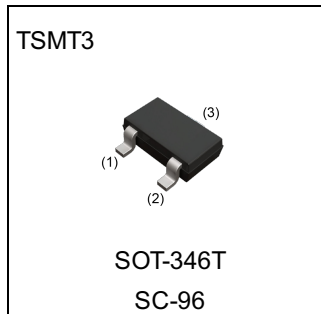


Parameter	Value
V_{CEO}	50V
I_C	1A

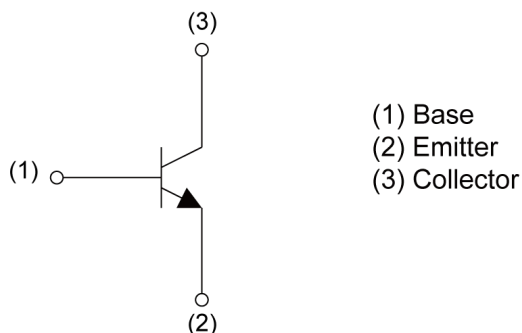
●Outline



●Features

- 1) Suitable for Middle Power Driver
- 2) Complementary PNP Types: 2SAR513R
- 3) Low $V_{CE(sat)}$
 $V_{CE(sat)} = 350\text{mV (Max.)}$
 $(I_C/I_B = 500\text{mA}/25\text{mA})$

●Inner circuit



●Application

LOW FREQUENCY AMPLIFIER, HIGH SPEED SWITCHING

●Packaging specifications

Part No.	Package	Package size	Taping code	Reel size (mm)	Tape width (mm)	Basic ordering unit.(pcs)	Marking
2SCR513R	TSMT3	2928	TL	180	8	3000	NC

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

Parameter	Symbol	Values	Unit
Collector-base voltage	V_{CBO}	50	V
Collector-emitter voltage	V_{CEO}	50	V
Emitter-base voltage	V_{EBO}	6	V
Collector current	I_C	1	A
	I_{CP}^{*1}	2	A
Power dissipation	P_D^{*2}	0.5	W
	P_D^{*3}	1.0	W
Junction temperature	T_j	150	$^\circ\text{C}$
Range of storage temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

● Electrical characteristics ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Collector-base breakdown voltage	BV_{CBO}	$I_C = 100\mu\text{A}$	50	-	-	V
Collector-emitter breakdown voltage	BV_{CEO}	$I_C = 1\text{mA}$	50	-	-	V
Emitter-base breakdown voltage	BV_{EBO}	$I_E = 100\mu\text{A}$	6	-	-	V
Collector cut-off current	I_{CBO}	$V_{CB} = 50\text{V}$	-	-	1.0	μA
Emitter cut-off current	I_{EBO}	$V_{EB} = 4\text{V}$	-	-	1.0	μA
Collector-emitter saturation voltage	$V_{CE(sat)}^{*4}$	$I_C = 500\text{mA}$, $I_B = 25\text{mA}$	-	130	350	mV
DC current gain	h_{FE}	$V_{CE} = 2\text{V}$, $I_C = 50\text{mA}$	180	-	450	-
Transition frequency	f_T^{*4}	$V_{CE} = 10\text{V}$, $I_E = -200\text{mA}$, $f = 100\text{MHz}$	-	360	-	MHz
Output capacitance	C_{ob}	$V_{CB} = 10\text{V}$, $I_E = 0\text{A}$, $f = 1\text{MHz}$	-	7	-	pF
Turn-On time	t_{on}	$I_C = 500\text{mA}$, $I_{B1} = 50\text{mA}$, $I_{B2} = -50\text{mA}$, $V_{CC} \approx 10\text{V}$, $R_L = 20\Omega$ See test circuit	-	40	-	ns
Storage time	t_{stg}		-	410	-	ns
Fall time	t_f		-	75	-	ns

*1 $P_w=10\text{ms}$ Single pulse

*2 Each terminal mounted on a reference land.

