



SANYO Semiconductors

# DATA SHEET

An ON Semiconductor Company

## 50C02CH — NPN Epitaxial Planar Silicon Transistor Low-Frequency General-Purpose Amplifier Applications

### Applications

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

### Features

- Large current capacitance
- Low collector-to-emitter saturation voltage (resistance)  $R_{CE(sat)}$  typ.=175m $\Omega$  [ $I_C=0.5A$ ,  $I_B=50mA$ ]
- Ultrasmall package facilitates miniaturization in end products
- Small ON-resistance ( $R_{on}$ )

### Specifications

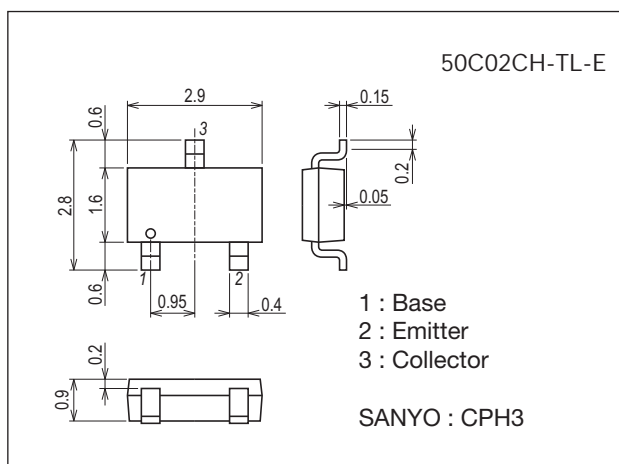
Absolute Maximum Ratings at  $T_a=25^\circ C$ 

| Parameter                    | Symbol    | Conditions   | Ratings     | Unit |
|------------------------------|-----------|--|-------------|------|
| Collector-to-Base Voltage    | $V_{CBO}$ |  | 60          | V    |
| Collector-to-Emitter Voltage | $V_{CEO}$ |  | 50          | V    |
| Emitter-to-Base Voltage      | $V_{EBO}$ |  | 5           | V    |
| Collector Current            | $I_C$     |  | 500         | mA   |
| Collector Current (Pulse)    | $I_{CP}$  |  | 1.0         | A    |
| Collector Dissipation        | $P_C$     | Mounted on a ceramic board (600mm <sup>2</sup> ×0.8mm) | 700         | mW   |
| Junction Temperature         | $T_j$     |  | 150         | °C   |
| Storage Temperature          | $T_{stg}$ |  | -55 to +150 | °C   |

### Package Dimensions

unit : mm (typ)

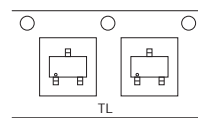
7015A-003



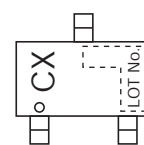
### Product & Package Information

- Package : CPH3
- JEITA, JEDEC : SC-59, TO-236, SOT-23
- Minimum Packing Quantity : 3,000 pcs./reel

