



SANYO Semiconductors

## DATA SHEET

An ON Semiconductor Company

# 12A02MH — 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.=285m $\Omega$  [ $I_C=1A$ ,  $I_B=50mA$ ]
- Small ON-resistance ( $R_{on}$ )

### Specifications

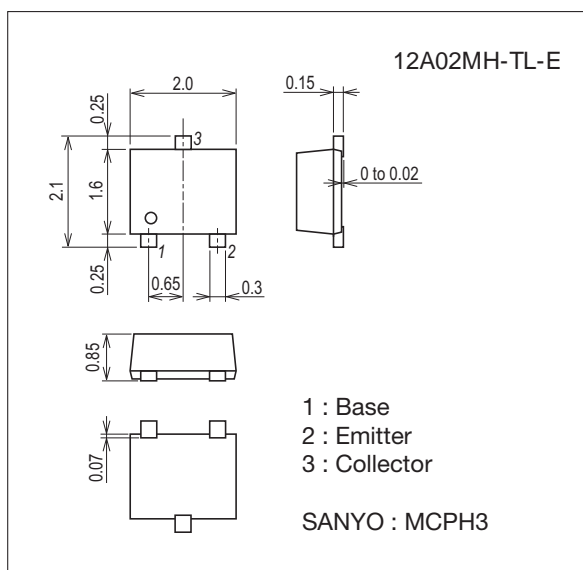
**Absolute Maximum Ratings** at  $T_a=25^\circ C$

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	$P_C$	When mounted on ceramic substrate (600mm <sup>2</sup> ×0.8mm)	600	mW
Junction Temperature	$T_j$		150	°C
Storage Temperature	$T_{stg}$		-55 to +150	°C

### Package Dimensions

unit : mm (typ)

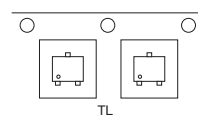
7019A-004



### Product & Package Information

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

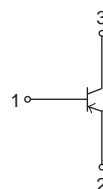
### Packing Type : TL



### Marking



### Electrical Connection

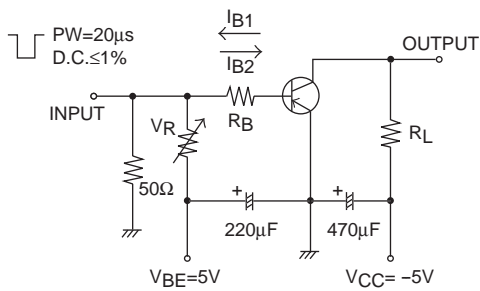


# 12A02MH

## 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	V
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

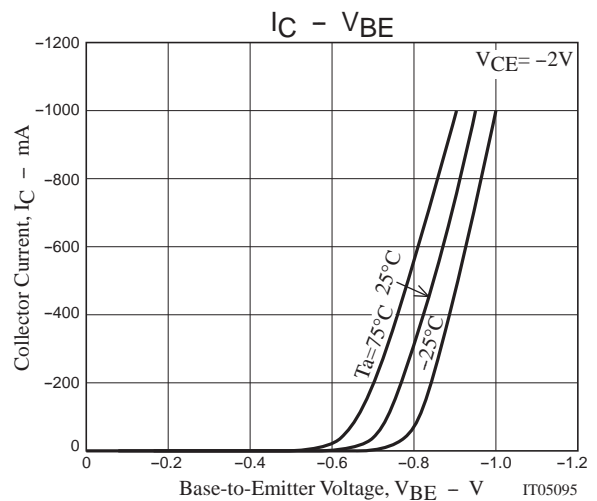
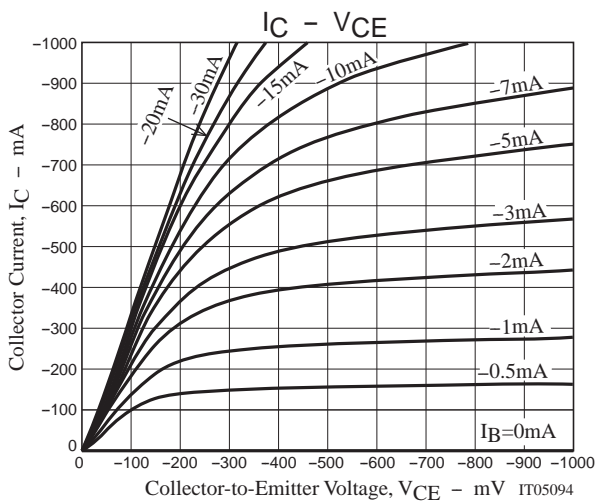
## Switching Time Test Circuit



