

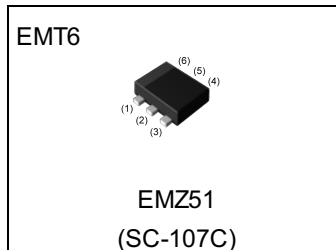
<For Tr1(NPN)>

Parameter	Value
V_{CEO}	20V
I_C	200mA

<For Tr2(PNP)>

Parameter	Value
V_{CEO}	-20V
I_C	-200mA

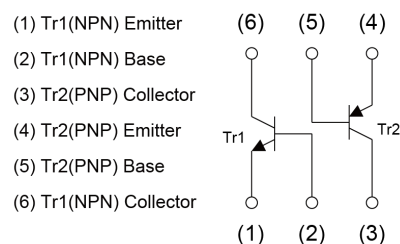
●Outline



●Features

- 1) General Purpose.
- 2) 2SAR522 and 2SCR522 chips in one package.
- 3) Transister 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
EMZ51	EMT6	1616	T2R	180	8	8000	Z51

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

Parameter	Symbol	Tr1(NPN)	Tr2(PNP)	Unit
Collector-base voltage	V_{CBO}	20	-20	V
Collector-emitter voltage	V_{CEO}	20	-20	V
Emitter-base voltage	V_{EBO}	5	-5	V
Collector current	I_{C}	200	-200	mA
	I_{CP}^{*1}	400	-400	mA
Power dissipation	P_{D}^{*2*3}	150(Total)		mW
Junction temperature	T_{j}	150		$^\circ\text{C}$
Range of storage temperature	T_{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_{CBO}	$I_{\text{C}} = 50\mu\text{A}$	20	-	-	V
Collector-emitter breakdown voltage	BV_{CEO}	$I_{\text{C}} = 1\text{mA}$	20	-	-	V
Emitter-base breakdown voltage	BV_{EBO}	$I_{\text{E}} = 50\mu\text{A}$	5	-	-	V
Collector cut-off current	I_{CBO}	$V_{\text{CB}} = 20\text{V}$	-	-	0.1	μA
Emitter cut-off current	I_{EBO}	$V_{\text{EB}} = 5\text{V}$	-	-	0.1	μA
Collector-emitter saturation voltage	$V_{\text{CE(sat)}}$	$I_{\text{C}} = 100\text{mA}$, $I_{\text{B}} = 10\text{mA}$	-	0.12	0.30	V
DC current gain	h_{FE}	$V_{\text{CE}} = 6\text{V}$, $I_{\text{C}} = 1\text{mA}$	120	-	560	-
Transition frequency	f_{T}	$V_{\text{CE}} = 10\text{V}$, $I_{\text{E}} = -10\text{mA}$, $f = 100\text{MHz}$	-	400	-	MHz
Output capacitance	C_{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_{CBO}	$I_{\text{C}} = -50\mu\text{A}$	-20	-	-	V
Collector-emitter breakdown voltage	BV_{CEO}	$I_{\text{C}} = -1\text{mA}$	-20	-	-	V
Emitter-base breakdown voltage	BV_{EBO}	$I_{\text{E}} = -50\mu\text{A}$	-5	-	-	V
Collector cut-off current	I_{CBO}	$V_{\text{CB}} = -20\text{V}$	-	-	-0.1	μA
Emitter cut-off current	I_{EBO}	$V_{\text{EB}} = -5\text{V}$	-	-	-0.1	μA
Collector-emitter saturation voltage	$V_{\text{CE(sat)}}$	$I_{\text{C}} = -100\text{mA}$, $I_{\text{B}} = -10\text{mA}$	-	-0.12	-0.30	V
DC current gain	h_{FE}	$V_{\text{CE}} = -6\text{V}$, $I_{\text{C}} = -1\text{mA}$	120	-	560	-
Transition frequency	f_{T}	$V_{\text{CE}} = -10\text{V}$, $I_{\text{E}} = 10\text{mA}$, $f = 100\text{MHz}$	-	350	-	MHz
Output capacitance	C_{ob}	$V_{\text{CB}} = -10\text{V}$, $I_{\text{E}} = 0\text{A}$, $f = 1\text{MHz}$	-	2	-	pF

*1 $P_{\text{W}}=1\text{ms}$ 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

