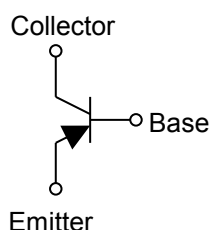


Parameter	Value
V_{CEO}	-50V
I_C	-1.0A

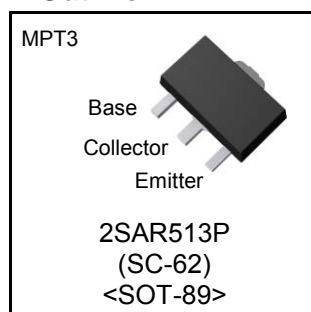
●Features

- 1) Suitable for Middle Power Driver
- 2) Complementary NPN Types : 2SCR513P
- 3) Low $V_{CE(sat)}$
 $V_{CE(sat)} = -0.4V(\text{Max.})$
 $(I_C/I_B = -500mA / -25mA)$
- 4) Lead Free/RoHS Compliant.

●Inner circuit



●Outline



●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
2SAR513P	MPT3	4540	T100	180	12	1,000	MC

●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	DC	I_C	−1.0	A
	Pulsed	I_{CP}^{*1}	−2.0	A
Power dissipation		P_D^{*2}	0.5	W
		P_D^{*3}	2.0	W
Junction temperature		T_j	150	°C
Range of storage temperature		T_{stg}	−55 to +150	°C

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

*2 Each terminal mounted on a reference land

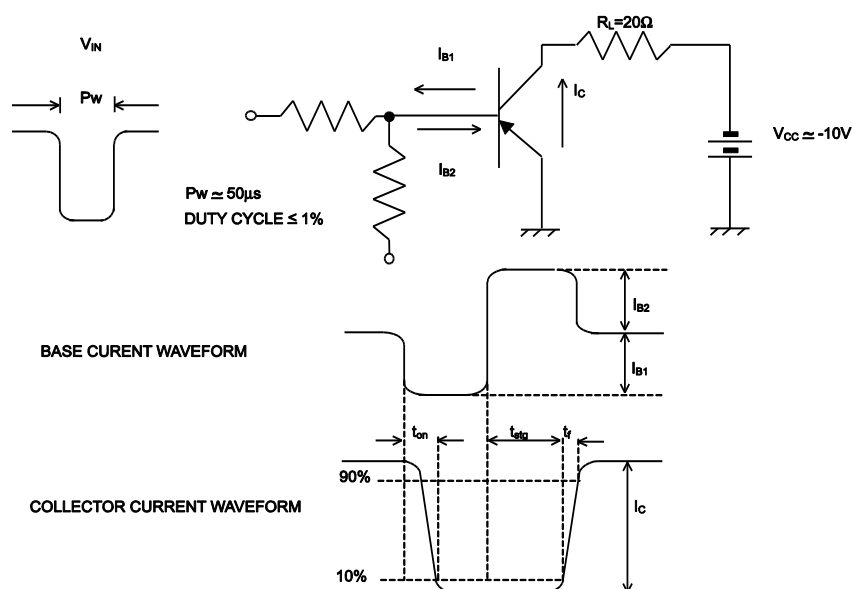
*3 Mounted on a ceramic board (40×40×0.7mm)

●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	μA
Emitter cut-off current	I_{EBO}	$V_{EB} = -4\text{V}$	-	-	-1	μA
Collector-emitter saturation voltage	$V_{CE(sat)}^{*1}$	$I_C = -500\text{mA}$, $I_B = -25\text{mA}$	-	-0.20	-0.40	V
DC current gain	h_{FE}	$V_{CE} = -2\text{V}$, $I_C = -50\text{mA}$	180	-	450	-
Transition frequency	f_T	$V_{CE} = -10\text{V}$, $I_E = -200\text{mA}$ $f = 100\text{MHz}$	-	400	-	MHz
Output capacitance	C_{ob}	$V_{CB} = -10\text{V}$, $I_E = 0\text{A}$ $f = 1\text{MHz}$	-	12	-	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}		-	250	-	ns
Fall time	t_f^{*2}		-	35	-	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