*3 Mounted on a ceramic board(40×40×0.7mm).

*4 Pulsed

●Electrical characteristic curves($T_a = 25^\circ\text{C}$)

Fig.1 Ground Emitter Propagation Characteristics

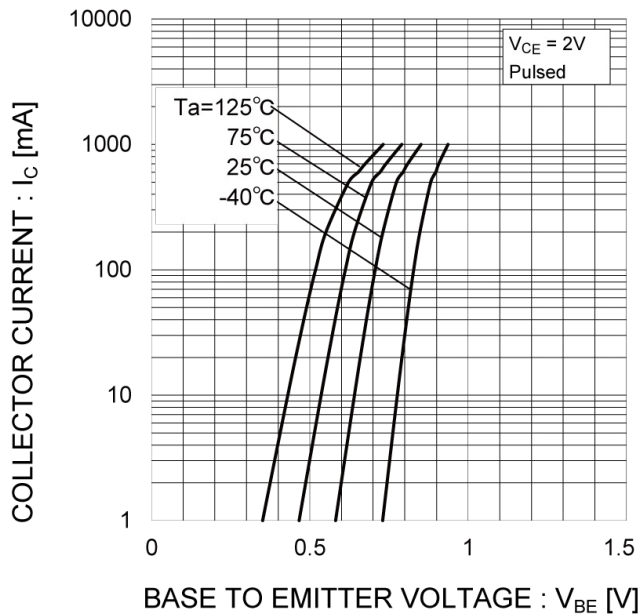


Fig.2 Typical Output Characteristics

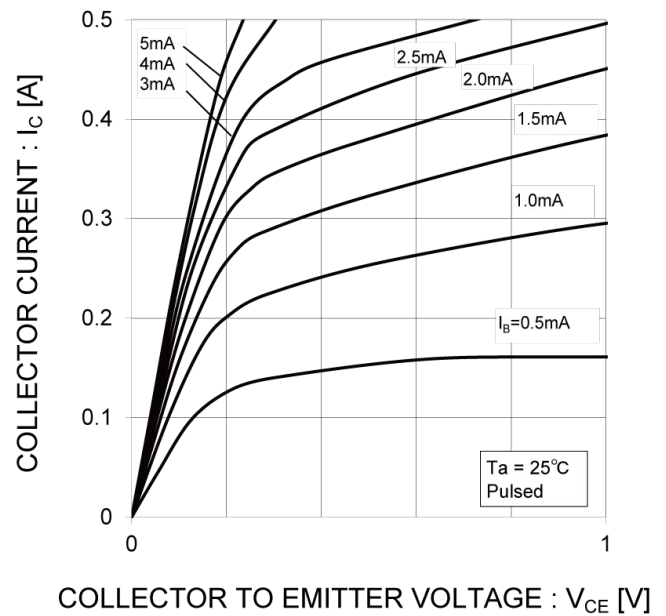


Fig.3 DC Current Gain vs. Collector Current (I)

