2SAR513P

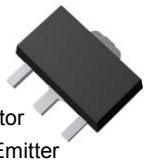
PNP -1.0A -50V Middle Power Transistor

Datasheet

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

●**Outline**

MPT3

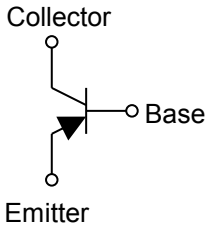


2SAR513P
(SC-62)
<SOT-89>

●**Features**

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

●**Inner circuit**



●**Applications**

Motor driver , LED driver
Power supply

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●**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** (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	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 Pw=10ms , single pulse
*2 Each terminal mounted on a reference land
*3 Mounted on a ceramic board (40×40×0.7mm)

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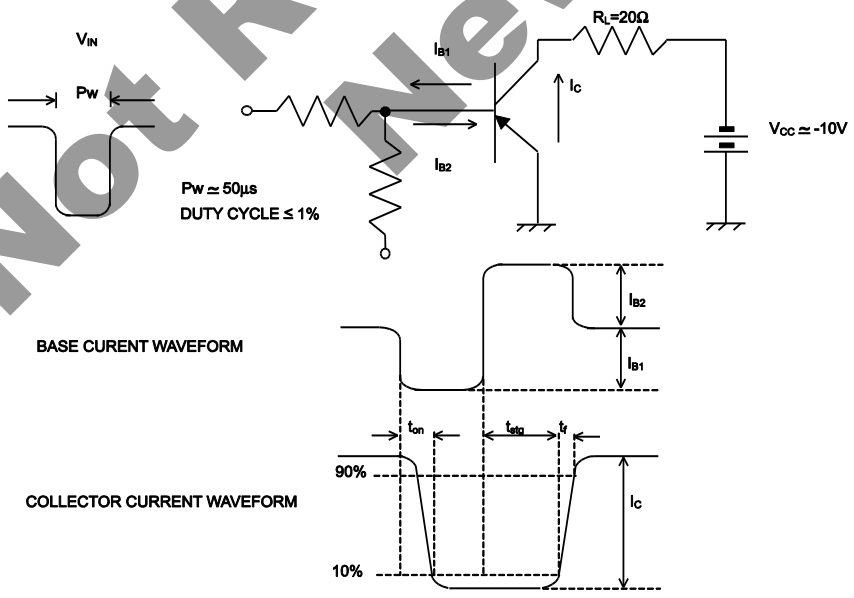
●Electrical characteristics(Ta = 25°C)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Collector-emitter breakdown voltage	BV_{CEO}	I_C = –1mA	–50	-	-	V
Collector-base breakdown voltage	BV_{CBO}	I_C = –100μA	–50	-	-	V
Emitter-base breakdown voltage	BV_{EBO}	I_E = –100μA	–6	-	-	V
Collector cut-off current	I_{CBO}	V_{CB} = –50V	-	-	–1	μA
Emitter cut-off current	I_{EBO}	V_{EB} = –4V	-	-	–1	μA
Collector-emitter saturation voltage	$V_{CE(sat)}$ *1	I_C = –500mA, I_B = –25mA	-	–0.20	–0.40	V
DC current gain	h_{FE}	V_{CE} = –2V, I_C = –50mA	180	-	450	-
Transition frequency	f_T	V_{CE} = –10V, I_E = –200mA f=100MHz	-	400	-	MHz
Output capacitance	C_{ob}	V_{CB} = –10V, I_E = 0A f = 1MHz	-	12	-	pF
Turn-on time	t_{on} *2	I_C= –0.5A I_{B1}= –50mA I_{B2}=50mA $V_{CC}\simeq$ –10V	-	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



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●**Electrical characteristic curves**(Ta = 25°C)

