

# Power transistor (-60V, -2A)

## 2SA2093

**●Features**

- 1) High speed switching.  
(Tf: Typ. : 30ns at Ic = -2A)
- 2) Low saturation voltage, typically  
(Typ. : -200mV at Ic = -1.0A, Ib = -0.1A)
- 3) Strong discharge power for inductive load and capacitance load.
- 4) Complements the 2SC5880

**●Applications**

Small signal low frequency amplifier  
High speed switching

**●Structure**

PNP Silicon epitaxial planar transistor

**●Packaging specifications**

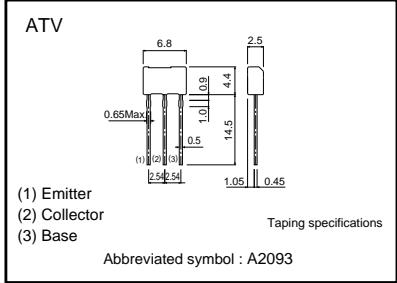
Type	Package	Taping
	Code	TV2
	Basic ordering unit (pieces)	2500
2SA2093		○

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

Parameter	Symbol	Limits	Unit
Collector-base voltage	V <sub>CB0</sub>	-60	V
Collector-emitter voltage	V <sub>CE0</sub>	-60	V
Emitter-base voltage	V <sub>EB0</sub>	-6	V
Collector current	DC	I <sub>c</sub>	-2.0 A
	Pulsed	I <sub>cP</sub>	-4.0 A *
Power dissipation	P <sub>c</sub>	1.0	W
Junction temperature	T <sub>j</sub>	150	°C
Range of storage temperature	T <sub>stg</sub>	-55 to 150	°C

\*Pw=10ms

**●External dimensions (Unit : mm)**



Transistors

●Electrical characteristics (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Collector-emitter breakdown voltage	$BV_{CEO}$	-60	-	-	V	$I_C = -1\text{mA}$
Collector-base breakdown voltage	$BV_{CBO}$	-60	-	-	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	$I_{CBO}$	-	-	-1.0	$\mu\text{A}$	$V_{CB} = -40\text{V}$
Emitter cut-off current	$I_{EBO}$	-	-	-1.0	$\mu\text{A}$	$V_{EB} = -4\text{V}$
Collector-emitter saturation voltage	$V_{CE(sat)}$	-	-200	-500	mV	$I_C = -1.0\text{A}$ $I_B = -100\text{mA}$
DC current gain	$h_{FE}$	120	-	390	-	$V_{CE} = -2\text{V}$ $I_C = -100\text{mA}$
Transition frequency	$f_r$	-	310	-	MHz	$V_{CE} = -10\text{V}$ $I_E = 100\text{mA}$ $f = 10\text{MHz}$
Corrector output capacitance	$C_{ob}$	-	25	-	pF	$V_{CB} = -10\text{V}$ $I_E = 0\text{mA}$ $f = 1\text{MHz}$
Turn-on time	$T_{on}$	-	25	-	ns	$I_C = -2.0\text{A}$ $I_{B1} = -200\text{mA}$ $I_{B2} = 200\text{mA}$ $V_{CC} = -25\text{V}$
Storage time	$T_{stg}$	-	120	-	ns	
Fall time	$T_f$	-	30	-	ns	

\*Single non repetitive pulse

●hFE RANK

Q	R
120-270	180-390

●Electrical characteristic curves

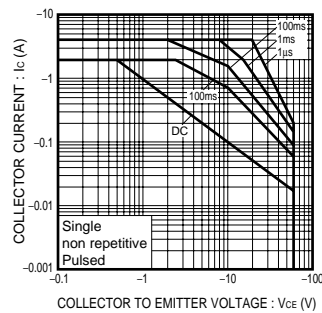


Fig.1 Safe Operating Area

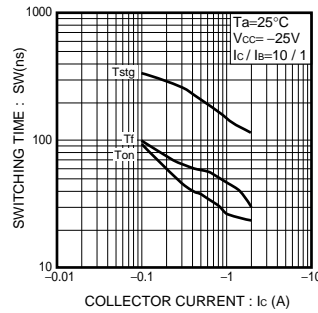


Fig.2 Switching Time

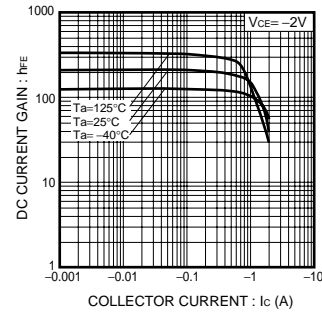


Fig.3 DC Current Gain vs. Collector Current (I)

