

# Midium Power Transistors (-50V / -3A)

## 2SAR543R

### ● Structure

PNP Silicon epitaxial planar transistor

### ● Features

1) Low saturation voltage

$$V_{CE(sat)} = -0.4V \text{ (Max.) } (I_C / I_B = -2A / -100mA)$$

2) High speed switching

### ● Applications

Driver

### ● Packaging specifications

Type	Package	TSMT3
	Code	TL
	Basic ordering unit (pieces)	3000

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

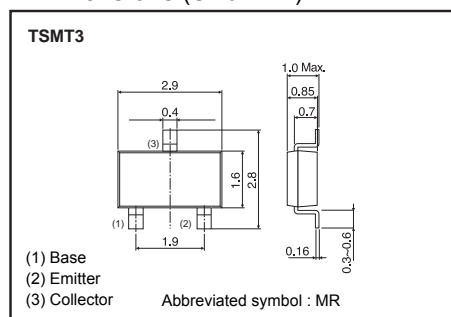
Parameter	Symbol	Limits	Unit	
Collector-base voltage	$V_{CBO}$	-50	V	
Collector-emitter voltage	$V_{CEO}$	-50	V	
Emitter-base voltage	$V_{EBO}$	-6	V	
Collector current	DC	$I_C$	-3	A
	Pulsed	$I_{CP} *1$	-6	A
Power dissipation		$P_D *2$	0.5	W
		$P_D *3$	1.0	W
Junction temperature	$T_j$	150	°C	
Range of storage temperature	$T_{stg}$	-55 to 150	°C	

\*1 Pw=10ms, Single Pulse

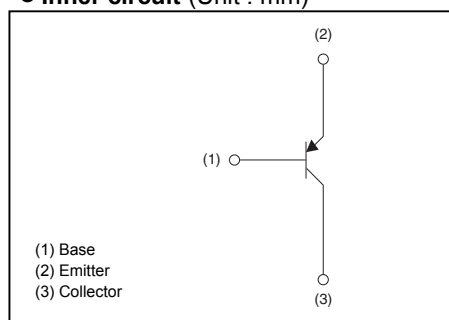
\*2 Mounted on a recommended land

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

### ● Dimensions (Unit : mm)



### ● Inner circuit (Unit : mm)



## ●Electrical characteristics (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	$I_{CBO}$	-	-	-1.0	$\mu\text{A}$	$V_{CB} = -50\text{V}$
Emitter cut-off current	$I_{EBO}$	-	-	-1.0	$\mu\text{A}$	$V_{EB} = -4\text{V}$
Collector-emitter saturation voltage	$V_{CE(sat)}$	-	-200	-400	mV	$I_C = -2\text{A}, I_B = -100\text{mA}$
DC current gain	$h_{FE}$	180	-	450	-	$V_{CE} = -3\text{V}, I_C = -100\text{mA}$
Transition frequency	$f_T$	-	300	-	MHz	$V_{CE} = -10\text{V}$ $I_E = 300\text{mA}, f = 100\text{MHz}$
Collector output capacitance	$C_{ob}$	-	35	-	pF	$V_{CB} = -10\text{V}, I_E = 0\text{A}$ $f = 1\text{MHz}$
Turn-on time	$t_{on}^*$	-	45	-	ns	$I_C = -2\text{A}, I_{B1} = -200\text{mA},$ $I_{B2} = 200\text{mA}, V_{CC} \approx -10\text{V}$
Storage time	$t_{stg}^*$	-	250	-	ns	
Fall time	$t_f^*$	-	40	-	ns	

\* See switching time test circuit

●Electrical characteristic curves (Ta=25°C)

