

DATA SHEET

TRANSIENT VOLTAGE SUPPRESSORS

AC/DC POWER SUPPLY

1.0SMB-AT series

RoHS compliant & Halogen free



Product specification— June 30, 2023 V.1



Transient Voltage Suppressors (TVS) Data Sheet

Features

- For surface mounted applications in order to optimize board space
- Low profile package
- Built-in strain relief
- Glass passivated junction
- Low inductance
- Excellent clamping capability
- 1000W peak pulse power capability at 10/1000 μ s waveform, repetition rate (duty cycle): 0.01%
- Fast response time
- Typical I_R less than 1 μ A above 12V
- High Temperature soldering: 260 $^{\circ}$ C/10 seconds at terminals
- Plastic package has underwriters laboratory flammability 94V-0
- Meets MSL level 1, per J-STD-020
- AEC-Q101 qualified
- IEC61000-4-2 ESD 30KV Air, 30KV contact compliance



Mechanical Data

- Case: JEDEC DO-214AA. Molded plastic over glass passivated junction
- Terminal: Tin plated, solderable per MIL-STD-750, Method 2026
- Polarity: Color band denotes cathode except bi-directional models
- Standard Packaging: 12mm tape (EIA STD RS-481)
- Weight: 0.10g

Applications

- I/O interface
- AC/DC power supply
- Low frequency signal transmission line (RS232, RS485, etc.)

Maximum Ratings and Characteristics

Ratings at 25°C ambient temperature unless otherwise specified.

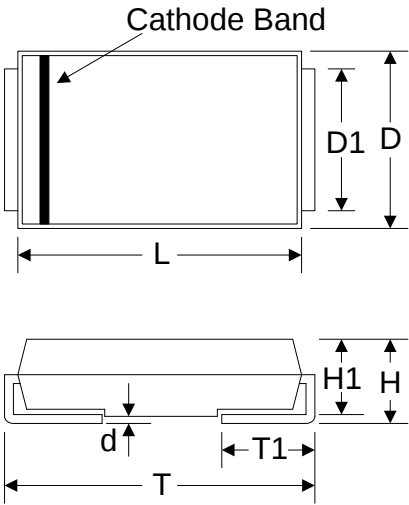
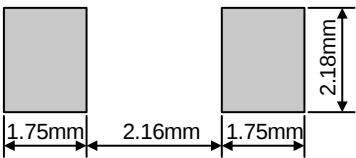
Rating	Symbol	Value	Units
Peak pulse power dissipation at 10/1000µs waveform (Note1, Note2, Fig.1)	P_{PPM}	Minimum 1000	Watts
Peak pulse current of at 10/1000µs waveform (Note 1, Fig.3)	I_{PPM}	See Table	Amps
Steady state power dissipation at $T_A=50^{\circ}\text{C}$ (Fig.5)	$P_{M(AV)}$	5.0	Watts
Peak forward surge current, 8.3ms single half sine-wave superimposed on rated load, (JEDEC Method) (Note3, Fig.6)	I_{FSM}	100	Amps
Operating junction and Storage Temperature Range.	T_J, T_{STG}	-55 to +150	°C
Typical thermal resistance junction to lead	$R_{\theta JL}$	20	°C/W
Typical thermal resistance junction to ambient	$R_{\theta JA}$	100	°C/W

Notes: 1. Non-repetitive current pulse, per Fig.3 and derated above $T_A=25^{\circ}\text{C}$ per Fig.2.

2. Mounted on 5.0mm×5.0mm (0.03mm thick) copper pads to each terminal.

3. 8.3ms single half sine-wave, or equivalent square wave, duty cycle=4 pulses per minutes maximum.

Dimensions (SMB/DO-214AA)

Product:		Symbol	Millimeters		Inches	
			Min.	Max.	Min.	Max.
Pad:		L	4.06	4.57	0.160	0.180
		D	3.30	3.94	0.130	0.155
		D1	1.95	2.20	0.077	0.086
		T	5.21	5.59	0.205	0.220
		T1	0.76	1.52	0.030	0.060
		d	-	0.203	-	0.008
		H	2.15	2.65	0.085	0.104
		H1	2.13	2.47	0.084	0.097