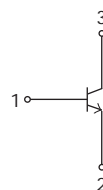
### Packing Type: TL



### Marking



### Electrical Connection

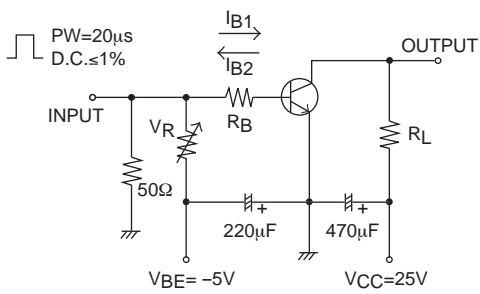


# 50C02CH

## Electrical Characteristics at $T_a=25^\circ\text{C}$

| Parameter                               | Symbol        | Conditions                           | Ratings |     |     | Unit |
|---|---------------|--------------------------------------|---------|-----|-----|------|
|   |               |                                      | min     | typ | max |      |
| Collector Cutoff Current                | $I_{CBO}$     | $V_{CB}=40\text{V}, I_E=0\text{A}$   |         |     | 100 | nA   |
| Emitter Cutoff Current                  | $I_{EBO}$     | $V_{EB}=4\text{V}, I_C=0\text{A}$    |         |     | 100 | nA   |
| DC Current Gain                         | $h_{FE}$      | $V_{CE}=2\text{V}, I_C=10\text{mA}$  | 300     |     | 800 |      |
| Gain-Bandwidth Product                  | $f_T$         | $V_{CE}=10\text{V}, I_C=50\text{mA}$ |         | 500 |     | MHz  |
| Output Capacitance                      | $C_{ob}$      | $V_{CB}=10\text{V}, f=1\text{MHz}$   |         | 2.8 |     | pF   |
| Collector-to-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C=100\text{mA}, I_B=10\text{mA}$  |         | 50  | 100 | mV   |
| Base-to-Emitter Saturation Voltage      | $V_{BE(sat)}$ | $I_C=100\text{mA}, I_B=10\text{mA}$  |         | 0.9 | 1.2 | V    |
| Collector-to-Base Breakdown Voltage     | $V_{(BR)CBO}$ | $I_C=10\mu\text{A}, I_E=0\text{A}$   | 60      |     |     | V    |
| Collector-to-Emitter Breakdown Voltage  | $V_{(BR)CEO}$ | $I_C=1\text{mA}, R_{BE}=\infty$      | 50      |     |     | V    |
| Emitter-to-Base Breakdown Voltage       | $V_{(BR)EBO}$ | $I_E=10\mu\text{A}, I_C=0\text{A}$   | 5       |     |     | V    |
| Turn-On Time                            | $t_{on}$      | See specified Test Circuit.          |         | 30  |     | ns   |
| Storage Time                            | $t_{stg}$     |                                      |         | 340 |     | ns   |
| Fall Time                               | $t_f$         |                                      |         | 55  |     | ns   |