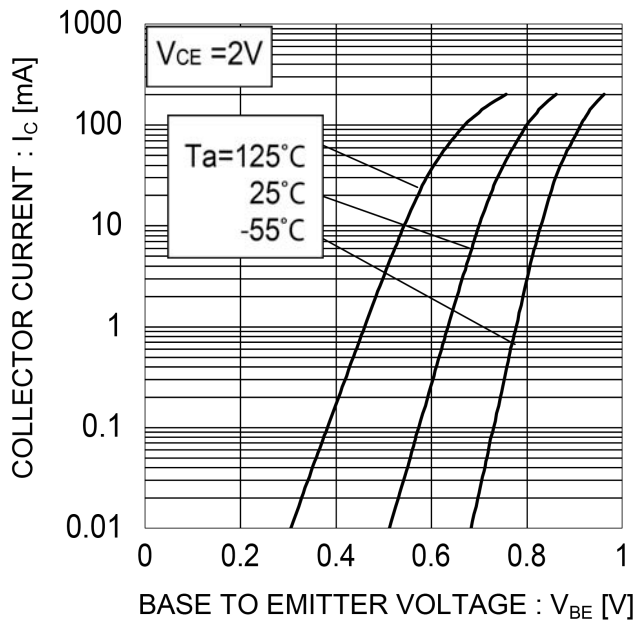


Fig.2 Typical Output Characteristics

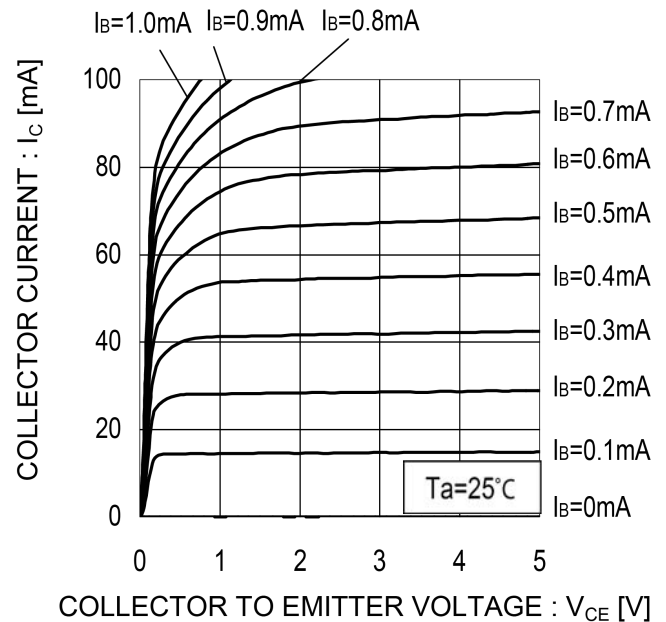


Fig.3 DC Current Gain vs. Collector Current(I)

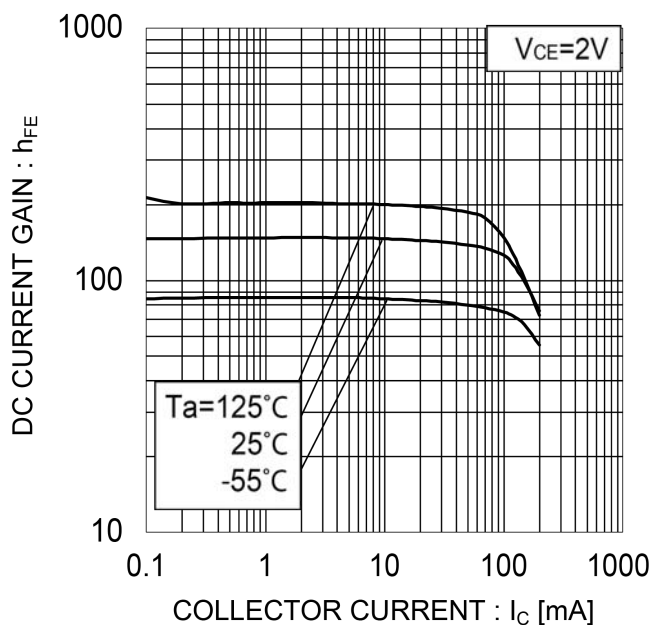
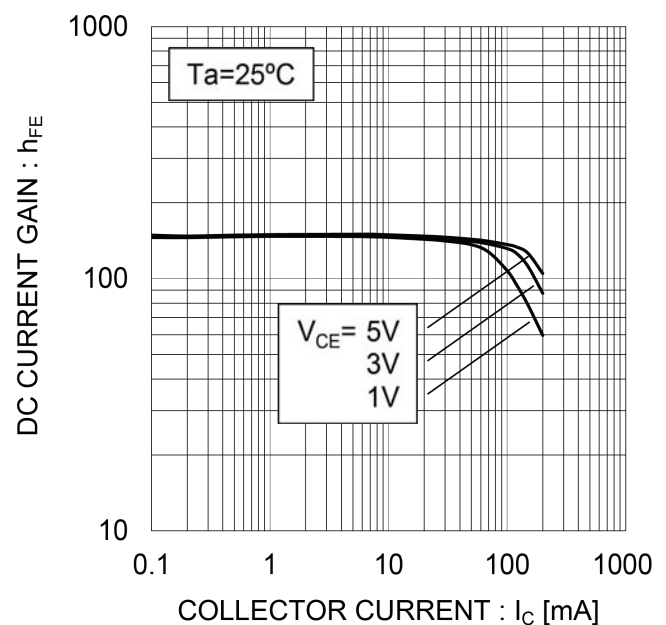


