Ordering number : ENA1100A

# 15GN01MA

## RF Transistor
## 8V, 50mA, fT=1.5GHz, NPN Single MCP

ON Semiconductor®
http://onsemi.com

### Features

- Small ON-resistance [Ron=2Ω ($I_B$=3mA)]
- Small output capacitance [Cob=1.1pF ($V_{CB}$=10V)]

### Specifications

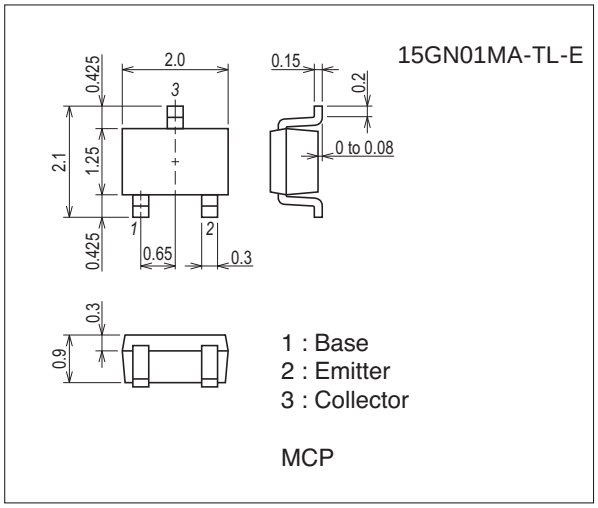
**Absolute Maximum Ratings** at Ta=25°C

| Parameter | Symbol | Conditions | Ratings | Unit |
|---|---|---|---|---|
| Collector-to-Base Voltage | $V_{CBO}$ | | 15 | V |
| Collector-to-Emitter Voltage | $V_{CEO}$ | | 8 | V |
| Emitter-to-Base Voltage | $V_{EBO}$ | | 3 | V |
| Collector Current | $I_C$ | | 50 | mA |
| Collector Dissipation | $P_C$ | When mounted on ceramic substrate (250mm$^2$×0.8mm) | 400 | mW |
| Junction Temperature | Tj | | 150 | °C |
| Storage Temperature | Tstg | | −55 to +150 | °C |

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

### Package Dimensions

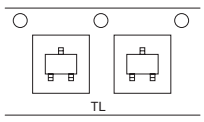
unit : mm (typ)
7023A-009



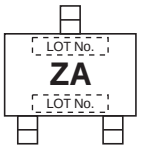

### Product & Package Information

- Package : MCP
- JEITA, JEDEC : SC-70, SOT-323
- Minimum Packing Quantity : 3,000 pcs./reel

