

Transient Voltage Suppressor

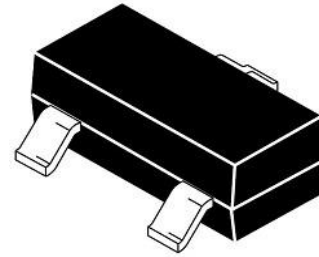
Features

- IEC 61000-4-2(ESD) $\pm 30\text{KV}(\text{air})$, $\pm 30\text{KV}(\text{contact})$
- IEC 61000-4-5 (Lightning) 20A (12V), 28A (7V), 8/20 μS
- 500 Watts peak pulse power per Line ($t_p=8/20\mu\text{S}$)
- Protects two lines(+12V, -7V)
- Low clamping voltage
- RoHS Compliant
- Moisture sensitivity level: Level 1
- Weight 8 mg

Application Information

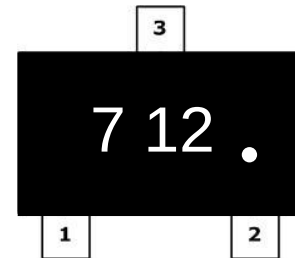
- Protection of RS-485 transceivers with extended common-mode range
- Security systems
- Automatic Teller Machines
- HFC systems
- Networks

Exterior



SOT-23

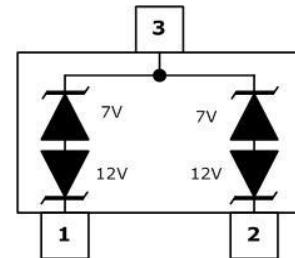
Package (top view)



Agency Approvals

Icon	Description
RoHS	Compliance with 2011/65/EU
HF	Compliance with IEC61249-2-21:2003
	Mean lead free

Schematic



Part Number and Electrical Parameter

Part Number	Mark	Direction	$I_{\text{DRM}}@ V_{\text{DRM}}$		$V_{\text{BR}}^{①}@ I_{\text{R}}$		$V_{\text{c}}@I_{\text{pp}}^{②}$		$R_{\text{DYN}}@ \text{TLP}^{③}$	$V_{\text{c}}@I_{\text{pp}} \text{ TLP}^{③}$		$C_{\text{O}}^{④}$
			μA	V	V	mA	V	A	Ω	V	A	pF
			MAX		MIN		MAX		TYP	TYP		MAX
BV_SM712-A	712.	Pin 3 to Pin 1 / Pin2	1	7	8	1	18	28	0.12	11.7	16	80
		Pin 1 / Pin 2 to Pin 3	1	12	13.3	1	26	20	0.14	18	16	80

Absolute maximum ratings measured at $T_{\text{A}}=25^{\circ}\text{C}$ RH = 45%-75% (unless otherwise noted).

① V_{BR} is measured at $I_{\text{R}}=1\text{mA}$

② Surge Waveform: 8/20 μS .

③ TLP parameter: $Z_0 = 50\Omega$, $t_p = 100\text{ns}$, $t_r = 1\text{ns}$, R_{DYN} is calculated from 4A to 16A

④ Off-state capacitance is measured in $V_{\text{DC}}=0\text{V}$, $V_{\text{RMS}}=300\text{mV}$, $f=1\text{MHz}$.

Transient Voltage Suppressor

Part Numbering System

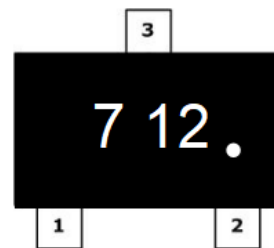
BV SM712 -A
(1) (2) (3)

