

# Medium Power Transistors (–30V / –2A)

## 2SAR512P

### ● Structure

PNP Silicon epitaxial planar transistor

### ● Features

1) Low saturation voltage, typically

$$V_{CE(sat)} = -0.4V \text{ (Max.) } (I_C / I_B = -700mA / -35mA)$$

2) High speed switching

### ● Applications

Driver

### ● Packaging specifications

Type	Package	Taping
	Code	T100
	Basic ordering unit (pieces)	1000
2SAR512P		○

### ● Absolute maximum ratings (Ta = 25°C)

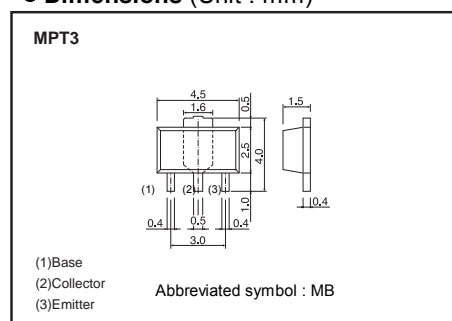
Parameter		Symbol	Limits	Unit
Collector-base voltage		$V_{CBO}$	-30	V
Collector-emitter voltage		$V_{CEO}$	-30	V
Emitter-base voltage		$V_{EBO}$	-6	V
Collector current	DC	$I_C$	-2	A
	Pulsed	$I_{CP}^{*1}$	-4	A
Power dissipation		$P_D^{*2}$	0.5	W
		$P_D^{*3}$	2	W
Junction temperature		$T_j$	150	°C
Range of storage temperature		$T_{stg}$	-55 to 150	°C

\*1  $P_w=10ms$ , Single Pulse

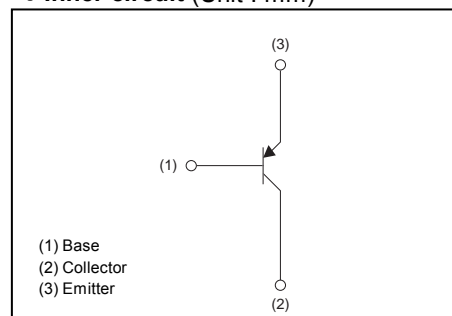
\*2 Each terminal mounted on a recommended land.

\*3 Mounted on a ceramic board. (40x40x0.7mm<sup>3</sup>)

### ● Dimensions (Unit : mm)



### ● Inner circuit (Unit : mm)



## ●Electrical characteristic (Ta = 25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-emitter breakdown voltage	$BV_{CBO}$	-30	-	-	V	$I_C = -1\text{mA}$
Collector-base breakdown voltage	$BV_{CEO}$	-30	-	-	V	$I_C = -100\mu\text{A}$
Emitter-base breakdown voltage	$BV_{EBO}$	-6	-	-	V	$I_E = -100\mu\text{A}$
Collector cut-off current	$I_{CBO}$	-	-	-1	$\mu\text{A}$	$V_{CB} = -30\text{V}$
Emitter cut-off current	$I_{EBO}$	-	-	-1	$\mu\text{A}$	$V_{EB} = -4\text{V}$
Collector-emitter saturation voltage	$V_{CE(sat)}$ <sup>*1</sup>	-	-200	-400	mV	$I_C = -700\text{mA}$ , $I_B = -35\text{mA}$
DC current gain	$h_{FE}$	200	-	500	-	$V_{CE} = -2\text{V}$ , $I_C = -100\text{mA}$
Transition frequency	$f_T$ <sup>*1</sup>	-	430	-	MHz	$V_{CE} = -10\text{V}$ $I_E = 100\text{mA}$ , $f = 100\text{MHz}$
Collector output capacitance	$C_{ob}$	-	15	-	pF	$V_{CB} = -10\text{V}$ , $I_E = 0\text{A}$ $f = 1\text{MHz}$
Turn-on time	$t_{on}$ <sup>*2</sup>	-	30	-	ns	$I_C = -1\text{A}$ , $I_{B1} = -100\text{mA}$ , $I_{B2} = 100\text{mA}$ , $V_{CC} \approx -10\text{V}$
Storage time	$t_{stg}$ <sup>*2</sup>	-	170	-	ns	
Fall time	$t_f$ <sup>*2</sup>	-	15	-	ns	

