



SANYO Semiconductors

# DATA SHEET

An ON Semiconductor Company

## 2SC5277A — NPN Epitaxial Planar Silicon Transistor UHF to S-Band Low-Noise Amplifier OSC Applications

### Features

- Low-noise : NF=0.9dB typ (f=1GHz)  
: NF=1.4dB typ (f=1.5GHz)
- High gain :  $|S_{21e}|^2=10\text{dB typ (f=1.5GHz)}$
- High cut-off frequency :  $f_T=8\text{GHz typ}$
- Low-voltage, low-current operation ( $V_{CE}=1\text{V, } I_C=1\text{mA}$ )  
:  $f_T=3.5\text{GHz typ}$   
:  $|S_{21e}|^2=5.5\text{dB typ (f=1.5GHz)}$
- Ultrasmall-sized package permitting applied sets to be made small and slim

### Specifications

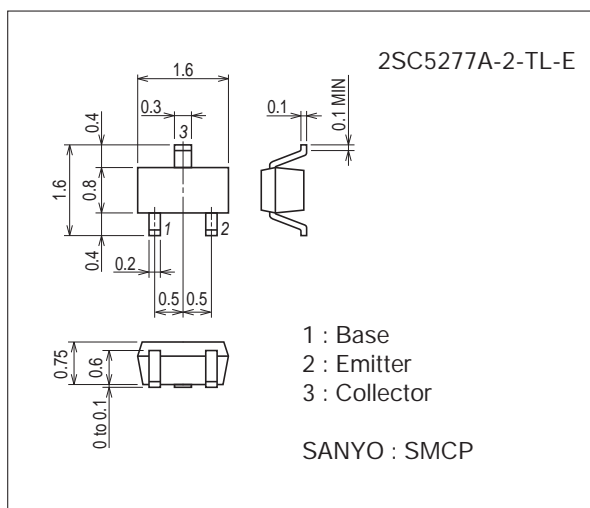
Absolute Maximum Ratings at  $T_a=25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	$V_{CB0}$		20	V
Collector-to-Emitter Voltage	$V_{CE0}$		10	V
Emitter-to-Base Voltage	$V_{EB0}$		1.5	V
Collector Current	$I_C$		30	mA
Collector Dissipation	$P_C$		100	mW
Junction Temperature	$T_J$		150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$		-55 to +150	$^\circ\text{C}$

### Package Dimensions

unit : mm (typ)

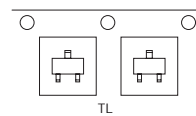
7027A-002



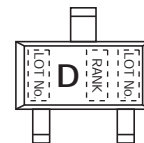
### Product & Package Information

- Package : SMCP
- JEITA, JEDEC : SC-75, SOT-416
- Minimum Packing Quantity : 3,000 pcs./reel