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

Part Number		Device Marking Code		Reverse Stand-Off Voltage	Breakdown Voltage @ I_T	Test Current	Maximum Clamping Voltage @ I_{PP}	Peak Pulse Current	Reverse Leakage @ V_{RWM}
Unidirectional	Bidirectional	UNI	BI	$V_{RWM}(V)$	$V_{BR}(V)$	$I_T(mA)$	$V_C(V)$	$I_{PP}(A)$	$I_R(\mu A)$
1.0SMB6.8A-AT	1.0SMB6.8CA-AT	6K8A	6K8C	5.80	6.45~7.14	10	10.5	96.8	1000
1.0SMB7.5A-AT	1.0SMB7.5CA-AT	7K5A	7K5C	6.40	7.13~7.88	10	11.3	90.0	500
1.0SMB8.2A-AT	1.0SMB8.2CA-AT	8K2A	8K2C	7.02	7.79~8.61	10	12.1	84.0	200
1.0SMB9.1A-AT	1.0SMB9.1CA-AT	9K1A	9K1C	7.78	8.65~9.55	1	13.4	75.8	50
1.0SMB10A-AT	1.0SMB10CA-AT	K10A	K10C	8.55	9.50~10.50	1	14.5	70.2	10
1.0SMB11A-AT	1.0SMB11CA-AT	K11A	K11C	9.40	10.50~11.60	1	15.6	65.2	5
1.0SMB12A-AT	1.0SMB12CA-AT	K12A	K12C	10.20	11.40~12.60	1	16.7	60.8	5
1.0SMB13A-AT	1.0SMB13CA-AT	K13A	K13C	11.10	12.40~13.70	1	18.2	55.8	1
1.0SMB15A-AT	1.0SMB15CA-AT	K15A	K15C	12.80	14.30~15.80	1	21.2	48.0	1
1.0SMB16A-AT	1.0SMB16CA-AT	K16A	K16C	13.60	15.20~16.80	1	22.5	45.2	1
1.0SMB18A-AT	1.0SMB18CA-AT	K18A	K18C	15.30	17.10~18.90	1	25.5	40.3	1
1.0SMB20A-AT	1.0SMB20CA-AT	K20A	K20C	17.10	19.00~21.00	1	27.7	36.7	1
1.0SMB22A-AT	1.0SMB22CA-AT	K22A	K22C	18.80	20.90~23.10	1	30.6	33.2	1
1.0SMB24A-AT	1.0SMB24CA-AT	K24A	K24C	20.50	22.80~25.20	1	33.2	30.7	1
1.0SMB27A-AT	1.0SMB27CA-AT	K27A	K27C	23.10	25.70~28.40	1	37.5	27.2	1
1.0SMB30A-AT	1.0SMB30CA-AT	K30A	K30C	25.60	28.50~31.50	1	41.4	24.5	1
1.0SMB33A-AT	1.0SMB33CA-AT	K33A	K33C	28.20	31.40~34.70	1	45.7	22.2	1
1.0SMB36A-AT	1.0SMB36CA-AT	K36A	K36C	30.80	34.20~37.80	1	49.9	20.3	1
1.0SMB39A-AT	1.0SMB39CA-AT	K39A	K39C	33.30	37.10~41.00	1	53.9	18.8	1
1.0SMB43A-AT	1.0SMB43CA-AT	K43A	K43C	36.80	40.90~45.20	1	59.3	17.2	1
1.0SMB47A-AT	1.0SMB47CA-AT	K47A	K47C	40.20	44.70~49.40	1	64.8	15.7	1
1.0SMB51A-AT	1.0SMB51CA-AT	K51A	K51C	43.60	48.50~53.60	1	70.1	14.5	1
1.0SMB56A-AT	1.0SMB56CA-AT	K56A	K56C	47.80	53.20~58.80	1	77.0	13.2	1
1.0SMB62A-AT	1.0SMB62CA-AT	K62A	K62C	53.00	58.90~65.10	1	85.0	12.0	1
1.0SMB68A-AT	1.0SMB68CA-AT	K68A	K68C	58.10	64.60~71.40	1	92.0	11.0	1