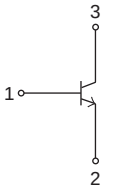
### Packing Type: TL




### Marking




### Electrical Connection

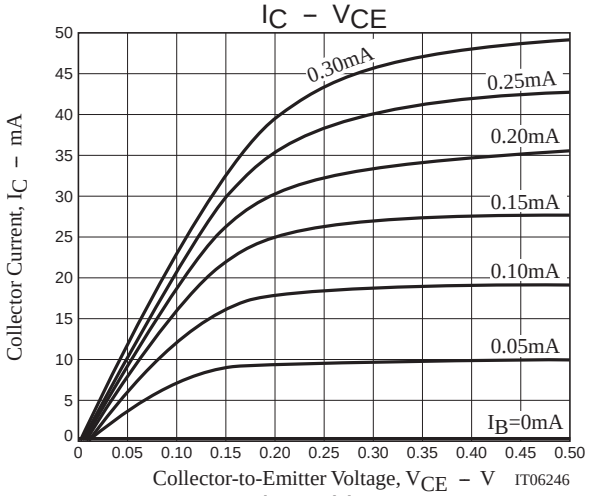


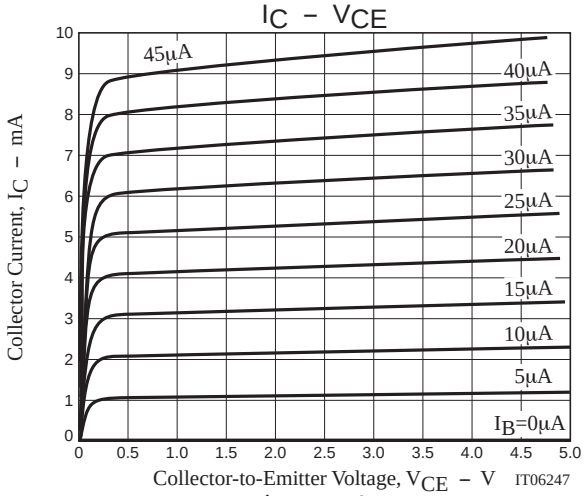
## Electrical Characteristics at Ta=25°C

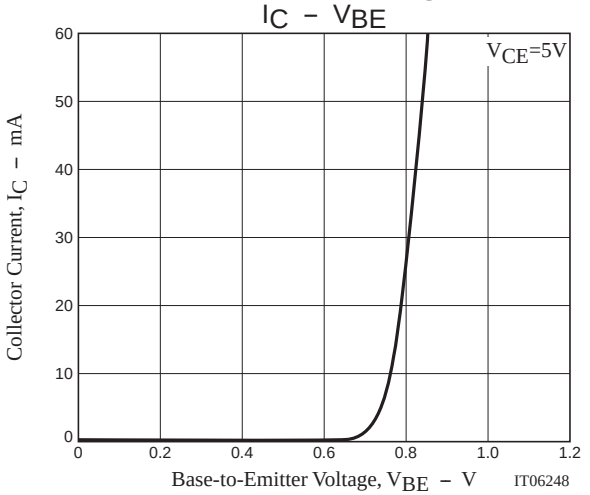
| Parameter | Symbol | Conditions | Ratings | | | Unit |
|---|---|---|---|---|---|---|
| | | | min | typ | max | |
| Collector Cutoff Current | $I_{CBO}$ | $V_{CB}$=10V, $I_E$=0A | | | 0.5 | μA |
| Emitter Cutoff Current | $I_{EBO}$ | $V_{EB}$=2V, $I_C$=0A | | | 0.5 | μA |
| DC Current Gain | $h_{FE}$ | $V_{CE}$=5V, $I_C$=10mA | 200 | | 400 | |
| Gain-Bandwidth Product | $f_T$ | $V_{CE}$=5V, $I_C$=10mA | 1.0 | 1.5 | | GHz |
| Output Capacitance | Cob | $V_{CB}$=10V, f=1MHz | | 1.1 | 1.5 | pF |
| Collector-to-Emitter Saturation Voltage | $V_{CE}$(sat) | $I_C$=20mA, $I_B$=2mA | | 0.06 | 0.12 | V |
| Output ON resistance | Ron | $I_B$=3mA, f=10kHz | | 2.0 | | Ω |