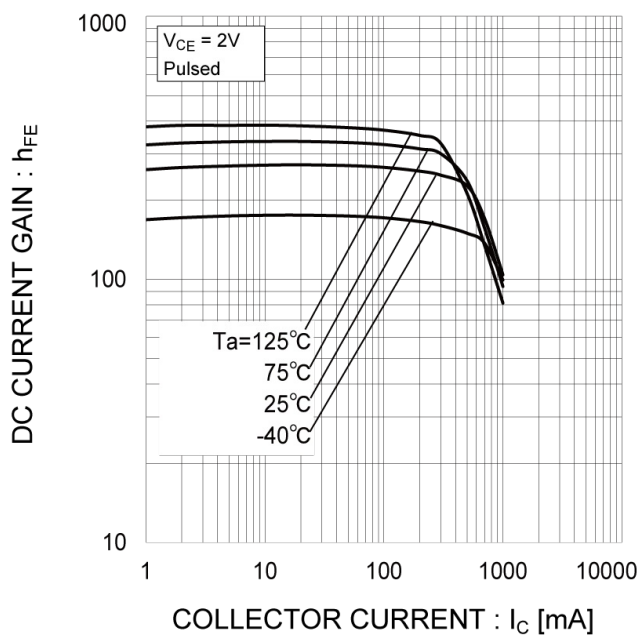
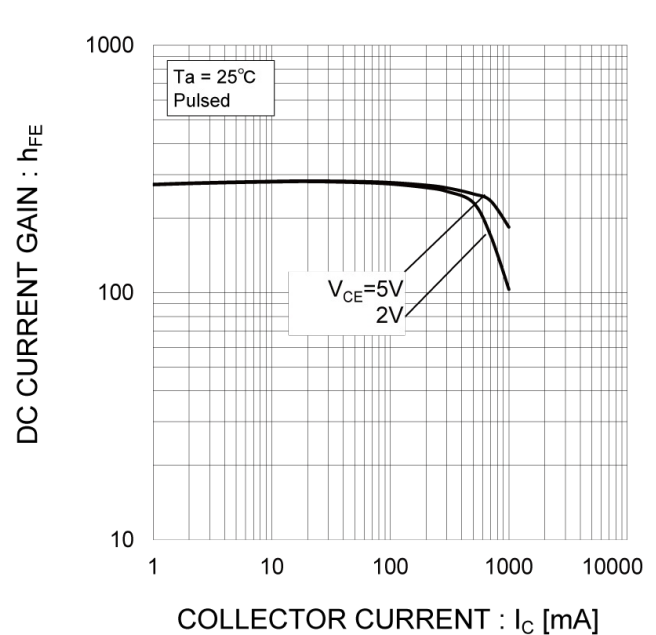


Fig.4 DC Current Gain vs. Collector Current (II)



●Electrical characteristic curves($T_a = 25^\circ\text{C}$)

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

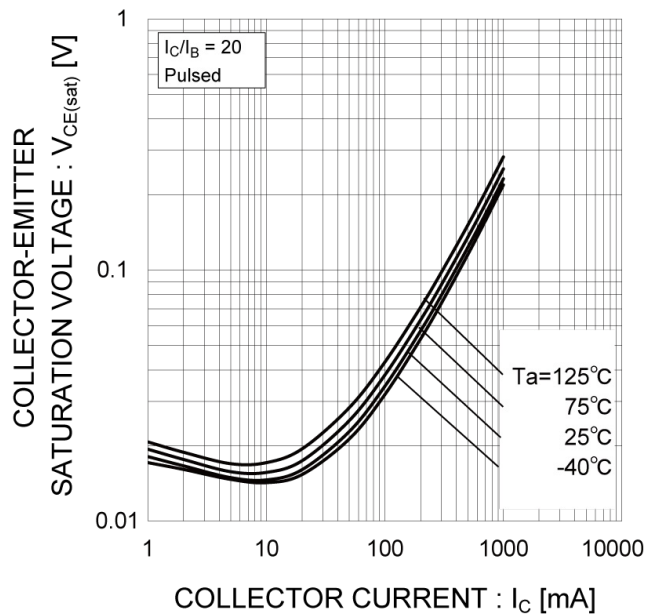


Fig.6 Collector-Emitter Saturation
Voltage vs. Collector Current (II)

