Ordering number : EN7364B

# 30C02MH

## Bipolar Transistor
## 30V, 0.7A, Low $V_{CE}$(sat) NPN Single MCPH3

ON Semiconductor®
http://onsemi.com

### Applications

- Low-frequency Amplifier, high-speed switching, small motor drive

### Features

- Large current capacity
- Low collector-to-emitter saturation voltage (resistance)) : $R_{CE}$(sat) typ=330mΩ [$I_C$=0.7A, $I_B$=35mA]
- Ultrasmall package facilitates miniaturization in end products
- Small ON-resistance (Ron)
- Halogen free compliance

### Specifications

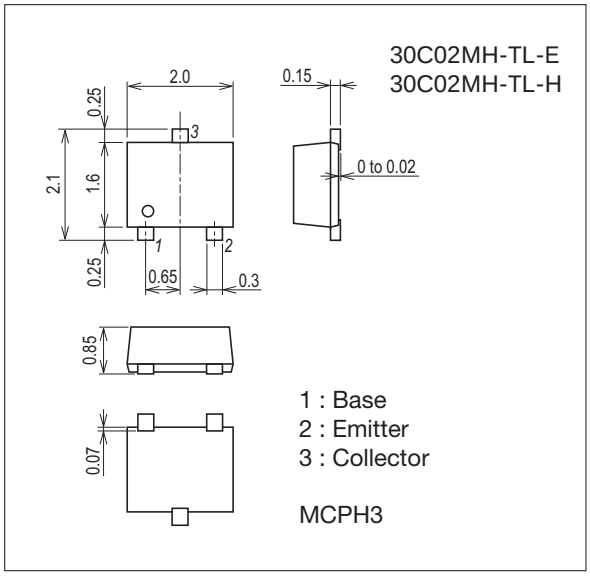
**Absolute Maximum Ratings** at Ta=25°C

| Parameter | Symbol | Conditions | Ratings | Unit |
|---|---|---|---|---|
| Collector-to-Base Voltage | $V_{CBO}$ | | 40 | V |
| Collector-to-Emitter Voltage | $V_{CEO}$ | | 30 | V |
| Emitter-to-Base Voltage | $V_{EBO}$ | | 5 | V |
| Collector Current | $I_C$ | | 700 | mA |
| Collector Current (Pulse) | $I_{CP}$ | | 1.4 | A |
| Collector Dissipation | $P_C$ | When mounted on ceramic substrate (600mm²×0.8mm) | 600 | 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

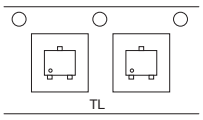
unit : mm (typ)
7019A-004




### Product & Package Information

- Package : MCPH3
- JEITA, JEDEC : SC-70, SOT-323
- Minimum Packing Quantity : 3,000 pcs./reel

