



SANYO Semiconductors

# DATA SHEET

An ON Semiconductor Company

## 12A02CH — PNP 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 capacity
- Low collector-to-emitter saturation voltage (resistance)  $R_{CE(sat)}$  typ.=285mΩ [ $I_C=1A, I_B=50mA$ ]
- Small ON-resistance ( $R_{on}$ )

### Specifications

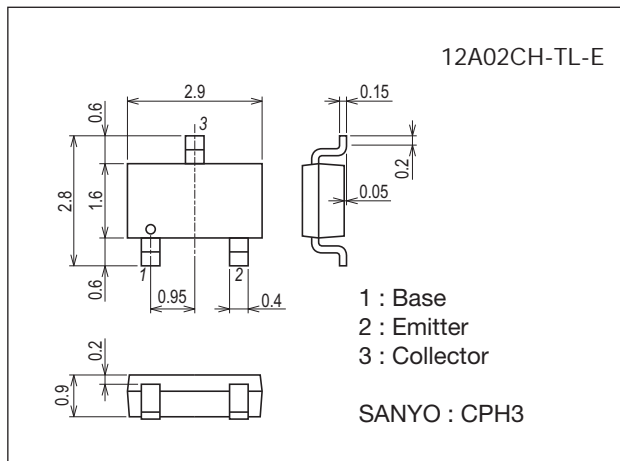
Absolute Maximum Ratings at  $T_a=25^\circ C$

| Parameter                    | Symbol    | Conditions   | Ratings     | Unit |
|------------------------------|-----------|--|-------------|------|
| Collector-to-Base Voltage    | $V_{CBO}$ |  | -15         | V    |
| Collector-to-Emitter Voltage | $V_{CEO}$ |  | -12         | V    |
| Emitter-to-Base Voltage      | $V_{EBO}$ |  | -5          | V    |
| Collector Current            | $I_C$     |  | -1          | A    |
| Collector Current (Pulse)    | $I_{CP}$  |  | -2          | 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)

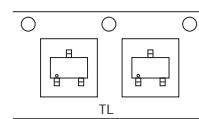
7015A-003



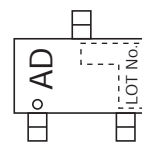
### Product & Package Information

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

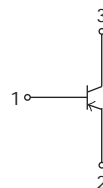
### Packing Type: TL



### Marking



### Electrical Connection

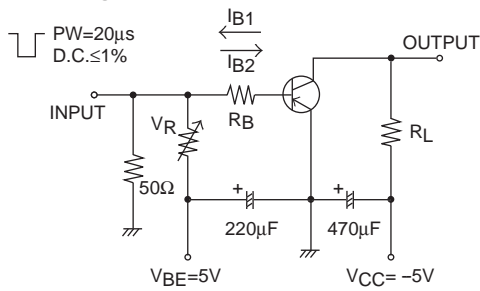


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## Electrical Characteristics at $T_a=25^\circ\text{C}$

| Parameter                               | Symbol        | Conditions                                | Ratings |      |      | Unit |    |
|---|---------------|---|---------|------|------|------|----|
|   |               |   | min     | typ  | max  |      |    |
| Collector Cutoff Current                | $I_{CBO}$     | $V_{CB} = -12\text{V}, I_E = 0\text{A}$   |         |      | -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     |      | 700  |      |    |
| Gain-Bandwidth Product                  | $f_T$         | $V_{CE} = -2\text{V}, I_C = -50\text{mA}$ |         | 450  |      | MHz  |    |
| Output Capacitance                      | $C_{ob}$      | $V_{CB} = -10\text{V}, f = 1\text{MHz}$   |         | 6    |      | pF   |    |
| Collector-to-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C = -400\text{mA}, I_B = -20\text{mA}$ |         | -120 | -240 | mV   |    |
| Base-to-Emitter Saturation Voltage      | $V_{BE(sat)}$ | $I_C = -400\text{mA}, I_B = -20\text{mA}$ |         | -0.9 | -1.2 | mV   |    |
| Collector-to-Base Breakdown Voltage     | $V_{(BR)CBO}$ | $I_C = -10\mu\text{A}, I_E = 0\text{A}$   | -15     |      |      | V    |    |
| Collector-to-Emitter Breakdown Voltage  | $V_{(BR)CEO}$ | $I_C = -1\text{mA}, R_{BE} = \infty$      | -12     |      |      | 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                            | $t_{stg}$     |   |         |      | 75   |      | ns |
| Fall Time                               | $t_f$         |   |         |      | 15   |      | ns |

