Ordering number : EN7516A

50C02MH

Bipolar Transistor
50V, 0.5A, Low V_{CE}(sat) NPN Single MCPH3

ON Semiconductor®
http://onsemi.com

Applications

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

Features

- Large current capacity
- Low collector-to-emitter saturation voltage (resistance) : R_{CE}(sat) typ=175mΩ[I_C=0.5A, I_B=50mA]
- Ultrasmall package facilitates miniaturization in end products
- Small ON-resistance (Ron)

Specifications

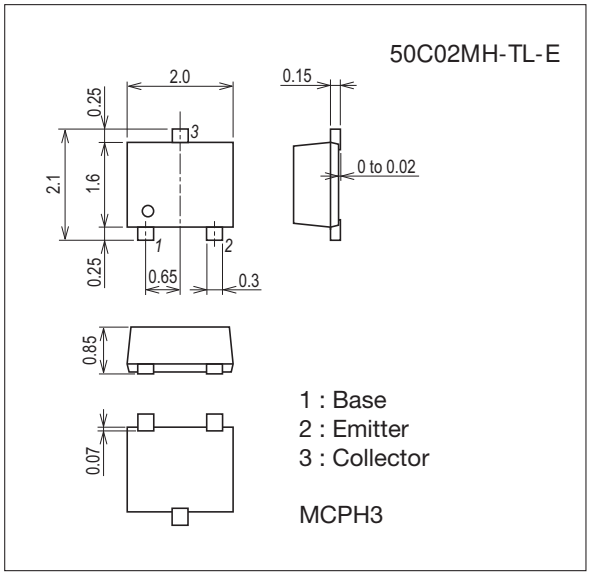
Absolute Maximum Ratings at Ta=25°C

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	When mounted on ceramic substrate (600mm^2×0.8mm)	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

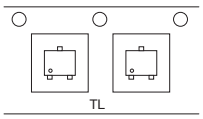
unit : mm (typ)
7019A-004



Product & Package Information

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

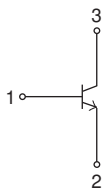
Packing Type : TL



Marking



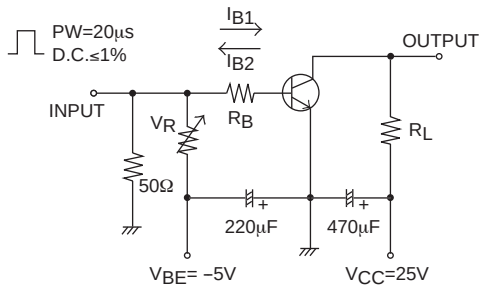
Electrical Connection



Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	V_{CB}=40V, 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=10mA	300		800	
Gain-Bandwidth Product	f_T	V_{CE}=10V, I_C=50mA		500		MHz
Output Capacitance	Cob	V_{CB}=10V, f=1MHz		2.8		pF
Collector-to-Emitter Saturation Voltage	V_{CE}(sat)	I_C=100mA, I_B=10mA		50	100	mV
Base-to-Emitter Saturation Voltage	V_{BE}(sat)	I_C=100mA, I_B=10mA		0.9	1.2	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	I_C=10μA, I_E=0A	60			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C=1mA, R_{BE}=∞	50			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.		30		ns
Storage Time	t_{stg}			340		ns
Fall Time	t_f			55		ns

