

# Surface Mount Transient Voltage Suppressors (TVS)

**SM4KBF Series**
**15 to 20 V**
**SMBF**
**Features**

- ◆ Excellent clamping capability.
- ◆ Low profile package and low inductance.
- ◆ High peak pulse voltage capability on 1.2/50µs-8/20µs@2Ω waveform..
- ◆ Fast response time: typically less than 1.0ps from 0V to  $V_{BR}$  min.
- ◆ High temperature soldering: 260°C/40s at terminals.
- ◆ Plastic package has underwriters laboratory flammability 94V-0.
- ◆ For surface mounted applications in order to optimize board space.

Bi-directional


**Functional Diagram**


Bi-directional

**Absolute Maximum Ratings ( $T_A=25^\circ\text{C}$ , RH=45%-75%, unless otherwise noted)**

Parameter	Symbol	Value	Unit
Steady state power dissipation at $T_L=75^\circ\text{C}$	$P_{M(AV)}$	6.5	W
Peak pulse voltage on 1.2/50µs-8/20µs@2Ω waveform	$V_{PP}$	4000	V
Storage temperature range	$T_{STG}$	-55 to +150	°C
Operating junction temperature range	$T_J$	-55 to +150	°C

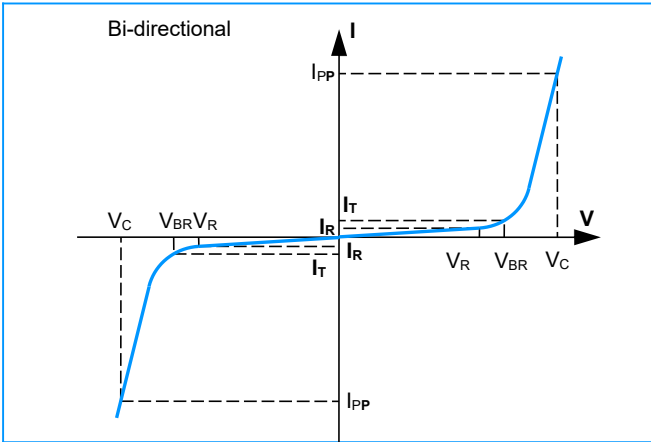
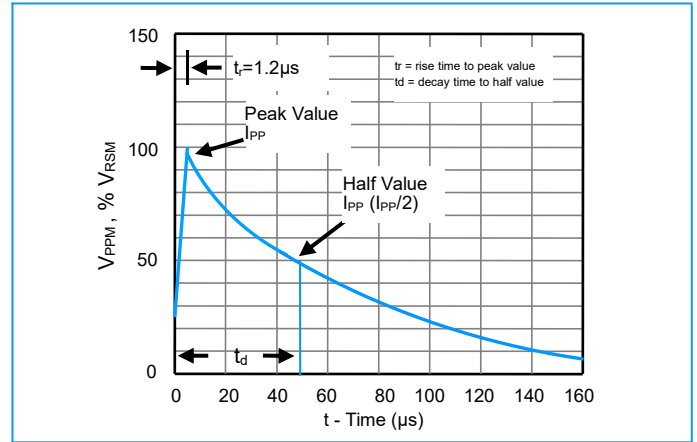
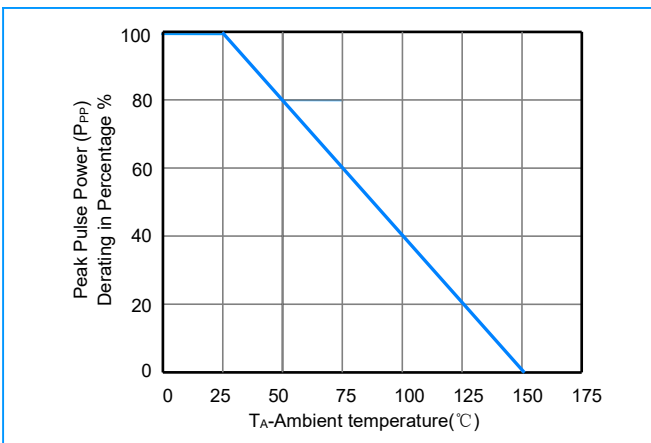
**Electrical Characteristics ( $T_A=25^\circ\text{C}$ )**

Part Number	Marking Code	$V_R$ (V)	$I_R @ V_R$ (µA)	$V_{BR} @ I_T$ (V)		$I_T$ (mA)	$V_C @ I_{PP}^{\text{①}}$ Max (V)	$V_{PP}/I_{PP}$ (V/A)
				MIN	MAX			
SM4KBF15CA	4K15B	15	1	16.7	18.5	1	42	4KV/2KA
SM4KBF16CA	4K16B	16	1	17.8	19.7	1	43	4KV/2KA
SM4KBF18CA	4K18B	18	1	20.0	22.3	1	45	4KV/2KA
SM4KBF20CA	4K20B	20	1	22.0	24.5	1	47	4KV/2KA

**Notes:**

- ① Surge waveform: 1.2/50µs - 8/20µs@2Ω (Meet IEC6100-4-5).  
 $V_R$ : Stand-off Voltage -- Maximum voltage that can be applied.  
 $V_{BR}$ : Breakdown Voltage.  
 $V_C$ : Clamping Voltage -- Peak voltage measured across the suppressor at a specified  $V_{PP}/I_{PP}$ .  
 $I_R$ : Reverse Leakage Current.

