

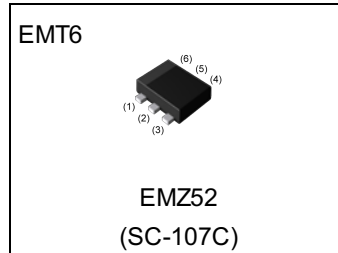
<For Tr1(NPN)>

Parameter	Value
$V_{CE0}$	50V
$I_C$	100mA

<For Tr2(PNP)>

Parameter	Value
$V_{CE0}$	-50V
$I_C$	-100mA

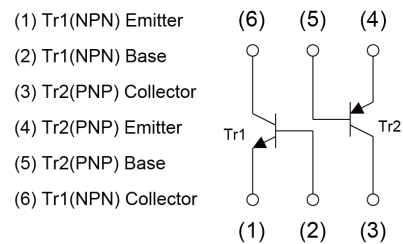
### ● Outline



### ● Features

- 1) General Purpose.
- 2) 2SAR523 and 2SCR523 chips in one package.
- 3) Transistor elements are independent, eliminating interface.
- 4) Mounting cost and area can be cut in half.
- 5) Lead Free/RoHS Compliant.

### ● Inner circuit



### ● Application

Switching, LED driver

### ● Packaging specifications

Part No.	Package	Package size	Taping code	Reel size (mm)	Tape width (mm)	Basic ordering unit.(pcs)	Marking
EMZ52	EMT6	1616	T2R	180	8	8000	Z52

**● Absolute maximum ratings ( $T_a = 25^\circ\text{C}$ )**

Parameter	Symbol	Tr1(NPN)	Tr2(PNP)	Unit
Collector-base voltage	$V_{\text{CBO}}$	50	-50	V
Collector-emitter voltage	$V_{\text{CEO}}$	50	-50	V
Emitter-base voltage	$V_{\text{EBO}}$	5	-5	V
Collector current	$I_{\text{C}}$	100	-100	mA
	$I_{\text{CP}}^{*1}$	200	-200	mA
Power dissipation	$P_{\text{D}}^{*2*3}$	150(Total)		mW
Junction temperature	$T_{\text{j}}$	150		$^\circ\text{C}$
Range of storage temperature	$T_{\text{stg}}$	-55 to +150		$^\circ\text{C}$

**● Electrical characteristics ( $T_a = 25^\circ\text{C}$ ) <For Tr1(NPN)>**

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Collector-base breakdown voltage	$BV_{\text{CBO}}$	$I_{\text{C}} = 50\mu\text{A}$	50	-	-	V
Collector-emitter breakdown voltage	$BV_{\text{CEO}}$	$I_{\text{C}} = 1\text{mA}$	50	-	-	V
Emitter-base breakdown voltage	$BV_{\text{EBO}}$	$I_{\text{E}} = 50\mu\text{A}$	5	-	-	V
Collector cut-off current	$I_{\text{CBO}}$	$V_{\text{CB}} = 50\text{V}$	-	-	0.1	$\mu\text{A}$
Emitter cut-off current	$I_{\text{EBO}}$	$V_{\text{EB}} = 5\text{V}$	-	-	0.1	$\mu\text{A}$
Collector-emitter saturation voltage	$V_{\text{CE(sat)}}$	$I_{\text{C}} = 50\text{mA}, I_{\text{B}} = 5\text{mA}$	-	0.15	0.40	V
DC current gain	$h_{\text{FE}}$	$V_{\text{CE}} = 6\text{V}, I_{\text{C}} = 1\text{mA}$	120	-	560	-
Transition frequency	$f_{\text{T}}$	$V_{\text{CE}} = 10\text{V}, I_{\text{E}} = -10\text{mA}, f = 100\text{MHz}$	-	350	-	MHz
Output capacitance	$C_{\text{ob}}$	$V_{\text{CB}} = 10\text{V}, I_{\text{E}} = 0\text{A}, f = 1\text{MHz}$	-	1.6	-	pF

**● Electrical characteristics ( $T_a = 25^\circ\text{C}$ ) <For Tr2(PNP)>**

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Collector-base breakdown voltage	$BV_{\text{CBO}}$	$I_{\text{C}} = -50\mu\text{A}$	-50	-	-	V
Collector-emitter breakdown voltage	$BV_{\text{CEO}}$	$I_{\text{C}} = -1\text{mA}$	-50	-	-	V
Emitter-base breakdown voltage	$BV_{\text{EBO}}$	$I_{\text{E}} = -50\mu\text{A}$	-5	-	-	V
Collector cut-off current	$I_{\text{CBO}}$	$V_{\text{CB}} = -50\text{V}$	-	-	-0.1	$\mu\text{A}$
Emitter cut-off current	$I_{\text{EBO}}$	$V_{\text{EB}} = -5\text{V}$	-	-	-0.1	$\mu\text{A}$
Collector-emitter saturation voltage	$V_{\text{CE(sat)}}$	$I_{\text{C}} = -50\text{mA}, I_{\text{B}} = -5\text{mA}$	-	-0.15	-0.40	V
DC current gain	$h_{\text{FE}}$	$V_{\text{CE}} = -6\text{V}, I_{\text{C}} = -1\text{mA}$	120	-	560	-
Transition frequency	$f_{\text{T}}$	$V_{\text{CE}} = -10\text{V}, I_{\text{E}} = 10\text{mA}, f = 100\text{MHz}$	-	300	-	MHz
Output capacitance	$C_{\text{ob}}$	$V_{\text{CB}} = -10\text{V}, I_{\text{E}} = 0\text{A}, f = 1\text{MHz}$	-	2	-	pF

