

Radial Varistor Series, Automotive Varistor series

Construction

Round varistor element, leaded

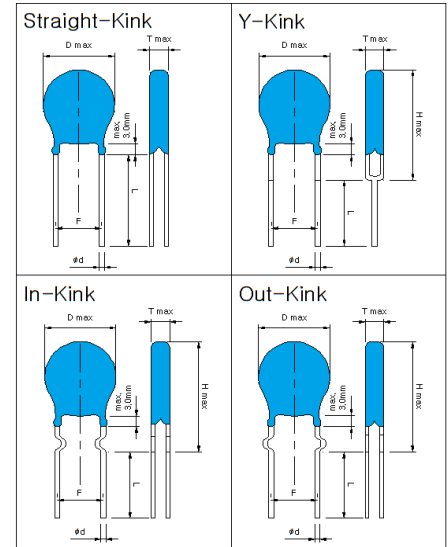
Coating : epoxy resin

Features

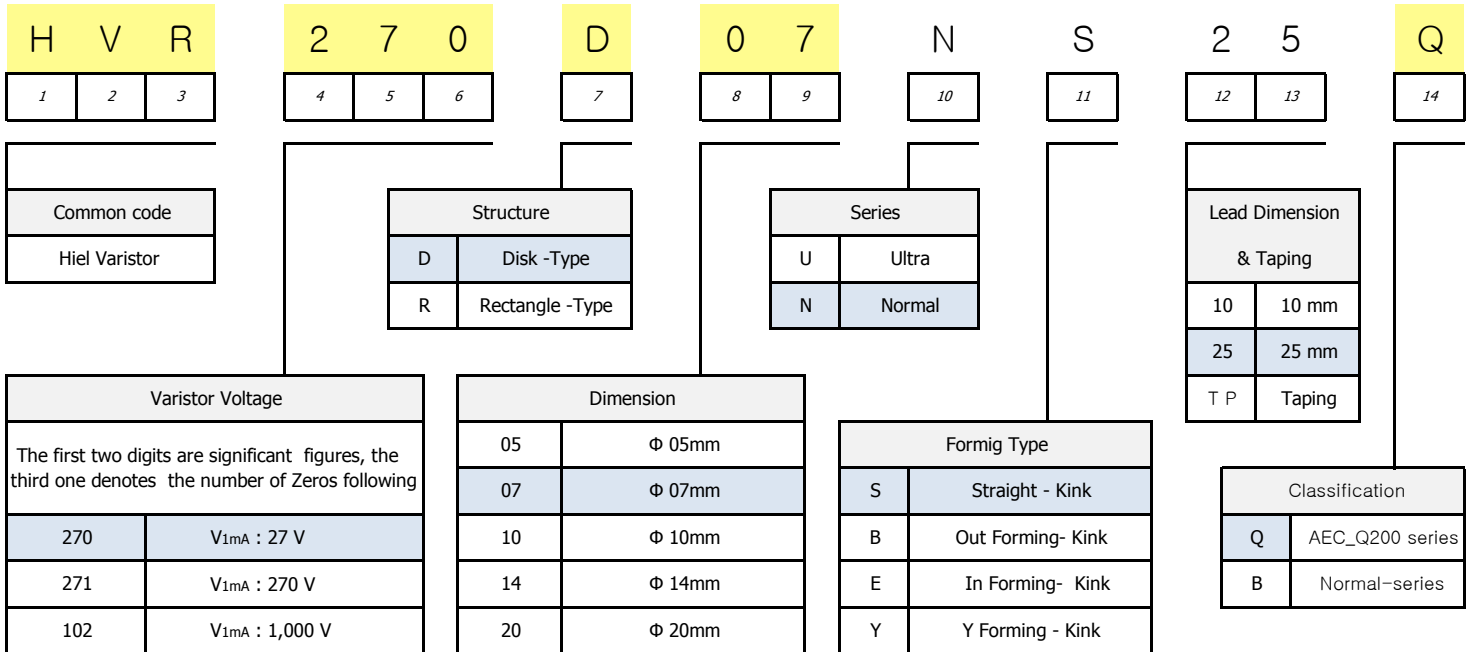
UL and VDE safety approvals.

Qualification based on AEC_Q200 REV_D

Operating varistor voltage range 12Vdc, 24Vdc



Explanation of Part Numbers



for 12Vdc system

- Dimension Table

Part No.	D max.	T max.	F	L	Φd
HVR220D07 Q	9	3.8	5.0 ± 1.0	Min. 4.0 ~ Max. 25.0	0.6 ± 0.1
HVR220D10 Q	14	4.2	5.0 ± 1.0		0.6 ± 0.1
HVR220D14 Q	18	4.3	7.5 ± 1.0		0.8 ± 0.1
HVR220D20 Q	24	4.6	10.0 ± 1.0		0.8 ± 0.1
HVR270D07 Q	9	4.0	5.0 ± 1.0	Min. 4.0 ~ Max. 25.0	0.6 ± 0.1
HVR270D10 Q	14	4.4	5.0 ± 1.0		0.6 ± 0.1
HVR270D14 Q	18	4.5	7.5 ± 1.0		0.8 ± 0.1
HVR270D20 Q	24	4.8	10.0 ± 1.0		0.8 ± 0.1

◆ for 12Vdc system

- Electrical Characteristics

Part No.	Varistor Voltage			Max.	Max.	Energy		Peak Current
				Continuous	Clamping	(10/1000 μ s)		(8/20 μ s)
	1mA(V)			Voltage(V)	Voltage(V)	Wtm(J)		Itm(A)
	Min	V _{N(DC)}	Max.	Vm(dc)	Vc(V)	Ip(A)	-	-
HVR220D07 Q	20	22	24	18	43	2.5	1.3	250
HVR220D10 Q	20	22	24	18	43	5	3.2	500
HVR220D14 Q	20	22	24	18	43	10	6.3	100
HVR220D20 Q	20	22	24	18	43	20	16.0	2,000
HVR270D07 Q	24	27	30	22	53	2.5	1.6	250
HVR270D10 Q	24	27	30	22	53	5	3.9	500
HVR270D14 Q	24	27	30	22	53	10	7.8	100
HVR270D20 Q	24	27	30	22	53	20	19.0	2,000