\*1 Pulsed

\*2 See switching time test circuit

# **Electrical characteristic curves**

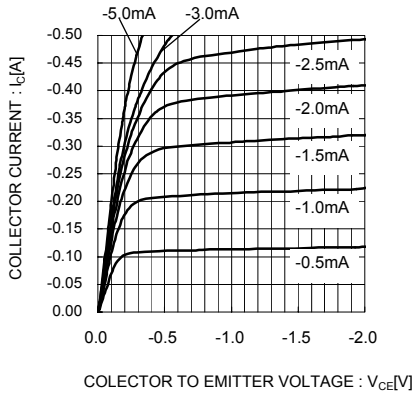


Fig.1 Typical Output Characteristics

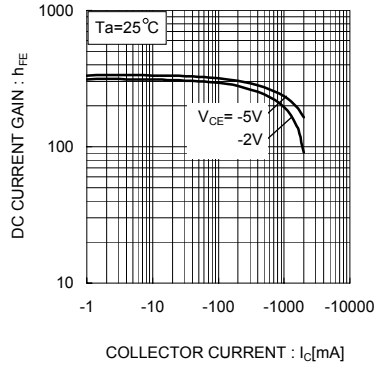


Fig.2 DC Current Gain vs. Collector Current (I)

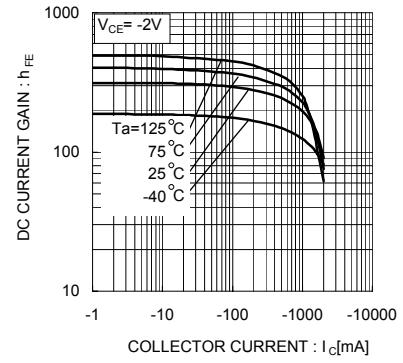


Fig.3 DC Current Gain vs. Collector Current (II)

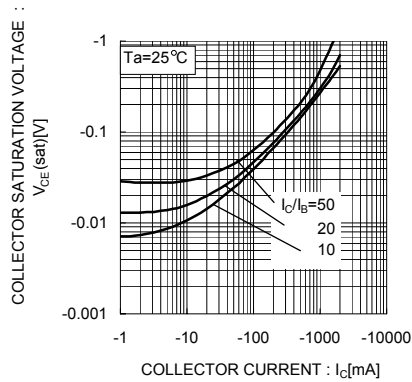


Fig.4 Collector-Emitter Saturation Voltage vs. Collector Current (I)

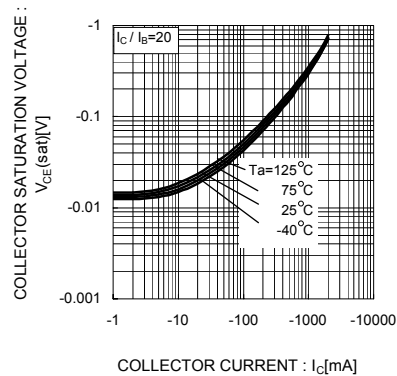


Fig.5 Collector-Emitter Saturation Voltage vs. Collector Current (II)