## Switching Time Test Circuit

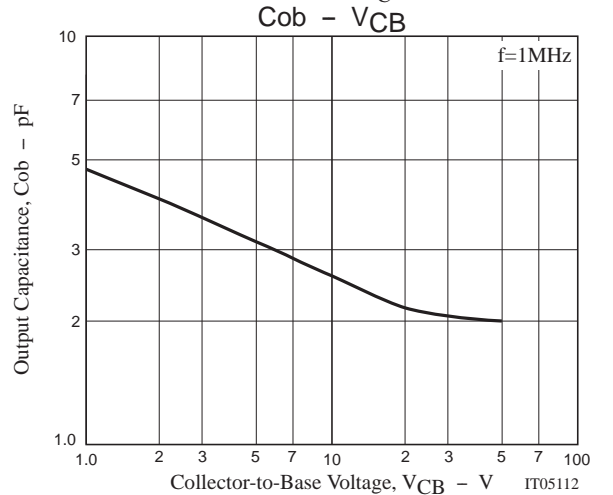
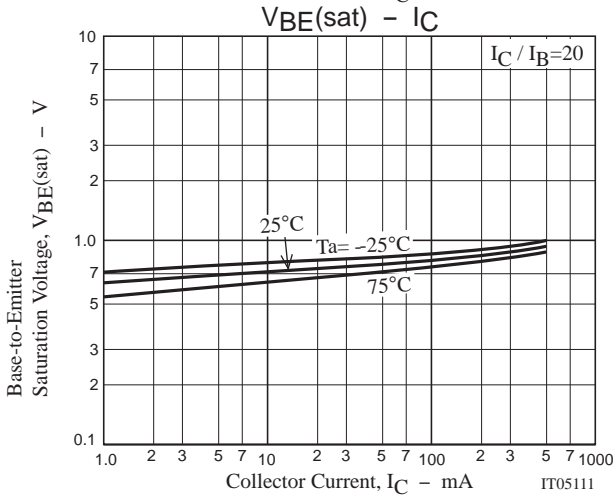
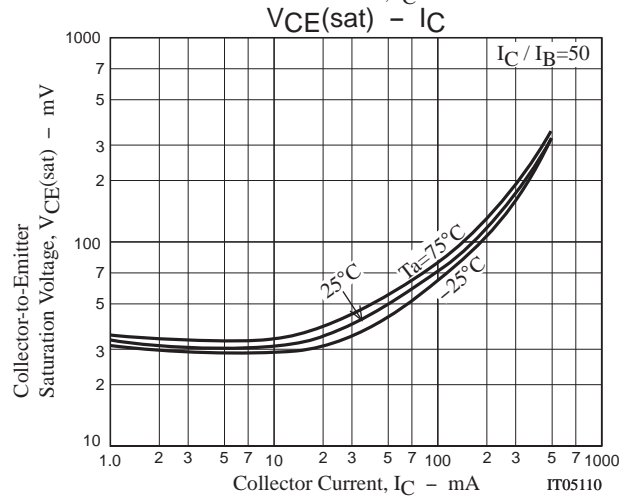
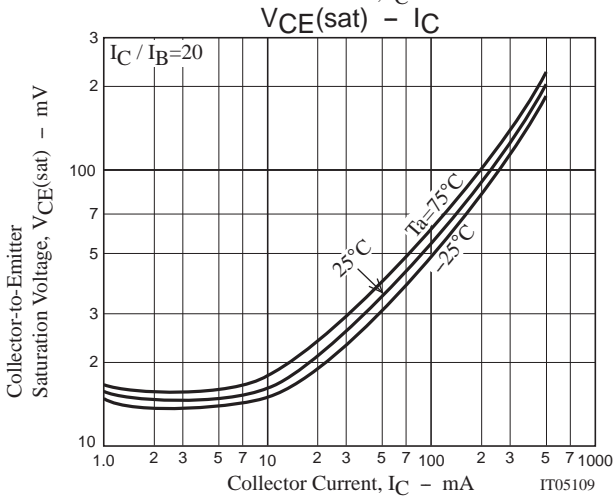
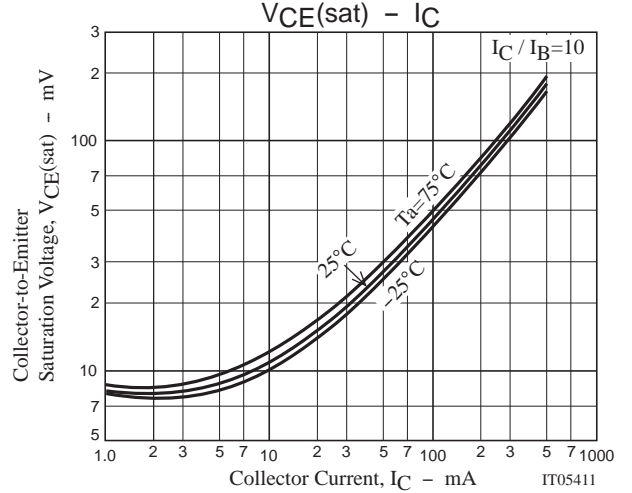
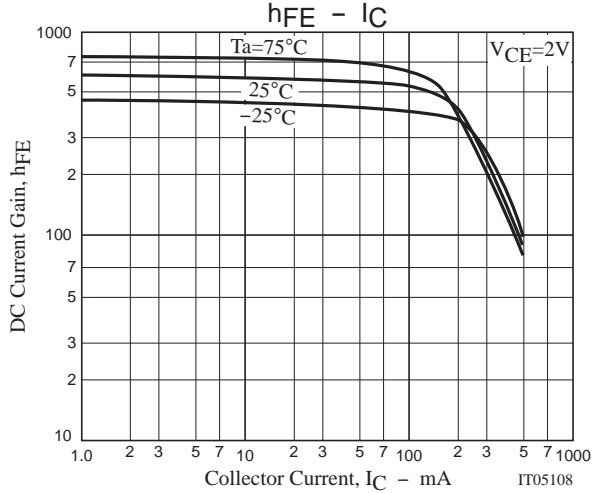
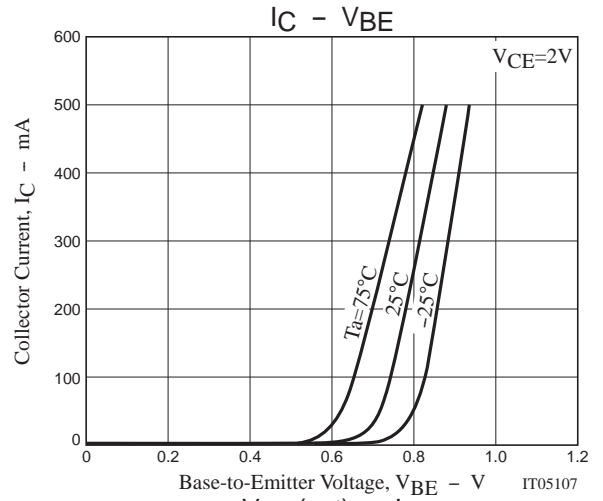
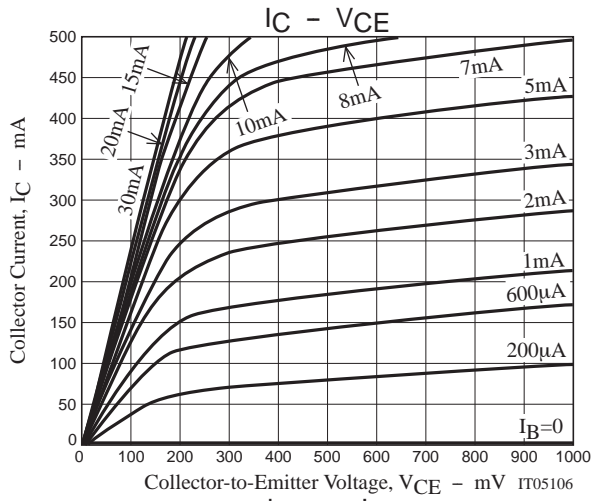