Fig.1 Ground Emitter Propagation Characteristics

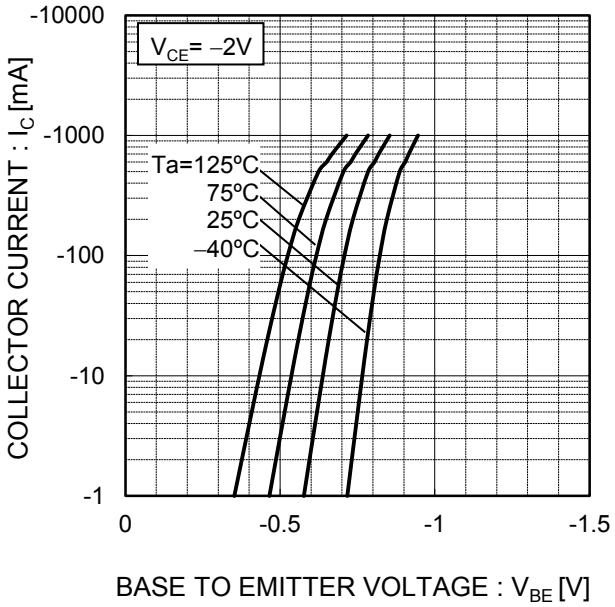


Fig.2 Typical Output Characteristics

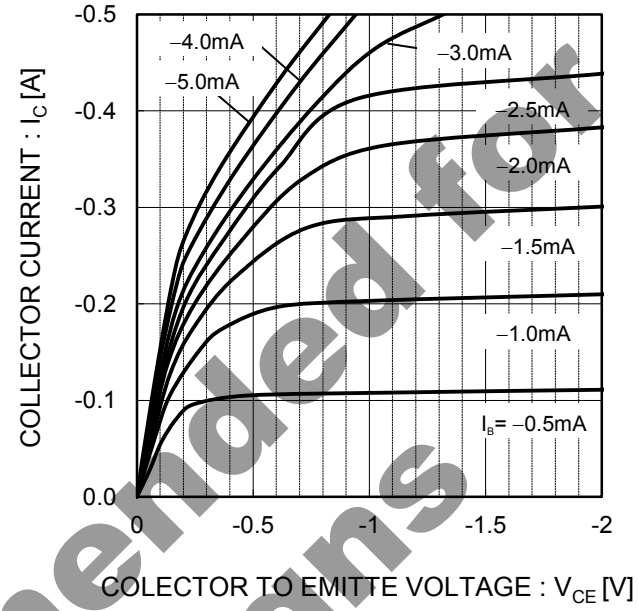


Fig.3 DC Current Gain vs. Collector Current(I)

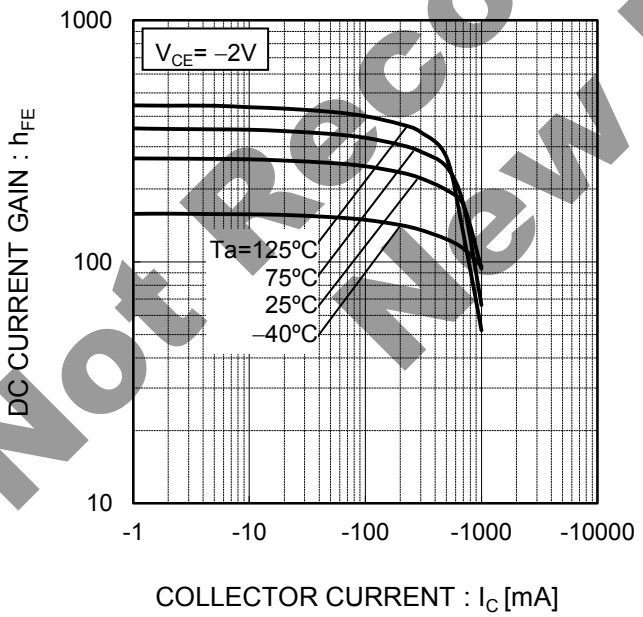
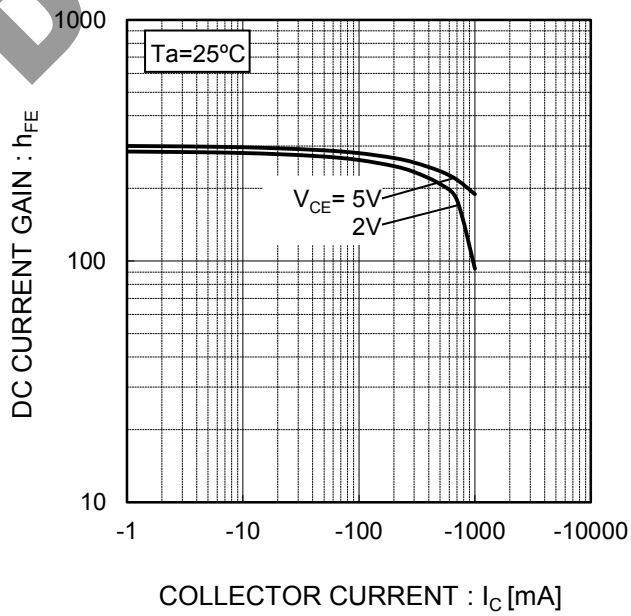


