## Applications

- Computer system
- Domestic appliance
- Video input

## Description

- Transient voltage suppression diodes, also known as TVS diodes, are protective electronic parts that protect electrical equipment from voltage spikes introduced by wires.

## Mechanical Data

- Package：SMA/DO-214AC
- Case Material：Molded Plastic. UL Flammability Classification Rating 94V-0. RoHS compliant
- Moisture Sensitivity：Meet MSL 1
- Terminal：Solder plated, solderable per MIL-STD-750, Method 2026
- Polarity：Color band denotes cathode except bi-directional models
- Weight：0.07g(approximate)

## Features

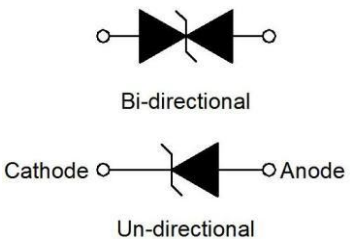
- For surface mounted applications
- Excellent clamping capability
- 600 W peak pulse power capability with a 10/1000μs
- Waveform.
- VRWM 5.0 ~ 75V
- Low profile package and low inductance
- Typical IR less than 1uA above 10V
- Fast response time: typically less than 1.0ps from 0V
- to VBR min.
- AEC-Q101 Qualified

## Product and Packing Information

| Part Number | QTY/Reel | Reel Size |
|---|---|---|
| 6SMAJxx(C)A-AT | 5,000 | 13 inch |

## DO-214AC(SMA)

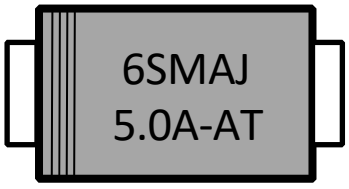
DO-214AC



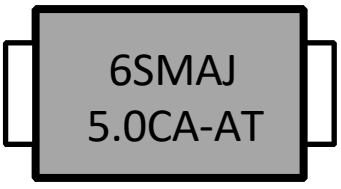

## Marking Information

EX :