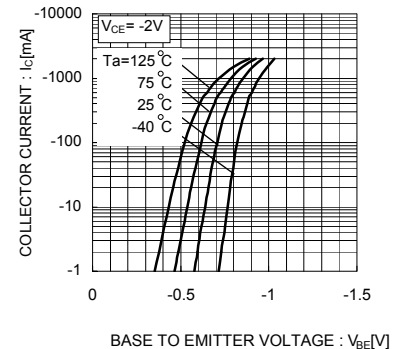


Fig.6 Ground Emitter Propagation Characteristics

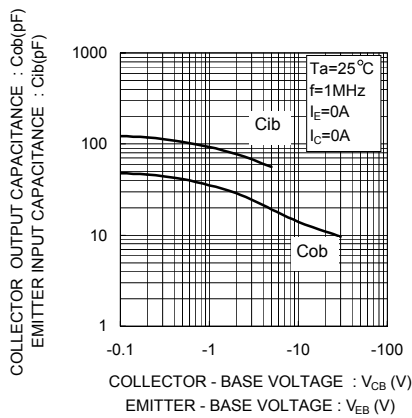
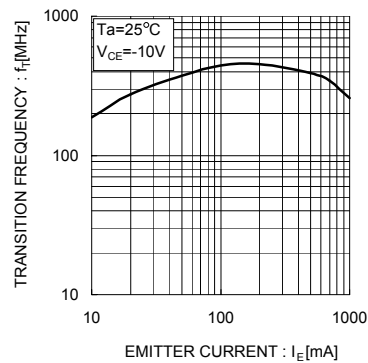
Fig.7 Emitter Input Capacitance vs. Emitter-Base Voltage  
Collector Output Capacitance vs. Collector-Base Voltage

Fig.8 Gain Bandwidth Product vs. Emitter Current

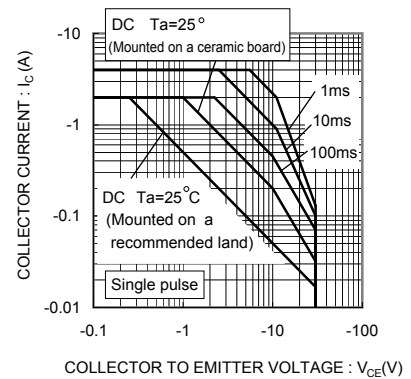
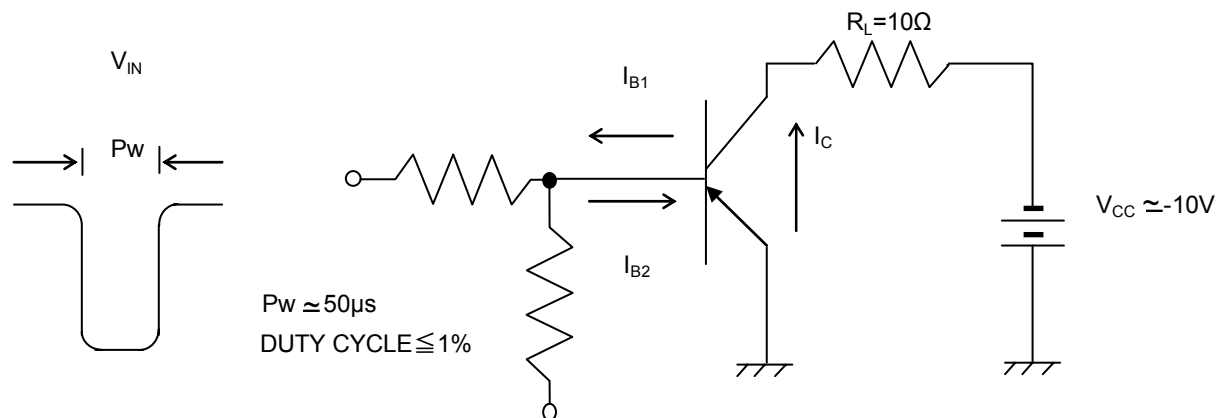
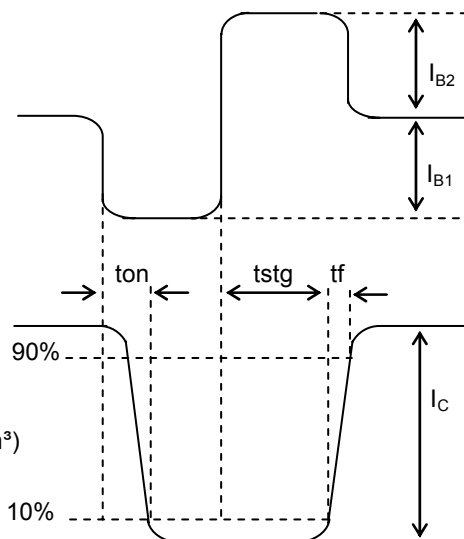


Fig.9 Safe Operating Area

## ●Switching time test circuit



BASE CURENT WAVEFORM

\*1  $P_w=10ms$ , Single Pulse

COLLECTOR CURRENT WAVEFORM

\*3 Mounted on a ceramic board. (40x40x0.7mm<sup>3</sup>)

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