



SANYO Semiconductors

DATA SHEET

An ON Semiconductor Company

2SC5536A — NPN Epitaxial Planar Silicon Transistor VHF Low-Noise Amplifier, OSC Applications

Features

- Low-noise : NF=1.8dB typ (f=150MHz)
- High gain : $|S_{21e}|^2=16\text{dB typ (f=150MHz)}$
- Ultrasmall, slim flat-lead package (1.4mm×0.8mm×0.6mm)
- Halogen free compliance

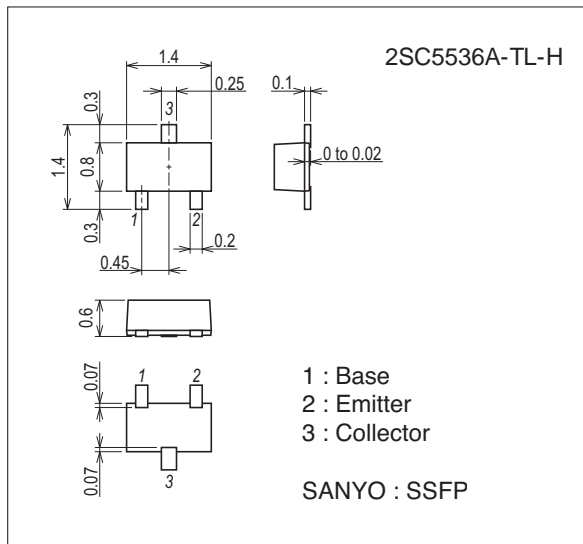
Specifications

Absolute Maximum Ratings at Ta=25°C

| Parameter | Symbol | Conditions | Ratings | Unit |
|------------------------------|--------|------------|-------------|------|
| Collector-to-Base Voltage | VCBO | | 20 | V |
| Collector-to-Emitter Voltage | VCEO | | 12 | V |
| Emitter-to-Base Voltage | VEBO | | 2 | V |
| Collector Current | IC | | 50 | mA |
| Collector Dissipation | PC | | 100 | mW |
| Junction Temperature | Tj | | 150 | °C |
| Storage Temperature | Tstg | | -55 to +150 | °C |

Package Dimensions

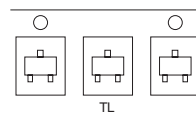
unit : mm (typ)
7029A-002



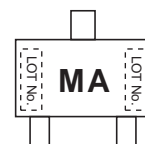
Product & Package Information

- Package : SSFP
- JEITA, JEDEC : SC-81
- Minimum Packing Quantity : 8,000 pcs./reel