Fig.4 DC current gain vs. output current (II)



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●**Electrical characteristic curves**(Ta = 25°C)

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

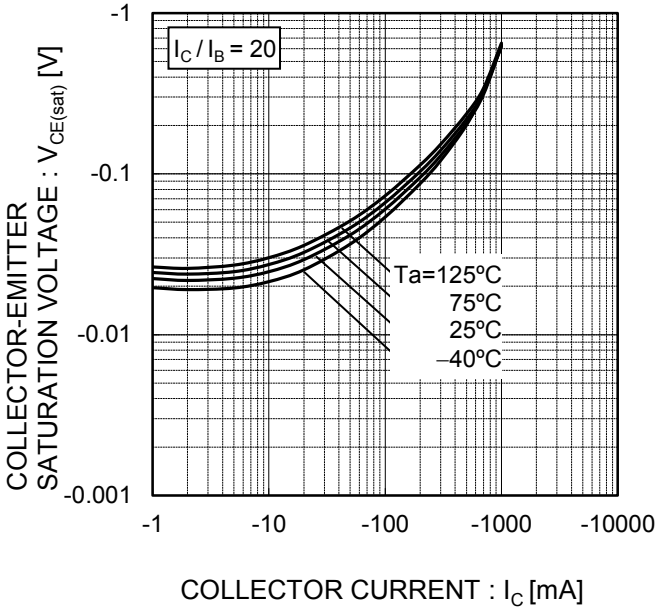


Fig.6 Collector-Emitter Saturation Voltage vs. Collector Current (II)