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

Figure 1. Peak Pulse Power Rating Curve

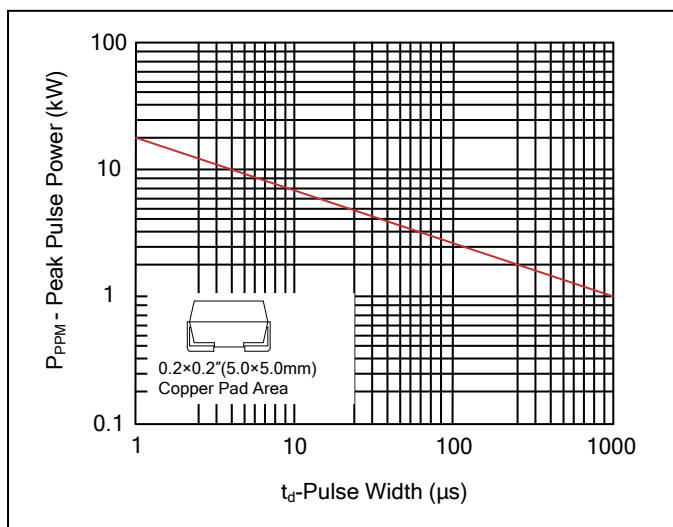


Figure 2. Pulse Derating Curve

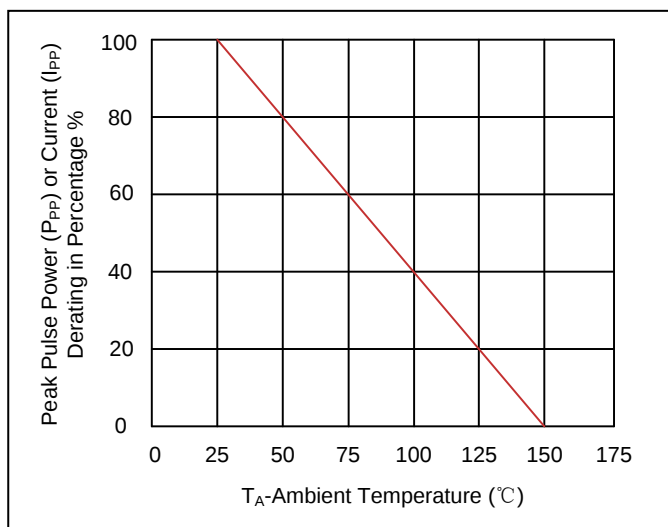


Figure 3. Pulse Waveform

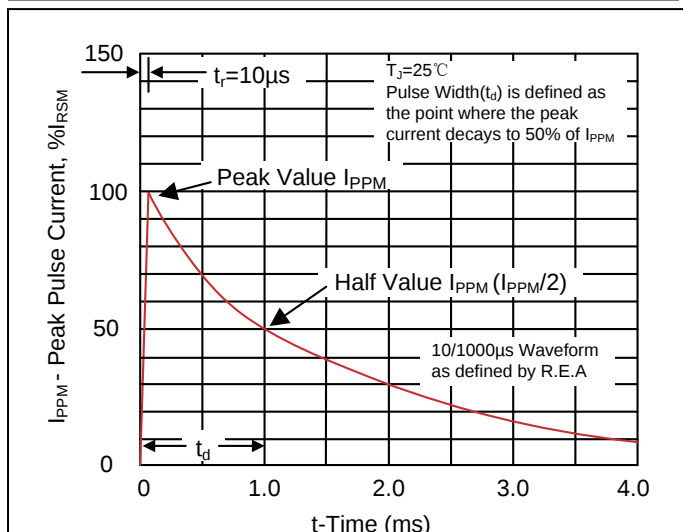


