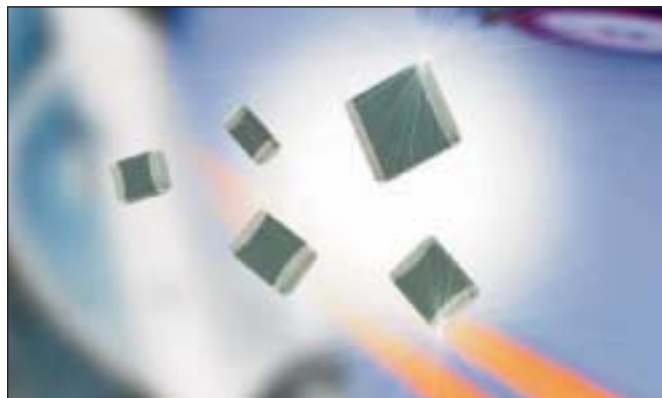


Medium Power MLV (VC13, 14, 15, 20)



Medium Power Multilayer Chip Varistor Transient Voltage Suppression and ESD Protection Devices



GENERAL DESCRIPTION

AVX's Transient Voltage Suppression (TVS) devices address six trends in today's electronic circuits: (1) mandatory ESD protection, (2) mandatory EMI control, (3) signal integrity improvement, (4) PCB downsizing, (5) reduced component placement costs, and (6) protection from induced slow speed transient voltages and currents.

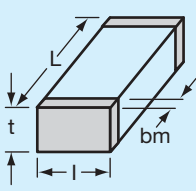
AVX's Medium Power Multilayer Varistors include 3 series of products as listed below:

- Standard 1210 Series (VJ13)
- Telecom Series (VC14)
- Automotive Range (VC13, 14, 15, 20)

TYPICAL APPLICATIONS

Mainly used to reduce transient over-voltages in a very wide range of electronic products. Some example applications are 1) Telecom, 2) Automotive, 3) Consumer Electronics, and 4) Industrial Applications.

PHYSICAL DIMENSIONS: millimeters (inches)

	Type	IEC Size	L	I	bm	t max
	VC20	1206	3.20±0.20 (0.126±0.008)	1.60±0.20 (0.063±0.008)	0.50±0.25 (0.020±0.010)	1.70 (0.067)
	VC13	1210	3.20±0.20 (0.126±0.008)	2.50±0.20 (0.098±0.008)	0.50±0.25 (0.020±0.010)	1.70 (0.067)
	VC14	1812	4.50±0.20 (0.177±0.008)	3.20±0.20 (0.126±0.008)	0.50±0.25 (0.020±0.010)	1.70 (0.067)
	VC15	2220	5.70±0.20 (0.224±0.008)	5.00±0.20 (0.197±0.008)	0.50±0.25 (0.020±0.010)	1.70 (0.067)

PART NUMBERING

VC
Varistor Series
VC = Unplated
VJ = Plated

14
Chip Size
20 = 1206
13 = 1210
14 = 1812
15 = 2220

M
Code
M = Standard
P = Pro Grade

T
Series Code
A = Automotive
T = Telecom
C = Standard

0950
AC Operating Voltage

K
1mA Voltage Tolerance
K = ±10%

BA
Packaging
BA = Tape & Reel
VC20: 4000 pcs/reel
VC13: 2000 pcs/reel
VC14: 1500 pcs/reel
VC15: 1250 pcs/reel

Medium Power MLV (VC13, 14, 15, 20)



Medium Power Multilayer Chip Varistor

Transient Voltage Suppression and ESD Protection Devices

STANDARD SERIES - VJ13 (1210)

FEATURES

- Plated Ni Barrier Terminations
- Bi-Directional Protection
- Fast Turn-On Time
- Multiple Strike Capability
- Provides EMC Capacitance
- 1210 EIA Case Size