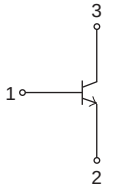
### Packing Type : TL




### Marking



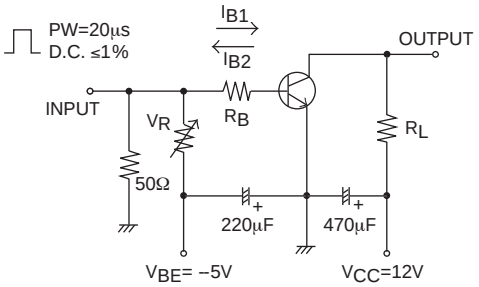

### Electrical Connection



## Electrical Characteristics at Ta=25°C

| Parameter | Symbol | Conditions | Ratings | | | Unit |
|---|---|---|---|---|---|---|
| | | | min | typ | max | |
| Collector Cutoff Current | $I_{CBO}$ | $V_{CB}$=30V, $I_E$=0A | | | 100 | nA |
| Emitter Cutoff Current | $I_{EBO}$ | $V_{EB}$=4V, $I_C$=0A | | | 100 | nA |
| DC Current Gain | $h_{FE}$ | $V_{CE}$=2V, $I_C$=50mA | 300 | | 800 | |
| Gain-Bandwidth Product | $f_T$ | $V_{CE}$=10V, $I_C$=50mA | | 540 | | MHz |
| Output Capacitance | Cob | $V_{CB}$=10V, f=1MHz | | 3.3 | | pF |
| Collector-to-Emitter Saturation Voltage | $V_{CE}$(sat) | $I_C$=200mA, $I_B$=10mA | | 85 | 190 | mV |
| Base-to-Emitter Saturation Voltage | $V_{BE}$(sat) | $I_C$=200mA, $I_B$=10mA | | 0.9 | 1.2 | V |
| Collector-to-Base Breakdown Voltage | $V_{(BR)CBO}$ | $I_C$=10μA, $I_E$=0A | 40 | | | V |
| Collector-to-Emitter Breakdown Voltage | $V_{(BR)CEO}$ | $I_C$=1mA, $R_{BE}$=∞ | 30 | | | V |
| Emitter-to-Base Breakdown Voltage | $V_{(BR)EBO}$ | $I_E$=10μA, $I_C$=0A | 5 | | | V |
| Turn-ON Time | $t_{on}$ | See specified Test Circuit. | | 35 | | ns |
| Storage Time | $t_{stg}$ | | | 255 | | ns |
| Fall Time | $t_f$ | | | 40 | | ns |