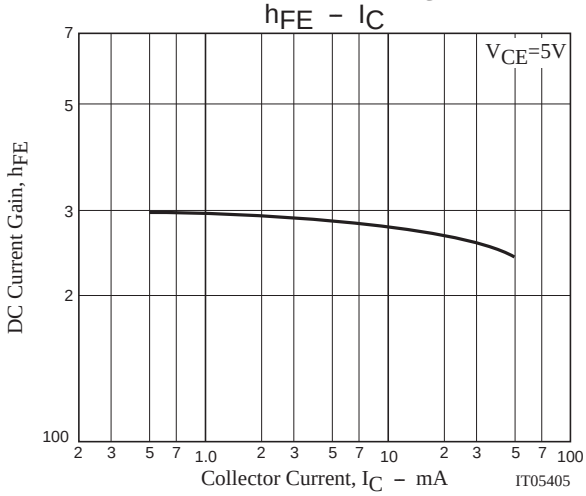
## Ordering Information

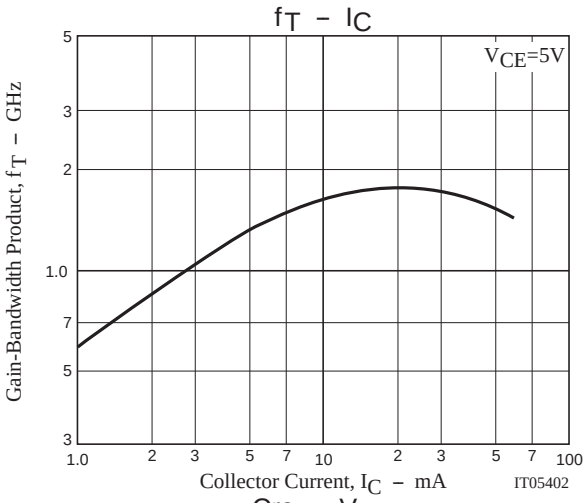
| Device | Package | Shipping | memo |
|---|---|---|---|
| 15GN01MA-TL-E | MCP | 3,000pcs./reel | Pb Free |