TARGET APPLICATIONS

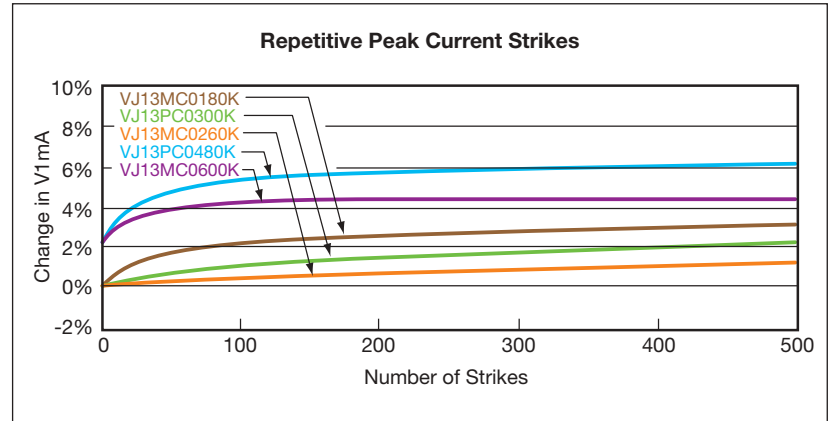
Consumer Electronic Products

GENERAL CHARACTERISTICS

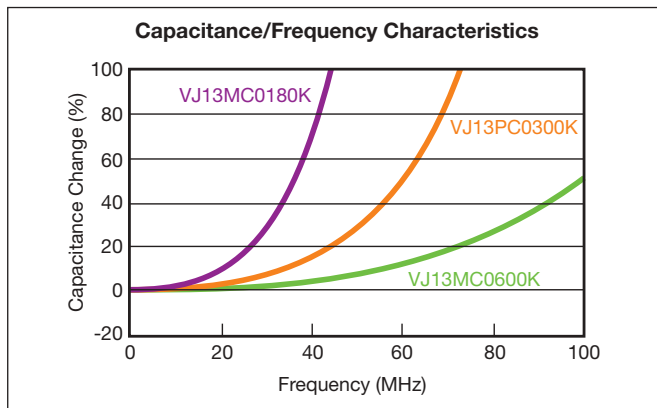
Storage Temperature: -55°C to +125°C

Operating Temperature: -55°C to +125°C

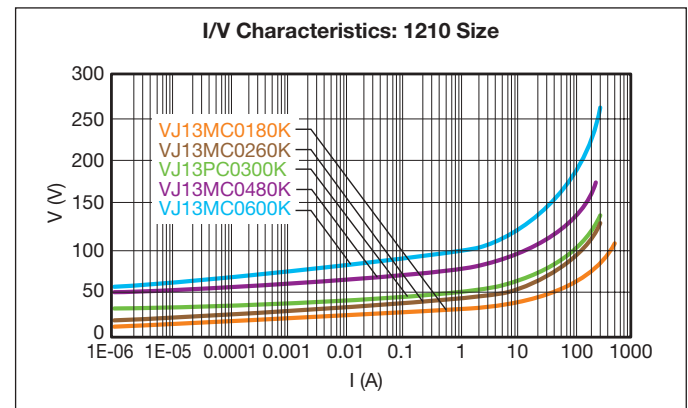
PULSE DEGRADATION



CAP VS FREQ CHARACTERISTICS



V/I CHARACTERISTICS



PART NUMBERS

Part Number	Operating Voltage	Vnominal At 1mA DC			Vclamp (8x20µs)		Energy (10x1000µs)	Max. Peak Current (8x20µs)	Typical CAP (1kHz/.5Vrms)
	Vdc	min	Nom	max	Vp	Ip(A)	J	A	pF
VJ13MC0180K	18	21.5	24	26.5	45	10	1.5	500	3000
VJ13MC0260K	26	29.7	33	36.3	62	10	1.2	300	1120
VJ13MC0300K	30	35	39	43	73	10	0.9	220	1020
VJ13PC0300K	30	35	39	43	73	10	1.2	280	1150
VJ13MC0480K	48	54.5	60.5	66.5	110	10	0.9	220	800
VJ13PC0480K	48	54.5	60.5	66.5	110	10	1.2	250	840
VJ13MC0600K	60	67	75	83	126	10	1.5	250	600



