



# MCH6103/MCH6203

## Bipolar Transistor

(-50V, (-)1A, Low VCE(sat), (PNP)NPN Single MCPH6

ON Semiconductor®

<http://onsemi.com>

### Applicaitons

- Relay drivers, lamp drivers, motor drivers, flash

### Features

- Adoption of MBIT processes
- Low collector-to-emitter saturation voltage
- Ultrasmall package facilitates miniaturization in end products (mounting height : 0.85mm)
- High allowable power dissipation
- Large current capacity
- High-speed switching

### Specifications ( ) : MCH6103

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

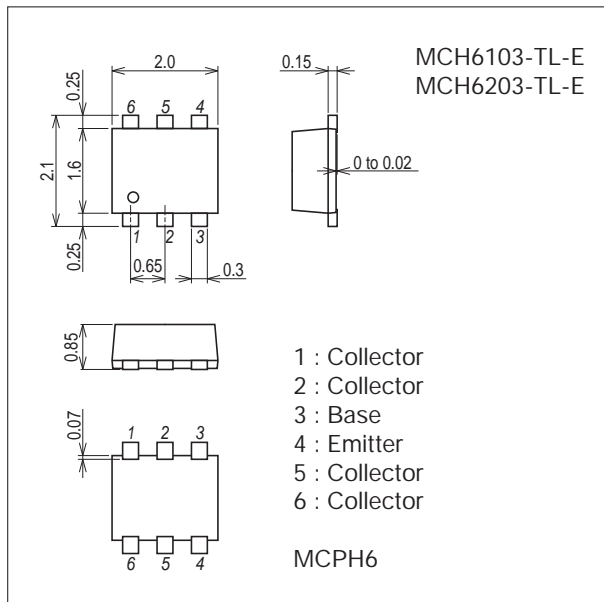
| Parameter                    | Symbol | Conditions | Ratings | Unit |
|------------------------------|--------|------------|---------|------|
| Collector-to-Base Voltage    | VCBO   |            | (-50)80 | V    |
| Collector-to-Emitter Voltage | VCES   |            | (-50)80 | V    |
|                              | VCEO   |            | (-50)   | V    |
| Emitter-to-Base Voltage      | VEBO   |            | (-5)    | V    |

Continued on next page.

### Package Dimensions

unit : mm (typ)

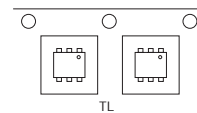
7022A-007



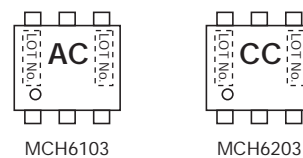
### Product & Package Information

- Package : MCPH6
- JEITA, JEDEC : SC-88, SC-70-6, SOT-363
- Minimum Packing Quantity : 3,000 pcs./reel

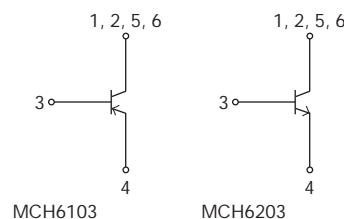
### Packing Type: TL



### Marking



### Electrical Connection



# MCH6103/MCH6203

Continued from preceding page.

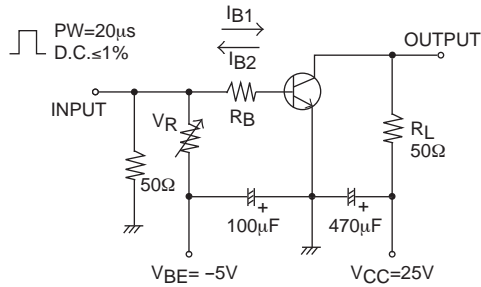
| Parameter                 | Symbol    | Conditions  | Ratings     | Unit |
|---------------------------|-----------|---|-------------|------|
| Collector Current         | $I_C$     |   | (-)1.0      | A    |
| Collector Current (Pulse) | $I_{CP}$  |   | (-)3        | A    |
| Base Current              | $I_B$     |   | 200         | mA   |
| Collector Dissipation     | $P_C$     | When mounted on ceramic substrate (600mm <sup>2</sup> ×0.8mm) | 1.0         | W    |
| Junction Temperature      | $T_j$     |   | 150         | °C   |
| Storage Temperature       | $T_{stg}$ |   | -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.