6SMAJ5.0A-AT : 6SMAJ5.0A-AT Marking code




6SMAJ5.0CA-AT : 6SMAJ5.0CA-AT Marking code



## Electrical Characteristics (T=25℃)

| Part Number | | Marking | | $V_R$ | $I_R$@$V_R$ | $V_{BR}$@$I_T$ | | $I_T$ | $V_C$@$I_{PP}$ | $I_{PP}$① |
|---|---|---|---|---|---|---|---|---|---|---|
| Uni-Polar | Bi-Polar | Uni | Bi | V | μA | min(V) | max(V) | mA | max(V) | A |
| 6SMAJ5.0A-AT | 6SMAJ5.0CA-AT | 6SMAJ5.0A-AT | 6SMAJ5.0CA-AT | 5.0 | 800 | 6.40 | 7.00 | 10 | 9.2 | 65.22 |
| 6SMAJ6.0A-AT | 6SMAJ6.0CA-AT | 6SMAJ6.0A-AT | 6SMAJ6.0CA-AT | 6.0 | 800 | 6.67 | 7.37 | 10 | 10.3 | 58.26 |
| 6SMAJ6.5A-AT | 6SMAJ6.5CA-AT | 6SMAJ6.5A-AT | 6SMAJ6.5CA-AT | 6.5 | 500 | 7.22 | 7.98 | 10 | 11.2 | 53.58 |
| 6SMAJ7.0A-AT | 6SMAJ7.0CA-AT | 6SMAJ7.0A-AT | 6SMAJ7.0CA-AT | 7.0 | 200 | 7.78 | 8.60 | 10 | 12.0 | 50.00 |
| 6SMAJ7.5A-AT | 6SMAJ7.5CA-AT | 6SMAJ7.5A-AT | 6SMAJ7.5CA-AT | 7.5 | 100 | 8.33 | 9.21 | 1 | 12.9 | 46.52 |
| 6SMAJ8.0A-AT | 6SMAJ8.0CA-AT | 6SMAJ8.0A-AT | 6SMAJ8.0CA-AT | 8.0 | 50 | 8.89 | 9.83 | 1 | 13.6 | 44.12 |
| 6SMAJ8.5A-AT | 6SMAJ8.5CA-AT | 6SMAJ8.5A-AT | 6SMAJ8.5CA-AT | 8.5 | 20 | 9.44 | 10.40 | 1 | 14.4 | 41.7 |
| 6SMAJ9.0A-AT | 6SMAJ9.0CA-AT | 6SMAJ9.0A-AT | 6SMAJ9.0CA-AT | 9.0 | 10 | 10.00 | 11.10 | 1 | 15.4 | 38.98 |
| 6SMAJ10A-AT | 6SMAJ10CA-AT | 6SMAJ10A-AT | 6SMAJ10CA-AT | 10.0 | 5 | 11.10 | 12.30 | 1 | 17.0 | 35.30 |
| 6SMAJ11A-AT | 6SMAJ11CA-AT | 6SMAJ11A-AT | 6SMAJ11CA-AT | 11.0 | 1 | 12.20 | 13.50 | 1 | 18.2 | 32.97 |
| 6SMAJ12A-AT | 6SMAJ12CA-AT | 6SMAJ12A-AT | 6SMAJ12CA-AT | 12.0 | 1 | 13.30 | 14.70 | 1 | 19.9 | 30.2 |
| 6SMAJ13A-AT | 6SMAJ13CA-AT | 6SMAJ13A-AT | 6SMAJ13CA-AT | 13.0 | 1 | 14.40 | 15.90 | 1 | 21.5 | 27.91 |
| 6SMAJ14A-AT | 6SMAJ14CA-AT | 6SMAJ14A-AT | 6SMAJ14CA-AT | 14.0 | 1 | 15.60 | 17.20 | 1 | 23.2 | 25.87 |
| 6SMAJ15A-AT | 6SMAJ15CA-AT | 6SMAJ15A-AT | 6SMAJ15CA-AT | 15.0 | 1 | 16.70 | 18.50 | 1 | 24.4 | 24.60 |
| 6SMAJ16A-AT | 6SMAJ16CA-AT | 6SMAJ16A-AT | 6SMAJ16CA-AT | 16.0 | 1 | 17.80 | 19.70 | 1 | 26.0 | 23.08 |
| 6SMAJ17A-AT | 6SMAJ17CA-AT | 6SMAJ17A-AT | 6SMAJ17CA-AT | 17.0 | 1 | 18.90 | 20.90 | 1 | 27.6 | 21.74 |
| 6SMAJ18A-AT | 6SMAJ18CA-AT | 6SMAJ18A-AT | 6SMAJ18CA-AT | 18.0 | 1 | 20.00 | 22.10 | 1 | 29.2 | 20.55 |
| 6SMAJ20A-AT | 6SMAJ20CA-AT | 6SMAJ20A-AT | 6SMAJ20CA-AT | 20.0 | 1 | 22.20 | 24.50 | 1 | 32.4 | 18.52 |
| 6SMAJ22A-AT | 6SMAJ22CA-AT | 6SMAJ22A-AT | 6SMAJ22CA-AT | 22.0 | 1 | 24.40 | 26.90 | 1 | 35.5 | 16.91 |
| 6SMAJ24A-AT | 6SMAJ24CA-AT | 6SMAJ24A-AT | 6SMAJ24CA-AT | 24.0 | 1 | 26.70 | 29.50 | 1 | 38.9 | 15.43 |
| 6SMAJ26A-AT | 6SMAJ26CA-AT | 6SMAJ26A-AT | 6SMAJ26CA-AT | 26.0 | 1 | 28.90 | 31.90 | 1 | 42.1 | 14.26 |
| 6SMAJ28A-AT | 6SMAJ28CA-AT | 6SMAJ28A-AT | 6SMAJ28CA-AT | 28.0 | 1 | 31.10 | 34.40 | 1 | 45.4 | 13.22 |
| 6SMAJ30A-AT | 6SMAJ30CA-AT | 6SMAJ30A-AT | 6SMAJ30CA-AT | 30.0 | 1 | 33.30 | 36.80 | 1 | 48.4 | 12.40 |
| 6SMAJ33A-AT | 6SMAJ33CA-AT | 6SMAJ33A-AT | 6SMAJ33CA-AT | 33.0 | 1 | 36.70 | 40.60 | 1 | 53.3 | 11.26 |
| 6SMAJ36A-AT | 6SMAJ36CA-AT | 6SMAJ36A-AT | 6SMAJ36CA-AT | 36.0 | 1 | 40.00 | 44.20 | 1 | 58.1 | 10.33 |
| 6SMAJ40A-AT | 6SMAJ40CA-AT | 6SMAJ40A-AT | 6SMAJ40CA-AT | 40.0 | 1 | 44.40 | 49.10 | 1 | 64.5 | 9.31 |
| 6SMAJ43A-AT | 6SMAJ43CA-AT | 6SMAJ43A-AT | 6SMAJ43CA-AT | 43.0 | 1 | 47.80 | 52.80 | 1 | 69.4 | 8.65 |