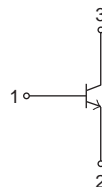
Packing Type: TL



Marking



Electrical Connection



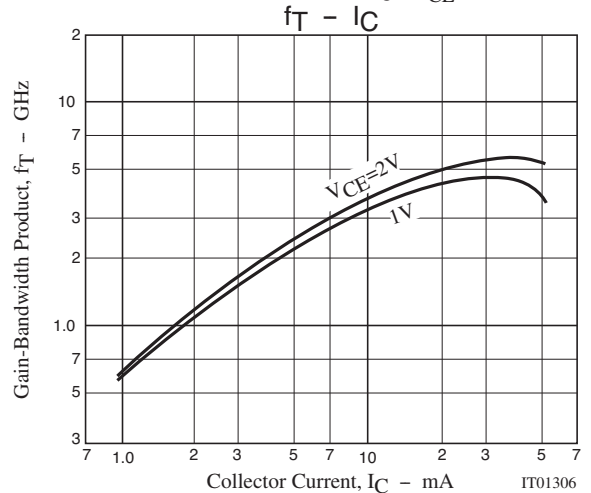
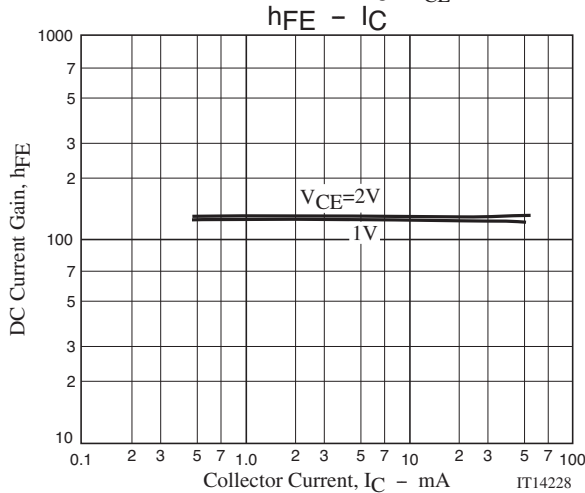
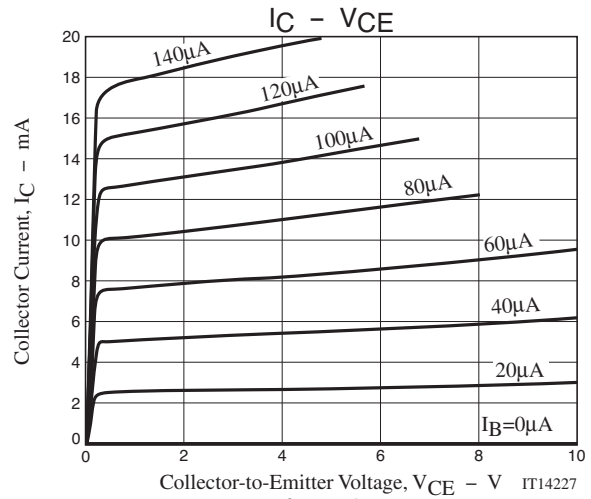
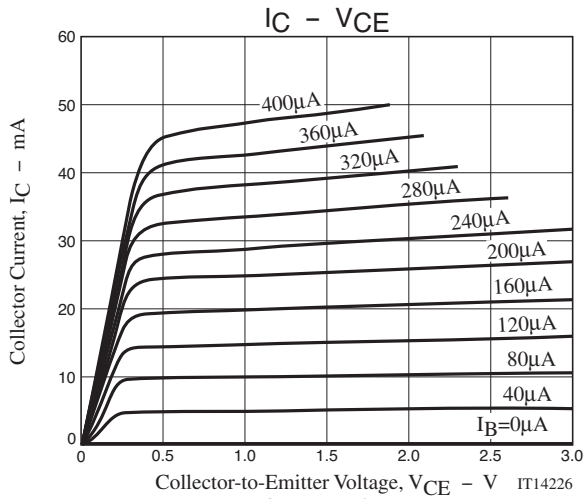
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Electrical Characteristics at Ta=25°C

