

## SMBG Plastic-Encapsulate Diodes

### Transient Voltage Suppressor Diodes

#### Features

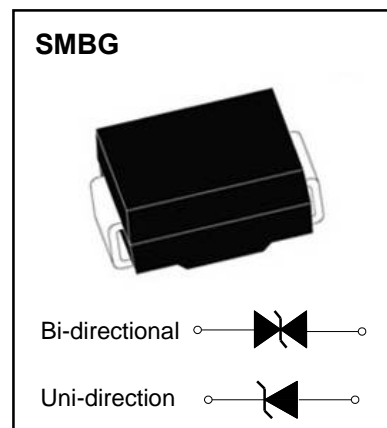
- $P_{PPM}$  1500W
- $V_{RWM}$  5.0V- 220V
- Low power loss, high efficiency
- Excellent clamping capability

#### Applications

- Protect sensitive circuit from damage by high voltage transients
- Lighting, ESD transient voltage protection of IC, system
- Inductive switching load protection of IC, system
- Electrical Fast Transient Immunity protection of IC, system

#### Mechanical Data

- Case: JEDEC DO-214AA molded plastic
- Molding compound: UL flammability classification rating 94V-0
- Terminals: Solder plated, solderable per MIL- STD-202, Method 208
- Polarity: Color band denotes cathode end



#### Limiting Values (Absolute Maximum Rating)

| Item   | Symbol         | Unit             | Conditions                                       | Max            |
|--|----------------|------------------|--|----------------|
| Peak pulse power dissipation                     | $P_{PPM}$      | W                | with a 10/1000us waveform                        | 1500           |
| Peak pulse current (1)                           | $I_{PPM}$      | A                | with a 10/1000us waveform                        | See Next Table |
| Power dissipation                                | $P_D$          | W                | On infinite heat sink at $T_L=75^\circ\text{C}$  | 6.5            |
| Peak forward surge current(2)                    | $I_{FSM}$      | A                | 8.3 ms single half sine-wave unidirectional only | 200            |
| Operating junction and storage temperature range | $T_J, T_{STG}$ | $^\circ\text{C}$ |  | -55 to +150    |

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

| Item                                      | Symbol          | Unit               | Conditions                      | Max     |
|---|-----------------|--------------------|---------------------------------|---------|
| Maximum instantaneous forward Voltage (2) | $V_F$           | V                  | at 100A for unidirectional only | 3.5/6.5 |
| Thermal resistance                        | $R_{\theta JL}$ | $^\circ\text{C/W}$ | Between junction and lead       | 20      |
|   | $R_{\theta JA}$ | $^\circ\text{C/W}$ | Between junction and Ambient    | 100     |
|   | $R_{\theta JC}$ | $^\circ\text{C/W}$ | Between junction and Case       | 15      |

#### Notes:

- (1) Non-repetitive current pulse, per Fig. 3 and derated above  $T_A=25^\circ\text{C}$  per Fig.2.
- (2)  $V_F < 3.5\text{V}$  for devices of  $V_{BR} < 200\text{V}$  and  $V_F < 6.5\text{V}$  for devices of  $V_{BR} > 201\text{V}$