Fig.4 DC Current Gain vs. Collector Current(II)



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

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

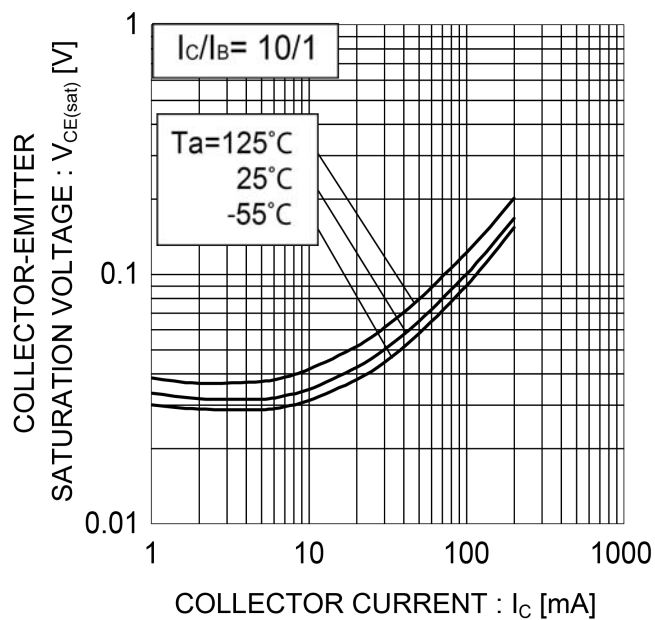


Fig.6 Collector-Emitter Saturation Voltage vs. Collector Current(II)

