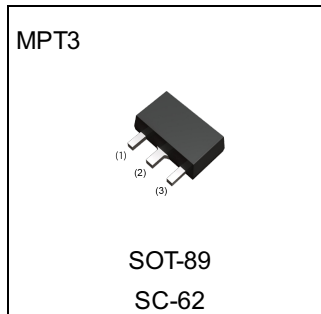


Parameter	Value
V_{CEO}	-30V
I_C	-5A

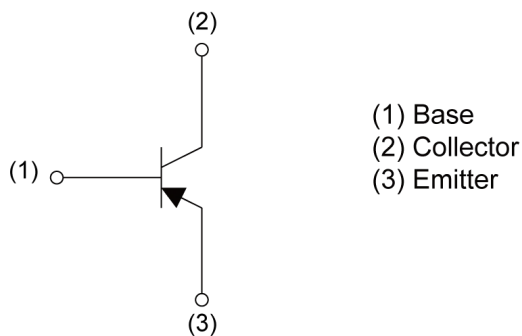
●Outline



●Features

- 1) Low saturation voltage, typically
 $V_{CE(sat)} = -0.4V$ (Max.)
 $(I_C/I_B = -2A/-100mA)$
- 2) High speed switching

●Inner circuit



●Application

LOW FREQUENCY AMPLIFIER, HIGH SPEED SWITCHING

●Packaging specifications

Part No.	Package	Package size	Taping code	Reel size (mm)	Tape width (mm)	Basic ordering unit.(pcs)	Marking
2SAR542P	MPT3	4540	T100	180	12	1000	MQ

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

Parameter	Symbol	Values	Unit
Collector-base voltage	V_{CBO}	-30	V
Collector-emitter voltage	V_{CEO}	-30	V
Emitter-base voltage	V_{EBO}	-6	V
Collector current	I_{C}	-5	A
	I_{CP}^{*1}	-10	A
Power dissipation	P_{D}^{*2}	0.5	W
	P_{D}^{*3}	2.0	W
Junction temperature	T_{j}	150	$^\circ\text{C}$
Range of storage temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

● **Electrical characteristics** ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Collector-base breakdown voltage	BV_{CBO}	$I_{\text{C}} = -100\mu\text{A}$	-30	-	-	V
Collector-emitter breakdown voltage	BV_{CEO}	$I_{\text{C}} = -1\text{mA}$	-30	-	-	V
Emitter-base breakdown voltage	BV_{EBO}	$I_{\text{E}} = -100\mu\text{A}$	-6	-	-	V
Collector cut-off current	I_{CBO}	$V_{\text{CB}} = -30\text{V}$	-	-	-1.0	μA
Emitter cut-off current	I_{EBO}	$V_{\text{EB}} = -4\text{V}$	-	-	-1.0	μA
Collector-emitter saturation voltage	$V_{\text{CE(sat)}}^{*4}$	$I_{\text{C}} = -2\text{A}, I_{\text{B}} = -100\text{mA}$	-	-200	-400	mV
DC current gain	h_{FE}	$V_{\text{CE}} = -2\text{V}, I_{\text{C}} = -500\text{mA}$	200	-	500	-
Transition frequency	f_{T}^{*4}	$V_{\text{CE}} = -10\text{V}, I_{\text{E}} = 100\text{mA}, f = 100\text{MHz}$	-	240	-	MHz
Output capacitance	C_{ob}	$V_{\text{CB}} = -10\text{V}, I_{\text{E}} = 0\text{A}, f = 1\text{MHz}$	-	40	-	pF
Turn-On time	t_{on}	$I_{\text{C}} = -2.5\text{A}, I_{\text{B1}} = -250\text{mA},$	-	45	-	ns
Storage time	t_{stg}	$I_{\text{B2}} = 250\text{mA}, V_{\text{CC}} \approx -10\text{V},$	-	200	-	ns
Fall time	t_{f}	$R_{\text{L}} = 3.9\Omega$ See test circuit	-	25	-	ns

*1 $P_{\text{w}}=10\text{ms}$, Single pulse

*2 Each terminal mounted on a reference land.