\*1  $P_w=1\text{ms}$  Single Pulse

\*2 Each terminal mounted on a reference footprint

\*3 120mW per element must not be exceeded.

●Electrical characteristic curves(Ta=25°C) <For Tr1(NPN)>

Fig.1 Grounded Emitter Propagation Characteristics

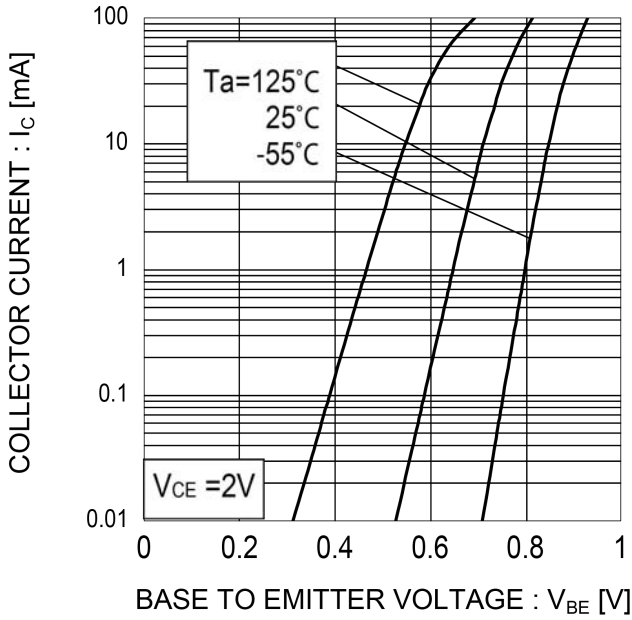


Fig.2 Typical Output Characteristics

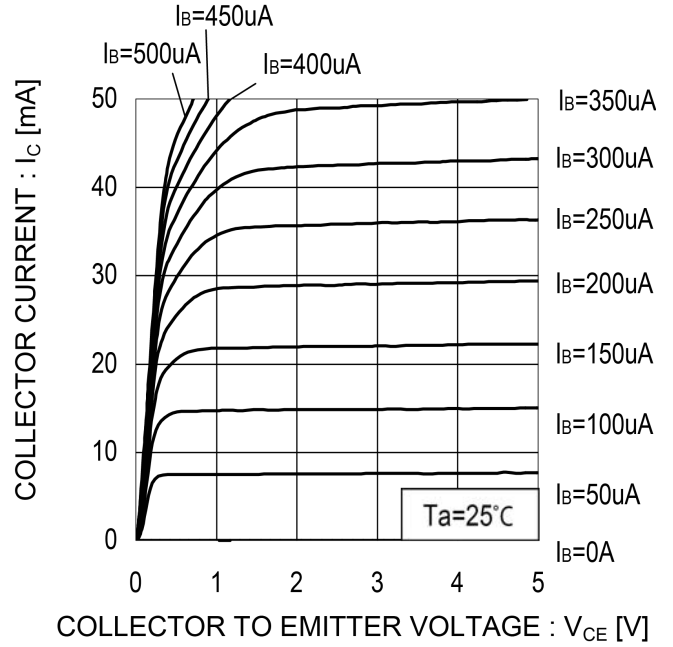


Fig.3 DC Current Gain vs. Collector Current(I)

