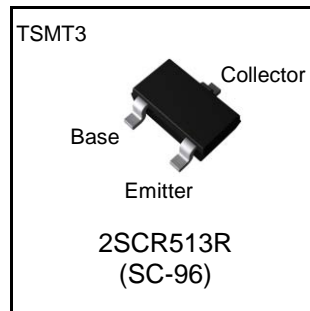


Parameter	Value
$V_{CEO}$	50V
$I_C$	1.0A

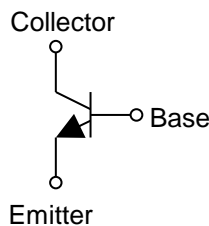
### ●Features

- 1) Suitable for Middle Power Driver
- 2) Complementary PNP Types : 2SAR513R
- 3) Low  $V_{CE(sat)}$   
 $V_{CE(sat)}=0.35V(\text{Max.})$   
 $(I_C/I_B=500mA/25mA)$
- 4) Lead Free/RoHS Compliant.

### ●Outline



### ●Inner circuit



### ●Applications

Motor driver , LED driver  
Power supply

### ●Packaging specifications

Part No.	Package	Package size (mm)	Taping code	Reel size (mm)	Tape width (mm)	Basic ordering unit (pcs)	Marking
2SCR513R	TSMT3	2928	TL	180	8	3,000	NC

### ●Absolute maximum ratings (Ta = 25°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	DC	$I_C$	1.0
	Pulsed	$I_{CP}^{*1}$	2.0
Power dissipation	$P_D^{*2}$	0.5	W
	$P_D^{*3}$	1	W
Junction temperature	$T_j$	150	°C
Range of storage temperature	$T_{stg}$	-55 to +150	°C

\*1 Pw=10ms , single pulse

\*2 Each terminal mounted on a reference land

\*3 Mounted on a ceramic board (40x40x0.7mm)

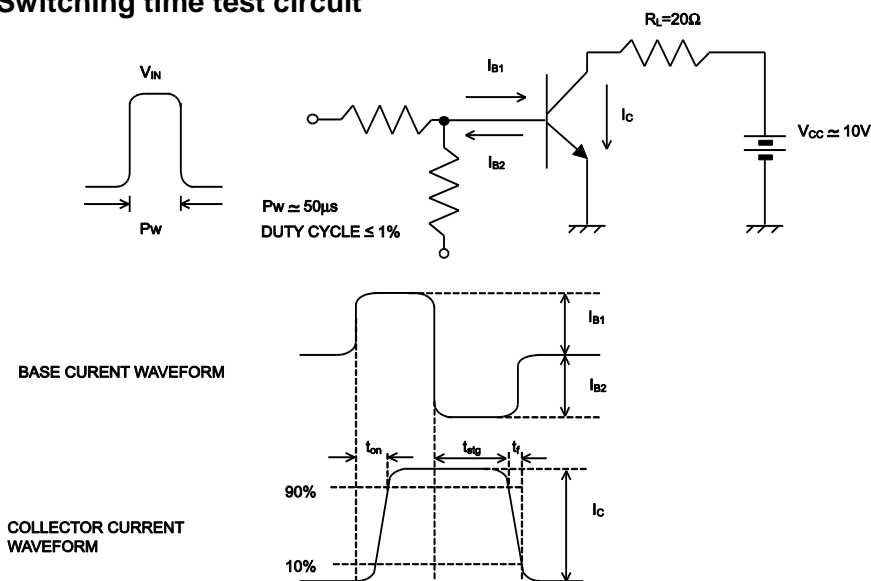
●Electrical characteristics(Ta = 25°C)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Collector-emitter breakdown voltage	$BV_{CEO}$	$I_C = 1\text{mA}$	50	-	-	V
Collector-base breakdown voltage	$BV_{CBO}$	$I_C = 100\mu\text{A}$	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	$\mu\text{A}$
Emitter cut-off current	$I_{EBO}$	$V_{EB} = 4\text{V}$	-	-	1	$\mu\text{A}$
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = 500\text{mA}, I_B = 25\text{mA}$	-	0.13	0.35	V
DC current gain	$h_{FE}$	$V_{CE} = 2\text{V}, I_C = 50\text{mA}$	180	-	450	-
Transition frequency	$f_T^{*1}$	$V_{CE} = 10\text{V}, I_E = -200\text{mA}$ $f = 100\text{MHz}$	-	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	$t_{on}^{*2}$	$I_C = 0.5\text{A}$ $I_{B1} = 50\text{mA}$ $I_{B2} = -50\text{mA}$ $V_{CC} \approx 10\text{V}$	-	40	-	ns
Storage time	$t_{stg}^{*2}$		-	410	-	ns
Fall time	$t_f^{*2}$		-	75	-	ns