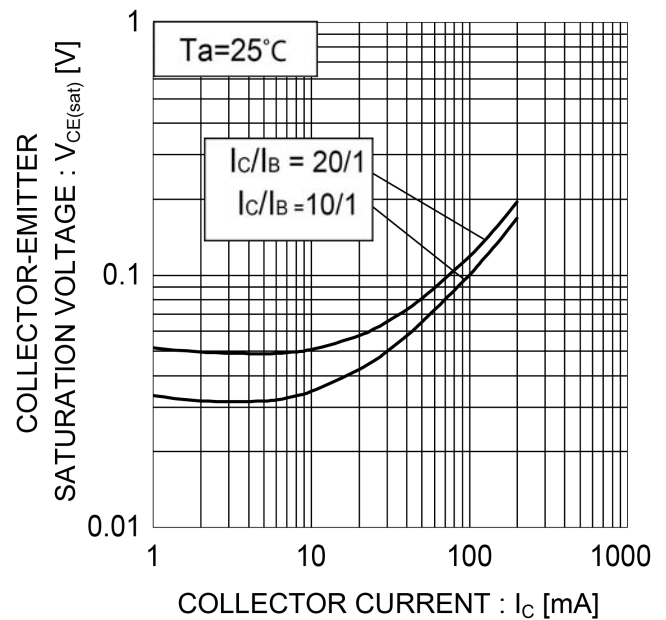


Fig.7 Base-Emitter Saturation Voltage vs. Collector Current

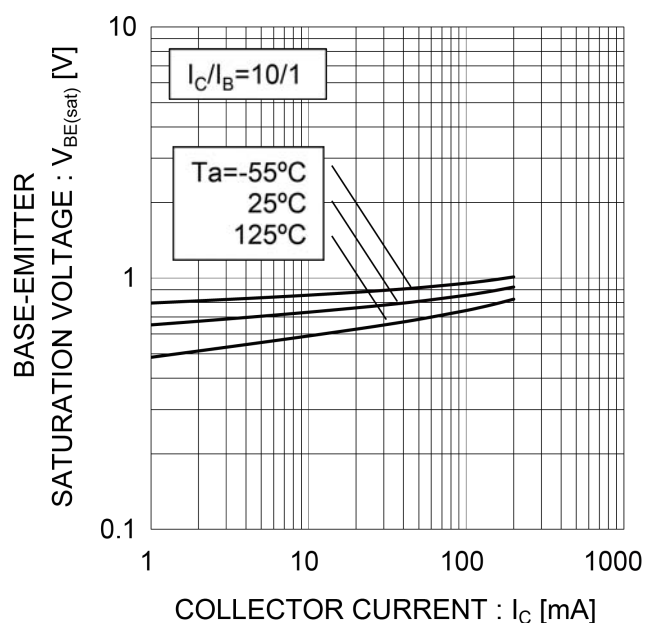
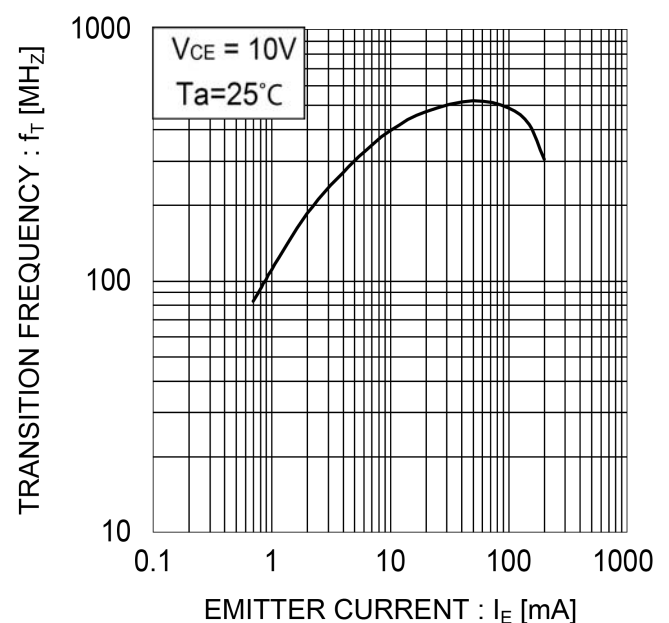


Fig.8 Gain Bandwidth Product vs. Emitter Current



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

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

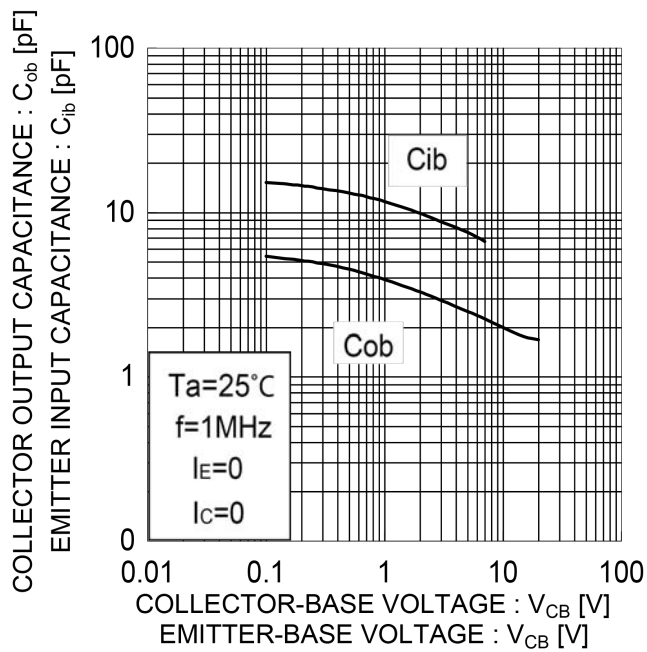
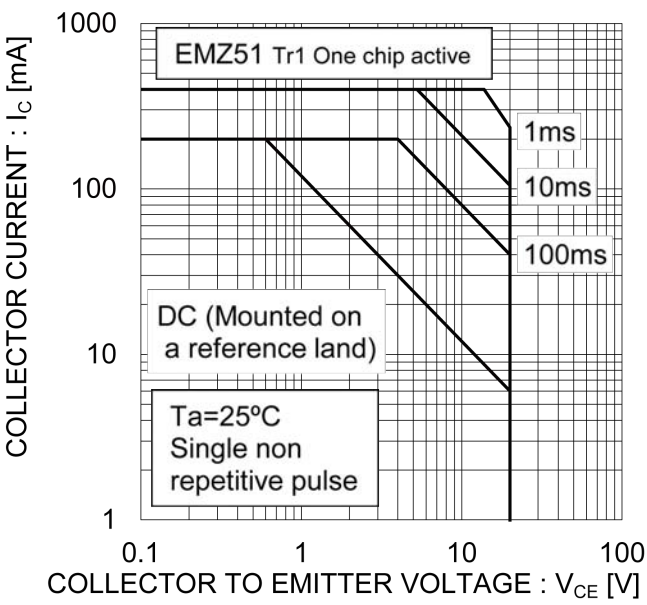


