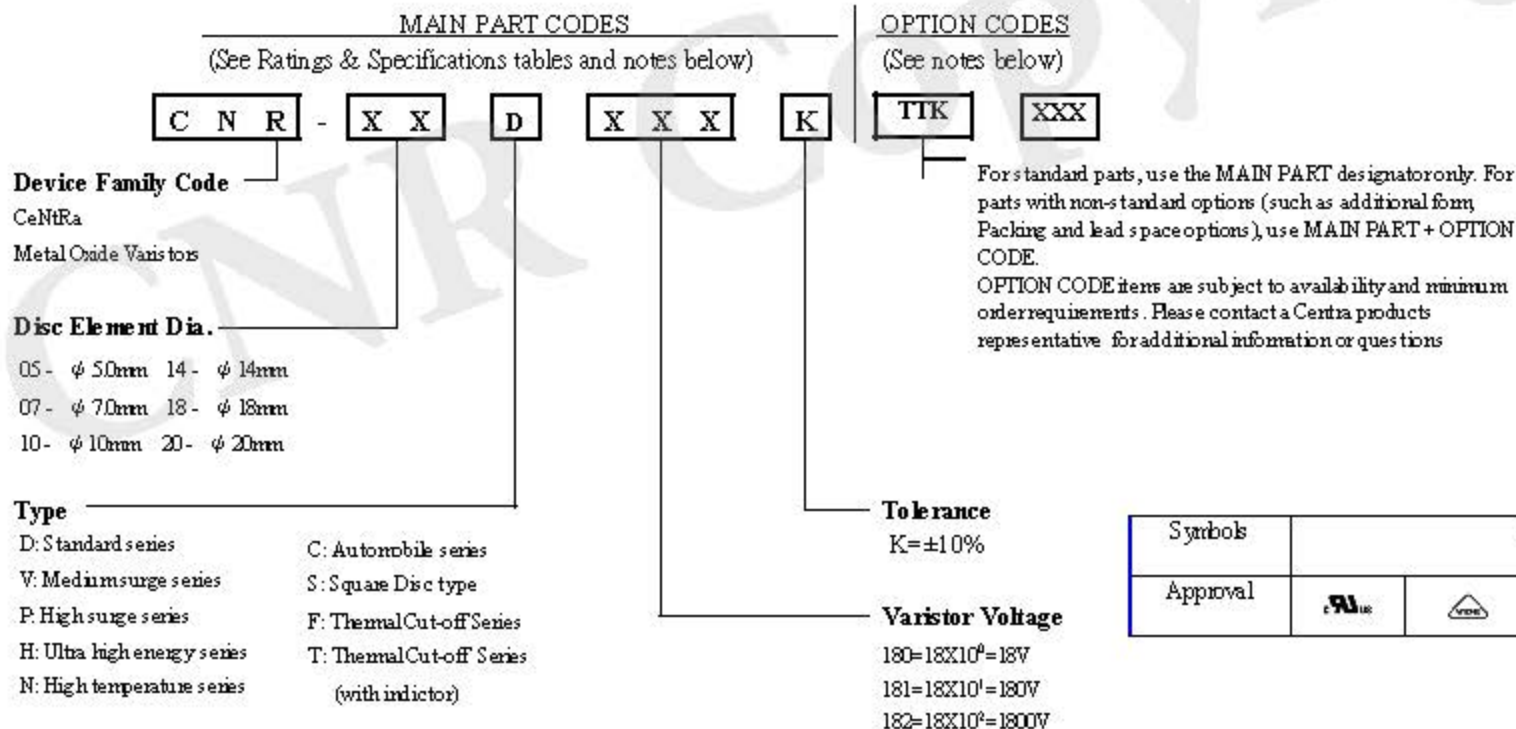
# MOV 突波吸收器 製程原理及應用介紹

舜全電子股份有限公司



# MOV 概念 - 參數

Part No.	Maximum Allowable		Varistor Voltage			Clamping Voltage @ Test Current		Maximum Energy	Maximum Peak Current	Rated Power	Typical Capacitance	UL1449 4th, In	Related Standard
	Voltage		(@1 mA)			(@8/20µs)		(@10/1000µs)	(@8/20µs)		(@1 KHz)	@8/20µs	Symbol
	ACrms(V)	DC(V)	Min.	Vn(Vdc)	Max.	Vc(V)	Ip(A)	(J)	(A)	(W)	(pF)	(KA)	
CNR-10D201K	130	170	180	200	220	340	25	30	2500	0.4	570	1	◇
CNR-10V201K	130	170	180	200	220	340	25	35	3500	0.4	430	2	◇