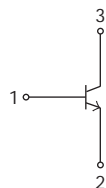
### Packing Type: TL



### Marking



### Electrical Connection



# 2SC5277A

## Electrical Characteristics at Ta=25°C

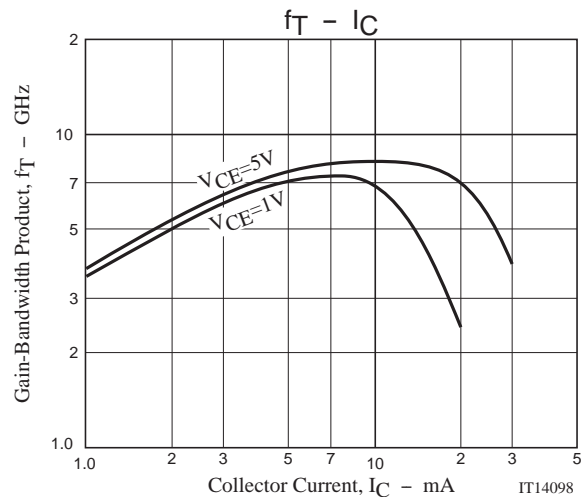
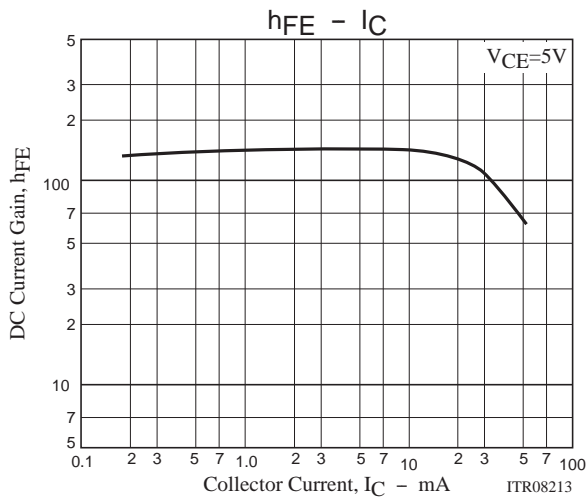
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	$I_{CBO}$	$V_{CB}=10V, I_E=0A$			1.0	$\mu A$
Emitter Cutoff Current	$I_{EBO}$	$V_{EB}=1V, I_C=0A$			10	$\mu A$
DC Current Gain	$h_{FE}$	$V_{CE}=5V, I_C=10mA$	60*		270*	
Gain-Bandwidth Product	$f_T1$	$V_{CE}=5V, I_C=10mA$	5	8		GHz
	$f_T2$	$V_{CE}=1V, I_C=1mA$		3.5		GHz
Output Capacitance	$C_{ob}$	$V_{CB}=10V, f=1MHz$		0.45	0.7	pF
Reverse Transfer Capacitance	$C_{re}$			0.30		pF
Forward Transfer Gain	$ S_{21e} ^2_1$	$V_{CE}=5V, I_C=10mA, f=1.5GHz$	8	10		dB
	$ S_{21e} ^2_2$	$V_{CE}=1V, I_C=1mA, f=1.5GHz$		5.5		dB
Noise Figure	NF1	$V_{CE}=5V, I_C=5mA, f=1.5GHz$		1.4	3.0	dB
	NF2	$V_{CE}=2V, I_C=3mA, f=1GHz$		0.9		dB

\* : The 2SC5277A is classified by 10mA  $h_{FE}$  as follows :