Fig.10 Safe Operating Area



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

Fig.1 Grounded Emitter Propagation Characteristics

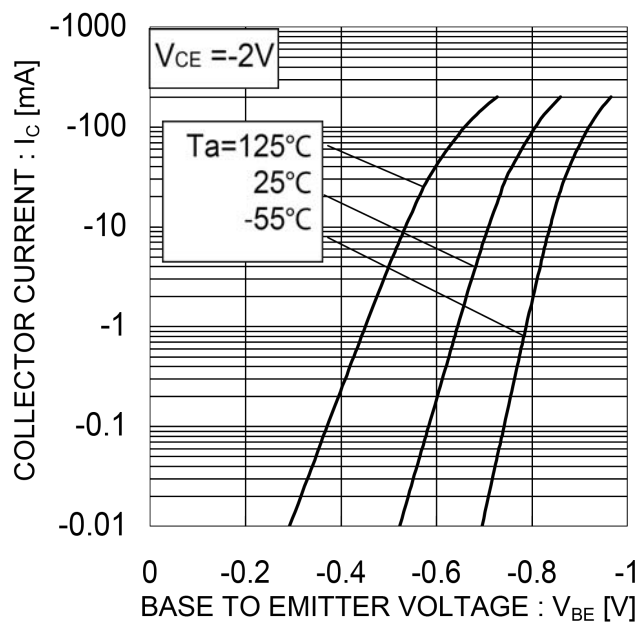


Fig.2 Typical Output Characteristics

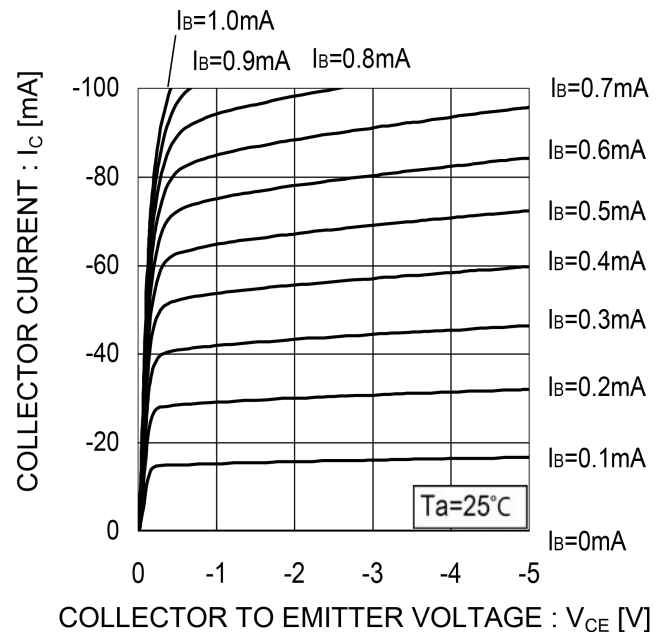


Fig.3 DC Current Gain vs. Collector Current(I)