## Electrical Characteristics (T<sub>A</sub>=25°C unless otherwise noted)

| Part Number |             | Reverse Stand-off Voltage | Breakdown Voltage V <sub>BR</sub> @ I <sub>T</sub> |         | Test Current        | Max. Clamping Voltage @ I <sub>PP</sub> | Max. Peak Pulse Current | Max. Reverse Leakage @ V <sub>RWM</sub> |
|-------------|-------------|---------------------------|--|---------|---------------------|---|-------------------------|---|
| UNI-POLAR   | BI-POLAR    | V <sub>RWM</sub> (V)      | Min.(V)  | Max.(V) | I <sub>T</sub> (mA) | V <sub>C MAX.</sub> (V)                 | I <sub>PP</sub> (A)     | I <sub>R</sub> (uA)                     |
| SMB15J5.0A  | SMB15J5.0CA | 5.0                       | 6.40   | 7.00    | 10                  | 9.2                                     | 163.0                   | 800                                     |
| SMB15J6.0A  | SMB15J6.0CA | 6.0                       | 6.67   | 7.37    | 10                  | 10.3                                    | 145.7                   | 800                                     |
| SMB15J6.5A  | SMB15J6.5CA | 6.5                       | 7.22   | 7.98    | 10                  | 11.2                                    | 134.0                   | 500                                     |
| SMB15J7.0A  | SMB15J7.0CA | 7.0                       | 7.78   | 8.60    | 10                  | 12.0                                    | 125.0                   | 200                                     |
| SMB15J7.5A  | SMB15J7.5CA | 7.5                       | 8.33   | 9.21    | 1                   | 12.9                                    | 116.3                   | 100                                     |
| SMB15J8.0A  | SMB15J8.0CA | 8.0                       | 8.89   | 9.83    | 1                   | 13.6                                    | 110.3                   | 50                                      |
| SMB15J8.5A  | SMB15J8.5CA | 8.5                       | 9.44   | 10.40   | 1                   | 14.4                                    | 104.2                   | 20                                      |
| SMB15J9.0A  | SMB15J9.0CA | 9.0                       | 10.00  | 11.10   | 1                   | 15.4                                    | 97.4                    | 10                                      |
| SMB15J10A   | SMB15J10CA  | 10.0                      | 11.10  | 12.30   | 1                   | 17.0                                    | 88.3                    | 5                                       |
| SMB15J11A   | SMB15J11CA  | 11.0                      | 12.20  | 13.50   | 1                   | 18.2                                    | 82.5                    | 1                                       |
| SMB15J12A   | SMB15J12CA  | 12.0                      | 13.30  | 14.70   | 1                   | 19.9                                    | 75.4                    | 1                                       |
| SMB15J13A   | SMB15J13CA  | 13.0                      | 14.40  | 15.90   | 1                   | 21.5                                    | 69.8                    | 1                                       |
| SMB15J14A   | SMB15J14CA  | 14.0                      | 15.60  | 17.20   | 1                   | 23.2                                    | 64.7                    | 1                                       |
| SMB15J15A   | SMB15J15CA  | 15.0                      | 16.70  | 18.50   | 1                   | 24.4                                    | 61.5                    | 1                                       |
| SMB15J16A   | SMB15J16CA  | 16.0                      | 17.80  | 19.70   | 1                   | 26.0                                    | 57.7                    | 1                                       |
| SMB15J17A   | SMB15J17CA  | 17.0                      | 18.90  | 20.90   | 1                   | 27.6                                    | 54.4                    | 1                                       |
| SMB15J18A   | SMB15J18CA  | 18.0                      | 20.00  | 22.10   | 1                   | 29.2                                    | 51.4                    | 1                                       |
| SMB15J20A   | SMB15J20CA  | 20.0                      | 22.20  | 24.50   | 1                   | 32.4                                    | 46.3                    | 1                                       |
| SMB15J22A   | SMB15J22CA  | 22.0                      | 24.40  | 26.90   | 1                   | 35.5                                    | 42.3                    | 1                                       |
| SMB15J24A   | SMB15J24CA  | 24.0                      | 26.70  | 29.50   | 1                   | 38.9                                    | 38.6                    | 1                                       |
| SMB15J26A   | SMB15J26CA  | 26.0                      | 28.90  | 31.90   | 1                   | 42.1                                    | 35.7                    | 1                                       |
| SMB15J28A   | SMB15J28CA  | 28.0                      | 31.10  | 34.40   | 1                   | 45.4                                    | 33.1                    | 1                                       |
| SMB15J30A   | SMB15J30CA  | 30.0                      | 33.50  | 36.80   | 1                   | 48.4                                    | 31.0                    | 1                                       |
| SMB15J33A   | SMB15J33CA  | 33.0                      | 36.70  | 40.60   | 1                   | 53.3                                    | 28.2                    | 1                                       |