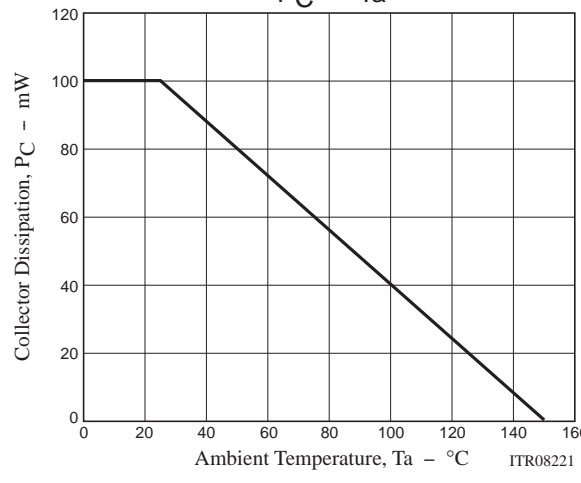
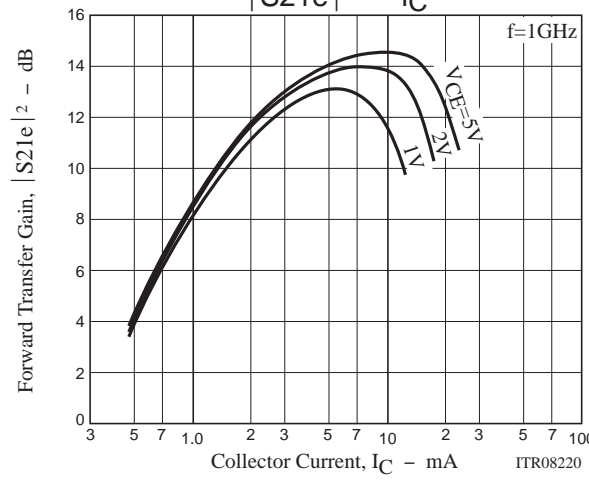
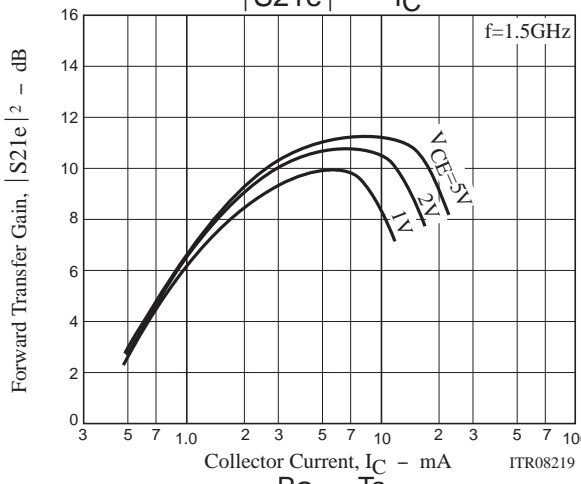
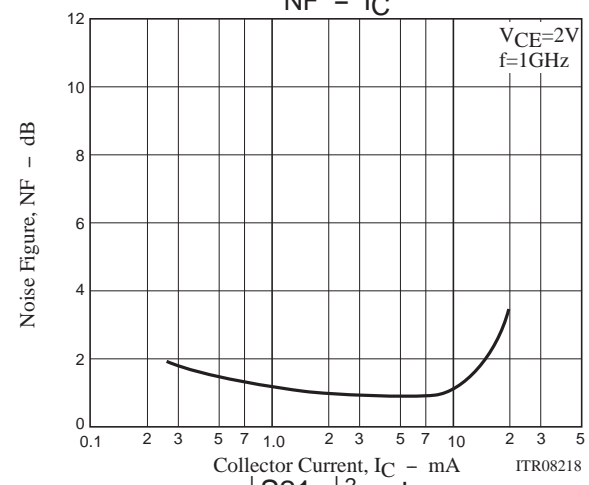
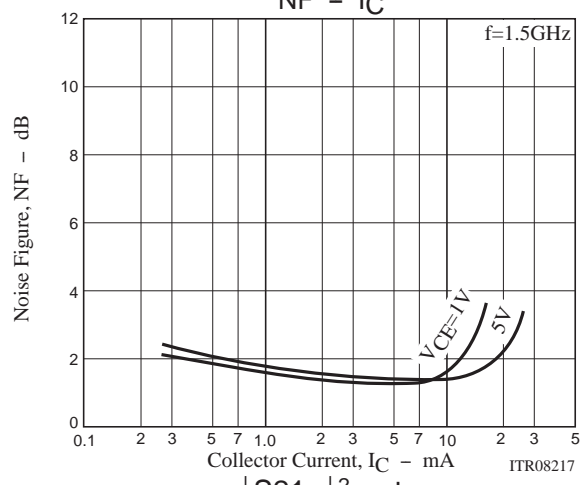
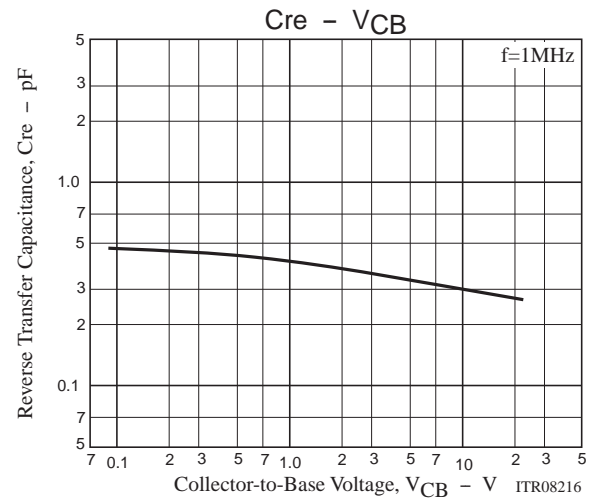
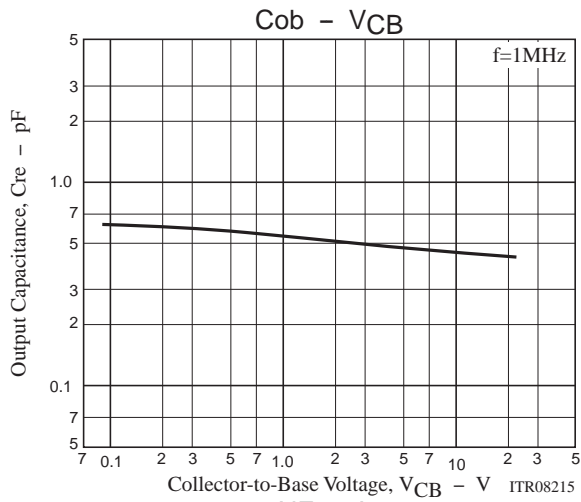
Rank	1	2	3
$h_{FE}$	60 to 120	90 to 180	135 to 270