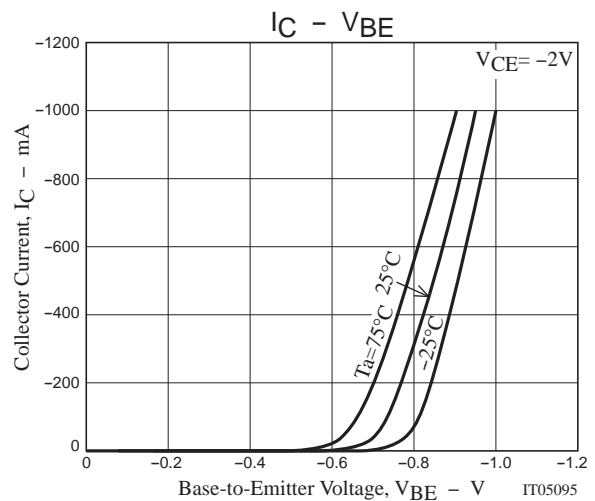
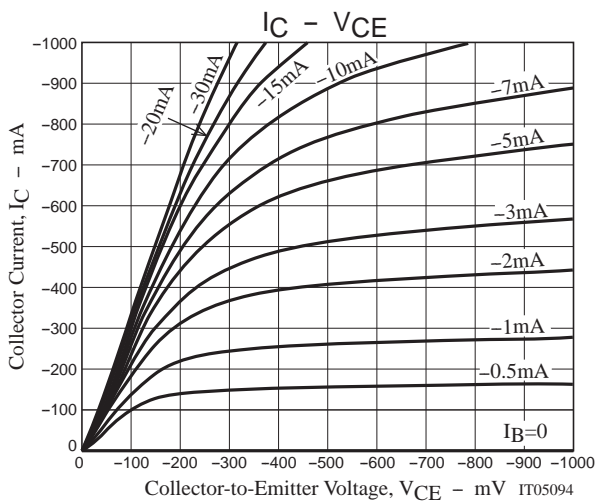
## Switching Time Test Circuit