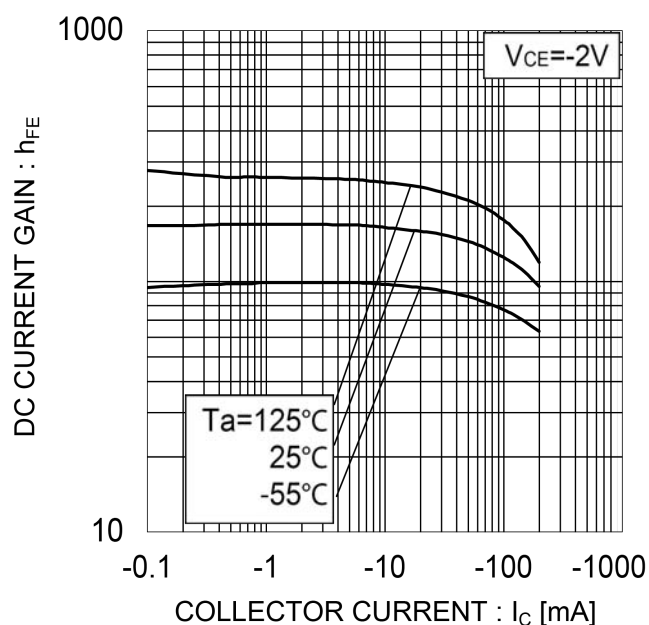
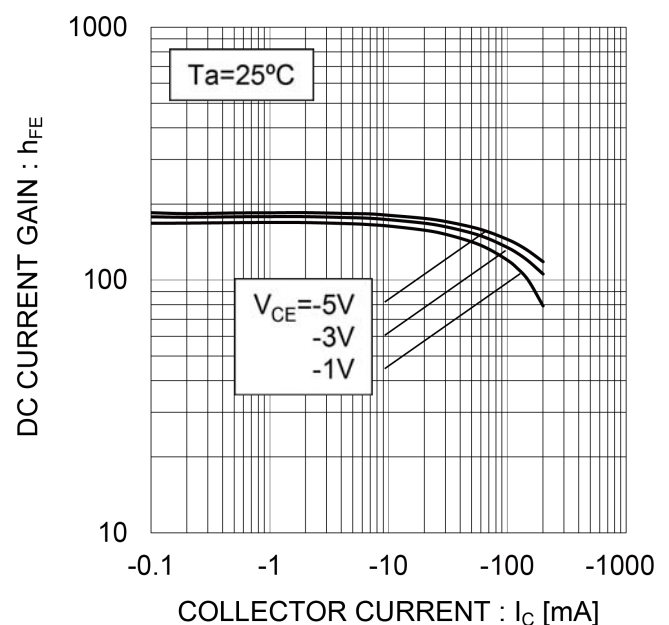


Fig.4 DC Current Gain vs. Collector Current(II)



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

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

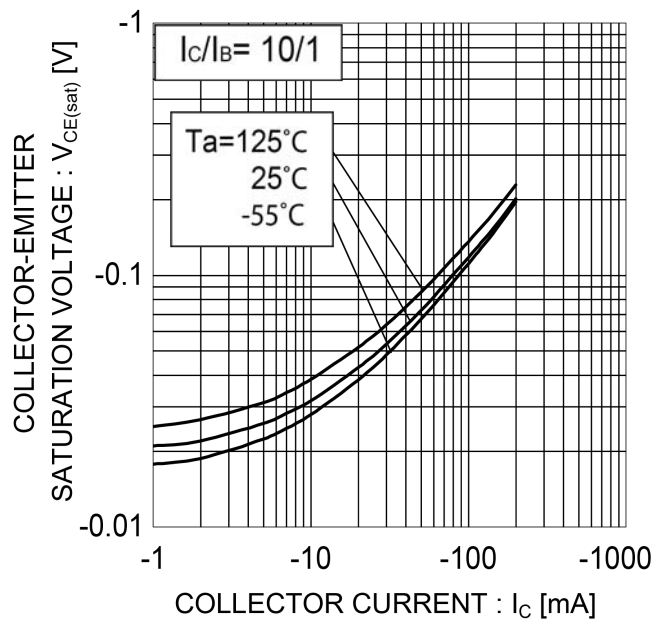


Fig.6 Collector-Emitter Saturation Voltage vs. Collector Current(II)