| SMB15J36A   | SMB15J36CA  | 36.0                      | 40.00  | 44.20   | 1                   | 58.1                                    | 25.9                    | 1                                       |
| SMB15J40A   | SMB15J40CA  | 40.0                      | 44.40  | 49.10   | 1                   | 64.5                                    | 23.3                    | 1                                       |
| SMB15J43A   | SMB15J43CA  | 43.0                      | 47.80  | 52.80   | 1                   | 69.4                                    | 21.7                    | 1                                       |
| SMB15J45A   | SMB15J45CA  | 45.0                      | 50.00  | 55.30   | 1                   | 72.7                                    | 20.6                    | 1                                       |
| SMB15J48A   | SMB15J48CA  | 48.0                      | 53.30  | 58.90   | 1                   | 77.4                                    | 19.4                    | 1                                       |
| SMB15J51A   | SMB15J51CA  | 51.0                      | 56.70  | 62.70   | 1                   | 82.4                                    | 18.2                    | 1                                       |
| SMB15J54A   | SMB15J54CA  | 54.0                      | 60.00  | 66.30   | 1                   | 87.1                                    | 17.3                    | 1                                       |
| SMB15J58A   | SMB15J58CA  | 58.0                      | 64.40  | 71.20   | 1                   | 93.6                                    | 16.1                    | 1                                       |
| SMB15J60A   | SMB15J60CA  | 60.0                      | 66.70  | 73.70   | 1                   | 96.8                                    | 15.5                    | 1                                       |
| SMB15J64A   | SMB15J64CA  | 64.0                      | 71.10  | 78.60   | 1                   | 103.0                                   | 14.6                    | 1                                       |
| SMB15J70A   | SMB15J70CA  | 70.0                      | 77.80  | 86.00   | 1                   | 113.0                                   | 13.3                    | 1                                       |
| SMB15J75A   | SMB15J75CA  | 75.0                      | 83.30  | 92.10   | 1                   | 121.0                                   | 12.4                    | 1                                       |
| SMB15J78A   | SMB15J78CA  | 78.0                      | 86.70  | 95.80   | 1                   | 126.0                                   | 11.9                    | 1                                       |
| SMB15J85A   | SMB15J85CA  | 85.0                      | 94.4   | 104.0   | 1                   | 137.0                                   | 11.0                    | 1                                       |
| SMB15J90A   | SMB15J90CA  | 90.0                      | 100.0  | 111.0   | 1                   | 146.0                                   | 10.3                    | 1                                       |
| SMB15J100A  | SMB15J100CA | 100.0                     | 111.0  | 123.0   | 1                   | 162.0                                   | 9.3                     | 1                                       |
| SMB15J110A  | SMB15J110CA | 110.0                     | 122.0  | 135.0   | 1                   | 177.0                                   | 8.5                     | 1                                       |
| SMB15J120A  | SMB15J120CA | 120.0                     | 133.0  | 147.0   | 1                   | 193.0                                   | 7.8                     | 1                                       |
| SMB15J130A  | SMB15J130CA | 130.0                     | 144.0  | 159.0   | 1                   | 209.0                                   | 7.2                     | 1                                       |
| SMB15J150A  | SMB15J150CA | 150.0                     | 167.0  | 185.0   | 1                   | 243.0                                   | 6.2                     | 1                                       |
| SMB15J160A  | SMB15J160CA | 160.0                     | 178.0  | 197.0   | 1                   | 259.0                                   | 5.8                     | 1                                       |
| SMB15J170A  | SMB15J170CA | 170.0                     | 189.0  | 209.0   | 1                   | 275.0                                   | 5.5                     | 1                                       |
| SMB15J180A  | SMB15J180CA | 180.0                     | 201.0  | 222.0   | 1                   | 292.0                                   | 5.1                     | 1                                       |
| SMB15J190A  |             | 190.0                     | 209.0  | 243.0   | 1                   | 308.0                                   | 4.8                     | 1                                       |
| SMB15J200A  |             | 200.0                     | 224.0  | 247.0   | 1                   | 324.0                                   | 4.6                     | 1                                       |
| SMB15J210A  |             | 210.0                     | 231.0  | 268.0   | 1                   | 340.0                                   | 4.4                     | 1                                       |
| SMB15J220A  |             | 220.0                     | 246.0  | 272.0   | 1                   | 356.0                                   | 4.2                     | 1                                       |

