



# CeNtRa Science Corp.

## APPROVAL SHEET

CUSTOMER NAME: \_\_\_\_\_  
 PRODUCT NAME: Varistors  
 CENTRA P/N: CNR-14D681KTRK  
 CUSTOMER P/N: \_\_\_\_\_

CeNtRa APPROVED STAMP		
APPROVED BY	CHECKED BY	EDITED BY
FOR CUSTOMER APPROVAL		
APPROVED BY	CHECKED BY	EDITED BY

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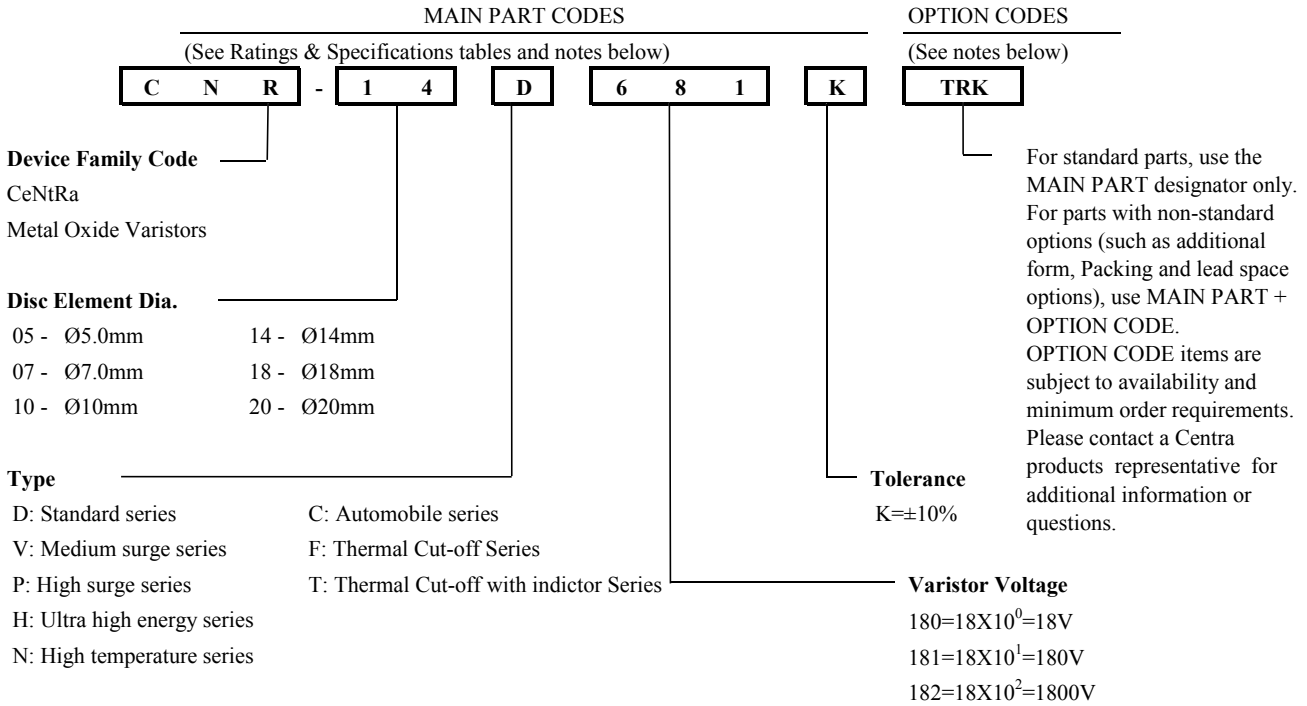
中國東莞廠

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# Metal Oxide Varistors

## Explanation of Part Numbers



## Ordering Notes:

### MAIN PART CODES

Series + /Packaging/ Lead Style / Designators:

Ordering examples:

<b>Straight Lead Bulk Pack (Standard)</b>	<b>Straight Lead (Short Cut) Bulk Pack</b>	<b>Straight Lead Tape &amp; Reel Pack</b>	<b>Straight Lead Flat Box Pack</b>
CNR-14D681K	CNR-14D681KTTSXXX	CNR-14D681KTRSX	CNR-14D681KBTSX
<b>Outside Kink Lead Bulk Pack</b>	<b>Outside Kink Lead (Short Cut) Bulk Pack</b>	<b>Outside Kink Lead Tape &amp; Reel Pack</b>	<b>Outside Kink Lead Flat Box Pack</b>
CNR-14D681KSOK	CNR-14D681KTTKXXX	CNR-14D681KTRKX	CNR-14D681KBTXK
<b>Inside Kink Lead Bulk Pack</b>	<b>Inside Kink Lead (Short Cut) Bulk Pack</b>	<b>Inside Kink Lead Tape &amp; Reel Pack</b>	<b>Inside Kink Lead Flat Box Pack</b>
CNR-14D681KSIK	CNR-14D681KTTIXXX	CNR-14D681KTRIX	CNR-14D681KBTIX
<b>In Line Kink Lead Bulk Pack</b>	<b>In Line Kink Lead (Short Cut) Bulk Pack</b>	<b>In Line Kink Lead Tape &amp; Reel Pack</b>	<b>In Line Kink Lead Flat Box Pack</b>
CNR-14D681KSHK	CNR-14D681KTTHXXX	CNR-14D681KTRHX	CNR-14D681KBTHX

### Option Code

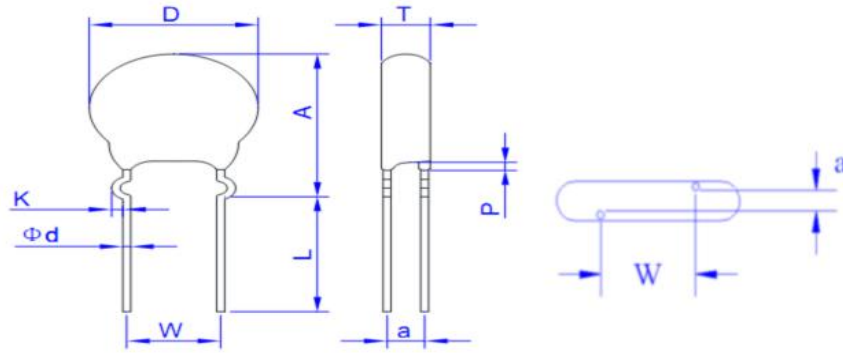
+ XXX

<b>Short Cut Lead Length 10mm±1.0mm</b>
CNR-14D681KTTS10
<b>Tape &amp; Reel Pack Feed Hole Pitch</b>
CNR-14D681KTRSA
CNR-14D681KTRSB

A: P<sub>0</sub> → 12.7mm±0.2mm  
B: P<sub>0</sub> → 15.0mm±0.2mm

CeNtRa D Series varistors are shipped standard in bulk pack with straight leads or Kink lead and lead spacing outlined in the Package Dimensions section of this data sheet. Contact your CeNtRa sales representative to discuss non-standard options.

## Product Dimensions



**Dimension Table**

Unit:mm

Symbol	Model size	14D	
		Min.	Max.
<b>D</b>		-	17
<b>A</b>		-	23.5
<b>W</b>		6.5	8.5
<b>Ød(±0.05)</b>		0.75	
<b>P(max.)</b>		3	
<b>T(max.)</b>		5.9	
<b>a(±1.0)</b>		2.2	
		CP/EI	