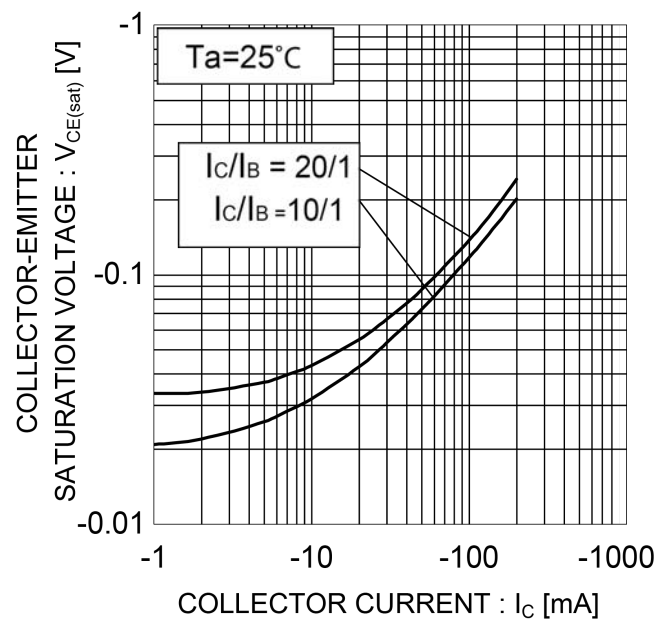


Fig.7 Base-Emitter Saturation Voltage vs. Collector Current

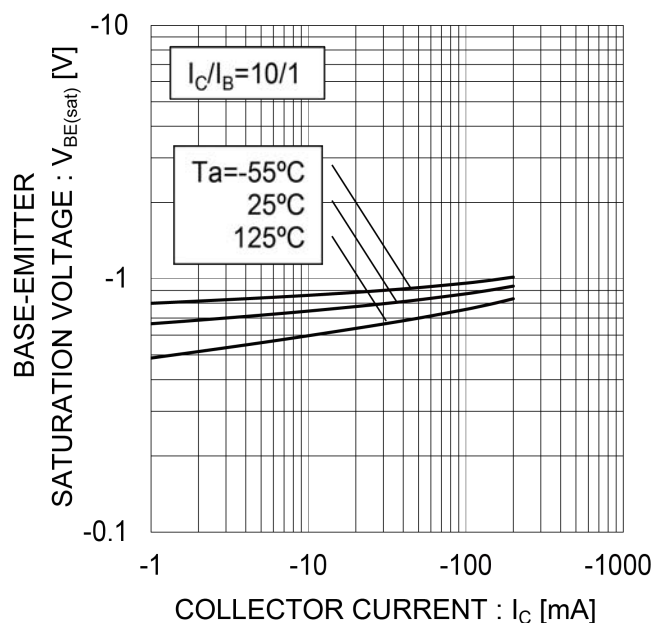
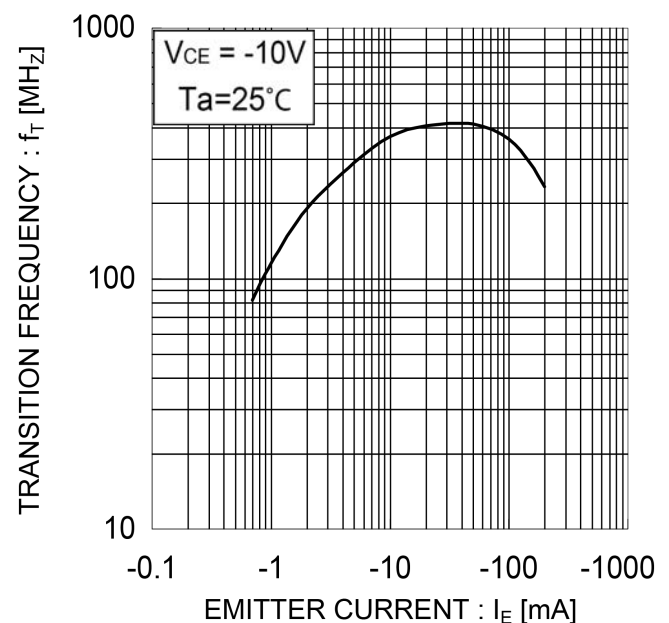


