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2SC5227A

RF Transistor

10V, 70mA, $f_T=7\text{GHz}$, NPN Single CP

Features

- Low-noise : $NF=1.0\text{dB}$ typ ($f=1\text{GHz}$)
- High gain : $|S_{21e}|^2=12\text{dB}$ typ ($f=1\text{GHz}$)
- High cut-off frequency : $f_T=7\text{GHz}$ typ

Specifications

Absolute Maximum Ratings at $T_a=25^\circ\text{C}$

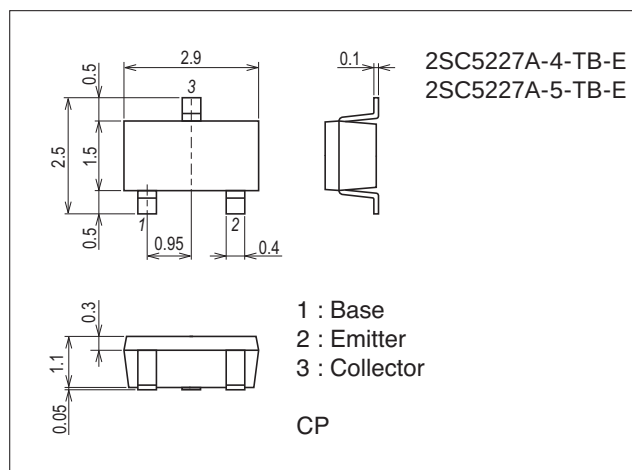
Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CBO}		20	V
Collector-to-Emitter Voltage	V_{CEO}		10	V
Emitter-to-Base Voltage	V_{EBO}		2	V
Collector Current	I_C		70	mA
Collector Dissipation	P_C		200	mW
Junction Temperature	T_j		150	$^\circ\text{C}$
Storage Temperature	T_{stg}		-55 to +150	$^\circ\text{C}$

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

Package Dimensions

unit : mm (typ)

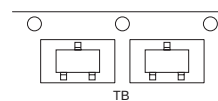
7013A-009



Product & Package Information

- Package : CP
- JEITA, JEDEC : SC-59, TO-236, SOT-23, TO-236AB
- Minimum Packing Quantity : 3,000 pcs./reel

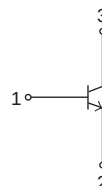
Packing Type: TB



Marking



Electrical Connection



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Electrical Characteristics at Ta=25°C