## Ordering Information

Device	Package	Shipping	memo
2SC5277A-2-TL-E	SMCP	3,000pcs./reel	Pb Free



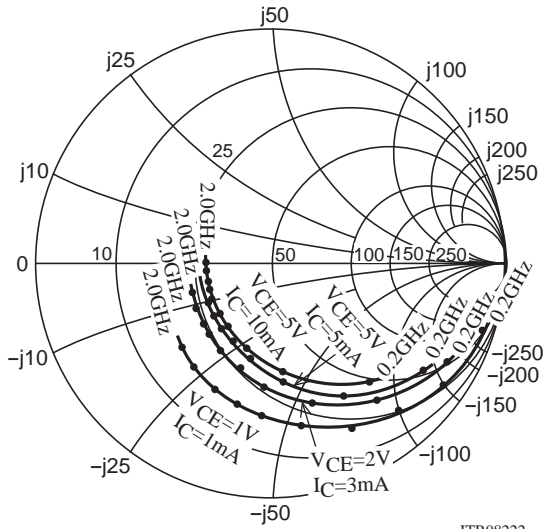
# 2SC5277A



# 2SC5277A

S11e

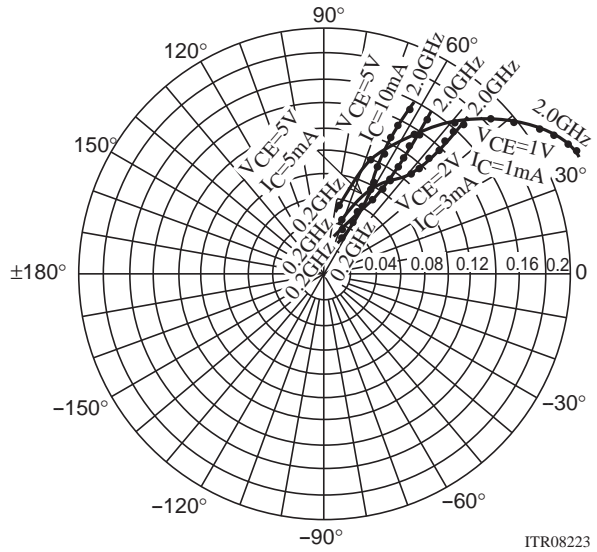
f=200MHz to 2000MHz(200MHz Step)



ITR08222

S21e

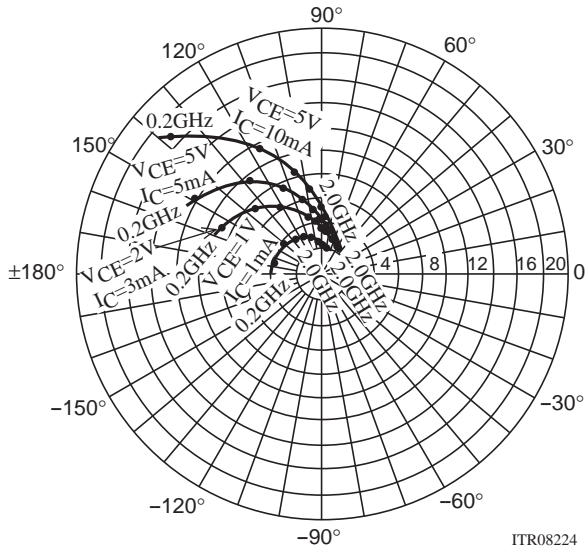
f=200MHz to 2000MHz(200MHz Step)