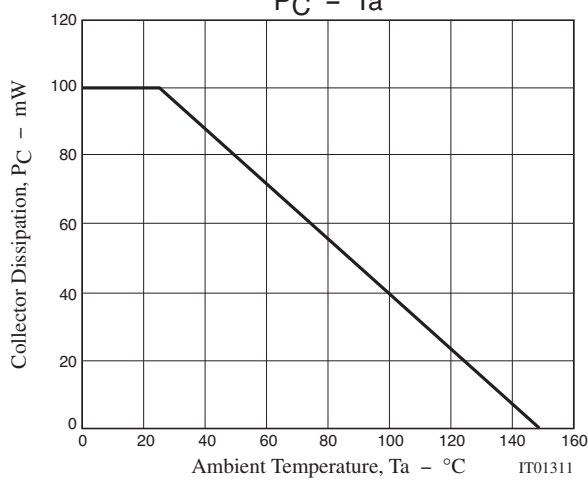
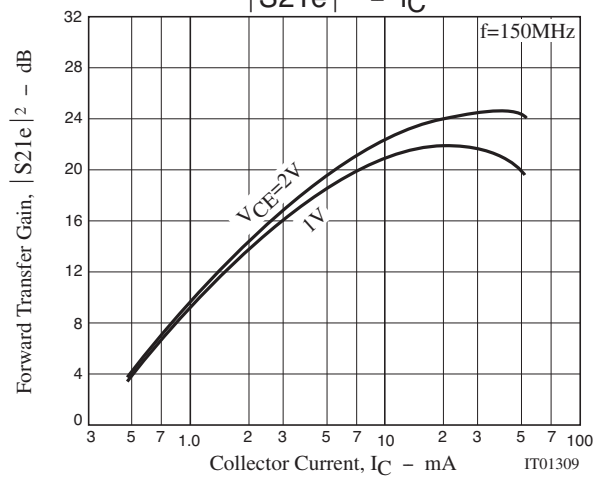
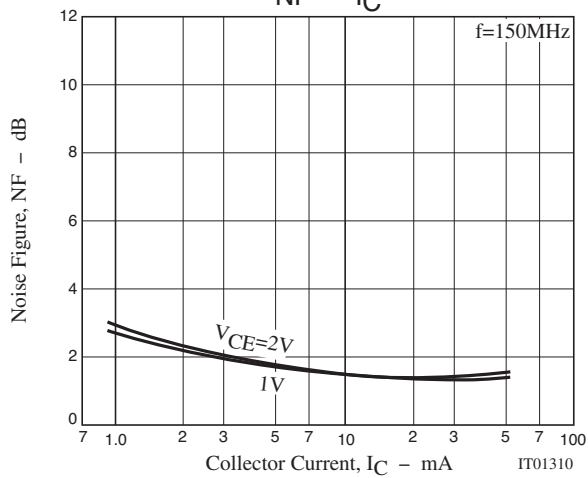
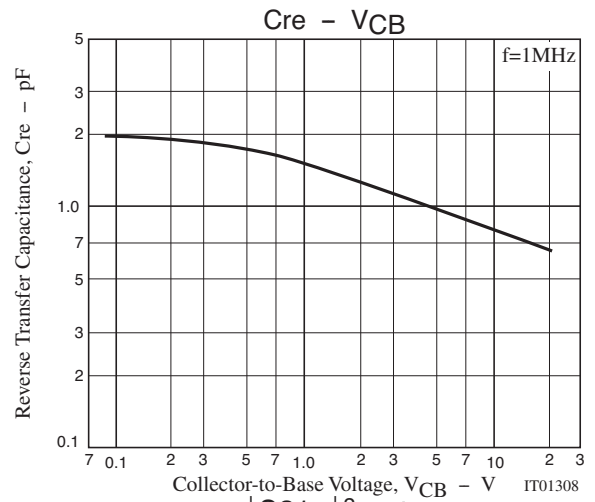
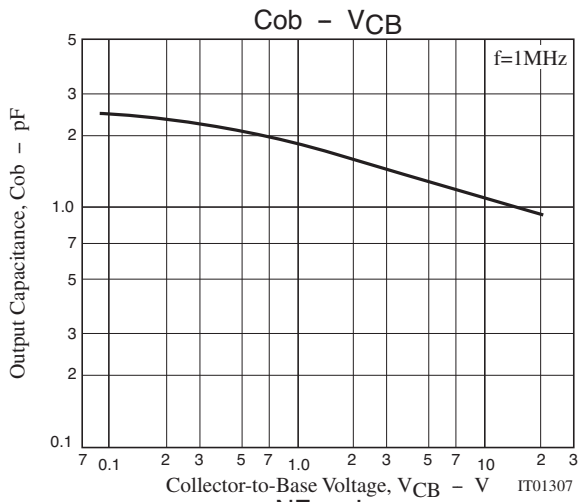
| Parameter | Symbol | Conditions | Ratings | | | Unit |
|------------------------------|---------------------------------|--|---------|-----|-----|------|
| | | | min | typ | max | |
| Collector Cutoff Current | ICBO | V _{CB} =10V, I _E =0A | | | 1.0 | μA |
| Emitter Cutoff Current | IEBO | V _{EB} =1V, I _C =0A | | | 10 | μA |
| DC Current Gain | h _{FE1} | V _{CE} =2V, I _C =3mA | 80 | | 200 | |
| | h _{FE2} | V _{CE} =2V, I _C =50mA | 70 | | | |
| Gain-Bandwidth Product | f _T | V _{CE} =2V, I _C =3mA | 1.0 | 1.7 | | GHz |
| Output Capacitance | C _{ob} | V _{CB} =10V, f=1MHz | | 1.1 | 1.8 | pF |
| Reverse Transfer Capacitance | C _{re} | | | | 0.8 | pF |
| Forward Transfer Gain | S _{21e} ² | V _{CE} =2V, I _C =3mA, f=150MHz | 13 | 16 | | dB |
| Noise Figure | NF | | | 1.8 | 3.0 | dB |