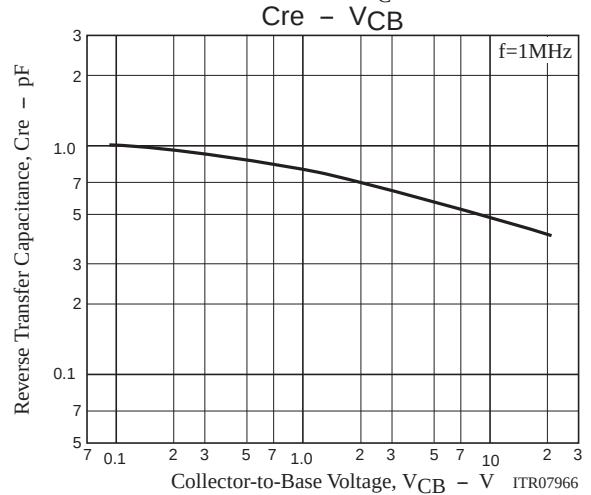
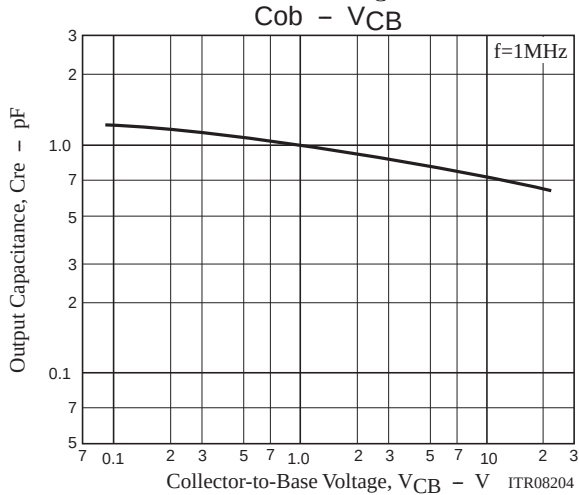
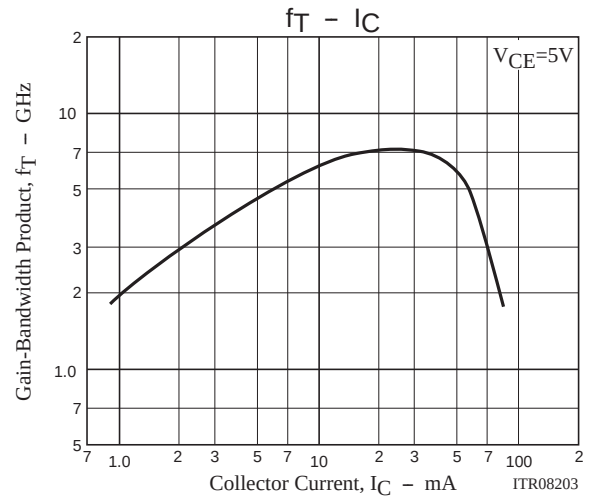
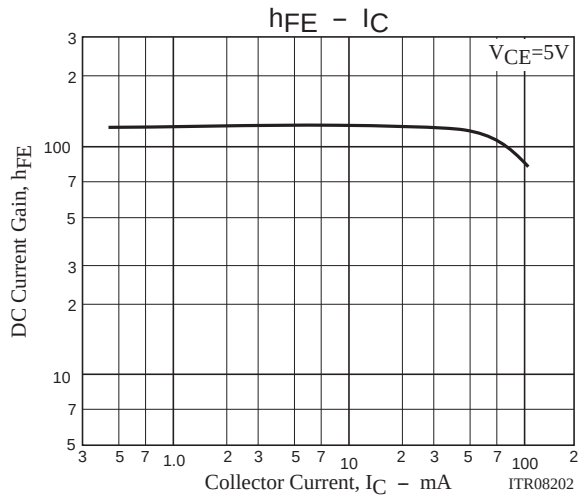
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	ICBO	V _{CB} =10V, I _E =0A			1.0	μA
Emitter Cutoff Current	IEBO	V _{EB} =1V, I _C =0A			10	μA
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =20mA	60*		270*	
Gain-Bandwidth Product	f _T	V _{CE} =5V, I _C =20mA	5	7		GHz
Output Capacitance	Cob	V _{CB} =10V, f=1MHz		0.75	1.2	pF
Reverse Transfer Capacitance	Cre			0.5		pF
Forward Transfer Gain	S _{21e} ² ₁	V _{CE} =5V, I _C =20mA, f=1GHz	9	12		dB
	S _{21e} ² ₂	V _{CE} =2V, I _C =3mA, f=1GHz		8		dB
Noise Figure	NF	V _{CE} =5V, I _C =7mA, f=1GHz		1.0	1.8	dB

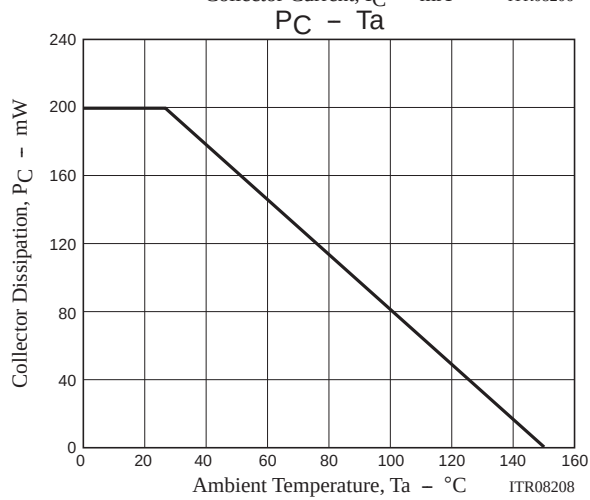
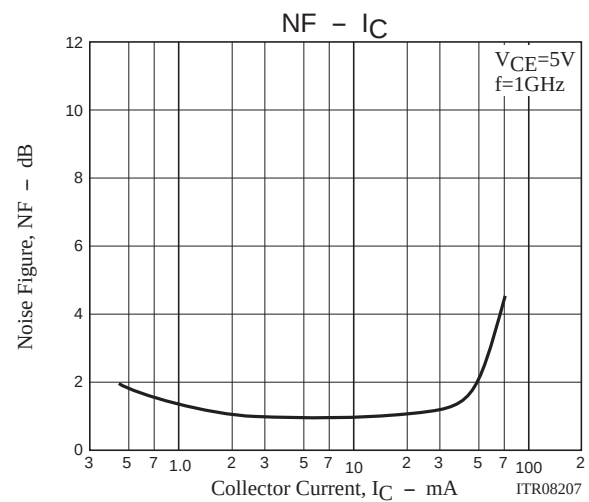
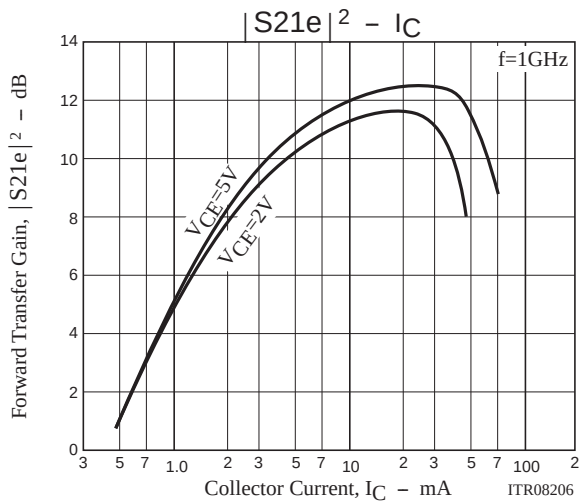
* : The 2SC5227A is classified by 20mA h_{FE} as follows :