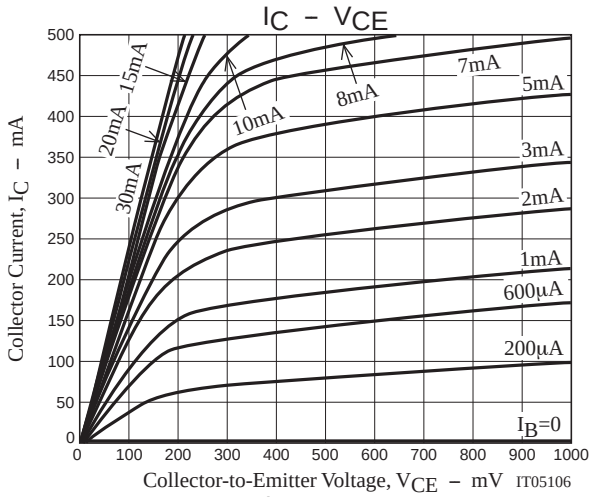
Switching Time Test Circuit

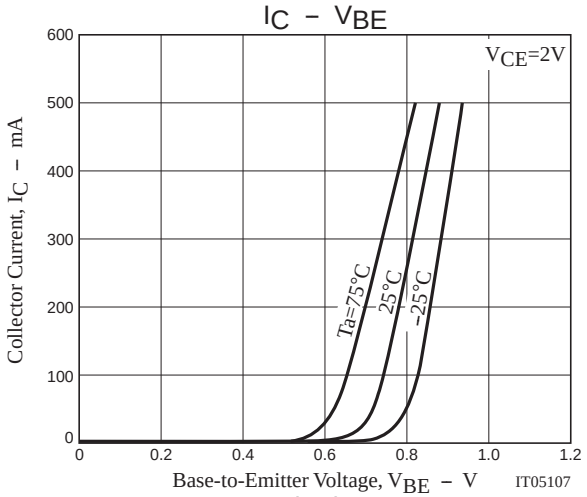


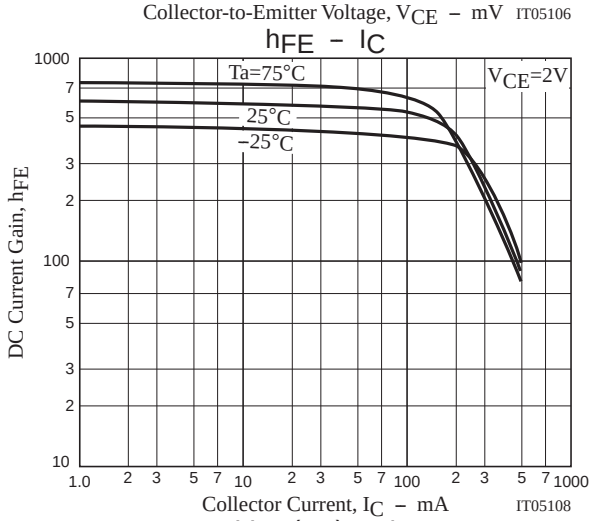
I_C=20I_{B1}= −20I_{B2}=200mA

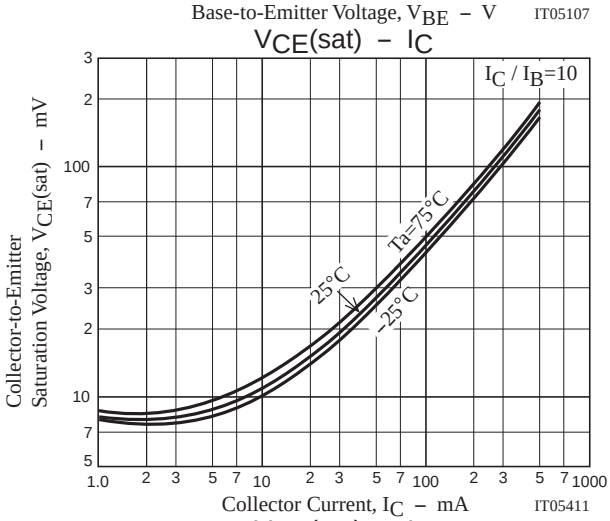
Ordering Information

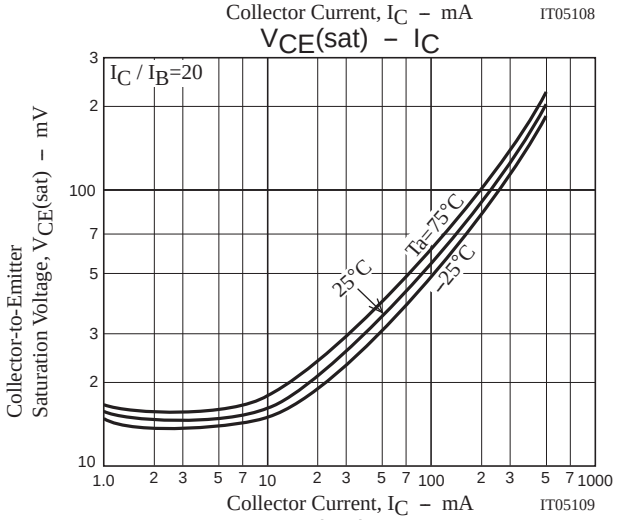
Device	Package	Shipping	memo
50C02MH-TL-E	MCPH3	3,000pcs./reel	Pb Free