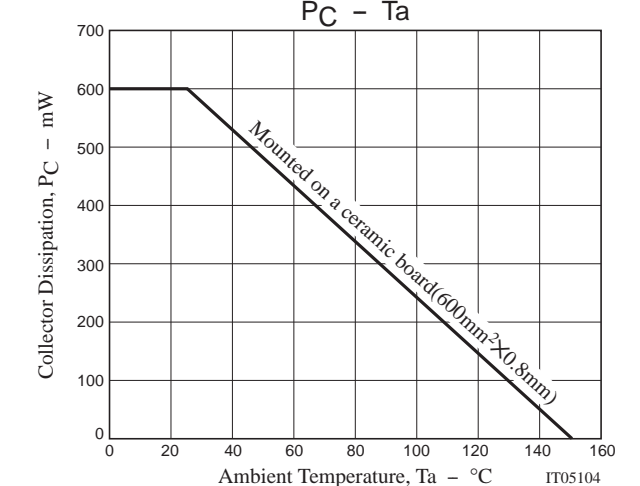
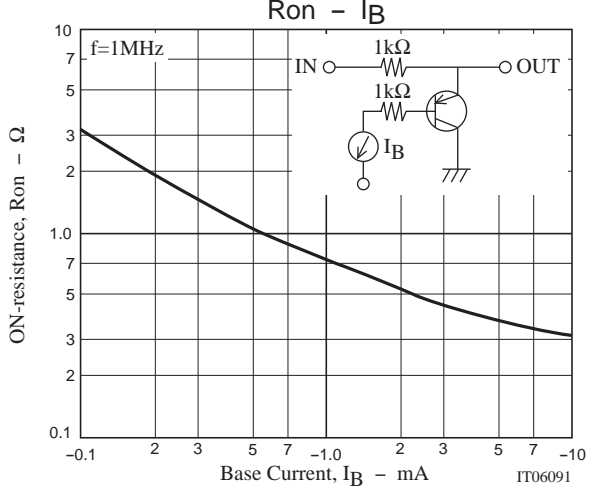
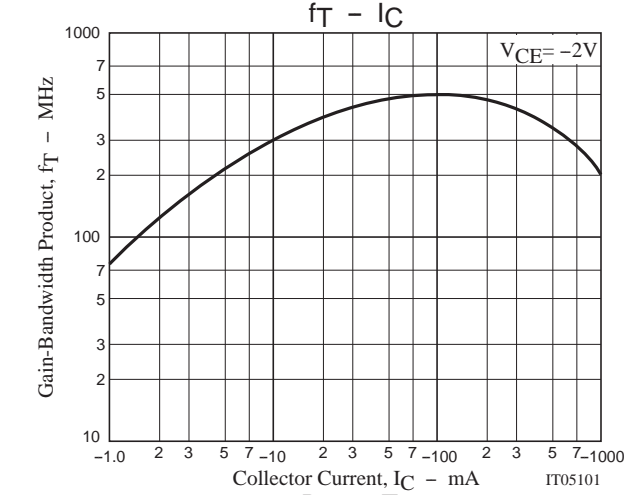
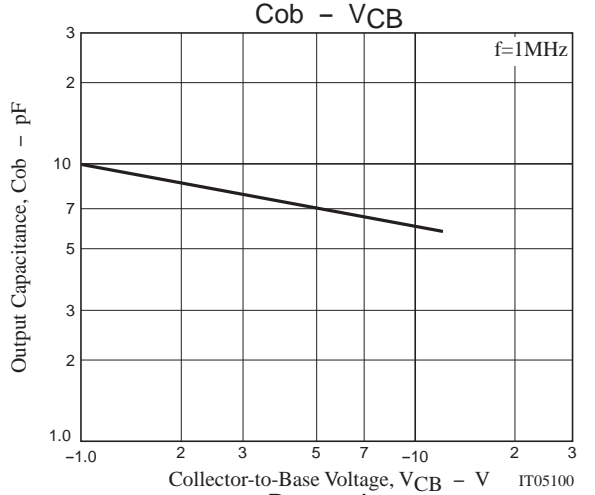
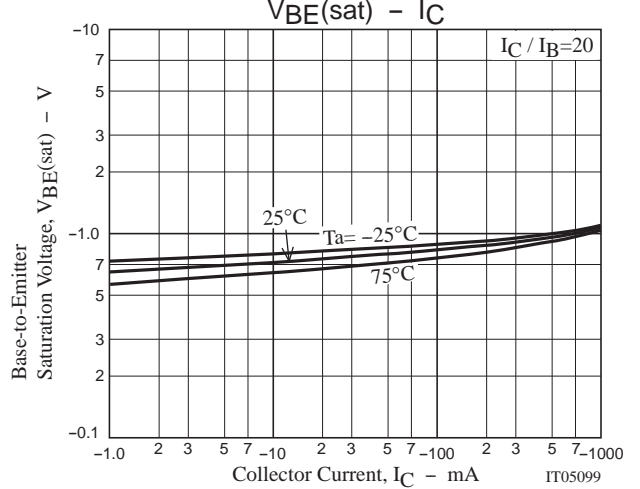