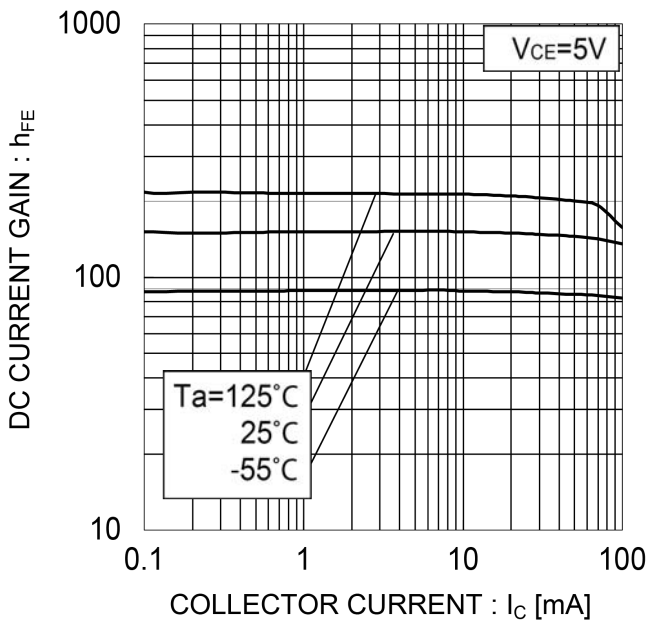
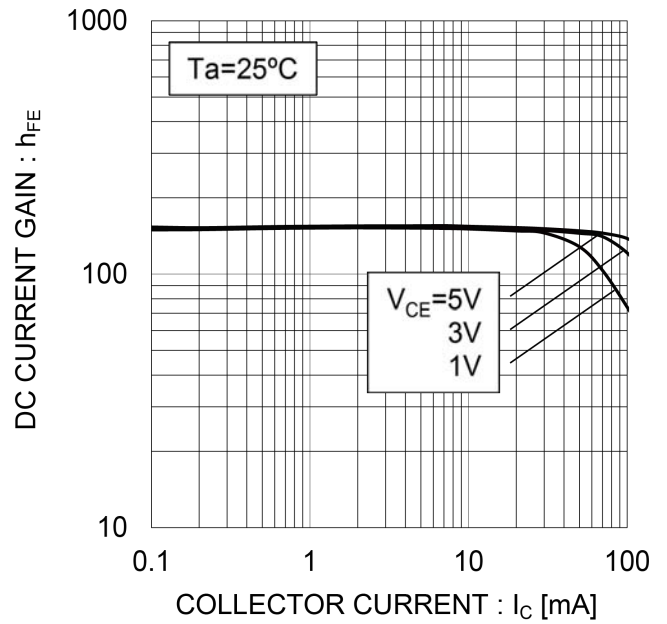


Fig.4 DC Current Gain vs. Collector Current(II)



● Electrical characteristic curves ( $T_a=25^\circ\text{C}$ ) <For Tr1(NPN)>

Fig.5 Collector-Emitter Saturation Voltage vs. Collector Current(I)

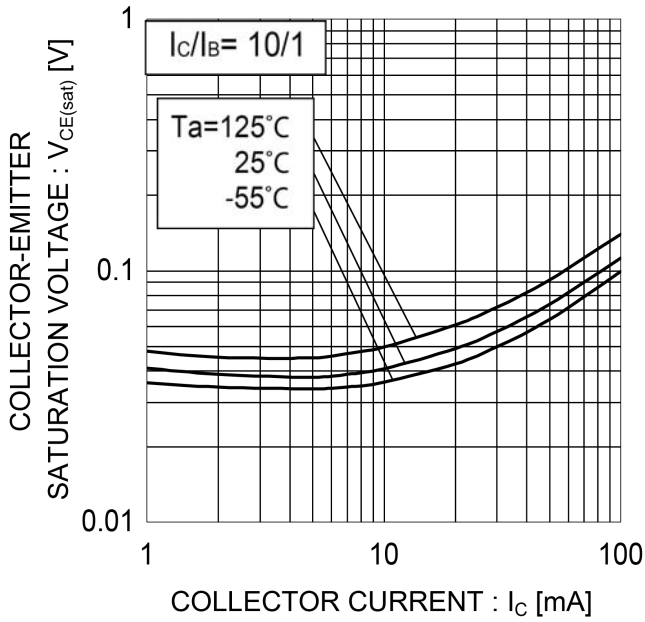


Fig.6 Collector-Emitter Saturation Voltage vs. Collector Current(II)

