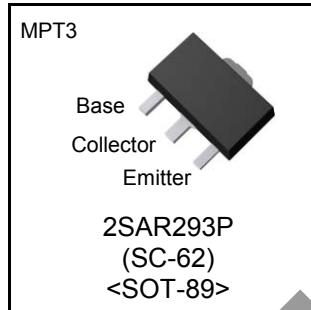


Parameter	Value
$V_{CEO}$	-30V
$I_C$	-1.0A

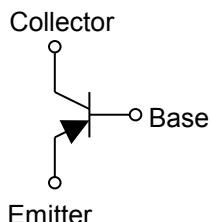
### ●Outline



### ●Features

- 1) Suitable for Middle Power Driver
- 2) Complementary NPN Types : 2SCR293P
- 3) Low  $V_{CE(sat)}$   
 $V_{CE(sat)} = -0.35V$ (Max.)  
 $(I_C/I_B = -500mA/-25mA)$
- 4) Lead Free/RoHS Compliant.

### ●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
2SAR293P	MPT3	4540	T100	180	12	1,000	ML

### ●Absolute maximum ratings ( $T_a = 25^\circ C$ )

Parameter	Symbol	Values	Unit	
Collector-base voltage	$V_{CBO}$	-30	V	
Collector-emitter voltage	$V_{CEO}$	-30	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  $P_w=10ms$ , single pulse

\*2 Each terminal mounted on a reference land

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

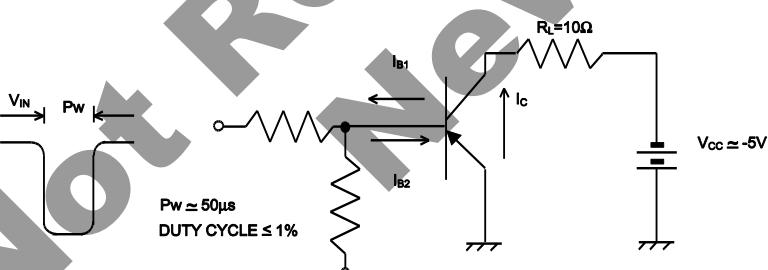
● Electrical characteristics( $T_a = 25^\circ\text{C}$ )

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Collector-emitter breakdown voltage	$\text{BV}_{\text{CEO}}$	$I_C = -1\text{mA}$	-30	-	-	V
Collector-base breakdown voltage	$\text{BV}_{\text{CBO}}$	$I_C = -10\mu\text{A}$	-30	-	-	V
Emitter-base breakdown voltage	$\text{BV}_{\text{EBO}}$	$I_E = -10\mu\text{A}$	-6	-	-	V
Collector cut-off current	$I_{\text{CBO}}$	$V_{\text{CB}} = -30\text{V}$	-	-	-100	nA
Emitter cut-off current	$I_{\text{EBO}}$	$V_{\text{EB}} = -6\text{V}$	-	-	-100	nA
Collector-emitter saturation voltage	$V_{\text{CE}(\text{sat})}^{*1}$	$I_C = -500\text{mA}, I_B = -25\text{mA}$	-	-0.15	-0.35	V
DC current gain	$h_{\text{FE}}$	$V_{\text{CE}} = -2\text{V}, I_C = -100\text{mA}$	270	-	680	-
Transition frequency	$f_T$	$V_{\text{CE}} = -2\text{V}, I_E = -100\text{mA}$ $f = 100\text{MHz}$	-	320	-	MHz
Output capacitance	$C_{\text{ob}}$	$V_{\text{CB}} = -10\text{V}, I_E = 0\text{A},$ $f = 1\text{MHz}$	-	7	-	pF
Turn-on time	$t_{\text{on}}^{*2}$	$I_C = -500\text{mA}$	-	60	-	ns
Storage time	$t_{\text{stg}}^{*2}$	$I_{B1} = -25\text{mA}$ $I_{B2} = 25\text{mA}$	-	160	-	ns
Fall time	$t_f^{*2}$	$V_{\text{CC}} \approx -5\text{V}$	-	50	-	ns

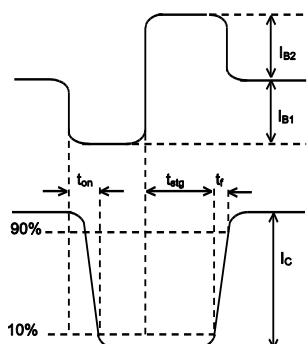
\*1 Pulsed

\*2 See switching time test circuit

## ● Switching time test circuit



BASE CURRENT WAVEFORM



COLLECTOR CURRENT WAVEFORM

● Electrical characteristic curves (Ta = 25°C)