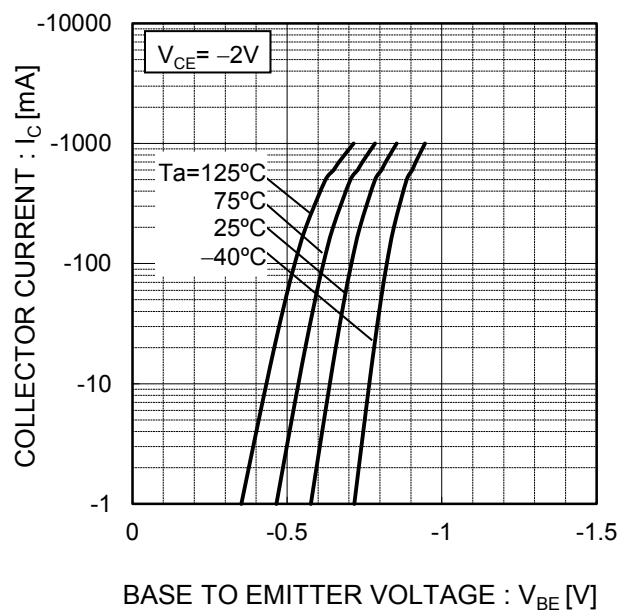


Fig.2 Typical Output Characteristics

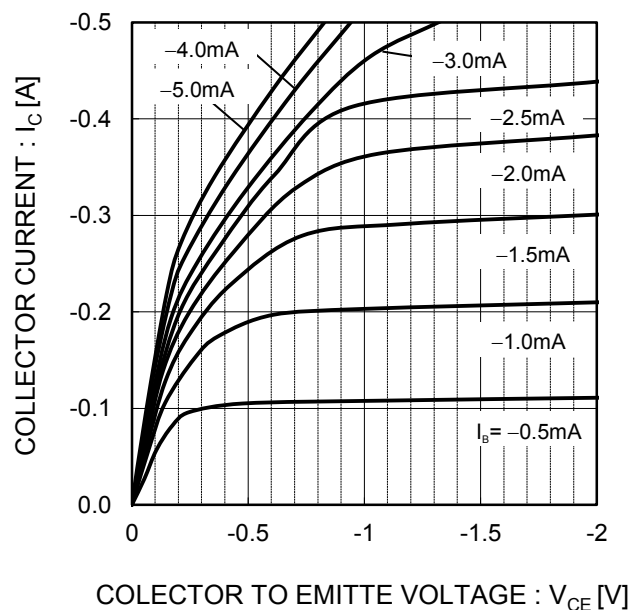


Fig.3 DC Current Gain vs. Collector Current(I)

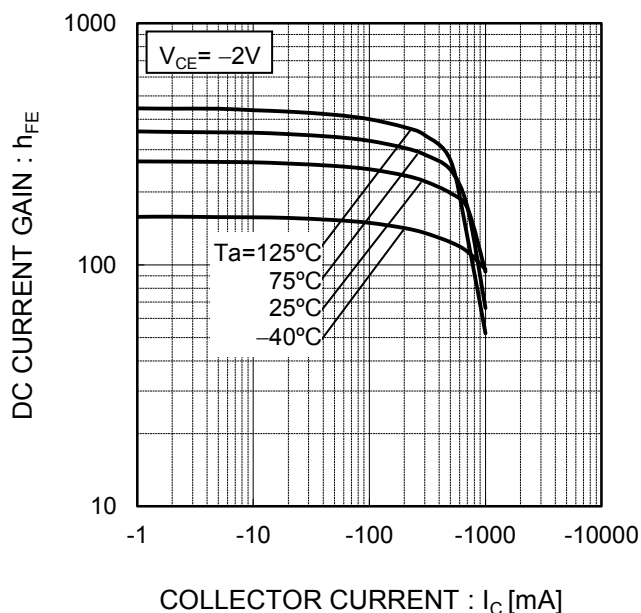
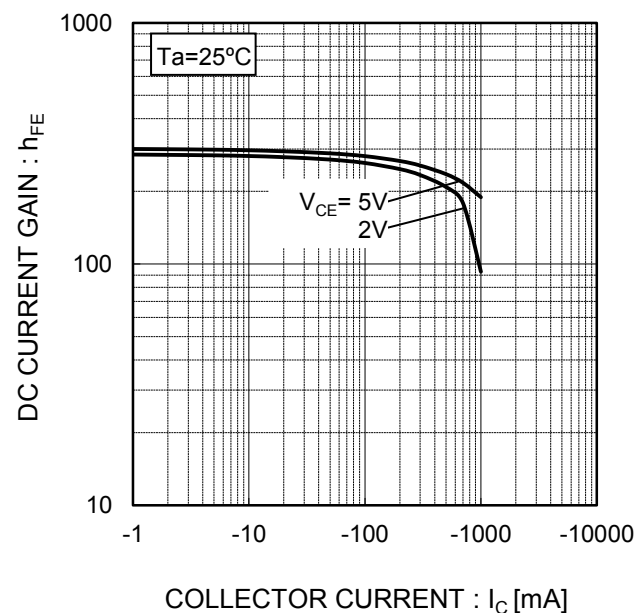