\*1 Pulsed

\*2 See switching time test circuit

●Switching time test circuit



●Electrical characteristic curves(Ta = 25°C)

Fig.1 Ground Emitter Propagation Characteristics

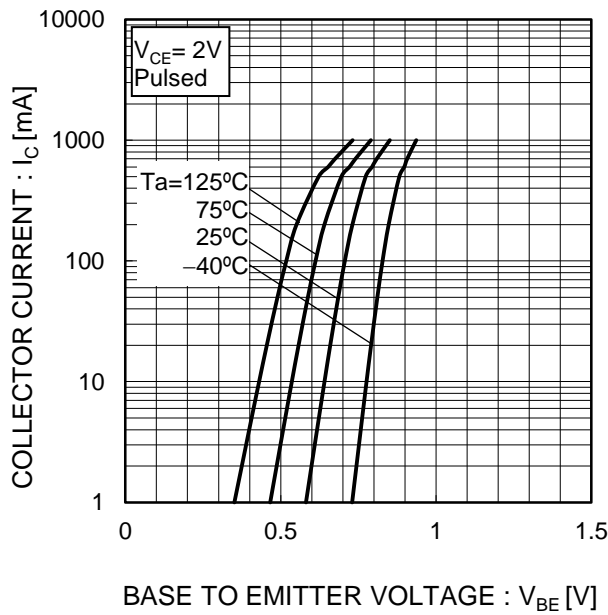


Fig.2 Typical Output Characteristics

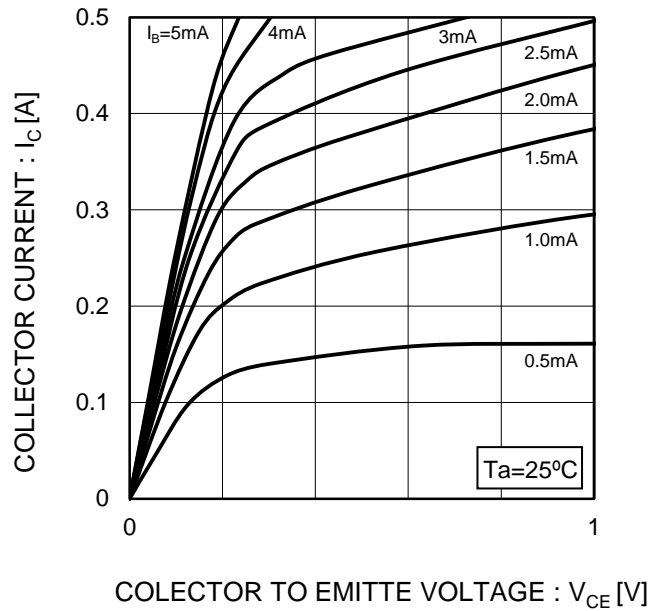


Fig.3 DC Current Gain vs. Collector Current(I)