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

| Parameter                               | Symbol         | Conditions                                  | Ratings |           |           | Unit          |
|---|----------------|---|---------|-----------|-----------|---------------|
|   |                |   | min     | typ       | max       |               |
| Collector Cutoff Current                | $I_{CBO}$      | $V_{CB}=(-)40\text{V}, I_E=0\text{A}$       |         |           | (-)0.1    | $\mu\text{A}$ |
| Emitter Cutoff Current                  | $I_{EBO}$      | $V_{EB}=(-)4\text{V}, I_C=0\text{A}$        |         |           | (-)0.1    | $\mu\text{A}$ |
| DC Current Gain                         | $h_{FE}$       | $V_{CE}=(-)2\text{V}, I_C=(-)100\text{mA}$  | 200     |           | 560       |               |
| Gain-Bandwidth Product                  | $f_T$          | $V_{CE}=(-)10\text{V}, I_C=(-)300\text{mA}$ |         | 420       |           | MHz           |
| Output Capacitance                      | $C_{ob}$       | $V_{CB}=(-)10\text{V}, f=1\text{MHz}$       |         | (9)6      |           | pF            |
| Collector-to-Emitter Saturation Voltage | $V_{CE(sat)1}$ | $I_C=(-)500\text{mA}, I_B=(-)10\text{mA}$   |         | (-280)130 | (-430)190 | mV            |
|   | $V_{CE(sat)2}$ | $I_C=(-)300\text{mA}, I_B=(-)6\text{mA}$    |         | (-145)90  | (-220)135 | mV            |
| Base-to-Emitter Saturation Voltage      | $V_{BE(sat)}$  | $I_C=(-)500\text{mA}, I_B=(-)10\text{mA}$   |         | (-)0.81   | (-)1.2    | V             |
| Collector-to-Base Breakdown Voltage     | $V_{(BR)CBO}$  | $I_C=(-)10\mu\text{A}, I_E=0\text{A}$       | (-50)80 |           |           | V             |
| Collector-to-Emitter Breakdown Voltage  | $V_{(BR)CES}$  | $I_C=(-)100\mu\text{A}, R_{BE}=0\Omega$     | (-50)80 |           |           | V             |
|   | $V_{(BR)CEO}$  | $I_C=(-)1\text{mA}, R_{BE}=\infty$          | (-)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.                 |         | (36)38    |           | ns            |
| Storage Time                            | $t_{stg}$      |   |         | (173)332  |           | ns            |
| Fall Time                               | $t_f$          |   |         | (28)40    |           | ns            |