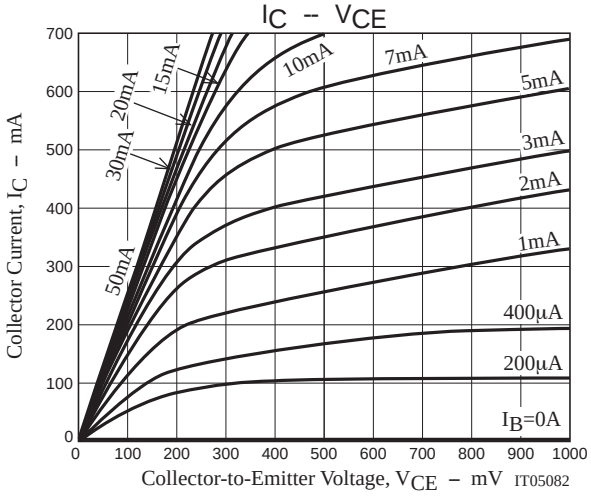
## Switching Time Test Circuit

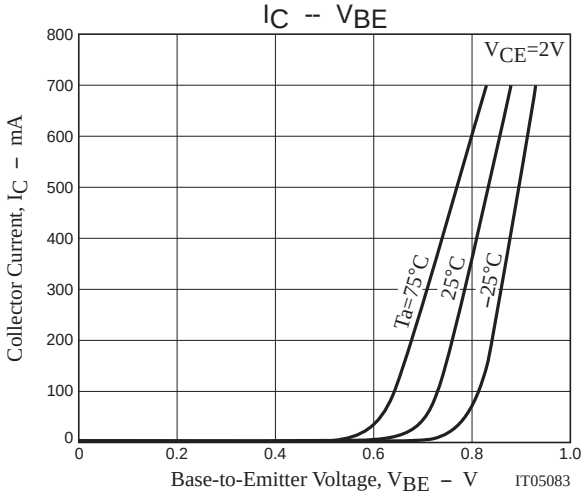


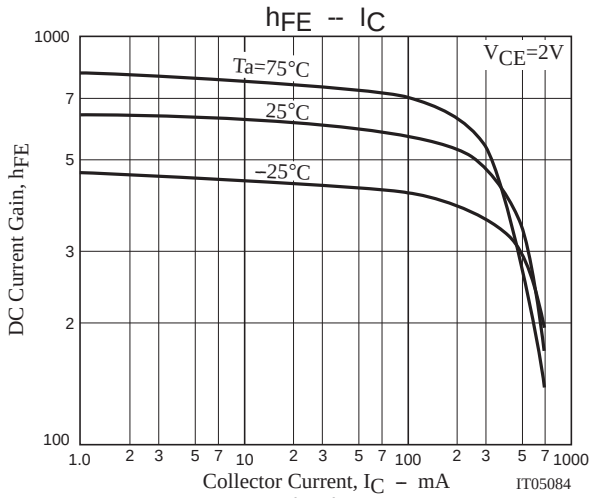

$I_C$=20$I_{B1}$= −20$I_{B2}$=300mA

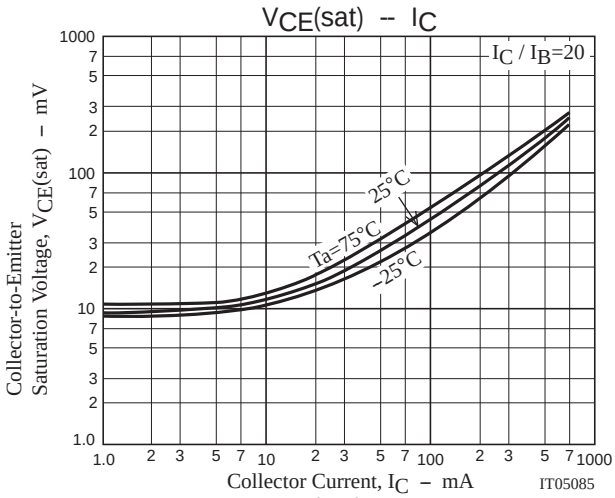
## Ordering Information

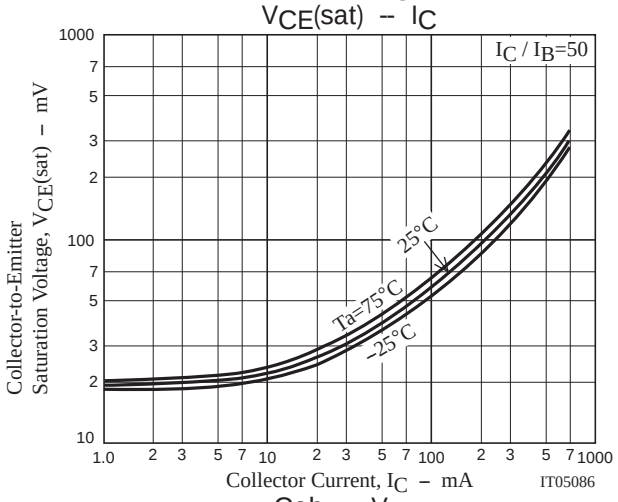
| Device | Package | Shipping | memo |
|---|---|---|---|
| 30C02MH-TL-E | MCPH3 | 3,000pcs./reel | Pb Free |
| 30C02MH-TL-H | MCPH3 | 3,000pcs./reel | Pb Free and Halogen Free |

