

# AQ27COM-02 Series

## 27 V Bidirectional 200 W TVS Diode Array, General Purpose ESD Protection

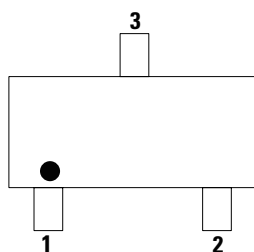


### Description

The AQ27COM-02 Series Bidirectional TVS Diodes utilize a proprietary silicon avalanche technology. These diodes provide electronic equipment with high ESD (electrostatic discharge) protection.

The AQ27COM-02 series TVS diodes can safely absorb repetitive ESD strikes of  $\pm 30$  kV (contact and air discharge as defined in IEC 61000-4-2) without any performance degradation. In addition, it can safely dissipate a 4 A 8/20  $\mu$ s surge event as defined in IEC 61000-4-5, 2nd edition.

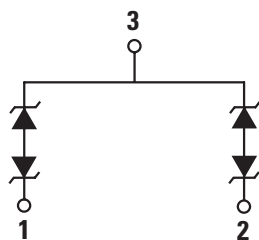
### Pinout



### Features

- ESD, IEC 61000-4-2,  $\pm 30$  kV contact/air
- ESD, ISO 10605, 330 pF 330  $\Omega$ ,  $\pm 30$  kV contact/air
- EFT, IEC 61000-4-4, 40 A (5/50 ns)
- Maximum surge tolerance, IEC 61000-4-5 2<sup>nd</sup> edition, 4A (8/20  $\mu$ s)
- Halogen-free, lead-free, and RoHS-compliant
- Moisture sensitivity level (MSL-1)
- AEC-Q101-qualified and PPAP-capable

### Functional Block Diagram



### Applications

- Automotive applications
- ADAS control units
- Body control units
- CAN bus
- Electronic control units
- Factory automation
- Lighting control (DALI)
- Power train control units

#### Life Support Note:

Not Intended for Use in Life Support or Life Saving Applications

The products shown herein are not designed for life-sustaining or life-saving applications unless expressly indicated.

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### Absolute Maximum Ratings

Symbol	Parameter	Value	Units
$P_{PK}$	Peak Pulse Power ( $t_p = 8/20 \mu s$ )	200	W
$I_{PP}$	Peak Current ( $t_p = 8/20 \mu s$ )	4.0	A
$T_{OP}$	Operating Temperature	-40 to 150	°C
$T_{STOR}$	Storage Temperature	-55 to 150	°C

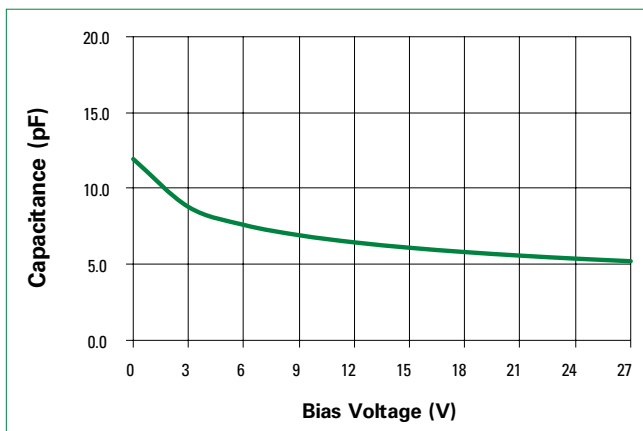
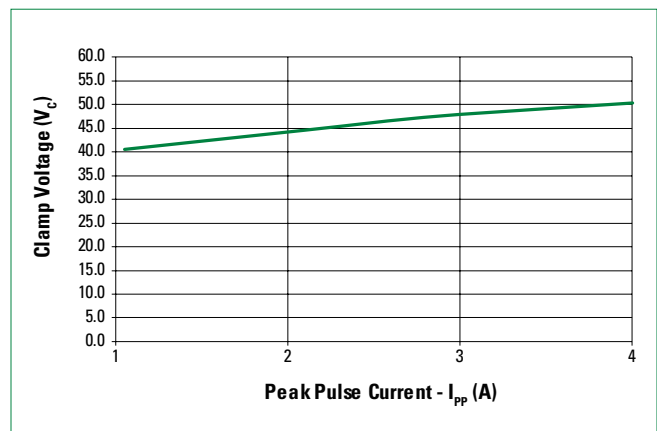
**CAUTION:** Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the component. This is a stress-only rating, and the operation of the component at these or any other conditions above those indicated in the operational sections of this specification is not implied or recommended.

