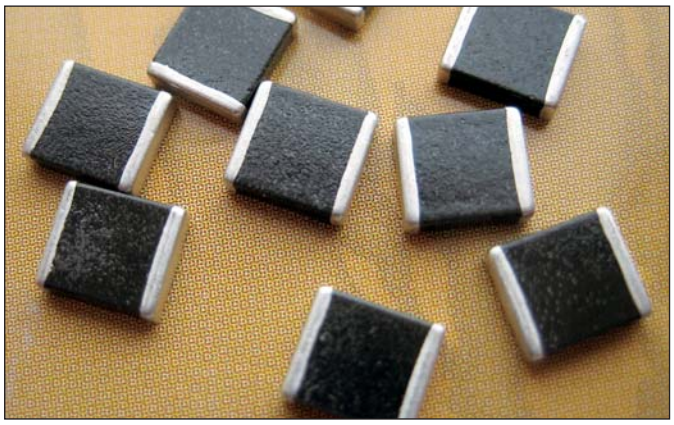
Glass Encapsulated TransGuard® Automotive Series

Multilayer Varistors for Automotive Applications



GENERAL DESCRIPTION

The Glass Encapsulated TransGuard® Automotive Series are zinc oxide (ZnO) based ceramic semiconductor devices with non-linear, bi-directional voltage-current characteristics.

They have the advantage of offering bi-directional overvoltage protection as well as EMI/RFI attenuation in a single SMT package. The Automotive Series high current and high energy handling capability make them well suited for protection against automotive related transients.

These large case size parts extend TransGuard range into high energy applications. In addition the glass encapsulation provides enhanced resistance against harsh environment or process such as acidic environment, salts or chlorite flux.

GENERAL CHARACTERISTICS

- Operating Temperature: -55ºC to 125ºC
- Case Size: 1206-2200
- Working Voltage: 16-65Vdc
- Energy: 07-12J
- Peak Current: 200-2000A

FEATURES

- High Reliability
- High Energy Absorption (Load Dump)
- High Current Handling
- Bi-Directional protection
- EMI/RFI attenuation in off-state
- Multi-strike capability
- Sub 1nS response to ESD strike
- AEC Q200 Qualified

APPLICATIONS

- Various Automotive Applications
- Internal Combustion Engine (ICE) Vehicles
- Hybrid Electric Vehicles (HEV)
- Plug-in Hybrid Electric Vehicles (PHEV)
- Commercial Vehicles
- Sensors
- LIN BUS
- ECU
- DC Motor
- Relays
- and more
- Applications where Glass Encapsulation is needed for Harsh Environment/Acid-Resistance

HOW TO ORDER

V	G	AS	1812	16	P	400	R	P
Varistor	**Glass Encapsulate Chip**	**Automotive Series**	**Chip Size** 1206 1210 1812 2220 3220	**Working Voltage** 16 = 16Vdc 18 = 18Vdc 22 = 22Vdc 26 = 26Vdc 30 = 30Vdc 31 = 31Vdc 34 = 34Vdc 42 = 42Vdc 48 = 48Vdc 60 = 60Vdc 65 = 65Vdc	**Engergy Rating** D = 0.4J F = 0.7J H = 1.2J J = 1.6J K = 0.6J N = 1.1J S = 2.0J P = 2.5-3.7J U = 4.0-5.0J Y = 6.5-12J	**Clamping Voltage** 390 = 40V 400 = 42V 440 = 44V 490 = 49V 540 = 54V 560 = 60V 570 = 57V 650 = 65V 770 = 77V 900 = 90V 101 = 100V 121 = 120V 131 = 135V	**Package** D = 7" reel R = 7" reel T = 13" reel	**Termination** P = Ni/Sn plated

PHYSICAL DIMENSIONS: mm (inches)

Size (EIA)	Length (L)	Width (W)	Max Thickness (T)	Land Length (t)
1206	3.20±0.20 (0.126±0.008)	1.60±0.20 (0.063±0.008)	1.70 (0.067)	0.94 max. (0.037 max.)
1210	3.20±0.20 (0.126±0.008)	2.49±0.20 (0.098±0.008)	1.70 (0.067)	0.14 max. (0.045 max.)
1812	4.50±0.30 (0.177±0.012)	3.20±0.30 (0.126±0.012)	2.00 (0.079)	1.00 max. (0.040 max.)
2220	5.70±0.40 (0.224±0.016)	5.00±0.40 (0.197±0.016)	2.50 (0.098)	1.00 max. (0.040 max.)
3220	8.20±0.40 (0.323±0.016)	5.00±0.40 (0.197±0.016)	2.50 max. (0.098 max.)	1.30 max. (0.051 max.)