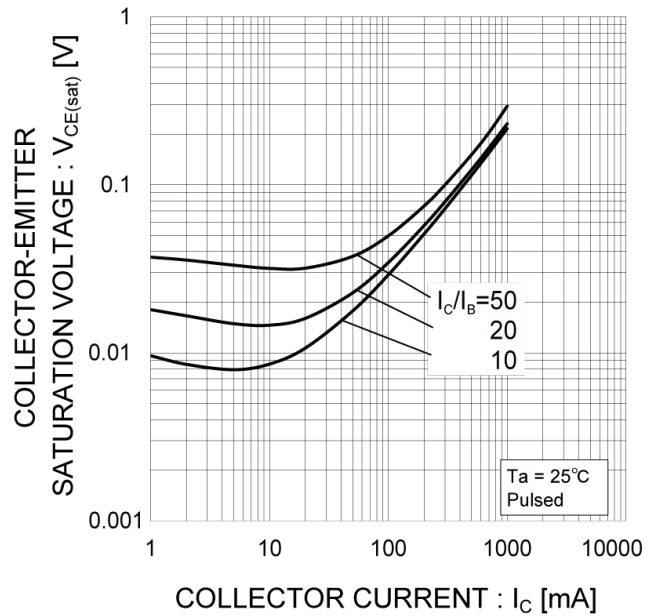


Fig.7 Base-Emitter Saturation Voltage
vs. Collector Current

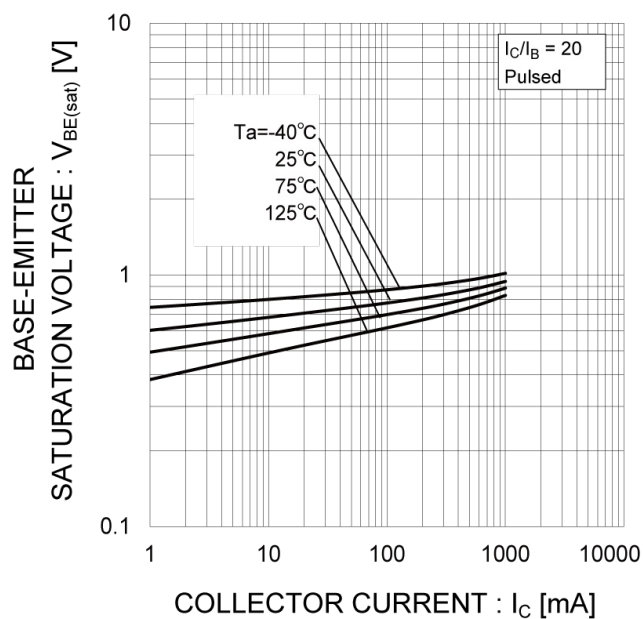
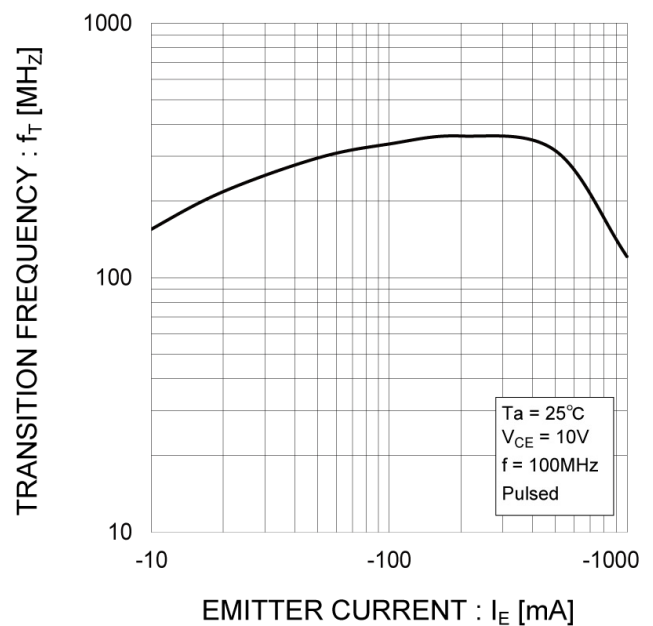


Fig.8 Gain Bandwidth Product vs.
Emitter Current



●Electrical characteristic curves($T_a = 25^{\circ}\text{C}$)

Fig.9 Emitter Input Capacitance vs.
Emitter-Base Voltage
Collector Output Capacitance vs.
Collector-Base Voltage