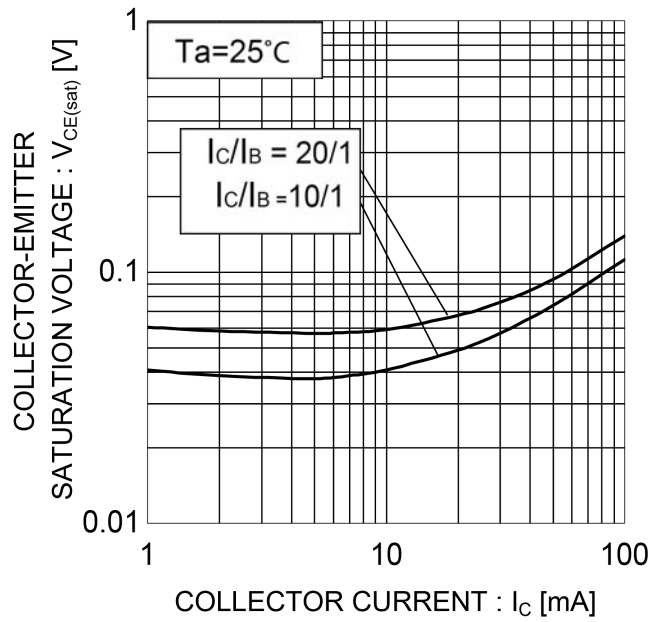


Fig.7 Base-Emitter Saturation Voltage vs. Collector Current

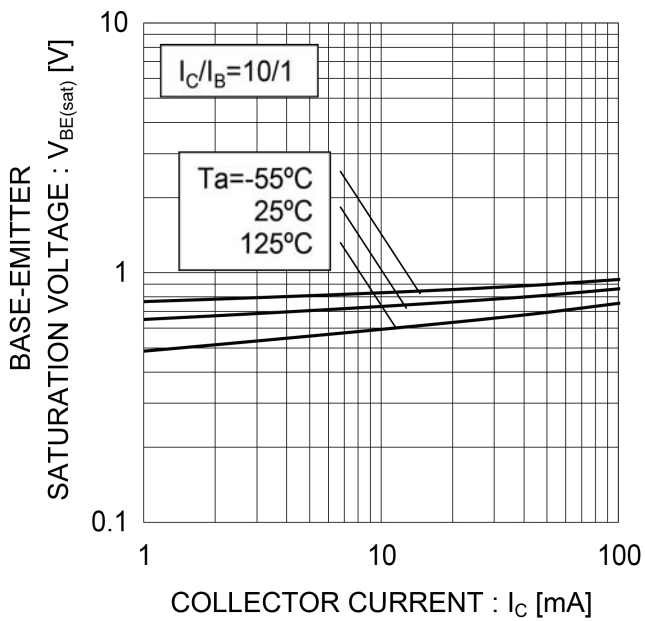
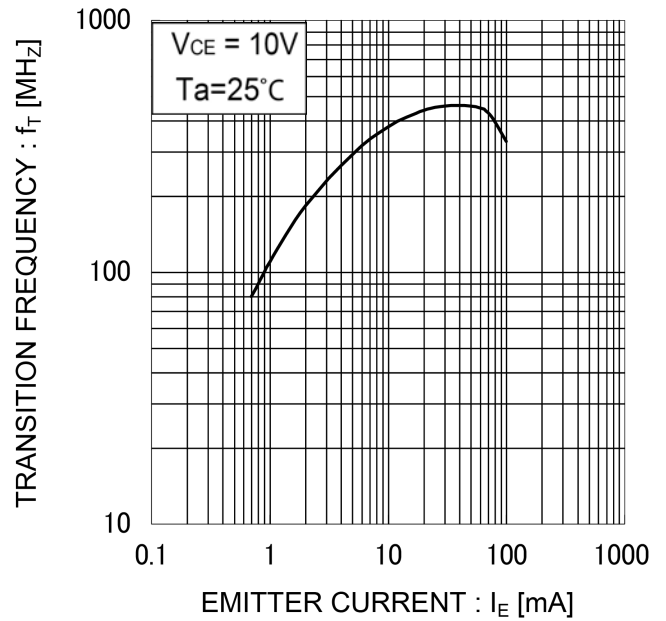


Fig.8 Gain Bandwidth Product vs. Emitter Current



● Electrical characteristic curves ( $T_a = 25^\circ\text{C}$ ) <For Tr1(NPN)>

Fig.9 Emitter input capacitance vs. Emitter-Base Voltage Collector output capacitance vs. Collector-

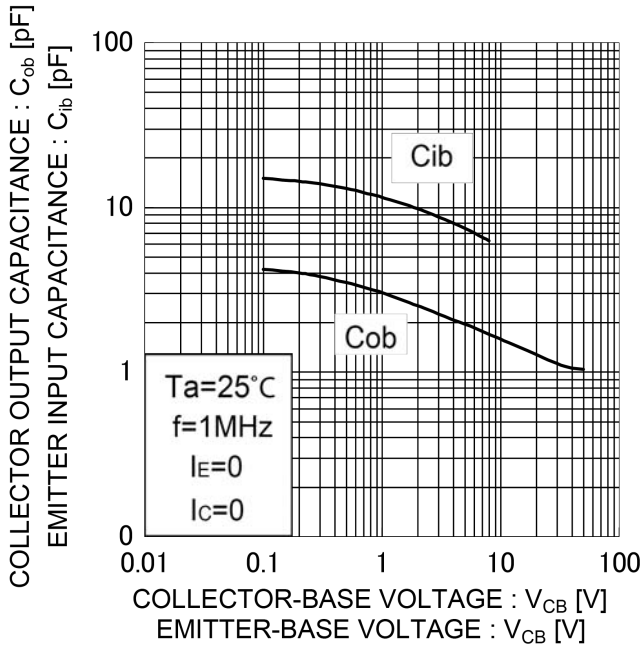
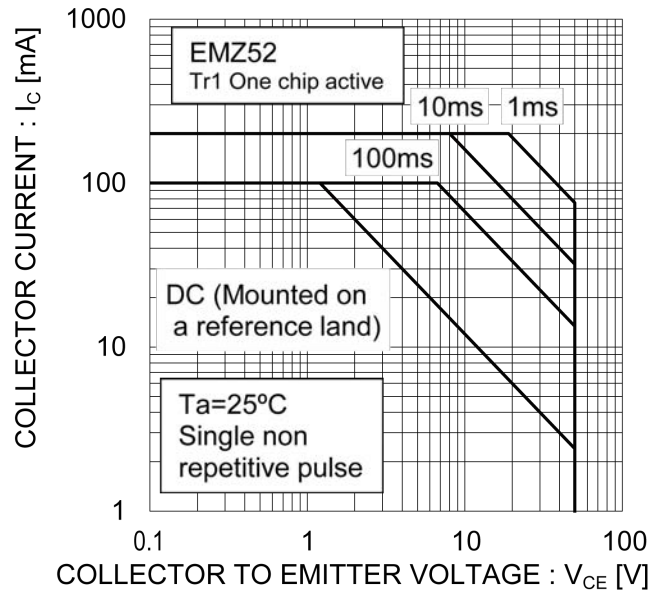