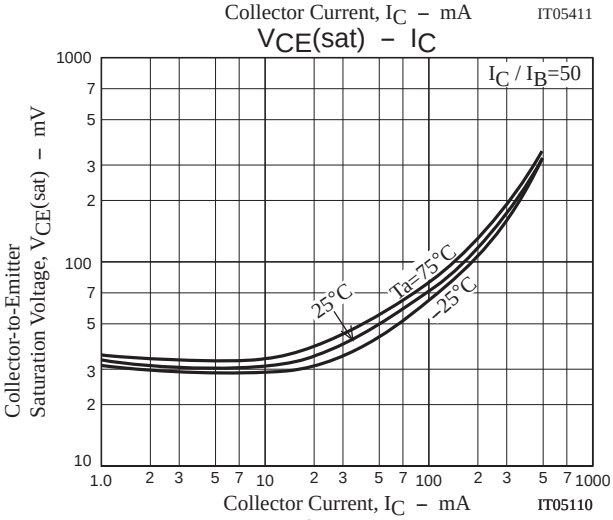

IC – VCE
Collector Current, IC – mA
Collector-to-Emitter Voltage, VCE – mV
IT05106
IB=0
200μA
600μA
1mA
2mA
3mA
5mA
7mA
8mA
10mA
15mA
20mA
30mA

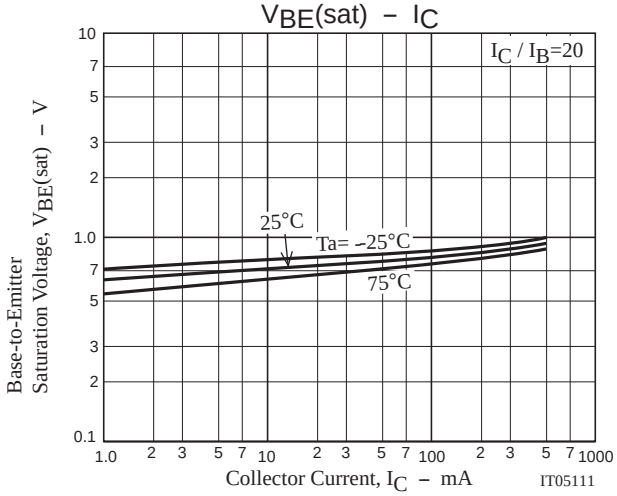

IC – VBE
VCE=2V
Collector Current, IC – mA
Base-to-Emitter Voltage, VBE – V
IT05107
Ta=75°C
25°C
–25°C

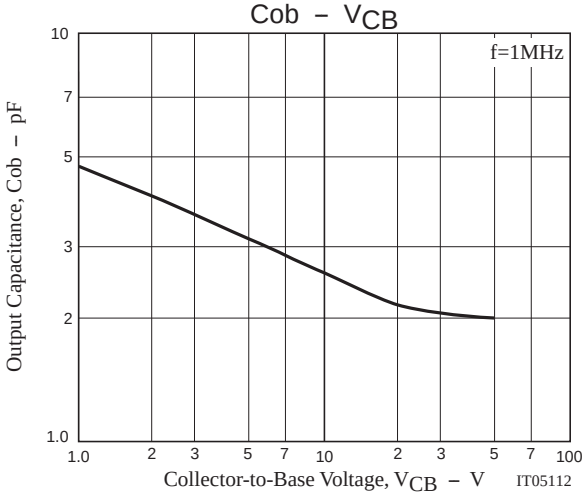

hFE – IC
DC Current Gain, hFE
Collector Current, IC – mA
IT05108
Ta=75°C
25°C
–25°C
VCE=2V