Fig.4 DC current gain vs. output current (II)



●Electrical characteristic curves(Ta = 25°C)

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

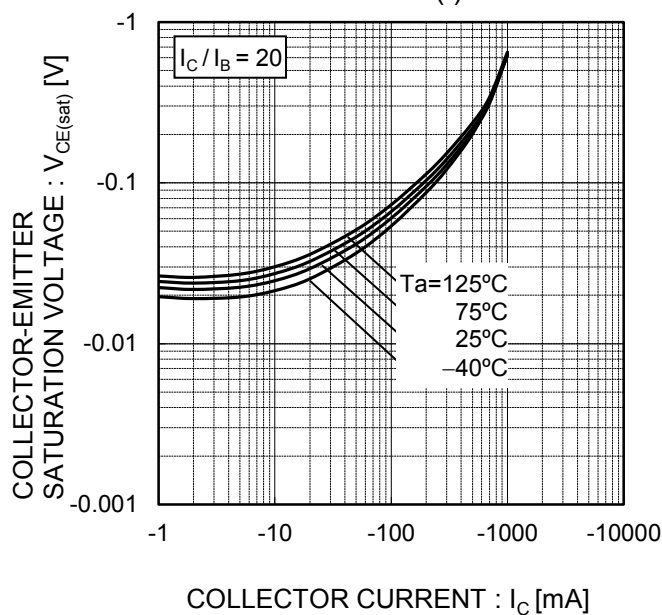


Fig.6 Collector-Emitter Saturation Voltage vs. Collector Current (II)