Figure 4. Typical Junction Capacitance

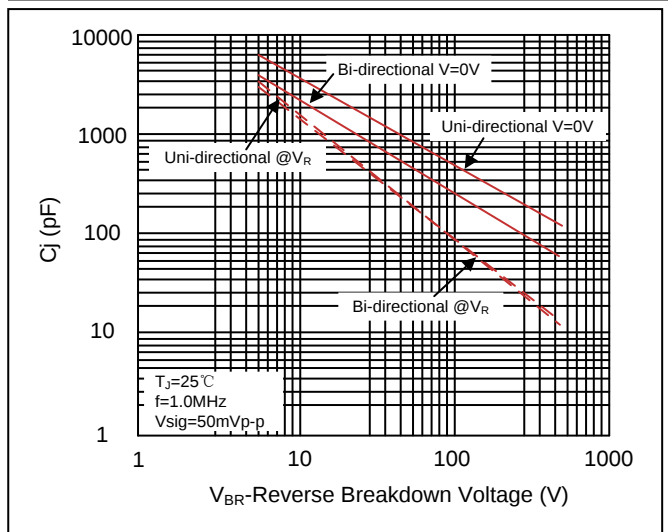


Figure 5. Steady State Power Dissipation Derating Curve

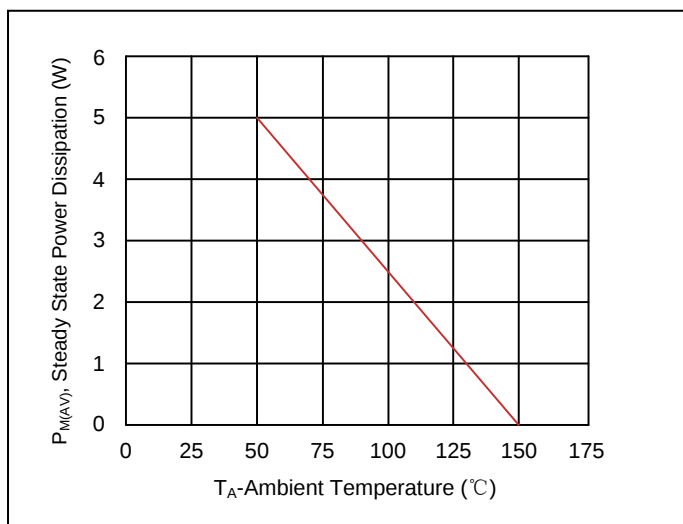
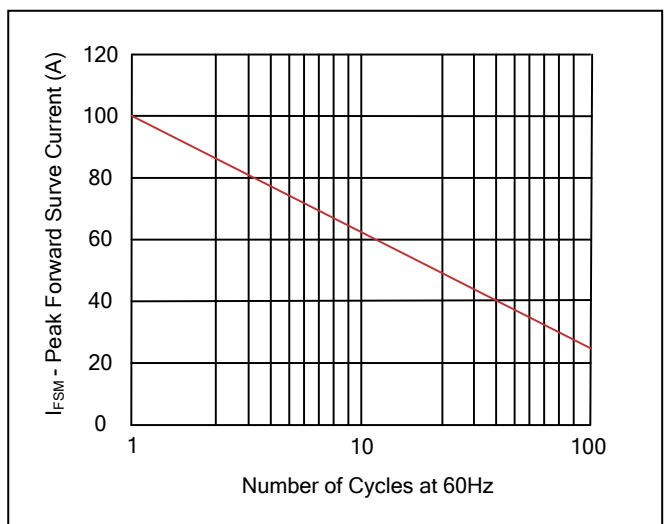
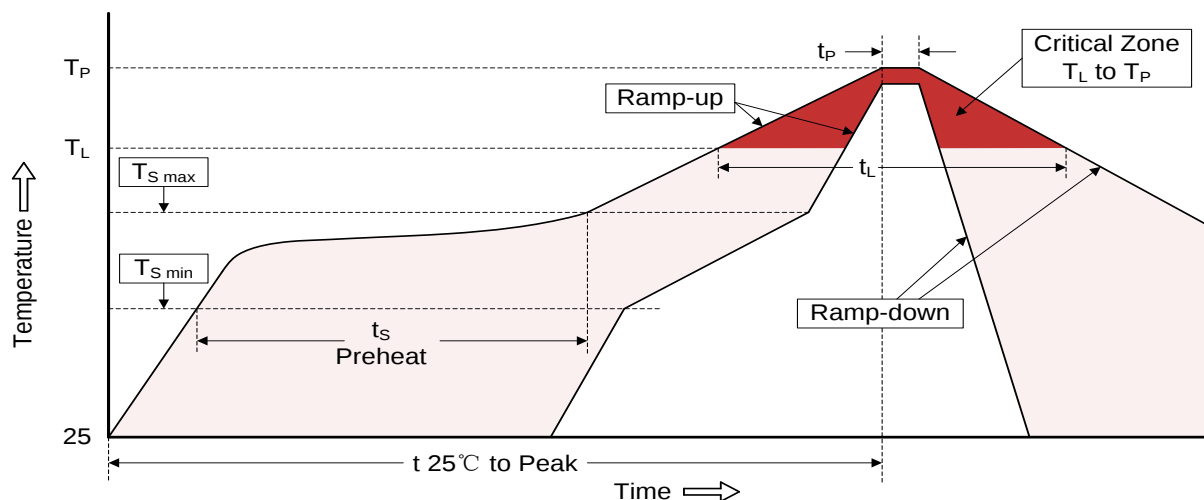