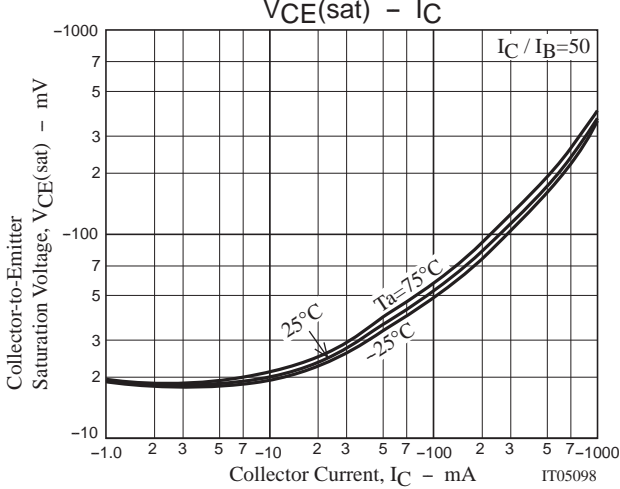
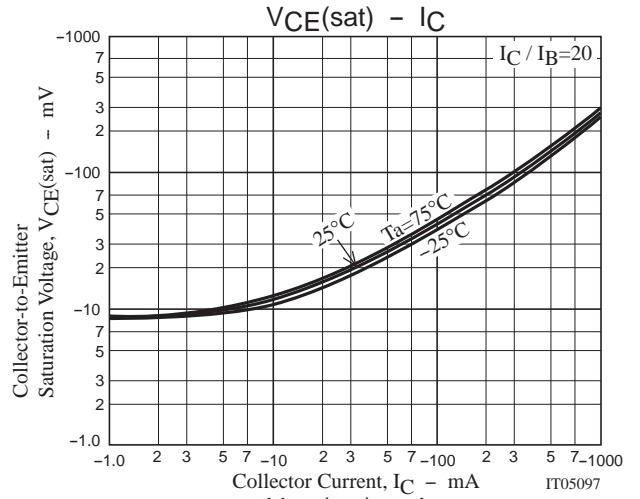
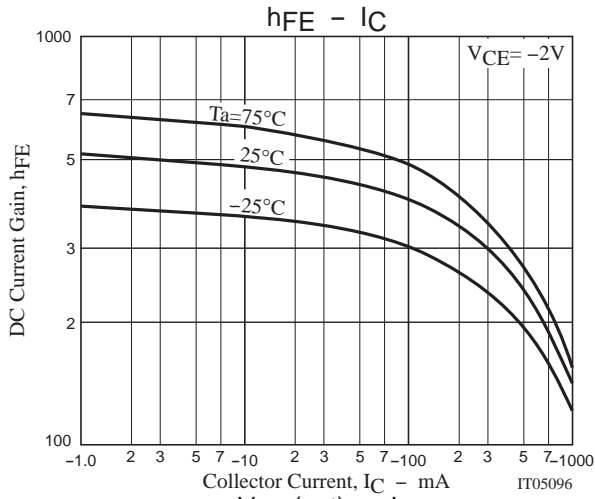
$$I_C = 20I_{B1} = -20I_{B2} = -400\text{mA}$$