*3 Mounted on a ceramic board.(40×40×0.7mm)

*4 Pulsed

● Electrical characteristic curves ($T_a = 25^\circ\text{C}$)

Fig.1 Ground Emitter Propagation Characteristics

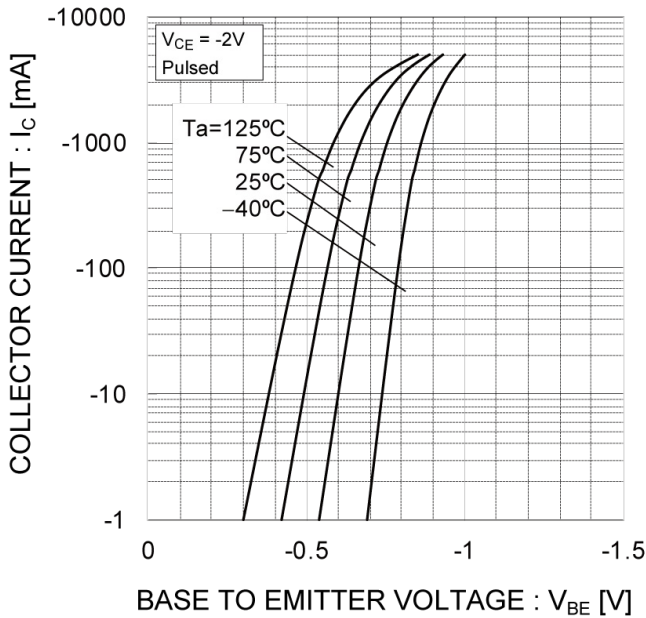


Fig.2 Typical Output Characteristics

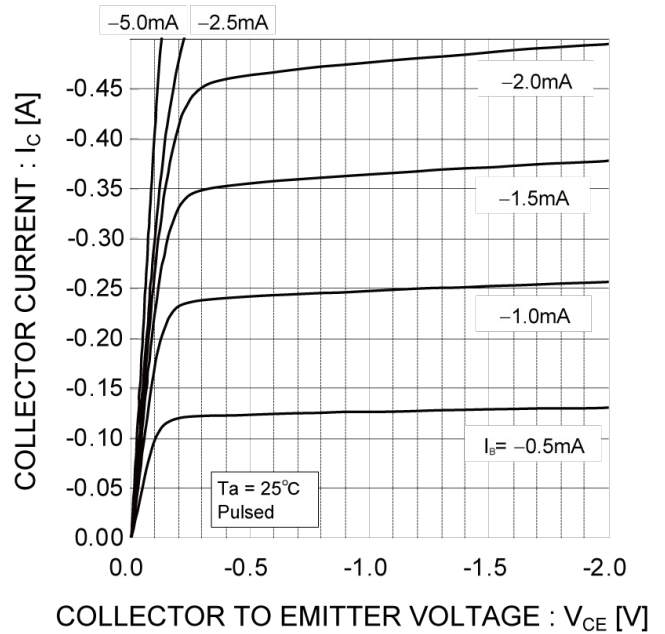


Fig.3 DC Current Gain vs. Collector Current (I)

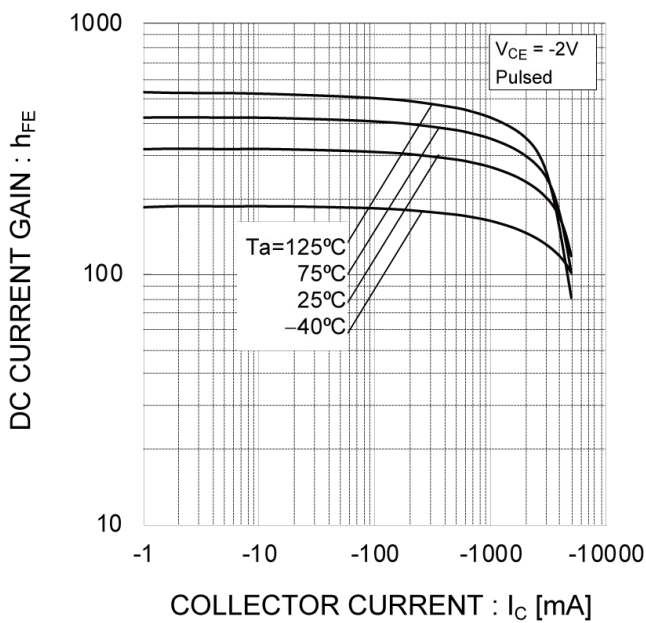
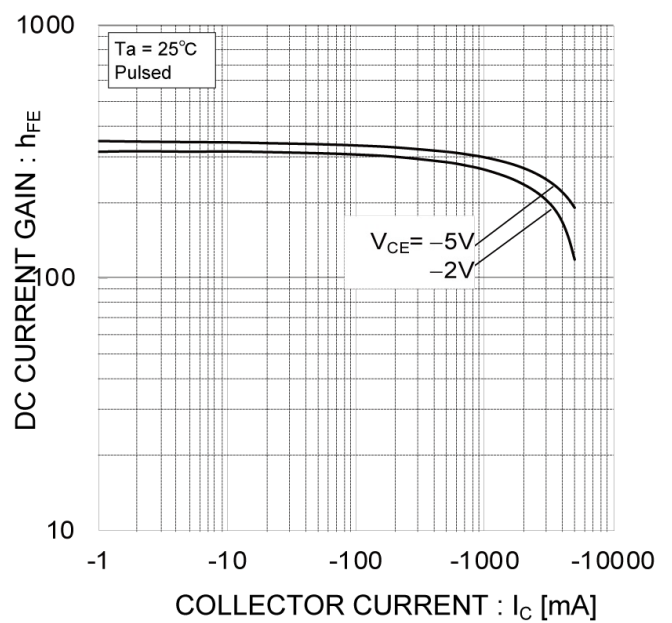


