

# SMTOAK2 Series

## Surface Mount – SMTO-263-2 kA



### Web Resources



Download ECAD models, order samples, and find technical resources at [www.littelfuse.com](http://www.littelfuse.com)

### Agency Approvals

Agency	Agency file number
	E230531

### Maximum Ratings and Thermal Characteristics

( $T_A=25\text{ }^\circ\text{C}$  unless otherwise noted)

Parameter	Symbol	Value	Unit
Current Rating <sup>1</sup>	$I_{PP}$	2	kA
Steady State Power Dissipation on Infinite Heat Sink at $T_J=75\text{ }^\circ\text{C}$	$P_D$	15	W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to 150	$^\circ\text{C}$
Typical Thermal Resistance Junction to case	$R_{\theta JC}$	1.8	$^\circ\text{C/W}$

**Note:**

1. Rated  $I_{PP}$  measured with 8/20  $\mu\text{s}$  pulse.

### Functional Diagram



Bi-directional

### Description

The SMTOAK2 TVS Diode Series is housed in a modified SMTO-263 package, achieving a compact mechanical design and compatible with automated PCB assembly. The SMTOAK2 series is designed to protect sensitive electronics against surge events and inductive load switching voltage transient events. The SMTOAK2 series offers superior clamping characteristics over standard S.A.D. technologies by virtue of the Littelfuse Foldbak™ technology, which provides a clamping voltage lower than the avalanche voltage (but above the rated working voltage).

### Features & Benefits

- SMTO-263 low profile surface mount package minimizing PCB footprint and foot print is compatible to industrial popular DO-218AB package PCB footprint
- $V_{BR} @ T_J = V_{BR} @ 25\text{ }^\circ\text{C} \times (1 + \alpha T \times (T_J - 25))$  ( $\alpha T$ : Temperature Coefficient, typical value is 0.1%)
- Glass passivated chip junction
- Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c pass class 1/2
- Foldbak™ technology for superior clamping factor
- IEC 61000-4-2 ESD 30 kV(Air), 30 kV (Contact)
- Low dynamic resistance
- Recognized compound meeting flammability rating UL94V-0
- Halogen free and RoHS compliant
- Pb-free E3 means 2<sup>nd</sup> level interconnect is Pb-free and the terminal finish material is tin (Sn) (IPC/JEDEC J-STD-609A.01)
- Recognized to UL 497B as an Isolated Loop Circuit Protector

### Applications

Designed to protect sensitive electronics from:

- Over voltage surge transients
- Inductive load switching voltage transients
- PoE ports
- Remote Radio Units (RRUs) and Baseband Units (BBUs)
- High power DC bus in harsh environments