Rank	3	4	5
h _{FE}	60 to 120	90 to 180	135 to 270

Ordering Information

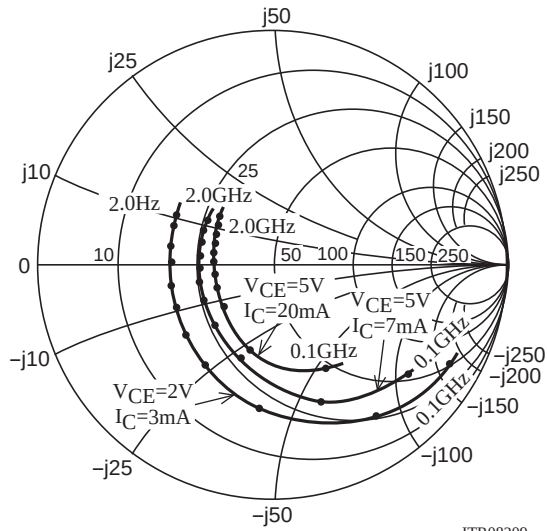
Device	Package	Shipping	memo
2SC5227A-4-TB-E	CP	3,000pcs./reel	Pb Free
2SC5227A-5-TB-E	CP	3,000pcs./reel	



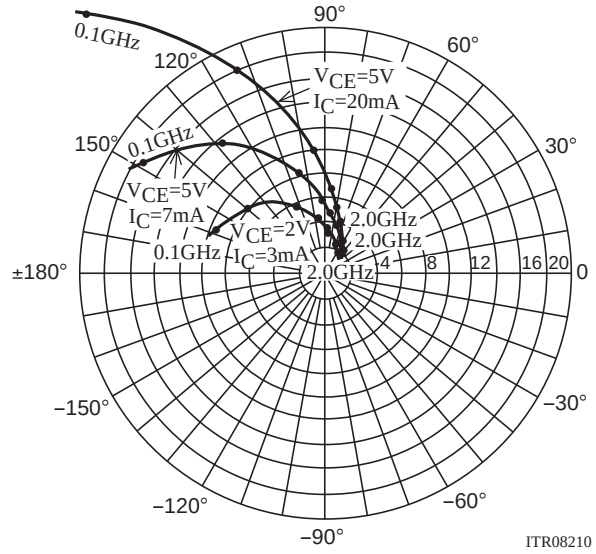


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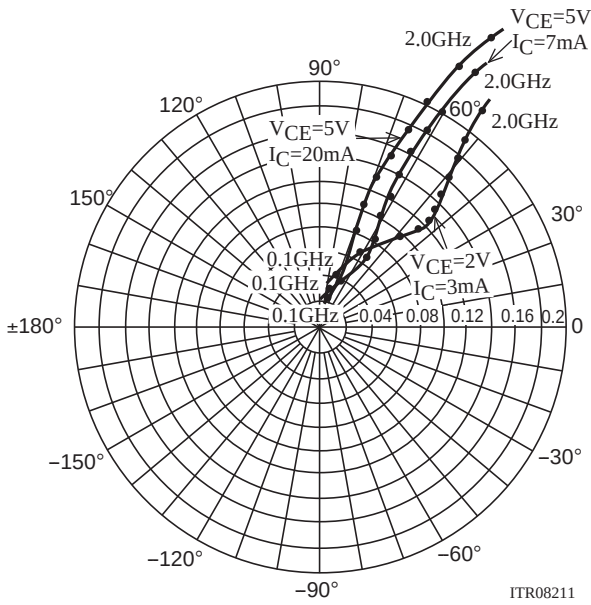
f=100MHz, 200MHz to 2000MHz(200MHz Step)