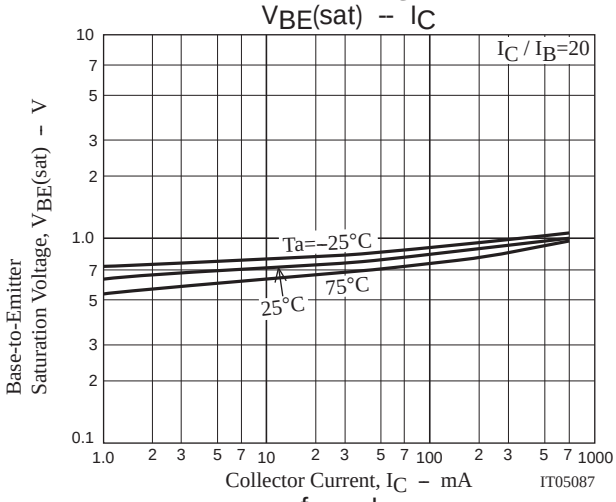


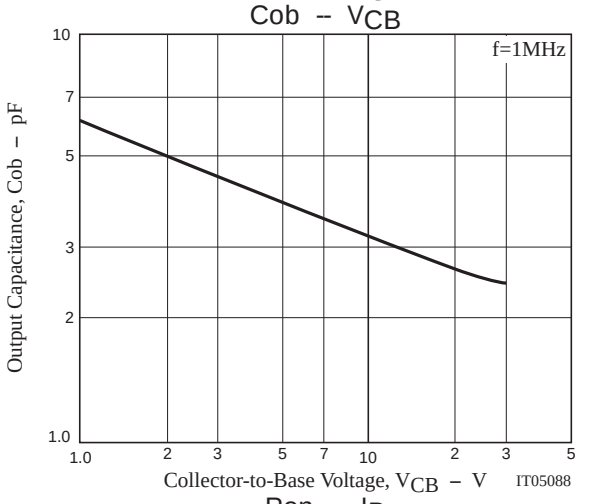



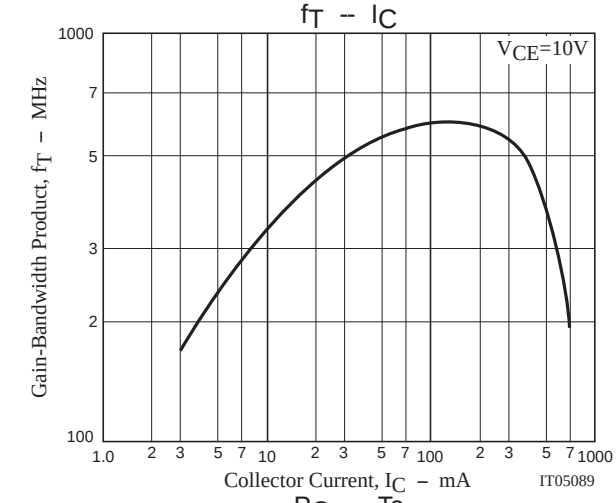

hFE -- IC
VCE=2V
Ta=75°C
25°C
–25°C
DC Current Gain, hFE
Collector Current, IC – mA
IT05084

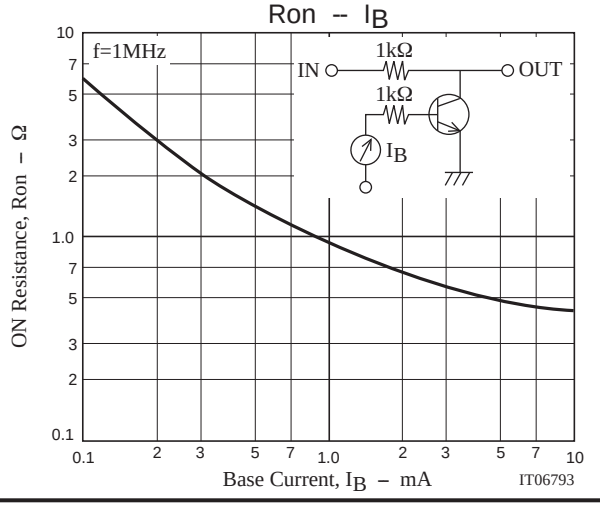

VCE(sat) -- IC
IC / IB=20
25°C
Ta=75°C
–25°C
Collector-to-Emitter Saturation Voltage, VCE(sat) – mV
Collector Current, IC – mA
IT05085

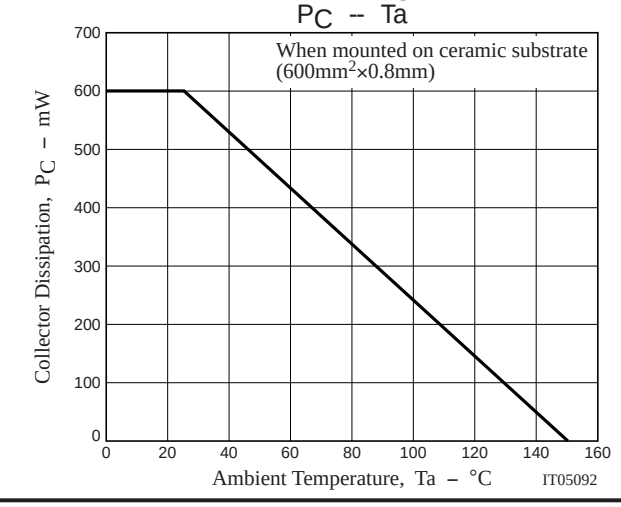

VCE(sat) -- IC
IC / IB=50
25°C
Ta=75°C
–25°C
Collector-to-Emitter Saturation Voltage, VCE(sat) – mV
Collector Current, IC – mA
IT05086


VBE(sat) -- IC
IC / IB=20
Ta=–25°C
75°C
25°C
Base-to-Emitter Saturation Voltage, VBE(sat) – V
Collector Current, IC – mA
IT05087


Cob -- VCB
f=1MHz
Output Capacitance, Cob – pF
Collector-to-Base Voltage, VCB – V
IT05088


fT -- IC
VCE=10V
Gain-Bandwidth Product, fT – MHz
Collector Current, IC – mA
IT05089


Ron -- IB
f=1MHz
IN
1kΩ
1kΩ
OUT
IB
ON Resistance, Ron – Ω
Base Current, IB – mA
IT06793


PC -- Ta
When mounted on ceramic substrate
(600mm2×0.8mm)
Collector Dissipation, PC – mW
Ambient Temperature, Ta – °C
IT05092