◆ for 24Vdc system

- Dimension Table

Part No.	D max.	T max.	F	L	Φ d
HVR390D07 Q	9	3.7	5.0 \pm 1.0	Min. 4.0 ~ Max. 25.0	0.6 \pm 0.1
HVR390D10 Q	14	4.1	5.0 \pm 1.0		0.6 \pm 0.1
HVR390D14 Q	18	4.2	7.5 \pm 1.0		0.8 \pm 0.1
HVR390D20 Q	24	4.5	10.0 \pm 1.0		0.8 \pm 0.1
HVR470D07 Q	9	3.9	5.0 \pm 1.0	Min. 4.0 ~ Max. 25.0	0.6 \pm 0.1
HVR470D10 Q	14	4.3	5.0 \pm 1.0		0.6 \pm 0.1
HVR470D14 Q	18	4.4	7.5 \pm 1.0		0.8 \pm 0.1
HVR470D20 Q	24	4.7	10.0 \pm 1.0		0.8 \pm 0.1

- Electrical Characteristics

Part No.	Varistor Voltage			Max.	Max.	Energy		Peak Current
				Continuous	Clamping	(10/1000 μ s)		(8/20 μ s)
	1mA(V)			Voltage(V)	Voltage(V)	Wtm(J)		Itm(A)
	Min	V _{N(DC)}	Max.	Vm(dc)	Vc(V)	Ip(A)	-	-
HVR390D07 Q	35	39	43	31	77	2.5	5.6	250
HVR390D10 Q	35	39	43	31	77	5	2.4	500
HVR390D14 Q	35	39	43	31	77	10	11.0	100
HVR390D20 Q	35	39	43	31	77	20	28.0	2,000
HVR470D07 Q	42	47	52	38	93	2.5	2.8	250
HVR470D10 Q	42	47	52	38	93	5	6.8	500
HVR470D14 Q	42	47	52	38	93	10	14.0	100
HVR470D20 Q	42	47	52	38	93	20	34.0	2,000

No.	Item	Standard	Test conditions / Method	Specifications
No. 1	Pre-and post stress Electrical Test	-	Test is performed except as specified in the applicable stress reference and the additional requirements in table 10.	Within the specified values
No. 3	High Temperature Exposure	MIL-STD-202 Method 108	Test power : Unpowered ----- Test Temp. : +150°C (±5°C) ----- Duration : 1,000±48 hours ----- Measurement at 24±2 hours after test conclusion	No visible damage ΔV1mA / V1mA ≤ 10%
No. 4	Temperature Cycling	JESD22 Method JA-104	Test power : Unpowered ----- Lower test Temp. : -40°C (-10°C) ----- Upper test Temp. : +125°C (+10°C) ----- maximum dwell time at each temperature : 30 minute ----- Transfer time : Maximum 1 minute ----- Measurement at 24±2 hours after test conclusion	No visible damage ΔV1mA / V1mA ≤ 10%
No. 7	Biased Humidity	MIL-STD-202 Method 103	Test power : Bias at 85% (+5%) of rated Varistor voltage ----- Test Temp. : +85°C (±3°C) ----- Humidity : +85%(±5%) ----- Duration : 1,000±48 hours ----- Measurement at 24±2 hours after test conclusion	No visible damage ΔV1mA / V1mA ≤ 10%
No. 8	Operational Life	MIL-STD-202 Method 108	Test power : Bias at 85% (+5%) of rated Varistor voltage ----- Test Temp. : +125°C (±5°C) ----- Duration : 1,000±48 hours ----- Measurement at 24±2 hours after test conclusion	No visible damage ΔV1mA / V1mA ≤ 10%
No. 9	External Visual	MIL-STD-883 Method 2009	Inspect device construction, marking and workmanship.	No visible damage
No. 10	Physical Dimension	JESD 22 Method JB-100	Verify physical dimensions to the applicable device detail specification.	Within the specified values
No. 11	Terminal Strength(Lead)	MIL-STD-202 Method 211	Pull test : 2.27Kg ----- Wire-lead bend test : 227g ----- Duration of the applied forces : 10±1 second	No visible damage ΔV1mA / V1mA ≤ 10%
No. 14	Vibration	MIL-STD-202 Method 204	Acceleration : 5g's ----- Sweep time : 20 minute ----- Frequency range : 10Hz ~ 2KHz ~ 10Hz ----- Number of cycles : 12	No visible damage ΔV1mA / V1mA ≤ 10%

◆ Reliability

AEC_Q200 REV_D

June. 1, 2010

No.	Item	Standard	Test conditions / Method	Specifications
No. 15	Resistance to Soldering Heat	MIL-STD-202 Method 210	No pre-heat of samples. ----- Test Temperature : +260°C(±5°C) ----- Test time : 10±1 second ----- immersion and emersion rate : 25/mm ± 6mm/s ----- Number of heat cycles : 1	No visible damage ΔV1mA / V1mA ≤ 10%
No. 18	Solderability	J-STD-002	Steam aging 8hr@+93°C(±3°C) ----- Test Temperature : +245°C(±5°C) ----- Test time : 5.0+0,-0.5 second	At least 95% of terminal electrodeis covered by new solder
No. 19	Electrical Characterization	-	Varistor voltage and clamping voltage	Within the specified values