Ordering Information

| Device | Package | Shipping | memo |
|---------------|---------|----------------|--------------------------|
| 2SC5536A-TL-H | SSFP | 8,000pcs./reel | Pb Free and Halogen Free |



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S Parameters (Common emitter)

$V_{CE}=2V, I_C=1mA, Z_O=50\Omega$

| Freq(MHz) | S11 | $\angle S11$ | S21 | $\angle S21$ | S12 | $\angle S12$ | S22 | $\angle S22$ |
|-----------|-------|--------------|------|--------------|-------|--------------|-------|--------------|
| 50 | 0.961 | -26.3 | 3.67 | 162.9 | 0.040 | 74.8 | 0.980 | -7.3 |
| 100 | 0.937 | -52.0 | 2.90 | 148.5 | 0.074 | 61.5 | 0.938 | -13.4 |
| 150 | 0.917 | -72.8 | 2.69 | 135.6 | 0.099 | 50.4 | 0.890 | -18.0 |
| 200 | 0.890 | -89.5 | 2.47 | 125.0 | 0.114 | 41.3 | 0.843 | -21.5 |
| 250 | 0.893 | -100.7 | 2.23 | 116.6 | 0.124 | 33.8 | 0.803 | -24.4 |
| 300 | 0.880 | -111.3 | 1.93 | 108.8 | 0.130 | 28.3 | 0.785 | -26.5 |
| 350 | 0.868 | -122.4 | 1.83 | 102.9 | 0.135 | 23.9 | 0.747 | -28.6 |
| 400 | 0.873 | -127.6 | 1.58 | 96.8 | 0.136 | 19.9 | 0.747 | -30.5 |
| 450 | 0.858 | -135.4 | 1.52 | 92.7 | 0.137 | 16.8 | 0.720 | -32.3 |
| 500 | 0.866 | -138.9 | 1.31 | 87.3 | 0.135 | 14.0 | 0.724 | -34.3 |

$V_{CE}=2V, I_C=3mA, Z_O=50\Omega$

| Freq(MHz) | S11 | $\angle S11$ | S21 | $\angle S21$ | S12 | $\angle S12$ | S22 | $\angle S22$ |
|-----------|-------|--------------|------|--------------|-------|--------------|-------|--------------|
| 50 | 0.888 | -37.5 | 9.15 | 157.9 | 0.038 | 69.9 | 0.942 | -15.0 |
| 100 | 0.860 | -68.6 | 8.01 | 140.2 | 0.064 | 54.0 | 0.829 | -26.1 |
| 150 | 0.835 | -91.8 | 6.76 | 127.0 | 0.080 | 43.3 | 0.723 | -32.9 |
| 200 | 0.810 | -108.7 | 5.56 | 117.8 | 0.088 | 35.6 | 0.636 | -36.7 |
| 250 | 0.800 | -121.4 | 4.93 | 110.1 | 0.095 | 30.8 | 0.581 | -39.1 |
| 300 | 0.792 | -130.6 | 4.17 | 104.6 | 0.098 | 27.4 | 0.533 | -40.9 |
| 350 | 0.791 | -137.9 | 3.73 | 98.9 | 0.098 | 24.8 | 0.510 | -42.2 |
| 400 | 0.787 | -143.8 | 3.28 | 95.2 | 0.100 | 23.0 | 0.482 | -43.3 |
| 450 | 0.785 | -148.4 | 2.99 | 91.0 | 0.098 | 22.2 | 0.472 | -44.6 |
| 500 | 0.783 | -152.5 | 2.69 | 88.1 | 0.100 | 21.3 | 0.457 | -45.7 |

