Ordering number : ENA1107A

15GN03FA

RF Transistor
10V, 70mA, fT=1.5GHz, NPN Single SSFP

ON Semiconductor®
http://onsemi.com

Applications

- VHF, RF, MIXER, OSC, IF amplifier

Features

- High cutoff frequency : f_T=1.5GHz typ
- High gain : $|S21e|^2$=14dB typ (f=0.4GHz)
- Ultrasmall package permitting applied sets to be small and slim
- Halogen free compliance

Specifications

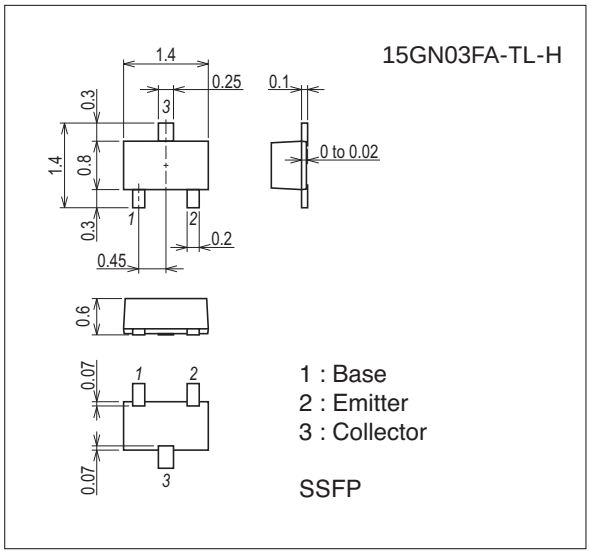
Absolute Maximum Ratings at Ta=25°C

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}		3	V
Collector Current	I_C		70	mA
Collector Dissipation	P_C		250	mW
Junction Temperature	Tj		150	°C
Storage Temperature	Tstg		−55 to +150	°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

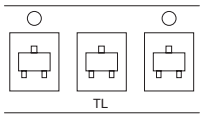
unit : mm (typ)
7029A-002



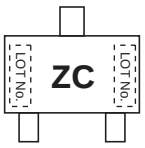
Product & Package Information

- Package : SSFP
- JEITA, JEDEC : SC-81
- Minimum Packing Quantity : 8,000 pcs./reel