(1) Bencent Transient Voltage Suppressor

(2) Series: SM712 etc

(3)Special code

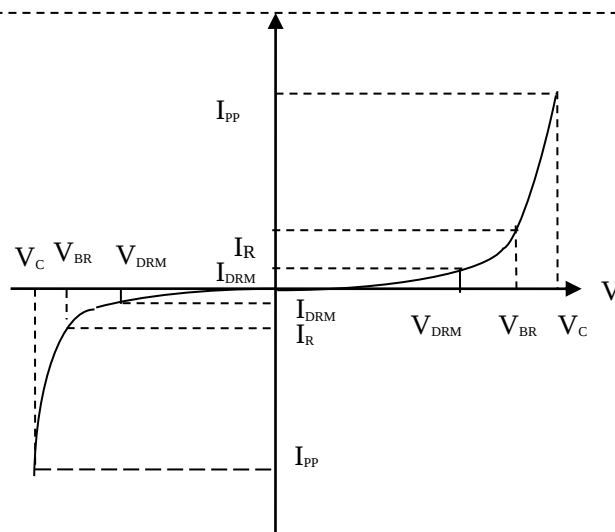
Mark



712: Part Number

V-I Curve

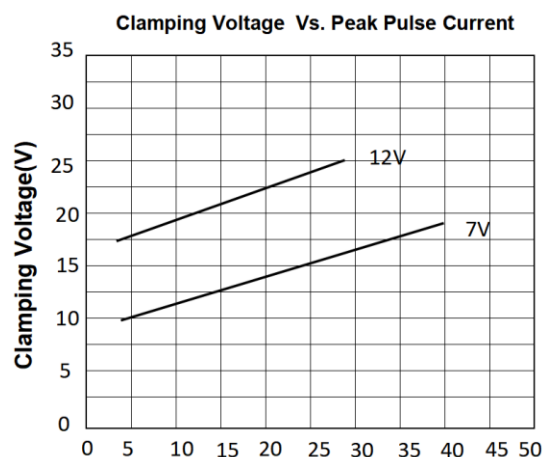
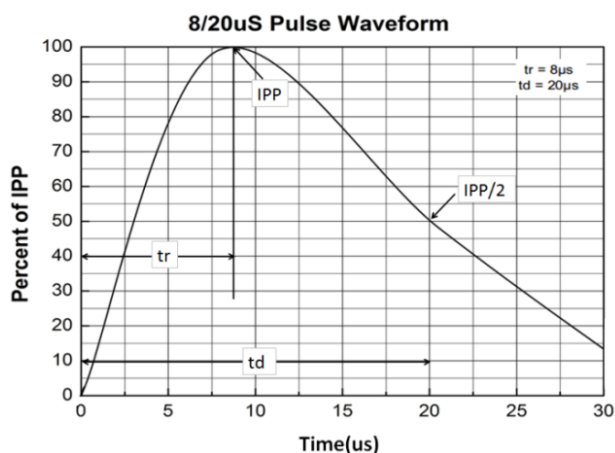
Parameters	Definition
V_C	Clamping voltage
I_{PP}	Surge waveform 8/20 μ s
V_{DRM}	Stand-off Voltage
V_{BR}	Breakdown Voltage
I_{DRM}	Reverse Leakage Current
I_R	Test current
P_{pp}	Peak Pulse Power Dissipation



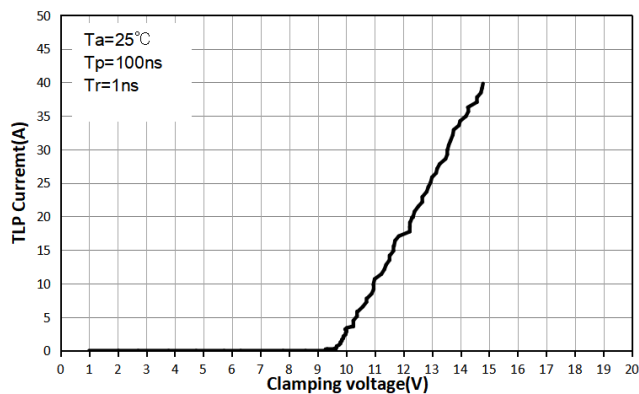
Thermal Considerations

symbol	Parameter	Value	Unit
T_J	Operating Junction Temperature Range	-55 to +150	°C
T_S	Storage Temperature Range	-55 to +150	°C