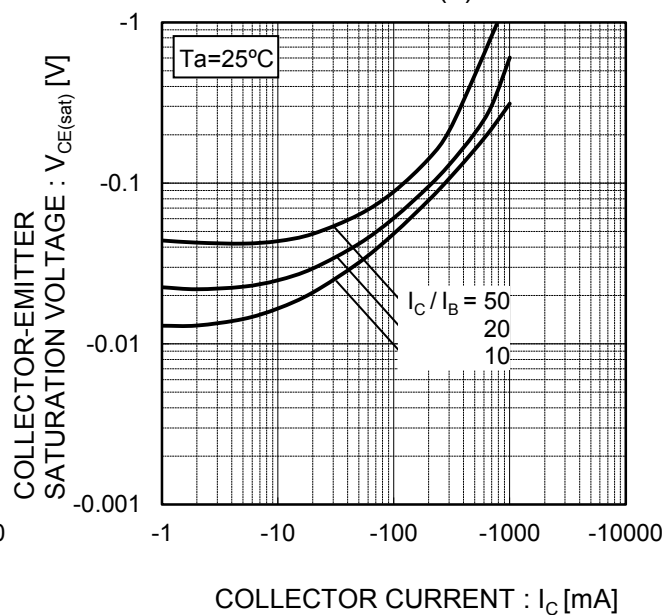


Fig.7 Base-Emitter Saturation Voltage vs. Collector Current

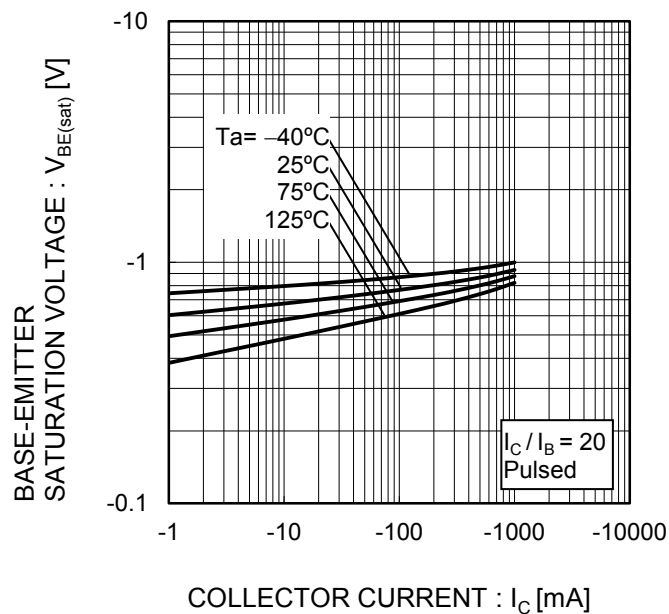
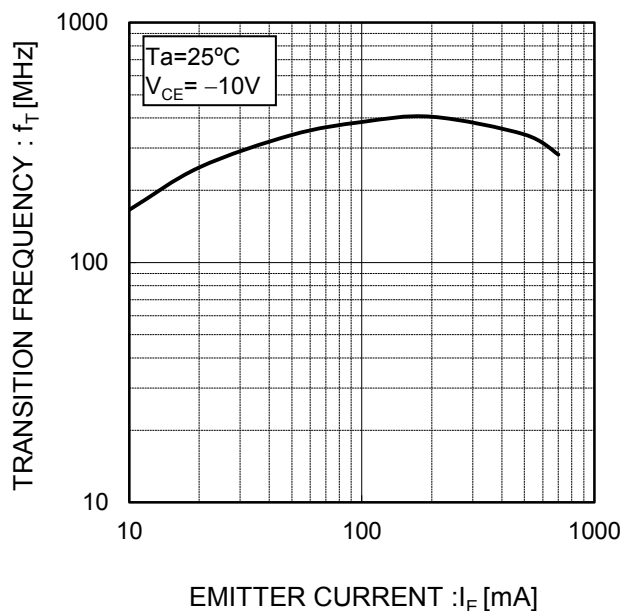


Fig.8 Gain Bandwidth Product vs. Emitter Current



●Electrical characteristic curves(Ta = 25°C)

