Ordering number : ENA1079A

CPH6001A

RF Transistor

12V, 100mA, f_T=6.7GHz, NPN Single CPH6

ON Semiconductor®

http://onsemi.com

Features

- High gain : $|S21e|^2$=11dB typ (f=1GHz)
- High cut-off frequency : f_T=6.7GHz typ
- Small and slim 6-pin package
- Large allowable collector dissipation (800mW max)

Specifications

Absolute Maximum Ratings at Ta=25°C

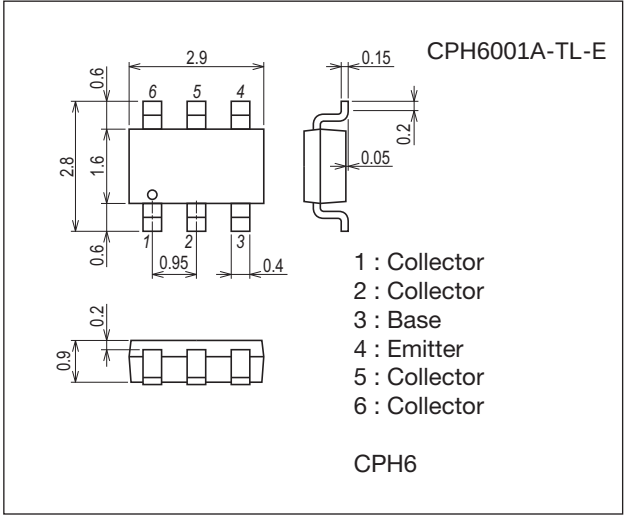
Parameter	Symbol	Conditions	Ratings	Unit
Collector-to- Base Voltage	V_{CBO}		20	V
Collector-to-Emitter Voltage	V_{CEO}		12	V
Emitter-to-Base Voltage	V_{EBO}		2	V
Collector Current	I_C		100	mA
Collector Dissipation	P_C	When mounted on ceramic substrate (250mm²×0.8mm)	800	mW
Junction Temperature	Tj		150	°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)

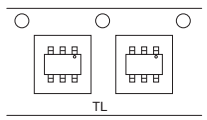
7018A-002



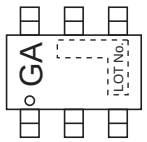
Product & Package Information

- Package : CPH6
- JEITA, JEDEC : SC-74, SOT-26, SOT-457
- Minimum Packing Quantity : 3,000 pcs./reel

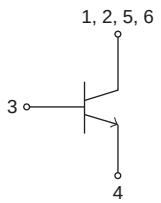
Packing Type: TL



Marking



Electrical Connection



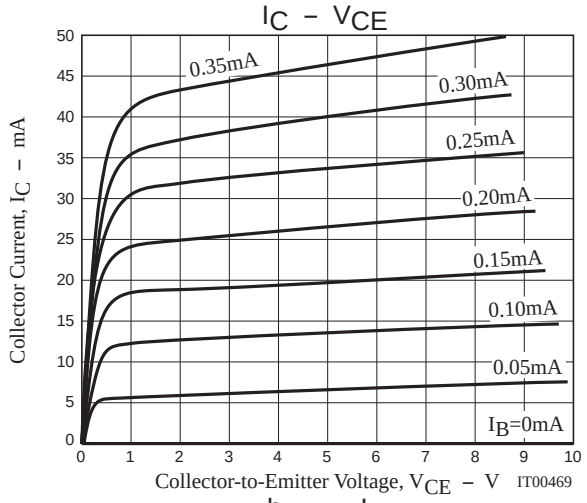
Semiconductor Components Industries, LLC, 2013