$V_{CE}=2V, I_C=10mA, Z_O=50\Omega$

| Freq(MHz) | S11 | $\angle S11$ | S21 | $\angle S21$ | S12 | $\angle S12$ | S22 | $\angle S22$ |
|-----------|-------|--------------|-------|--------------|-------|--------------|-------|--------------|
| 50 | 0.733 | -64.8 | 22.70 | 145.6 | 0.031 | 60.7 | 0.825 | -33.9 |
| 100 | 0.722 | -105.2 | 16.71 | 125.0 | 0.046 | 44.9 | 0.605 | -53.9 |
| 150 | 0.719 | -126.7 | 12.55 | 113.3 | 0.052 | 38.2 | 0.462 | -64.8 |
| 200 | 0.713 | -139.6 | 9.94 | 106.2 | 0.055 | 36.3 | 0.371 | -71.4 |
| 250 | 0.716 | -147.8 | 8.10 | 101.0 | 0.059 | 35.6 | 0.314 | -76.1 |
| 300 | 0.716 | -153.8 | 6.88 | 96.9 | 0.060 | 36.2 | 0.276 | -79.7 |
| 350 | 0.716 | -158.8 | 5.96 | 93.4 | 0.062 | 37.4 | 0.248 | -82.6 |
| 400 | 0.717 | -162.1 | 5.25 | 90.7 | 0.065 | 38.6 | 0.228 | -85.1 |
| 450 | 0.715 | -165.3 | 4.70 | 88.2 | 0.067 | 40.6 | 0.215 | -86.7 |
| 500 | 0.716 | -167.6 | 4.24 | 85.9 | 0.069 | 42.1 | 0.204 | -88.6 |

$V_{CE}=2V, I_C=30mA, Z_O=50\Omega$

| Freq(MHz) | S11 | $\angle S11$ | S21 | $\angle S21$ | S12 | $\angle S12$ | S22 | $\angle S22$ |
|-----------|-------|--------------|-------|--------------|-------|--------------|-------|--------------|
| 50 | 0.605 | -104.0 | 36.87 | 131.9 | 0.022 | 54.3 | 0.672 | -59.9 |
| 100 | 0.660 | -137.6 | 23.04 | 112.9 | 0.030 | 44.3 | 0.450 | -89.4 |
| 150 | 0.677 | -151.7 | 16.23 | 104.1 | 0.034 | 45.3 | 0.352 | -106.7 |
| 200 | 0.681 | -159.5 | 12.43 | 99.4 | 0.038 | 47.4 | 0.302 | -118.6 |
| 250 | 0.686 | -164.5 | 10.04 | 95.6 | 0.042 | 50.8 | 0.276 | -127.0 |
| 300 | 0.687 | -168.1 | 8.44 | 92.8 | 0.045 | 53.9 | 0.260 | -133.7 |
| 350 | 0.689 | -170.8 | 7.27 | 90.2 | 0.050 | 56.5 | 0.251 | -138.8 |
| 400 | 0.691 | -173.0 | 6.38 | 88.3 | 0.055 | 58.3 | 0.244 | -142.9 |
| 450 | 0.691 | -174.8 | 5.70 | 86.4 | 0.059 | 60.5 | 0.239 | -145.6 |
| 500 | 0.691 | -176.5 | 5.14 | 84.7 | 0.064 | 61.5 | 0.237 | -148.2 |