Fig.10 Safe Operating Area



● Electrical characteristic curves ( $T_a = 25^\circ\text{C}$ ) <For Tr2(PNP)>

Fig.1 Grounded Emitter Propagation Characteristics

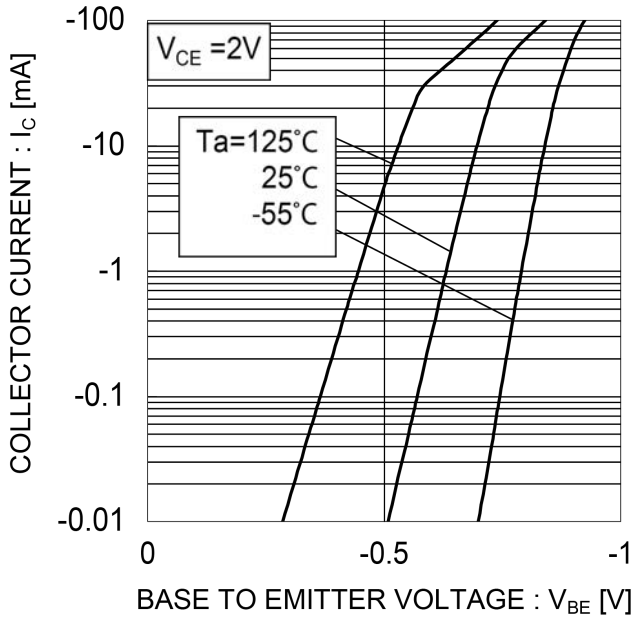


Fig.2 Typical Output Characteristics

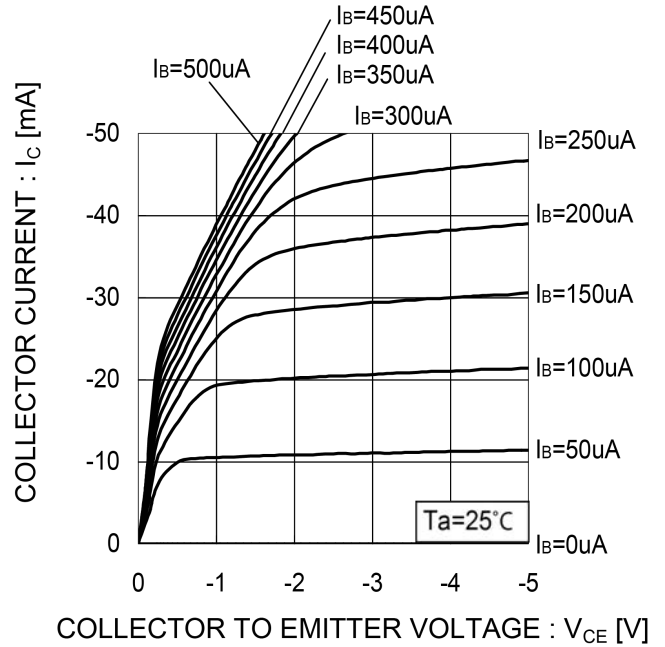


Fig.3 DC Current Gain vs. Collector Current(I)