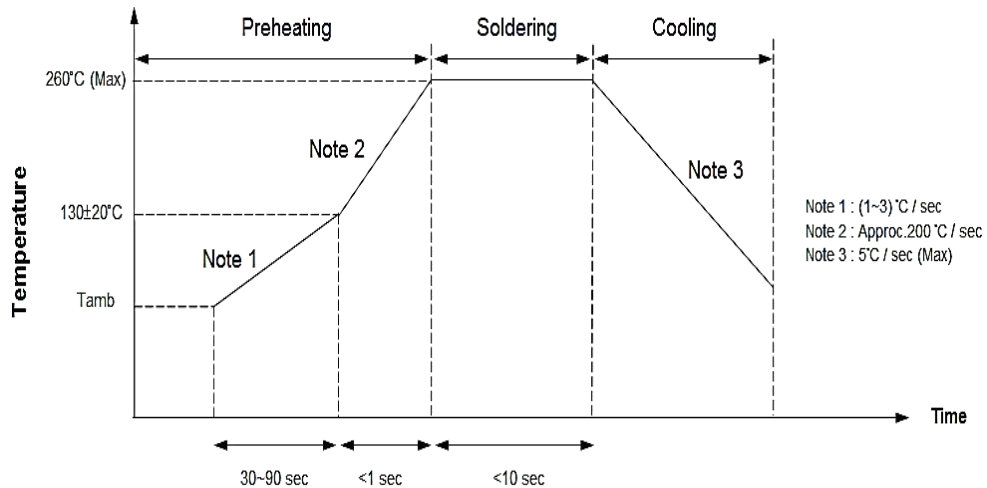
## Device Ratings and Characteristics

Part No.	Device Marking	Maximum Allowable Voltage		Varistor Voltage (@1mA)			Clamping Voltage @ Test Current (@8/20µs)		Maximum Energy (@10/1000µs) (J)
		ACrms(V)	DC(V)	Vn(Vdc)	Min.	Max.	Vc(V)	Ip(A)	
CNR-14D681K	14D681K	420	560	680	612	748	1120	50	130

Part No.	Device Marking	Maximum Peak Current (@8/20µs) (A)	Rated Power (W)	Typical Capacitance (@1KHz) (pF)	LEAKAGE CURRENT AT 560V (DC) (µA)
CNR-14D681K	14D681K	4500	0.6	350	<20

Reliability			
Characteristics	Standard	Test Conditions	Specifications
Robustness of terminations	IEC 60068-2-21 Test Ua1	F = 10 N (d ≤ 0.8 mm), F = 20 N (d = 1 mm)	$\Delta V/V \leq \pm 5\%$ No visible damage
Solderability	IEC 60068-2-20 Test Ta (Method 1)	T = 235±5°C, d = 2±0.5s	Approximately ≥ 95%
Resistance to soldering heat	IEC 60068-2-20 Test Tb (Method 1A)	T = 260±5°C, d = 10±1s	$\Delta V/V \leq \pm 5\%$ No visible damage
Vibration	IEC 60068-2-6 Test Fc Method B4	Frequency range: 10 Hz to 55 Hz, a = 0.75 mm or 98 m/s <sup>2</sup> (whichever is the less), d = 3x2 h	$\Delta V/V \leq \pm 5\%$ No visible damage
Voltage proof	IEC 61051-2	Metal balls method (4.8.1.2) 2500 V, 60 s	As specified in specification
Pulse current- 8/20 μs	IEC 61051-2	8/20 μs, 10 times, I <sub>peak</sub> =0.25*I <sub>max</sub>	$\Delta V/V \leq \pm 10\%$ No visible damage
Pulse current- 10/1000 μs	IEC 61051-2	10/1000 μs, 10 times, I <sub>peak</sub> = 0.0075* I <sub>max</sub>	$\Delta V/V \leq \pm 10\%$ No visible damage
Rapid change of temperature	IEC 60068-2-14 Test Na	N = 5 cycles, d = 30 min, θA = -40±3°C, θB = 85±2°C	$\Delta V/V \leq \pm 5\%$ No visible damage
Endurance at upper category temperature	IEC 61051-1 (4.21)	T: max temperature as specified, Duration: 1000 h, Voltage: max. a.c. voltage or max. d.c. voltage	$\Delta V/V \leq \pm 10\%$ No visible damage R ≥ 1000MΩ U ≤ 1,1 U <sub>initial</sub>
Damp heat (Steady state)	IEC 60068-2-78 Test Ca	T = 40±2°C, RH = 93(+2/-3)%, 56d, 4 specimens: No voltage applied, Other 4 specimens: Applied voltage: 100% of the max. d.c. voltage	$\Delta V/V \leq \pm 10\%$ R <sub>ISO</sub> ≥ 100MΩ
Varistor Voltage Temp. Coefficient	Specification Standard	V <sub>1mA</sub> at -40°C, 105°C, 25°C $\frac{V_{1mA} \text{ at } 105^{\circ}\text{C} - V_{1mA} \text{ at } 25^{\circ}\text{C}}{V_{1mA} \text{ at } 25^{\circ}\text{C}} \times \frac{1}{80} \times 100(\%/^{\circ}\text{C})$ $\frac{V_{1mA} \text{ at } -40^{\circ}\text{C} - V_{1mA} \text{ at } 25^{\circ}\text{C}}{V_{1mA} \text{ at } 25^{\circ}\text{C}} \times \frac{1}{65} \times 100(\%/^{\circ}\text{C})$	-0.05 ≤ TC ≤ 0.05(%/°C)
High Temperature Storage	IEC60068-2-2	1000h, T = 125±2°C	$\Delta V/V \leq \pm 5\%$ No visible damage
Low Temperature Storage/Cold	Specification Standard	The specimen shall be subjected to -40±2 °C, without load for 1000 hours and then stored at room temperature for one to two hours. Thereafter, the change of V <sub>c</sub> shall be measured.	$\Delta V_{c mA} / V_{c mA} \leq \pm 5\%$ No visible damage