Fig.1 Ground Emitter Propagation Characteristics

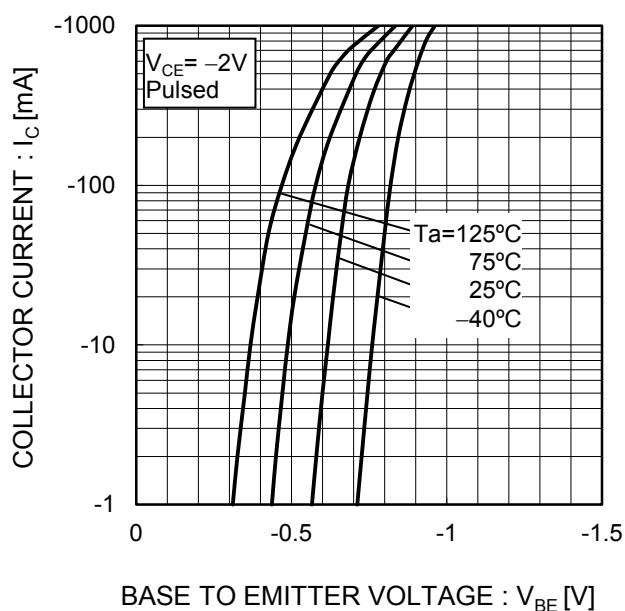


Fig.2 Typical Output Characteristics

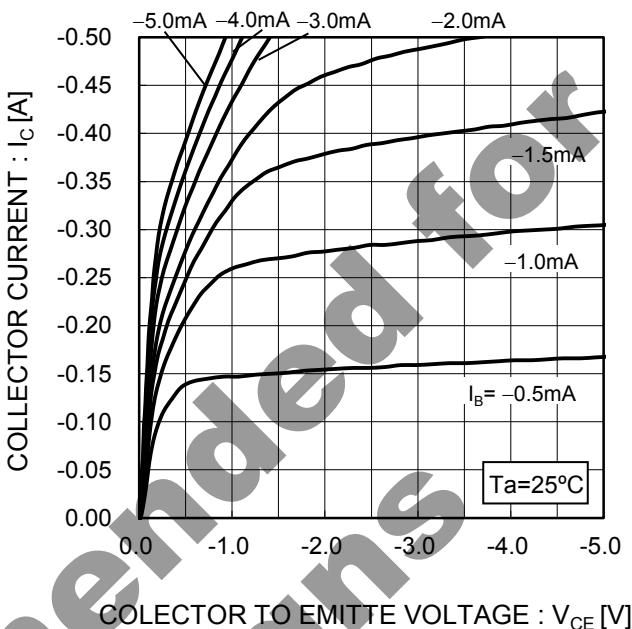


Fig.3 DC Current Gain vs. Collector Current ( $I$ )

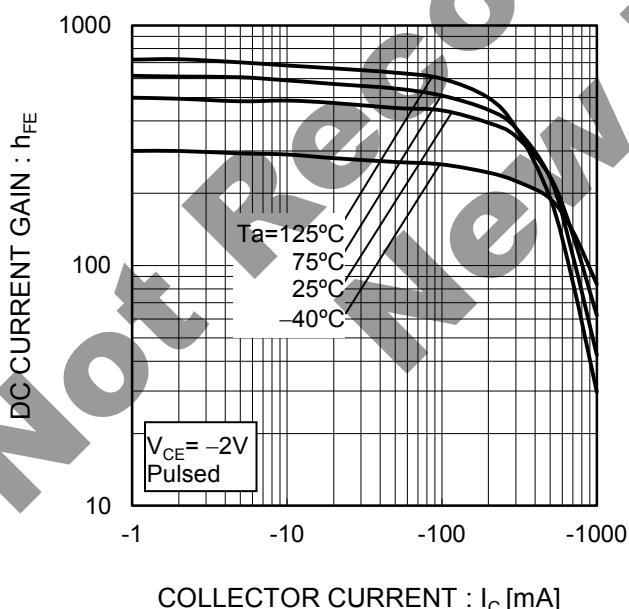
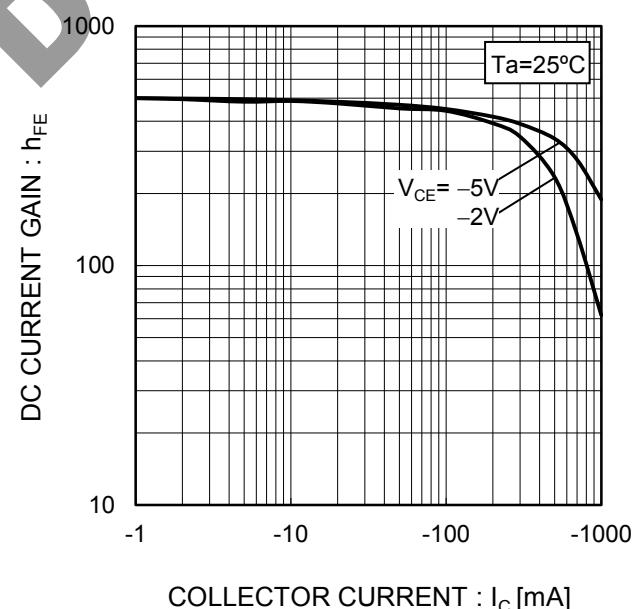