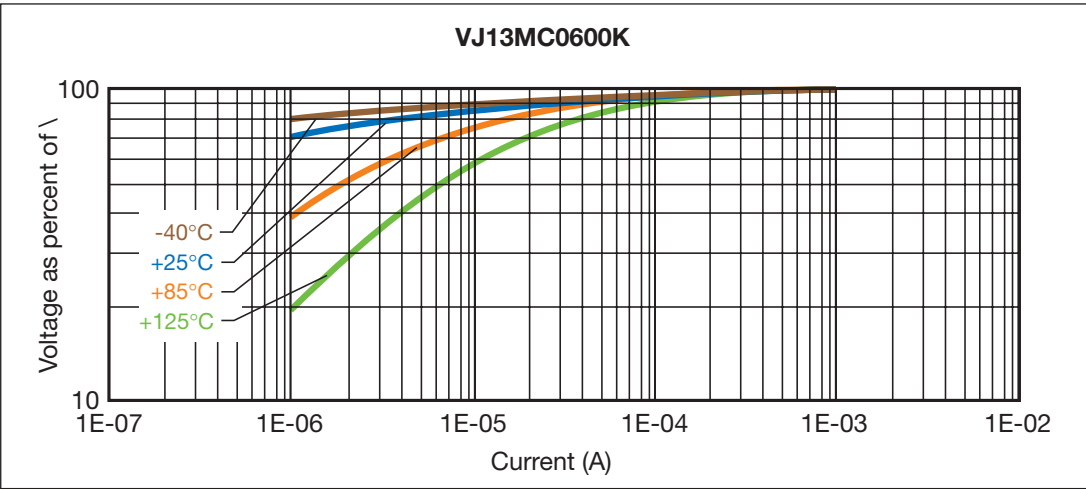
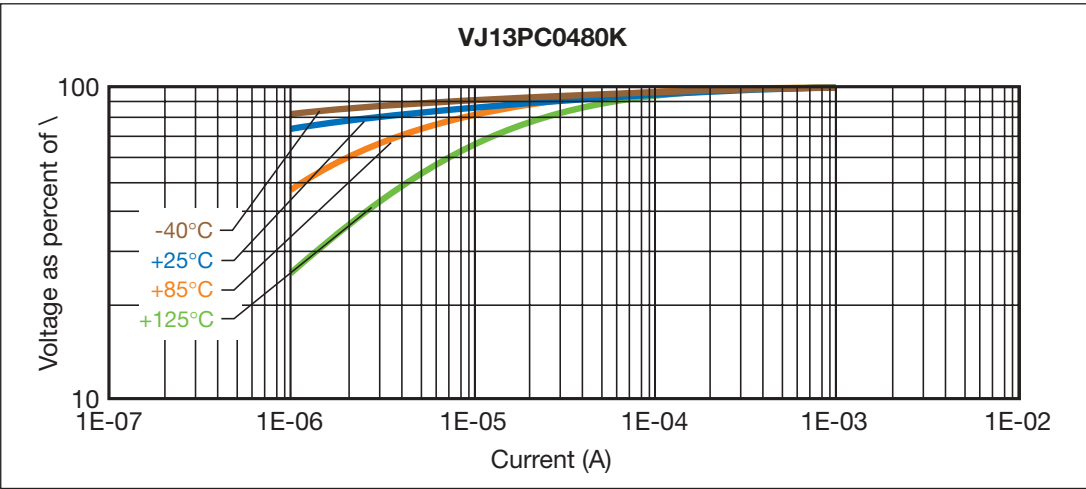
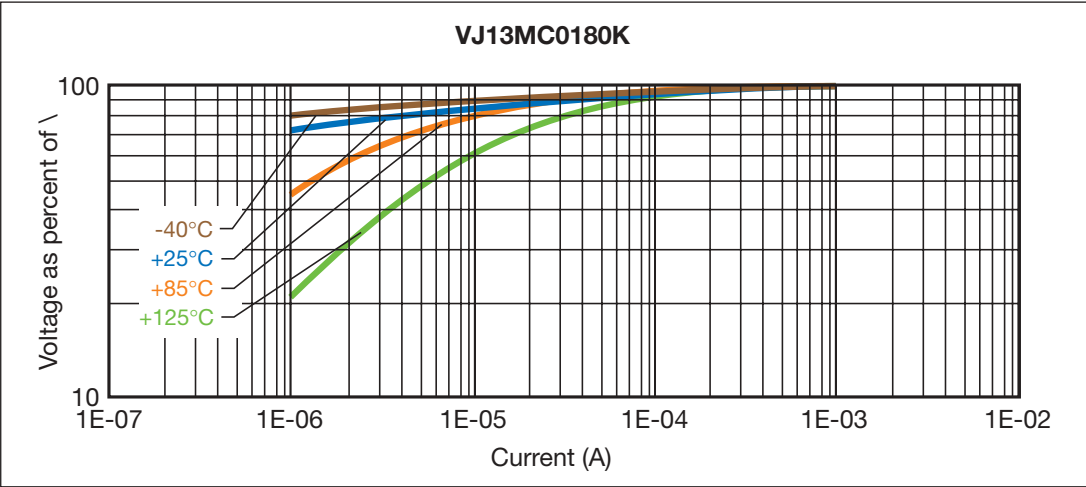
Medium Power MLV (VC13, 14, 15, 20)