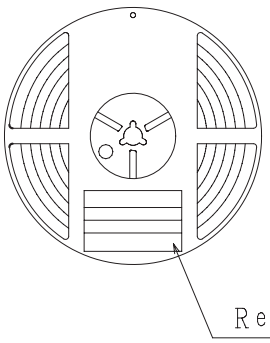
**Embossed Taping Specification**

30C02MH-TL-E, 30C02MH-TL-H

## 1. Packing Format

| Package Name | Carrier Tape Type | Maximun Number of devices contained (pcs) | | | Packing format | |
|---|---|---|---|---|---|---|
| | | Reel | Inner box | Outer box | Inner BOX (C-1) | Outer BOX (A-7) |
| MCPH3 | MCPH3 | 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 |

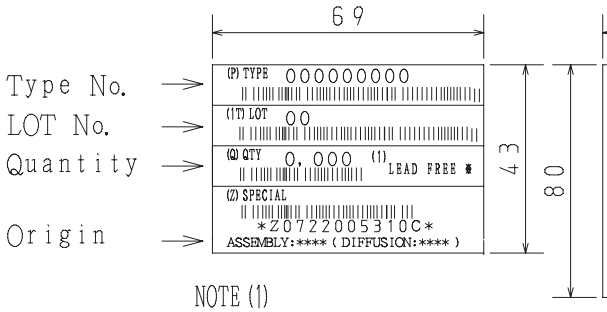
Packing method



Reel label

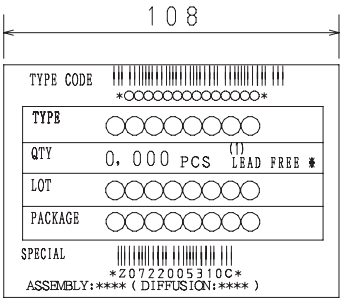
Reel label, Inner box label

(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.



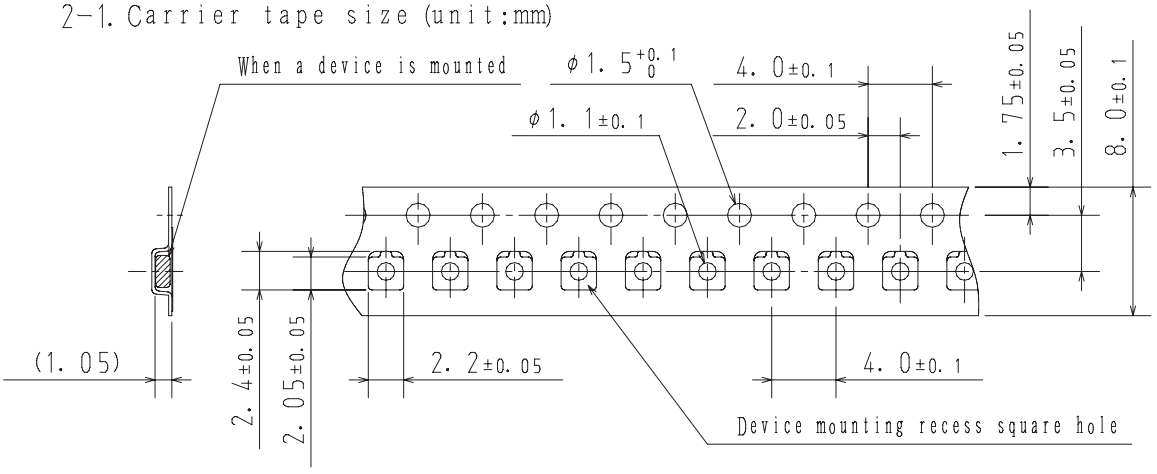

NOTE (1)