Fig.1 Typical Output Characteristics

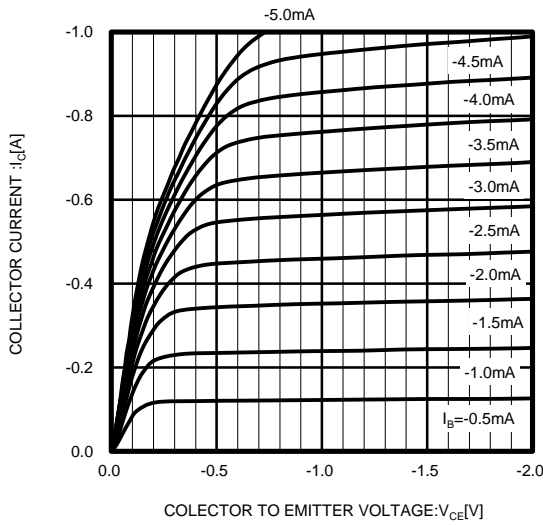


Fig.2 DC Current Gain vs. Collector Current ( I )

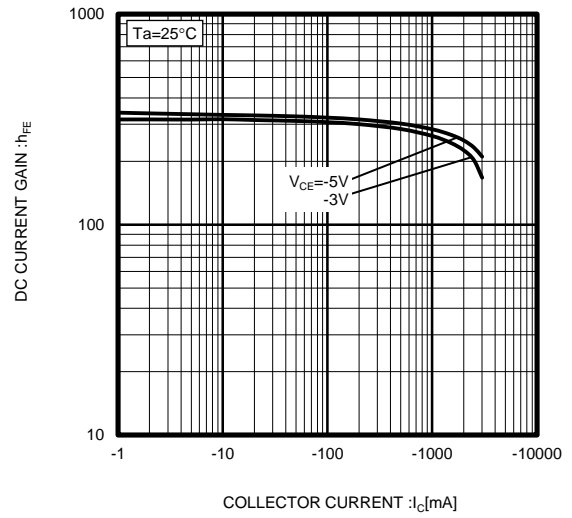


Fig.3 DC Current Gain vs. Collector Current ( II )

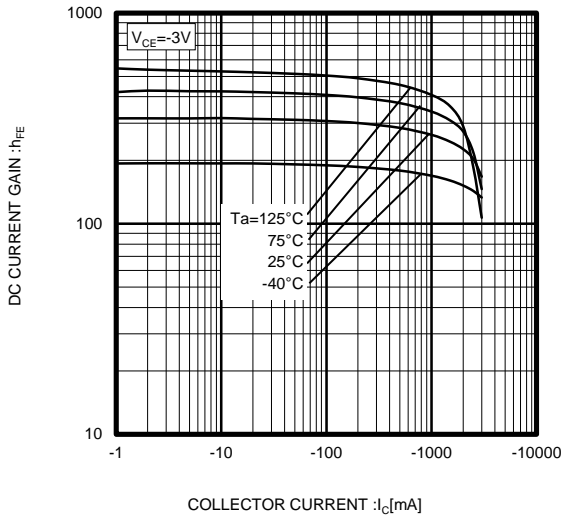


Fig.4 Collector-Emitter Saturation Voltage vs. Collector Current ( I )

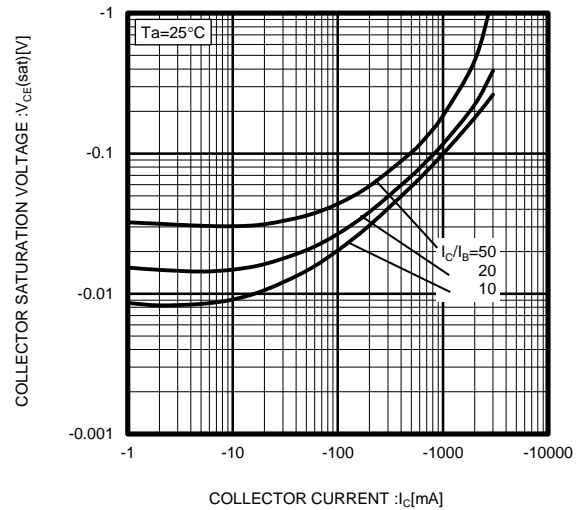


Fig.5 Collector-Emitter Saturation Voltage vs. Collector Current ( II )