Medium Power Multilayer Chip Varistor Transient Voltage Suppression and ESD Protection Devices

STANDARD SERIES - VJ13 (1210)

TEMPERATURE DEPENDENCE OF V/I CHARACTERISTIC



Medium Power MLV (VC13, 14, 15, 20)



Medium Power Multilayer Chip Varistor Transient Voltage Suppression and ESD Protection Devices

TELECOM SERIES - VC14 (1812)

FEATURES

- Pd/Ag Terminations
- High Energy Ratings (up to 6 Joules with 1812 case)
- Multiple Strike Capability
- Provides EMC Capacitance
- Effective Alternative to Leaded MOVs between 60-90Vrms
- Specified in accordance to CCITT 10/700ms Pulse test

TARGET APPLICATIONS

- Phone Lines, ADSL Lines, and other Telecom Circuits
- Consumer Products

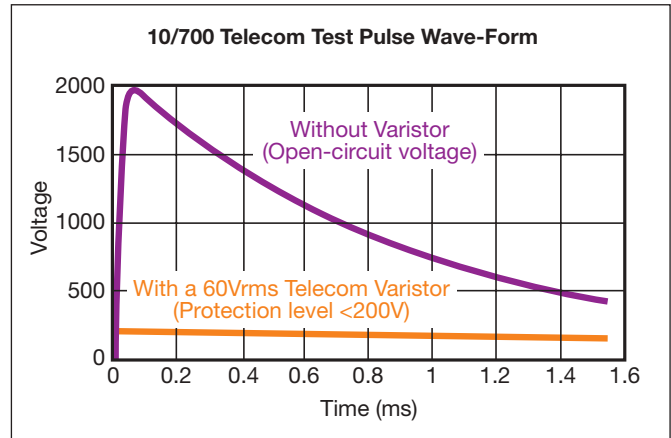
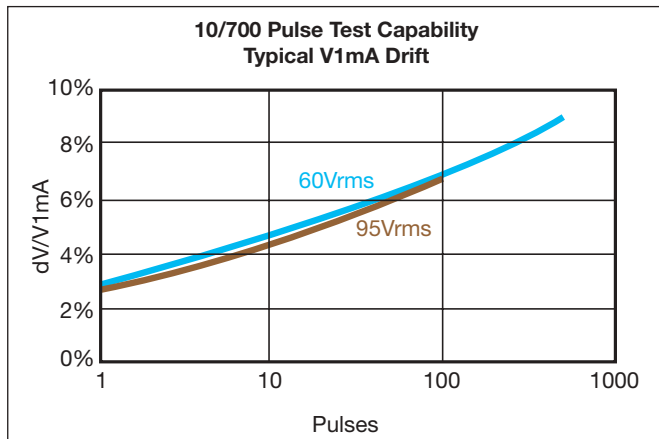
GENERAL CHARACTERISTICS