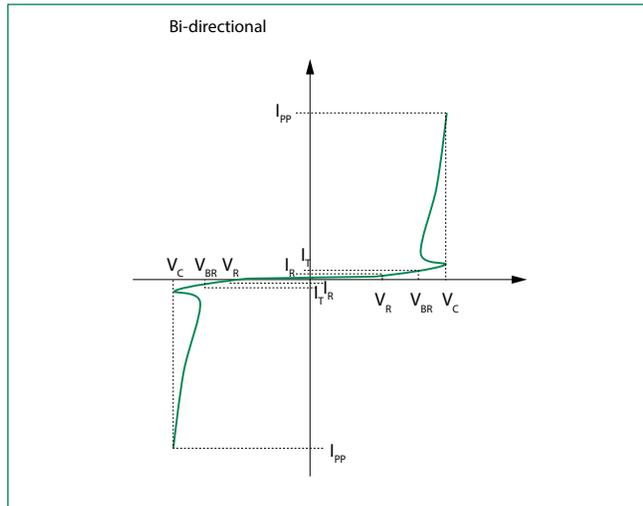
# SMTOAK2 Series

## Surface Mount – SMT0-263-2 kA

### Electrical Characteristics ( $T_A=25\text{ }^\circ\text{C}$ unless otherwise noted)

Part Number	Part Marking	Stand off Voltage $V_R$	Breakdown Voltage $V_{BR}$ (Volts) @ $I_T$		Test Current $I_T$ (mA)	Maximum Peak Pulse Current $I_{PP}$ (10/350 $\mu\text{s}$ ) (A)	Maximum Clamping Voltage $V_C$ @ $I_{PP}$ (8/20 $\mu\text{s}$ ) (V)	Maximum Peak Pulse Current $I_{PP}$ (8/20 $\mu\text{s}$ ) (A)	Maximum Reverse Leakage $I_R$ @ $V_R$ ( $\mu\text{A}$ )	Maximum Temperature coefficient of $V_{BR}$ (%/C)
			Min	Max						
SMTOAK2-066C	SM2K66C	66	73.73	81.10	5	200	108	2000	2	0.072
SMTOAK2-070C	SM2K70C	70	78.20	86.02	5	250	113	2000	2	0.074
SMTOAK2-076C	SM2K76C	76	84.91	93.39	5	360	120	2000	2	0.077

### I-V Curve Characteristics



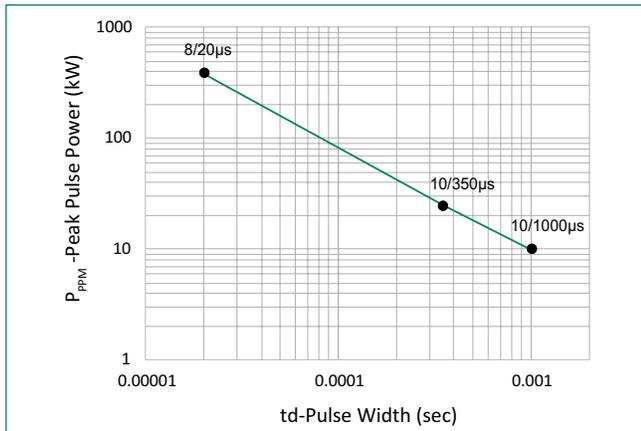
- $P_{PPM}$  Peak Pulse Power Dissipation ( $I_{PP} \times V_C$ )** -- Max power dissipation
- $V_{BR}$  Breakdown Voltage** -- Maximum voltage that flows through the TVS at a specified test current ( $I_T$ )
- $V_C$  Clamping Voltage** -- Peak voltage measured across the TVS at a specified  $I_{PPM}$  (peak impulse current)
- $I_R$  Reverse Leakage Current** -- Current measured at  $V_R$

# SMT0AK2 Series

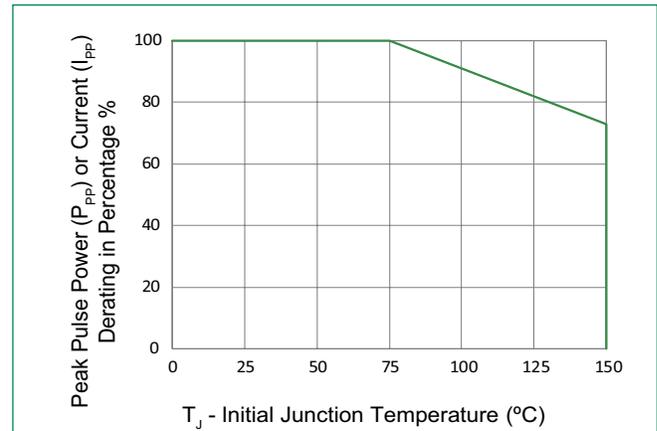
## Surface Mount – SMT0-263-2 kA

### Ratings and Characteristic Curves ( $T_A=25\text{ }^\circ\text{C}$ unless otherwise noted)

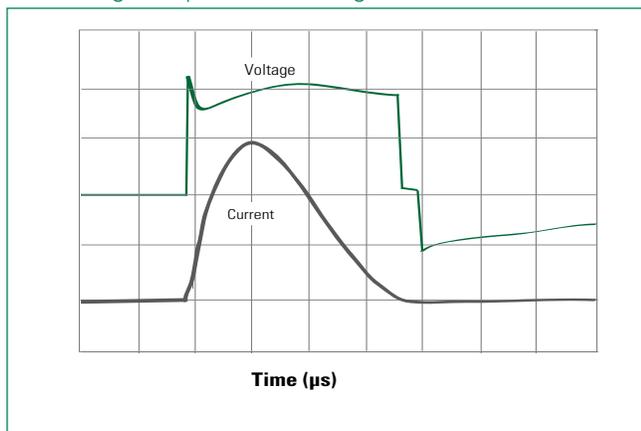
**Figure 1:**  
Peak Pulse Power Rating Curve