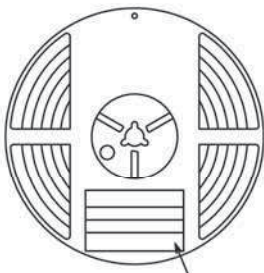
Embossed Taping Specification

2SC5536A-TL-H

1. Packing Format

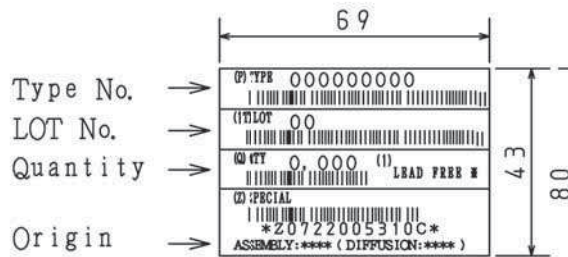
| Package Name | Carrier Tape Type | Maximum Number of devices contained (pcs) | | | Packing format | |
|--------------|-------------------|---|-----------|-----------|---|--|
| | | Reel | Inner box | Outer box | Inner BOX (C-1) | Outer BOX (A-7) |
| SSFP | SSFP | 8,000 | 40,000 | 240,000 | 5 reels contained Dimensions:mm (external) 183×72×185 | 6 inner boxes contained Dimension::mm (external) 440×195×210 |

Packing method

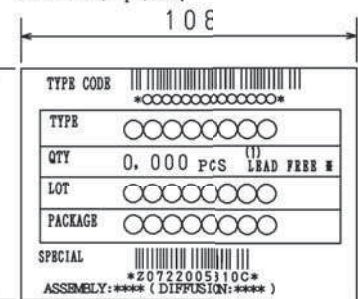


Reel label

Reel label, Inner box label
(unit:mm)



Outer box label
It is a label at the time of factory shipments. The form of a label may change in physical distribution process.



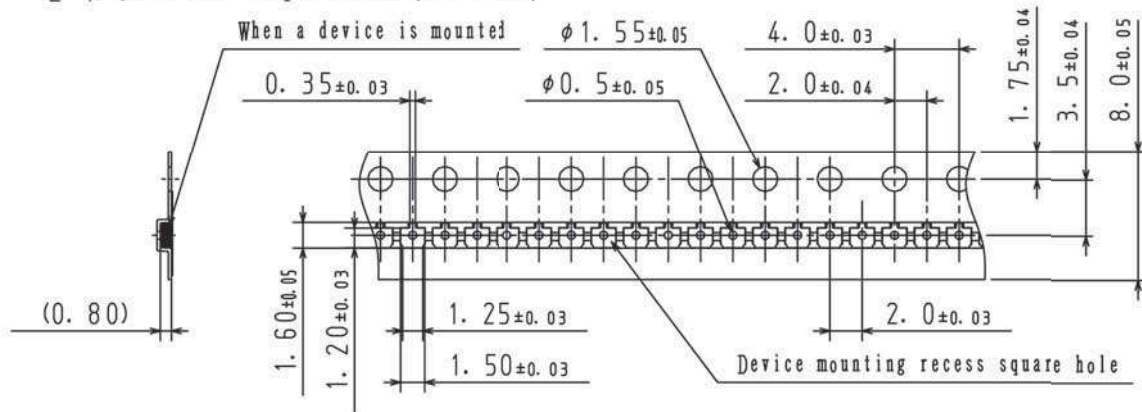
NOTE (1)

The LEAD FREE * description shows that the surface treatment of the terminal is lead free.

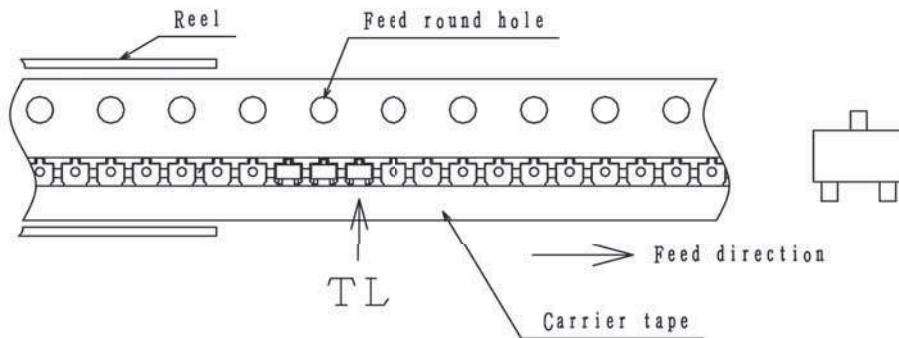
| Label | JEITA Phase |
|-------------|----------------|
| LEAD FREE 3 | JEITA Phase 3A |
| LEAD FREE 4 | JEITA Phase 3 |