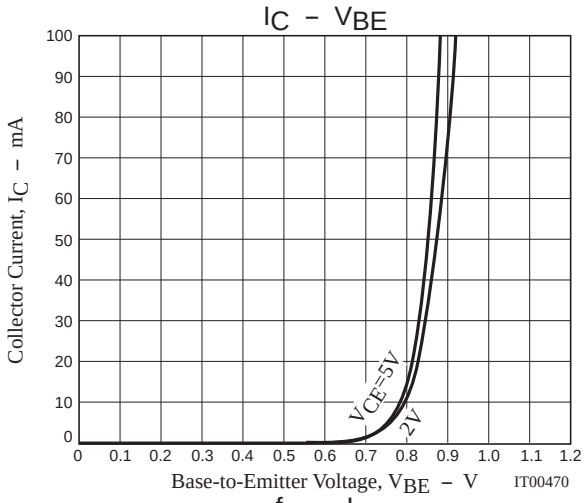
Electrical Characteristics at Ta=25°C

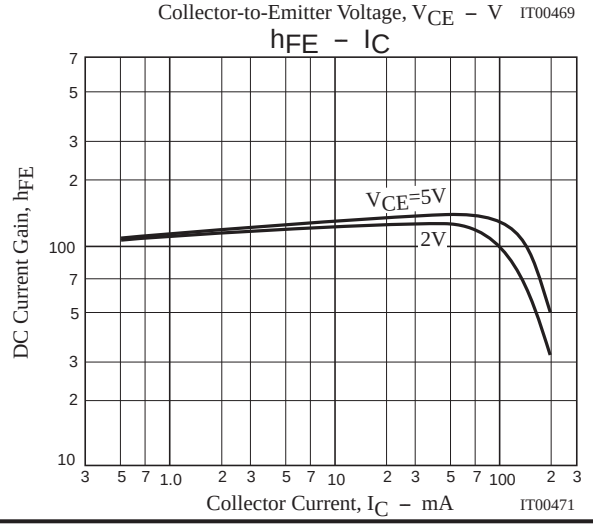
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	V_{CB}=10V, I_E=0A			1.0	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=1V, I_C=0A			10	μA
DC Current Gain	$h_{FE}1$	V_{CE}=5V, I_C=30mA	90		180	
	$h_{FE}2$	V_{CE}=5V, I_C=70mA	70			
Gain-Bandwidth Product	f_T	V_{CE}=5V, I_C=30mA	5	6.7		GHz
Output Capacitance	Cob	V_{CB}=5V, f=1MHz		0.95	1.5	pF
Reverse Transfer Capacitance	Cre			0.6		pF
Forward Transfer Gain	$\|S21e\|^2$	V_{CE}=5V, I_C=30mA, f=1GHz	9	11		dB
Noise Figure	NF	V_{CE}=5V, I_C=7mA, f=1GHz		1.1	2.0	dB