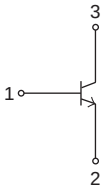
Packing Type: TL



Marking



Electrical Connection

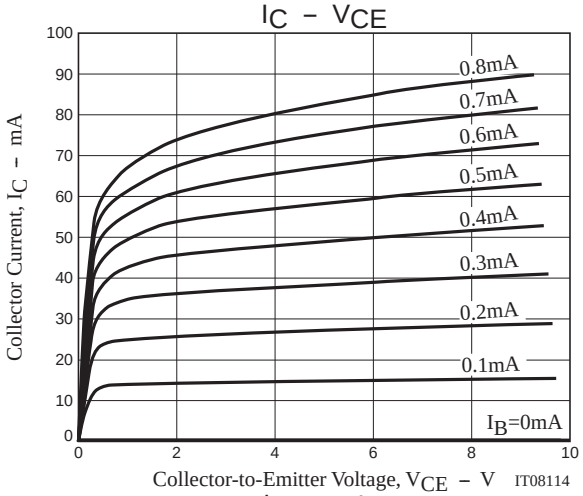


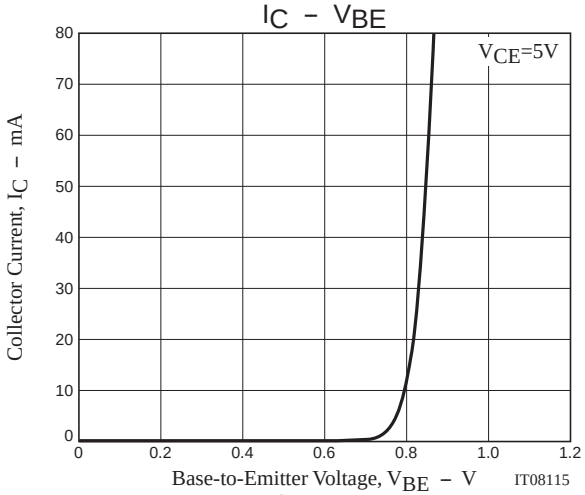
Electrical Characteristics at Ta=25°C

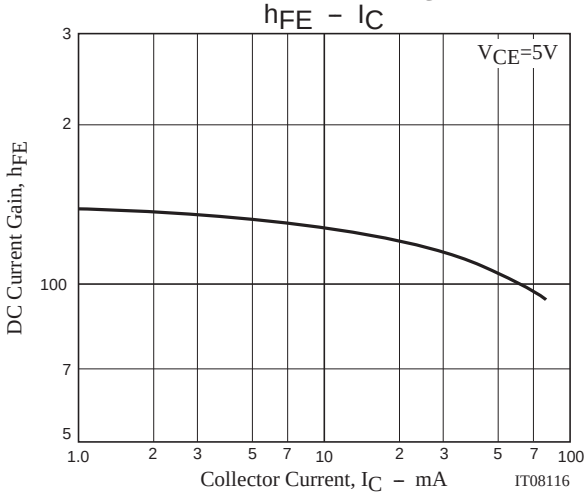
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	V_{CB}=10V, I_E=0A			0.1	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=2V, I_C=0A			1	μA
DC Current Gain	h_{FE}	V_{CE}=5V, I_C=10mA	100		180	
Gain-Bandwidth Product	f_T	V_{CE}=5V, I_C=20mA	1.0	1.5		GHz
Output Capacitance	Cob	V_{CB}=10V, f=1MHz		0.9	1.2	pF
Reverse Transfer Capacitance	Cre			0.6		pF
Forward Transfer Gain	$\|S21e\|^2$	V_{CE}=5V, I_C=20mA, f=0.4GHz	11	14		dB
Noise Figure	NF	V_{CE}=3V, I_C=2mA, f=0.4GHz		1.6		dB

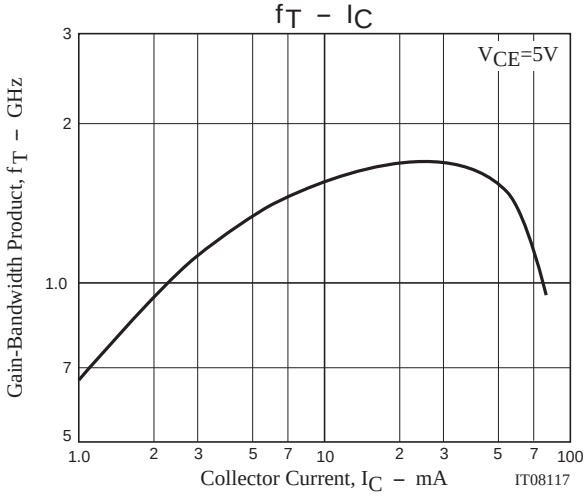
Ordering Information

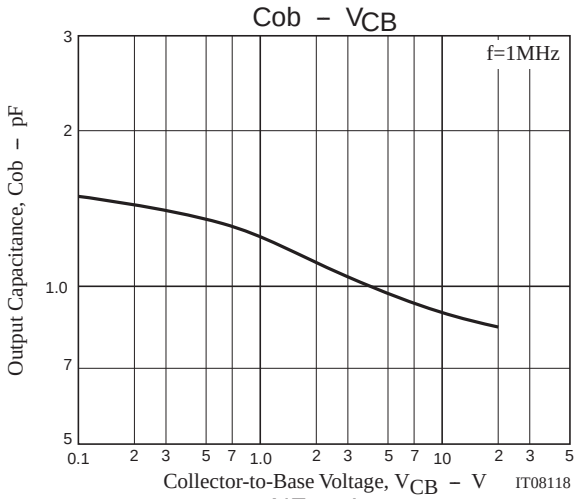
Device	Package	Shipping	memo
15GN03FA-TL-H	SSFP	8,000pcs./reel	Pb Free and Halogen Free