Storage Temperature: -55°C to +125°C
Operating Temperature: -55°C to +125°C

CCITT 10x700µs TEST

A test pulse of 10x700µs duration as specified by CCITT or IEC 61000-4-5 is often used to check the interference immunity of telecom equipment.

The curves show that the 60Vrms varistor can reduce the interference voltage at the equipment connected from 2kV to less than 200V.



Ten pulses with a duration of 10x700µs applied at one minute intervals are specified for telecom equipment.

The curves show the V1mA drift when more than 10 pulses are applied.

PART NUMBERS

Part Number	Operating Voltage		Vclamp (8x20µs)		Energy (10x1000µs) J	Max Ipeak (8x20µs) 1 Surge Ip (A)	Mean Power Dissipation W	CCITT 10Pulse (10x700µs) V	Typical Cap pF
	Vrms	Vdc	Vp	Ip					
VC14MT0600K--	60	85	200	45	6	400	0.015	2000	400
VC14MT0950K--	95	125	270	45	5	250	0.015	2000	250

Medium Power MLV (VC13, 14, 15, 20)



Medium Power Multilayer Chip Varistor Transient Voltage Suppression and ESD Protection Devices

AUTOMOTIVE SERIES – VC13, 14, 15, 20

FEATURES

- Pd/Ag Terminations
- High Energy Ratings (up to 25 Joules with 2220 case size)
- Multiple Strike Capability
- Provides EMC Capacitance
- Well suited to protect against automotive related transients
- Specified with “Load Dump” and “Jump Start” Test Requirements

GENERAL CHARACTERISTICS

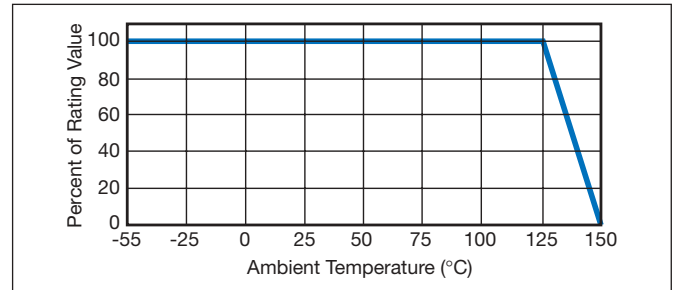
Storage Temperature: -55°C to +125°C
Operating Temperature: -55°C to +125°C