Symbols	◇			
Approval				



# 挑選 MOV 規格範例 – 操作及測試條件

## ■ 操作電壓及溫度

- 工作電壓：110V<sub>AC</sub>、環境溫度：50°C
- 最大箝制電壓：500V ( $V_{c,max}$ )

## ■ Surge 測試條件

- Surge Requirement
  - ◆ Level 4 (12Ω Circuit), 100 pluses
  - ◆ Short Circuit Current = 4KV / 12 Ω = 333A

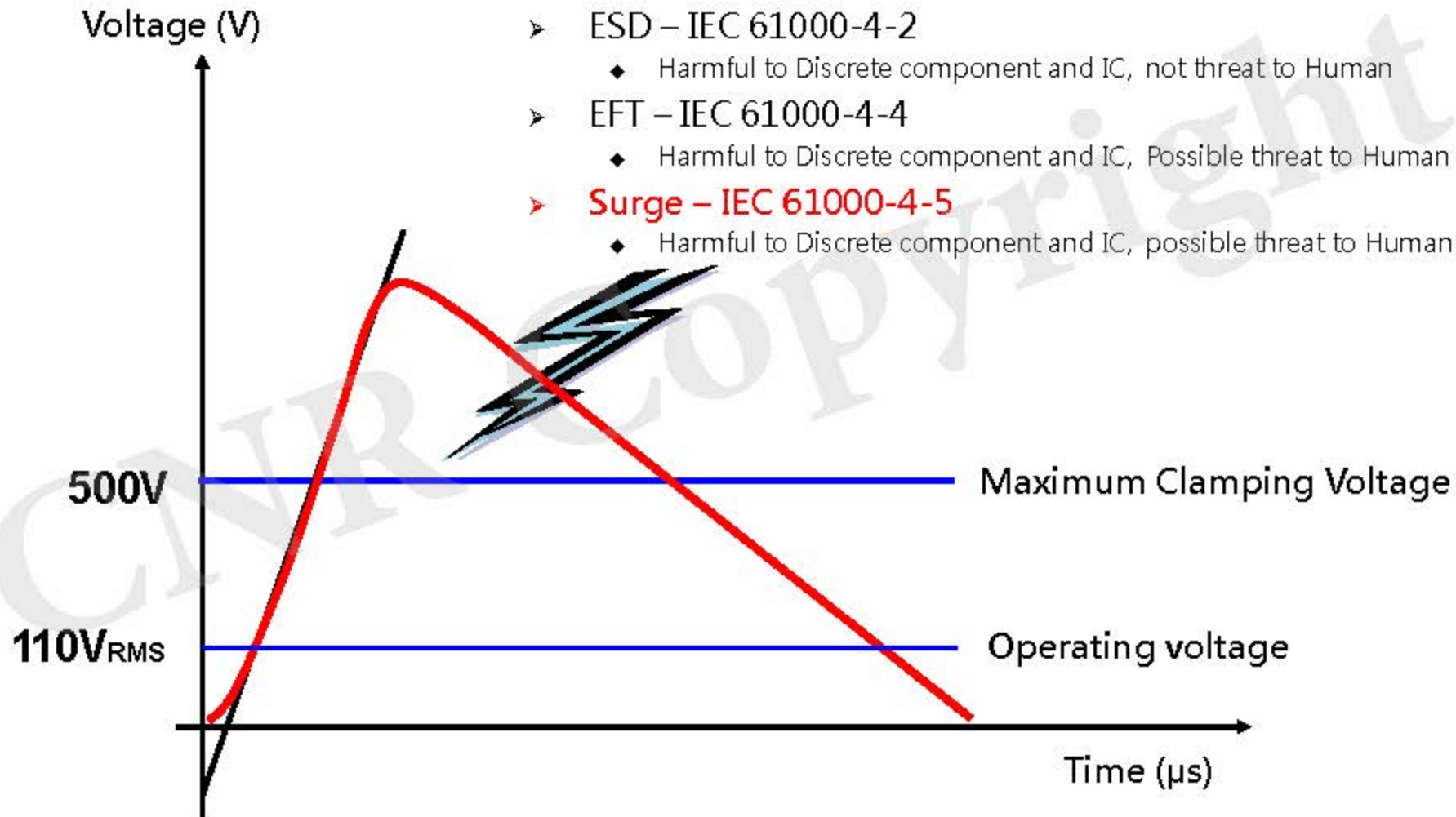
Equipment Class / Test Level	Open Circuit Voltage (kV)	Surge Waveforms	
		Voltage	Current
1	0.5	1.2 / 50μs	8 / 20μs
2	1.0	1.2 / 50μs	8 / 20μs
3	2.0	1.2 / 50μs	8 / 20μs
<b>4</b>	<b>4.0</b>	<b>1.2 / 50μs</b>	<b>8 / 20μs</b>
X	Special		