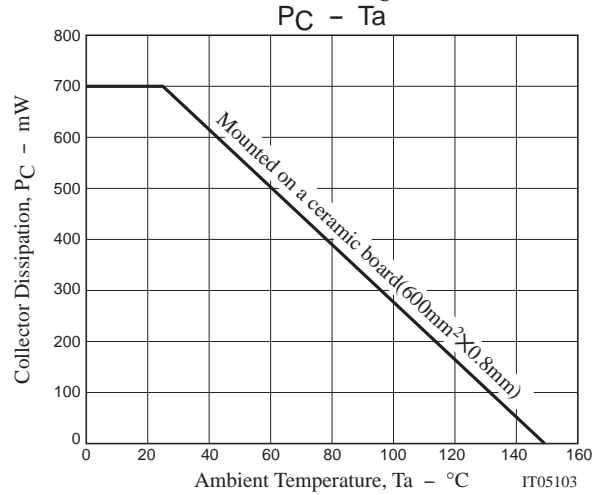
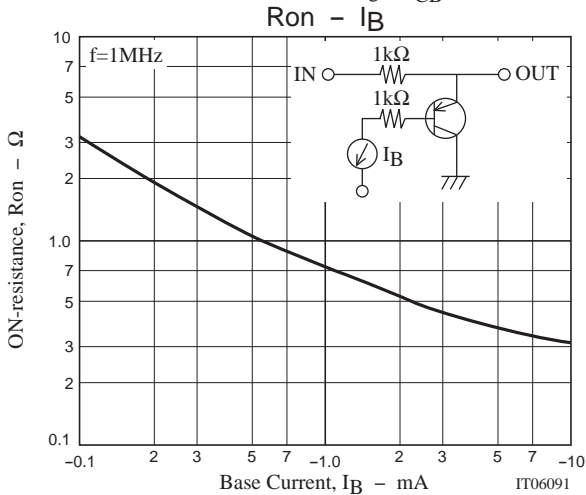
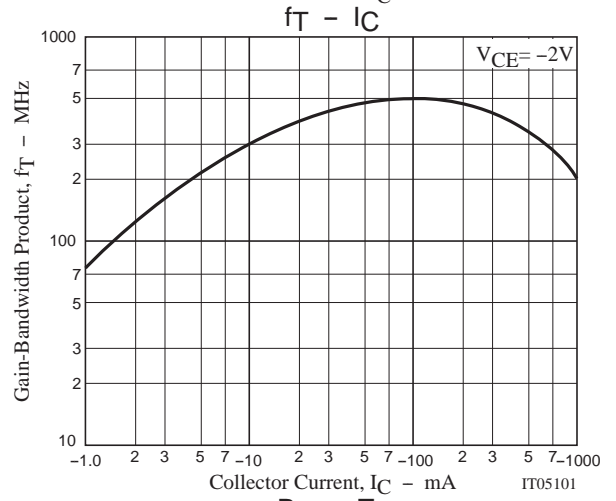
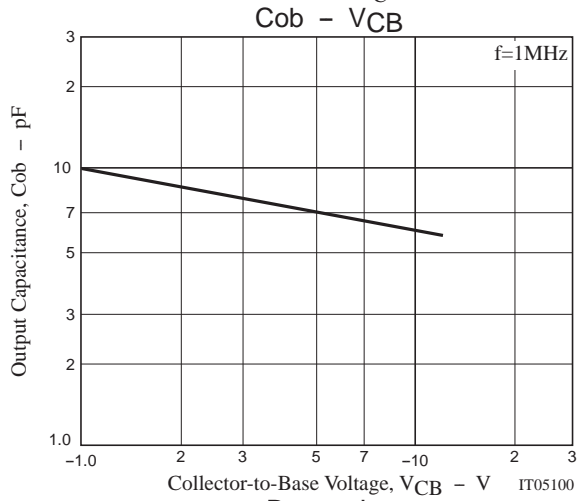
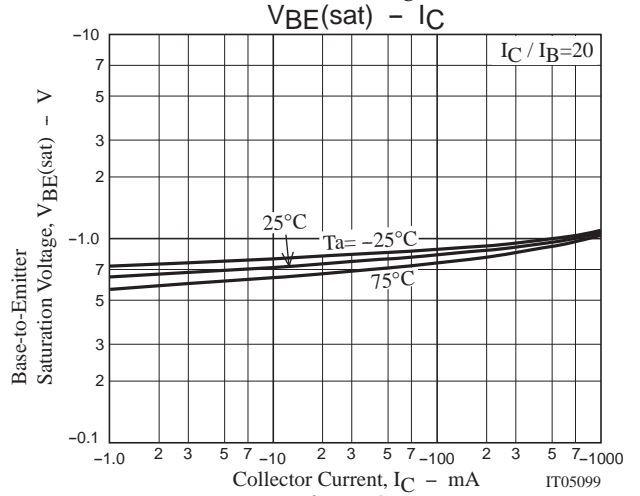
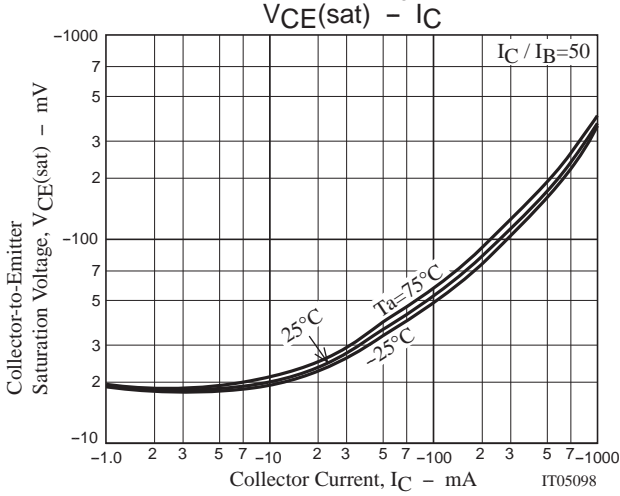
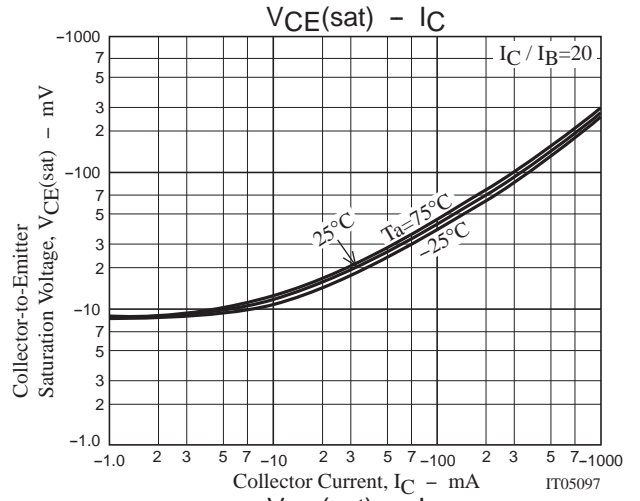
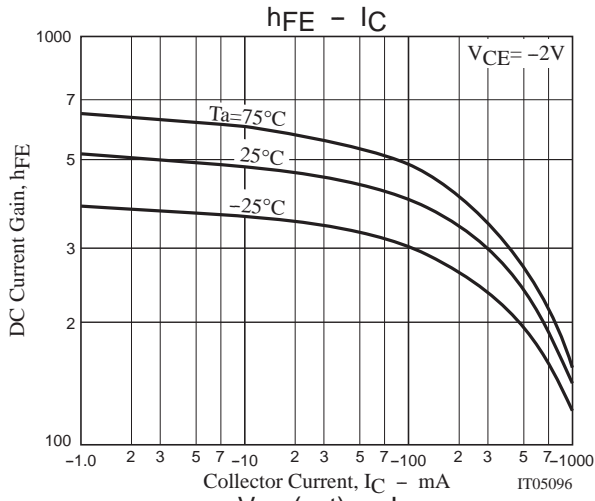
$$I_C = 20I_{B1} = -20I_{B2} = -400\text{mA}$$