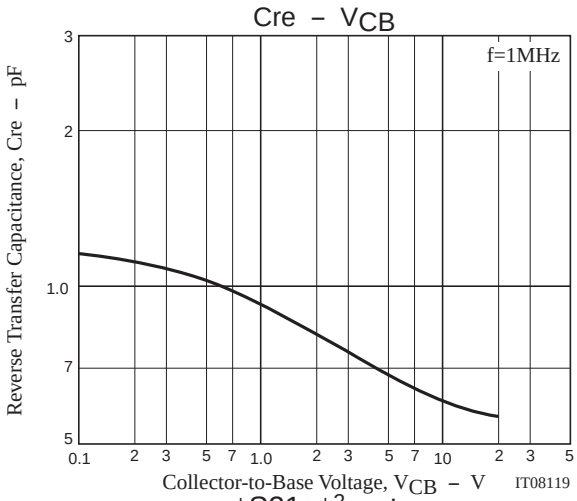


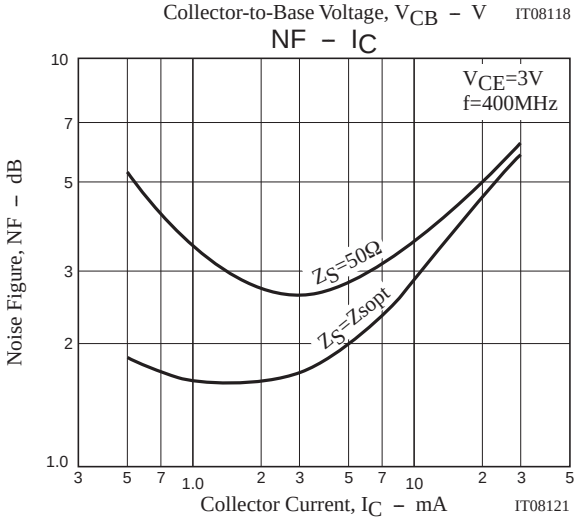


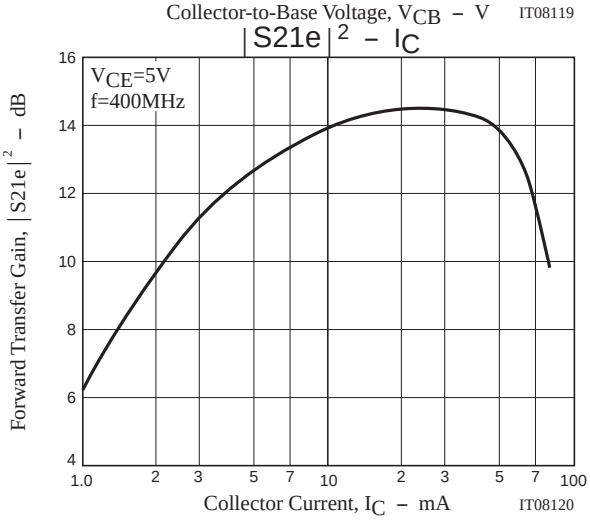


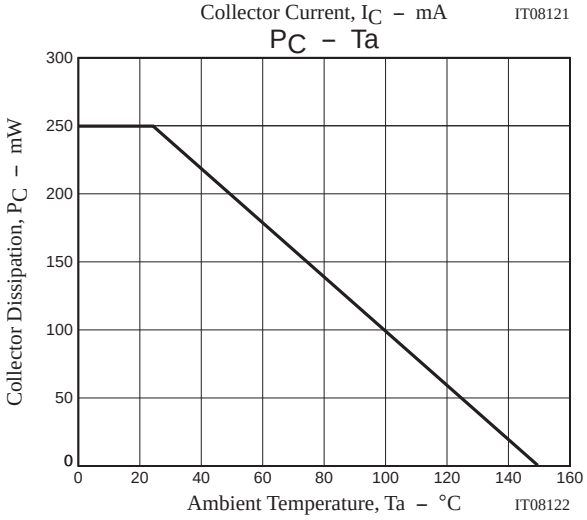



Cob – VCB
f=1MHz
Output Capacitance, Cob – pF
Collector-to-Base Voltage, VCB – V
IT08118