## Ordering Information

Device	Package	Shipping	memo
12A02MH-TL-E	MCPH3	3,000pcs./reel	Pb Free



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# 12A02MH

## Embossed Taping Specification

12A02MH-TL-E

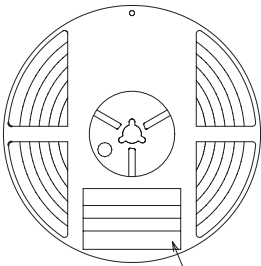
### 1. Packing Format

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)
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

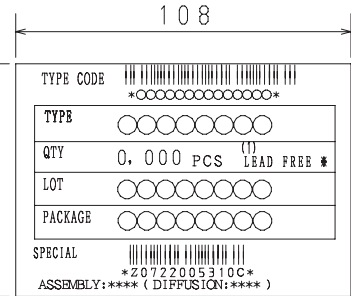
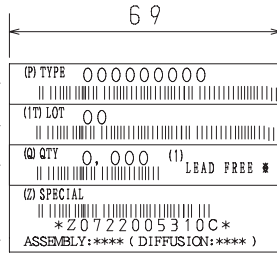
Reel label, Inner box label  
(unit: mm)

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



Reel label

Type No.  
LOT No.  
Quantity  
Origin



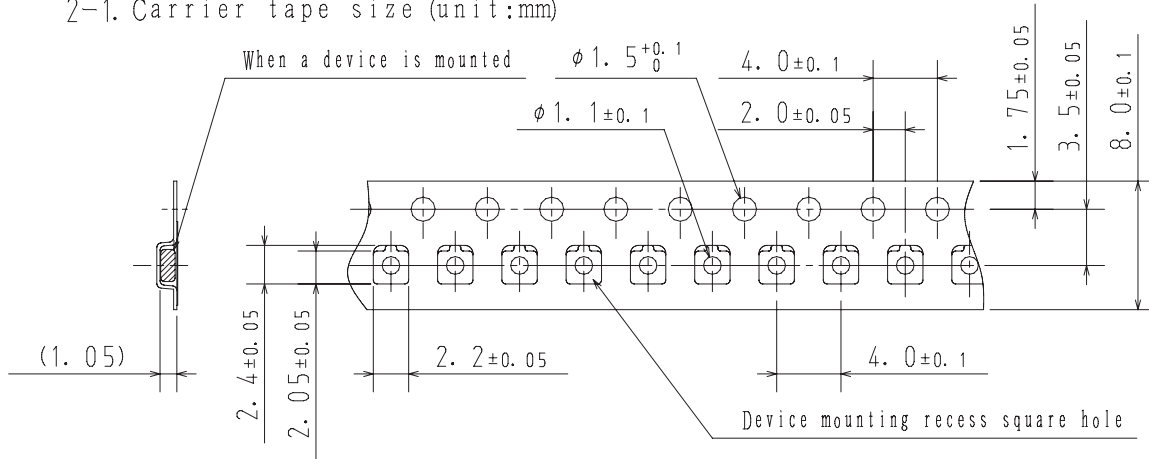
#### NOTE (1)

