Ordering number : ENN6611A

SANYO Semiconductors
DATA SHEET

# MCH6103 / MCH6203 — PNP / NPN Epitaxial Planar Silicon Transistors
# DC / DC Converter Applications

## Applications

- Relay drivers, lamp drivers, motor drivers, flash.

## Features

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

## Specifications ( ) : MCH6103

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

| Parameter | Symbol | Conditions | Ratings | Unit |
|---|---|---|---|---|
| Collector-to-Base Voltage | $V_{CBO}$ | | (-50)80 | V |
| Collector-to-Emitter Voltage | $V_{CES}$ | | (-50)80 | V |
| | $V_{CEO}$ | | (-)50 | V |
| Emitter-to-Base Voltage | $V_{EBO}$ | | (-)5 | V |
| Collector Current | $I_C$ | | (-)1.0 | A |
| Collector Current (Pulse) | $I_{CP}$ | | (-)3 | A |
| Base Current | $I_B$ | | 200 | mA |
| Collector Dissipation | $P_C$ | Mounted on a ceramic board (600mm²×0.8mm) | 1.0 | W |
| Junction Temperature | Tj | | 150 | °C |
| Storage Temperature | Tstg | | -55 to +150 | °C |

### Electrical Characteristics at Ta=25°C

| Parameter | Symbol | Conditions | Ratings | | | Unit |
|---|---|---|---|---|---|---|
| | | | min | typ | max | |
| Collector Cutoff Current | $I_{CBO}$ | $V_{CB}$=(-)40V, $I_E$=0 | | | (-)0.1 | μA |
| Emitter Cutoff Current | $I_{EBO}$ | $V_{EB}$=(-)4V, $I_C$=0 | | | (-)0.1 | μA |
| DC Current Gain | $h_{FE}$ | $V_{CE}$=(-)2V, $I_C$=(-)100mA | 200 | | 560 | |
| Gain-Bandwidth Product | $f_T$ | $V_{CE}$=(-)10V, $I_C$=(-)300mA | | 420 | | MHz |
| Output Capacitance | Cob | $V_{CB}$=(-)10V, f=1MHz | | (9)6 | | pF |

Marking : MCH6103 : AC, MCH6203 : CC

Continued on next page.

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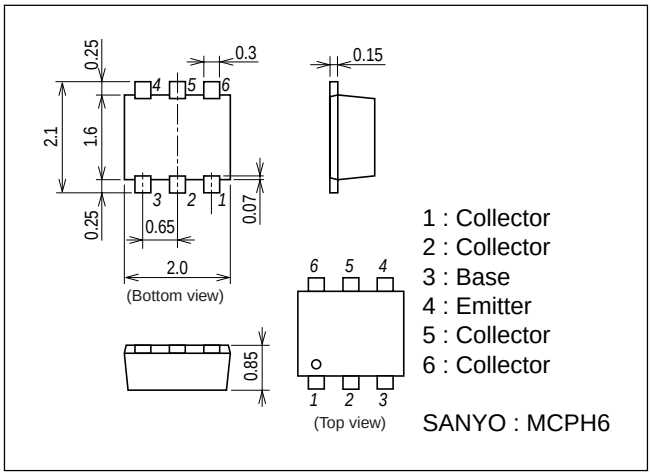
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| Parameter | Symbol | Conditions | Ratings | | | Unit |
|---|---|---|---|---|---|---|
| | | | min | typ | max | |
| Collector-to-Emitter Saturation Voltage | $V_{CE}$(sat)1 | $I_C$=(–)500mA, $I_B$=(–)10mA | | (-280)130 | (-430)190 | mV |
| | $V_{CE}$(sat)2 | $I_C$=(–)300mA, $I_B$=(–)6mA | | (-145)90 | (-220)135 | mV |
| Base-to-Emitter Saturation Voltage | $V_{BE}$(sat) | $I_C$=(–)500mA, $I_B$=(–)10mA | | (–)0.81 | (–)1.2 | V |
| Collector-to-Base Breakdown Voltage | $V_{(BR)CBO}$ | $I_C$=(–)10μA, $I_E$=0 | (-50)80 | | | V |
| Collector-to-Emitter Breakdown Voltage | $V_{(BR)CES}$ | $I_C$=(–)100μA, $R_{BE}$=0 | (-50)80 | | | V |
| | $V_{(BR)CEO}$ | $I_C$=(–)1mA, $R_{BE}$=∞ | (–)50 | | | V |
| Emitter-to-Base Breakdown Voltage | $V_{(BR)EBO}$ | $I_E$=(–)10μA, $I_C$=0 | (–)5 | | | V |
| Turn-ON Time | $t_{on}$ | See specified Test Circuit. | | (36)38 | | ns |
| Storage Time | $t_{stg}$ | See specified Test Circuit. | | (173)332 | | ns |
| Fall Time | $t_f$ | See specified Test Circuit. | | (28)40 | | ns |