# 挑選 MOV 規格範例 – Voltage Clamping

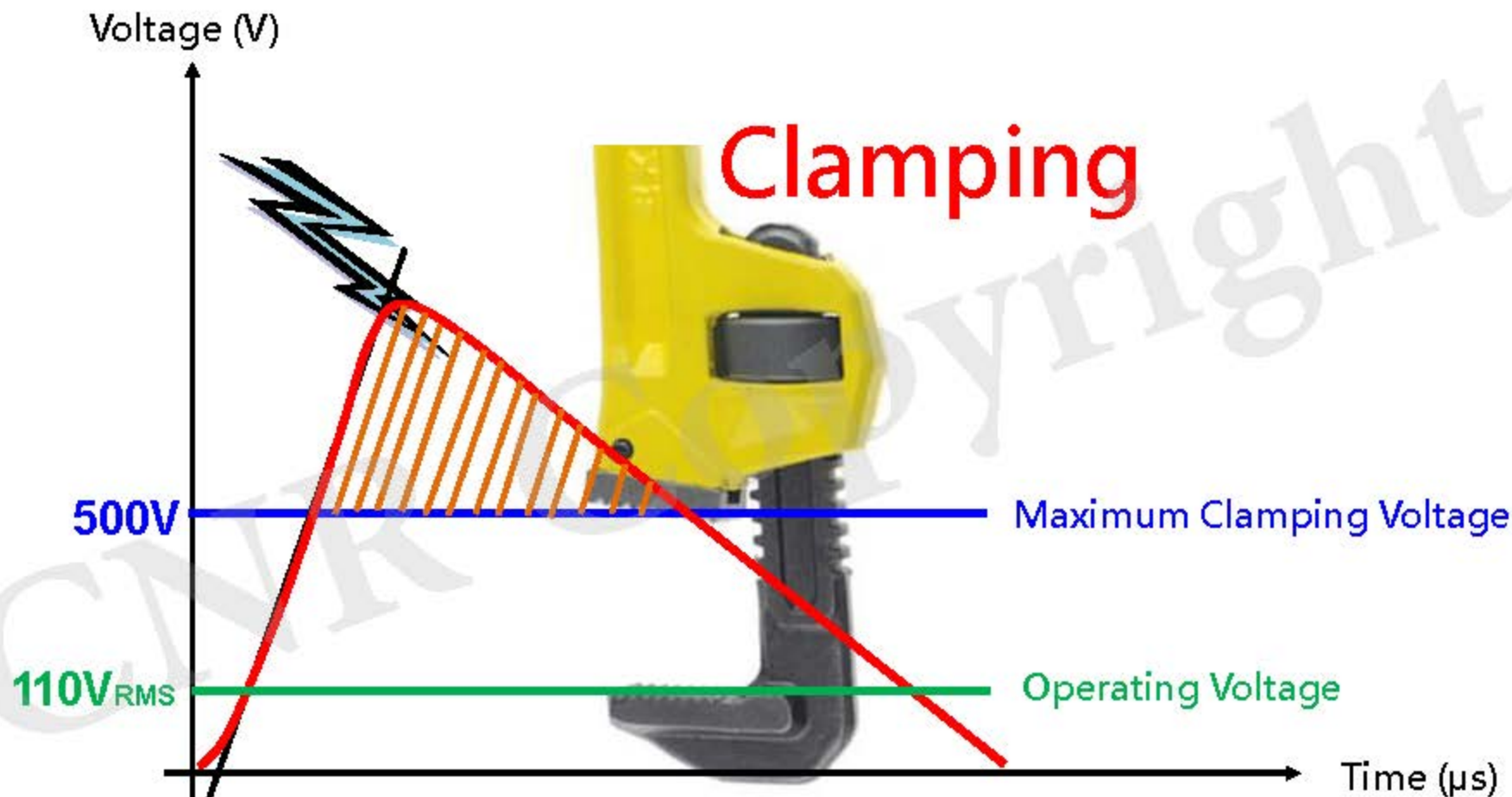
## ■ IEC Immunity Standards

- ESD – IEC 61000-4-2
  - ◆ Harmful to Discrete component and IC, not threat to Human
- EFT – IEC 61000-4-4
  - ◆ Harmful to Discrete component and IC, Possible threat to Human
- **Surge – IEC 61000-4-5**
  - ◆ Harmful to Discrete component and IC, possible threat to Human