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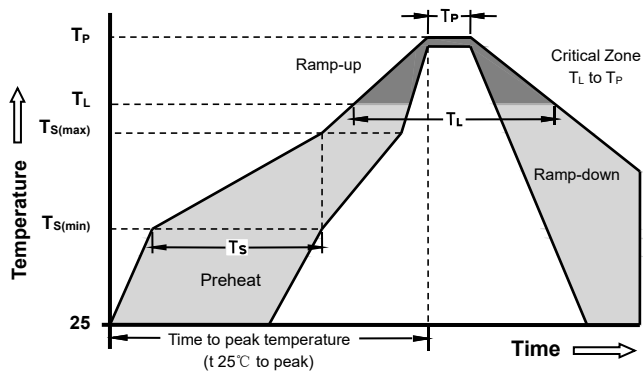
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**Ratings and V-I Characteristics Curves ( $T_A=25^{\circ}\text{C}$ , unless otherwise noted)**
**Figure 1 - V-I Curve Characteristics**

**Figure 2 - Pulse Waveform**

**Figure 3 - Pulse Derating Curve**


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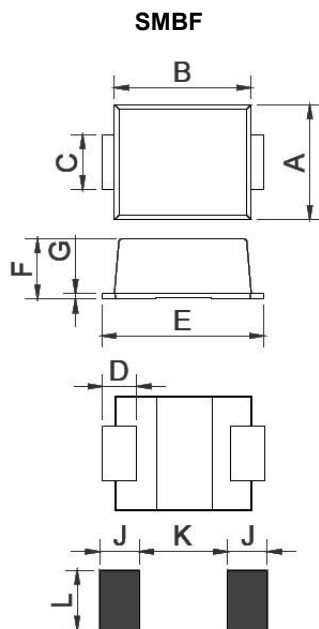
## Soldering Parameters

### Reflow Condition



Reflow Condition		Lead-free assembly
Pre Heat	-Temperature Min ( $T_{s(min)}$ )	150°C
	-Temperature Max ( $T_{s(max)}$ )	200°C
	- Time (min to max) ( $T_s$ )	60 - 180 seconds
Average ramp up rate ( Liquidus Temp $T_L$ ) to peak		3°C/second max
$T_{s(max)}$ to $T_L$ - Ramp-up Rate		3°C/second max
Reflow	- Temperature ( $T_L$ ) (Liquidus)	217°C
	- Time (min to max) ( $T_L$ )	60 - 150 seconds
Peak Temperature ( $T_P$ )		260 +0/-5°C
Time within 5 °C of actual peak Temperature ( $t_p$ )		20 - 40 seconds
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature ( $T_P$ )		8 minutes max
Do not exceed		260°C

## Dimensions

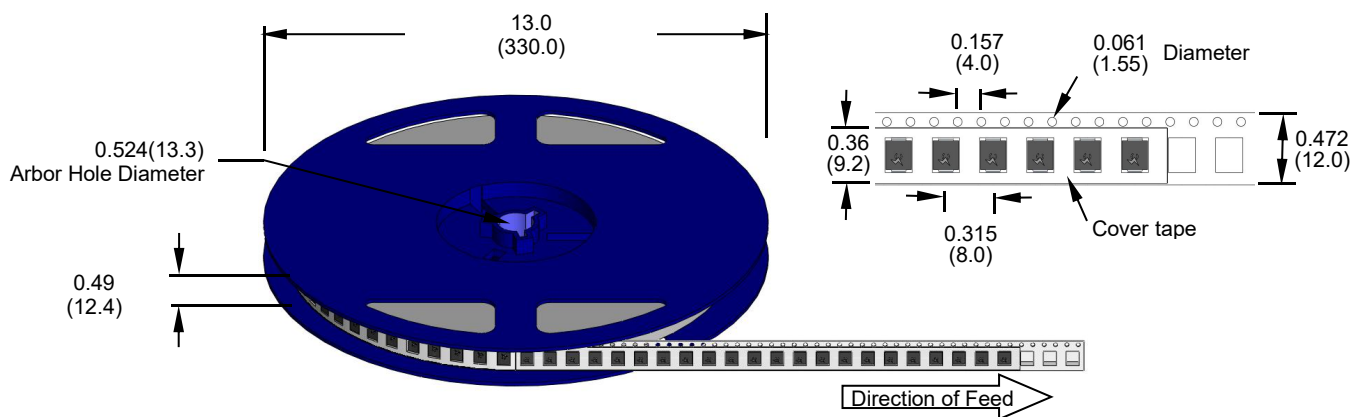


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.154	0.177	3.90	4.50
B	0.183	0.203	4.65	5.15
C	0.073	0.085	1.85	2.15
D	0.024	-	0.6	-
E	0.220	0.236	5.60	6.00
F	0.081	0.093	2.05	2.35
G	0.005	0.011	0.12	0.28
J	0.079	-	2.00	-
K	-	0.126	-	3.20
L	0.091	-	2.30	-

# Surface Mount Transient Voltage Suppressors (TVS)

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**Packaging**

Part Number	Package	Reel (pcs)	Per Carton (pcs)	Tape & Reel (inch)
SM4KBF Series	SMBF	3000	48000	13

**Tape and Reel Specifications**

 Dimensions are in inches  
(and millimeters)