## Ordering Information

| Device       | Package | Shipping       | memo    |
|--------------|---------|----------------|---------|
| 12A02CH-TL-E | CPH3    | 3,000pcs./reel | Pb Free |



# 12A02CH



# 12A02CH

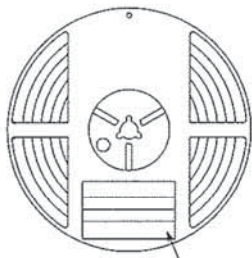
## Embossed Taping Specification

12A02CH-TL-E

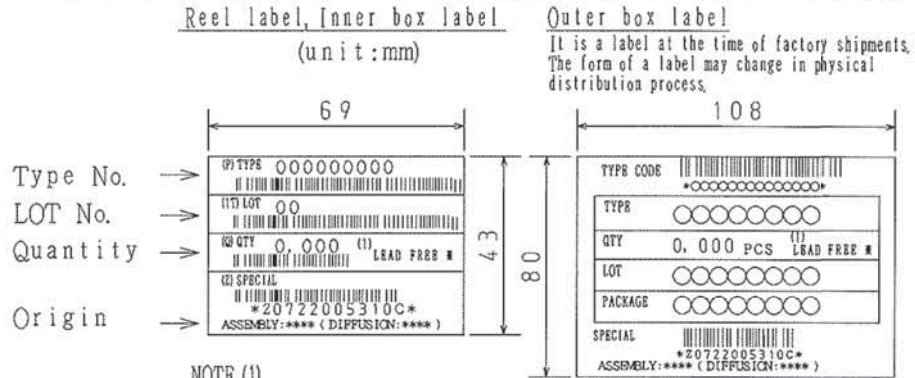
### 1. Packing Format

| 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 |

#### Packing method



Reel label



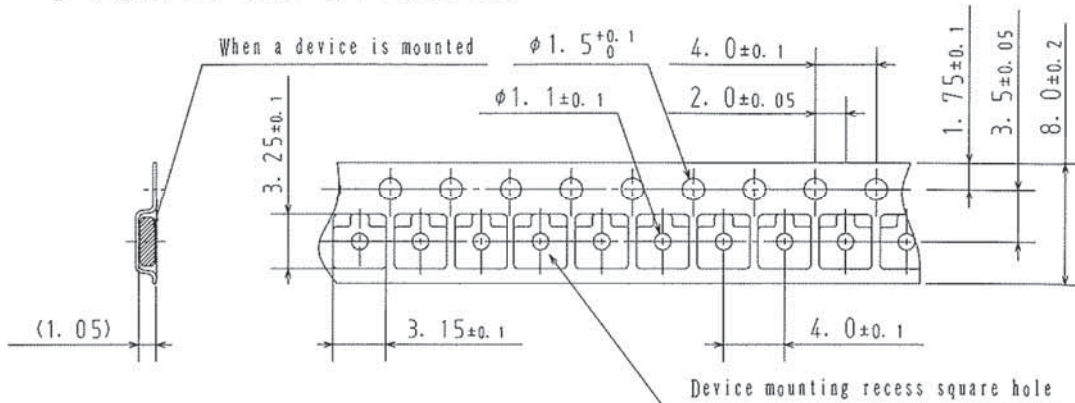
NOTE (1)