# Typical Characteristics

FIG1: Peak Pulse Power Rating Curve

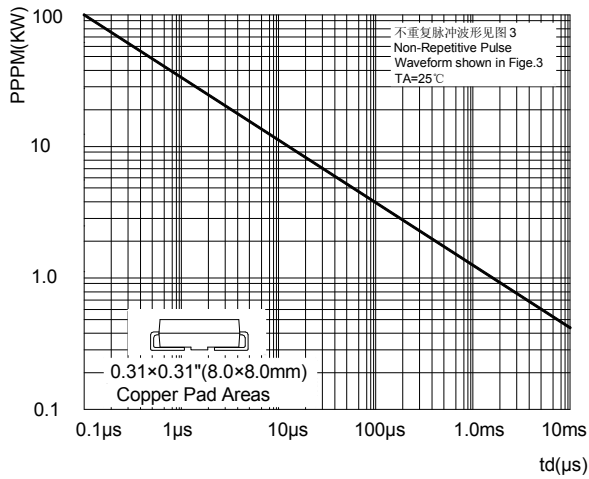


FIG2: Pulse Power or Current vs. Initial Junction Temperature

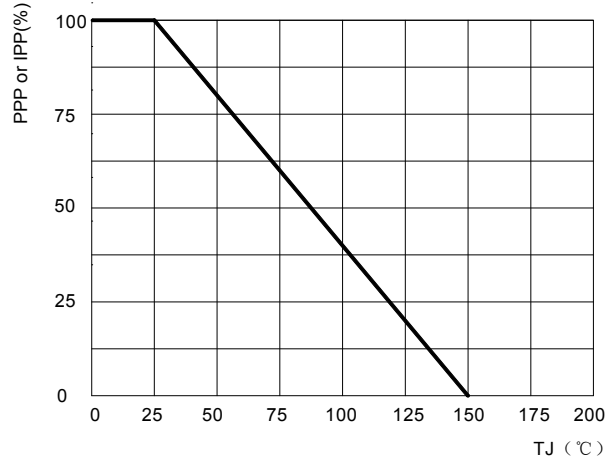


FIG3: Pulse Waveform

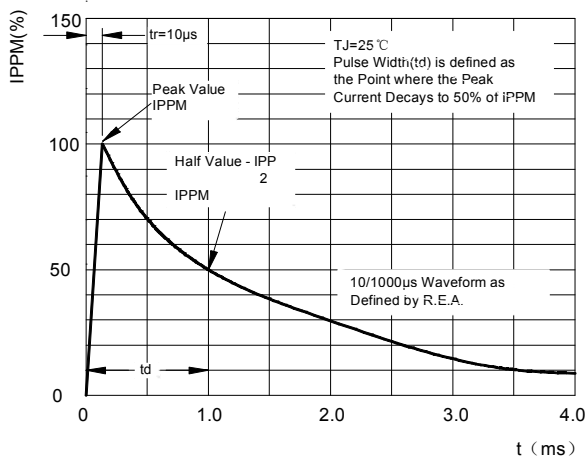


FIG4: Typical Transient Thermal Impedance

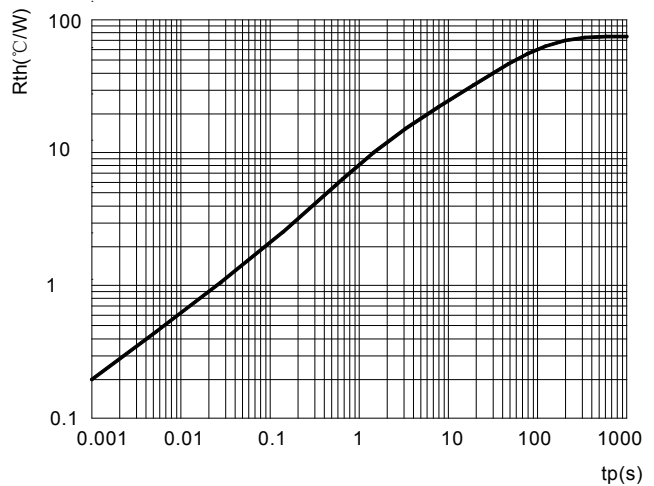


FIG5: Maximum Non-Repetitive Surge Current

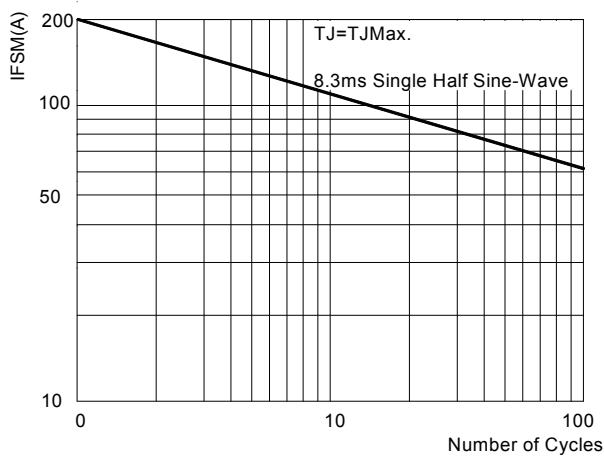
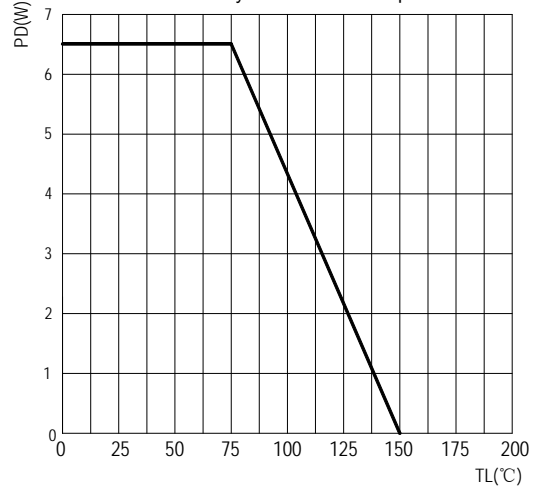
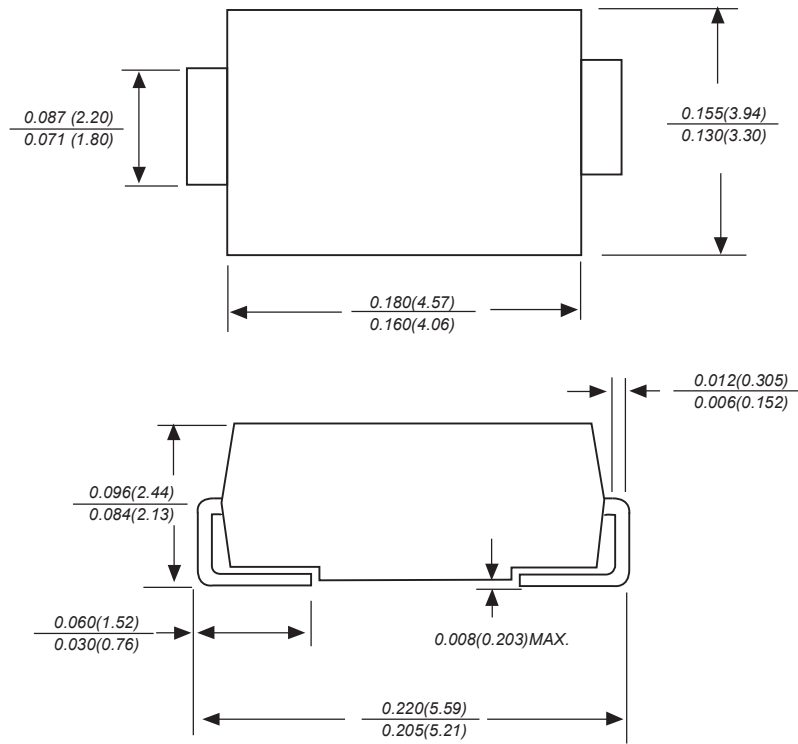


FIG6: Steady State Power Dissipation

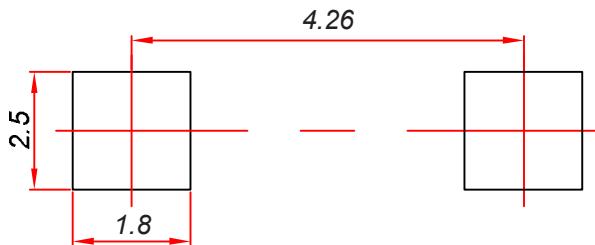


## SMBG Package Outline Dimensions



Dimensions in inches and (millimeters)

## SMBG Suggested Pad Layout



### Note:

1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.05 \text{ mm}$ .
3. The pad layout is for reference purposes only.

## Ordering Information

| Part Number                     | Package | Shipping Quantity |
|---------------------------------|---------|-------------------|
| SMB15J5.0(C)A-<br>SMB15J220(C)A | SMBG    | 3000/tape&Reel    |