$$I_C = 20I_{B1} = -20I_{B2} = 200\text{mA}$$

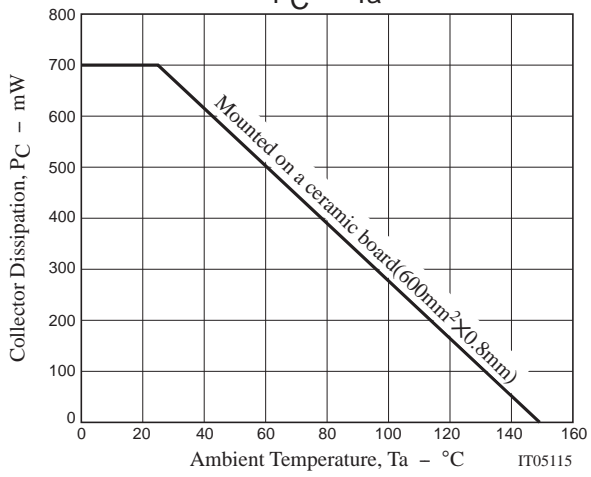
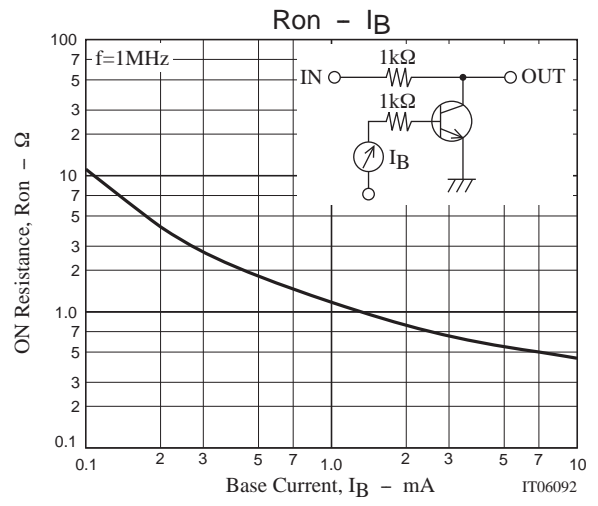
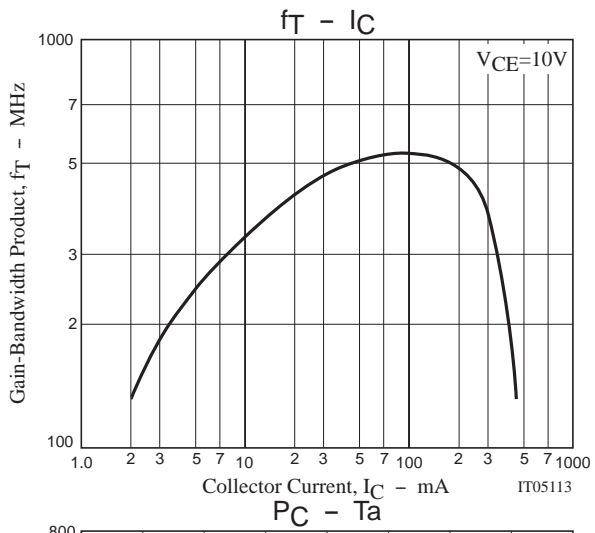
## Ordering Information

| Device       | Package | Shipping       | memo    |
|--------------|---------|----------------|---------|
| 50C02CH-TL-E | CPH3    | 3,000pcs./reel | Pb Free |