Fig.4 DC current gain vs. output current (II)



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

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

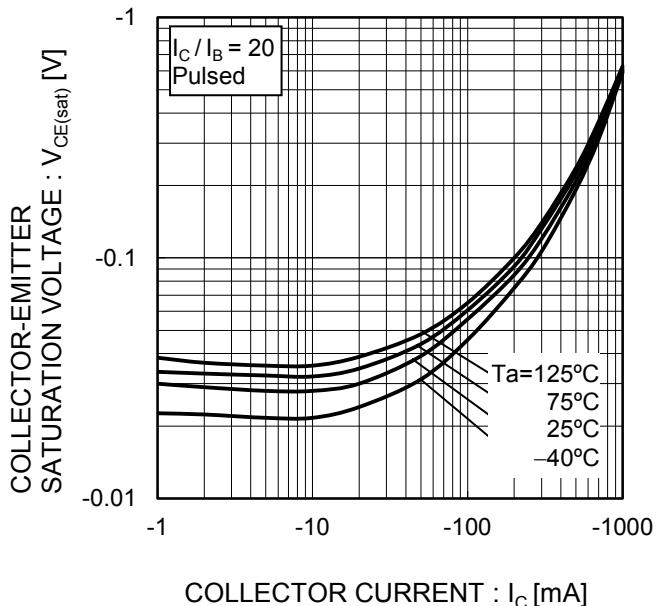


Fig.6 Collector-Emitter Saturation Voltage vs. Collector Current (II)

