

Parameter	Value
$V_{CEO}$	-30V
$I_C$	-0.5A

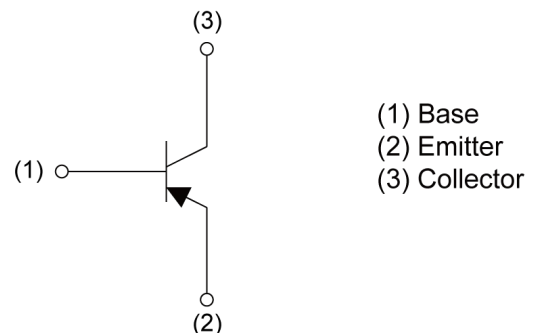
### ●Outline

EMT3F	UMT3F
2SAR502EB SOT-416FL	2SAR502UB SOT-323FL

### ●Features

- 1)General purpose.
- 2)Complementary NPN types :  
2SCR502EB(EMT3F)/2SCR502UB(UMT3F)
- 3)Collector current is large.
- 4)Low  $V_{CE(sat)}$ .

### ●Inner circuit



### ●Application

LOW FREQUENCY AMPLIFIER

### ●Packaging specifications

Part No.	Package	Package size	Taping code	Reel size (mm)	Tape width (mm)	Basic ordering unit.(pcs)	Marking
2SAR502EB	EMT3F	1616	TL	180	8	3000	LT
2SAR502UB	UMT3F	2021	TL	180	8	3000	LT

● **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		$I_C^{*1}$	-0.5	A
		$I_{CP}^{*2}$	-1	A
Base current		$I_B$	-0.15	A
Power dissipation	2SAR502EB	$P_D^{*3}$	150	mW
	2SAR502UB		200	
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	$BV_{CBO}$	$I_C = -100\mu\text{A}$	-30	-	-	V
Collector-emitter breakdown voltage	$BV_{CEO}$	$I_C = -1\text{mA}$	-30	-	-	V
Emitter-base breakdown voltage	$BV_{EBO}$	$I_E = -100\mu\text{A}$	-6	-	-	V
Collector cut-off current	$I_{CBO}$	$V_{CB} = -25\text{V}$	-	-	-200	nA
Emitter cut-off current	$I_{EBO}$	$V_{EB} = -4\text{V}$	-	-	-200	nA
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = -200\text{mA}, I_B = -10\text{mA}$	-	-150	-400	mV
DC current gain	$h_{FE}$	$V_{CE} = -2\text{V}, I_C = -100\text{mA}$	200	-	500	-
Transition frequency	$f_T^{*4}$	$V_{CE} = -10\text{V}, I_E = 100\text{mA}, f = 100\text{MHz}$	-	520	-	MHz
Output capacitance	$C_{ob}$	$V_{CB} = 10\text{V}, I_E = 0\text{A}, f = 1\text{MHz}$	-	4	-	pF

\*1 Limited by power dissipation.

\*2  $P_w=10\text{ms}$ , Single pulse.

\*3 Each terminal mounted on a reference land.