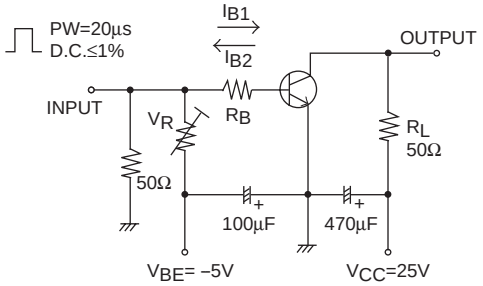
## Package Dimensions

unit : mm

2177A

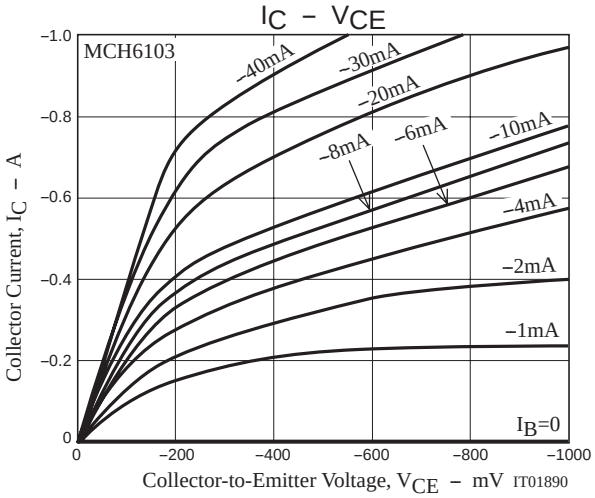


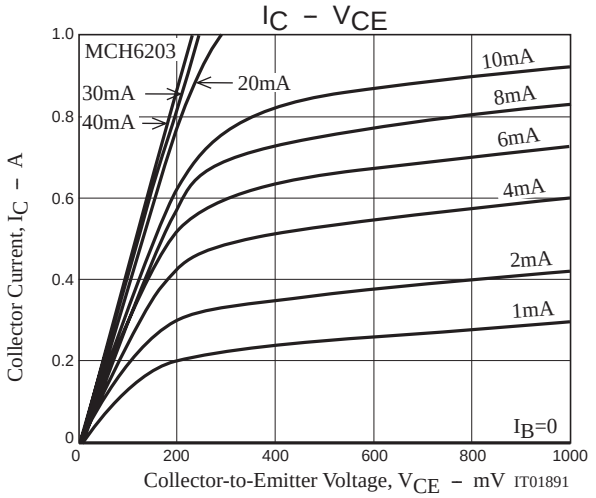

## Switching Time Test Circuit

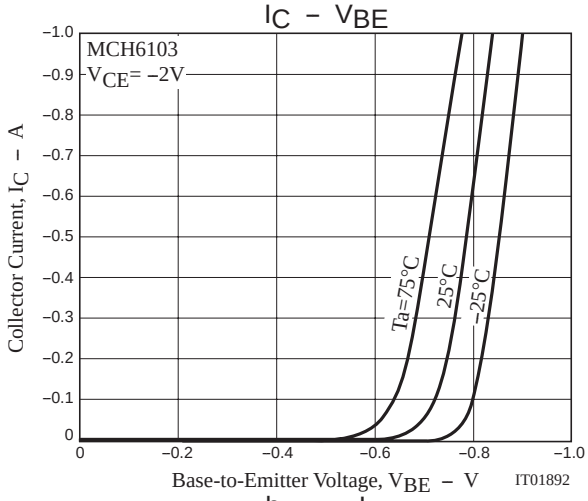


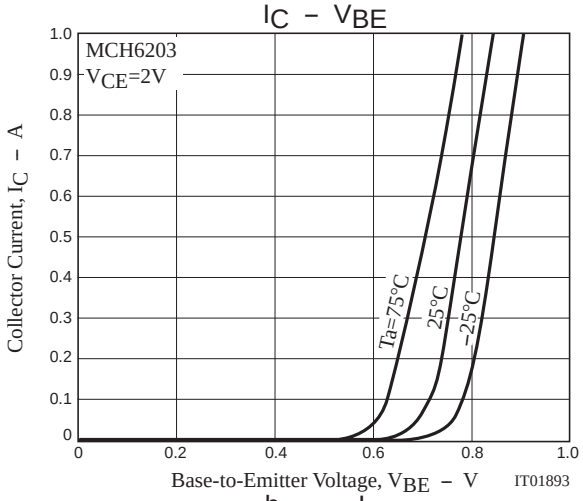

$I_C$=20$I_{B1}$= –20$I_{B2}$=500mA