Cre – VCB
f=1MHz
Reverse Transfer Capacitance, Cre – pF
Collector-to-Base Voltage, VCB – V
IT08119


NF – IC
VCE=3V
f=400MHz
ZS=50Ω
ZS=Zsopt
Noise Figure, NF – dB
Collector Current, IC – mA
IT08121


|S21e|2 – IC
VCE=5V
f=400MHz
Forward Transfer Gain, |S21e|2 – dB
Collector Current, IC – mA
IT08120


PC – Ta
Collector Dissipation, PC – mW
Ambient Temperature, Ta – °C
IT08122

S Parameters (Common emitter)

V_{CE}=5V, I_C=1mA, Z_O=50Ω

Freq(MHz)	|S11|	∠S11	|S21|	∠S21	|S12|	∠S12	|S22|	∠S22
100	0.961	-34.18	3.294	157.68	0.040	70.32	0.974	-8.70
200	0.932	-63.71	2.882	139.23	0.068	53.42	0.920	-15.14
300	0.907	-86.85	2.472	124.36	0.087	40.84	0.873	-19.79
400	0.887	-104.47	2.112	112.52	0.096	32.90	0.842	-23.48
500	0.871	-117.78	1.834	102.94	0.099	28.12	0.818	-26.33
600	0.859	-128.62	1.605	94.86	0.101	23.64	0.802	-29.35
700	0.857	-137.14	1.432	87.95	0.097	19.29	0.798	-32.27
800	0.850	-144.21	1.289	81.60	0.095	17.58	0.796	-35.02
900	0.845	-150.72	1.176	76.29	0.090	17.23	0.797	-38.01
1000	0.839	-156.10	1.081	70.99	0.085	16.55	0.797	-41.02

V_{CE}=5V, I_C=3mA, Z_O=50Ω

Freq(MHz)	|S11|	∠S11	|S21|	∠S21	|S12|	∠S12	|S22|	∠S22
100	0.892	-58.77	8.161	145.03	0.034	56.36	0.902	-14.46
200	0.843	-98.07	6.099	122.67	0.051	42.43	0.786	-20.13
300	0.817	-121.82	4.658	108.72	0.055	33.87	0.727	-22.56
400	0.803	-136.85	3.715	98.70	0.058	30.68	0.700	-24.99
500	0.792	-146.48	3.051	91.64	0.058	28.74	0.687	-26.83
600	0.786	-154.00	2.599	85.58	0.058	29.60	0.678	-29.37
700	0.788	-159.54	2.257	80.45	0.056	31.43	0.677	-32.02
800	0.787	-164.23	2.001	75.47	0.055	35.06	0.680	-34.73
900	0.784	-168.41	1.798	71.27	0.054	40.40	0.683	-37.51
1000	0.782	-171.95	1.635	67.12	0.056	43.46	0.687	-40.32

V_{CE}=5V, I_C=5mA, Z_O=50Ω

Freq(MHz)	|S11|	∠S11	|S21|	∠S21	|S12|	∠S12	|S22|	∠S22
100	0.836	-76.63	11.501	136.45	0.030	52.40	0.838	-17.51
200	0.798	-117.27	7.726	114.17	0.040	37.48	0.709	-21.18
300	0.781	-137.77	5.593	101.72	0.043	34.01	0.658	-22.46
400	0.773	-149.33	4.358	93.38	0.044	33.11	0.638	-24.37
500	0.769	-156.90	3.532	87.35	0.046	36.56	0.630	-26.09
600	0.766	-162.43	2.982	81.95	0.045	39.81	0.625	-28.60
700	0.769	-167.07	2.577	77.34	0.045	42.61	0.624	-31.24
800	0.770	-170.74	2.274	72.95	0.048	47.50	0.632	-33.83
900	0.768	-173.91	2.041	69.14	0.049	53.32	0.637	-36.62
1000	0.765	-176.92	1.844	65.26	0.054	58.93	0.643	-39.47