Fig.8 Gain Bandwidth Product vs. Emitter Current



● **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-

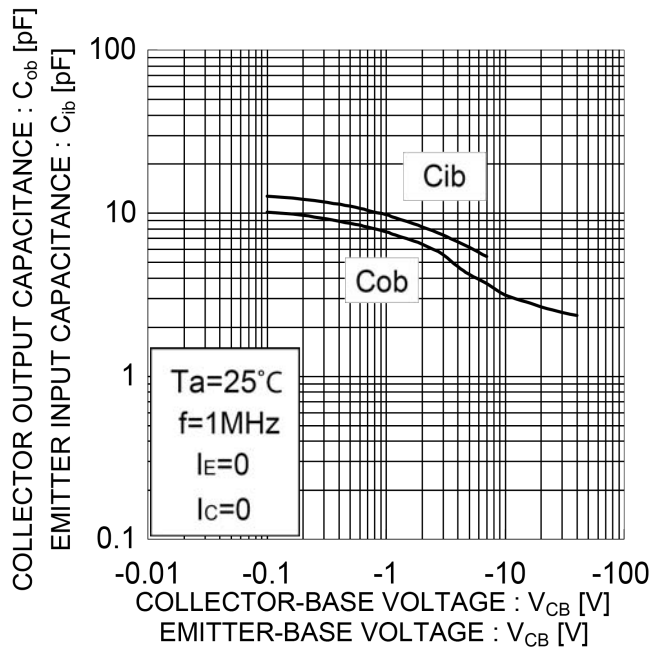
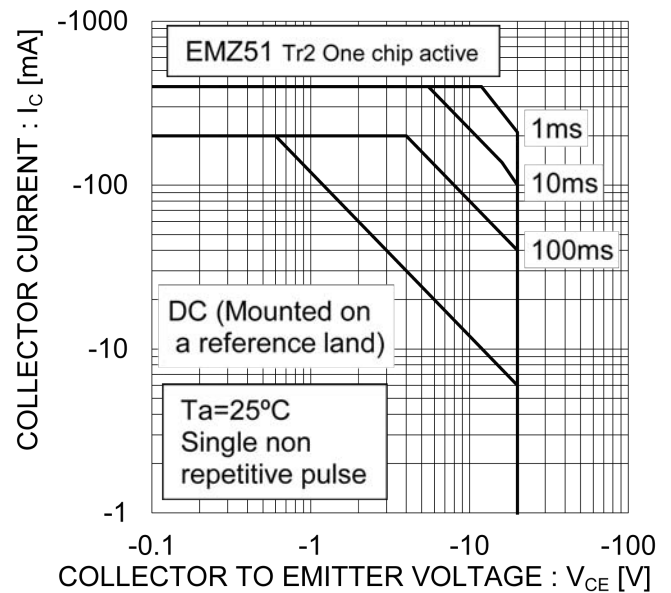
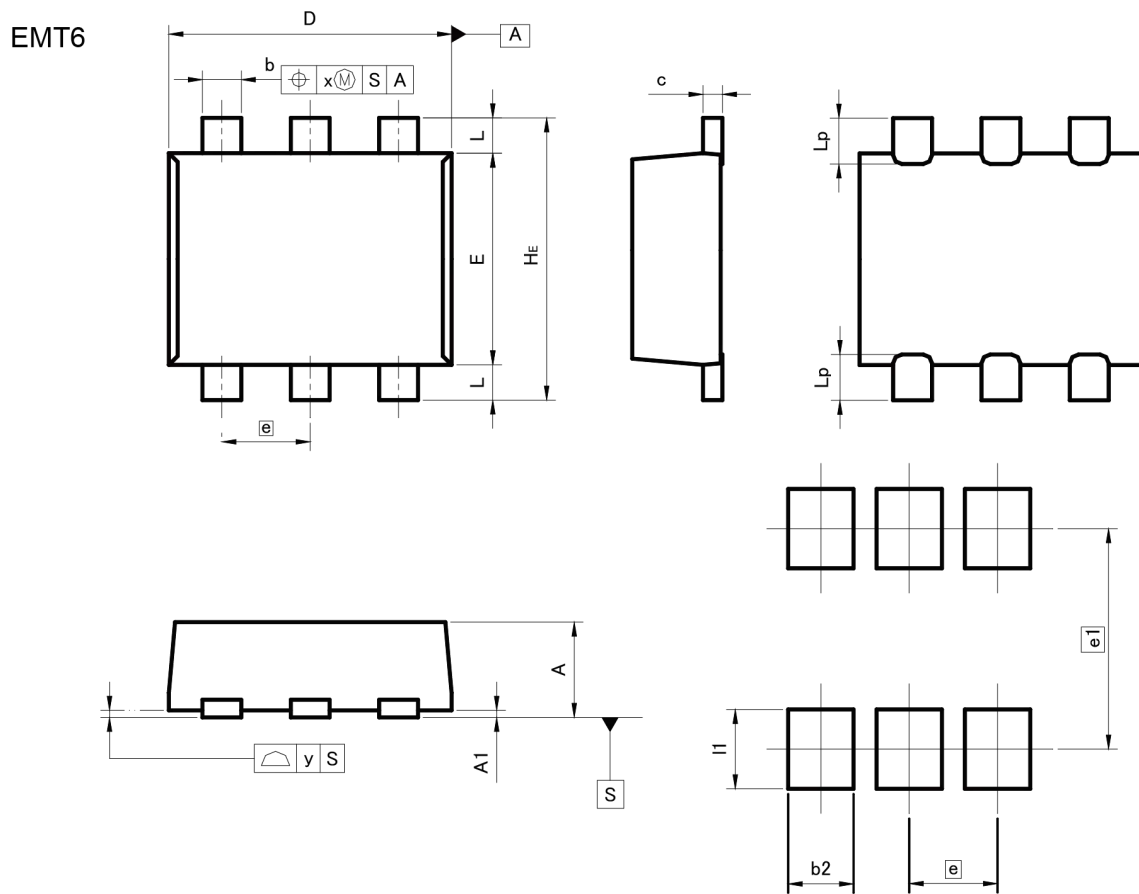


Fig.10 Safe Operating Area



●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

Notes

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