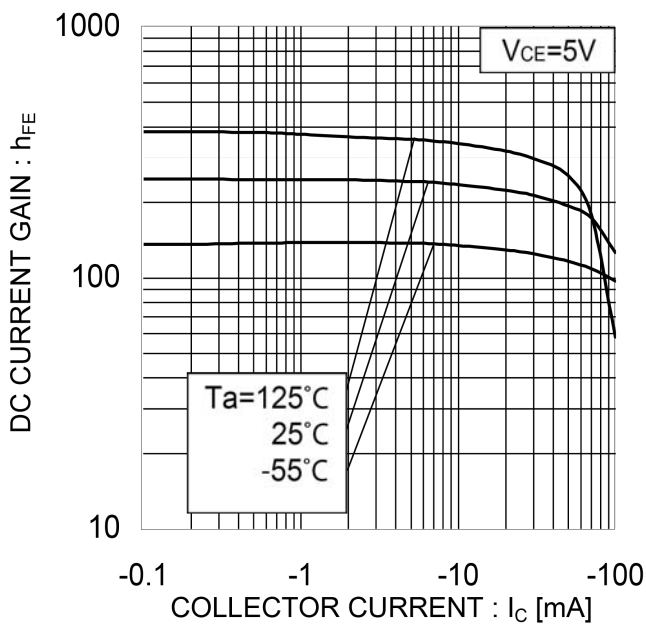
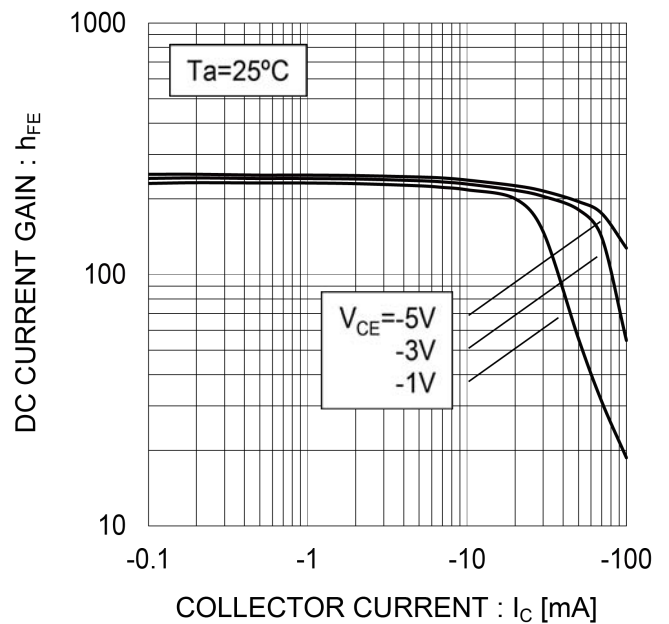


Fig.4 DC Current Gain vs. Collector Current(II)



● Electrical characteristic curves ( $T_a = 25^\circ\text{C}$ ) <For Tr2(PNP)>

Fig.5 Collector-Emitter Saturation Voltage vs. Collector Current(I)

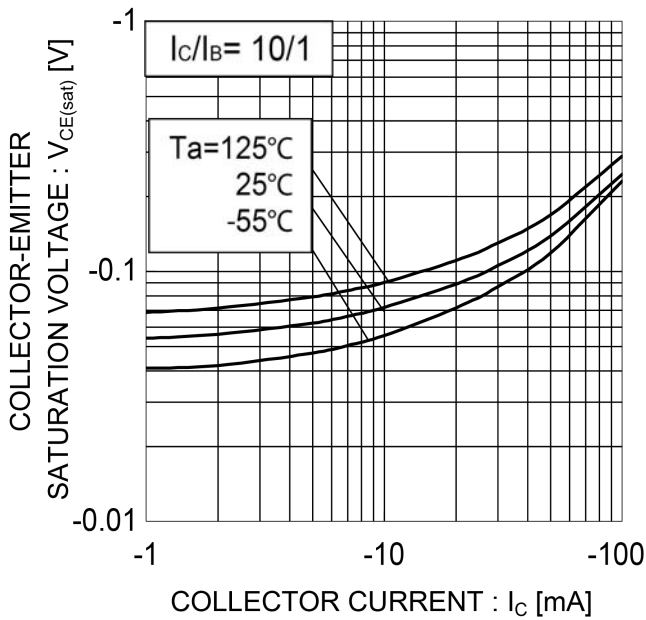


Fig.6 Collector-Emitter Saturation Voltage vs. Collector Current(II)