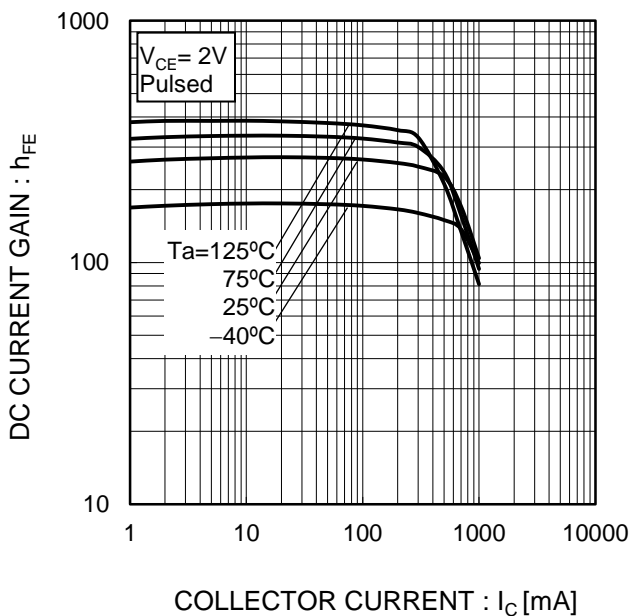
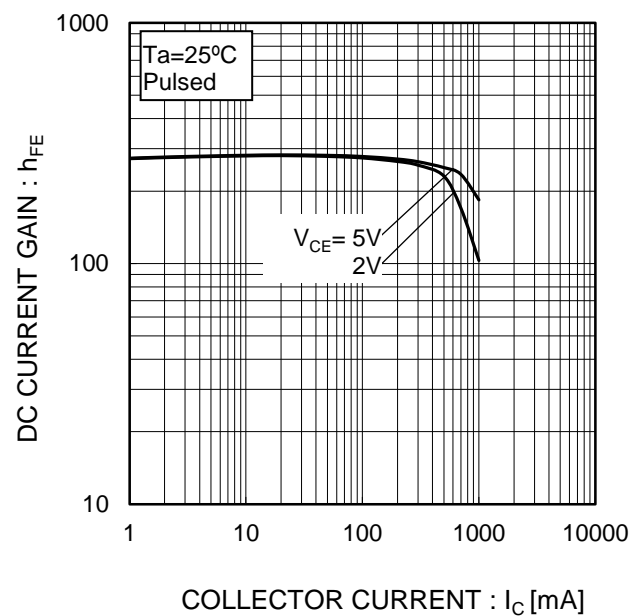


Fig.4 DC current gain vs. output current (II)



●Electrical characteristic curves(Ta = 25°C)

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

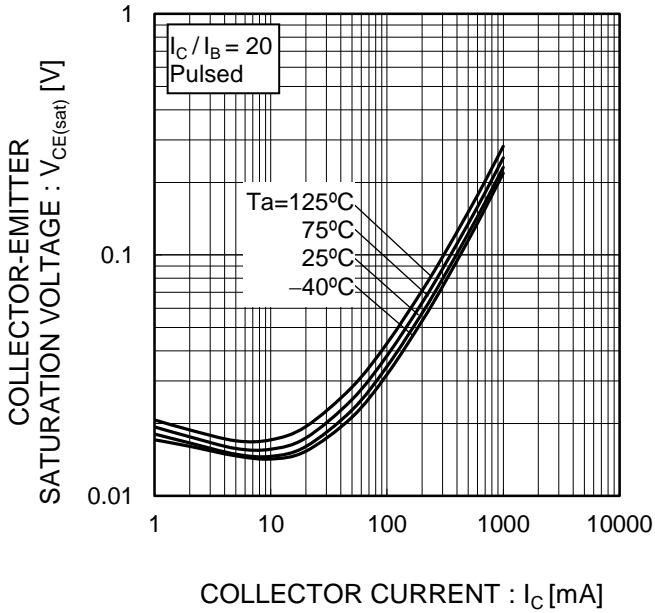


Fig.6 Collector-Emitter Saturation Voltage vs. Collector Current (II)