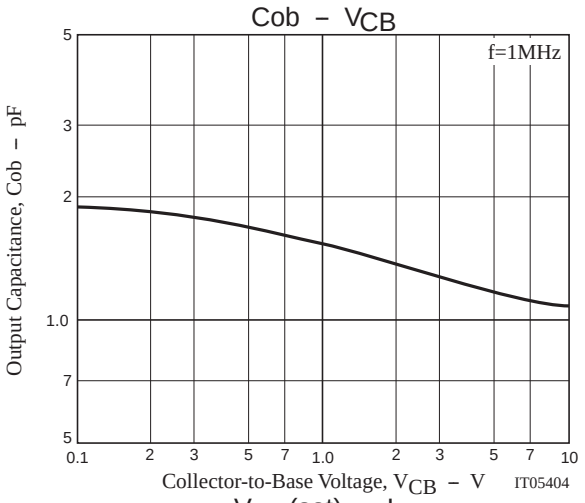


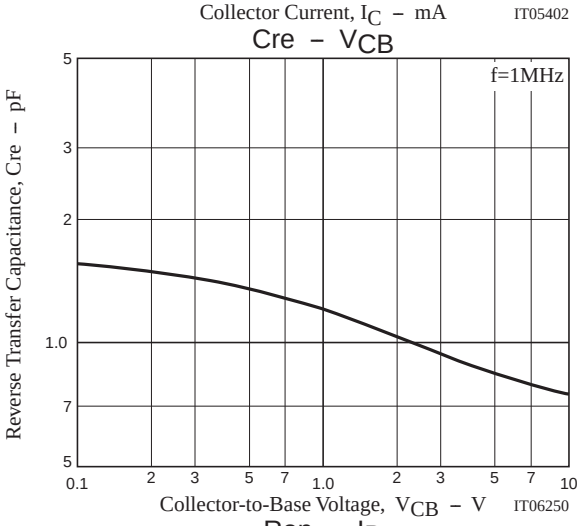



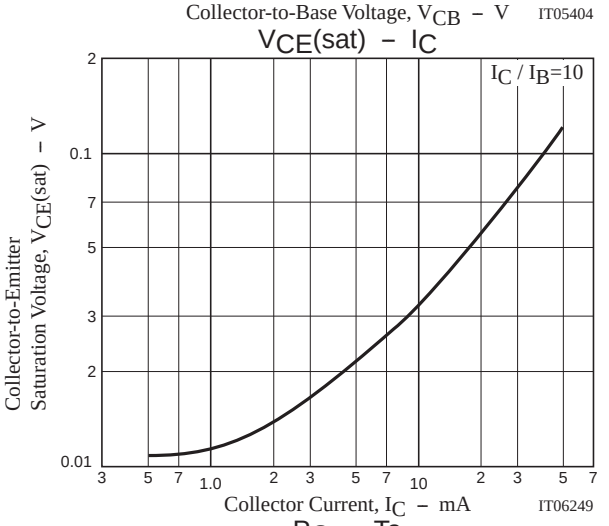



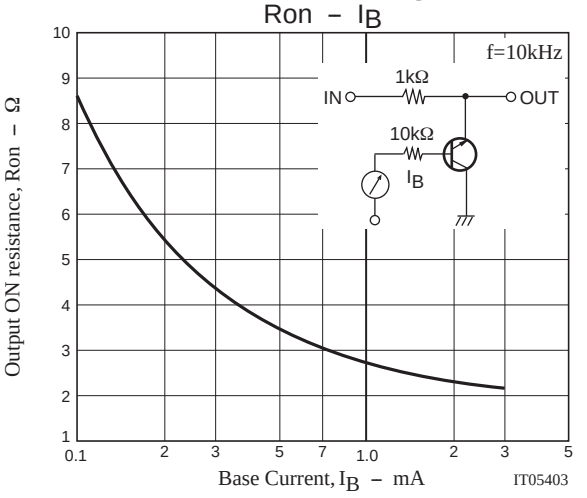



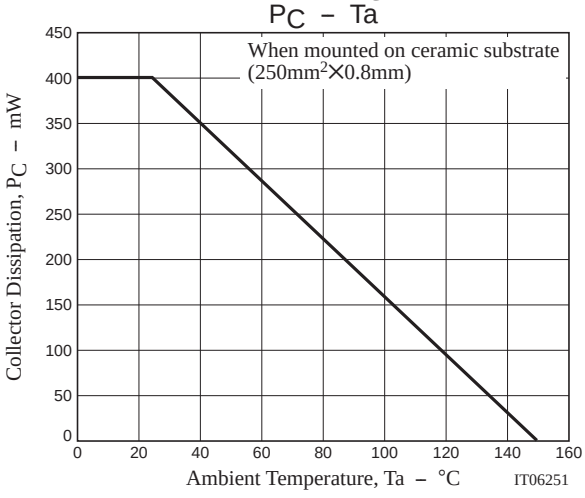

fT – IC
VCE=5V
Gain-Bandwidth Product, fT – GHz
Collector Current, IC – mA
IT05402


Cob – VCB
f=1MHz
Output Capacitance, Cob – pF
Collector-to-Base Voltage, VCB – V
IT05404


Cre – VCB
f=1MHz
Reverse Transfer Capacitance, Cre – pF
Collector-to-Base Voltage, VCB – V
IT06250


VCE(sat) – IC
IC / IB=10
Collector-to-Emitter Saturation Voltage, VCE(sat) – V
Collector Current, IC – mA
IT06249


Ron – IB
f=10kHz
1kΩ
IN
OUT
10kΩ
IB
Output ON resistance, Ron – Ω
Base Current, IB – mA
IT05403


PC – Ta
When mounted on ceramic substrate
(250mm2×0.8mm)
Collector Dissipation, PC – mW
Ambient Temperature, Ta – °C
IT06251

**S Parameters (Common emitter)**

$V_{CE}$=5V, $I_C$=5mA, $Z_O$=50Ω

| Freq(MHz) | \|S11\| | ∠S11 | \|S21\| | ∠S21 | \|S12\| | ∠S12 | \|S22\| | ∠S22 |
|---|---|---|---|---|---|---|---|---|
| 100 | 0.662 | -25.65 | 4.631 | 122.00 | 0.028 | 71.36 | 0.765 | -10.50 |
| 200 | 0.582 | -36.72 | 3.028 | 112.20 | 0.051 | 68.80 | 0.732 | -14.15 |
| 300 | 0.529 | -47.21 | 2.353 | 104.69 | 0.071 | 65.59 | 0.713 | -17.91 |
| 400 | 0.487 | -56.61 | 1.955 | 97.68 | 0.088 | 63.00 | 0.700 | -21.58 |
| 500 | 0.459 | -65.82 | 1.691 | 91.07 | 0.103 | 60.43 | 0.689 | -25.23 |
| 600 | 0.429 | -74.14 | 1.496 | 85.11 | 0.116 | 57.83 | 0.679 | -28.81 |
| 700 | 0.409 | -82.44 | 1.353 | 79.01 | 0.128 | 56.22 | 0.674 | -32.38 |
| 800 | 0.388 | -89.94 | 1.239 | 73.29 | 0.138 | 54.76 | 0.671 | -35.89 |
| 900 | 0.374 | -96.79 | 1.149 | 67.98 | 0.148 | 53.44 | 0.671 | -39.34 |
| 1000 | 0.365 | -103.28 | 1.072 | 63.13 | 0.156 | 52.60 | 0.670 | -42.75 |