## Switching Time Test Circuit

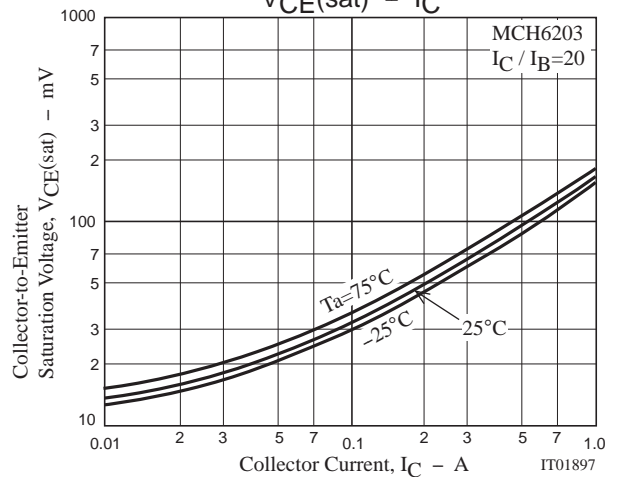
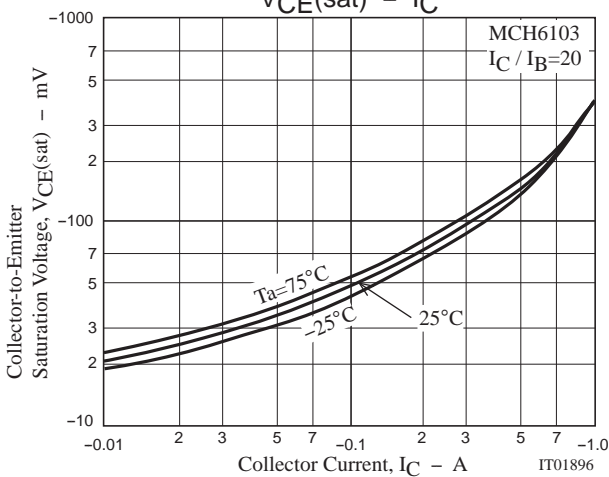
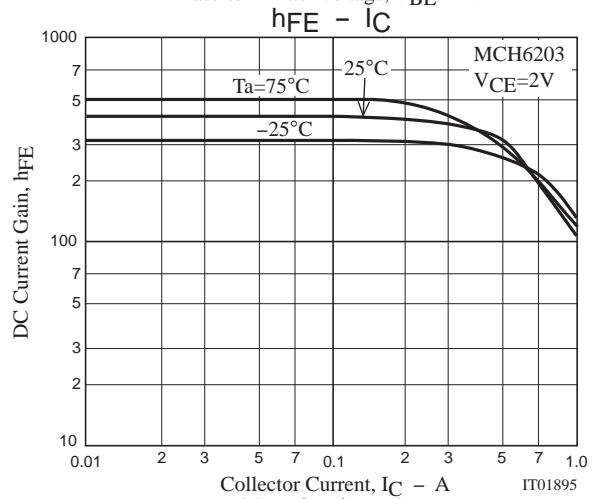
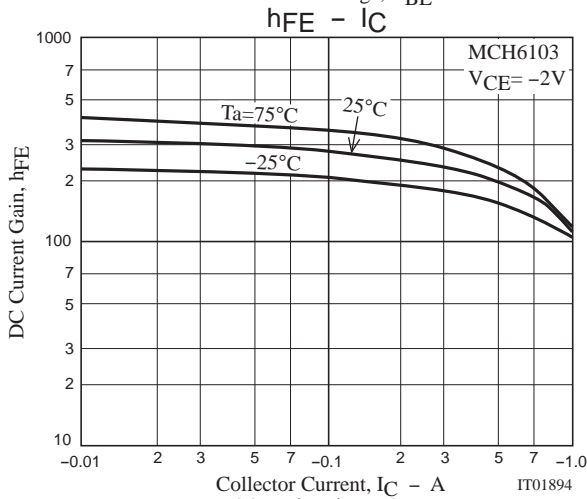
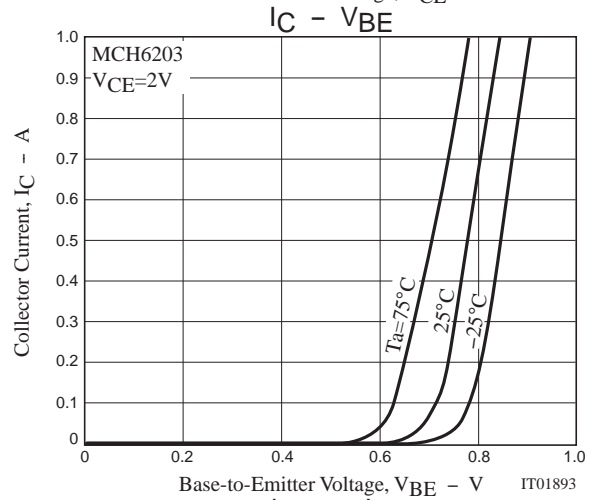
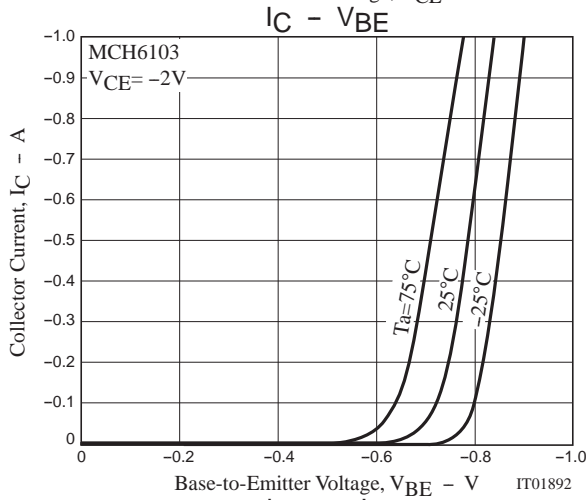
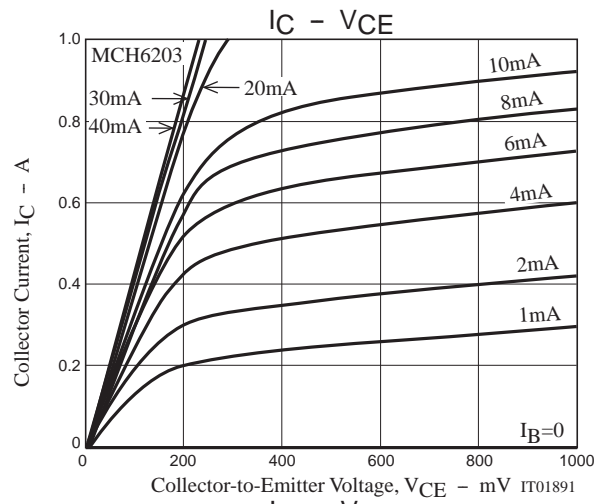
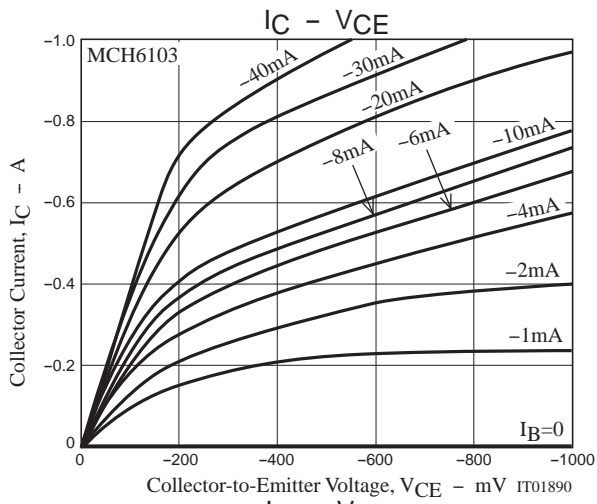