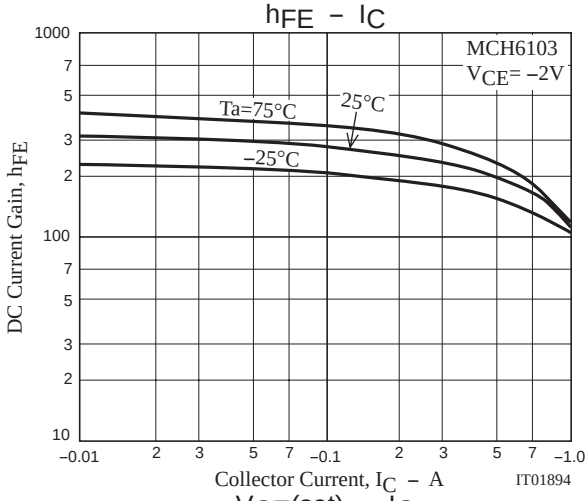
For PNP, the polarity is reversed.

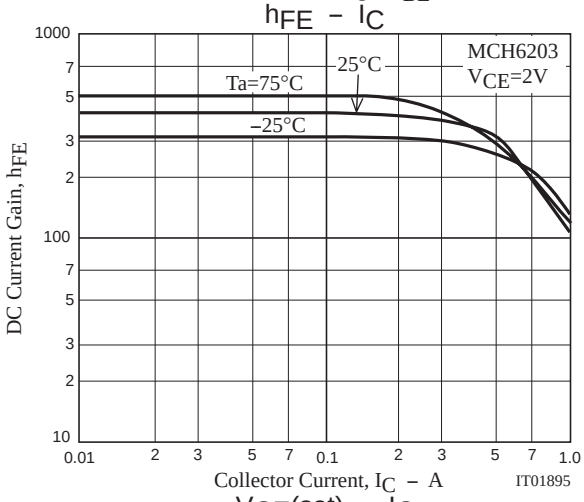


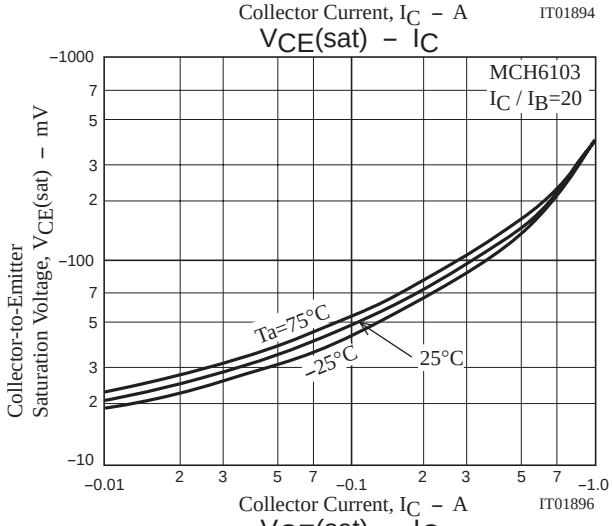



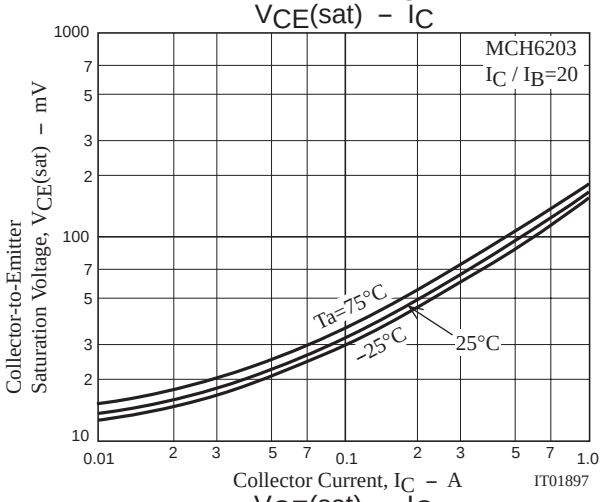

IC – VBE
MCH6103
VCE= –2V
Ta=75°C
25°C
–25°C
Collector Current, IC – A
Base-to-Emitter Voltage, VBE – V
IT01892