V_{CE}=5V, I_C=10mA, Z_O=50Ω

Freq(MHz)	|S11|	∠S11	|S21|	∠S21	|S12|	∠S12	|S22|	∠S22
100	0.767	-103.15	15.822	124.63	0.023	46.33	0.734	-20.47
200	0.755	-138.50	9.411	104.65	0.028	38.32	0.619	-20.77
300	0.754	-153.35	6.527	94.69	0.030	38.73	0.584	-21.03
400	0.752	-161.57	4.982	87.97	0.033	42.64	0.572	-22.78
500	0.750	-166.80	4.014	82.84	0.035	48.31	0.572	-24.69
600	0.748	-170.55	3.373	78.22	0.037	54.47	0.569	-27.25
700	0.753	-173.80	2.897	73.96	0.041	59.86	0.572	-29.68
800	0.756	-176.67	2.549	69.82	0.044	62.98	0.581	-32.50
900	0.757	-179.14	2.277	66.41	0.049	68.43	0.588	-35.36
1000	0.755	178.64	2.056	62.61	0.053	72.29	0.593	-38.13

S Parameters (Common emitter)

V_{CE}=5V, I_C=15mA, Z_O=50Ω

Freq(MHz)	|S11|	∠S11	|S21|	∠S21	|S12|	∠S12	|S22|	∠S22
100	0.738	-117.62	17.843	118.37	0.020	37.24	0.676	-21.03
200	0.743	-147.93	10.060	100.54	0.023	37.86	0.576	-19.90
300	0.747	-159.66	6.883	91.63	0.025	46.10	0.554	-19.99
400	0.745	-166.45	5.220	85.36	0.029	50.71	0.546	-21.67
500	0.744	-170.73	4.196	80.63	0.032	56.16	0.545	-23.38
600	0.745	-173.77	3.511	76.05	0.037	61.92	0.546	-26.19
700	0.752	-176.53	3.020	72.07	0.040	66.25	0.552	-28.81
800	0.756	-179.03	2.658	68.01	0.044	70.92	0.560	-31.80
900	0.755	178.79	2.361	64.63	0.049	74.88	0.565	-34.57
1000	0.756	176.76	2.132	60.89	0.053	76.28	0.574	-37.19

V_{CE}=5V, I_C=20mA, Z_O=50Ω

Freq(MHz)	|S11|	∠S11	|S21|	∠S21	|S12|	∠S12	|S22|	∠S22
100	0.726	-126.53	18.861	114.70	0.017	40.89	0.640	-21.11
200	0.739	-153.13	10.358	98.19	0.022	42.84	0.553	-18.93
300	0.745	-163.18	7.042	89.82	0.024	49.20	0.536	-19.14
400	0.745	-169.08	5.324	83.86	0.027	55.62	0.530	-20.71
500	0.745	-172.83	4.271	79.22	0.031	60.79	0.533	-22.65
600	0.746	-175.56	3.573	74.72	0.035	67.12	0.534	-25.56
700	0.753	-177.99	3.062	70.86	0.039	71.29	0.539	-28.07
800	0.756	179.89	2.695	66.61	0.043	73.72	0.550	-30.95
900	0.757	177.73	2.394	63.36	0.050	76.38	0.557	-33.79
1000	0.758	175.84	2.152	59.54	0.055	80.04	0.565	-36.64

V_{CE}=5V, I_C=30mA, Z_O=50Ω

Freq(MHz)	|S11|	∠S11	|S21|	∠S21	|S12|	∠S12	|S22|	∠S22
100	0.717	-137.48	19.630	110.26	0.015	44.21	0.601	-20.34
200	0.738	-159.18	10.491	95.35	0.018	47.49	0.531	-17.41
300	0.746	-167.18	7.088	87.53	0.021	53.11	0.517	-17.66
400	0.748	-172.07	5.346	81.72	0.026	61.37	0.517	-19.37
500	0.748	-175.06	4.275	77.20	0.030	66.16	0.521	-21.62
600	0.752	-177.32	3.568	72.74	0.034	71.42	0.527	-24.47
700	0.760	-179.44	3.054	68.73	0.039	73.32	0.532	-26.91
800	0.764	178.51	2.662	64.73	0.044	78.79	0.543	-29.78
900	0.766	176.85	2.365	61.05	0.049	79.65	0.553	-32.93
1000	0.766	174.89	2.129	57.53	0.055	81.62	0.562	-35.85