TARGET APPLICATIONS

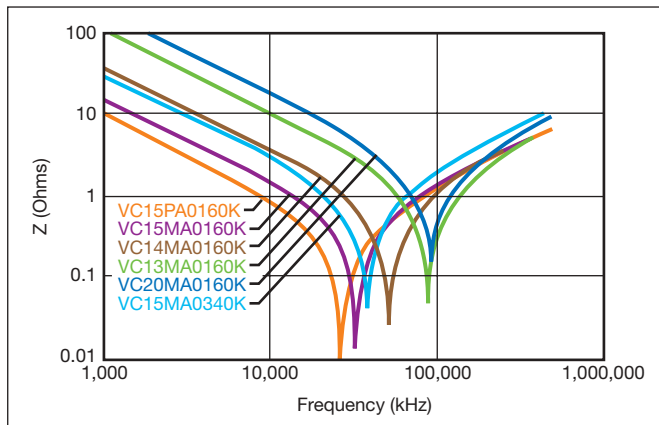
Automotive and other Consumer Products

TEMPERATURE CHARACTERISTICS

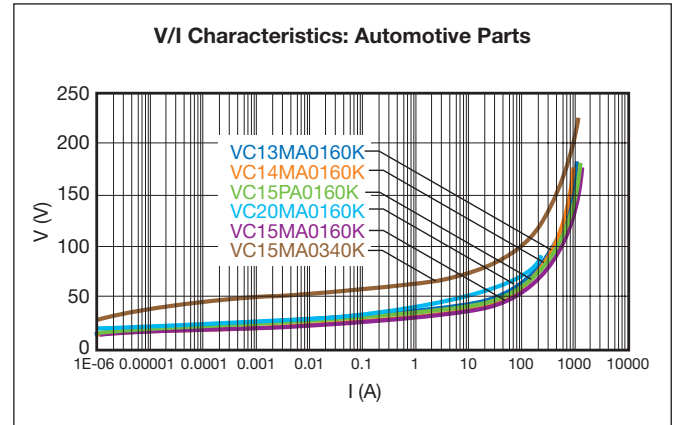
For Current, Energy and Power



IMPEDANCE CHARACTERISTICS



V/I CHARACTERISTICS



PART NUMBERS

Part Number	Case Size	Operating Voltage		Vnominal At 1mA DC			Vclamp (8x20µs)		Leakage At Vdc	Energy (10x1000µs)	Load Dump (10x)	Jump Start 5min	Max.Peak Current (8x20µs)	Mean Power Dissipation	CAP (1kHz/.5Vrms)
	EIA	Vrms	Vdc	min	Nom	max	Vp	Ip(A)	µA	J	J	Max V	Ip (A)	W	pF
VC20MA0160K	1206	14	16	22	24.5	27	40	1	50	0.6	1.5	24.5	200	0.008	900
VC13MA0160K	1210	14	16	22	24.5	27	40	2.5	100	1.6	3	24.5	400	0.010	1800
VC14MA0160K	1812	14	16	22	24.5	27	40	5	100	2.4	6	24.5	800	0.015	5000
VC15MA0160K	2220	14	16	22	24.5	27	40	10	100	5.8	12	24.5	1200	0.030	11000
VC15PA0160K	2220	14	16	22	24.5	27	40	10	100	5.8	25	24.5	1200	0.030	16000
VC15MA0340K	2220	30	34	42.3	47	51.7	77	10	100	12	12	50	1200	0.030	4000

Medium Power MLV (VC13, 14, 15, 20)

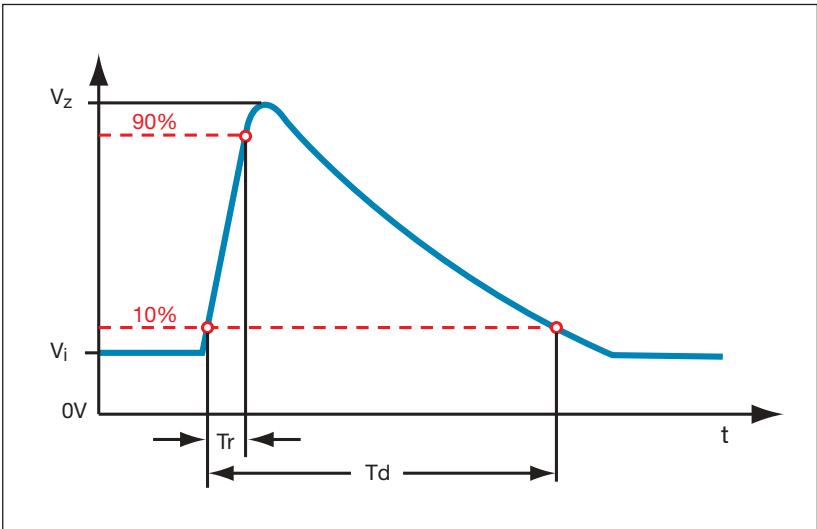


Medium Power Multilayer Chip Varistor Transient Voltage Suppression and ESD Protection Devices

AUTOMOTIVE SERIES – VC13, 14, 15, 20

AUTOMOTIVE LOAD DUMP TEST

(According to ISO DP7637/2 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.