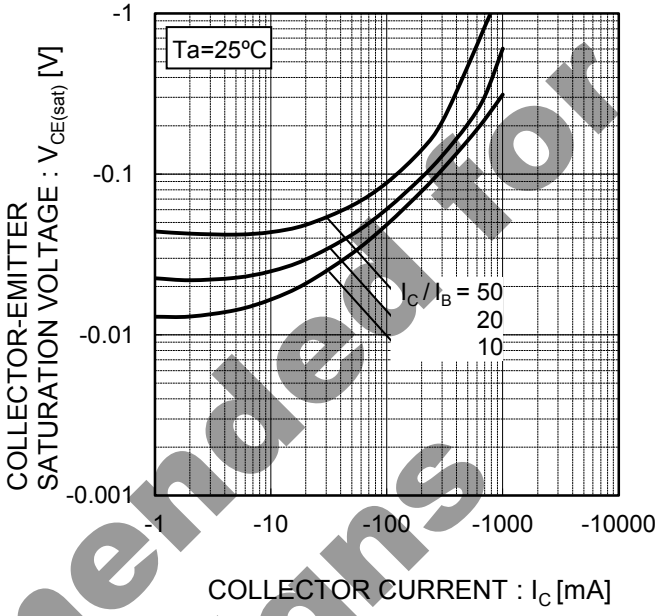


Fig.7 Base-Emitter Saturation Voltage vs. Collector Current

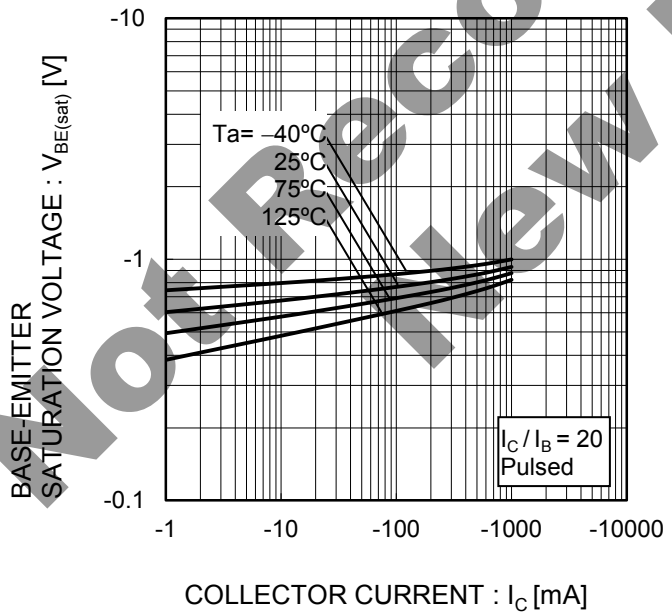
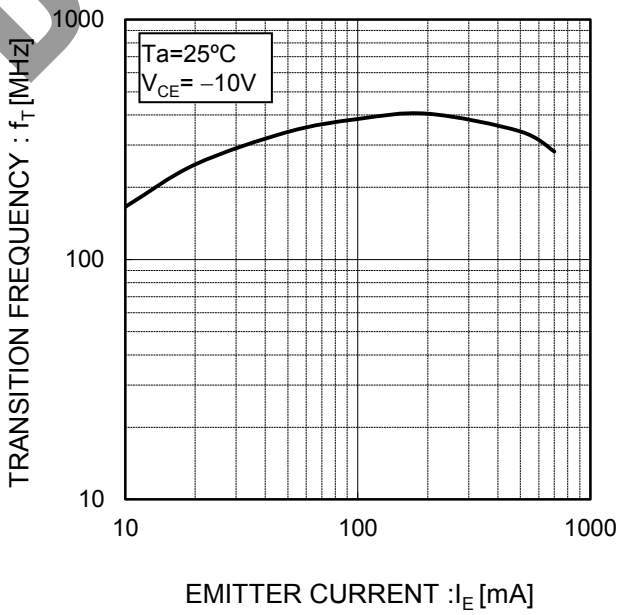


Fig.8 Gain Bandwidth Product vs. Emitter Current



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●**Electrical characteristic curves**(Ta = 25°C)

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

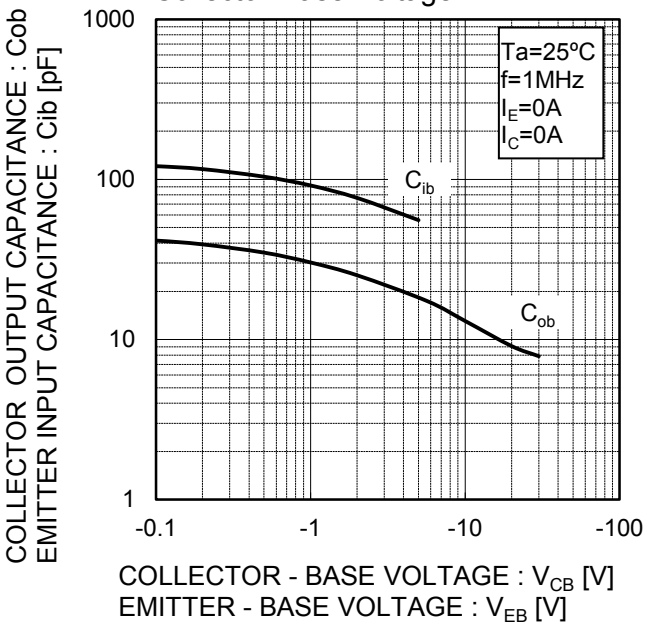
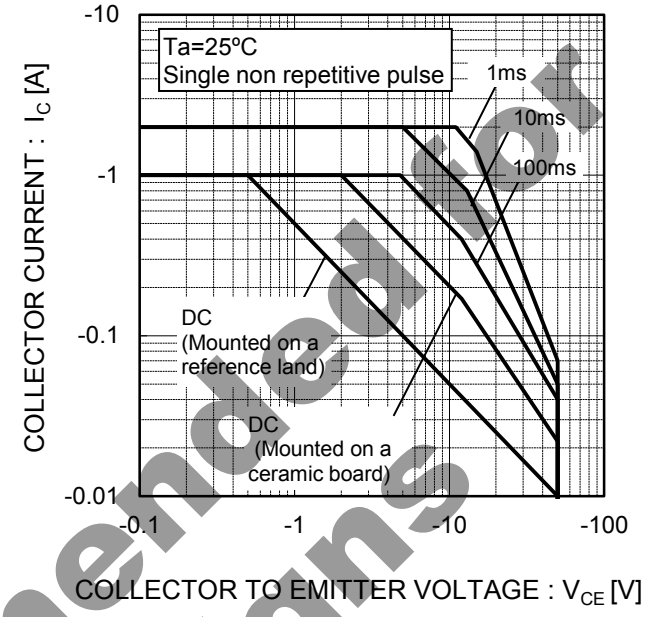