ITR08223

S12e

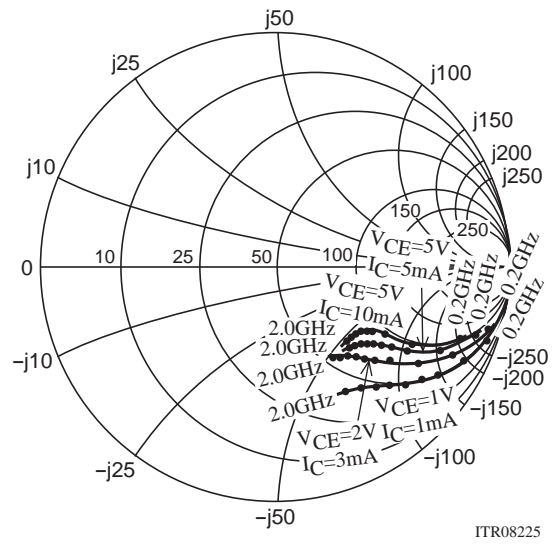
f=200MHz to 2000MHz(200MHz Step)



ITR08224

S22e

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



ITR08225

## 2SC5277A

### S Parameters (Common emitter)

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

Freq(MHz)	S11	$\angle S11$	S21	$\angle S21$	S12	$\angle S12$	S22	$\angle S22$
200	0.782	-37.1	12.043	148.4	0.038	69.7	0.889	-19.5
400	0.623	-65.4	9.431	126.6	0.057	60.8	0.758	-28.3
600	0.502	-85.6	7.415	112.2	0.072	56.5	0.646	-33.3
800	0.420	-102.4	6.000	101.5	0.083	55.2	0.577	-35.9
1000	0.369	-114.7	5.025	93.6	0.094	55.1	0.538	-37.6
1200	0.339	-127.2	4.323	86.7	0.105	55.6	0.513	-38.7
1400	0.311	-137.2	3.785	80.6	0.115	55.6	0.490	-39.7
1600	0.296	-144.9	3.391	75.3	0.127	56.7	0.480	-41.3
1800	0.285	-156.5	3.018	70.1	0.139	56.4	0.466	-43.5
2000	0.277	-164.2	2.767	65.7	0.150	56.7	0.460	-45.5

$V_{CE}=5V, I_C=10mA, Z_O=50\Omega$

Freq(MHz)	S11	$\angle S11$	S21	$\angle S21$	S12	$\angle S12$	S22	$\angle S22$
200	0.641	-52.7	16.527	137.8	0.031	67.4	0.820	-22.9
400	0.468	-85.4	11.299	115.7	0.048	60.5	0.643	-30.2
600	0.377	-106.6	8.303	103.1	0.060	60.0	0.549	-32.2
800	0.321	-124.1	6.502	94.0	0.072	60.9	0.499	-33.2
1000	0.293	-136.1	5.342	87.4	0.084	61.9	0.477	-33.9
1200	0.280	-146.7	4.546	81.4	0.097	62.7	0.462	-35.0
1400	0.266	-156.6	3.947	76.4	0.108	63.0	0.449	-36.2
1600	0.263	-163.2	3.527	71.4	0.123	63.7	0.444	-37.8
1800	0.263	173.5	3.121	67.0	0.136	62.8	0.435	-39.9
2000	0.264	179.8	2.864	62.8	0.150	62.4	0.434	-42.4

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

Freq(MHz)	S11	$\angle S11$	S21	$\angle S21$	S12	$\angle S12$	S22	$\angle S22$
200	0.851	-30.4	8.644	154.1	0.042	73.0	0.937	-16.4
400	0.724	-55.7	7.310	133.8	0.073	61.3	0.820	-27.9
600	0.612	-76.1	6.083	118.6	0.093	54.2	0.709	-35.7
800	0.521	-93.0	5.085	106.9	0.107	50.4	0.628	-40.4
1000	0.461	-106.1	4.343	98.1	0.118	48.3	0.572	-43.7
1200	0.423	-118.6	3.806	90.0	0.128	47.5	0.536	-45.8
1400	0.382	-129.4	3.349	83.3	0.137	46.9	0.506	-47.3
1600	0.366	-138.0	3.036	77.5	0.147	47.4	0.485	-49.5
1800	0.341	-148.8	2.685	71.7	0.157	47.2	0.463	-51.9
2000	0.333	-157.7	2.479	66.7	0.167	47.6	0.453	-54.1