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

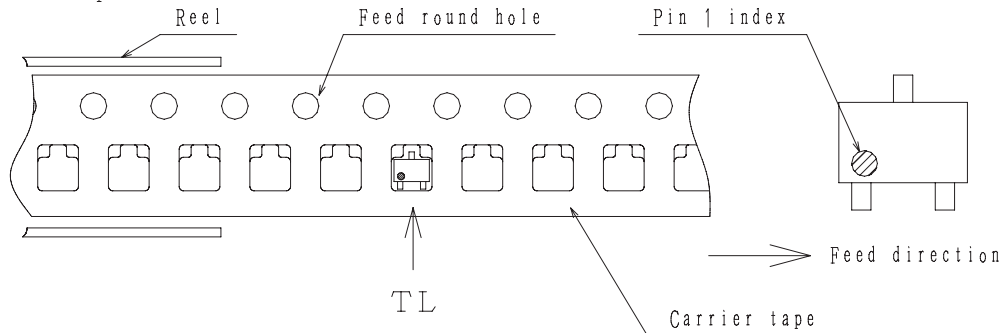
Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A
LEAD FREE 4	JEITA Phase 3

### 2. Taping configuration

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



#### 2-2. Device placement direction

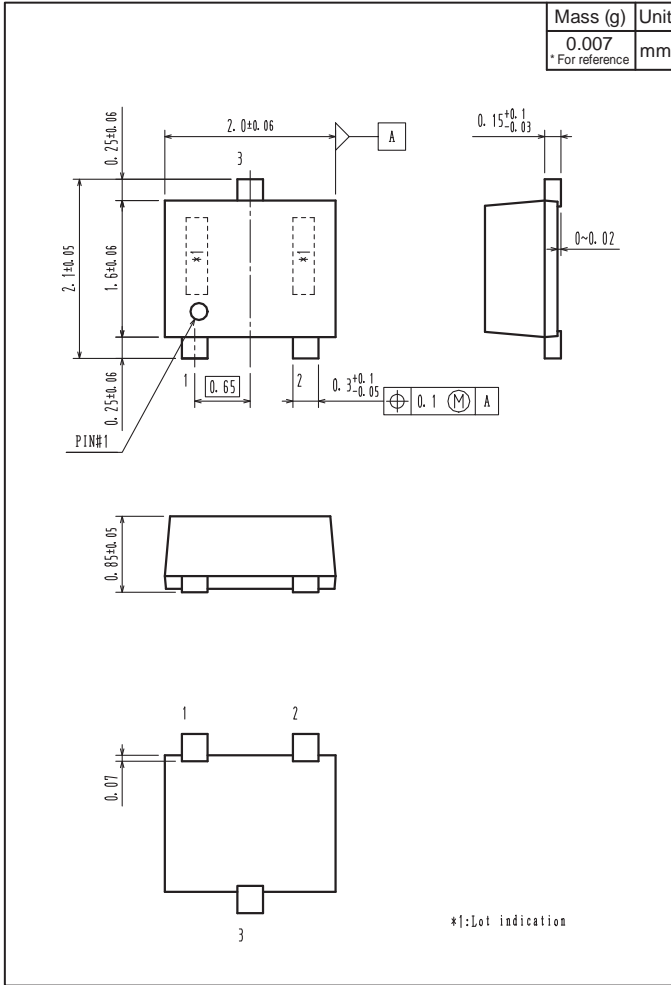


Those with pin 1 index on the feed hole side.....TL

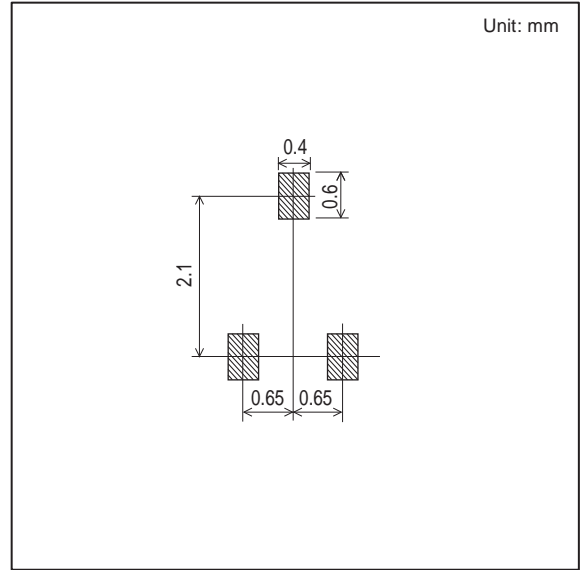
# 12A02MH

## Outline Drawing

12A02MH-TL-E



## Land Pattern Example



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