\*4 Pulsed

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

Fig.1 Grounded Emitter Propagation Characteristics

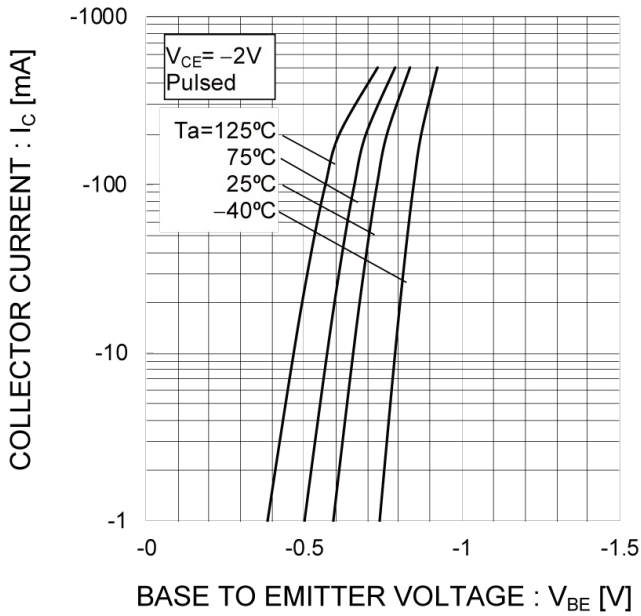


Fig.2 Typical Output Characteristics

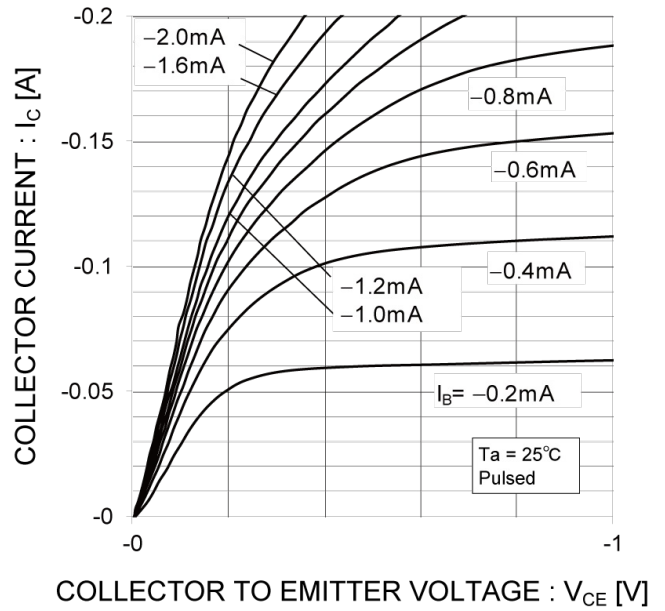


Fig.3 DC Current Gain vs. Collector Current(I)

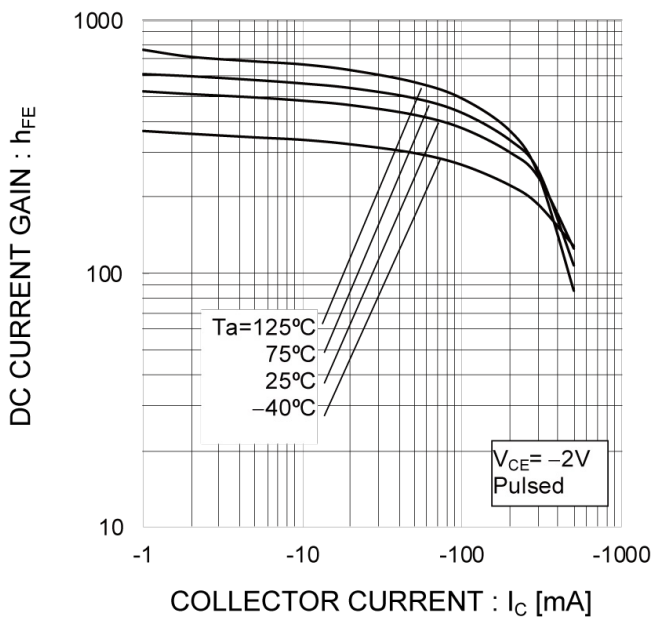
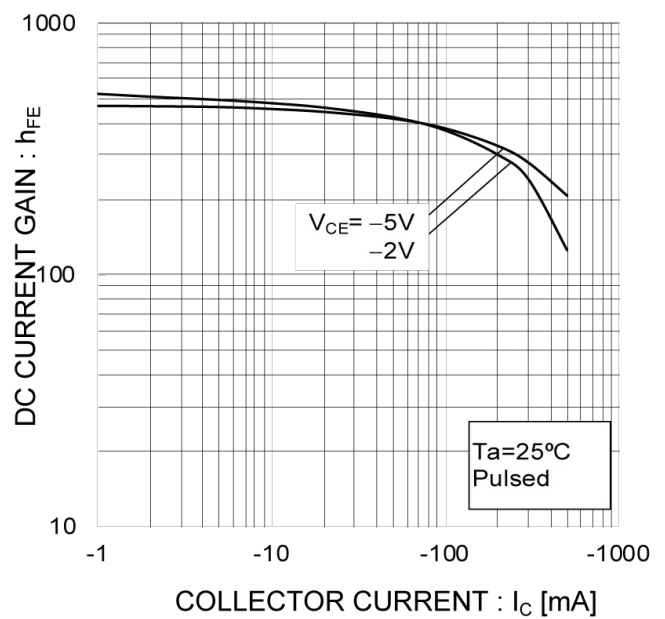