## Marking Diagram

Uni-direction

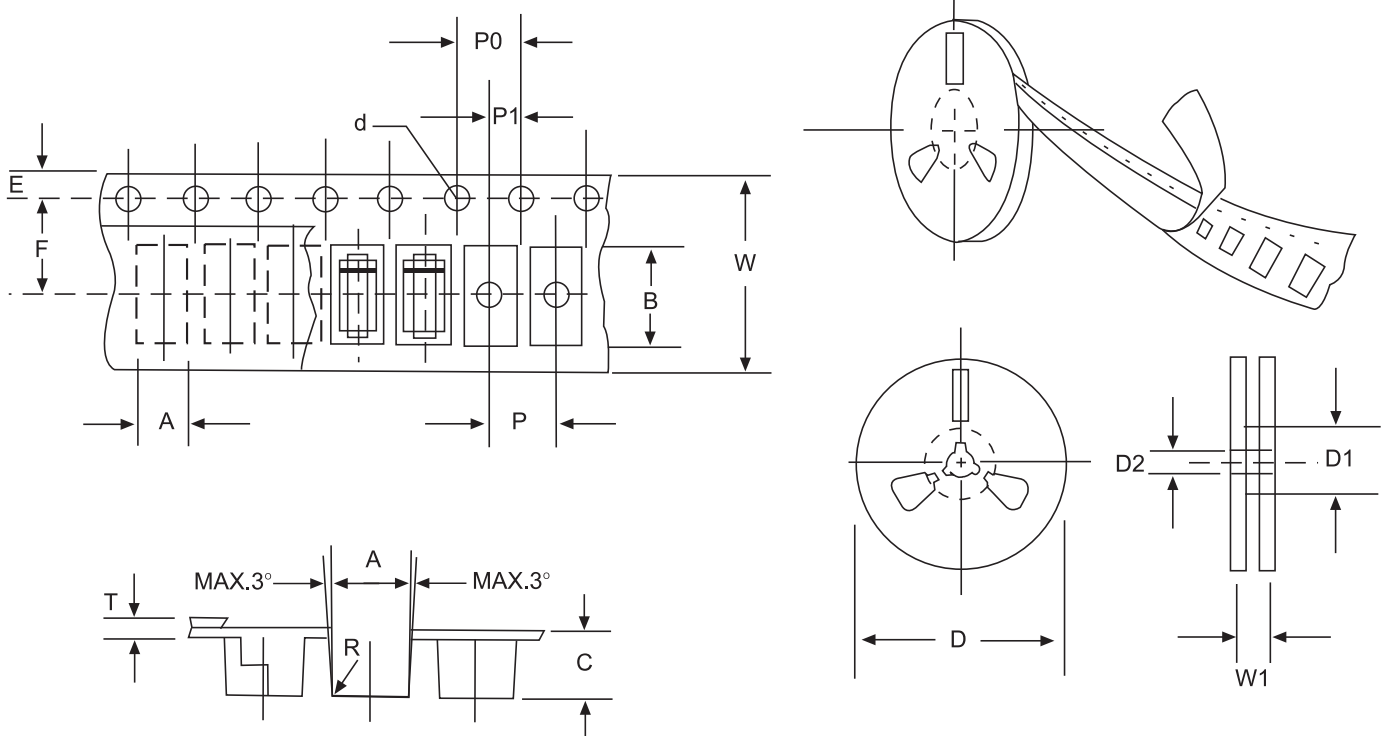


XX: From 5.0 To 220

Bi-directional



# Reel Taping Specifications For Surface Mount Devices–SMBG



**FIG : CONFIGURATION OF SURFACE MOUNTED DEVICES TAPING**

| ITEM                   | SYMBOL | SMBG mm(inch)          |
|------------------------|--------|------------------------|
| Carrier width          | A      | 4.09±0.1(0.161±0.004)  |
| Carrier length         | B      | 5.82±0.1(0.229±0.004)  |
| Carrier depth          | C      | 2.50±0.1(0.100±0.004)  |
| Sprocket hole          | d      | 1.55±0.05(0.061±0.002) |
| Reel outside diameter  | D      | 330±2.0(13±0.079)      |
| Reel inner diameter    | D1     | 75±1.0 ( 2.95 ±0.039)  |
| Feed hole diameter     | D2     | 13±0.5(0.512±0.020)    |
| Sprocket hole position | E      | 1.75±0.1(0.069±0.004)  |
| Punch hole position    | F      | 5.65±0.05(0.222±0.002) |
| Punch hole pitch       | P      | 8.0±0.1(0.315±0.004)   |
| Sprocket hole pitch    | P0     | 4.0±0.1(0.157±0.004)   |
| Embossment center      | P1     | 2.0±0.1(0.079±0.004)   |
| Totall tape thickness  | T      | 0.32±0.1(0.013±0.004)  |
| Tape width             | W      | 12.0±0.2(0.472±0.008)  |
| Reel width             | W1     | 16.8±2.0(0.661±0.079)  |

NOTE:Devices are packde in accordance with EIA standard RS-481-A and specification given above.