**Figure 2:**  
Peak Pulse Power Derating Curve



**Figure 3:**  
Surge Response (8/20 Surge current waveform)



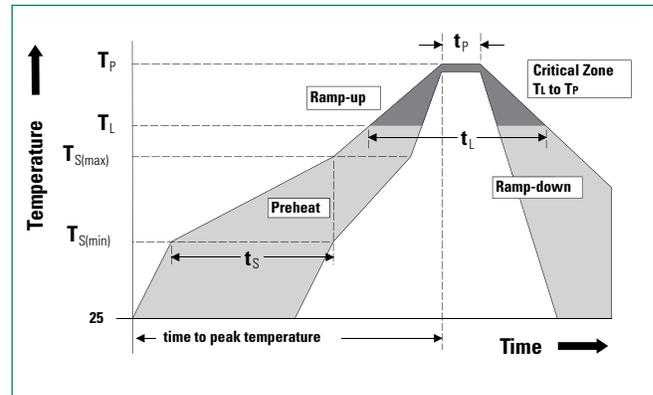
**Note:** The power dissipation causes a change in avalanche voltage during the surge and the avalanche voltage eventually returns to the original value when the transient has passed.

# SMT0AK2 Series

## Surface Mount – SMT0-263-2 kA

### Soldering Parameters

<b>Reflow Condition</b>		Pb – Free assembly
<b>Pre Heat</b>	- Temperature Min ( $T_{s(min)}$ )	150 °C
	- Temperature Max ( $T_{s(max)}$ )	200 °C
	- Time (min to max) ( $t_s$ )	60 – 120 secs
<b>Average ramp up rate (Liquidus Temp (<math>T_L</math>) to peak</b>		5 °C/second max
<b><math>T_{s(max)}</math> to <math>T_A</math> - Ramp-up Rate</b>		5 °C/second max
<b>Reflow</b>	- Temperature ( $T_L$ ) (Liquidus)	217 °C
	- Time (min to max) ( $T_s$ )	60 – 150 seconds
<b>Peak Temperature (<math>T_p</math>)</b>		245 <sup>+0/-5</sup> °C
<b>Time within 5 °C of actual peak Temperature (<math>t_p</math>)</b>		30 seconds
<b>Ramp-down Rate</b>		5 °C/second max
<b>Time 25 °C to peak Temperature (<math>T_p</math>)</b>		8 minutes Max.
<b>Do not exceed</b>		245 °C



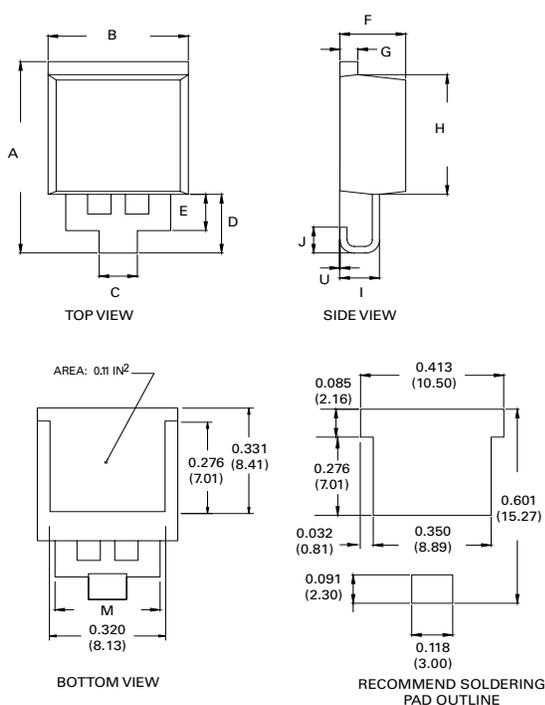
### Physical Specifications

<b>Weight</b>	0.065 ounce, 1.85 grams
<b>Case</b>	SMT0-263 molded component over glass passivated junction
<b>Terminal</b>	Matte Tin-plated leads, solderable per JESD22-B102

