

# Medium power transistor (−60V, −0.5A)

## 2SA2090

### ●Features

- 1) High speed switching. ( $T_f$ : Typ.: 35ns at  $I_c = 500\text{mA}$ )
- 2) Low saturation voltage, typically.  
(Typ.:  $-150\text{mV}$  at  $I_c = -100\text{mA}$ ,  $I_B = -10\text{mA}$ )
- 3) Strong discharge power for inductive load and capacitance load.
- 4) Complements the 2SC5868.

### ●Applications

High speed switching, Low noise

### ●Structure

NPN Silicon epitaxial planar

### ●Packaging Specifications

Type	Package	Taping
	Code	TL
	Basic ordering unit (pieces)	3000
2SA2090		○

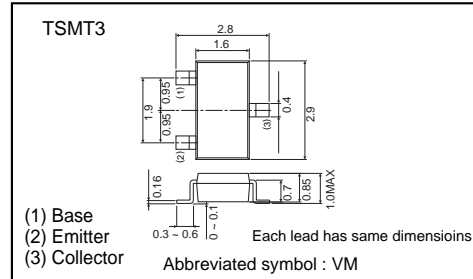
### ●Absolute maximum ratings ( $T_a=25^\circ\text{C}$ )

Parameter	Symbol	Limits	Unit
Collector-base voltage	$V_{CB0}$	−60	V
Collector-emitter voltage	$V_{CE0}$	−60	V
Emitter-base voltage	$V_{EB0}$	−6	V
Collector current	$I_c$	−0.5	A
	$I_{CP}$	−1.0	A <sup>*1</sup>
Power dissipation	$P_C$	500	mW <sup>*2</sup>
Junction temperature	$T_j$	150	$^\circ\text{C}$
Storage temperature	$T_{stg}$	−55 to +150	$^\circ\text{C}$

\*1  $P_w=10\text{ms}$

\*2 Each terminal mounted on a recommended land.

### ●Dimensions (Unit : mm)



Transistors

●Electrical characteristics (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-emitter breakdown voltage	$BV_{CEO}$	-60	-	-	V	$I_C = -1mA$
Collector-base breakdown voltage	$BV_{CBO}$	-60	-	-	V	$I_C = -100mA$
Emitter-base breakdown voltage	$BV_{EBO}$	-6	-	-	V	$I_E = -100\mu A$
Collector cut-off current	$I_{CBO}$	-	-	-1.0	$\mu A$	$V_{CB} = -60V$
Emitter cut-off current	$I_{EBO}$	-	-	-1.0	$\mu A$	$V_{EB} = -4V$
Collector-emitter saturation voltage	$V_{CE(sat)}$	-	-150	-300	mV	$I_C = -100mA, I_B = -10mA$
DC current gain	$h_{FE}$	120	-	270	-	$V_{CE} = -2V, I_C = -50mA$
Transition frequency	$f_T$	-	400	-	MHz	$V_{CE} = -10V, I_E = 100mA, f = 10MHz$ *1
Collector output capacitance	$C_{ob}$	-	10	-	pF	$V_{CB} = -10V, I_E = 0mA, f = 1MHz$
Turn-on time	$T_{on}$	-	35	-	ns	$I_C = -500mA,$ $I_{B1} = -50mA$
Storage time	$T_{stg}$	-	100	-	ns	$I_{B2} = 50mA$
Fall time	$T_f$	-	60	-	ns	$V_{CC} = -25V$ *1

\*1 Measured using pulse current

●hFE RANK

Q
120-270

●Electrical characteristic curves

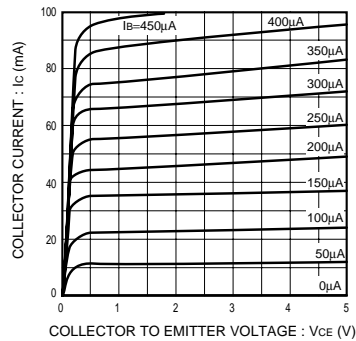


Fig.1 Typical output characteristics

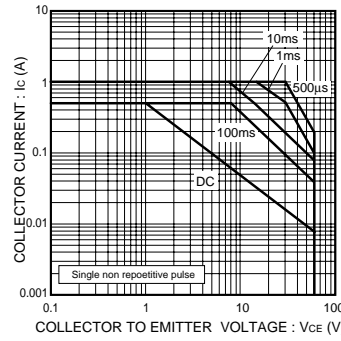


Fig.2 Safe operating area

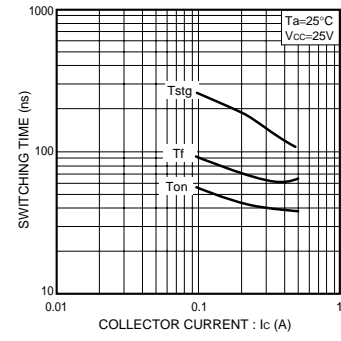


Fig.3 Switching Time

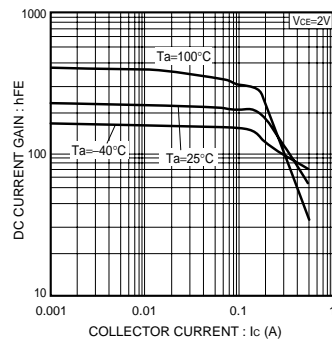


Fig.4 DC current gain vs. collector current ( I )