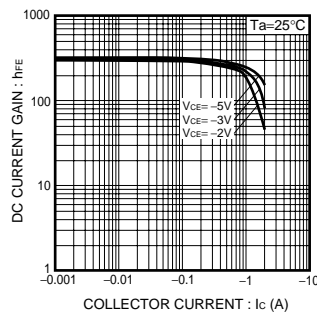


Fig.4 DC Current Gain vs. Collector Current (II)

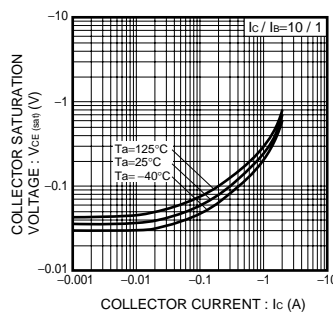


Fig.5 Collector-Emitter Saturation Voltage vs. Collector Current (I)

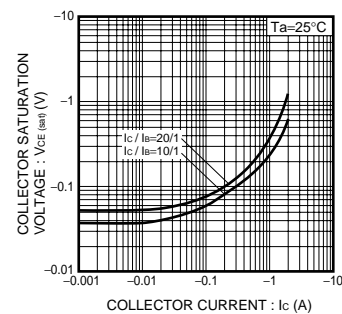


Fig.6 Collector-Emitter Saturation Voltage vs. Collector Current (II)

Transistors

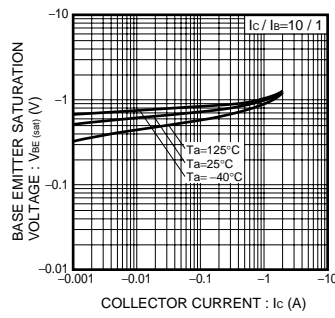


Fig.7 Base-Emitter Saturation Voltage vs. Collector Current

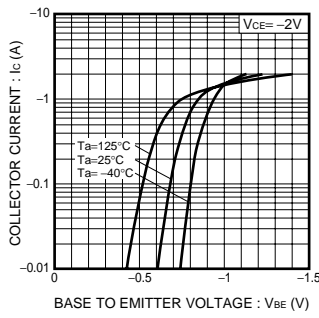


Fig.8 Grounded Emitter Propagation Characteristics

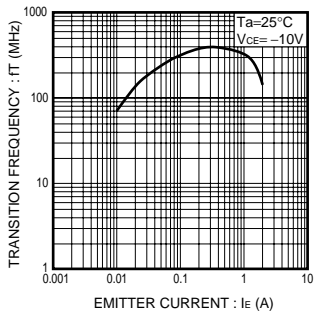


Fig.9 Transition Frequency

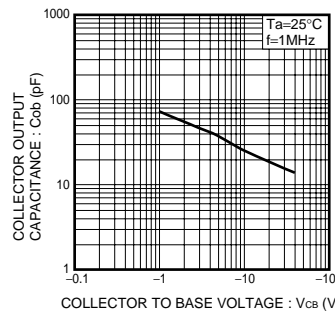
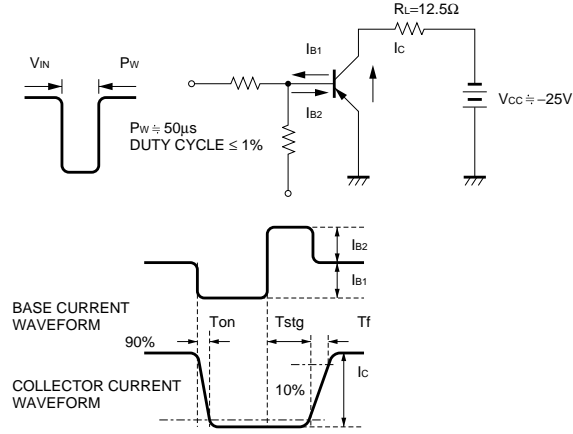


Fig.10 Collector Output Capacitance

● Switching characteristics measurement circuits



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