### Environmental Specifications

<b>High Temp Voltage Blocking (HTRB)</b>	100% DC reverse voltage rated 150°C, 1008 hrs. JEDEC, JESD22-A-108
<b>Biased Temp &amp; Humidity (H3TRB)</b>	1008 hours at TA = 85°C/85% RH with part reverse biased at 80% of rated breakdown voltage. JEDEC, JESD22-A-101
<b>Unbiased Highly Accelerated Stress Test (UAHST)</b>	96 hours at TA=130°C/85%RH .JEDEC, JESD22-A-118
<b>Temp Cycle(TC)</b>	-55°C to +150°C, 15 min. dwell, 1000 cycles. JEDEC, JESD22-A104
<b>Resistance to soldering heat (RSH)</b>	+260°C, 30 secs. JEDEC JESD22-A111
<b>Moisture Sensitivity Level (MSL)</b>	85%RH, +85°C, 168 hrs., 3 reflow cycles (+260°C Peak). JEDEC-J-STD-020, Level 1

### Dimensions

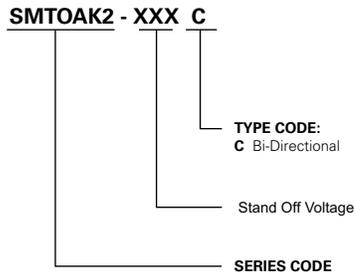


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.568	0.600	14.44	15.24
B	0.380	0.420	9.65	10.67
C	0.098	0.114	2.50	2.90
D	0.169	0.189	4.30	4.80
E	0.102	0.118	2.60	3.00
F	0.178	0.188	4.52	4.78
G	0.045	0.060	1.14	1.52
H	0.360	0.370	9.14	9.40
I	0.106	0.122	2.69	3.09
J	0.069	0.089	1.75	2.25
M	0.284	0.300	7.22	7.62
U	0	0.010	0	0.25

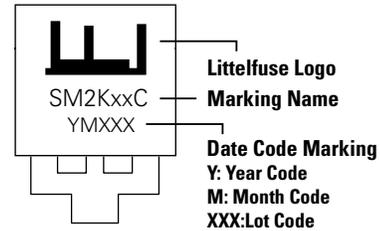
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### Part Numbering System



### Part Marking System

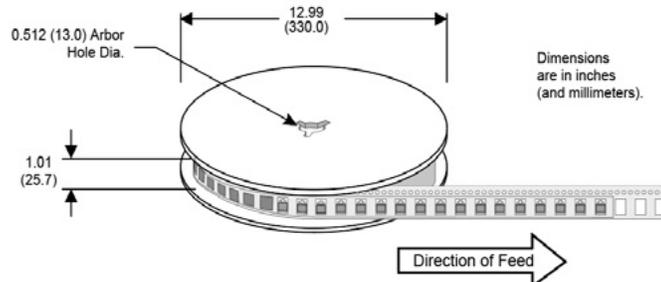
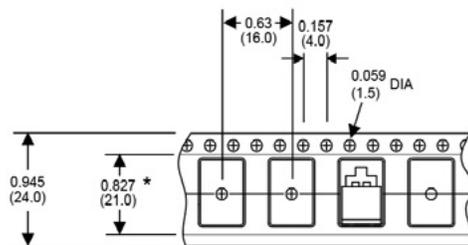


### Packing Option

Part Number	Component Package	Quantity	Packaging Option	Packaging Specification
SMTAK2-XXX-C	SMT0-263	500	Tape & Reel - 24mm tape/13" reel	EIA STD RS-481

### SMTO-263 Embossed Carrier Reel Pack (RP) Specifications

Meets all EIA-481-2 Standards



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