## 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 2011/65/EU

## Storage Conditions of Products

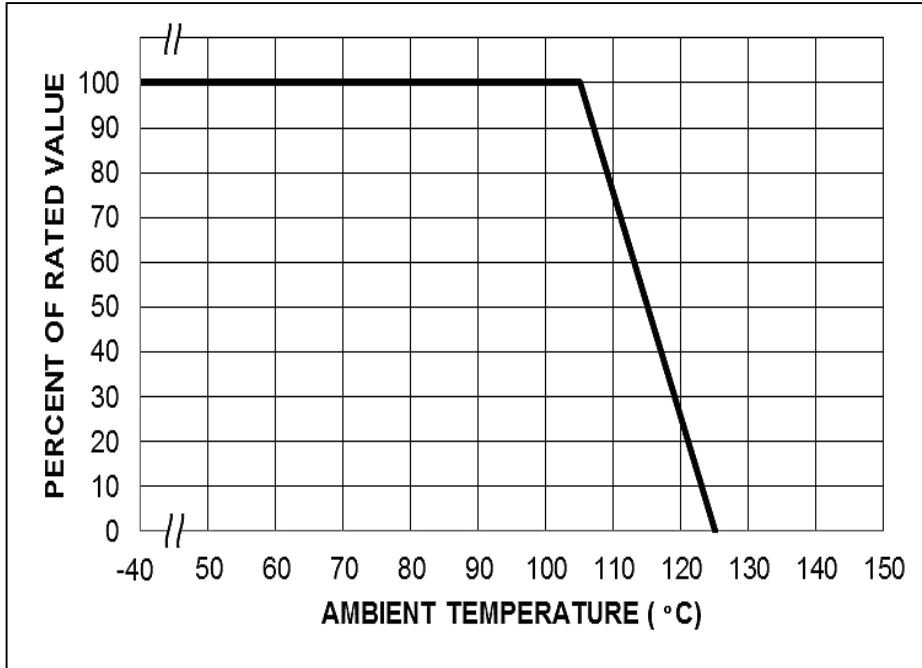
(I) Storage Conditions:

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

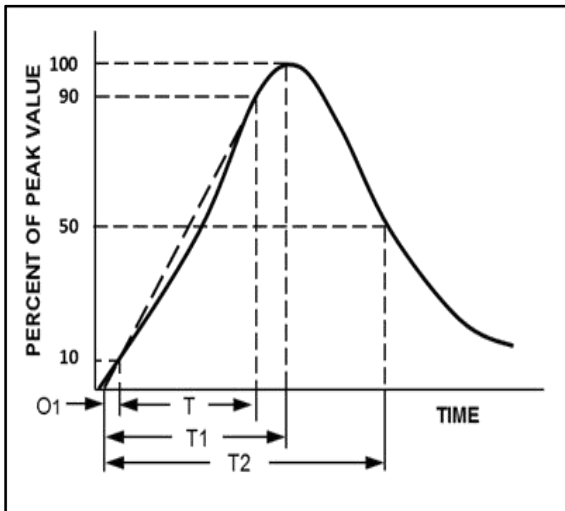
(II) Period of Storage: 1 year

## 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.



## Surge Current Standard Waveform

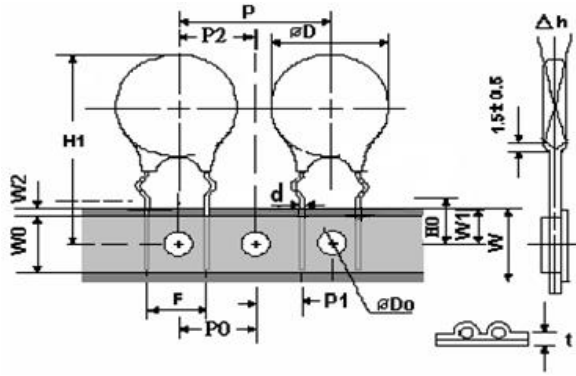


O1 = Virtual Origin of Wave  
 T = Time from 10% to 90% of Peak  
 T1 = Rise Time = 1.25 x T  
 T2 = Decay Time