V_{CE}=5V, I_C=50mA, Z_O=50Ω

Freq(MHz)	|S11|	∠S11	|S21|	∠S21	|S12|	∠S12	|S22|	∠S22
100	0.726	-148.90	18.826	105.46	0.013	44.77	0.567	-18.27
200	0.751	-165.14	9.843	92.00	0.017	52.99	0.521	-15.19
300	0.762	-171.12	6.595	84.51	0.020	59.41	0.513	-16.09
400	0.764	-174.96	4.946	78.62	0.024	66.61	0.516	-18.39
500	0.767	-177.43	3.935	74.00	0.029	73.69	0.522	-20.54
600	0.772	-179.26	3.268	69.60	0.033	75.14	0.529	-23.65
700	0.780	178.77	2.784	65.39	0.038	78.53	0.537	-26.50
800	0.786	176.95	2.430	60.89	0.043	80.73	0.548	-29.67
900	0.789	175.17	2.150	57.73	0.050	83.79	0.559	-32.92
1000	0.791	173.32	1.926	53.98	0.054	84.92	0.569	-35.99

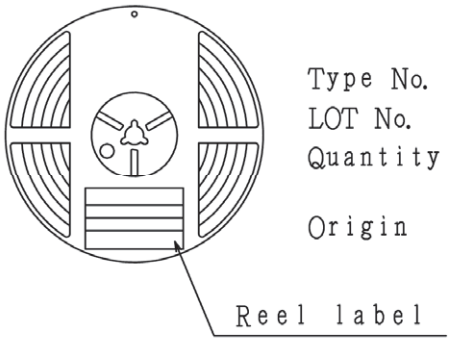
Embossed Taping Specification

15GN03FA-TL-H

1. Packing Format

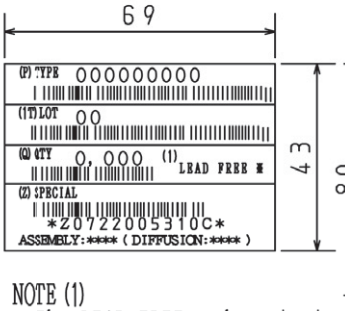
Package Name	Carrier Tape Type	Maximum Number of devices contained (pcs)			Packing format	
		Reel	Inner box	Outer box	Inner BOX (C-1)	Outer BOX (A-7)
SSFP	SSFP	8,000	40,000	240,000	5 reels contained Dimensions:mm (external) 183×72×185	6 inner boxes contained Dimensions:mm (external) 440×195×210

Packing method



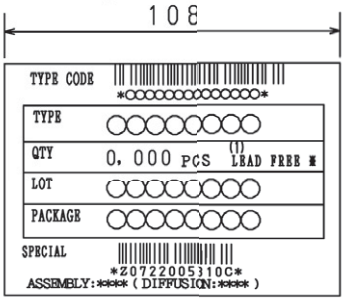
Reel label, Inner box label

(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.

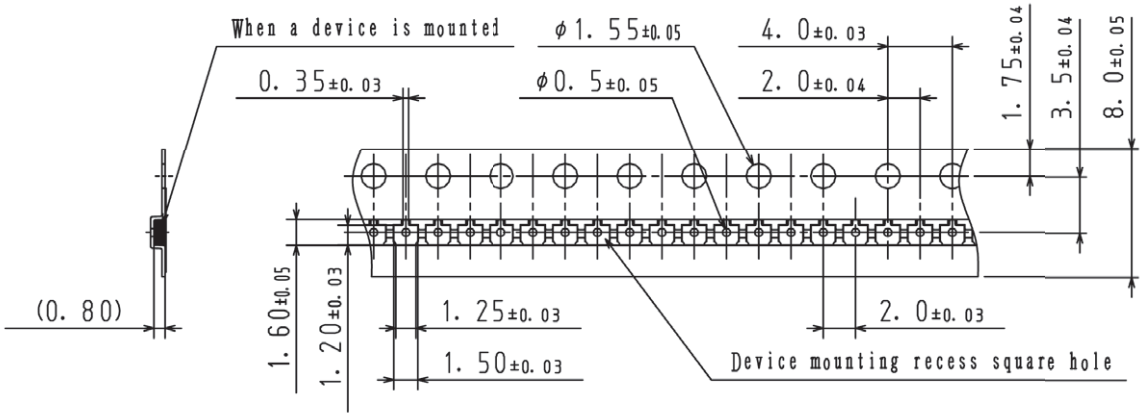


NOTE (1)
The LEAD FREE ※ description shows that the surface treatment of the terminal is lead free.