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

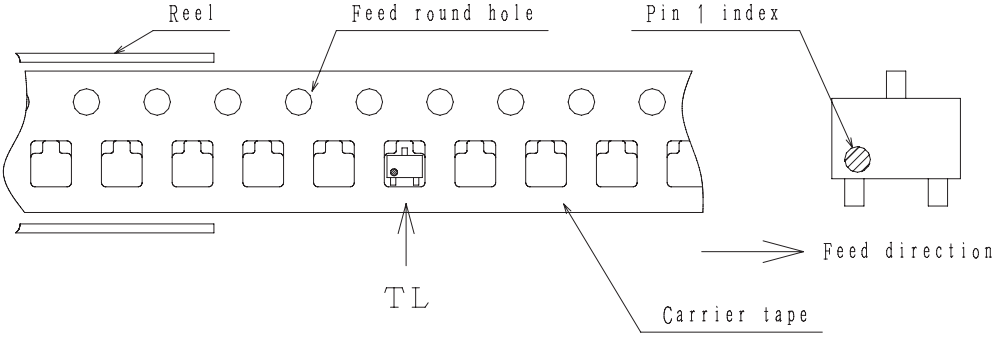
| Label | JEITA Phase |
|---|---|
| LEAD FREE 3 | JEITA Phase 3A |
| LEAD FREE 4 | JEITA Phase 3 |

## 2. Taping configuration

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



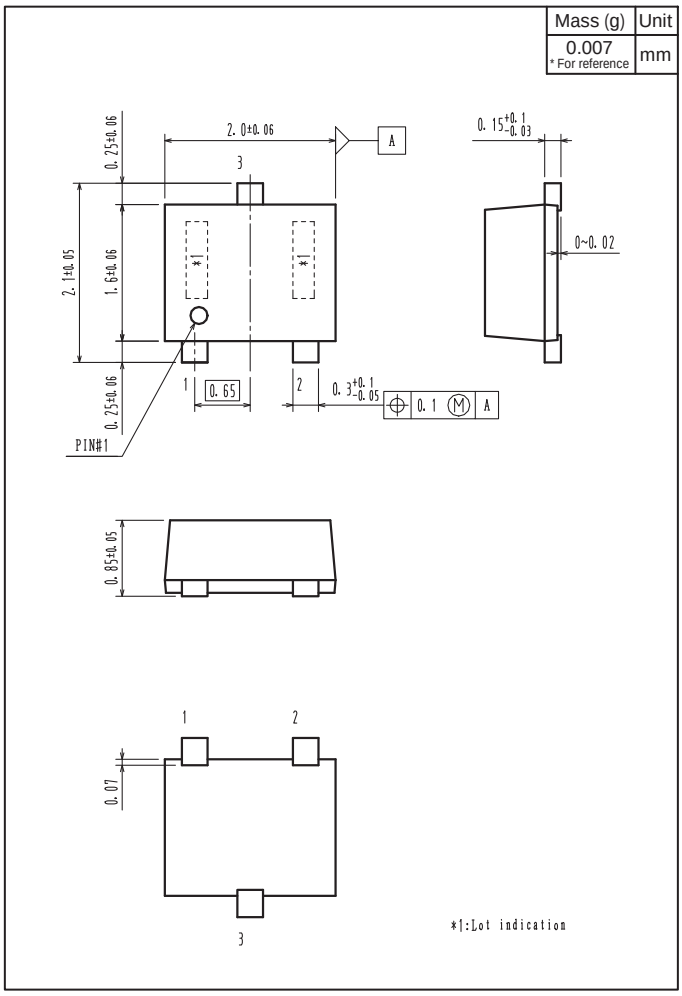

### 2-2. Device placement direction



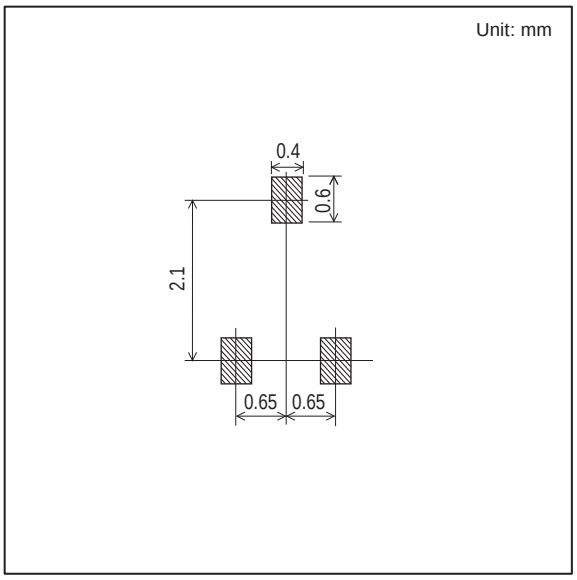

Those with pin 1 index on the feed hole side·····TL

## Outline Drawing

30C02MH-TL-E, 30C02MH-TL-H




## Land Pattern Example



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