Voltage Pulse applied to the varistor:

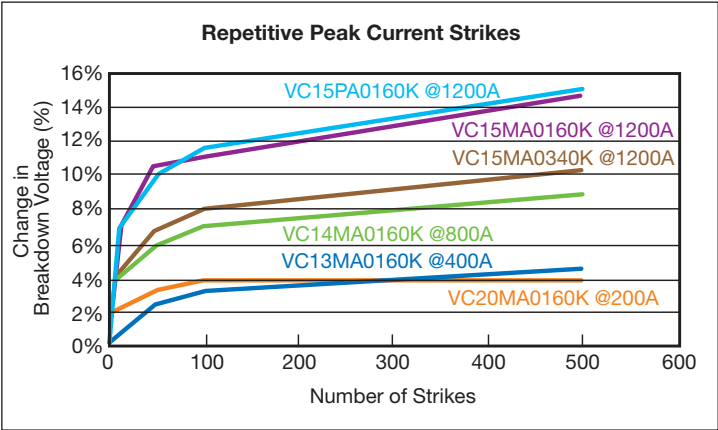
12V Network

$V_i = 13.5V$
 $T_d = 100$ to $350ms$
 $R_i = 2$ Ohms (Internal Resistance)
 $V_z = 70$ to $200V$
Number of Pulses = 10 Pulses
Other Load Dump Simulations can be achieved

24V Network

$V_i = 27V$
 $T_d = 100$ to $350ms$
 $R_i = 2$ Ohms (Internal Resistance)
 $V_z = 70$ to $200V$
Number of Pulses = 10 Pulses