Fig.10 Safe Operating Area



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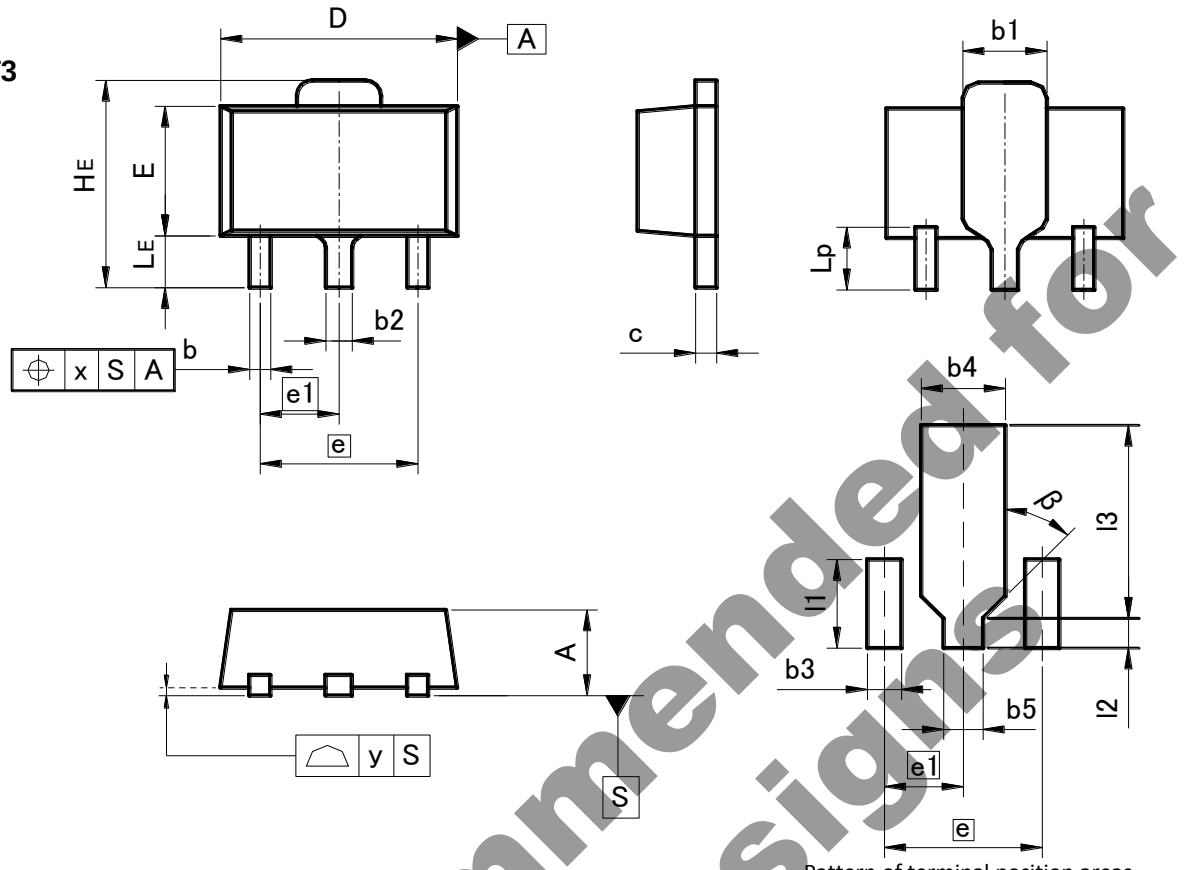
●**Dimensions** (Unit : mm)

MPT3



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

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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