# 挑選 MOV 規格範例 – Voltage Clamping



- **New Minimum voltage requirement = 121V<sub>AC</sub>**
  - (Operating Voltage) x (Safety factory) = 110V<sub>AC</sub> x 1.1<sub>min</sub> = 121V<sub>AC</sub>



# 挑選 MOV 規格範例 – Step 1

## Allowable Voltage & Short Circuit Current

### ■ Data sheet of **CNR**

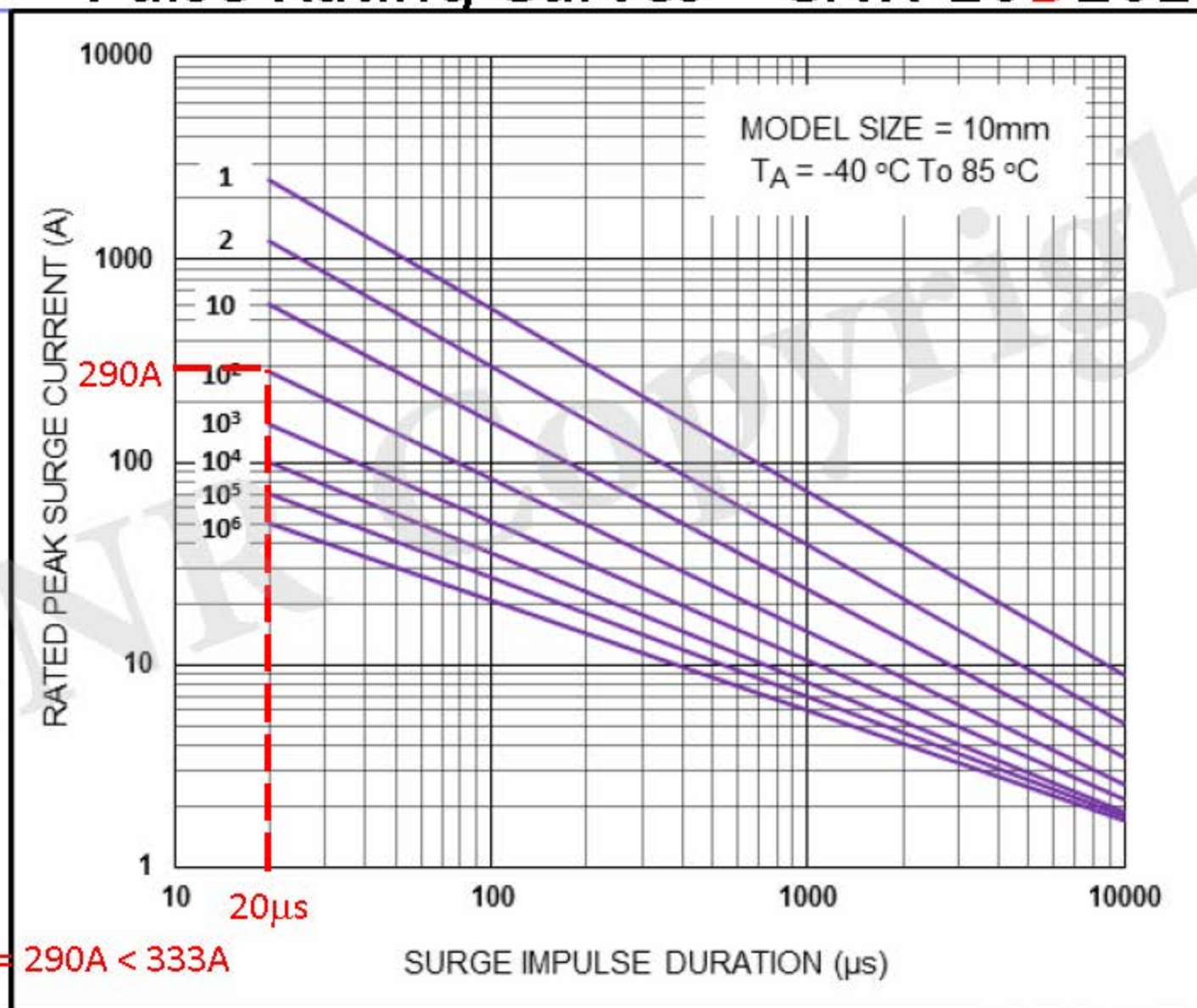
- Standard D series & Medium Surge V series (10mm)
- Meet Allowable Voltage =  $130V_{AC}$
- Meet Short Circuit Surge Current = 333A
  - ◆ *HINT: look at the Peak Current  $8 \times 20\mu s$ .*