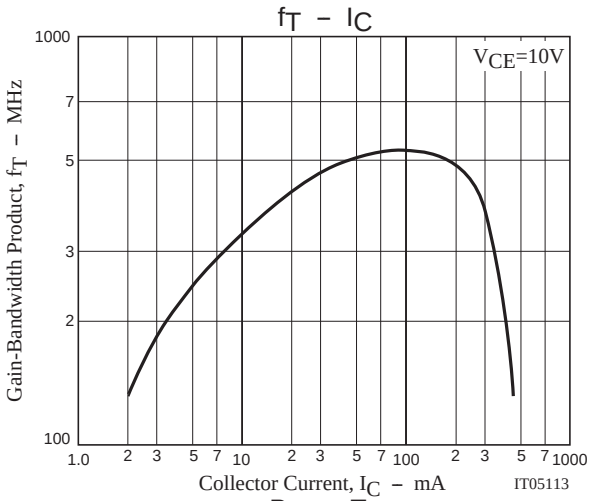

VCE(sat) – IC
Collector-to-Emitter Saturation Voltage, VCE(sat) – mV
Collector Current, IC – mA
IT05411
IC / IB=10
Ta=75°C
25°C
–25°C

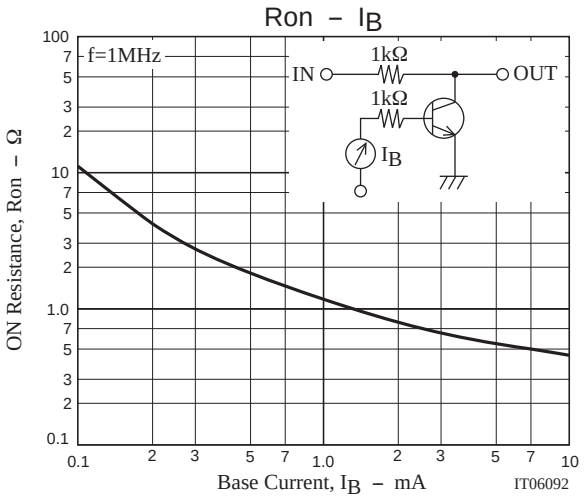

VCE(sat) – IC
Collector-to-Emitter Saturation Voltage, VCE(sat) – mV
Collector Current, IC – mA
IT05109
IC / IB=20
Ta=75°C
25°C
–25°C

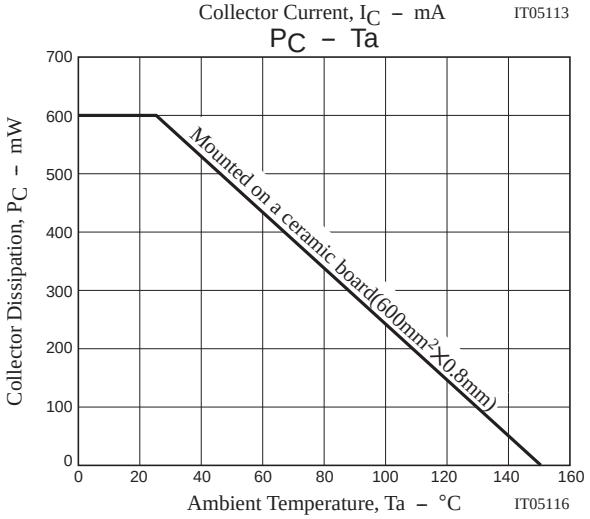

VCE(sat) – IC
Collector-to-Emitter Saturation Voltage, VCE(sat) – mV
Collector Current, IC – mA
IT05110
IC / IB=50
Ta=75°C
25°C
–25°C


VBE(sat) – IC
Base-to-Emitter Saturation Voltage, VBE(sat) – V
Collector Current, IC – mA
IT05111
IC / IB=20
25°C
Ta= –25°C
75°C


Cob – VCB
Output Capacitance, Cob – pF
Collector-to-Base Voltage, VCB – V
IT05112
f=1MHz


fT – IC
VCE=10V
Gain-Bandwidth Product, fT – MHz
Collector Current, IC – mA
IT05113


Ron – IB
f=1MHz
1kΩ
IN
OUT
1kΩ
IB
ON Resistance, Ron – Ω
Base Current, IB – mA
IT06092


PC – Ta
Mounted on a ceramic board(600mm2X0.8mm)
Collector Dissipation, PC – mW
Ambient Temperature, Ta – °C
IT05116