# 50C02CH



# 50C02CH



Embossed Taping Specification

50C02CH-TL-E

1. Packing Format

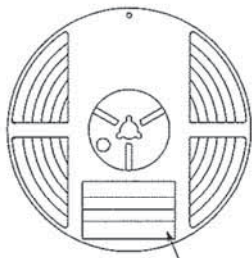
| Package Name | Carrier Tape Type | Maximum Number of devices contained (pcs) |           |           | Packing format  |  |
|--------------|-------------------|---|-----------|-----------|---|--|
|              |                   | Reel                                      | Inner box | Outer box | Inner BOX (C-1)   | Outer BOX (A-7)  |
| CPH3         | CPH3              | 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 |

Reel label, Inner box label  
(unit:mm)

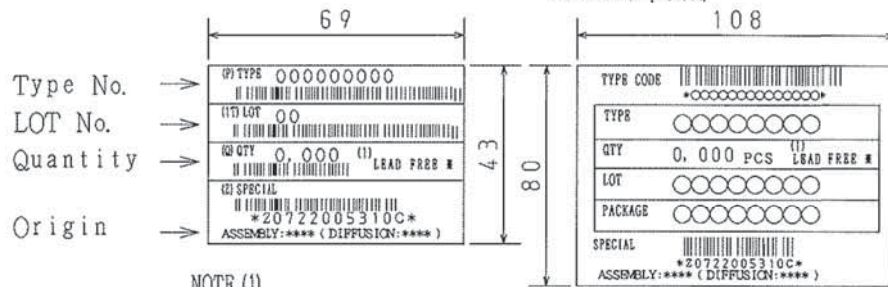
Outer box label

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

Packing method



Reel label



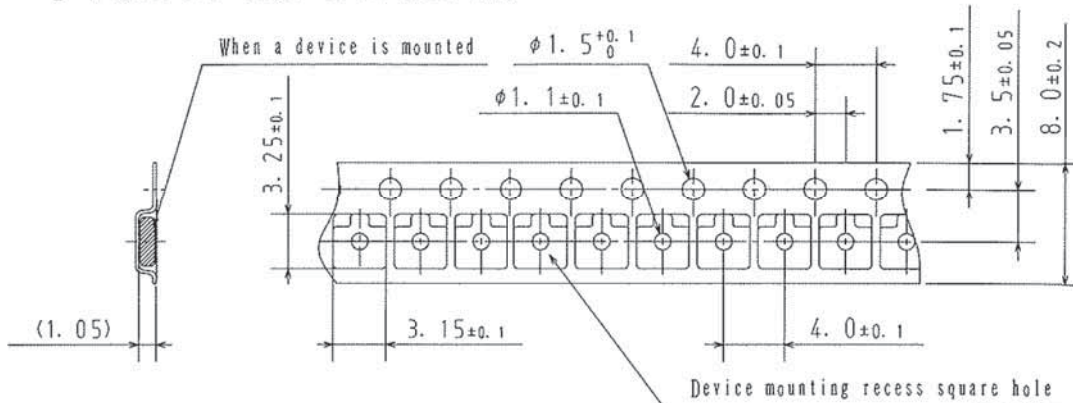
NOTE (1)

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

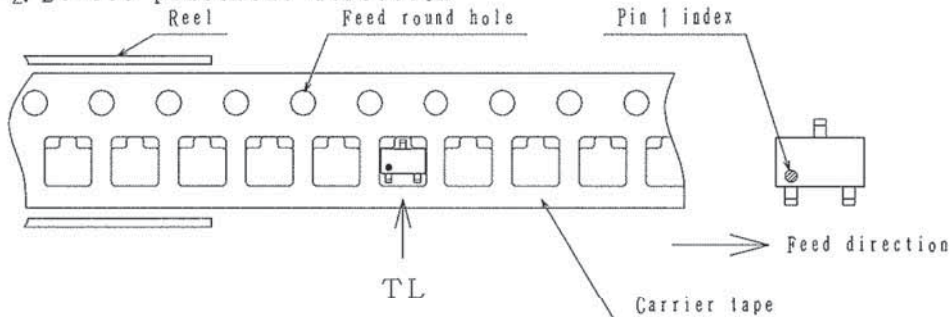
| Label       | JEITA Phase    |
|-------------|----------------|
| LEAD FREE 3 | JEITA Phase 3A |
| LEAD FREE 4 | JEITA Phase 3  |