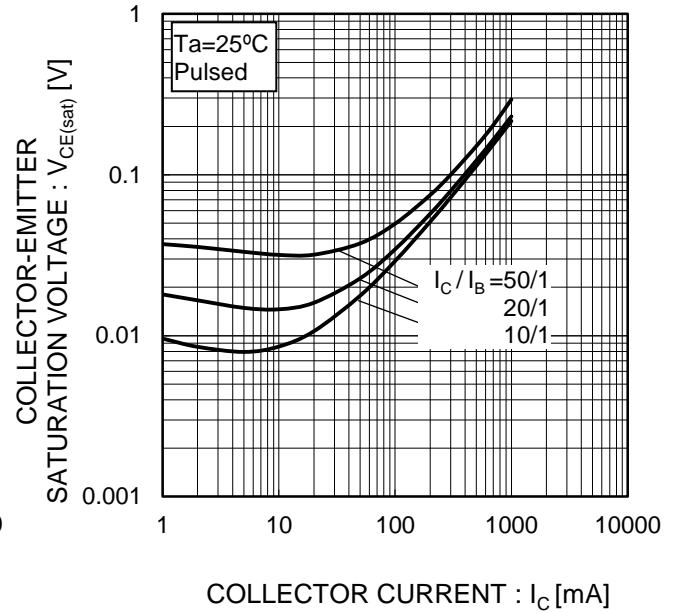


Fig.7 Base-Emitter Saturation Voltage vs. Collector Current

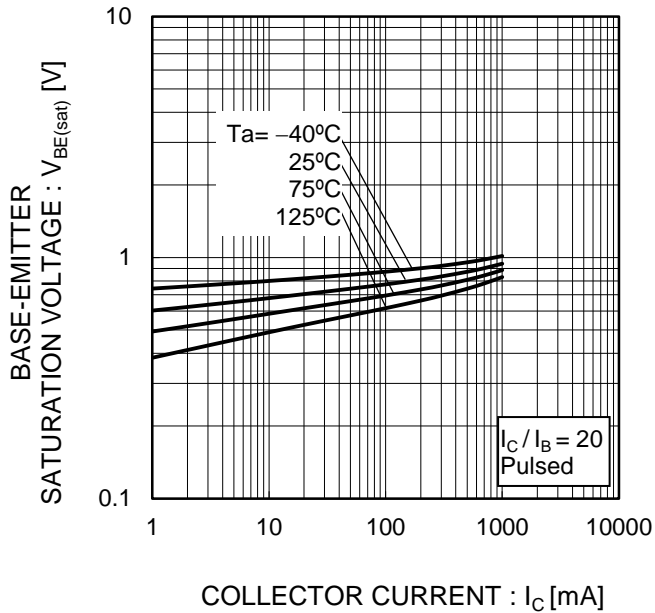
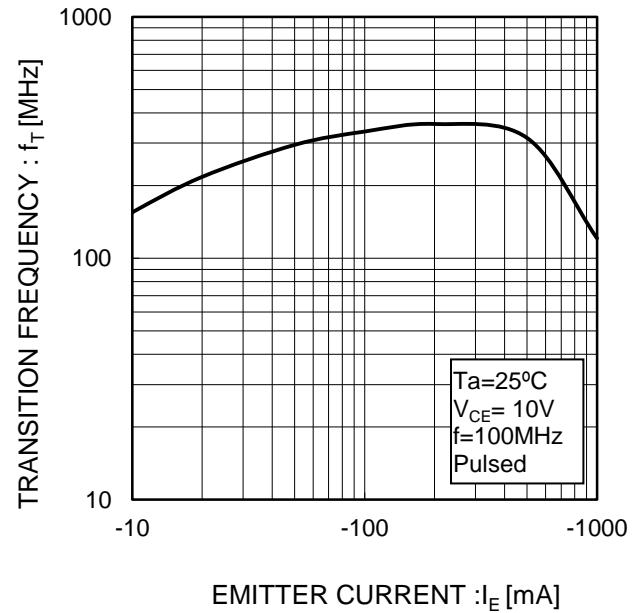


Fig.8 Gain Bandwidth Product vs. Emitter Current



●Electrical characteristic curves(Ta = 25°C)