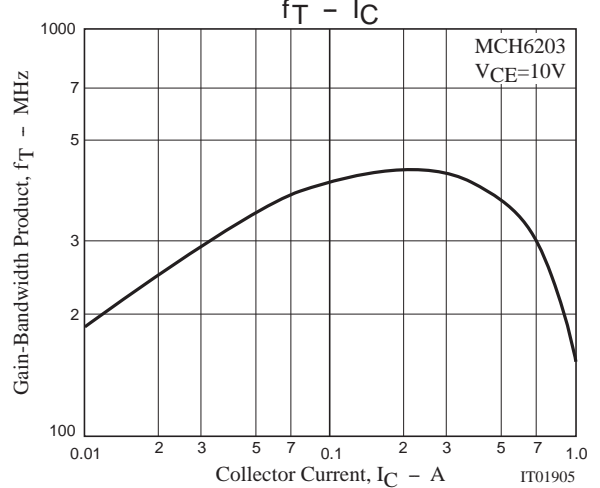
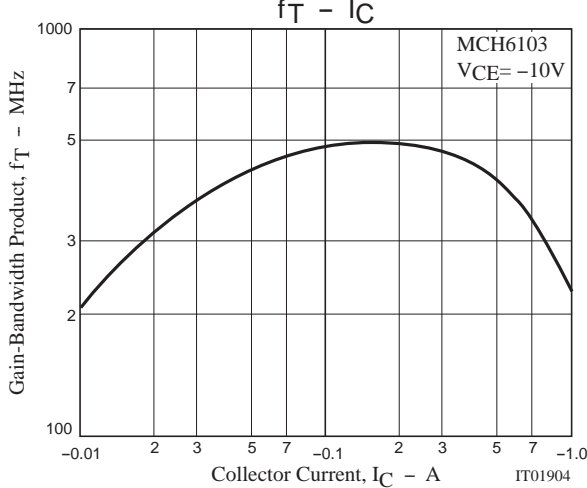
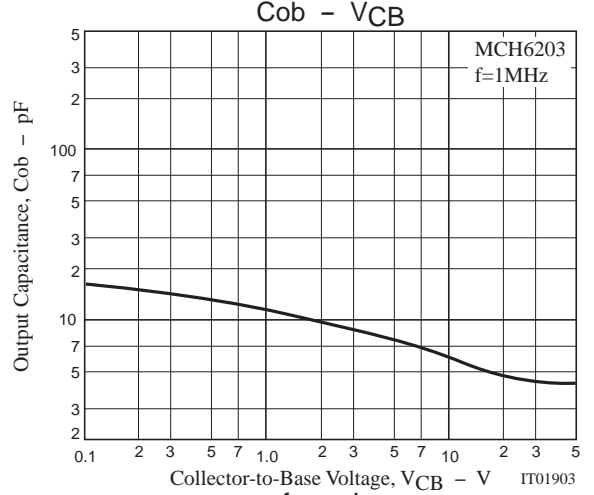
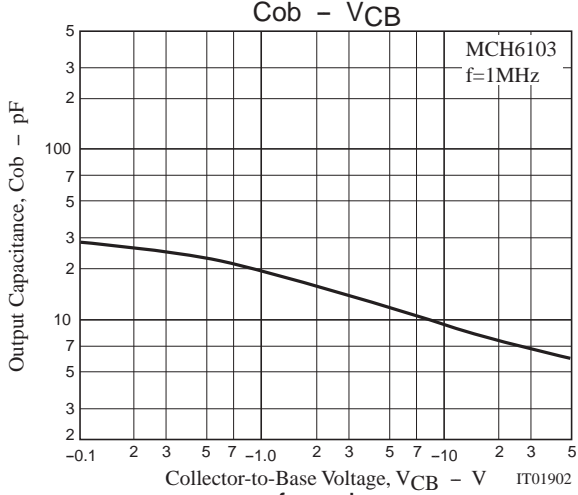
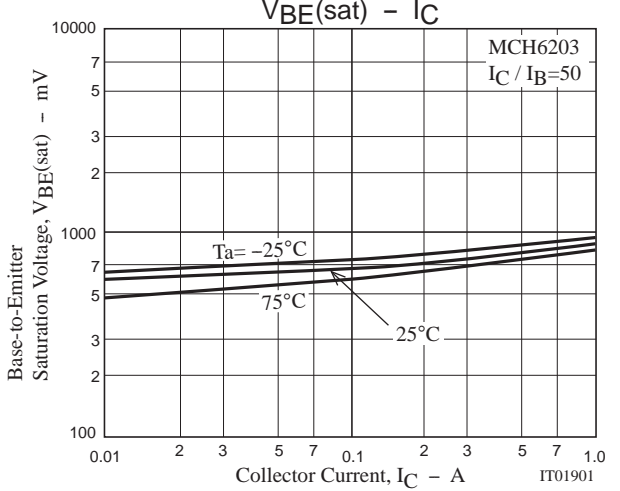