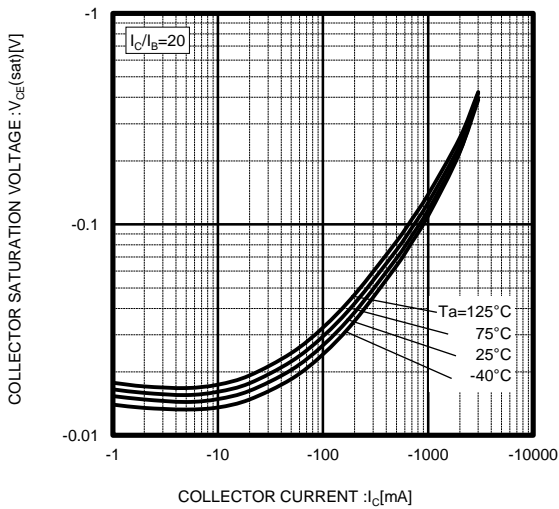


Fig.6 Ground Emitter Propagation Characteristics

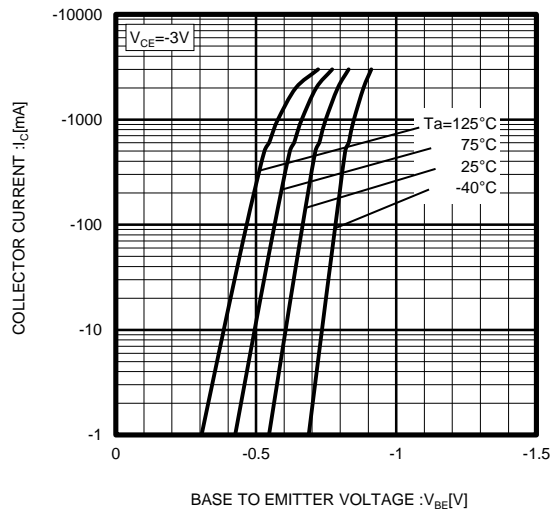


Fig.7 Emitter input capacitance vs. Emitter-Base Voltage  
Collector output capacitance vs. Collector-Base Voltage