Fig.4 DC Current Gain vs. Collector Current(II)



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

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

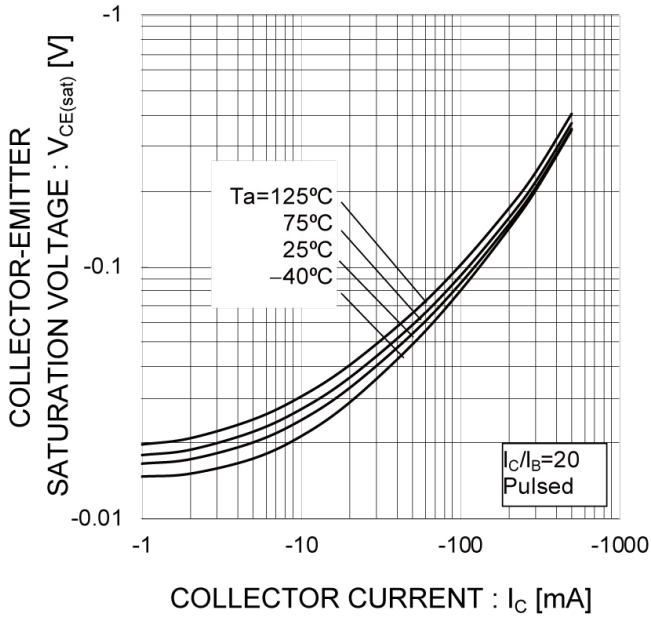


Fig.6 Collector-Emitter Saturation Voltage vs. Collector Current(II)