### Electrical Characteristics ( $T_{OP} = 25 \text{ }^\circ\text{C}$ )

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	$V_{RWM}$	Pin 1 or Pin2 to Pin 3			27	V
Breakdown Voltage	$V_{BR}$	$I_R = 1 \text{ mA}$ , Pin 1 or Pin2 to Pin 3	28		35	V
Reverse Leakage Current	$I_{LEAK}$	$V_R = 27 \text{ V}$		10	50	nA
Clamp Voltage <sup>1</sup>	$V_C$	$I_{PP} = 1 \text{ A}$ , $t_p = 8/20 \mu s$ , Pin 1 or Pin2 to Pin 3		40.5		V
		$I_{PP} = 4 \text{ A}$ , $t_p = 8/20 \mu s$ , Pin 1 or Pin2 to Pin 3		50		V
Dynamic Resistance <sup>1,2</sup>	$R_{DYN}$	TLP, $t_p = 100 \text{ ns}$ , Pin 1 or Pin2 to Pin 3		0.5		$\Omega$
ESD Withstand Voltage <sup>1,3,4</sup>	$V_{ESD}$	IEC 61000-4-2 (Contact Discharge)	$\pm 30$			kV
		IEC 61000-4-2 (Air Discharge)	$\pm 30$			kV
		ISO 10605 (Contact Discharge)	$\pm 30$			kV
		ISO 10605 (Air Discharge)	$\pm 30$			kV
Diode Capacitance <sup>1</sup>	$C_{I/O-GND}$	Reverse Bias = 0 V, $f = 1 \text{ MHz}$ ; Pin 1 or Pin 2 to Pin 3		12		pF

**Note:**

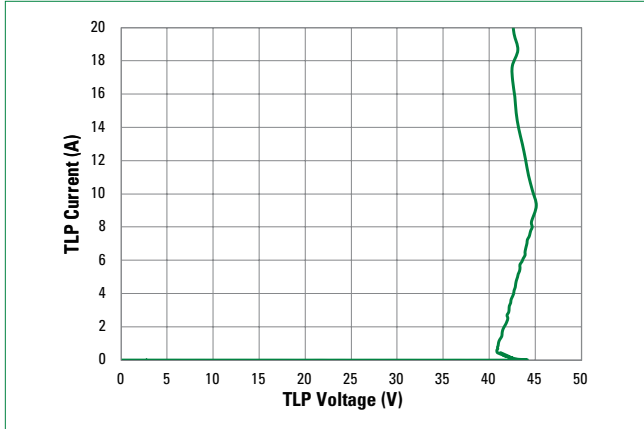
- Parameter is guaranteed by design and/or component characterization.
- Transmission Line Pulse (TLP) with 100ns width, 0.2 ns rise time, and average window  $t1 = 70 \text{ ns}$  to  $t2 = 90 \text{ ns}$
- Device stressed with ten non-repetitive ESD pulses according to IEC61000-4-2 ( $R = 330 \text{ } \Omega$ ,  $C = 150 \text{ pF}$ ).
- Device stressed with three non-repetitive ESD pulses according to ISO10605 ( $R = 330 \text{ } \Omega$ ,  $C = 330 \text{ pF}$ ).