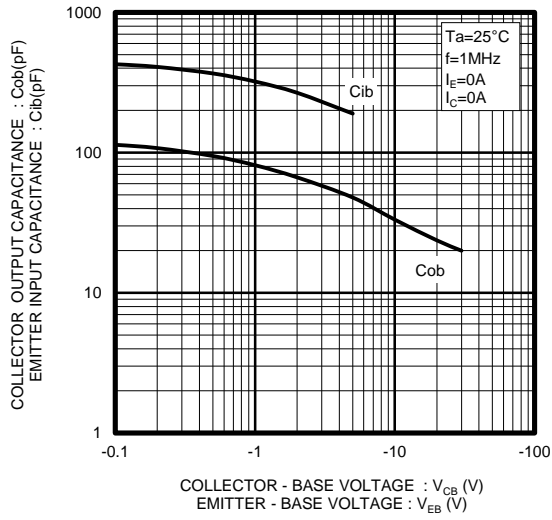


Fig.8 Gain Bandwidth Product vs. Emitter Current

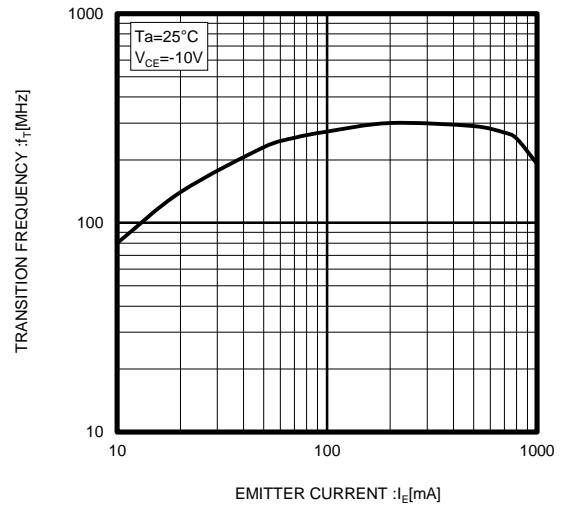
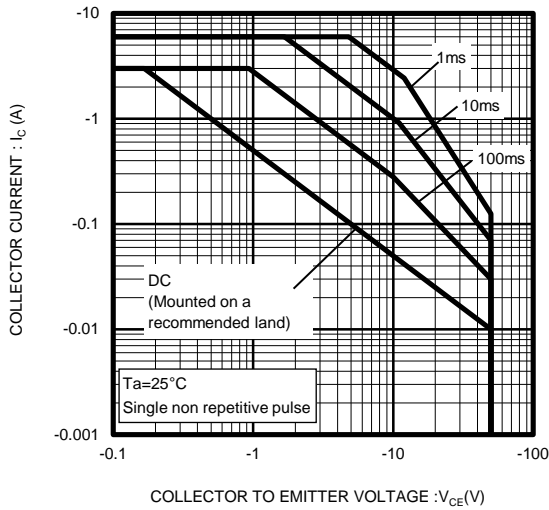
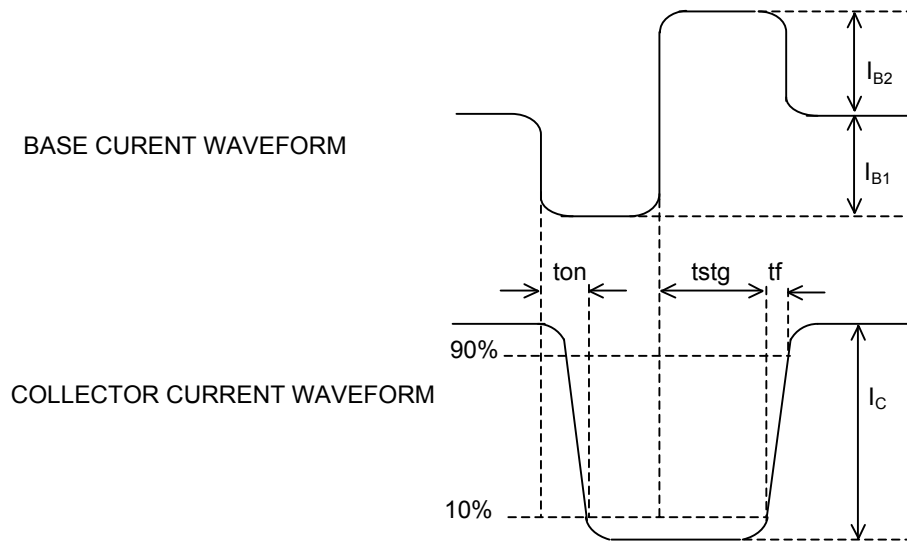
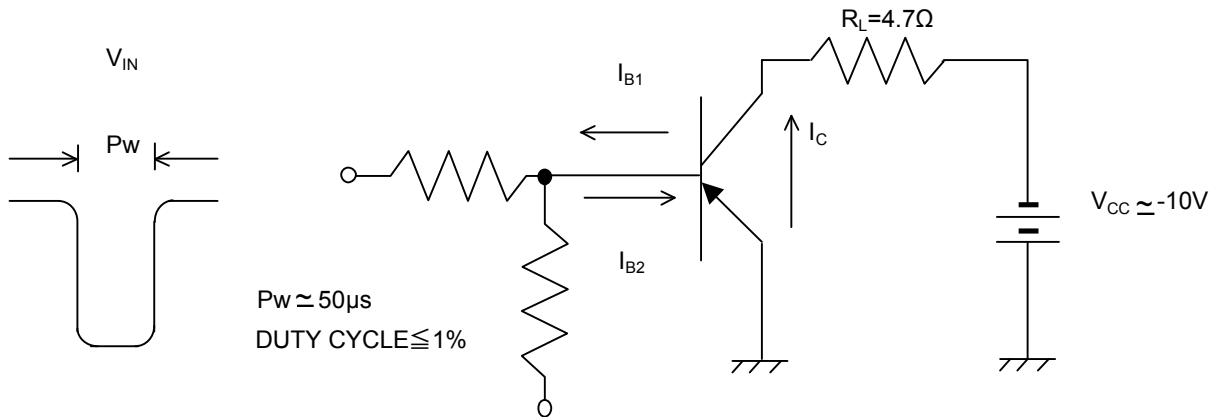


Fig.9. Safe Operating Area



●Switching time test circuit



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