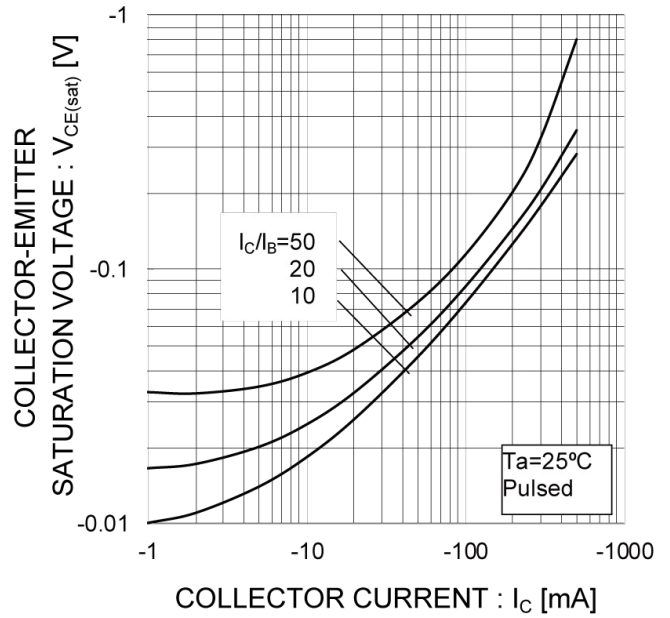


Fig.7 Base-Emitter Saturation Voltage vs. Collector Current

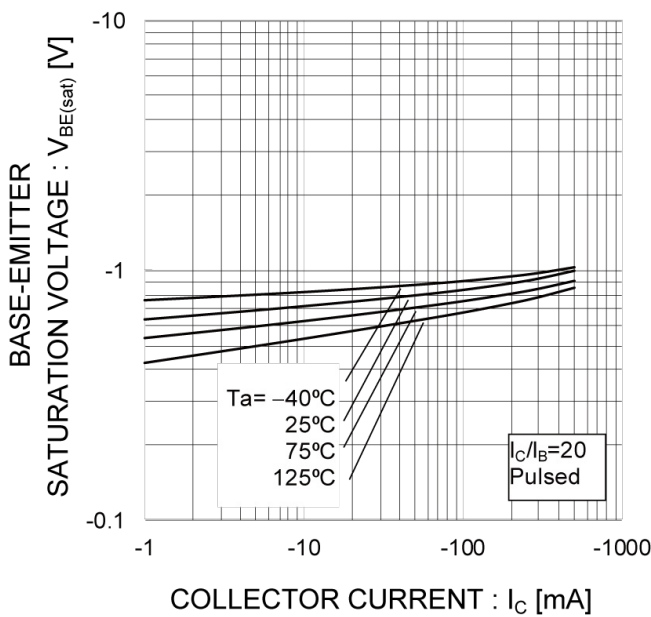
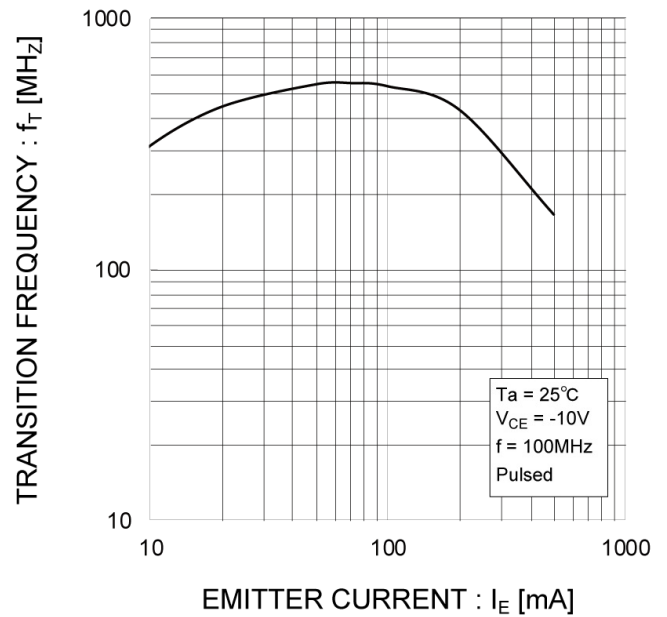