**Capacitance vs. Reverse Bias****Clamping Voltage vs  $I_{PP}$** 

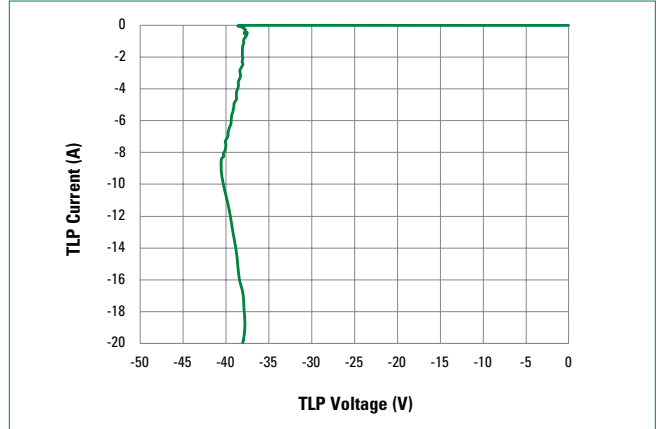
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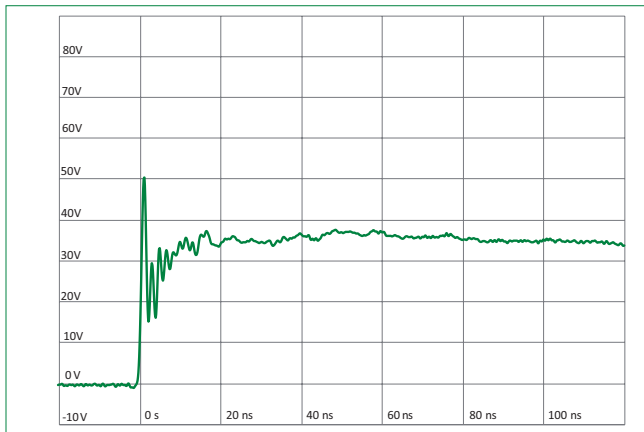
Positive Transmission Line Pulsing (TLP) Plot



Negative Transmission Line Pulsing (TLP) Plot



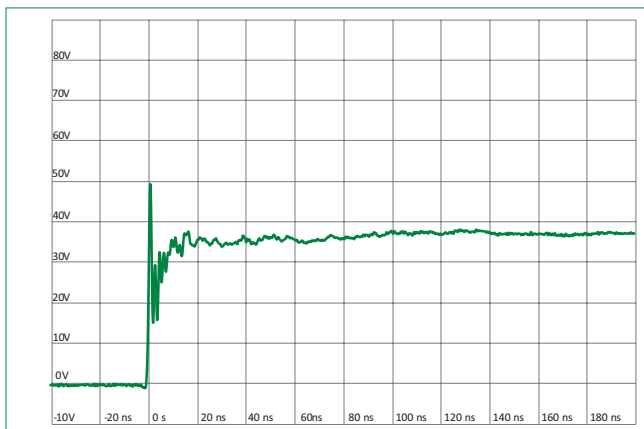
IEC 61000-4-2 +8 kV Contact ESD Clamping Voltage



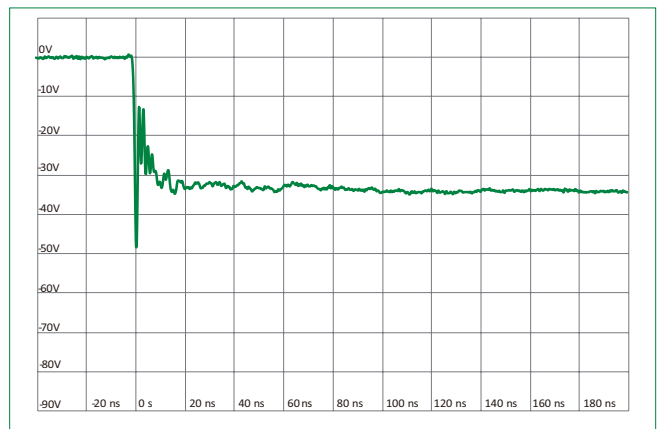
IEC 61000-4-2 -8 kV Contact ESD Clamping Voltage