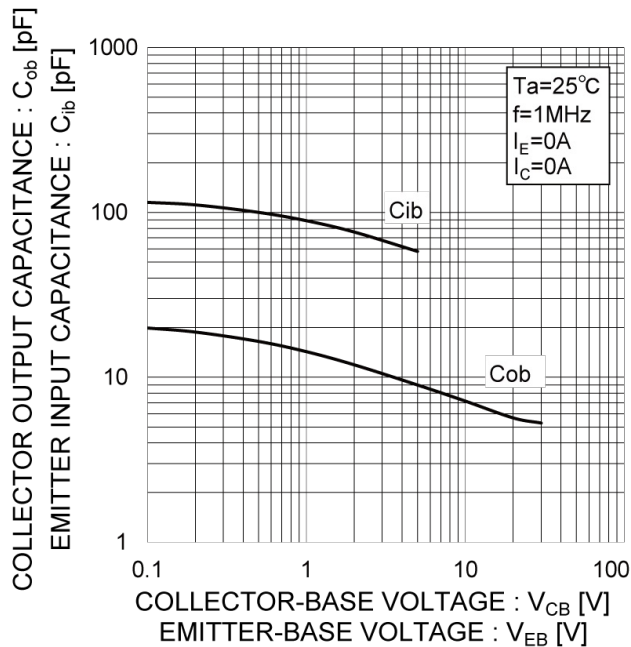
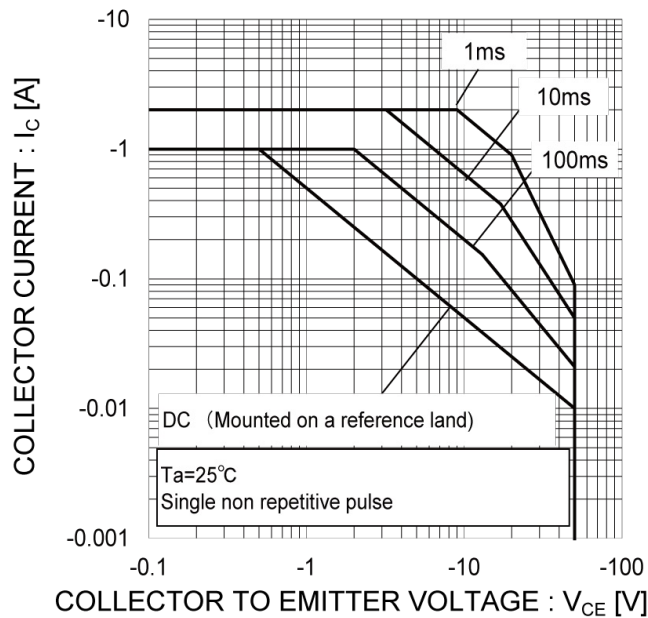
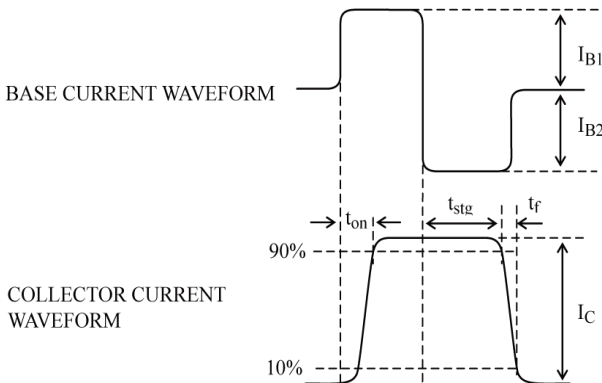
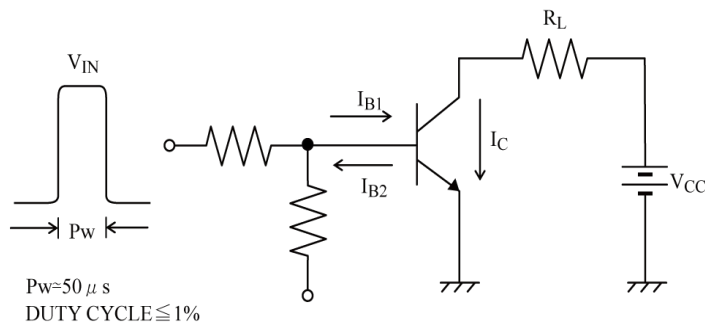


