

Medium Power Transistors (50V / 1A)

2SCR513P

● **Structure**

NPN Silicon epitaxial planar transistor

● **Features**

- 1) Low saturation voltage, typically
 $V_{CE(sat)} = 0.35V$ (Max.) ($I_C / I_B = 500mA / 25mA$)
- 2) High speed switching

● **Applications**

Driver

● **Packaging specifications**

Type	Package	Taping
	Code	T100
	Basic ordering unit (pieces)	1000
2SCR513P		○

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

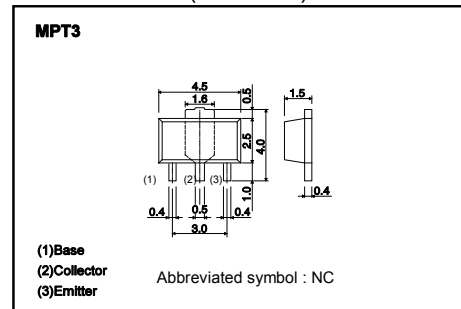
Parameter	Symbol	Limits	Unit	
Collector-base voltage	V_{CBO}	50	V	
Collector-emitter voltage	V_{CEO}	50	V	
Emitter-base voltage	V_{EBO}	6	V	
Collector current	DC	I_C	1	A
	Pulsed	I_{CP}^{*1}	2	A
Power dissipation	P_D^{*2}	0.5	W	
	P_D^{*3}	2	W	
Junction temperature	T_j	150	°C	
Range of storage temperature	T_{stg}	-55 to 150	°C	

*1 Pw=10ms, Single Pulse

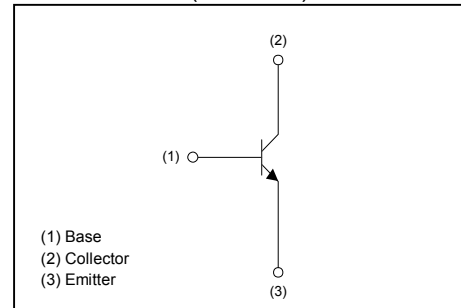
*2 Each terminal mounted on a recommended land.

*3 Mounted on a ceramic board. (40x40x0.7mm³)

● **Dimensions (Unit : mm)**



● **Inner circuit (Unit : mm)**



●Electrical characteristic (Ta = 25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-emitter breakdown voltage	BV_{CEO}	50	-	-	V	$I_C = 1\text{mA}$
Collector-base breakdown voltage	BV_{CBO}	50	-	-	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	μA	$V_{CB} = 50\text{V}$
Emitter cut-off current	I_{EBO}	-	-	1	μA	$V_{EB} = 4\text{V}$
Collector-emitter saturation voltage	$V_{CE(sat)}^{*1}$	-	130	350	mV	$I_C = 500\text{mA}, I_B = 25\text{mA}$
DC current gain	h_{FE}	180	-	450	-	$V_{CE} = 2\text{V}, I_C = 50\text{mA}$
Transition frequency	f_T^{*1}	-	360	-	MHz	$V_{CE} = 10\text{V}$ $I_E = -200\text{mA}, f = 100\text{MHz}$
Collector output capacitance	C_{ob}	-	7	-	pF	$V_{CB} = 10\text{V}, I_E = 0\text{A}$ $f = 1\text{MHz}$
Turn-on time	t_{on}^{*2}	-	40	-	ns	$I_C = 0.5\text{A}, I_{B1} = 50\text{mA},$ $I_{B2} = -50\text{mA}, V_{CC} \approx 10\text{V}$
Storage time	t_{stg}^{*2}	-	410	-	ns	
Fall time	t_f^{*2}	-	75	-	ns	