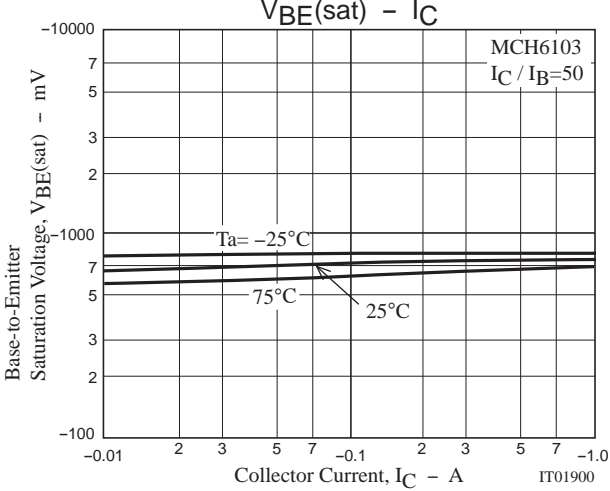
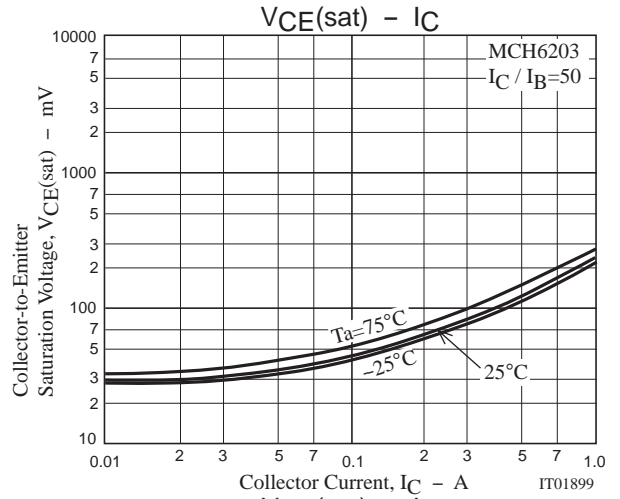
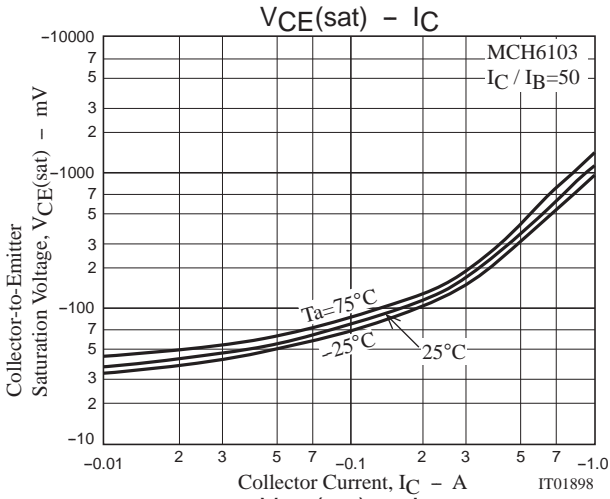
$I_C=20I_{B1} = -20I_{B2}=500\text{mA}$   
For PNP, the polarity is reversed.