Fig.10 Safe Operating Area

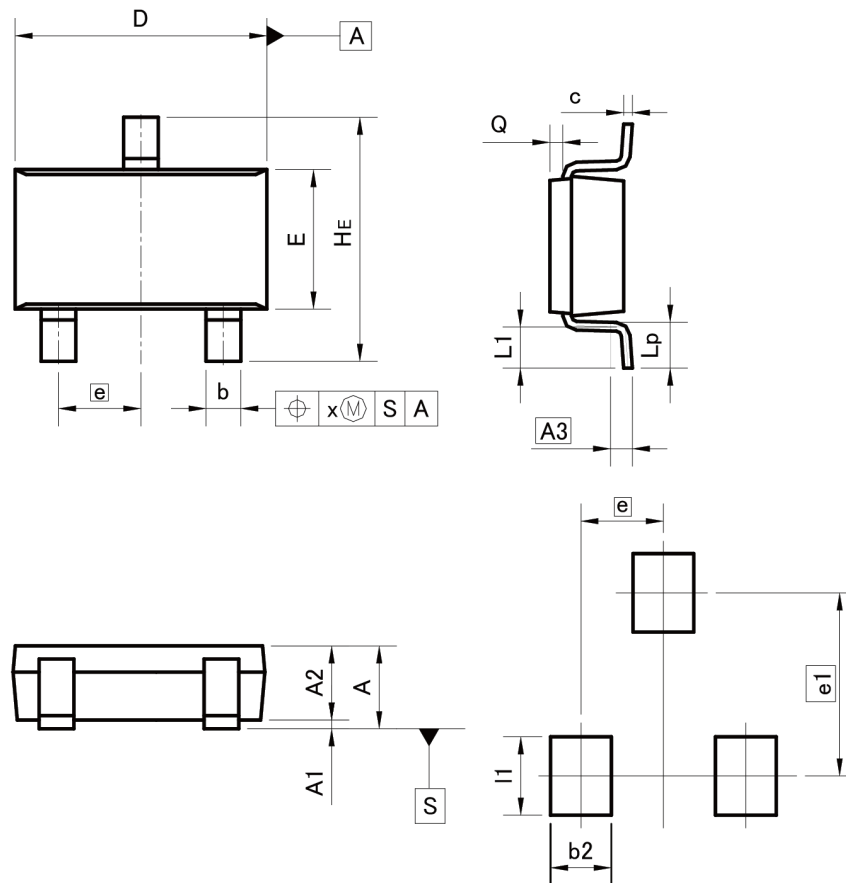


SWITCHING TIME TEST CIRCUIT



●Dimensions

TSMT3



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

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	—	1.00	—	0.039
A1	0.00	0.10	0.000	0.004
A2	0.75	0.95	0.030	0.037
A3	0.25		0.010	
b	0.35	0.50	0.014	0.020
c	0.10	0.26	0.004	0.010
D	2.80	3.00	0.110	0.118
E	1.50	1.80	0.059	0.071
e	0.95		0.037	
HE	2.60	3.00	0.102	0.118
L1	0.30	0.60	0.012	0.024
Lp	0.40	0.70	0.016	0.028
Q	0.05	0.25	0.002	0.010
x	—	0.20	—	0.008

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
b2	0.70		—	0.028
e1	2.10		0.083	
l1	—	0.90	—	0.035

Dimension in mm/inches

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