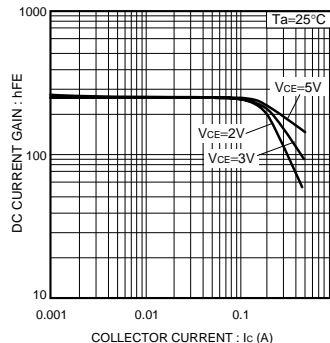


Fig.5 DC current gain vs. collector current ( II )

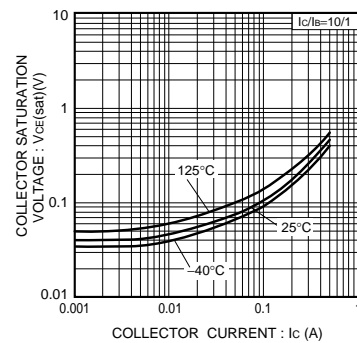


Fig.6 Collector-emitter saturation voltage vs. collector current ( I )

Transistors

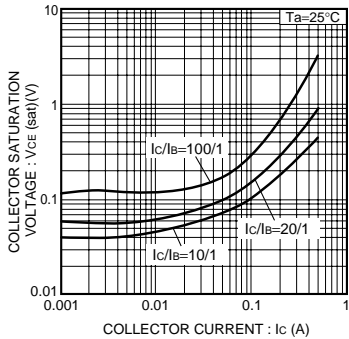


Fig.7 Collector-emitter saturation voltage vs. collector current (II)

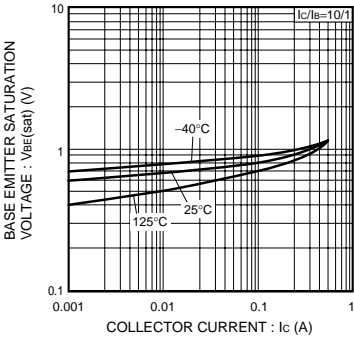


Fig.8 Base-emitter saturation voltage vs. collector current

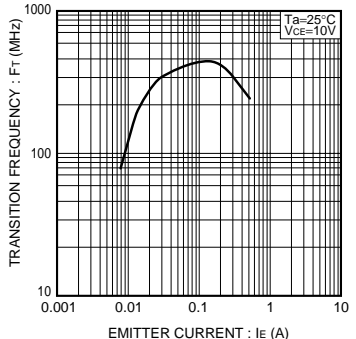


Fig.9 Transition frequency

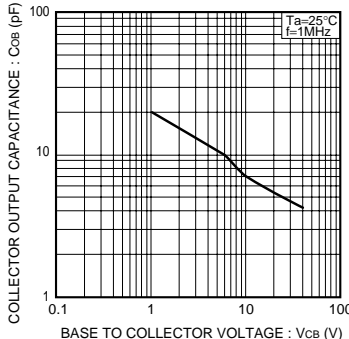


Fig.10 Collector output capacitance

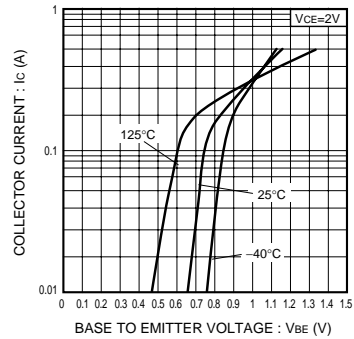
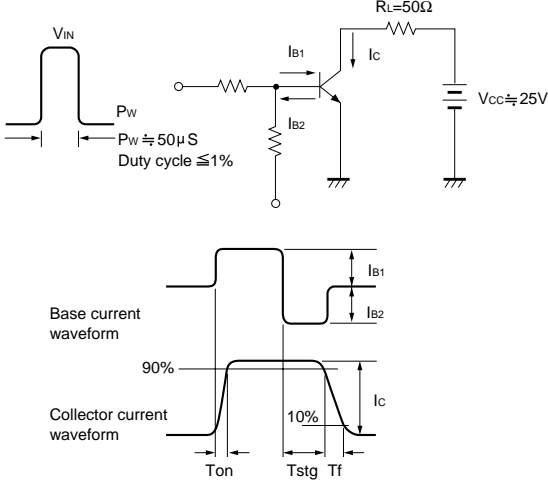


Fig.11 Ground emitter propagation characteristics

●Switching characteristics measurement circuit



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