Part No.	Maximum		Varistor			Clamping Voltage		Maximum	Maximum	Rated	Typical	UL1449	Related
	Allowable		Voltage			@ Test Current		Energy	Peak Current	Power	Capacitance	4th, In	Standards
	Voltage		(@1mA)			(@8/20 $\mu s$ )		(@10/1000 $\mu s$ )	(@8/20 $\mu s$ )		(@1KHz)	@8/20 $\mu s$	Symbol
	ACrms(V)	DC(V)	Min.	Vr(Vdc)	Max.	Vc(V)	Ip(A)	(J)	(A)	(W)	(pF)	(KA)	
CNR-10D201K	<b>130</b>	170	180	200	220	340	25	30	<b>2500</b>	0.4	570	1	◇
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# 挑選 MOV 規格範例 – Step 2A

## Pulse Rating Curves – CNR-10D201K



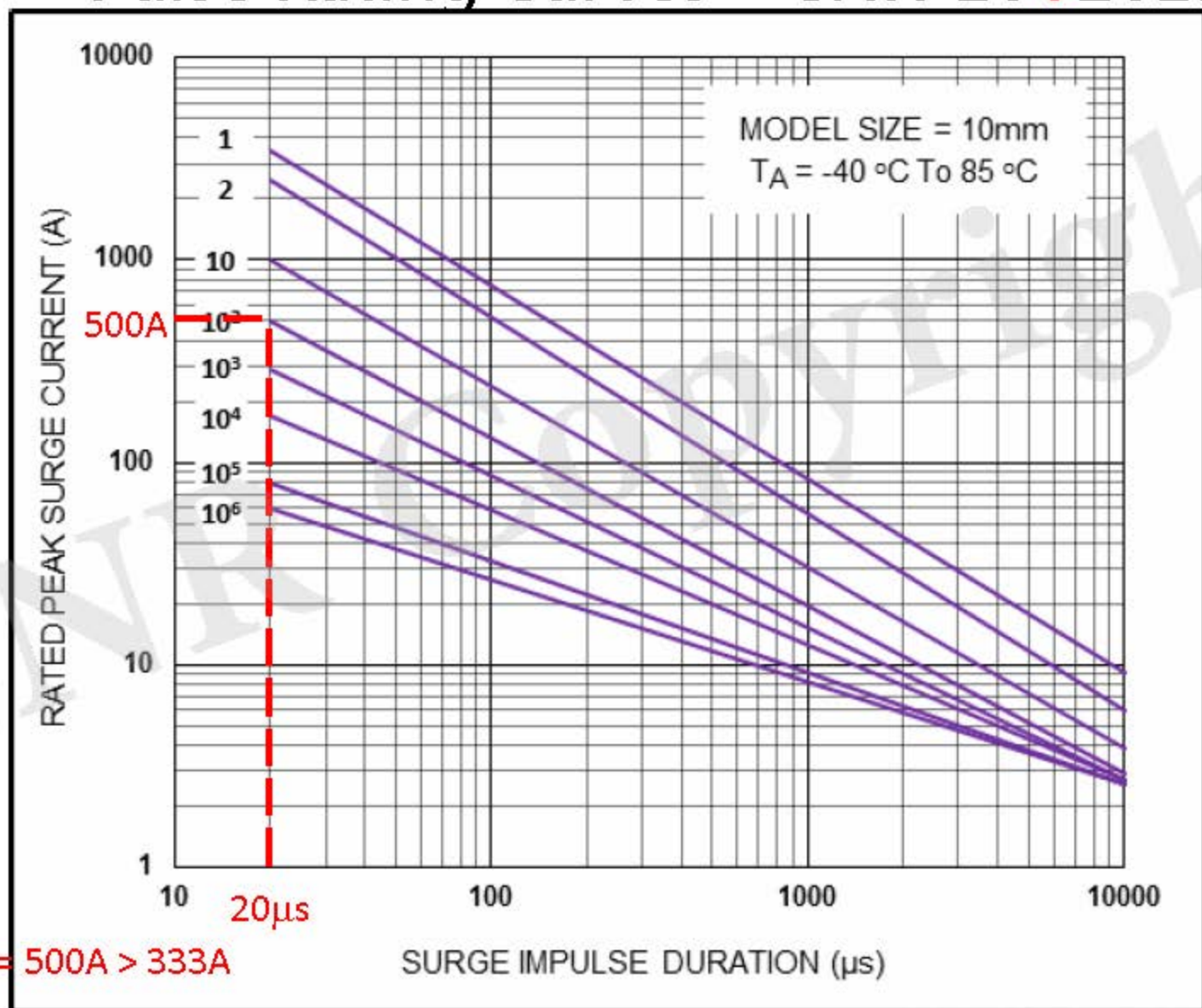
Rating  $I_{PK} = 290A < 333A$





# 挑選 MOV 規格範例 – Step 2B

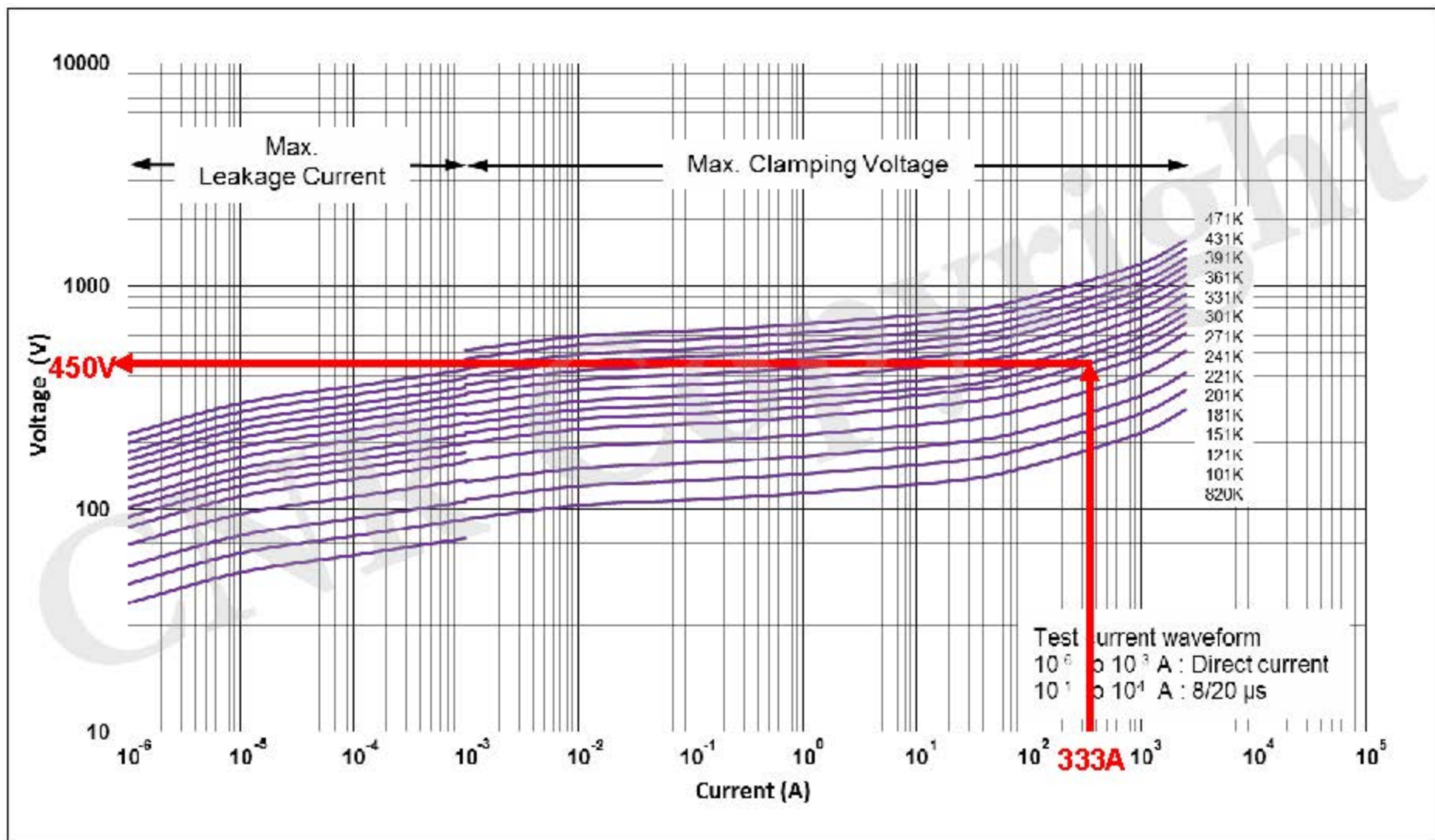
## Pulse Rating Curves – CNR-10V201K





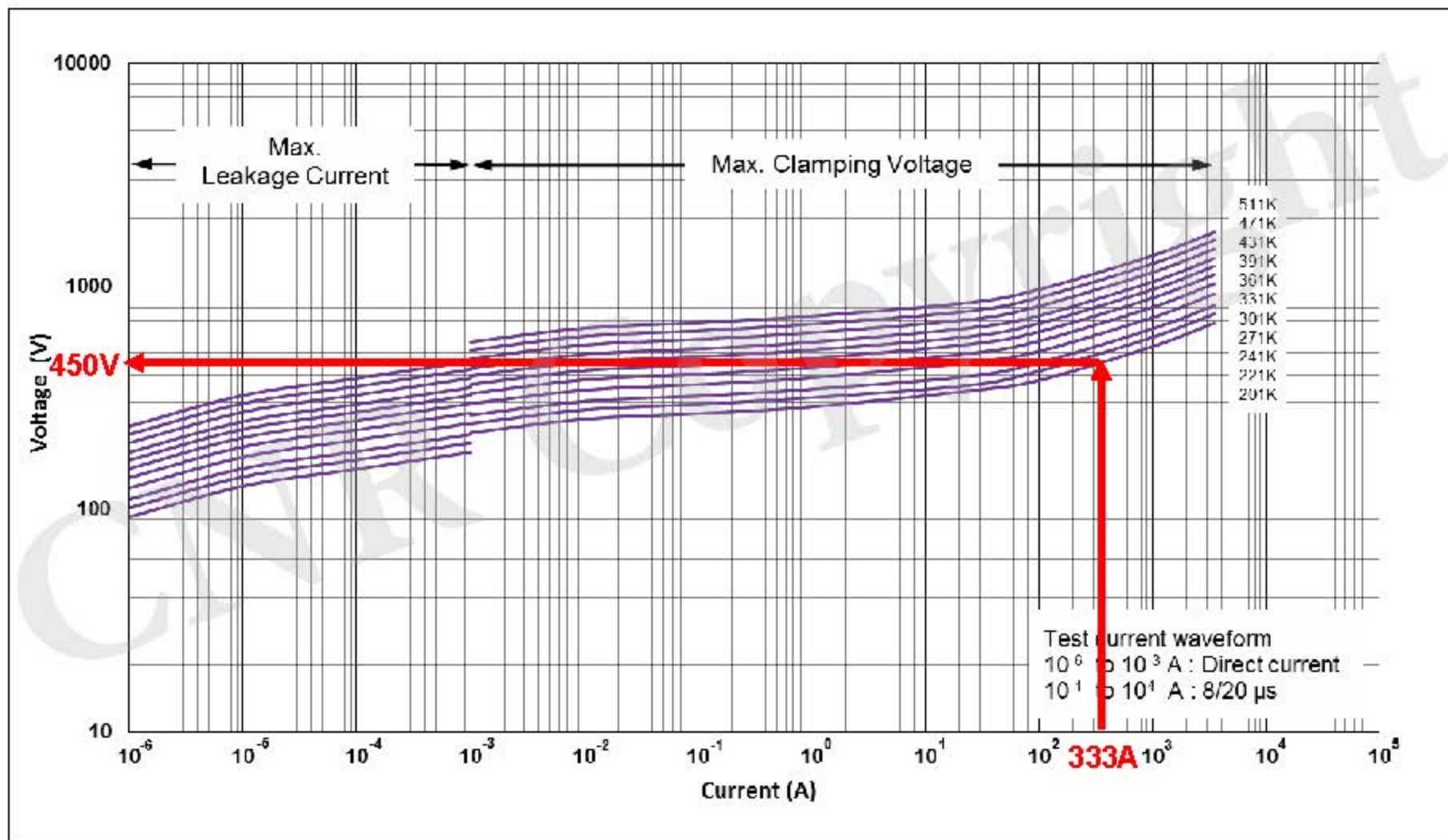