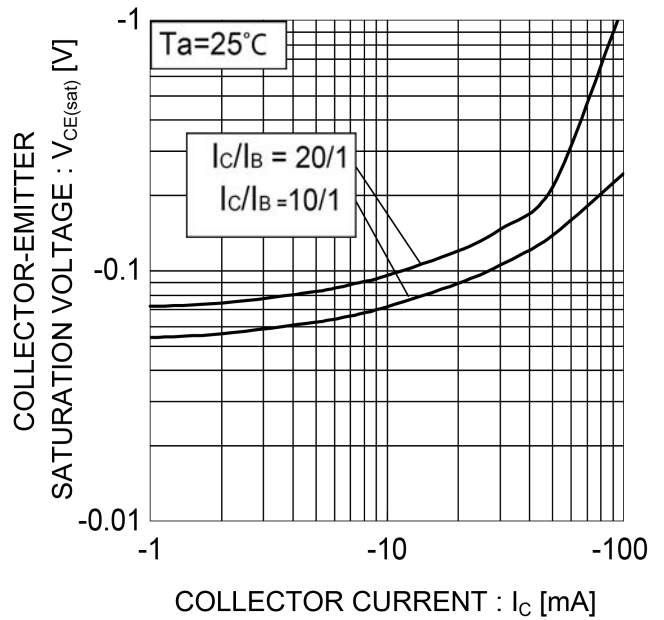


Fig.7 Base-Emitter Saturation Voltage vs. Collector Current

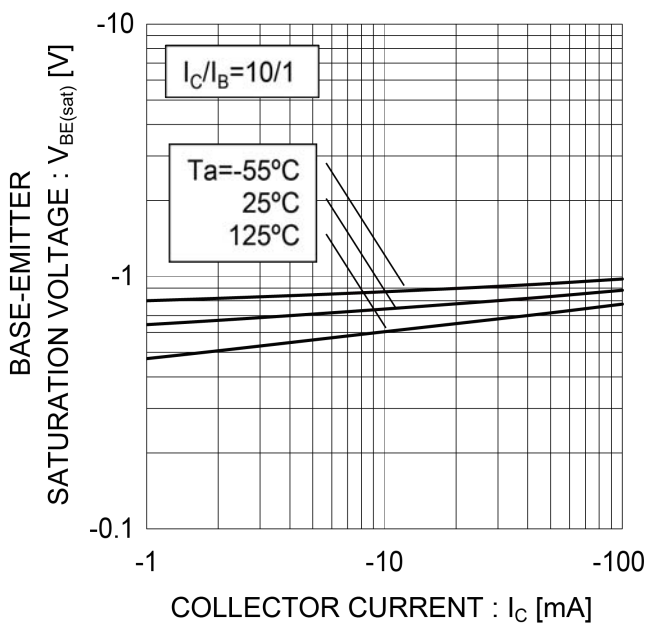
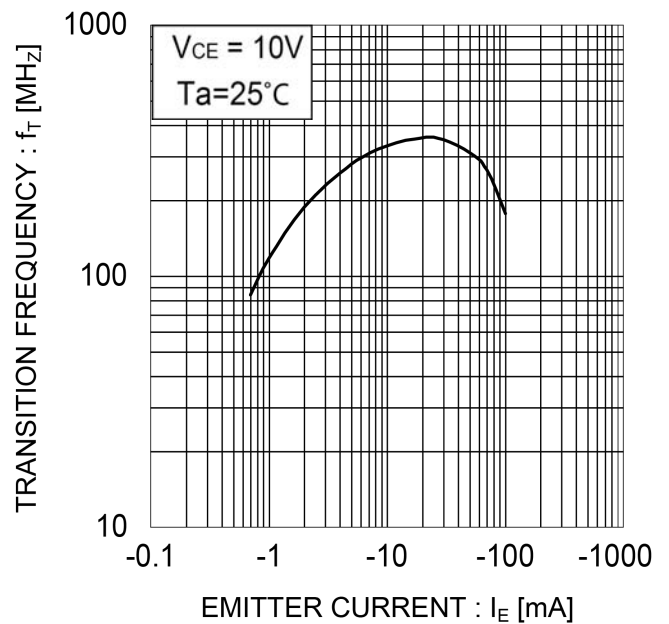


Fig.8 Gain Bandwidth Product vs. Emitter Current



● **Electrical characteristic curves** ( $T_a = 25^\circ\text{C}$ ) <For Tr2(PNP)>

Fig.9 Emitter input capacitance vs. Emitter-Base Voltage Collector output capacitance vs. Collector-