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ELECTRIAL CHARACTERISTICS

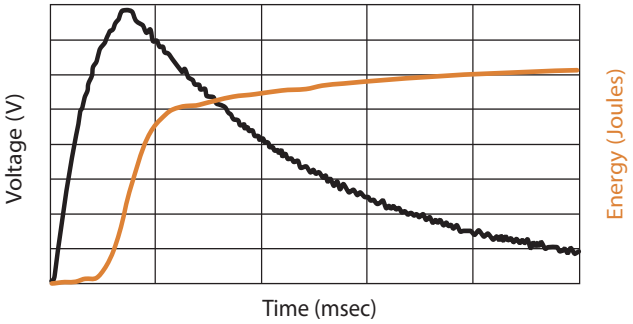
AVX PN	V_W (DC)	V_W (AC)	V_B	V_C	I_{VC}	I_L	E_T	E_{LD}	I_P	Cap	Freq	V_{Jump}	$P_{Diss, MAX}$
VGAS120616K390	16	11	24.5±10%	40	1	15	0.6	1.5	200	900	K	27.5	0.01
VGAS120616N390	16	11	24.5±10%	40	1	15	1.1	2	200	1300	K	27.5	0.01
VGAS121016S390	16	14	24.5±10%	40	2.5	15	2.0	5.00	500	3000	K	27.5	0.01
VGAS121016J400	16	13	25.5±10%	42	5	10	1.6	3	500	3100	K	27.5	0.03
VGAS181216P390	16	11	24.5±10%	40	5	15	2.9	10	1000	7000	K	27.5	0.07
VGAS181216P400	16	11	24.5±10%	42	5	10	2.9	10	1000	5000	K	27.5	0.07
VGAS222016Y390	16	11	24.5±10%	40	10	15	10.2	45	1500	20000	K	27.5	0.08
VGAS222016Y400	16	11	24.5±10%	42	10	10	7.2	25	1500	13000	K	27.5	0.10
VGAS120618D400	18	13	25.5±10%	42	1	15	0.4	1.5	150	1200	K	27.5	0.008
VGAS121018J400	18	13	25.5±10%	42	5	15	1.6	3.0	500	2300	K	27.5	0.03
VGAS181218P440	18	14	27.5±10%	44	5	15	2.9	6	800	5000	K	27.5	0.05
VGAS222022Y490	22	17	30±10%	49	10	15	6.8	25	1200	12000	K	27.5	0.03
VGAS120626F540	26	18	33.0±10%	54	1	15	0.7	1.5	200	600	K	27.5	0.008
VGAS121026H560	26	18	34.5±10%	60	5	15	1.2	3	300	1200	K	27.5	0.018
VGAS181226P570	26	23	35.0±10%	57	5	15	2.5	8	600	3000	K	30	0.015
VGAS222026Y570	26	23	35±10%	57	10	15	6.8	25	1100	7000	K	30	0.03
VGAS322026Z570	26	23	35+/-10%	57	10	15	13.0	50	1800	15000	K	30	0.04
VGAS121030H620	30	21	41.0±10%	67	5	15	1.2	3	280	1850	K	30	0.018
VGAS181231P650	31	25	39.0±10%	65	5	15	3.7	8	800	2600	K	30	0.06
VGAS120634N770	34	30	47±10%	77	1.0	15	1.1	1.50	200	500	K	47	0.02
VGAS121034S770	34	30	47.0±10%	77	2.5	15	2	3	400	1000	K	48	0.04
VGAS181234U770	34	30	47.0±10%	77	5	15	5	6.1	800	1500	K	48	0.08
VGAS222034Y770	34	30	47.0±10%	77	10	15	12	25	2000	6300	K	48	0.24
VGAS181242U900	42	35	56.0±10%	90	5	15	4.0	6	500	1200	K	48	0.015
VGAS222042Y900	42	37	56±10%	90	10	15	12	24	1000	5000	K	48	0.06
VGAS121048H101	48	34	62.0±10%	100	5	15	1.2	-	250	500	K	48	0.022
VGAS181256U111	56	40	68±10%	110	5.0	15	4.8	-	500	1100	K	48	0.04
VGAS121060J121	60	42	76.0±10%	120	5	15	1.5	-	250	400	K	48	0.03
VGAS121065P131	65	50	82.0±10%	135	2.5	15	2.7	-	350	600	K	48	0.05
VGAS181265U131	65	50	82±10%	135	5.0	15	4.5	-	400	800	K	48	0.03
VGAS222065Y131	65	50	82±10%	135	10	15	6.5	-	1100	3000	K	48	0.06
VGAS181285U161	85	60	100±10%	165	5.0	15	4.5	-	400	500	K	48	0.04

V_W(DC)	DC Working Voltage [V]
V_W(AC)	AC Working Voltage [V]
V_B	Typical Breakdown Votage [V @ 1mA$_{DC}$, 25°C]
V_C	Clamping Voltage [V @ I_{VC}]
I_{VC}	Test Current for V_C [A, 8x20µs]
I_L	Maximum leakage current at the working voltage, 25°C [µA]
E_T	Transient Energy Rating [J, 10x1000µS]
E_{LD}	Load Dump Energy (x10) [J]
I_P	Peak Current Rating [A, 8x20µS]
Cap	Typical capacitance [pF] @ frequency specified and 0.5V_{RMS}, 25°C, M = 1MHz, K = 1kHz
V_{Jump}	Jump Start [V, 5 min]
P_{DISS}	Power Dissipation [W]

AUTOMOTIVE SERIES – LOAD DUMP TEST

According to ISO DP7637 rev 2 Pulse 5

Automotive Load Dump Pulse (According to ISO 7637 Pulse 5)



When using the test method indicated below, the amount of Energy dissipated by the varistor must not exceed the Load Dump Energy value specified in the product table.

12V SYSTEMS

VGAS181216P400	0.5Ω	1Ω	4Ω
100ms	46	52	72
200ms	37	41	59
400ms	32	35	51
VGAS222016Y400	0.5Ω	1Ω	4Ω
100ms	53	60	77
200ms	50	55	73
400ms	47	50	66