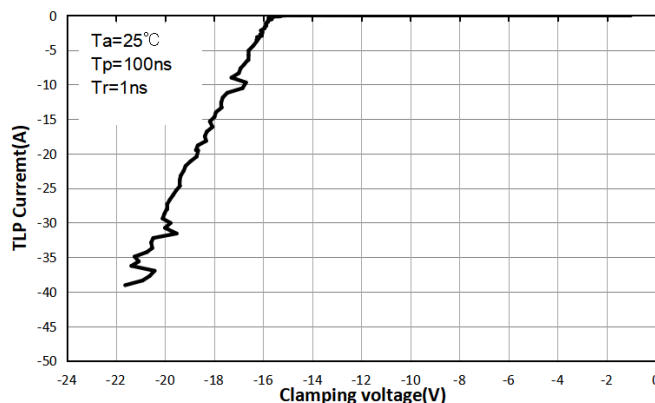
Typical Characteristics



TLP IV curve Pin3 to Pin1,2



TLP IV curve Pin1,2 to Pin3

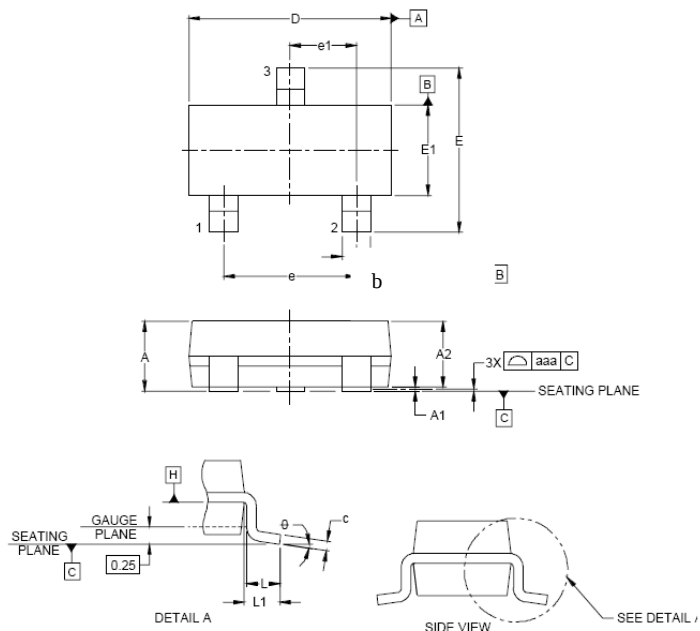


Environmental Characteristics

Testing items	Technical standards
High temperature Reverse Bias Test	Temperature: $150\pm 3^{\circ}\text{C}$ Bias= $80\%V_{\text{DRM}}$ Time: 168H
High Temperature Life Test	Temperature: 150°C Time: 168H
High-low Temperature Cycle test	Temperature: From -40°C to 125°C Dwell time: 30min, 10cycles
High Temperature & High Humidity Test	Temperature: 85°C Humidity: 85% Time: 168H
Pressure cooker Test	Temperature: 121°C , 2atm. Humidity: 100% Time: 24H
Resistance of soldering heat	Temperature: $260\pm 5^{\circ}\text{C}$ Time of dip soldering: 10s, 3times

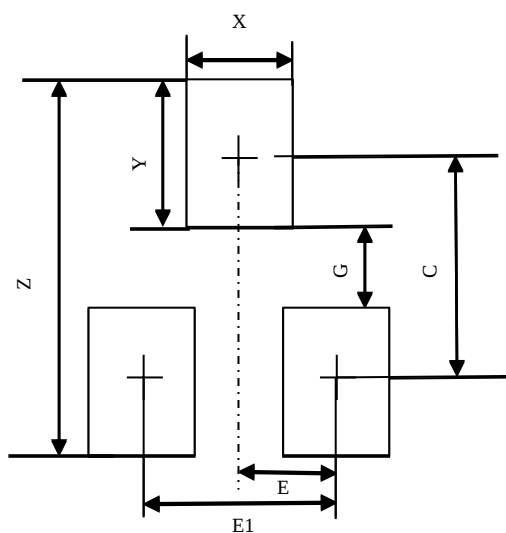
Note: The above testing items can be specified by customer's special request

Product Dimensions



REF	mm	inch
A	1.005 ± 0.12	0.04 ± 0.005
A1	0.1 (max)	0.004 (max)
A2	0.95 ± 0.07	0.037 ± 0.003
b	0.4 ± 0.1	0.016 ± 0.04
c	0.13 ± 0.05	0.005 ± 0.02
D	2.9 ± 0.14	0.114 ± 0.005
E	2.37 ± 0.27	0.093 ± 0.011
E1	1.3 ± 0.1	0.051 ± 0.004
L	0.5 ± 0.1	0.02 ± 0.005
L1	0.55(Max)	0.022(Max)
e	1.9	0.075
e1	0.95	0.037
θ	8 degree(Max)	