ISO10605 Contact Discharge Plot at +8 kV



ISO10605 Contact Discharge Plot at -8 kV

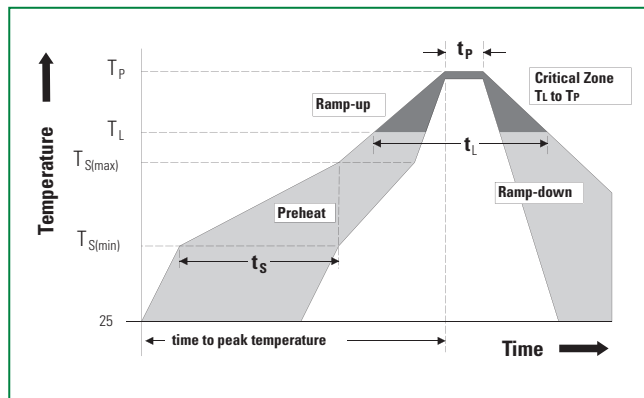


# AQ27COM-02 Series

## 27 V Bidirectional 200 W TVS Diode Array, General Purpose ESD Protection

### 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 seconds
<b>Average Ramp Up Rate (Liquidus) Temp (<math>T_L</math>) to Peak</b>		3 °C/second max
<b><math>T_{s(max)}</math> to <math>T_L</math> - Ramp-up Rate</b>		3 °C/second max
<b>Reflow</b>	- Temperature ( $T_L$ ) (Liquidus)	217 °C
	- Temperature ( $t_L$ )	60 – 150 seconds
<b>Peak Temperature (<math>T_p</math>)</b>		260 <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>		6 °C/second max
<b>Time 25 °C to Peak Temperature (<math>T_p</math>)</b>		8 minutes max
<b>Do Not Exceed</b>		260 °C



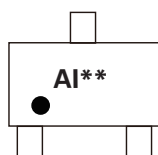
### Product Characteristics

<b>Lead Plating</b>	Matte tin
<b>Lead Material</b>	Copper alloy
<b>Body Material</b>	Molded compound
<b>Flammability</b>	UL recognized compound meeting flammability rating V-0

### Ordering Information

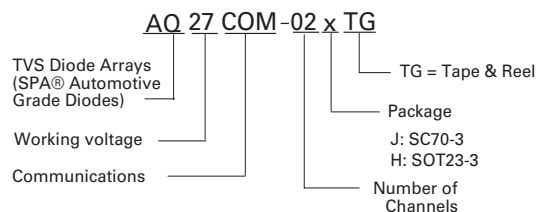
Part Number	Package	Marking	Min. Order Qty.
AQ27COM-02JTG	SC70-3	AI**	3000
AQ27COM-02HTG	SOT23-3	BA**	3000

### Part Marking System



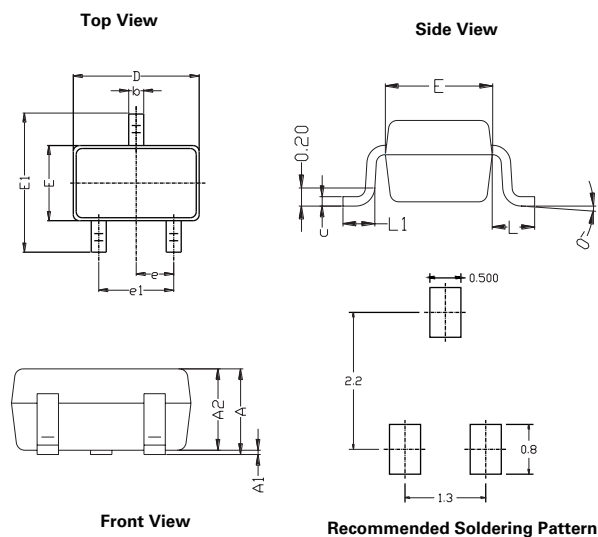
AI = Part code  
 \* = Assembly code  
 \* = Date code

### Part Numbering System

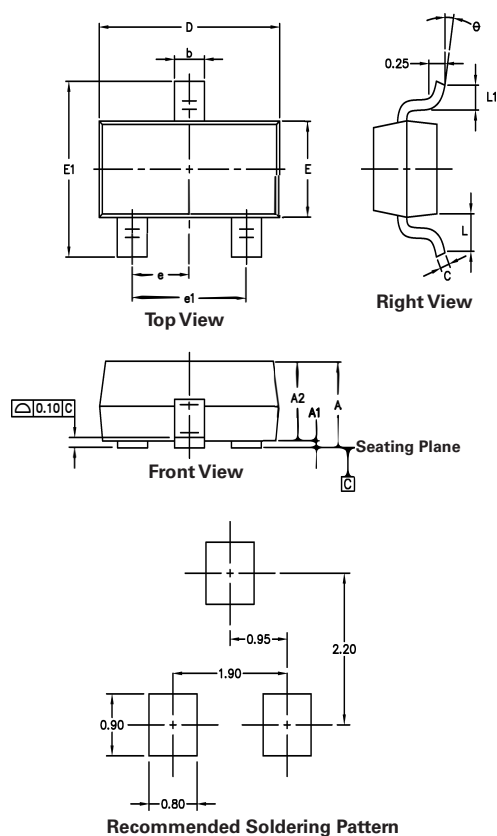


**AQ27COM-02 Series**

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**Package Dimensions - SC70-3**

Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	0.90	1.10	0.035	0.043
A1	0.00	0.10	0.000	0.004
A2	0.90	1.00	0.035	0.039
b	0.20	0.40	0.008	0.016
C	0.08	0.15	0.003	0.006
D	2.00	2.20	0.079	0.087
E	1.15	1.35	0.045	0.053
E1	2.15	2.40	0.085	0.094
e	0.650 Typ		0.026 Typ	
e1	1.20	1.40	0.047	0.055
L	0.53 Ref		0.021 Ref	
L1	0.26	0.45	0.010	0.018
θ	0°	8°	0°	8°

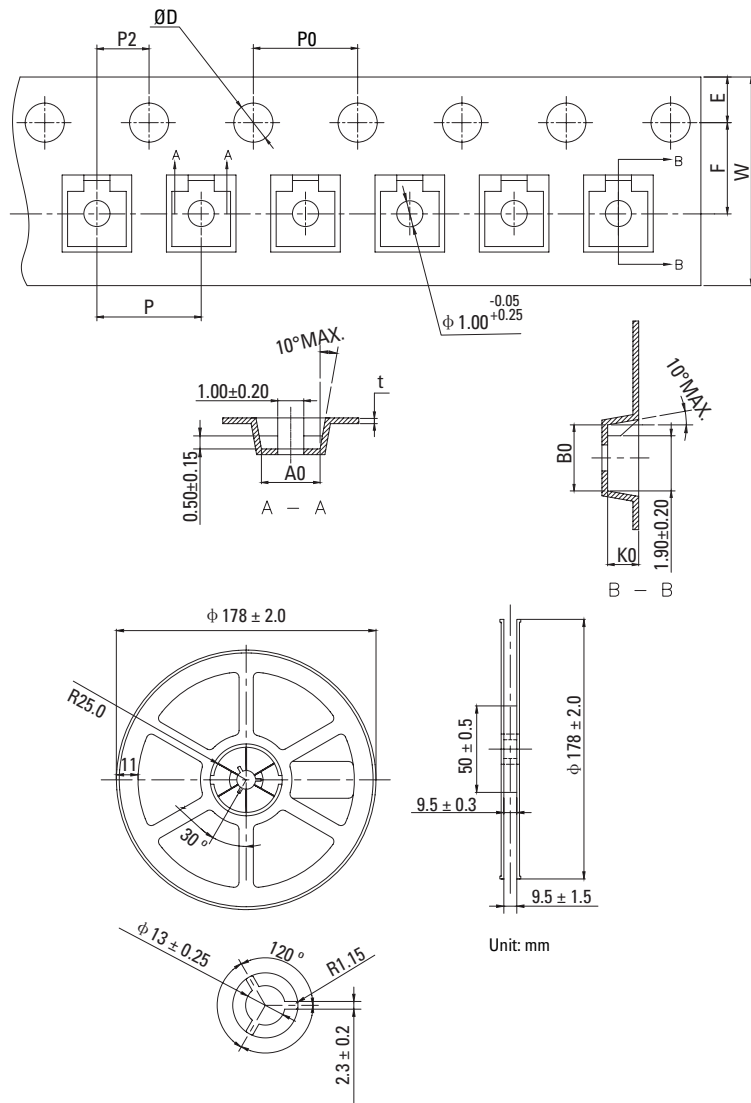
**Package Dimensions - SOT23-3**

Package	SOT23-3			
Pins	3			
Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	0.880	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.880	1.050	0.035	0.041
b	0.300	0.510	0.012	0.020
C	0.080	0.200	0.003	0.008
D	2.800	3.040	0.110	0.120
E	1.200	1.400	0.047	0.055
E1	2.100	2.640	0.083	0.104
e	0.950 Typ		0.037 Typ	
e1	1.780	2.050	0.070	0.081
L	0.550 Ref		0.022 Ref	
L1	0.300	0.550	0.012	0.022
θ	0°	8°	0°	8°