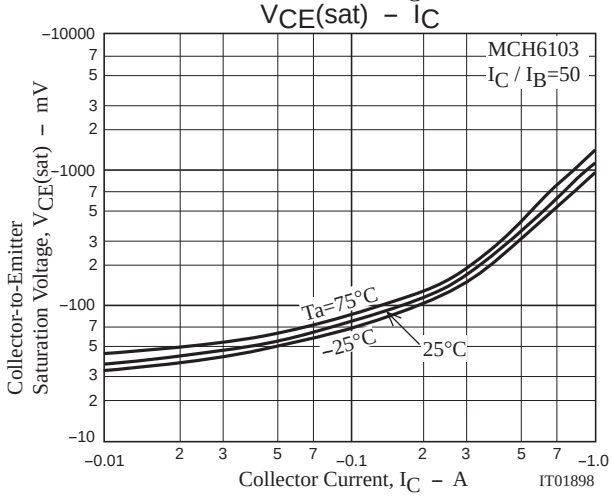

IC – VBE
MCH6203
VCE=2V
Ta=75°C
25°C
–25°C
Collector Current, IC – A
Base-to-Emitter Voltage, VBE – V
IT01893

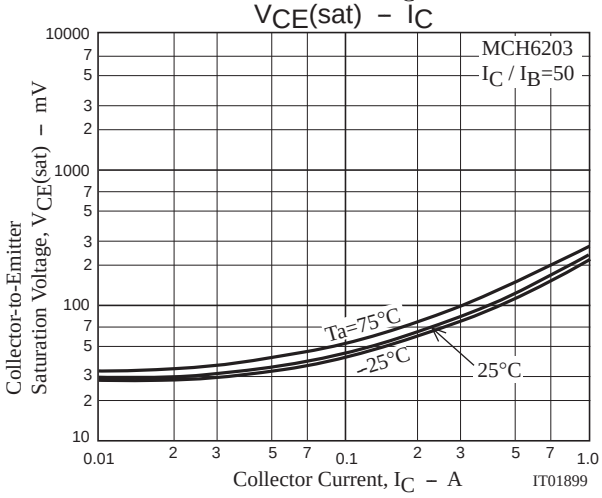

hFE – IC
MCH6103
VCE= –2V
Ta=75°C
25°C
–25°C
DC Current Gain, hFE
Collector Current, IC – A
IT01894

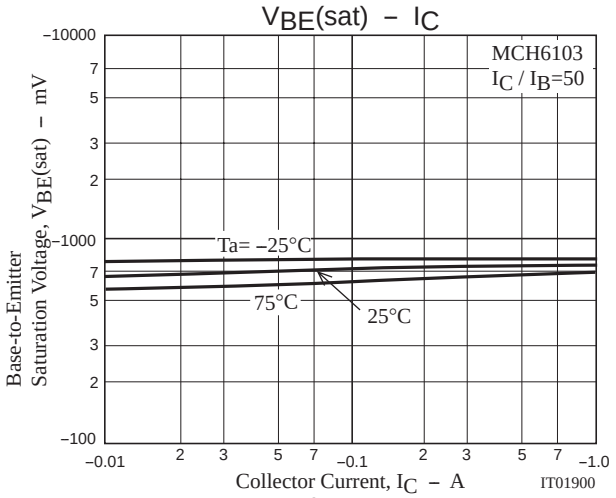

hFE – IC
MCH6203
VCE=2V
Ta=75°C
25°C
–25°C
DC Current Gain, hFE
Collector Current, IC – A
IT01895