$V_{CE}$=5V, $I_C$=10mA, $Z_O$=50Ω

| Freq(MHz) | \|S11\| | ∠S11 | \|S21\| | ∠S21 | \|S12\| | ∠S12 | \|S22\| | ∠S22 |
|---|---|---|---|---|---|---|---|---|
| 100 | 0.587 | -31.65 | 6.647 | 118.78 | 0.026 | 71.86 | 0.694 | -11.96 |
| 200 | 0.502 | -46.40 | 4.239 | 108.57 | 0.046 | 68.22 | 0.653 | -15.76 |
| 300 | 0.444 | -59.47 | 3.227 | 100.32 | 0.064 | 65.90 | 0.630 | -19.10 |
| 400 | 0.405 | -70.80 | 2.616 | 93.18 | 0.079 | 63.91 | 0.619 | -22.50 |
| 500 | 0.381 | -81.80 | 2.217 | 86.64 | 0.093 | 62.30 | 0.607 | -25.83 |
| 600 | 0.356 | -91.29 | 1.922 | 80.82 | 0.105 | 60.39 | 0.598 | -29.19 |
| 700 | 0.342 | -101.15 | 1.715 | 74.86 | 0.115 | 59.29 | 0.596 | -32.72 |
| 800 | 0.329 | -109.42 | 1.544 | 69.40 | 0.125 | 58.34 | 0.593 | -36.10 |
| 900 | 0.319 | -116.99 | 1.414 | 64.16 | 0.135 | 57.86 | 0.594 | -39.48 |
| 1000 | 0.315 | -124.06 | 1.305 | 59.41 | 0.144 | 57.47 | 0.593 | -42.80 |

$V_{CE}$=5V, $I_C$=20mA, $Z_O$=50Ω

| Freq(MHz) | \|S11\| | ∠S11 | \|S21\| | ∠S21 | \|S12\| | ∠S12 | \|S22\| | ∠S22 |
|---|---|---|---|---|---|---|---|---|
| 100 | 0.505 | -41.07 | 8.945 | 114.82 | 0.023 | 71.42 | 0.611 | -13.64 |
| 200 | 0.417 | -60.49 | 5.500 | 103.75 | 0.042 | 69.03 | 0.568 | -16.14 |
| 300 | 0.369 | -76.83 | 4.039 | 95.20 | 0.056 | 67.39 | 0.548 | -18.89 |
| 400 | 0.341 | -90.31 | 3.197 | 88.11 | 0.070 | 66.22 | 0.539 | -21.75 |
| 500 | 0.328 | -102.08 | 2.654 | 81.71 | 0.082 | 65.43 | 0.533 | -24.77 |
| 600 | 0.316 | -112.57 | 2.264 | 76.38 | 0.094 | 64.49 | 0.528 | -27.99 |
| 700 | 0.311 | -122.49 | 1.988 | 70.80 | 0.104 | 64.03 | 0.530 | -31.32 |
| 800 | 0.306 | -130.50 | 1.771 | 65.75 | 0.115 | 63.95 | 0.530 | -34.57 |
| 900 | 0.304 | -137.80 | 1.605 | 60.92 | 0.125 | 64.09 | 0.534 | -37.93 |
| 1000 | 0.306 | -144.30 | 1.470 | 56.51 | 0.135 | 64.16 | 0.537 | -41.24 |