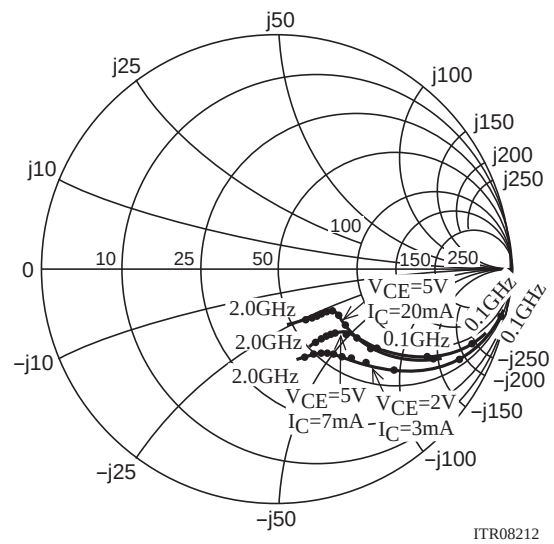
f=100MHz, 200MHz to 2000MHz(200MHz Step)



f=100MHz, 200MHz to 2000MHz(200MHz Step)



f=100MHz, 200MHz to 2000MHz(200MHz Step)



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S Parameters (Common emitter)

$V_{CE}=5V$, $I_C=7mA$, $Z_O=50\Omega$

Freq(MHz)	S11	$\angle S11$	S21	$\angle S21$	S12	$\angle S12$	S22	$\angle S22$
100	0.722	-41.6	17.352	148.7	0.029	70.9	0.883	-21.3
200	0.587	-73.2	13.419	127.6	0.046	60.8	0.710	-33.1
400	0.426	-113.0	8.371	105.1	0.067	56.9	0.507	-40.7
600	0.369	-136.6	5.914	92.7	0.084	58.4	0.423	-42.5
800	0.344	-152.9	4.593	83.9	0.102	60.3	0.382	-43.9
1000	0.334	-165.7	3.750	76.7	0.121	61.5	0.360	-46.3
1200	0.326	-177.9	3.178	70.3	0.141	62.0	0.350	-49.1
1400	0.324	172.3	2.784	64.9	0.162	61.8	0.341	-52.2
1600	0.328	163.4	2.476	59.5	0.183	61.2	0.334	-56.4
1800	0.335	154.5	2.246	54.6	0.204	60.5	0.328	-60.8
2000	0.346	147.5	3.073	50.0	0.226	59.6	0.328	-65.4

$V_{CE}=5V$, $I_C=20mA$, $Z_O=50\Omega$

Freq(MHz)	S11	$\angle S11$	S21	$\angle S21$	S12	$\angle S12$	S22	$\angle S22$
100	0.477	-66.8	28.090	133.6	0.022	67.7	0.726	-32.7
200	0.358	-104.1	17.995	112.9	0.035	65.3	0.506	-41.6
400	0.288	-142.2	9.903	95.9	0.057	68.3	0.350	-42.4
600	0.273	-159.8	6.777	86.7	0.081	69.9	0.299	-41.8
800	0.270	-171.7	5.181	79.9	0.104	70.2	0.278	-43.2
1000	0.271	178.7	4.209	73.9	0.129	69.1	0.269	-45.9
1200	0.273	169.4	3.554	68.5	0.153	67.9	0.264	-49.6
1400	0.275	161.1	3.085	63.6	0.177	66.2	0.258	-53.3
1600	0.284	153.4	2.749	59.1	0.202	64.3	0.253	-58.3
1800	0.294	145.6	2.479	54.6	0.224	62.5	0.249	-63.4
2000	0.302	140.8	2.295	50.6	0.248	60.4	0.248	-68.7