Fig.4 DC Current Gain vs. Collector Current (II)



● Electrical characteristic curves ($T_a = 25^\circ\text{C}$)

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

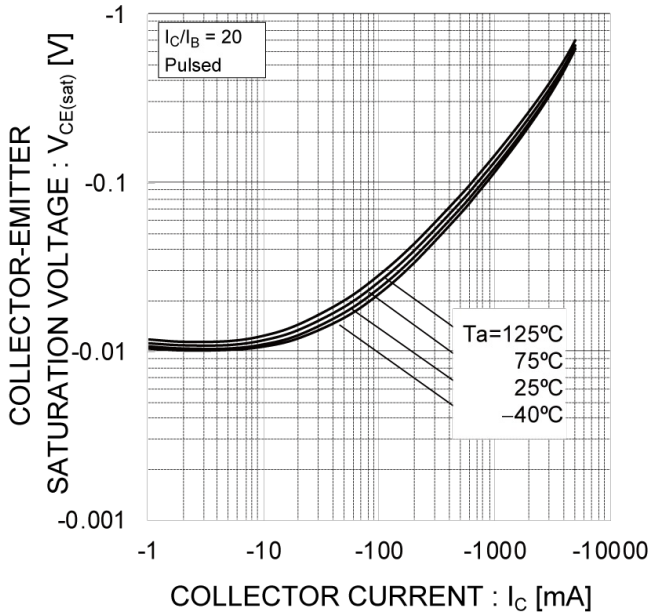


Fig.6 Collector-Emitter Saturation Voltage vs. Collector Current (II)