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

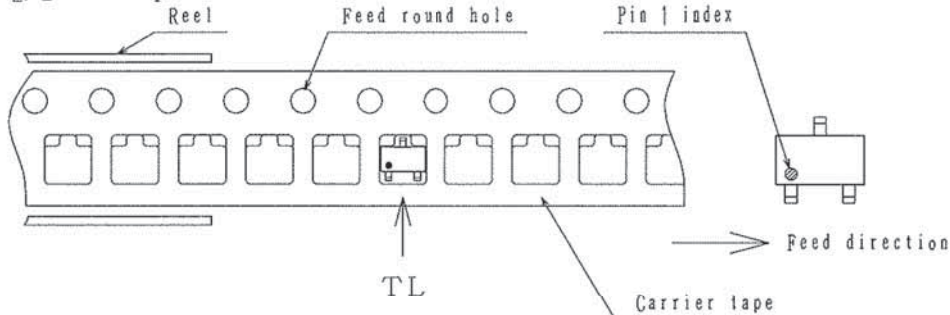
| Label       | JEITA Phase    |
|-------------|----------------|
| LEAD FREE 3 | JEITA Phase 3A |
| LEAD FREE 4 | JEITA Phase 3  |

### 2. Taping configuration

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



#### 2-2. Device placement direction

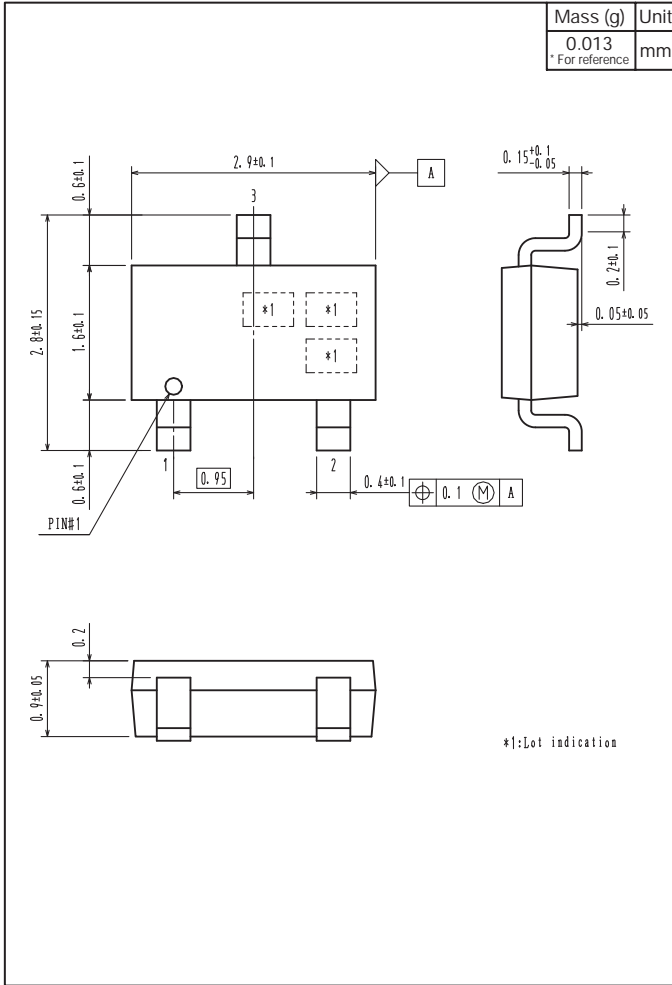


Those with one electrode terminal on the feed hole side.....TL

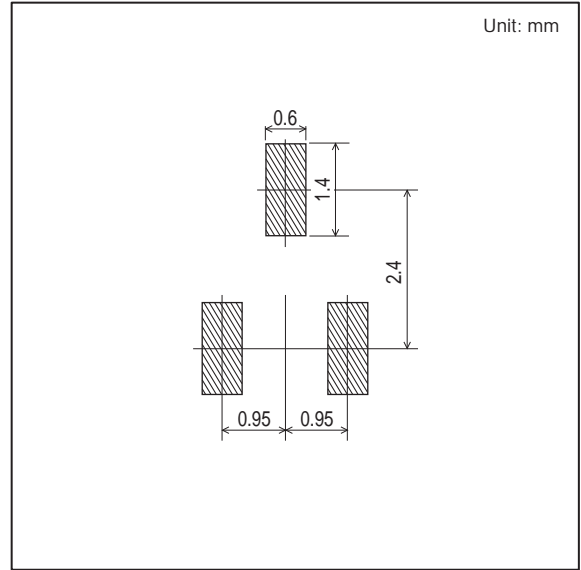
# 12A02CH

## Outline Drawing

12A02CH-TL-E



## Land Pattern Example



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- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



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