$V_{CE}=1V, I_C=1mA, Z_O=50\Omega$

Freq(MHz)	S11	$\angle S11$	S21	$\angle S21$	S12	$\angle S12$	S22	$\angle S22$
200	0.945	-18.7	3.431	162.9	0.053	78.1	0.982	-10.3
400	0.892	-36.9	3.263	147.1	0.099	66.9	0.939	-19.7
600	0.826	-52.9	3.004	133.2	0.136	57.5	0.879	-27.7
800	0.754	-67.9	2.765	120.4	0.164	49.7	0.815	-34.8
1000	0.691	-81.1	2.539	109.9	0.184	43.4	0.758	-40.0
1200	0.639	-94.3	2.366	99.8	0.199	38.4	0.727	-44.3
1400	0.589	-104.9	2.143	91.2	0.207	34.1	0.683	-47.8
1600	0.558	-114.1	1.969	83.6	0.213	31.7	0.653	-51.4
1800	0.522	-124.4	1.797	76.2	0.218	28.7	0.621	-54.9
2000	0.490	-134.9	1.701	69.7	0.219	27.0	0.601	-58.1

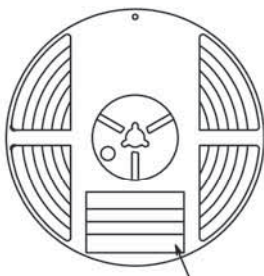
Embossed Taping Specification

2SC5277A-2-TL-E

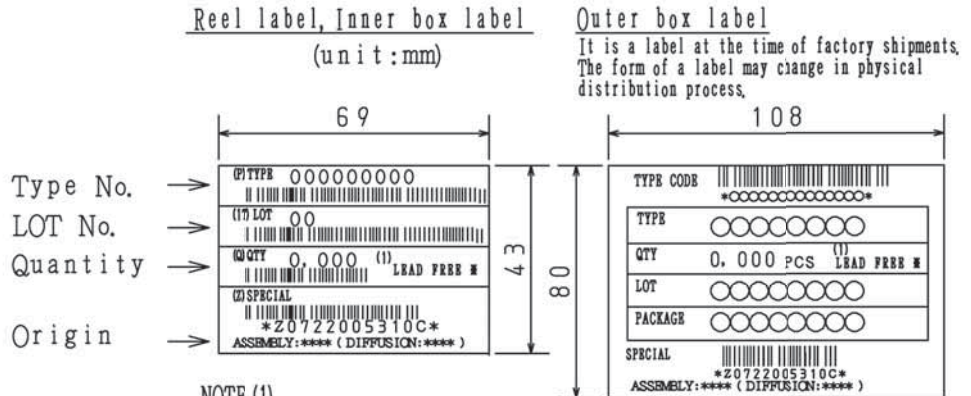
1. Packing Format

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)
SMCP	SMCP	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

Packing method



Reel label



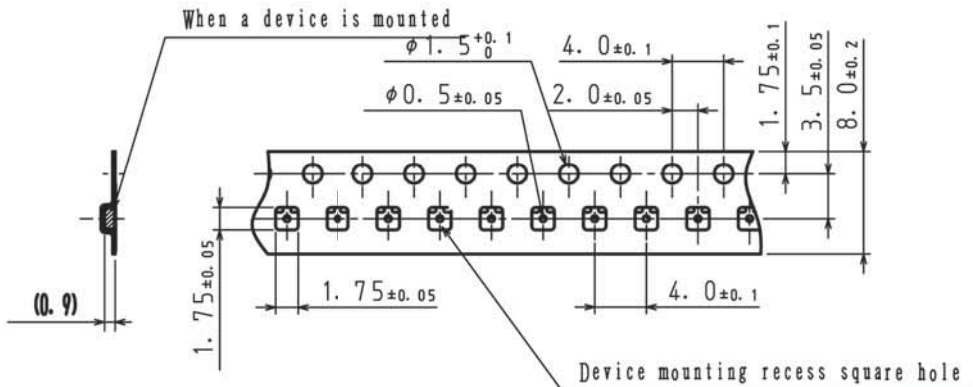
NOTE (1)

The LEAD FREE \* description shows that the surface treatment of the terminal is lead free.