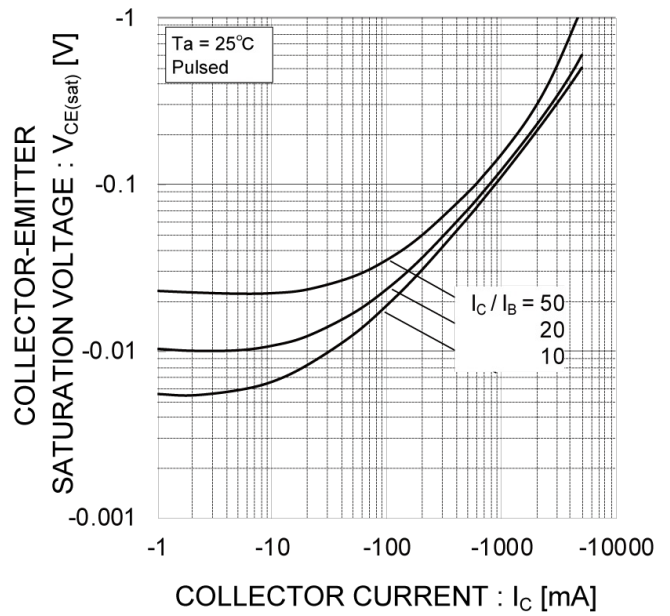


Fig.7 Base-Emitter Saturation Voltage vs. Collector Current

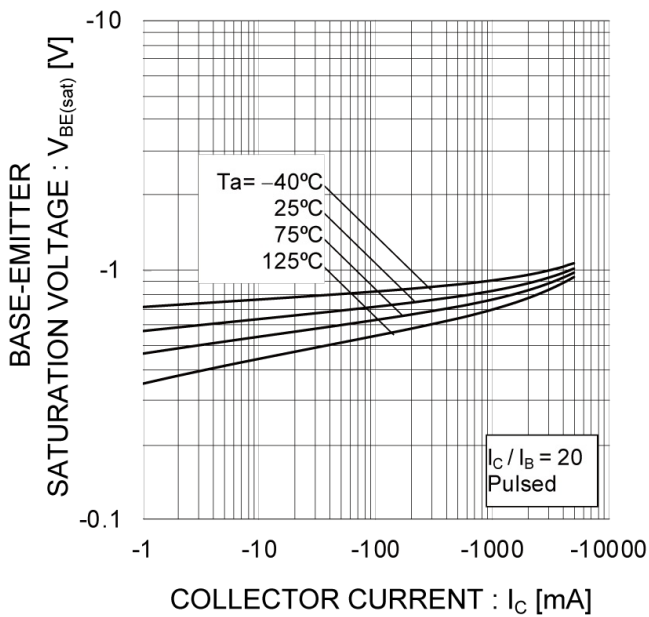
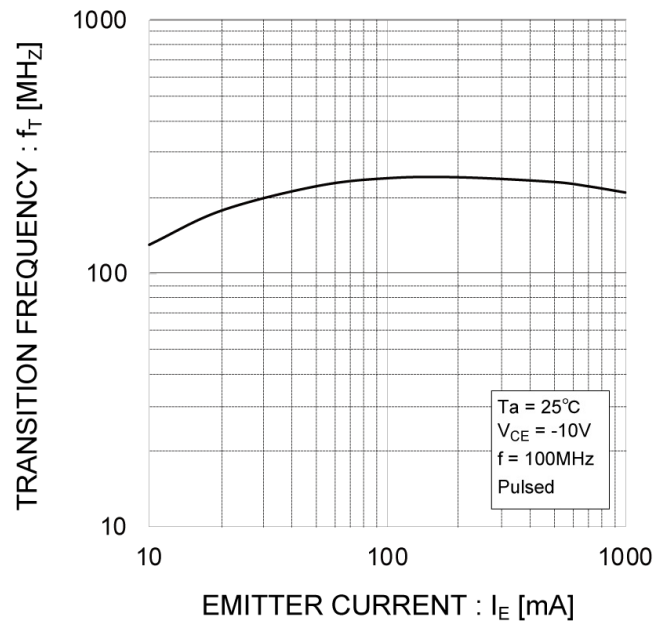


Fig.8 Gain Bandwidth Product vs. Emitter Current



● Electrical characteristic curves ($T_a = 25^\circ\text{C}$)

Fig.9 Emitter Input Capacitance vs. Emitter-Base Voltage
Collector Output Capacitance vs. Collector-Base Voltage

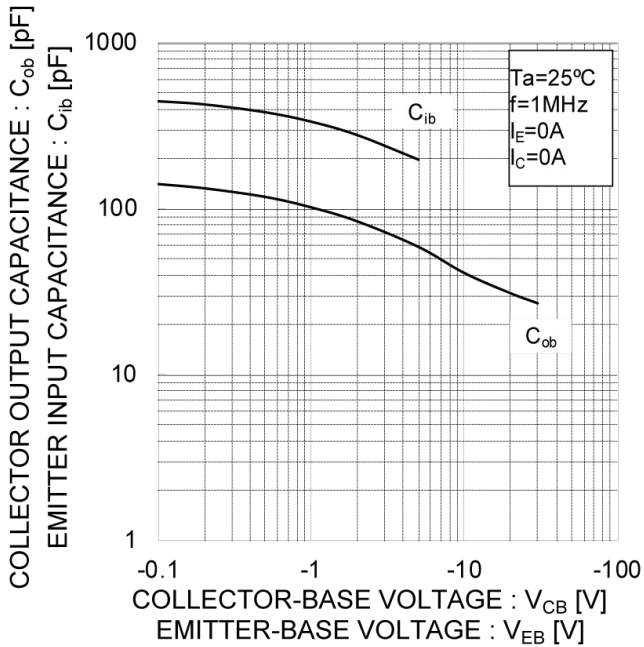
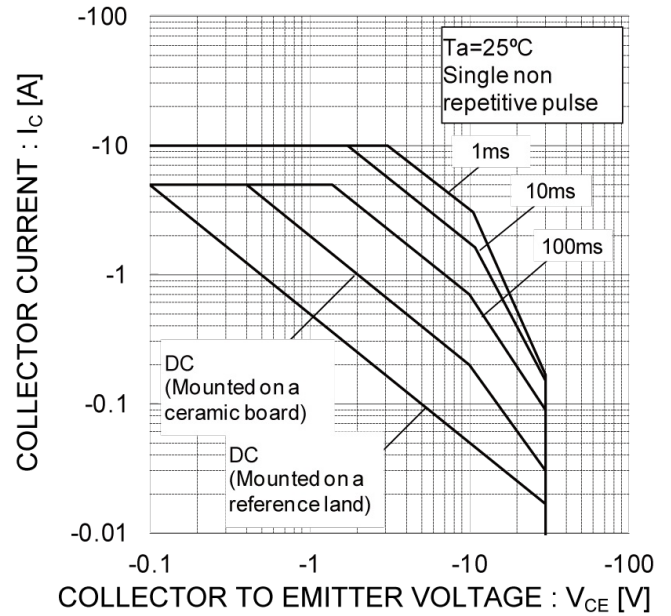