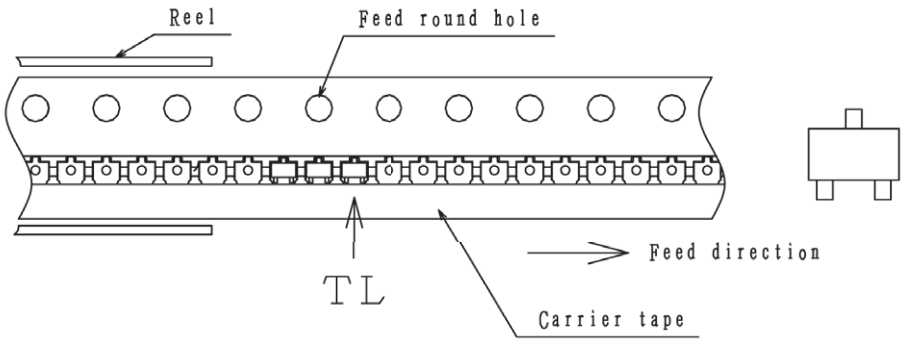
Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A
LEAD FREE 4	JEITA Phase 3

2. Taping configuration

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



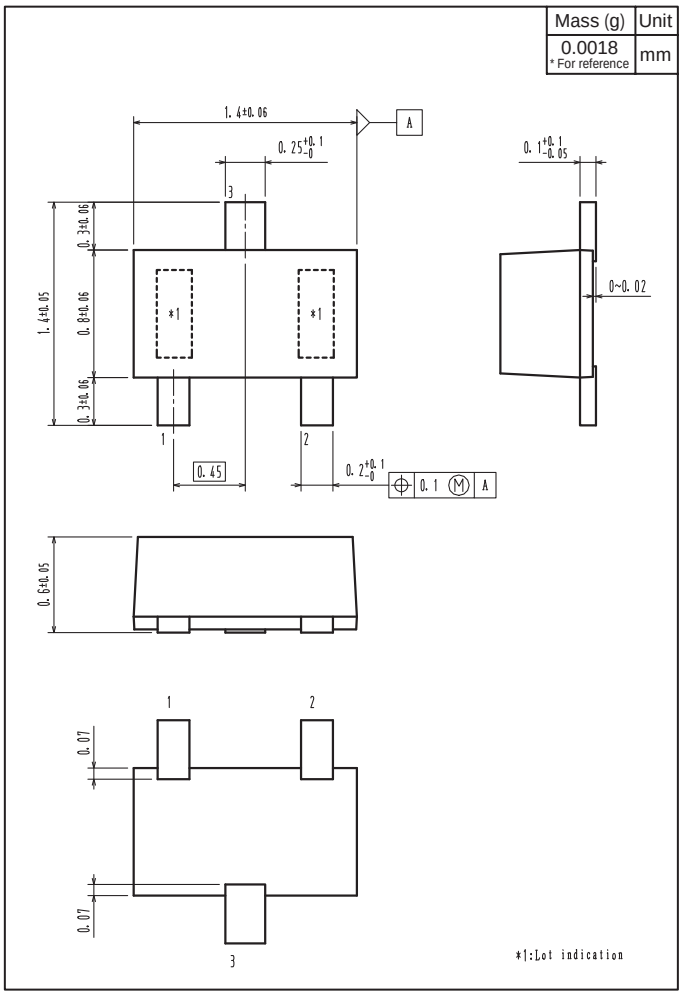
2-2. Device placement direction



Those with pin 1 index on the feed hole side……TL

Outline Drawing

15GN03FA-TL-H



Land Pattern Example