## Ordering Information

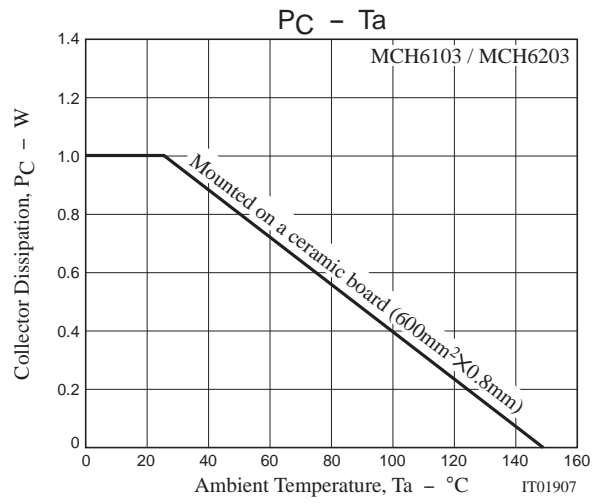
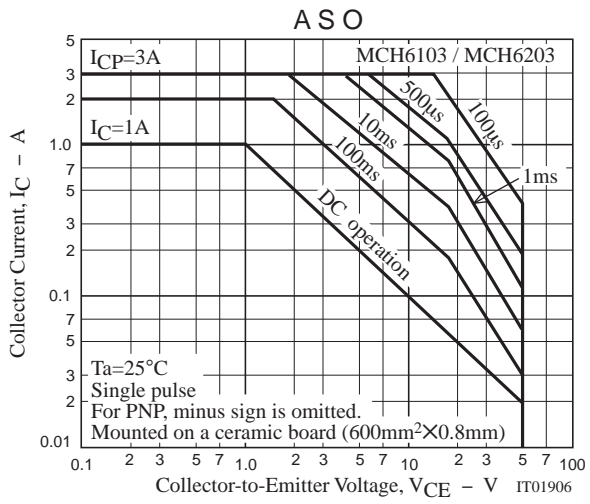
| Device       | Package | Shipping       | memo    |
|--------------|---------|----------------|---------|
| MCH6103-TL-E | MCPH6   | 3,000pcs./reel | Pb Free |
| MCH6203-TL-E | MCPH6   | 3,000pcs./reel |         |