## Electrical Characteristics (T=25℃)

| Part Number | | Marking | | $V_R$ | $I_R$@$V_R$ | $V_{BR}$@$I_T$ | | $I_T$ | $V_C$@$I_{PP}$ | $I_{PP}$① |
|---|---|---|---|---|---|---|---|---|---|---|
| Uni-Polar | Bi-Polar | Uni | Bi | V | μA | min(V) | max(V) | mA | max(V) | A |
| 6SMAJ45A-AT | 6SMAJ45CA-AT | 6SMAJ45A-AT | 6SMAJ45CA-AT | 45.0 | 1 | 50.00 | 55.30 | 1 | 72.7 | 8.26 |
| 6SMAJ48A-AT | 6SMAJ48CA-AT | 6SMAJ48A-AT | 6SMAJ48CA-AT | 48.0 | 1 | 53.30 | 58.90 | 1 | 77.4 | 7.78 |
| 6SMAJ51A-AT | 6SMAJ51CA-AT | 6SMAJ51A-AT | 6SMAJ51CA-AT | 51.0 | 1 | 56.70 | 62.70 | 1 | 82.4 | 7.29 |
| 6SMAJ54A-AT | 6SMAJ54CA-AT | 6SMAJ54A-AT | 6SMAJ54CA-AT | 54.0 | 1 | 60.00 | 66.30 | 1 | 87.1 | 6.89 |
| 6SMAJ58A-AT | 6SMAJ58CA-AT | 6SMAJ58A-AT | 6SMAJ58CA-AT | 58.0 | 1 | 64.40 | 71.20 | 1 | 93.6 | 6.42 |
| 6SMAJ60A-AT | 6SMAJ60CA-AT | 6SMAJ60A-AT | 6SMAJ60CA-AT | 60.0 | 1 | 66.70 | 73.70 | 1 | 96.8 | 6.20 |
| 6SMAJ64A-AT | 6SMAJ64CA-AT | 6SMAJ64A-AT | 6SMAJ64CA-AT | 64.0 | 1 | 71.10 | 78.60 | 1 | 103.0 | 5.83 |
| 6SMAJ70A-AT | 6SMAJ70CA-AT | 6SMAJ70A-AT | 6SMAJ70CA-AT | 70.0 | 1 | 77.80 | 86.00 | 1 | 113.0 | 5.31 |
| 6SMAJ75A-AT | 6SMAJ75CA-AT | 6SMAJ75A-AT | 6SMAJ75CA-AT | 75.0 | 1 | 83.30 | 92.10 | 1 | 121.0 | 4.96 |