Figure 6. Maximum Non-Repetitive Forward Surge Current Uni-Directional Only



Recommended Soldering Conditions

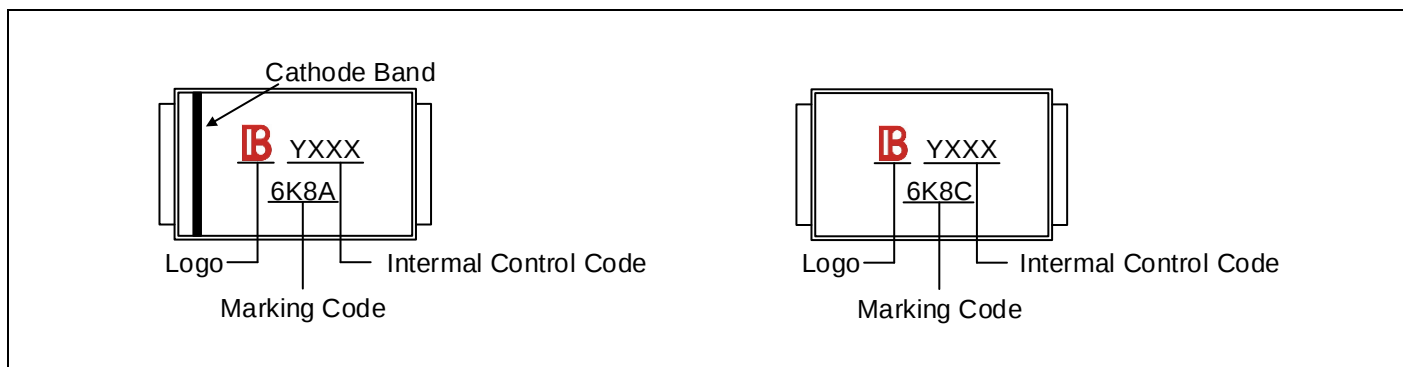
Reflow Soldering



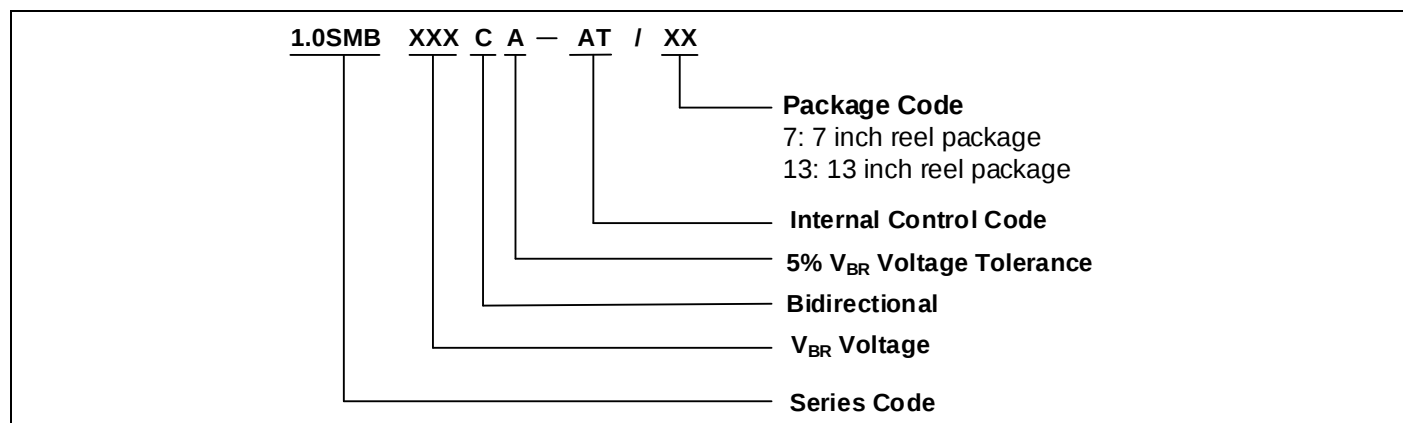
Recommended Conditions

Profile Feature	Pb-Free Assembly
Average ramp-up rate (T _L to T _P)	3°C/second max.
Preheat -Temperature Min (T_{S min}) -Temperature Max (T_{S max}) -Time (min to max) (t_s)	150°C 200°C 60-180 seconds
T _{S max} to T _L -Ramp-up Rate	3°C/second max.
Time maintained above: -Temperature (T_L) -Time (t_L)	217°C 60-150 seconds
Peak Temperature (T _P)	260°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	8 minutes max.