2. Taping configuration

2-1. Carrier tape size (unit:mm)



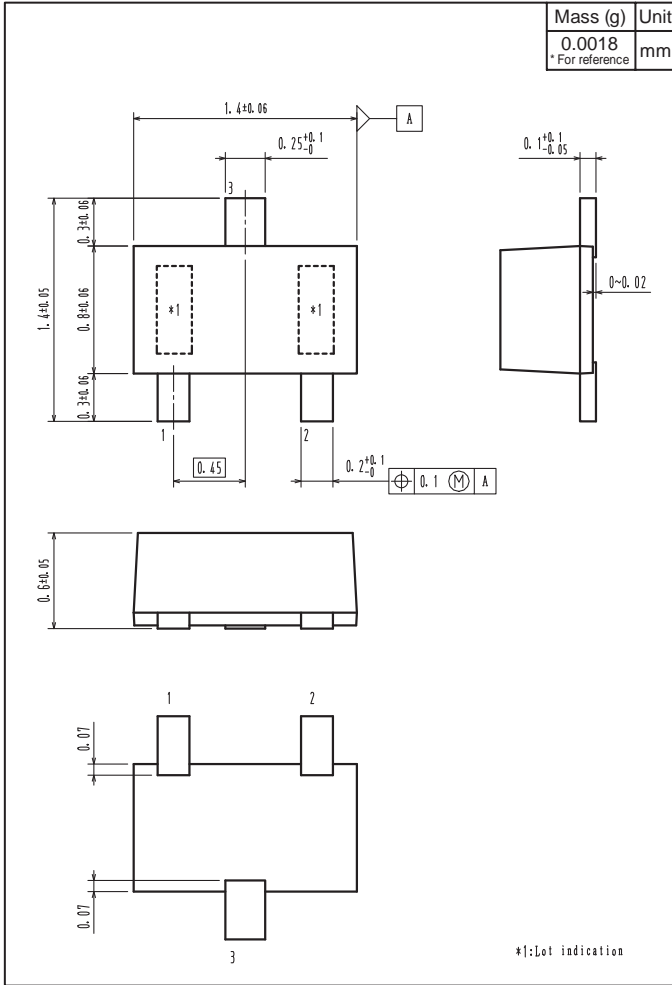
2-2. Device placement direction



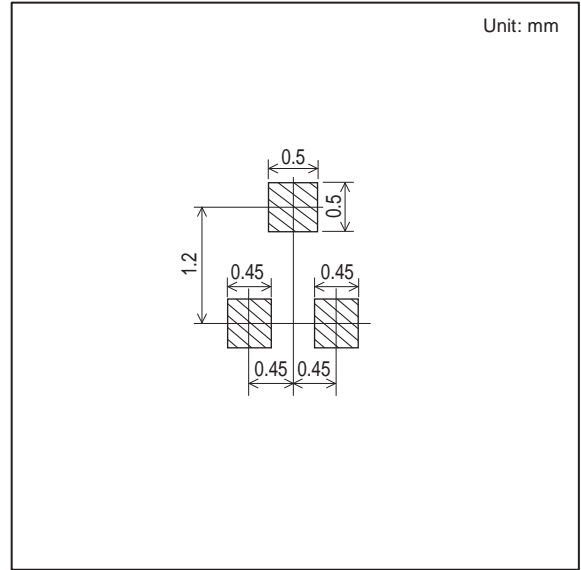
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Outline Drawing

2SC5536A-TL-H



Land Pattern Example



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