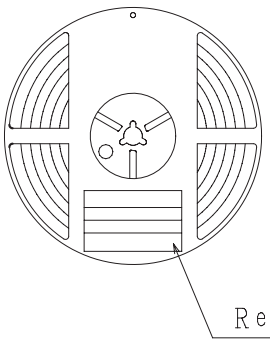
Embossed Taping Specification

50C02MH-TL-E

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 Dimensions:mm(external) 183×72×185	6 inner boxes contained Dimensions:mm(external) 440×195×210

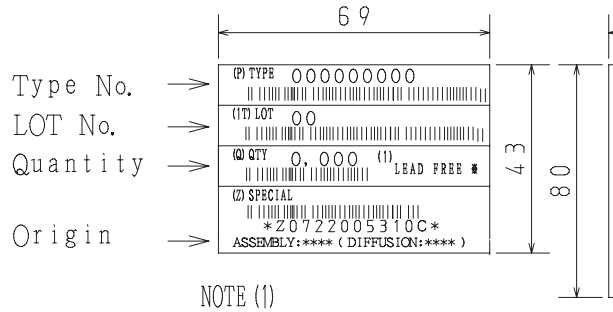
Packing method



Reel label

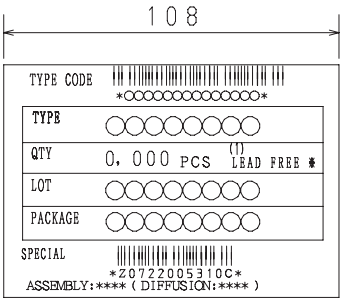
Reel label, Inner box label

(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.

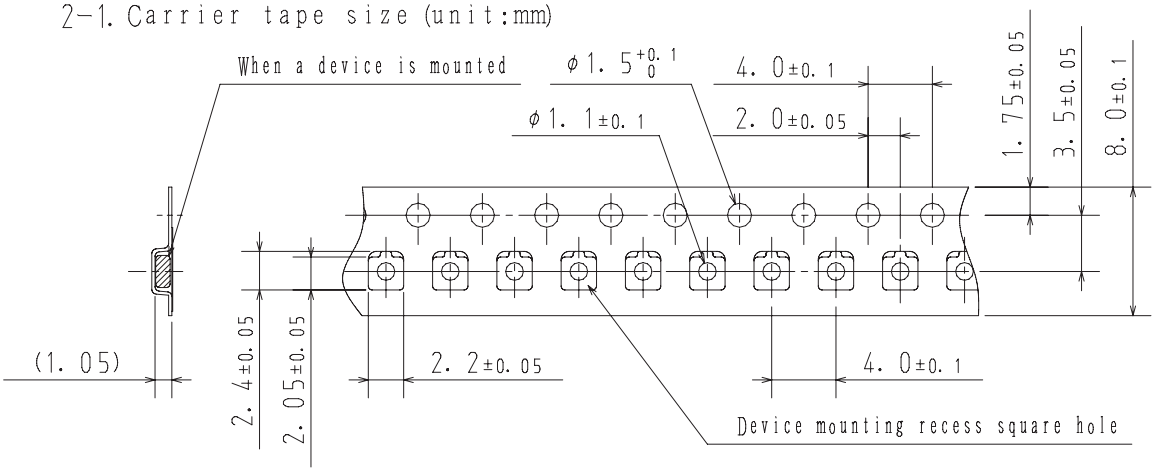


NOTE (1)
The LEAD FREE ※ description shows that the surface treatment of the terminal is lead free.