2. Taping configuration

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



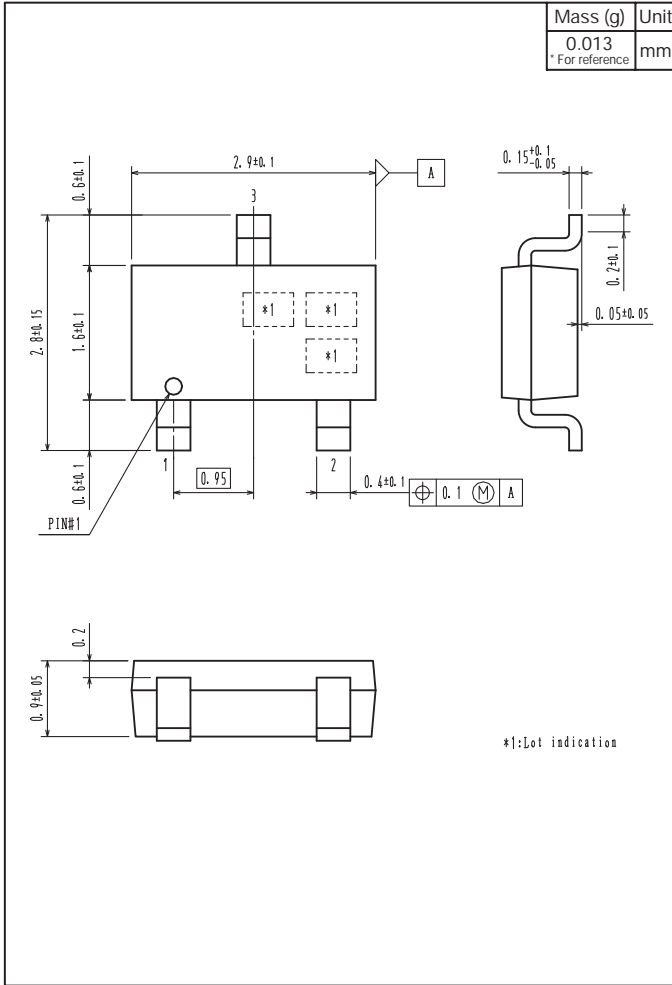
2-2. Device placement direction



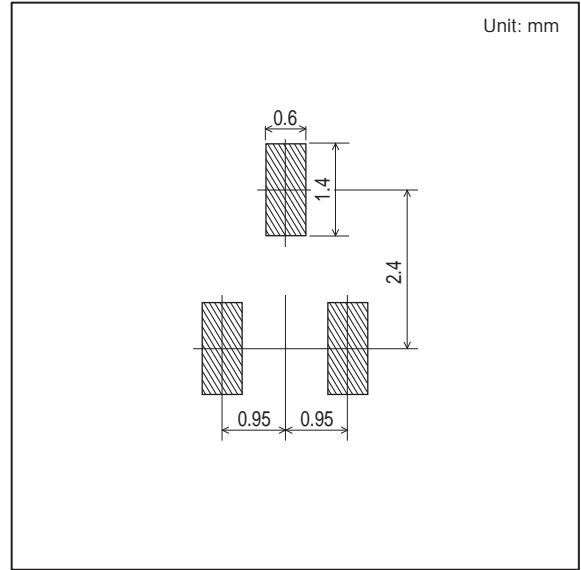
Those with one electrode terminal on the feed hole side.....TL

# 50C02CH

## Outline Drawing 50C02CH-TL-E



## Land Pattern Example



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**Телефон:** +7 812 627 14 35

**Электронная почта:** [sales@st-electron.ru](mailto:sales@st-electron.ru)

**Адрес:** 198099, Санкт-Петербург,  
Промышленная ул, дом № 19, литера Н,  
помещение 100-Н Офис 331