**Note:** ①.Surge waveform: 10/1000μs

$V_R$: 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 $I_{PP}$

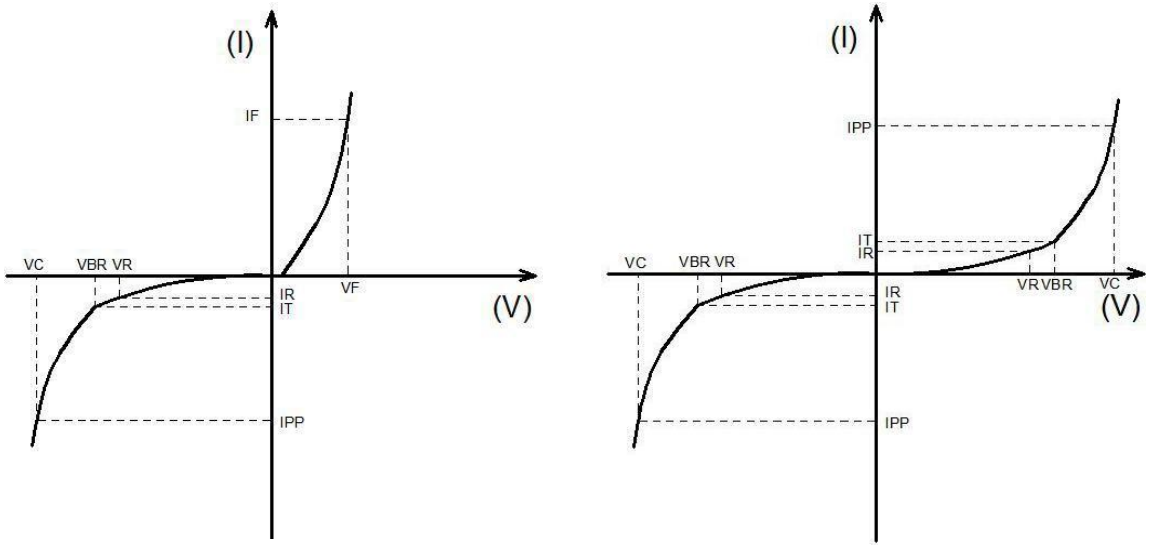
$I_R$: Reverse leakage current

$I_T$: Test current

## Maximum Ratings (T=25°C, RH=45% ~ 75%, unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Peak pulse power dissipation on 10/1000μs waveform | $P_{PP}$ | 600 | W |
| Steady state power dissipation at $T_L$=75℃ | $P_{M(AV)}$ | 5.0 | W |
| Operating junction temperature range | $T_j$ | -55 to +175 | ℃ |
| Storage temperature range | $T_{stg}$ | -55 to +175 | ℃ |

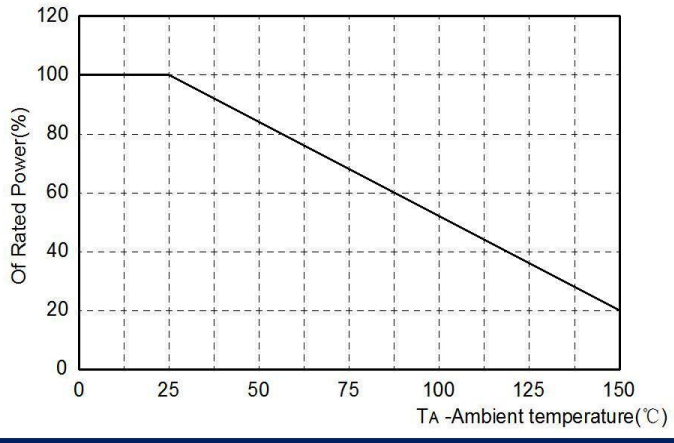
## Ratings And V-I Characteristics Curves (T=25ºC, unless otherwise noted)



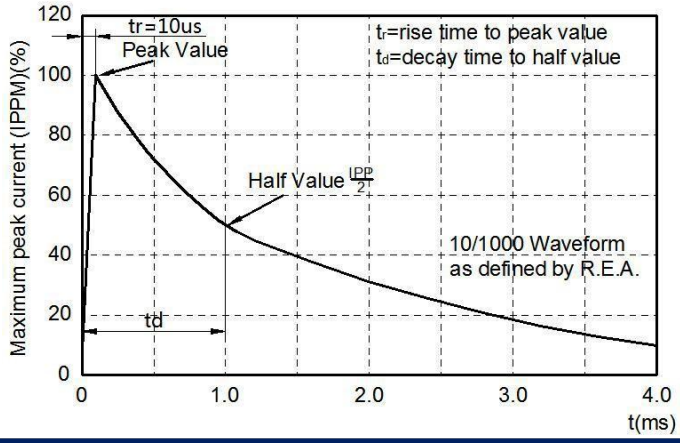

V-I cure characteristics

| Symbol | Parameter |
|---|---|
| $I_F$ | Mean Forward Current |
| $V_F$ | Maximum Forward Voltage @$I_F$ |
| $V_R$ | Peak Reverse Working Voltage |
| $I_R$ | Reverse Leakage Current @ $V_R$ |
| $V_{BR}$ | Breakdown Voltage @ $I_T$ |
| $I_T$ | Test Current |
| $I_{PP}$ | Maximum Reverse Peak Pulse Current |
| $V_C$ | Clamping Voltage @ $I_{PP}$ |