Fig.8 Gain Bandwidth Product vs. Emitter Current



● 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

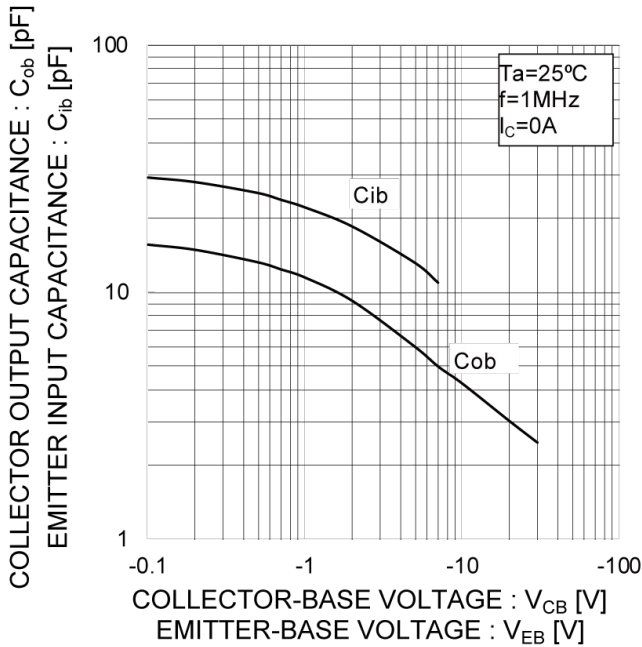


Fig.10 Safe Operating Area

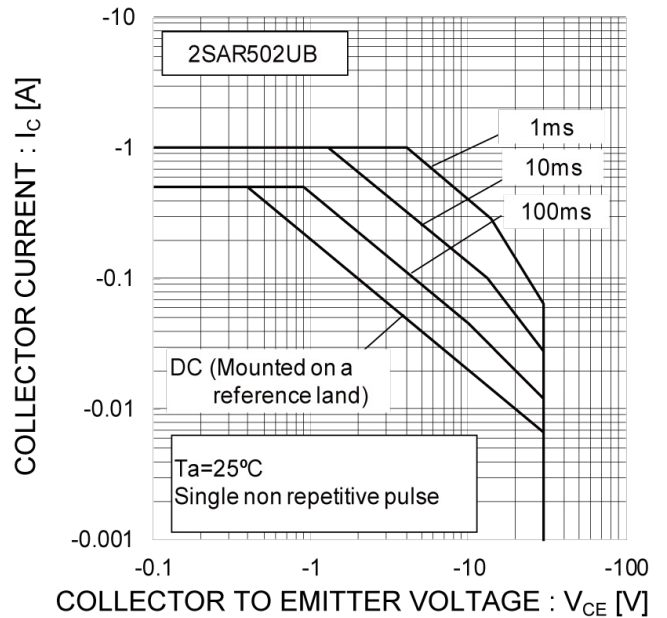
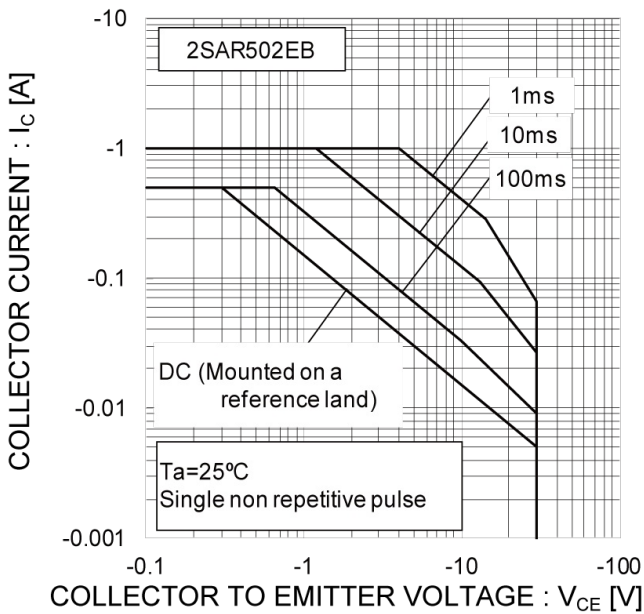