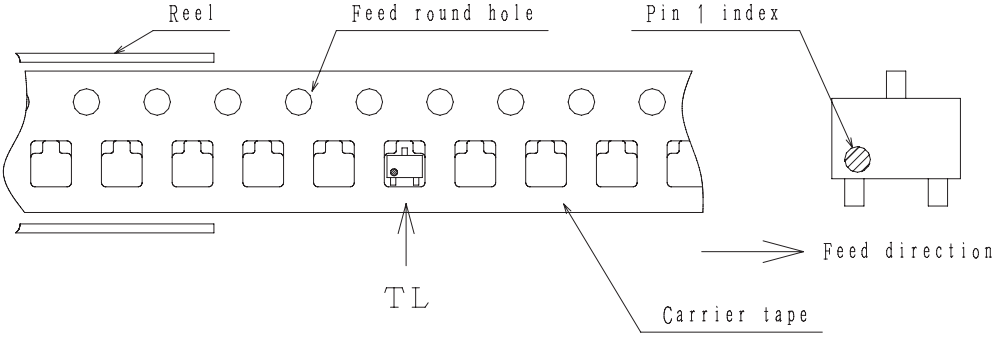
Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A
LEAD FREE 4	JEITA Phase 3

2. Taping configuration

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



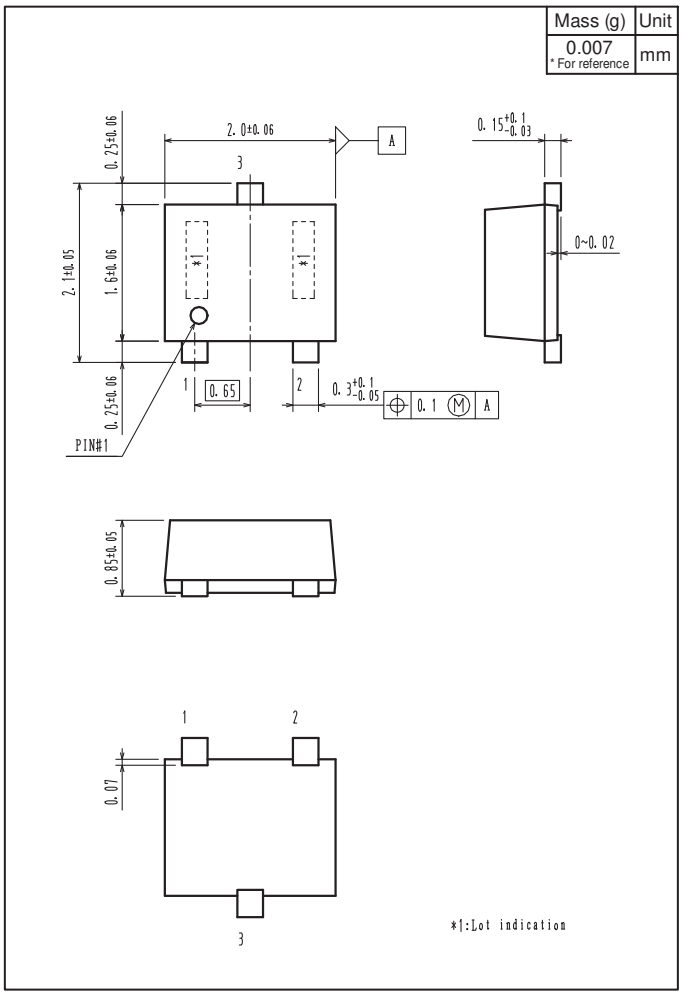
2-2. Device placement direction



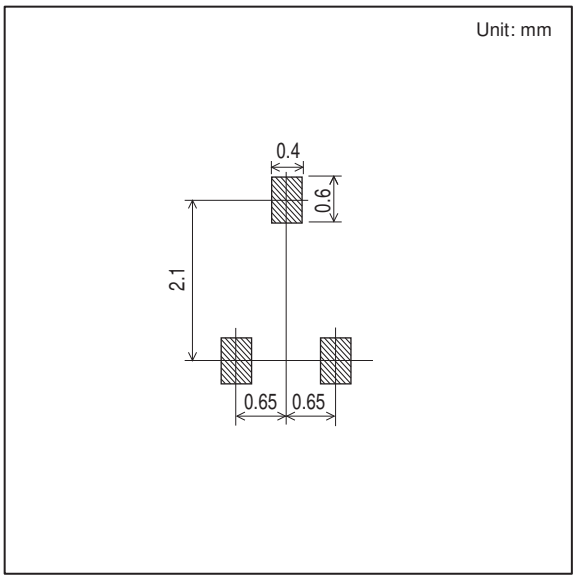
Those with pin 1 index on the feed hole side·····TL

Outline Drawing

50C02MH-TL-E



Land Pattern Example



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