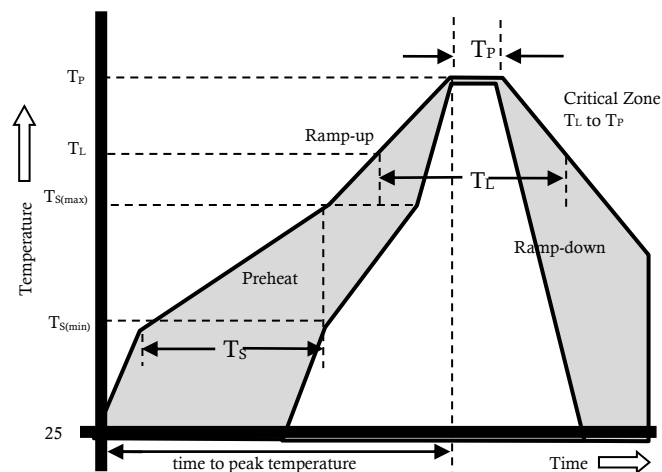
Recommended Soldering Pad



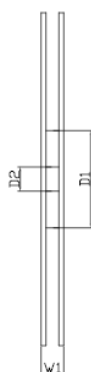
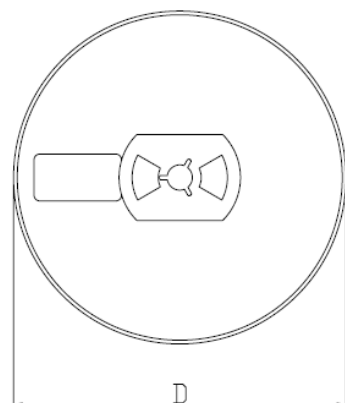
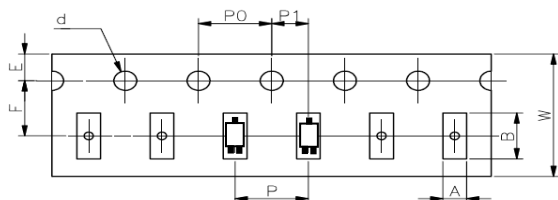
REF	mm	inch
C	2.20	0.087
E	0.95	0.037
E1	1.90	0.075
G	0.80	0.031
X	1.00	0.039
Y	1.40	0.055
Z	3.60	0.141

Reflow Profile

Reflow Condition		Pb-Free assembly
Pre Heat	Temperature Min	150°C
	Temperature Max	200°C
	Time (min to max)	60 – 180 secs
Average ramp up rate (Liquid) Tamp (T _L) to peal		3°C/s max
T _S (max) to T _L - Ramp-up Rate		3°C/s max
Reflow	- Temperature (T _L) (Liquid)	217°C
	- Temperature (T _L)	60 – 150 secs
Peak Temperature (T _P)		260+0/-5 °C
Time within 5°C of actual peak Temperature (T _P)		30secs
Ramp-down Rate		6°C/s max
Time 25°C to peak Temperature (T _P)		8 mins Max.
Do not exceed		260°C



Package Reel Information



REF	mm	inch
A	3.50+/-0.1	0.138+/-0.004
B	2.9+/-0.1	0.114+/-0.004
d	1.25+/-0.1	0.049+/-0.004
D	178+/-1.0	7.01+/-0.039
D1	55+/-3	2.165+/-0.118
D2	13+/-0.5	0.512+/-0.020
E	1.75+/-0.1	0.069+/-0.004
F	3.5+/-0.2	0.138+/-0.008
P	4.0+/-0.2	0.158+/-0.008
P0	4.0+/-0.2	0.158+/-0.008
P1	2.0+/-0.2	0.079+/-0.008
W	8.0+/-0.2	0.315+/-0.008
W1	14.4+/-0.5	0.567+/-0.020

Outline	Reel (pcs)	Per Carton (pcs)	Reel Diameters (mm)	Carton Size(mm)		
				L	W	H
Taping	3,000	90,000	177	380	220	205