*1 Pulsed

*2 See switching time test circuit

●Electrical characteristic curves

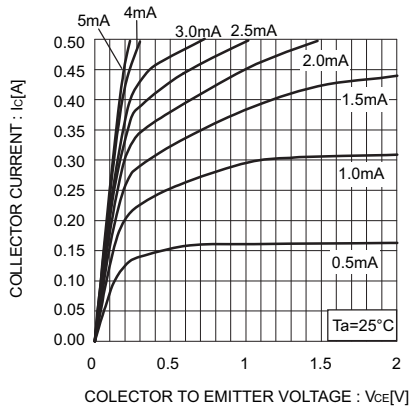


Fig.1 Typical Output Characteristics

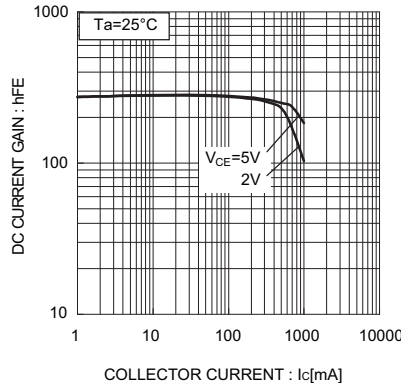


Fig.2 DC Current Gain vs. Collector Current (I)

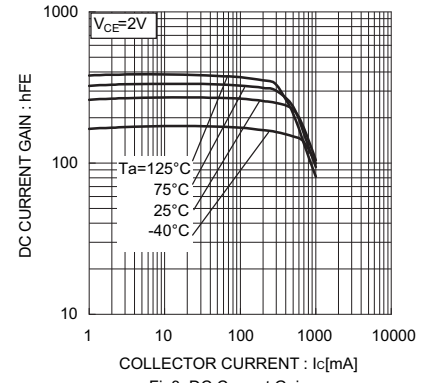


Fig.3 DC Current Gain vs. Collector Current (II)

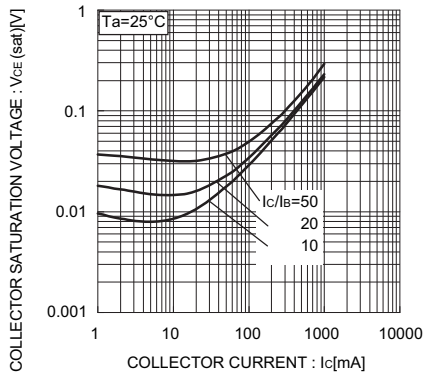


Fig.4 Collector-Emitter Saturation Voltage vs. Collector Current (I)

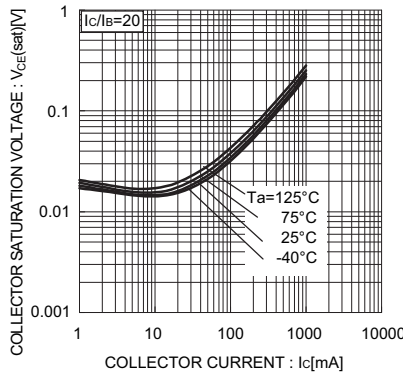


Fig.5 Collector-Emitter Saturation Voltage vs. Collector Current (II)

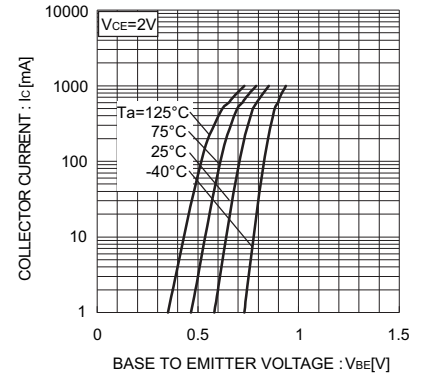


Fig.6 Ground Emitter Propagation Characteristics

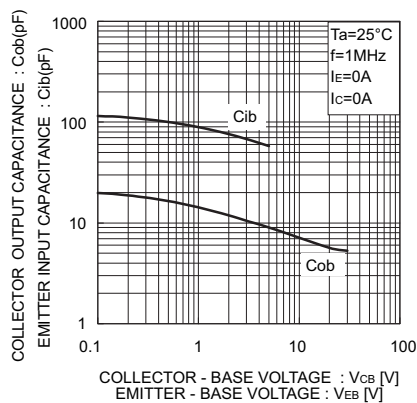


Fig.7 Emitter Input Capacitance vs. Emitter-Base Voltage
Collector Output Capacitance vs. Collector-Base Voltage