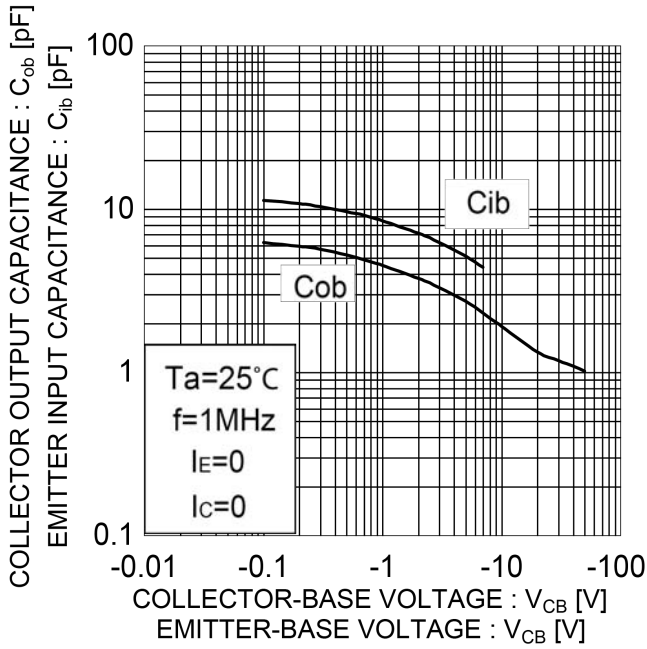
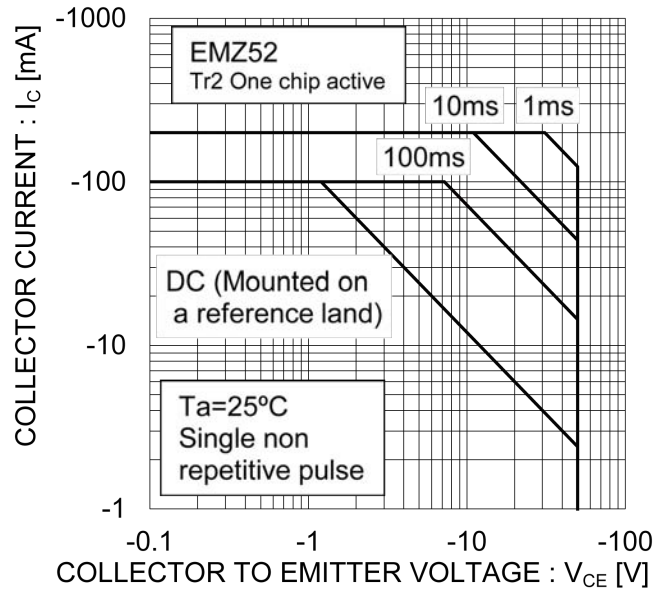
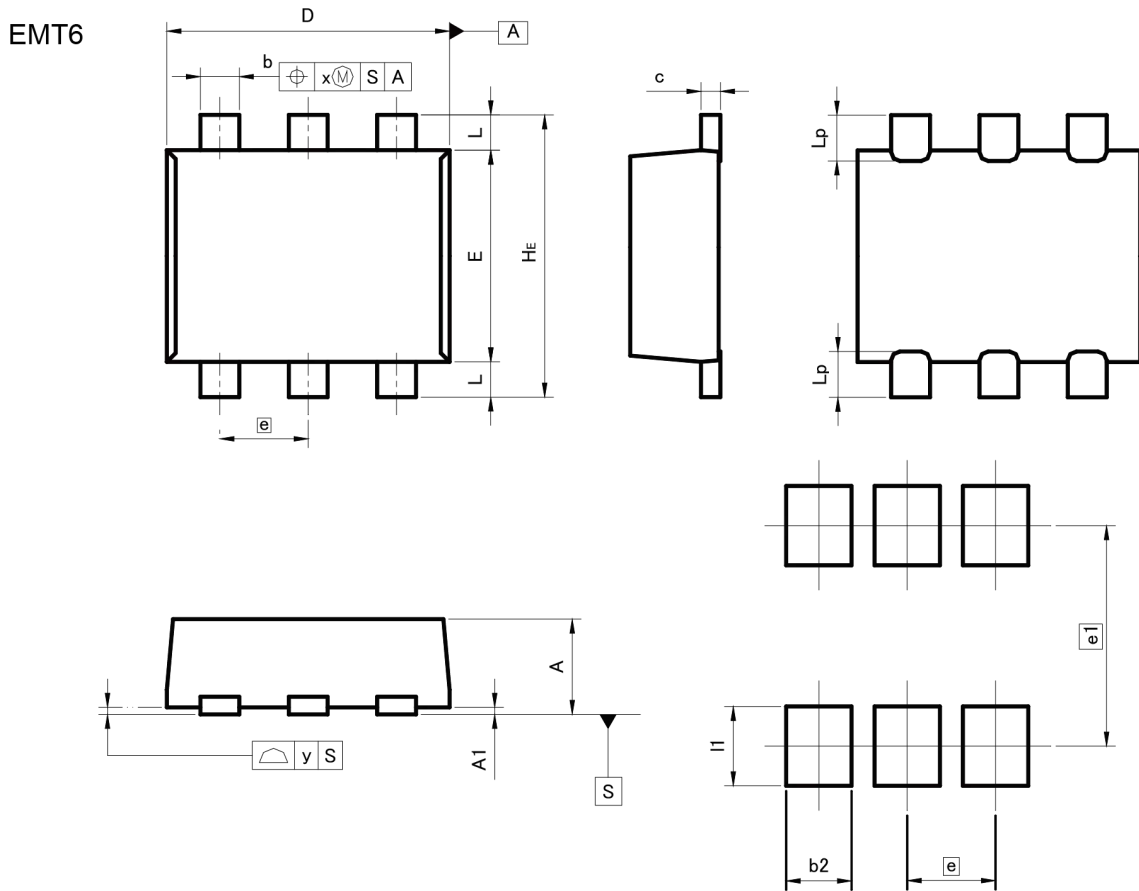


Fig.10 Safe Operating Area





●Dimensions



Pattern of terminal position areas  
[Not a recommended pattern of soldering pads]

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.45	0.55	0.018	0.022
A1	0.00	0.10	0.000	0.004
b	0.17	0.27	0.007	0.011
c	0.08	0.18	0.003	0.007
D	1.50	1.70	0.059	0.067
E	1.10	1.30	0.043	0.051
e	0.50		0.020	
HE	1.50	1.70	0.059	0.067
L	0.10	0.30	0.004	0.012
Lp	-	0.35	-	0.014
x	-	0.10	-	0.004
y	-	0.10	-	0.004
DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
b2	-	0.37	-	0.015
e1	1.25		0.049	
I1	-	0.45	-	0.018

Dimension in mm/inches

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