$V_{CE}=2V$, $I_C=3mA$, $Z_O=50\Omega$

Freq(MHz)	S11	$\angle S11$	S21	$\angle S21$	S12	$\angle S12$	S22	$\angle S22$
100	0.858	-30.5	9.283	157.3	0.039	73.6	0.944	-15.6
200	0.769	-57.4	8.036	138.7	0.068	61.4	0.834	-27.5
400	0.607	-97.1	5.756	113.9	0.099	48.4	0.641	-40.5
600	0.528	-123.2	4.302	98.1	0.114	44.4	0.525	-46.5
800	0.486	-141.6	3.414	87.0	0.125	43.9	0.465	-50.2
1000	0.460	-156.4	2.834	78.0	0.137	45.4	0.429	-53.7
1200	0.453	-169.4	2.429	70.3	0.149	47.5	0.408	-57.3
1400	0.440	179.8	2.143	63.6	0.163	49.2	0.395	-60.9
1600	0.441	170.1	1.919	57.4	0.179	50.8	0.385	-65.4
1800	0.447	160.4	1.739	51.7	0.196	52.3	0.381	-70.1
2000	0.454	152.5	1.621	46.4	0.215	53.3	0.379	-75.2

Embossed Taping Specification

2SC5227A-4-TB-E, 2SC5227A-5-TB-E

1. Packing Format

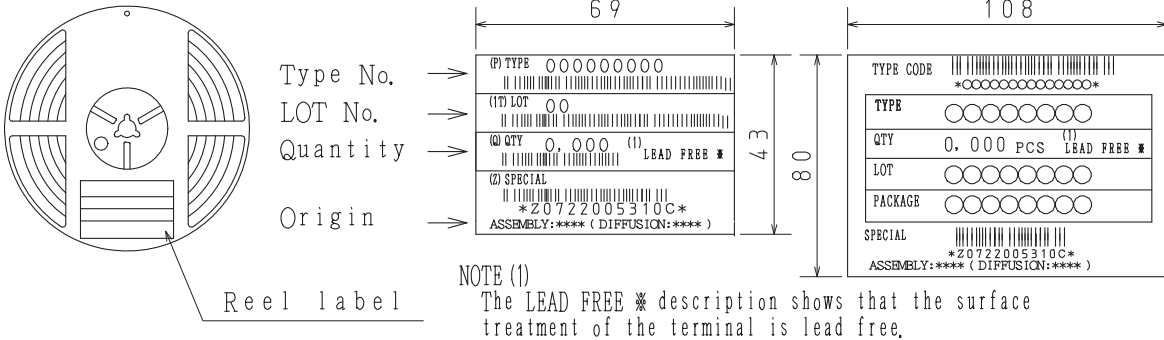
Package Name	Carrier Tape Type	Maximum Number of devices contained (pcs)			Packing format	
		Reel	Inner box	Outer box	Inner BOX (C-1)	Outer BOX (A-7)
CP	CP	3,000	15,000	90,000	5 reels contained Dimensions:mm (external) 183×72×185	6 inner boxes contained Dimensions:mm (external) 440×195×210

Reel label, Inner box label
(unit:mm)

Outer box label

It is a label at the time of factory shipments.
The form of a label may change in physical distribution process.