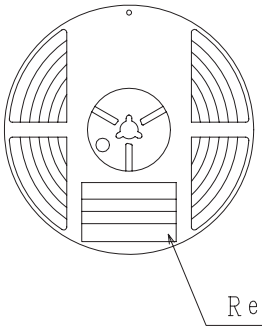
**Embossed Taping Specification**

15GN01MA-TL-E

## 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) |
| MCP | MCP | 3,000 | 15,000 | 90,000 | 5 reels contained<br>Dimensions:mm (external)<br>183×72×185 | 6 inner boxes contained<br>Dimensions:mm (external)<br>440×195×210 |

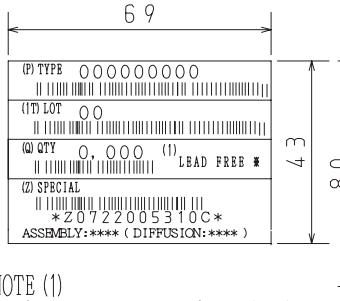
Packing method



Reel label

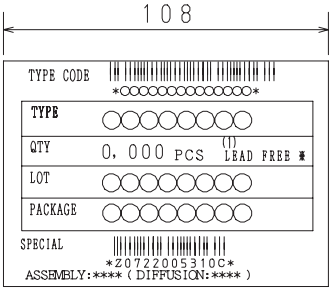
Reel label, Inner box label

(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.



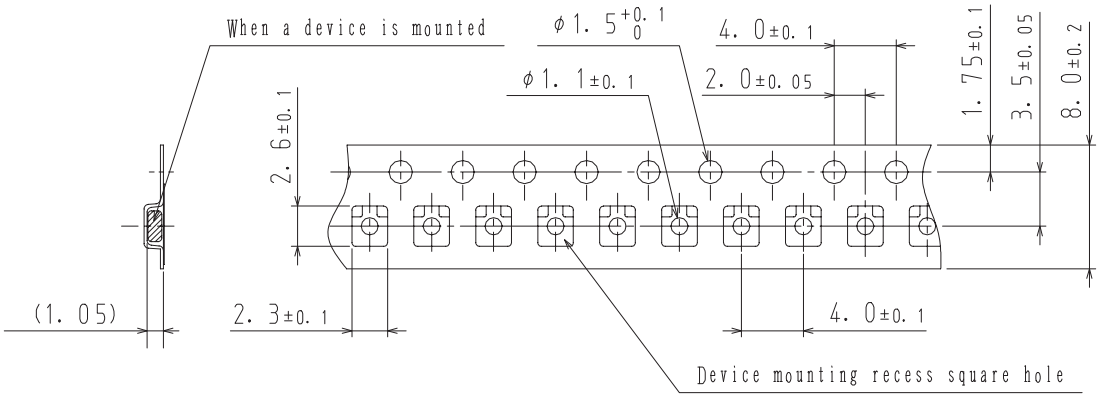

NOTE (1)

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

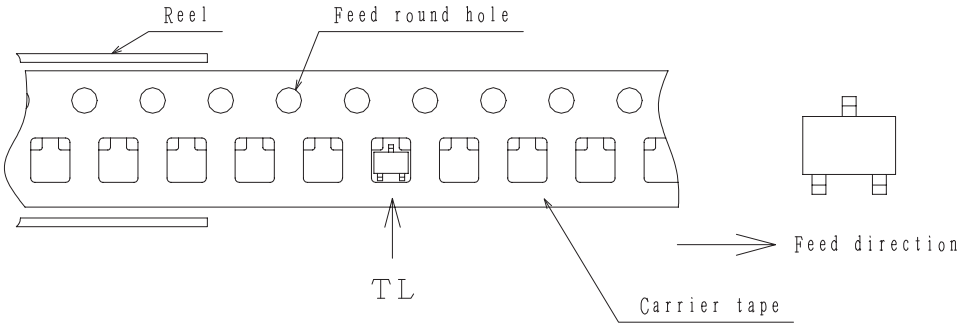
| Label | JEITA Phase |
|---|---|
| LEAD FREE 3 | JEITA Phase 3A |
| LEAD FREE 4 | JEITA Phase 3 |