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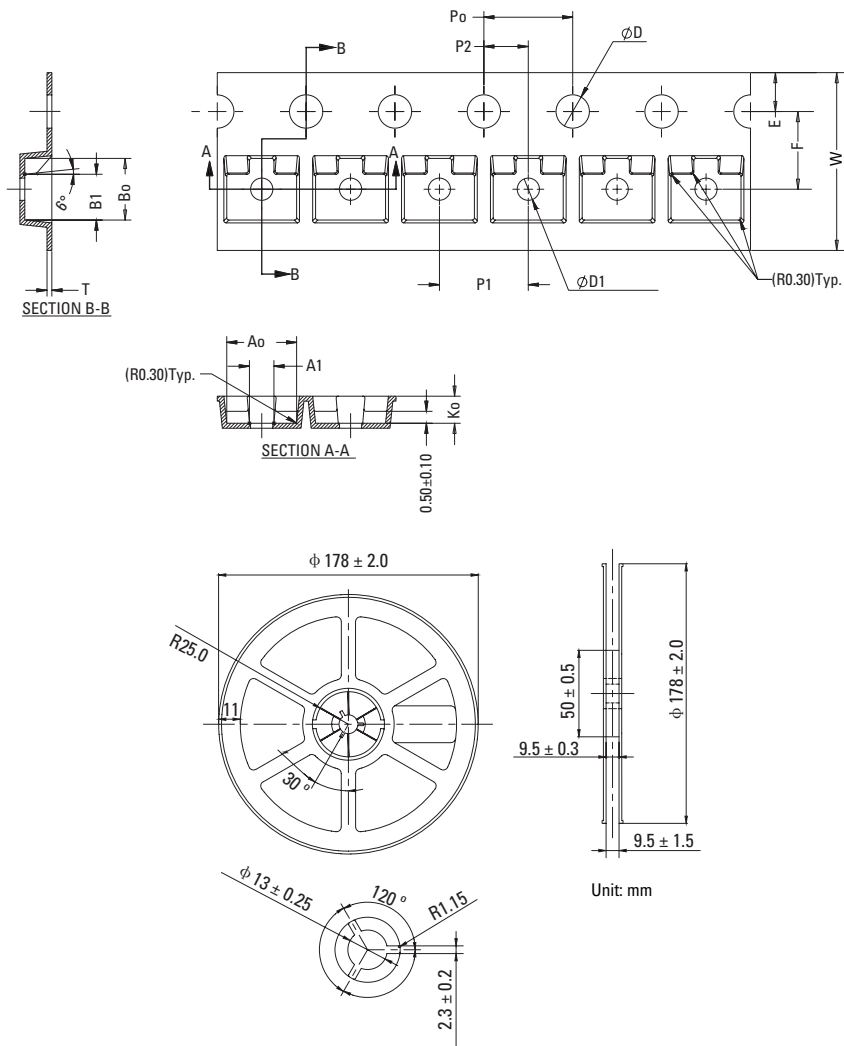
## Embossed Carrier Tape & Reel Specification - SC70-3



Symbol	Millimeters		Inches	
	Min	Max	Min	Max
E	1.65	1.85	0.065	0.073
F	3.45	3.55	0.136	0.140
P2	1.95	2.05	0.077	0.081
D	1.50	1.60	0.059	0.063
P0	3.90	4.10	0.154	0.161
W	7.90	8.30	0.311	0.327
P	3.90	4.10	0.154	0.161
A0	2.15	2.35	0.085	0.093
B0	2.45	2.65	0.096	0.104
K0	1.09	1.29	0.043	0.051
t	0.18	0.22	0.007	0.009

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**Embossed Carrier Tape & Reel Specification — SOT23-3**

Symbol	Millimeters		Inches	
	Min	Max	Min	Max
<b>Ao</b>	3.05	3.25	0.120	0.128
<b>A1</b>	0.79	1.19	0.031	0.047
<b>Bo</b>	2.67	2.87	0.105	0.113
<b>B1</b>	1.96	2.16	0.077	0.085
<b>D</b>	1.50	1.60	0.059	0.063
<b>D1</b>	1.00	1.25	0.039	0.049
<b>E</b>	1.65	1.85	0.065	0.073
<b>F</b>	3.40	3.60	0.134	0.142
<b>W</b>	7.90	8.30	0.311	0.327
<b>Po</b>	3.90	4.10	0.154	0.161
<b>P1</b>	3.90	4.10	0.154	0.161
<b>P2</b>	1.95	2.05	0.077	0.081
<b>K0</b>	1.12	1.32	0.044	0.052
<b>T</b>	0.18	0.26	0.007	0.010

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