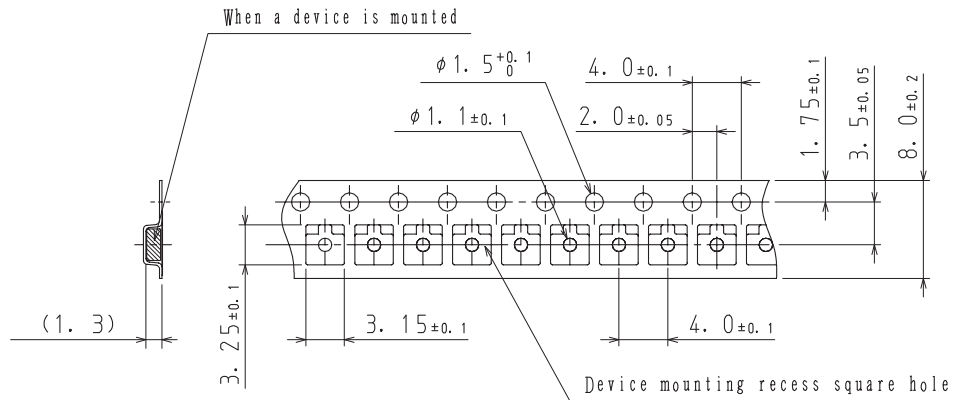
Packing method



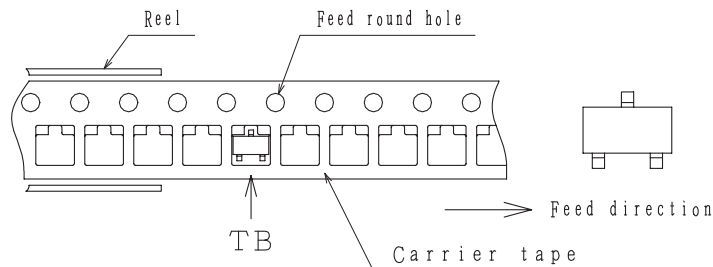
Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A
LEAD FREE 4	JEITA Phase 3

2. Taping configuration

2-1. Carrier tape size (unit:mm)



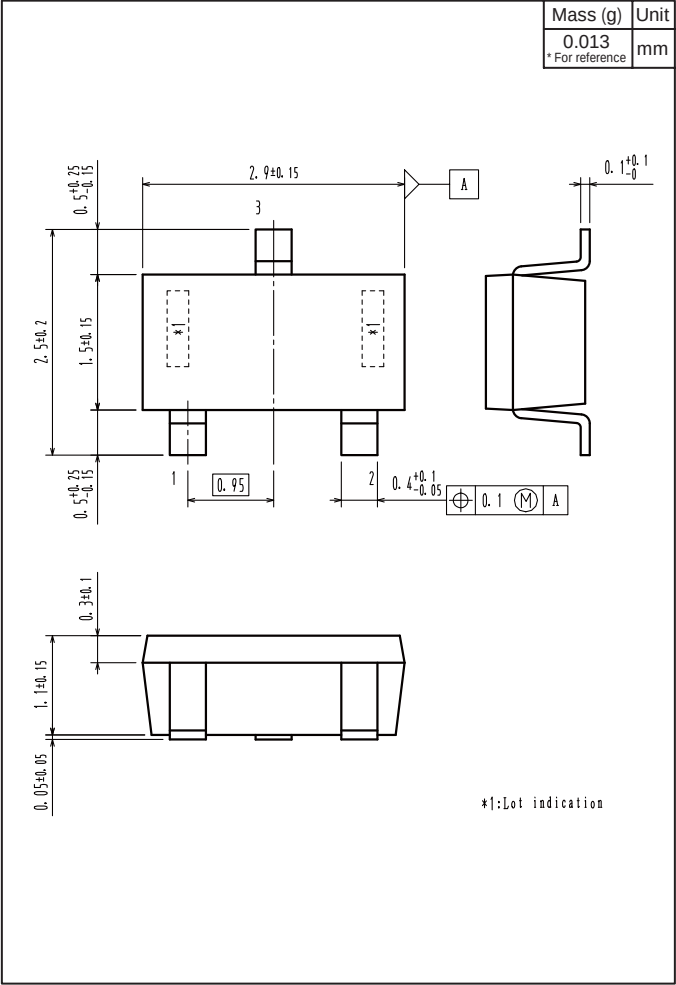
2-2. Device placement direction



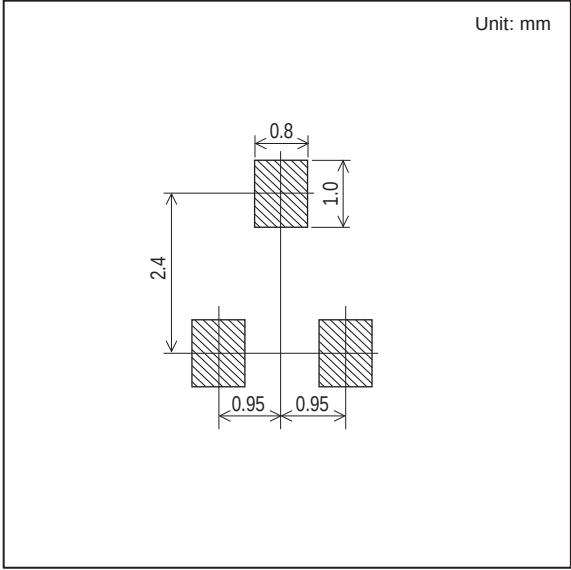
Those with one electrode terminal on the feed hole side.....TB

Outline Drawing

2SC5227A-4-TB-E, 2SC5227A-5-TB-E



Land Pattern Example



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