## 2. Taping configuration

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



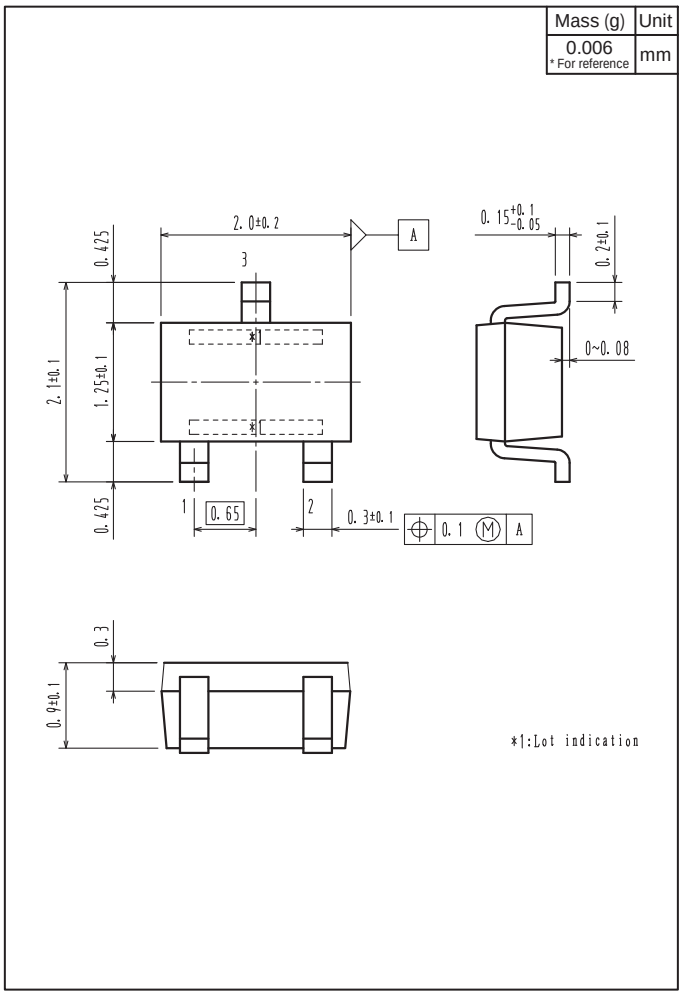

### 2-2. Device placement direction



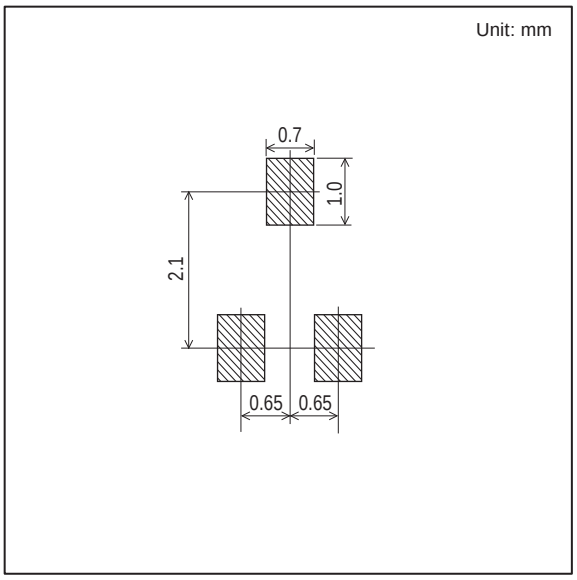

Those with oen electrode terminal on the feed hole side·····TL

## Outline Drawing

15GN01MA-TL-E




## Land Pattern Example



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