MCH6103/MCH6203





# MCH6103/MCH6203



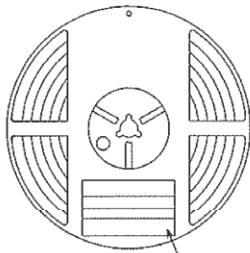
Embossed Taping Specification

MCH6103-TL-E, MCH6203-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)  |
| MCPH6        | MCP4              | 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 |

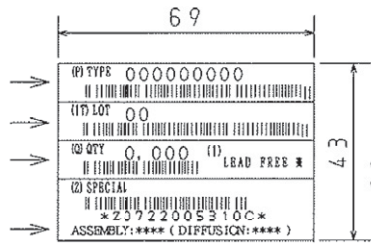
Packing method



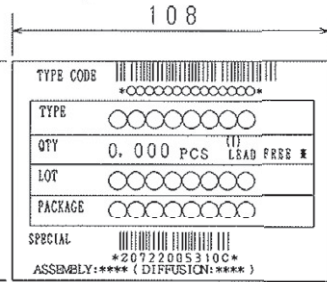
Type No.  
LOT No.  
Quantity  
Origin

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.



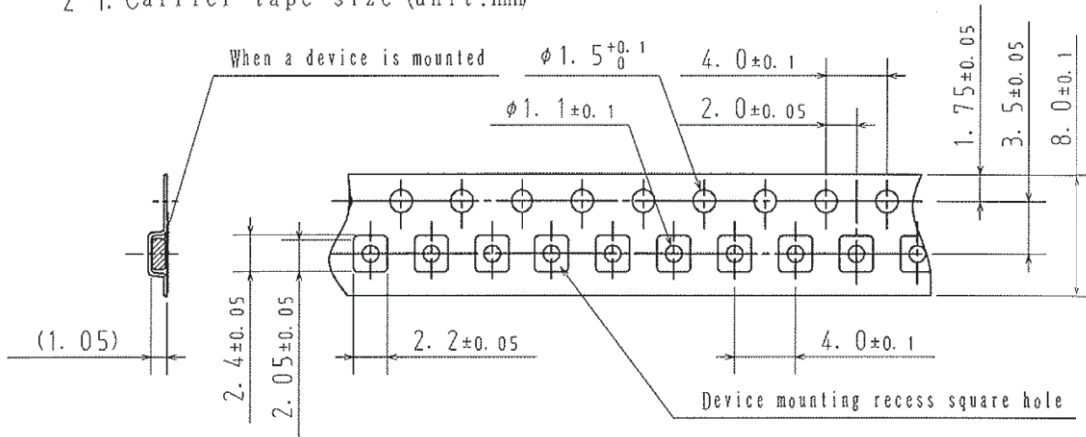
NOTE (1)

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

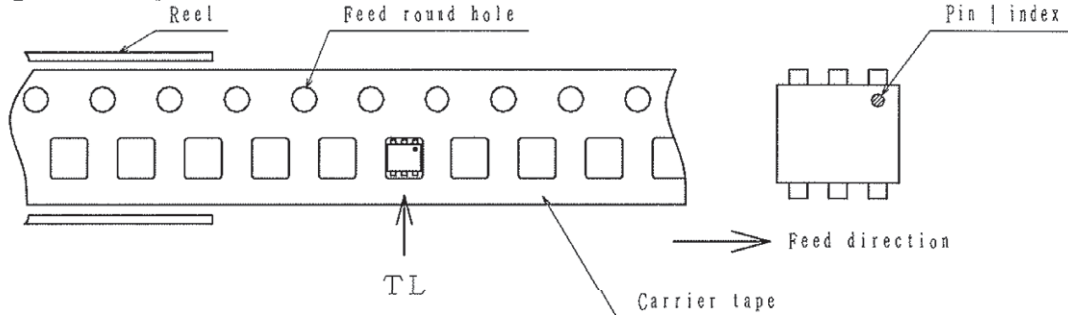
| Label       | JEITA Phase    |
|-------------|----------------|
| LEAD FREE 3 | JEITA Phase 3A |
| LEAD FREE 4 | JEITA Phase 3  |