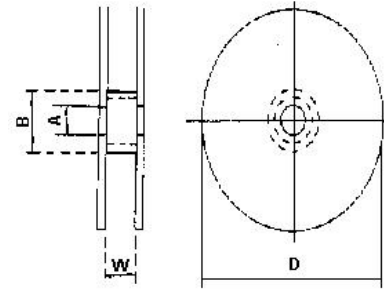
Example - For an 8/20  $\mu$ s Current Waveform:

8  $\mu$ s = T1 = Rise Time  
 20  $\mu$ s = T2 = Decay Time

## Tape and Reel Specifications



## Packaging Specifications



Symbol	PARAMETER	14D
P	Pitch of Component	25.4±1.0
P <sub>0</sub>	Feed Hole Pitch	12.7±0.2
P <sub>1</sub>	Feed Hole Center to Pitch	8.95±0.7
P <sub>2</sub>	Hole Center to Component Center	12.7±0.7
F	Lead to Lead Distance	7.5±1.0
Δh	Component Alignment	2.0Max
W	Tape Width	18.0+1.0
		18.0-0.5
W <sub>0</sub>	Hold Down Tape Width	5.0Min
W <sub>1</sub>	Hole Position	9.0+0.75
		9.0-0.50
W <sub>2</sub>	Hold Down Tape Position	3.0Max
H <sub>0</sub>	Seating Plane Height	16.0±0.5
H <sub>1</sub>	Component Height	40.0Max
D <sub>0</sub>	Feed Hole Diameter	4.0±0.2
t	Total Tape Thickness	0.7±0.2

Unit:mm

Symbol	14D
W	Approx. 55
D	360 Max.
A	Approx. φ 30
B	Approx. φ 90

Unit:mm

14D	Min. Q'ty	600
	Q'ty/Innerbox	1200
	Q'ty/Carton	4800

Unit:pcs



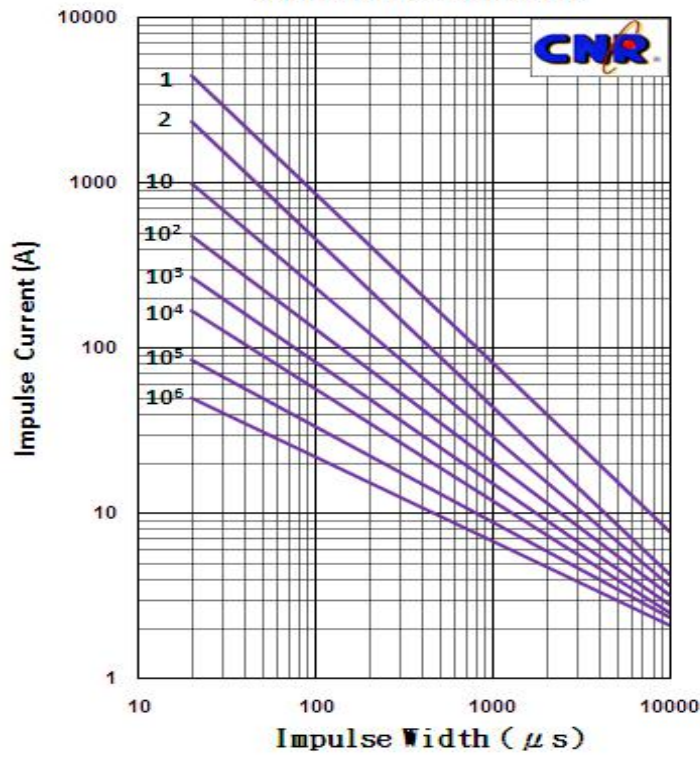


## Impulse Life Time Rating Curves

CNR-14D681K

### 14D Series

CNR14D511K to CNR14D182K



CNR-14D681K

CNR-14D511K to CNR-14D182K