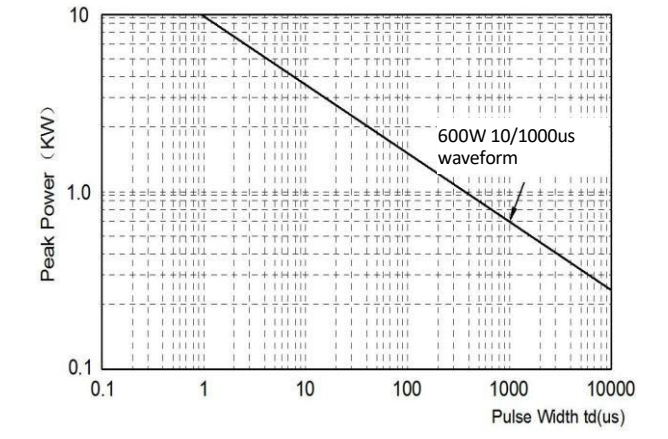
## Typical Characteristics



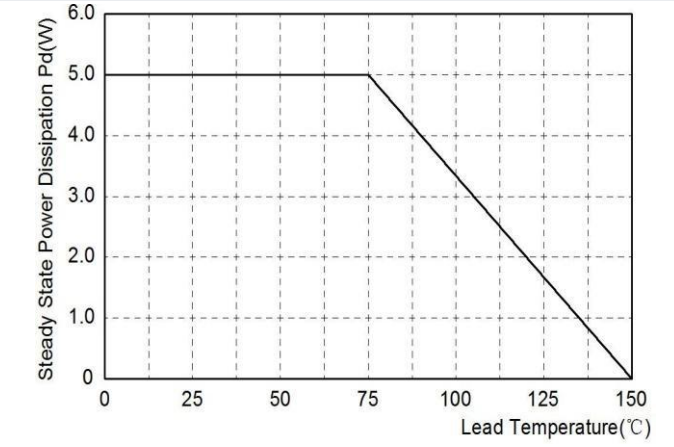

Pulse Derating Curve




Pulse Waveform



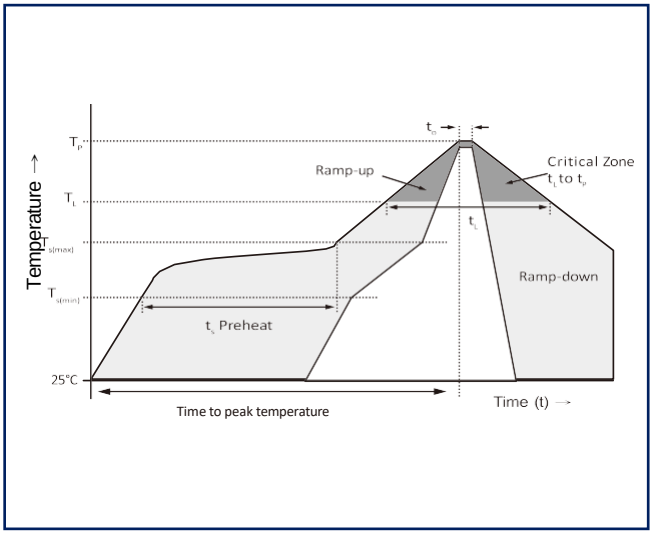

Peak Pulse Power Rating Curve



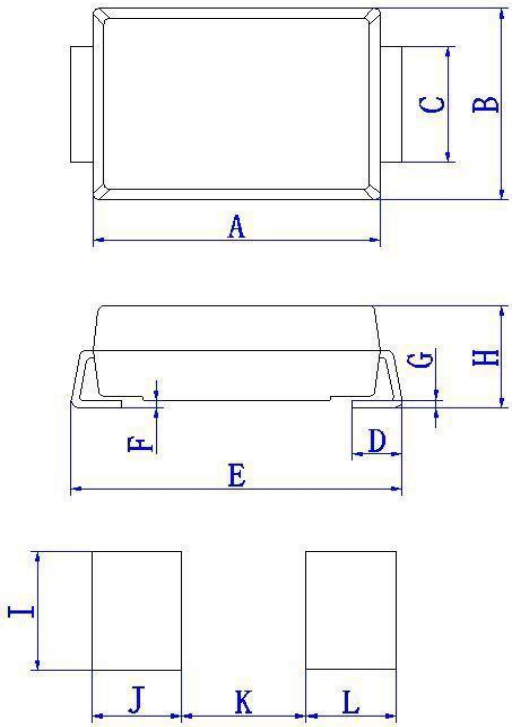

Steady State Power Dissipation

## Soldering Parameters

| Reflow Condition | | Lead–free assembly |
|---|---|---|
| Pre Heat | Temperature Max ($T_{s(min)}$) | 150°C |
| | Temperature Max ($T_{s(max)}$) | 200°C |
| | Time (min to max) ($t_s$) | 60 – 180 secs |
| 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°C (+0/-5) |
| Time within 5°C of actual peak Temperature ($t_p$) | | 30 seconds Max |
| Ramp-down Rate | | 6°C/second Max |
| Time 25°C to peak Temperature ($T_P$) | | 8 minutes Max. |