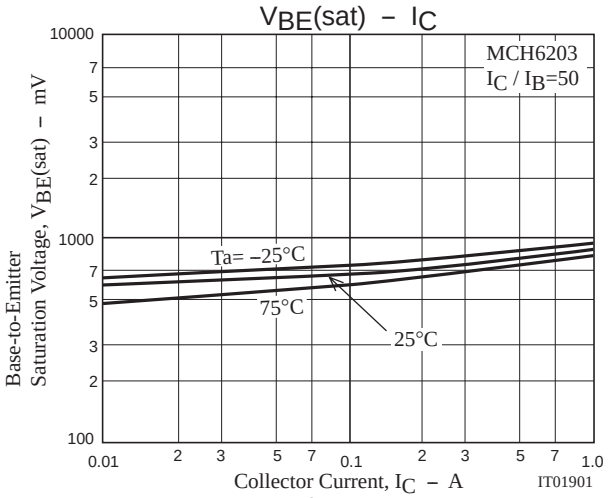

VCE(sat) – IC
MCH6103
IC / IB=20
Ta=75°C
25°C
–25°C
Collector-to-Emitter Saturation Voltage, VCE(sat) – mV
Collector Current, IC – A
IT01896

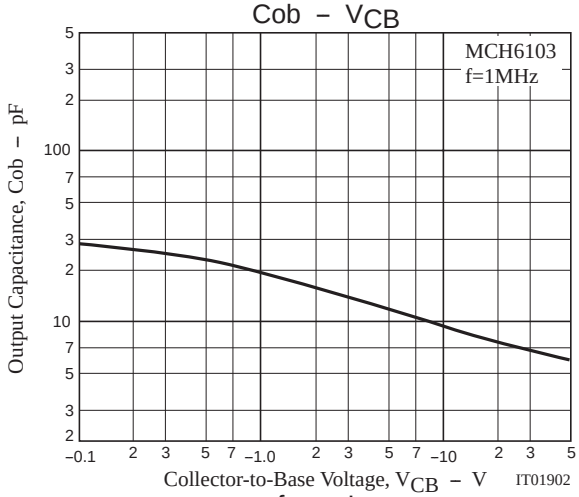

VCE(sat) – IC
MCH6203
IC / IB=20
Ta=75°C
25°C
–25°C
Collector-to-Emitter Saturation Voltage, VCE(sat) – mV
Collector Current, IC – A
IT01897

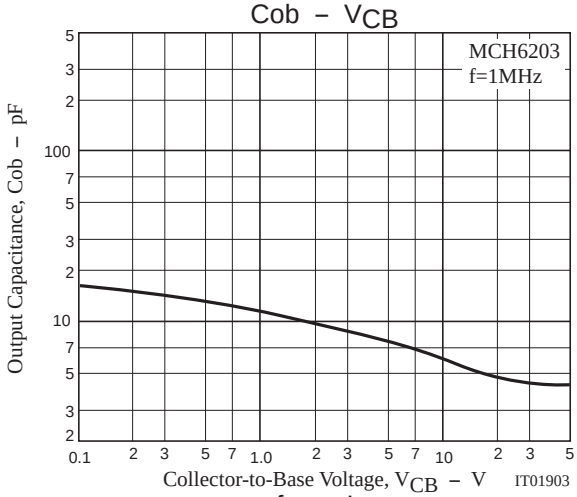

VCE(sat) – IC
MCH6103
IC / IB=50
Ta=75°C
25°C
–25°C
Collector-to-Emitter Saturation Voltage, VCE(sat) – mV
Collector Current, IC – A
IT01898

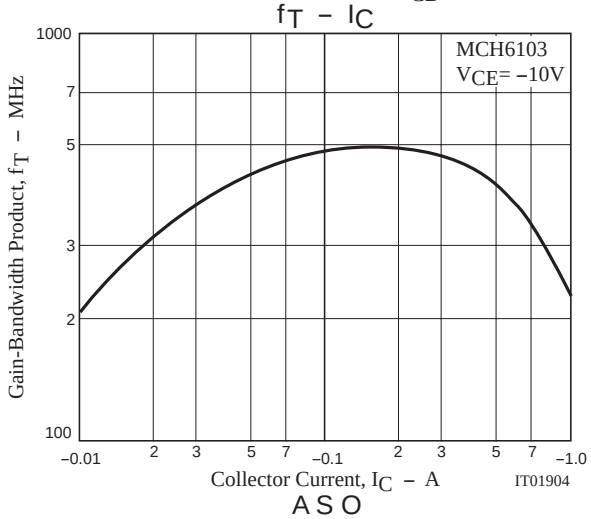

VCE(sat) – IC
MCH6203
IC / IB=50
Ta=75°C
25°C
–25°C
Collector-to-Emitter Saturation Voltage, VCE(sat) – mV
Collector Current, IC – A
IT01899