2. Taping configuration

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



2-2. Device placement direction

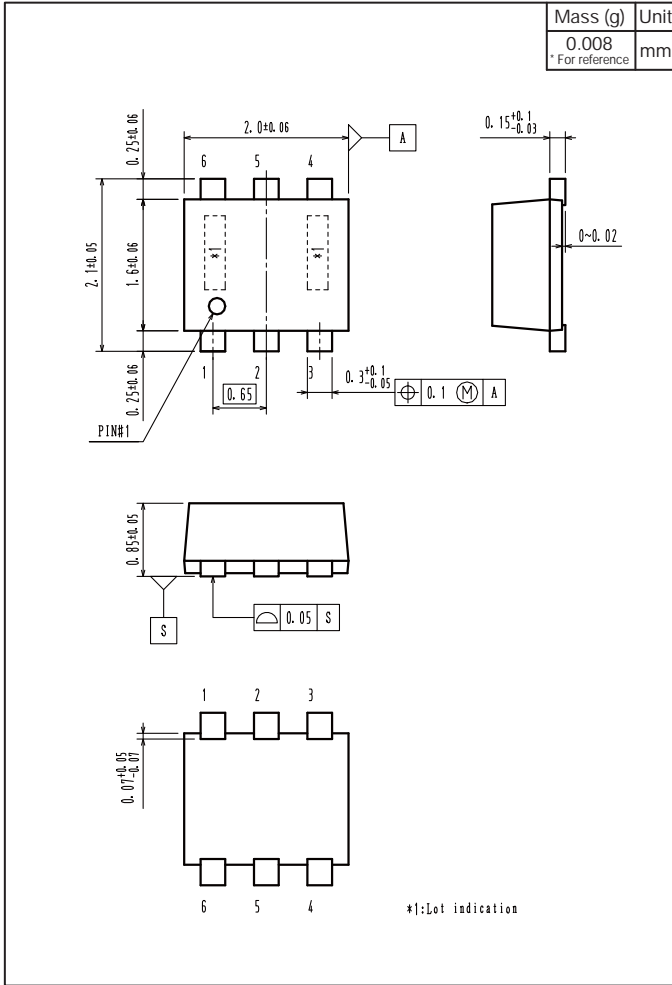


Those with pin | index on the feed hole side.....TL

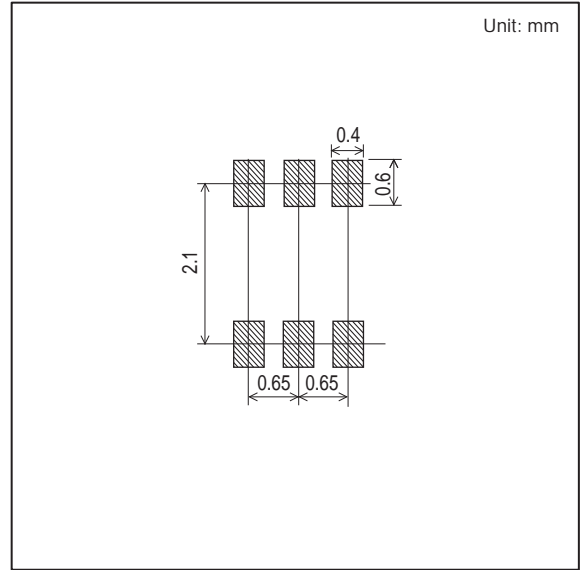
# MCH6103/MCH6203

## Outline Drawing

MCH6103-TL-E, MCH6203-TL-E



## Land Pattern Example



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