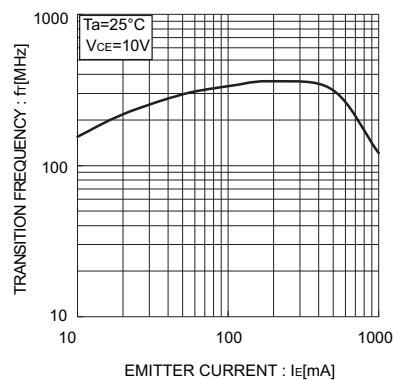


Fig.8 Gain Bandwidth Product vs. Emitter Current

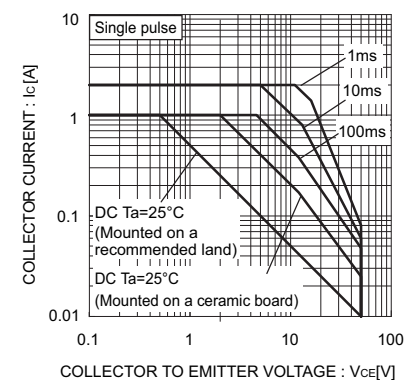
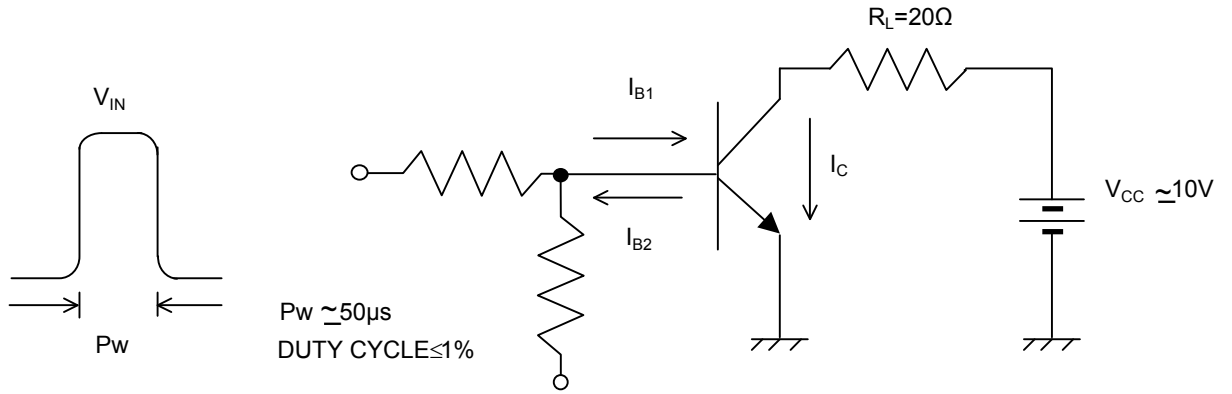
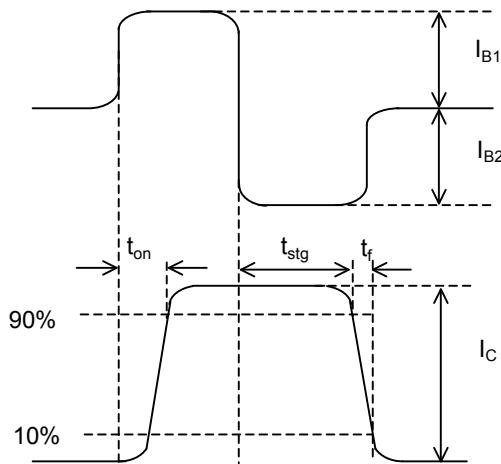


Fig.9 Safe Operating Area

●Switching time test circuit



BASE CURRENT WAVEFORM



COLLECTOR CURRENT WAVEFORM

Notes

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