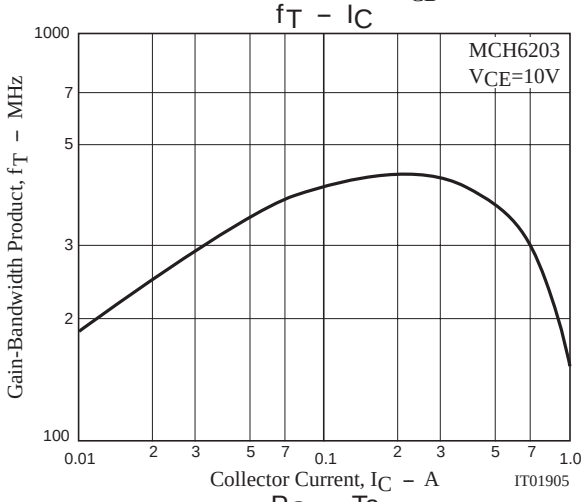

VBE(sat) – IC
MCH6103
IC / IB=50
Ta= –25°C
75°C
25°C
Base-to-Emitter Saturation Voltage, VBE(sat) – mV
Collector Current, IC – A
IT01900

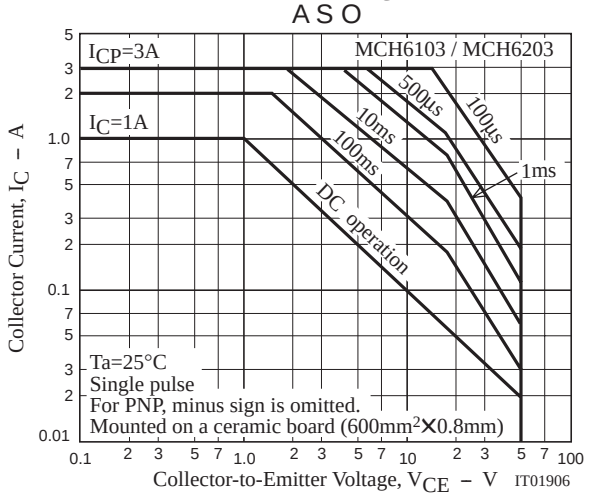

VBE(sat) – IC
MCH6203
IC / IB=50
Ta= –25°C
75°C
25°C
Base-to-Emitter Saturation Voltage, VBE(sat) – mV
Collector Current, IC – A
IT01901

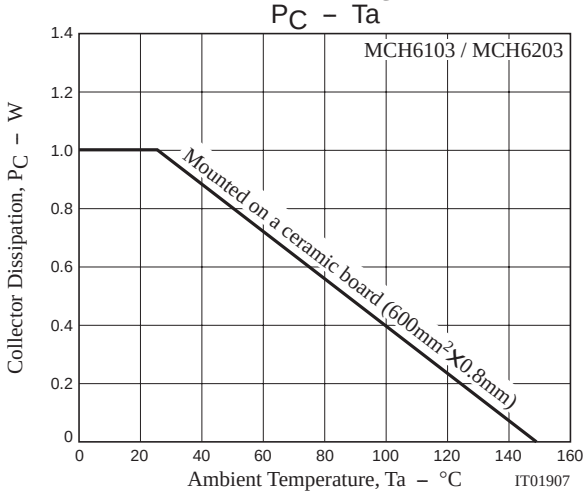

Cob – VCB
MCH6103
f=1MHz
Output Capacitance, Cob – pF
Collector-to-Base Voltage, VCB – V
IT01902


Cob – VCB
MCH6203
f=1MHz
Output Capacitance, Cob – pF
Collector-to-Base Voltage, VCB – V
IT01903


fT – IC
MCH6103
VCE= –10V
Gain-Bandwidth Product, fT – MHz
Collector Current, IC – A
IT01904


fT – IC
MCH6203
VCE=10V
Gain-Bandwidth Product, fT – MHz
Collector Current, IC – A
IT01905


A S O
MCH6103 / MCH6203
ICP=3A
IC=1A
500µs
100µs
10ms
100ms
1ms
DC operation
Ta=25°C
Single pulse
For PNP, minus sign is omitted.
Mounted on a ceramic board (600mm2×0.8mm)
Collector Current, IC – A
Collector-to-Emitter Voltage, VCE – V
IT01906


PC – Ta
MCH6103 / MCH6203
Mounted on a ceramic board (600mm2×0.8mm)
Collector Dissipation, PC – W
Ambient Temperature, Ta – °C
IT01907

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