# 挑選 MOV 規格範例 – Step 3A

## V-I Curves – CNR-10D201K



# 挑選 MOV 規格範例 – Step 3B

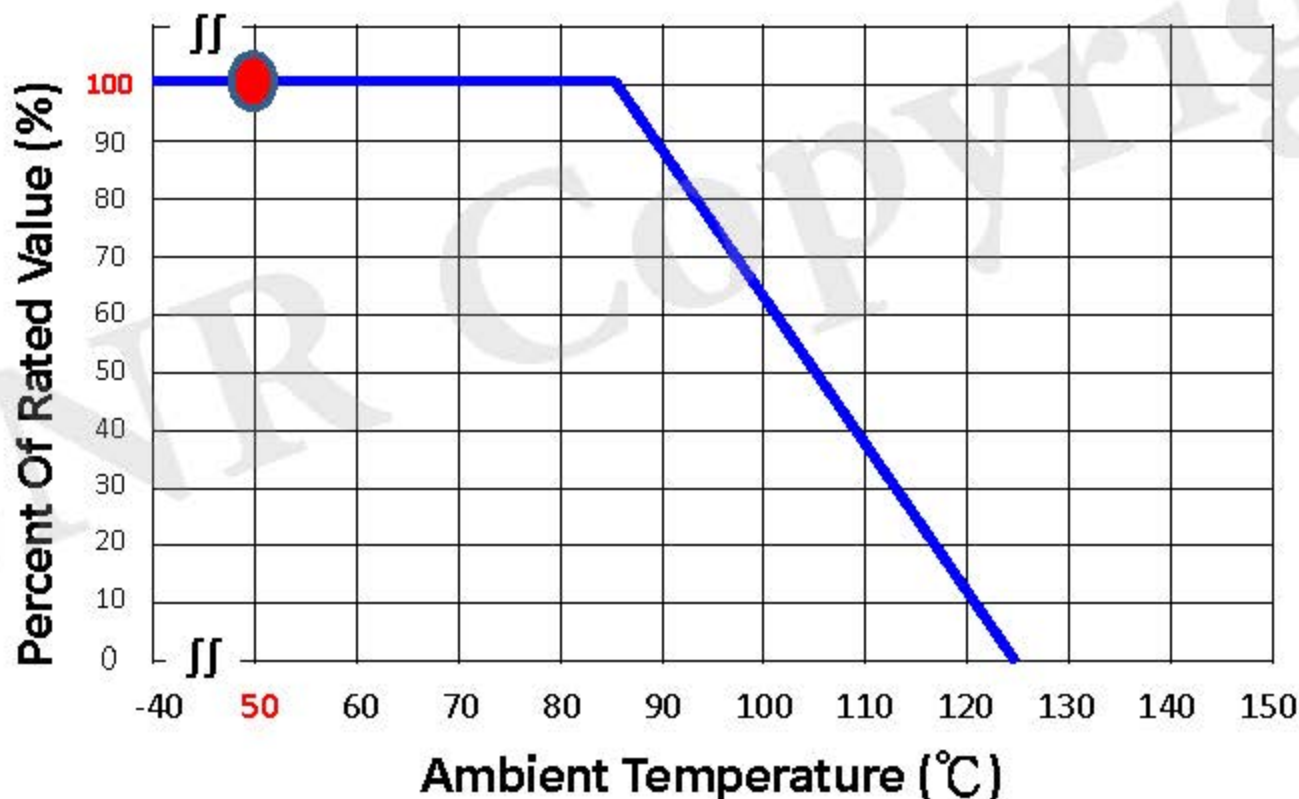
## V-I Curves – CNR-10V201K



# 挑選 MOV 規格範例 – Step 4

## 環境溫度 vs De-Rating

- 環境溫度條件：50°C
  - 理論值不須 De-Rating



# 挑選 MOV 規格範例 – 確定料號

- **最大連續工作電壓** (Max. Allowable Voltage,  $V_{AC,rms}$ )
  - 條件要大於  $V_{AC,rms} > 121V_{AC}$
  - ( $V_{AC}=130V_{AC} > 121V_{AC}$ ) → 滿足規格
- **浪湧電流** (Max Surge Current,  $I_n@8/20\mu s$ )
  - 條件要大於 333A
  - (100次,  $I_n=500A > 333A$ ) → 滿足規格
- **最大箝制電壓** : (Max. Clamping Voltage,  $V_{c,max}$ )
  - 條件要大於 500V
  - V-I Curves 在333A 下為 450 V → 滿足規格
- **環境溫度 De-Rating** (Ambient Temperature)
  - 環境溫度 50°C 不會 De-Rating → 滿足規格
- **CNR-10V201K 滿足此範例需求**







# CNR 舜全電子 保護元件的最佳選擇！

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