PULSE DEGRADATION



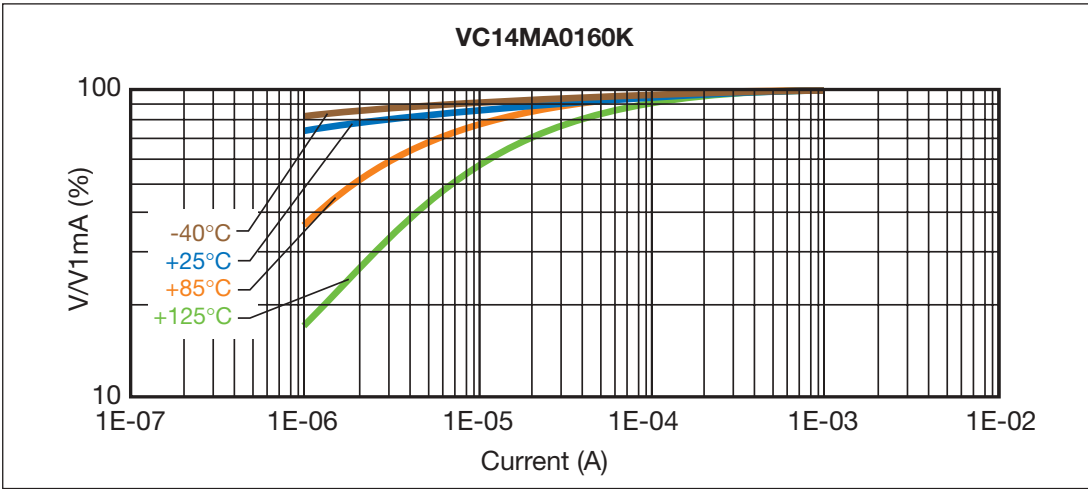
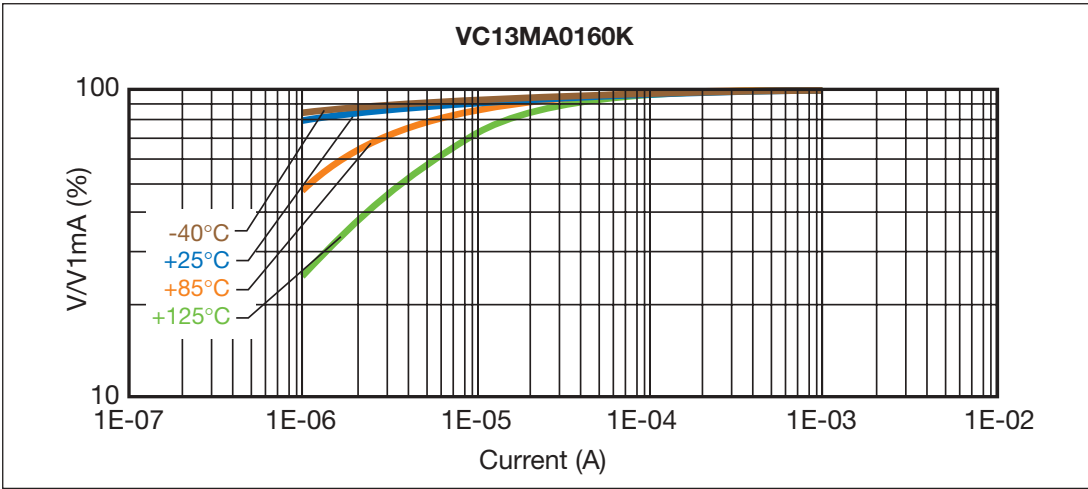
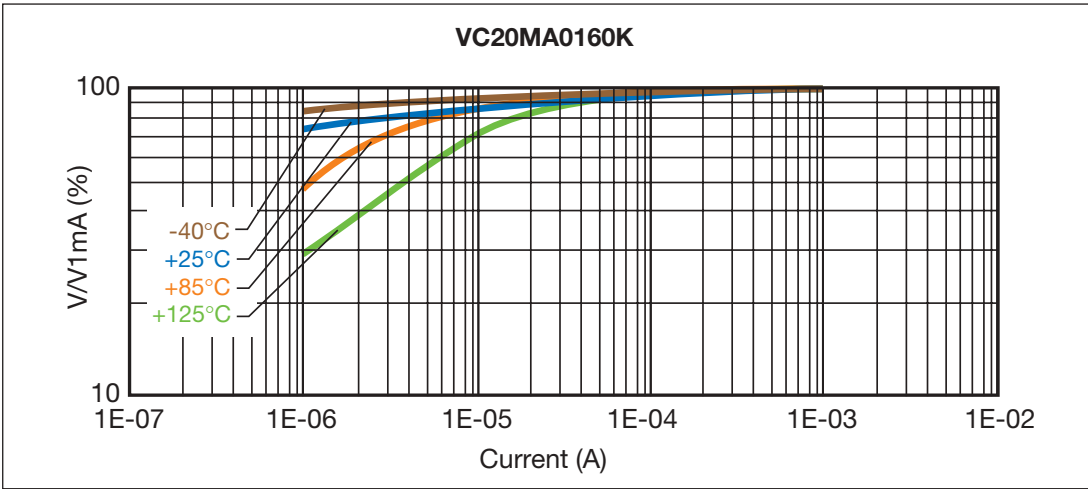
Medium Power MLV (VC13, 14, 15, 20)



Medium Power Multilayer Chip Varistor Transient Voltage Suppression and ESD Protection Devices

AUTOMOTIVE SERIES – VC13, 14, 15, 20

TEMPERATURE DEPENDENCE OF V/I CHARACTERISTIC



Medium Power MLV (VC13, 14, 15, 20)



Medium Power Multilayer Chip Varistor Transient Voltage Suppression and ESD Protection Devices

AUTOMOTIVE SERIES – VC13, 14, 15, 20

TEMPERATURE DEPENDENCE OF V/I CHARACTERISTIC