Marking Code



Part Number Code

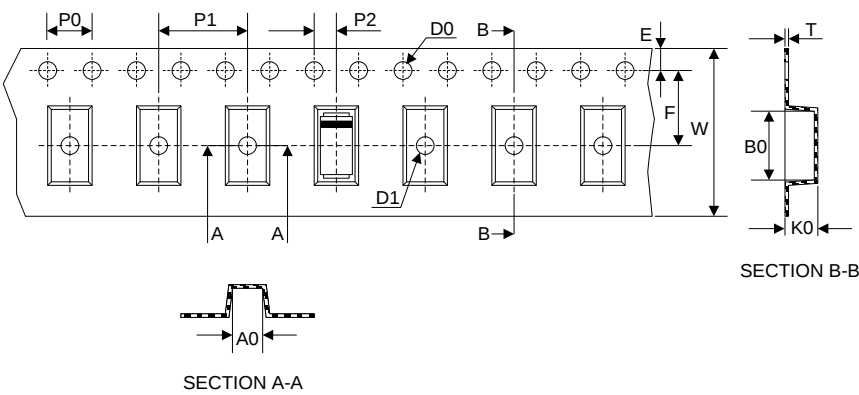
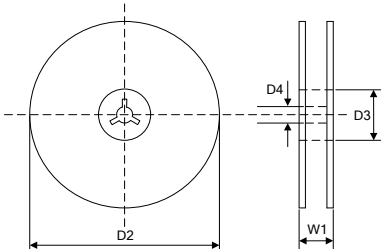
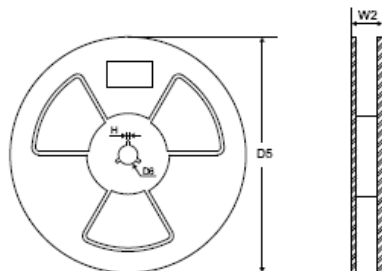


Ordering Code for Different Package

7 inch reel package: Add suffix "/7" at the end of the part number, such as 1.0SMBXXXCA-AT/7

13 inch reel package: Add suffix "/13" at the end of the part number, such as 1.0SMBXXXCA-AT/13

Packaging

Tape  SECTION A-A SECTION B-B	<table> <tr> <th>Symbol</th><th>Dimension (mm)</th></tr> <tr> <td>W</td><td>12.00±0.20</td></tr> <tr> <td>P0</td><td>4.00±0.10</td></tr> <tr> <td>P1</td><td>8.00±0.10</td></tr> <tr> <td>P2</td><td>2.00±0.10</td></tr> <tr> <td>D0</td><td>Φ1.55±0.10</td></tr> <tr> <td>D1</td><td>Φ1.5±0.10</td></tr> <tr> <td>E</td><td>1.75±0.10</td></tr> <tr> <td>F</td><td>5.50±0.10</td></tr> <tr> <td>A0</td><td>3.86±0.15</td></tr> <tr> <td>B0</td><td>5.65±0.10</td></tr> <tr> <td>K0</td><td>2.75±0.15</td></tr> <tr> <td>T</td><td>0.25±0.05</td></tr> </table>	Symbol	Dimension (mm)	W	12.00±0.20	P0	4.00±0.10	P1	8.00±0.10	P2	2.00±0.10	D0	Φ1.55±0.10	D1	Φ1.5±0.10	E	1.75±0.10	F	5.50±0.10	A0	3.86±0.15	B0	5.65±0.10	K0	2.75±0.15	T	0.25±0.05
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7" Reel 	<table> <tr> <td>D2</td><td>Φ178.0±2.0</td></tr> <tr> <td>D3</td><td>Φ50.0Min.</td></tr> <tr> <td>D4</td><td>Φ13.0±0.5</td></tr> <tr> <td>W1</td><td>16.0±2.0</td></tr> <tr> <td colspan="2">Quantity: 500PCS</td></tr> </table>	D2	Φ178.0±2.0	D3	Φ50.0Min.	D4	Φ13.0±0.5	W1	16.0±2.0	Quantity: 500PCS																	
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13" Reel 	<table> <tr> <td>D5</td><td>Φ330.0±2.0</td></tr> <tr> <td>D6</td><td>Φ13.5±0.5</td></tr> <tr> <td>H</td><td>2.5±1.0</td></tr> <tr> <td>W2</td><td>16.0±2.0</td></tr> <tr> <td colspan="2">Quantity: 3000PCS</td></tr> </table>	D5	Φ330.0±2.0	D6	Φ13.5±0.5	H	2.5±1.0	W2	16.0±2.0	Quantity: 3000PCS																	
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