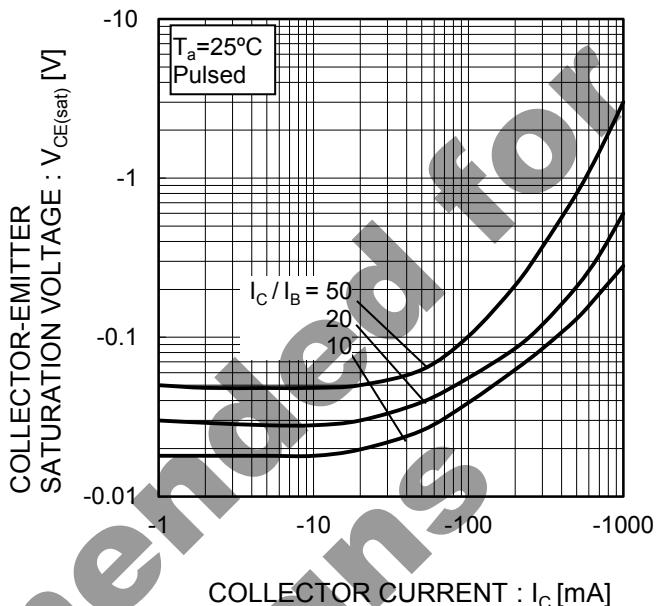


Fig.7 Base-Emitter Saturation Voltage vs. Collector Current

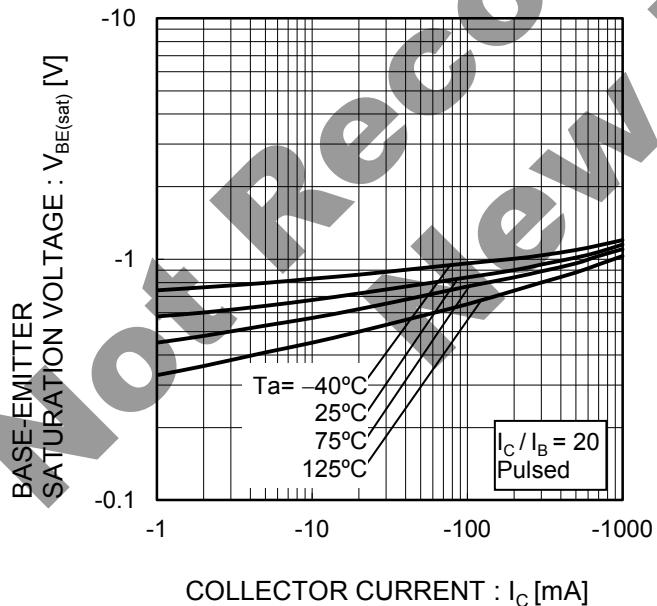
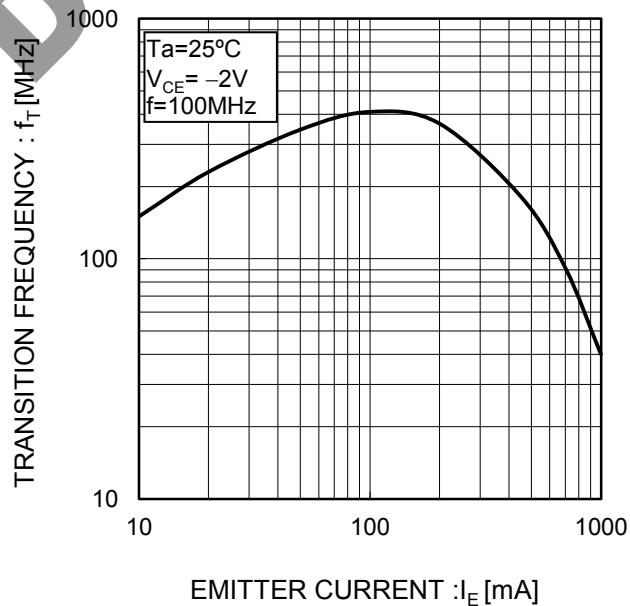