Fig.11 Safe Operating Area



●Dimensions

EMT3F



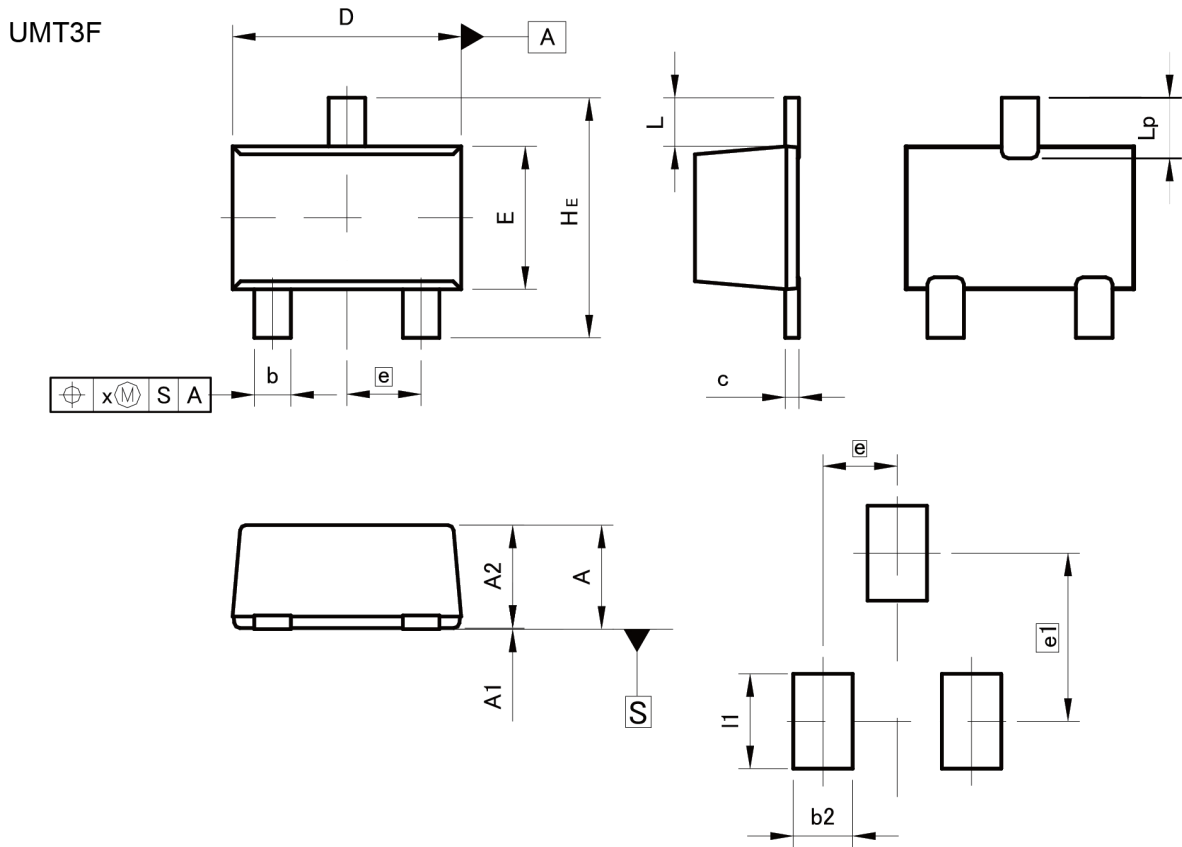
Pattern of terminal position areas  
[Not a recommended pattern of soldering pads]

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.65	0.85	0.026	0.033
A1	0.00	0.10	0.000	0.004
A2	0.60	0.80	0.024	0.031
b	0.21	0.36	0.008	0.014
c	0.08	0.18	0.003	0.007
D	1.50	1.70	0.059	0.067
E	0.76	0.96	0.030	0.038
e	0.50		0.020	
HE	1.50	1.70	0.059	0.067
L	0.37		0.015	
Lp	0.35	0.55	0.014	0.022
x	-	0.10	-	0.004

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
b2	-	0.46	-	0.018
e1	-	1.05	-	0.041
l1	-	0.65	-	0.026

Dimension in mm/inches

●Dimensions



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

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.85	1.05	0.033	0.041
A1	0.00	0.10	0.000	0.004
A2	0.80	1.00	0.031	0.039
b	0.27	0.42	0.011	0.017
c	0.08	0.18	0.003	0.007
D	1.90	2.10	0.075	0.083
E	1.15	1.35	0.045	0.053
e	0.65		0.026	
HE	2.00	2.20	0.079	0.087
L	0.43		0.017	
Lp	0.43	0.63	0.017	0.025
x	-	0.10	-	0.004

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
b2	-	0.52	-	0.020
e1	1.47		0.058	
l1	-	0.83	-	0.033

Dimension in mm/inches

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