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

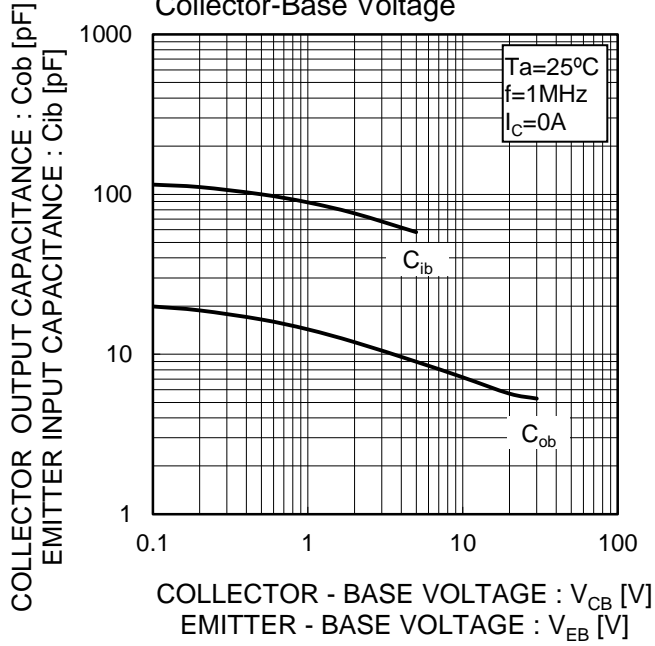
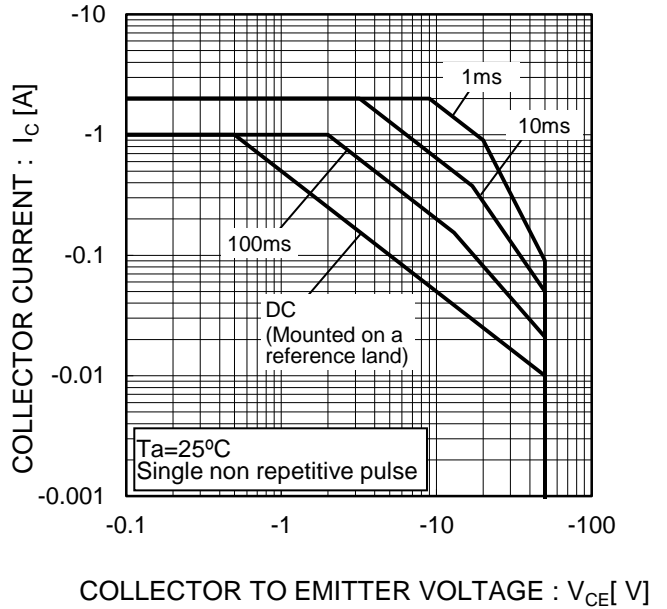
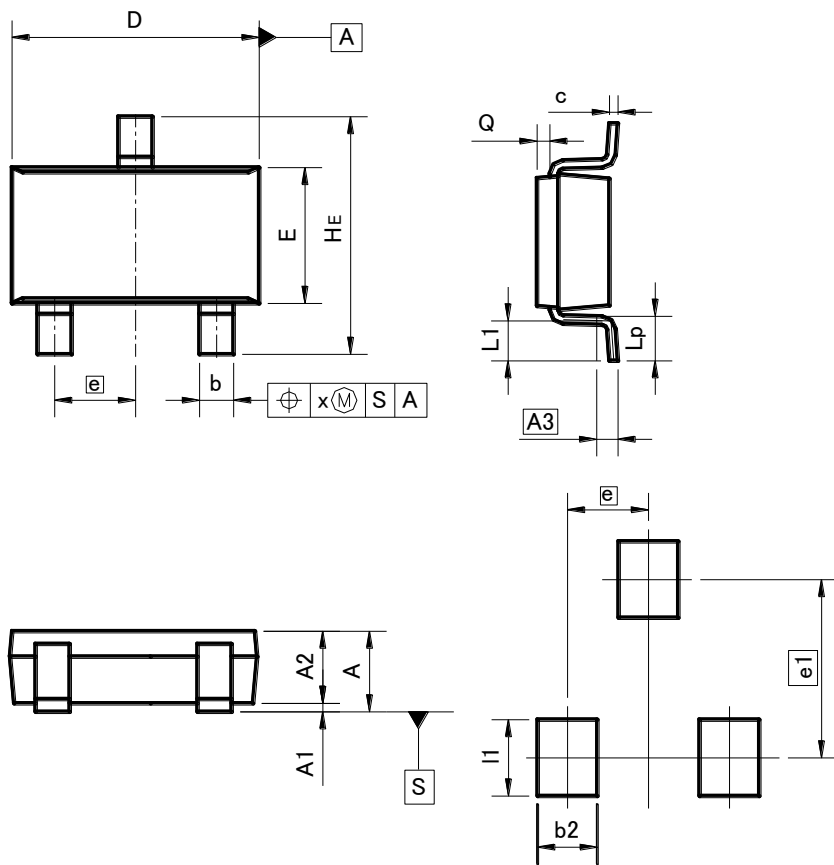


Fig.10 Safe Operating Area



●Dimensions (Unit : mm)

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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