Fig.8 Gain Bandwidth Product vs. Emitter Current



### ● 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

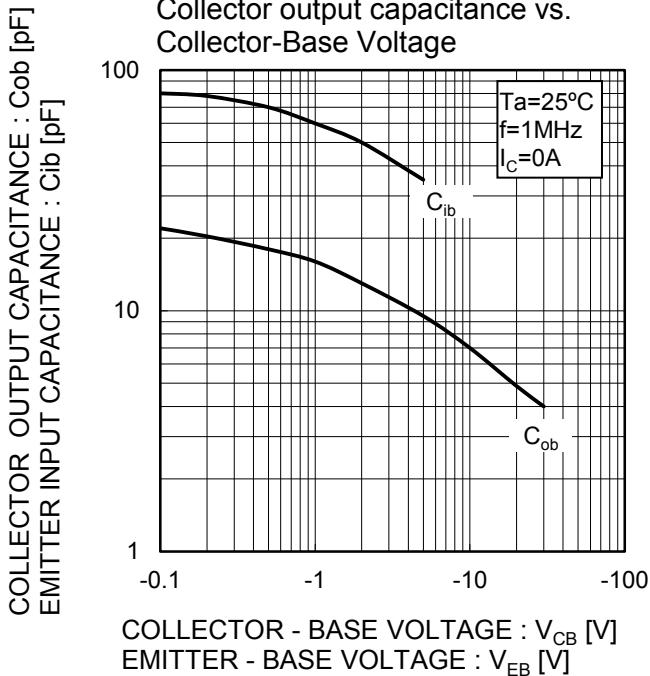
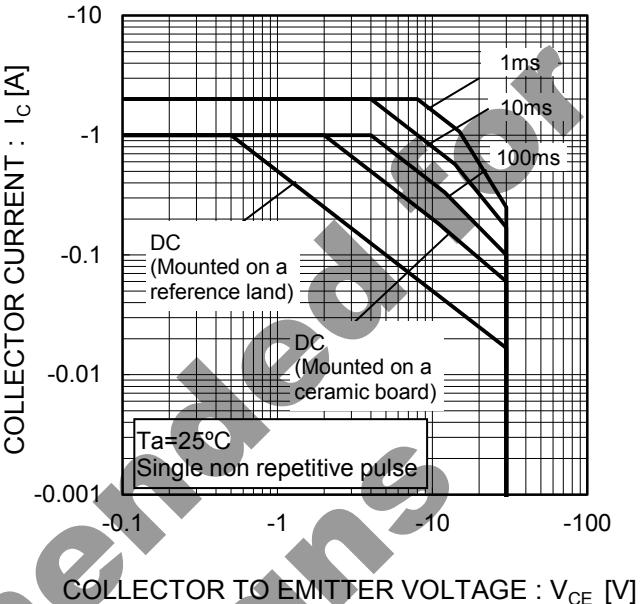
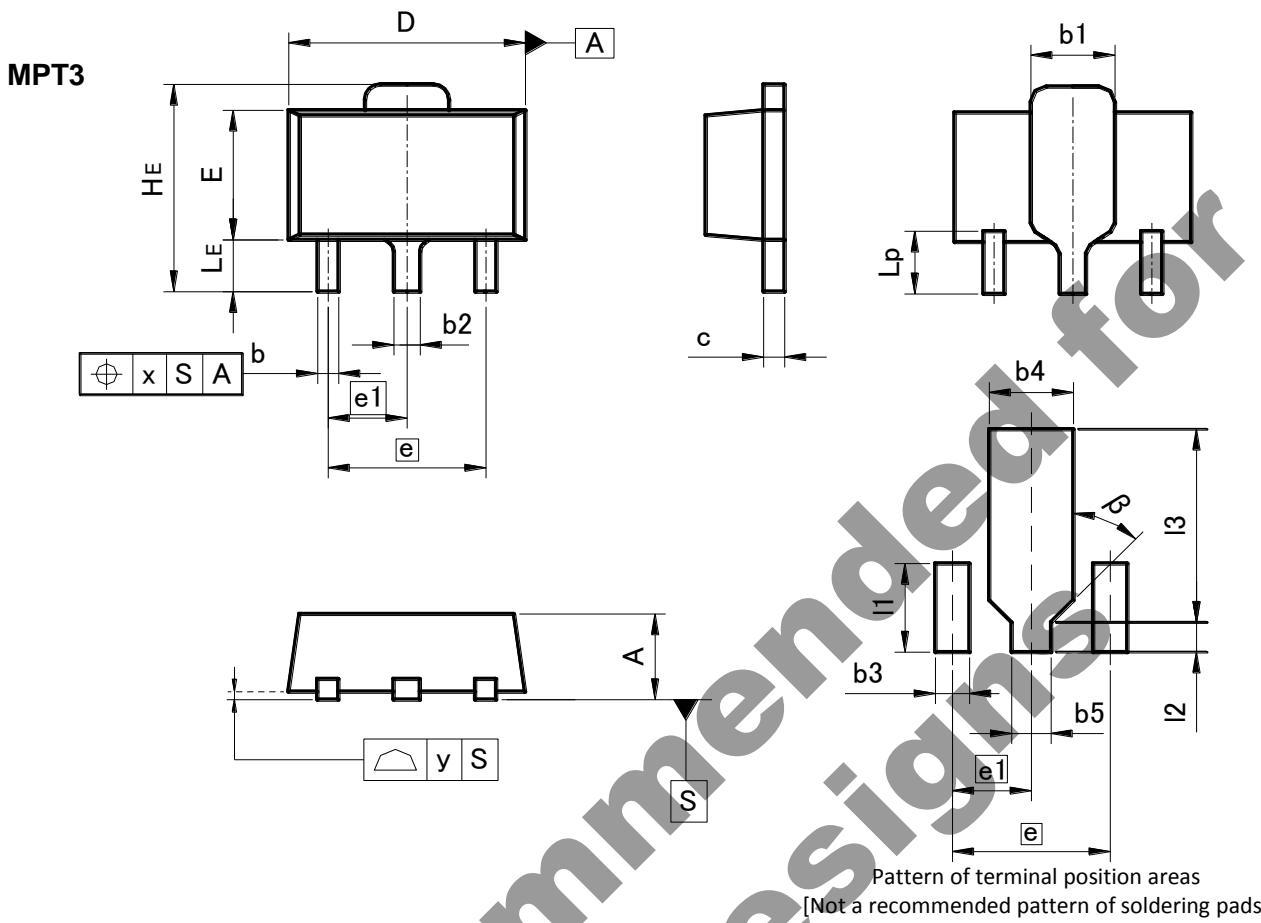


Fig.10 Safe Operating Area



## ● Dimensions (Unit : mm)



DIM	MILLIMETERS		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	MILLIMETERS		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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