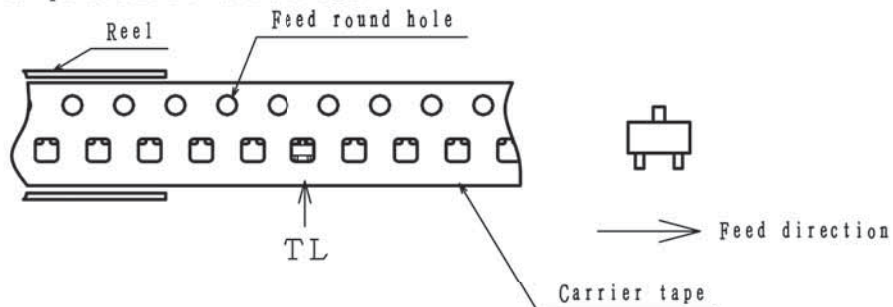
Label	JEITA Phase
.....	JEITA Phase 3

2. Taping configuration

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



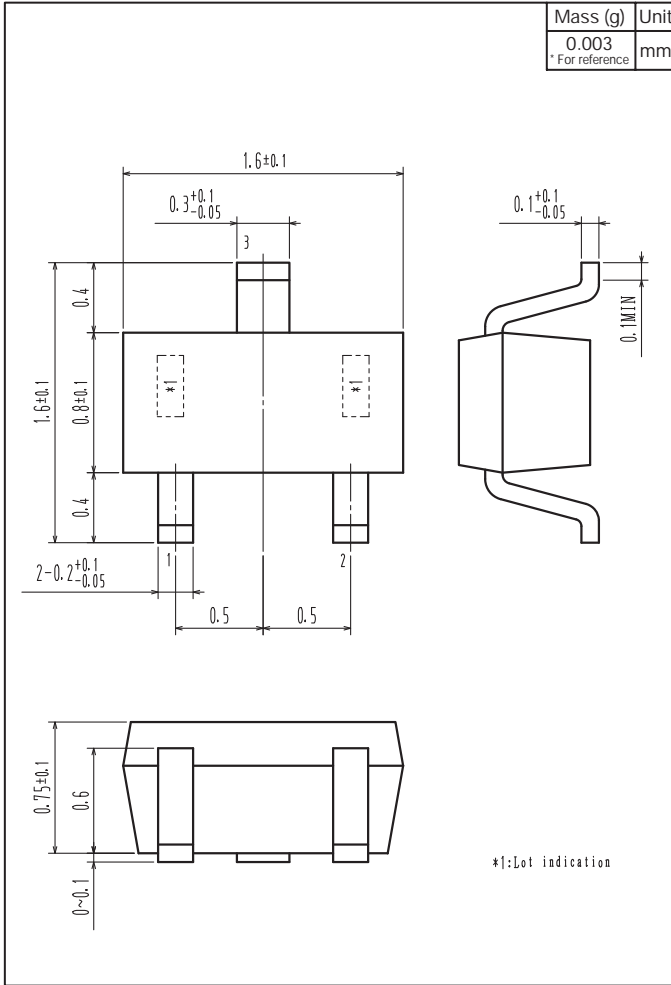
2-2. Device placement direction



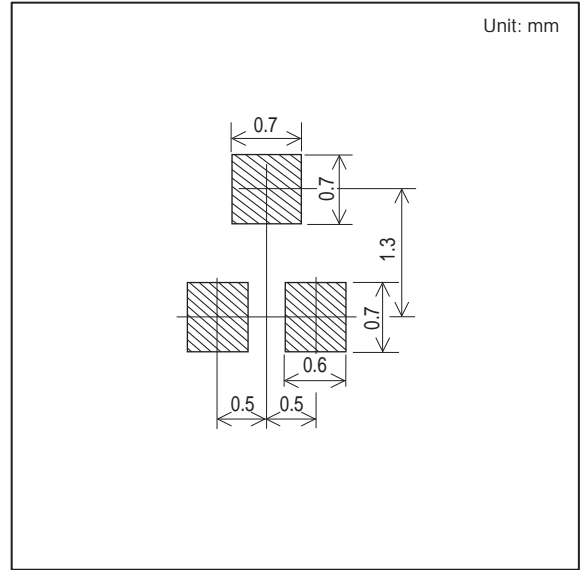
Those with one electrode terminal on the feed hole side.....TL

# 2SC5277A

## Outline Drawing 2SC5277A-2-TL-E



## Land Pattern Example



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