| Do not exceed | | 260°C |

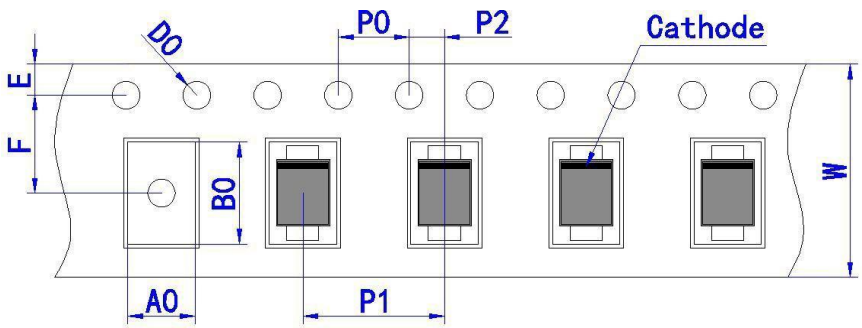


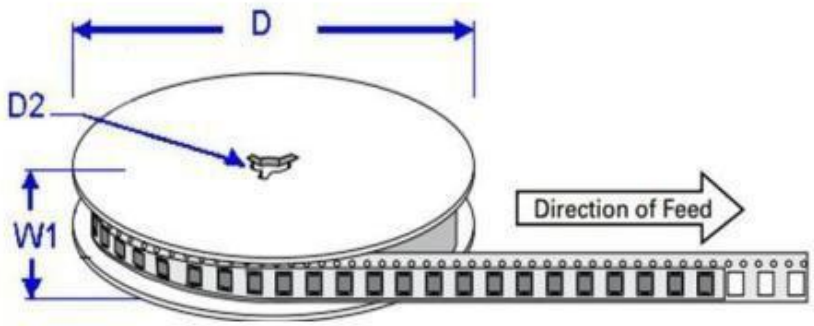

## Package mechanical data & Suggested Land




| Ref. (mm) | Millimeters | |
|---|---|---|
| | Min. | Max. |
| A | 3.99 | 4.5 |
| B | 2.5 | 2.9 |
| C | 1.2 | 1.7 |
| D | 0.76 | 1.52 |
| E | 4.93 | 5.28 |
| F | -- | 0.203 |
| G | 0.15 | 0.25 |
| H | 1.98 | 2.41 |
| I | 1.50 | 1.70 |
| J | 1.40 | 1.60 |
| K | 2.30 | 2.50 |
| L | 1.40 | 1.60 |

## Tape And Reel Specification -SMA




| Ref. | Millimeters |
|---|---|
| A0 | 2.79±0.20 |
| B0 | 5.33±0.20 |
| C | 330.00 |
| D0 | 1.55±0.10 |
| E | 1.75±0.20 |
| E1 | 13.50±1.00 |
| F | 5.50±0.10 |
| P0 | 4.00±0.20 |
| P1 | 4.00±0.20 |
| P2 | 2.00±0.20 |
| W | 12.00±0.30 |
| W1 | 16.00±4.00 |
| D | 333±4.00 |
| D2 | 13.5±0.2 |