Fig.10 Safe Operating Area

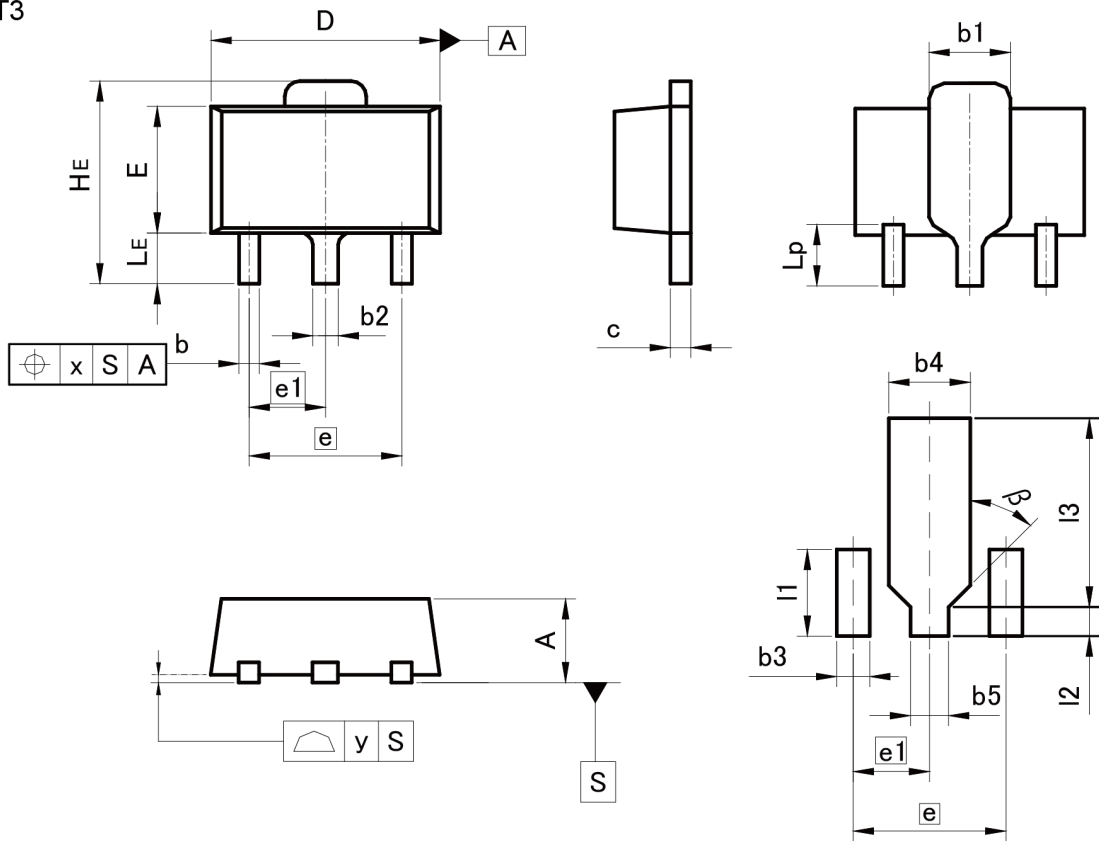


SWITCHING TIME TEST CIRCUIT



●Dimensions

MPT3



Pattern of terminal position areas
[Not a recommended pattern of soldering pads]

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.40	1.50	0.055	0.059
b	0.30	0.50	0.012	0.020
b1	1.50	1.70	0.059	0.067
b2	0.40	0.60	0.016	0.024
c	0.35	0.50	0.014	0.020
D	4.40	4.70	0.173	0.185
E	2.40	2.70	0.094	0.106
e	3.00		0.118	
e1	1.50		0.059	
HE	3.70	4.30	0.146	0.169
LE	0.80	1.20	0.031	0.047
Lp	1.01	1.41	0.040	0.056
x	-	0.15	-	0.006
y	-	0.10	-	0.004

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
b3	-	0.65	-	0.026
b4	-	1.70	-	0.067
b5	-	0.75	-	0.030
l1	-	1.71	-	0.067
l2	-	0.58	-	0.023
l3	-	3.72	-	0.146
β	45°		45°	

Dimension in mm/inches

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