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

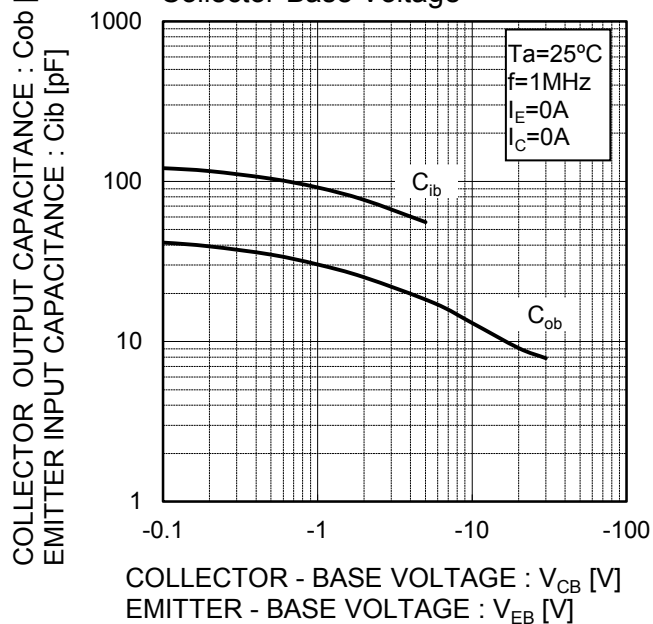
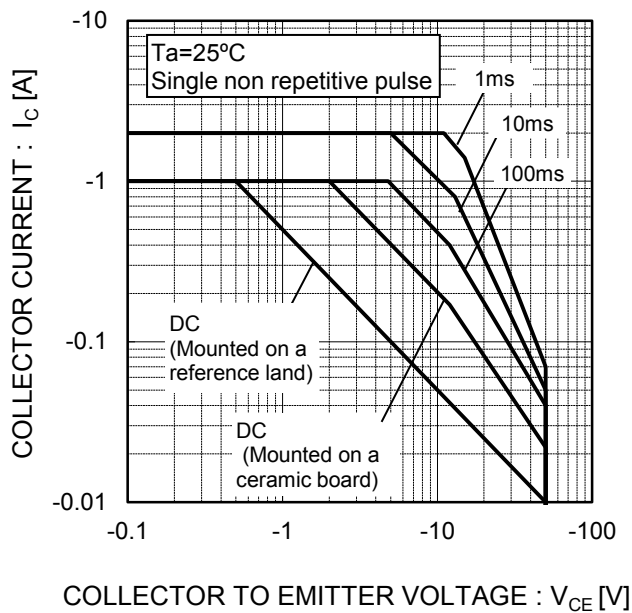
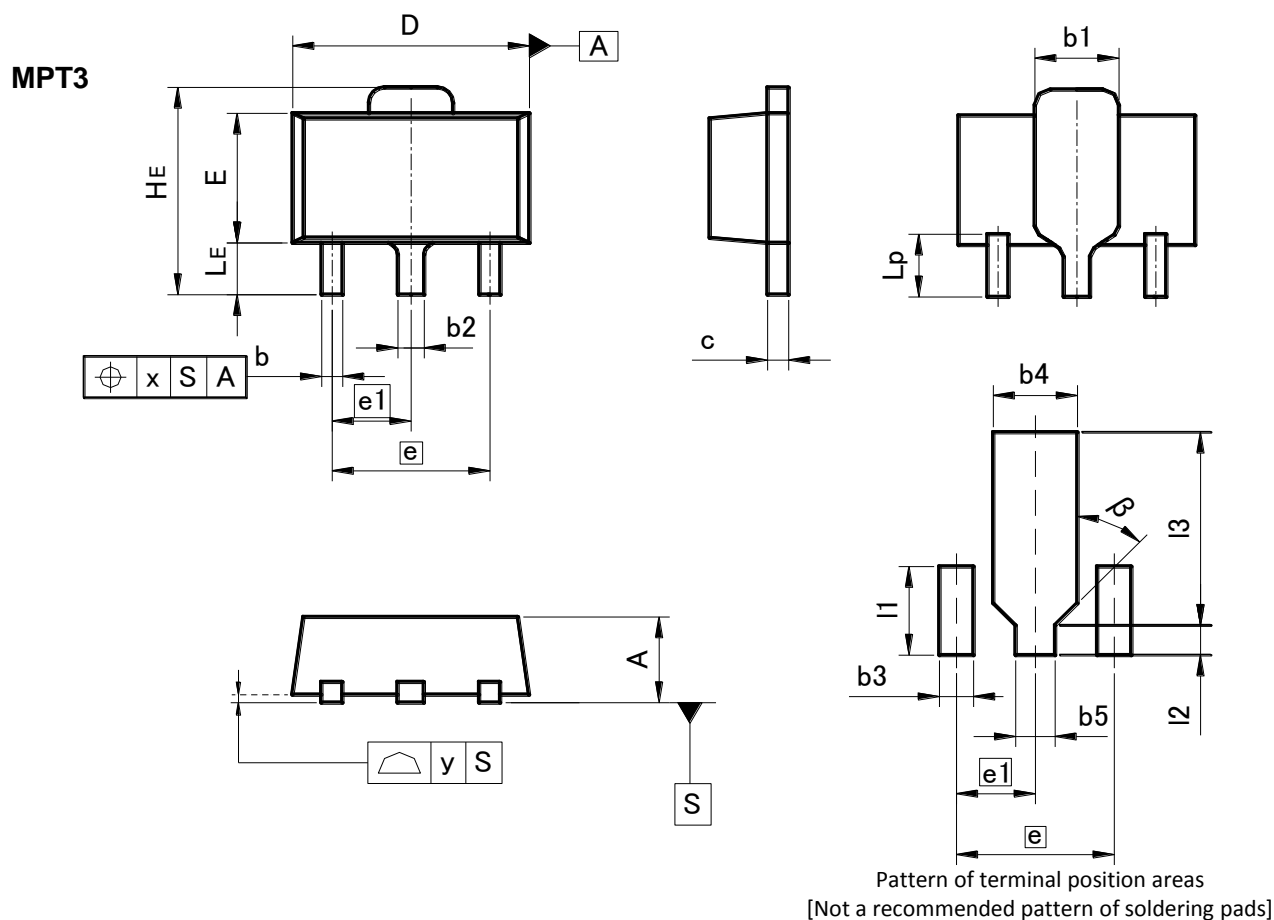


Fig.10 Safe Operating Area



●Dimensions (Unit : mm)



DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.40	1.50	0.055	0.059
b	0.30	0.50	0.012	0.020
b1	1.50	1.70	0.059	0.067
b2	0.40	0.60	0.016	0.024
c	0.35	0.50	0.014	0.020
D	4.40	4.70	0.173	0.185
E	2.40	2.70	0.094	0.106
e	3.00		0.118	
e1	1.50		0.059	
HE	3.70	4.30	0.146	0.169
LE	0.80	1.20	0.031	0.047
Lp	1.01	1.41	0.040	0.056
x	—	0.15	—	0.006
y	—	0.10	—	0.004

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
b3	—	0.65	—	0.026
b4	—	1.70	—	0.067
b5	—	0.75	—	0.030
l1	—	1.71	—	0.067
l2	—	0.58	—	0.023
l3	—	3.72	—	0.146
β	45°		45°	

Dimension in mm / inches

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