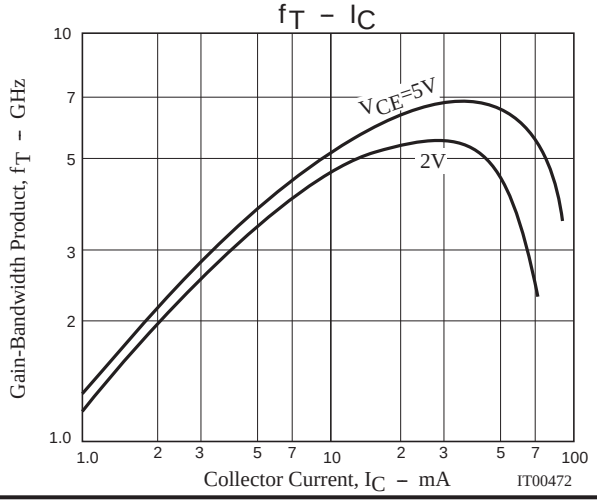
Ordering Information

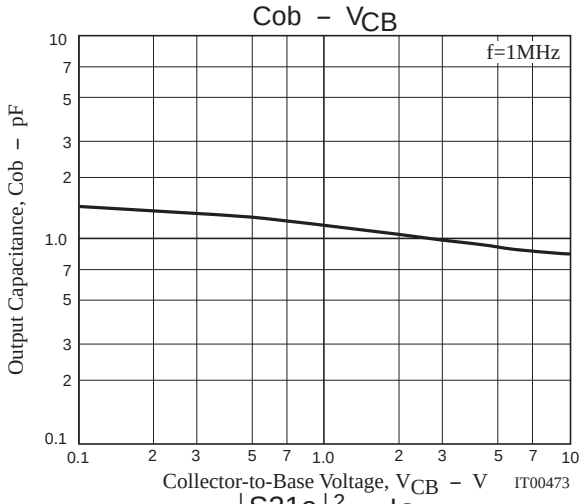
Device	Package	Shipping	memo
CPH6001A-TL-E	CPH6	3,000pcs./reel	Pb Free

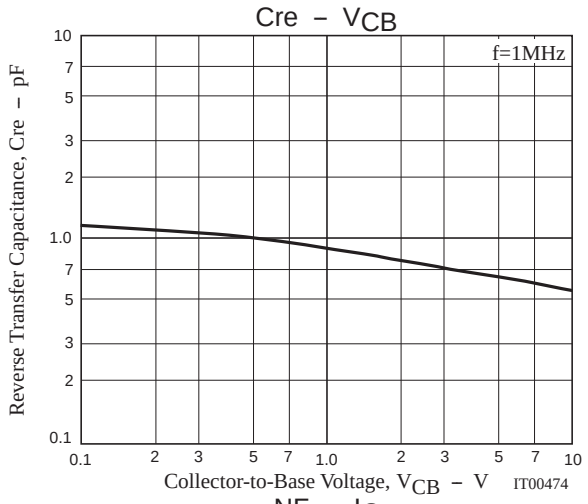


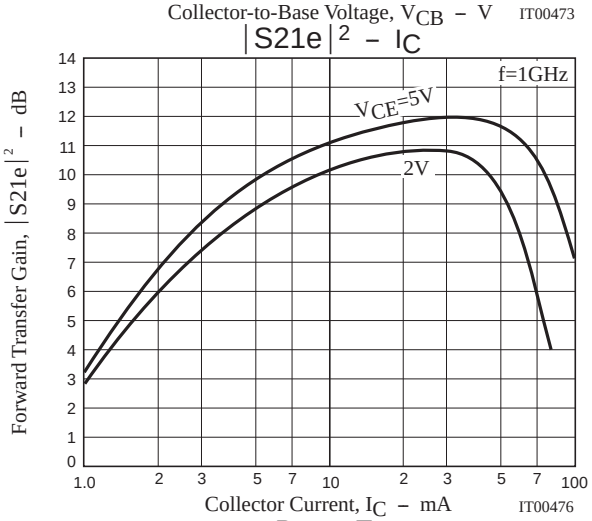


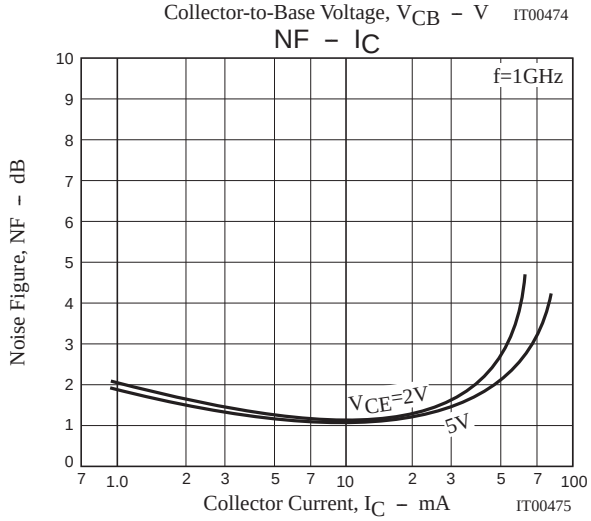


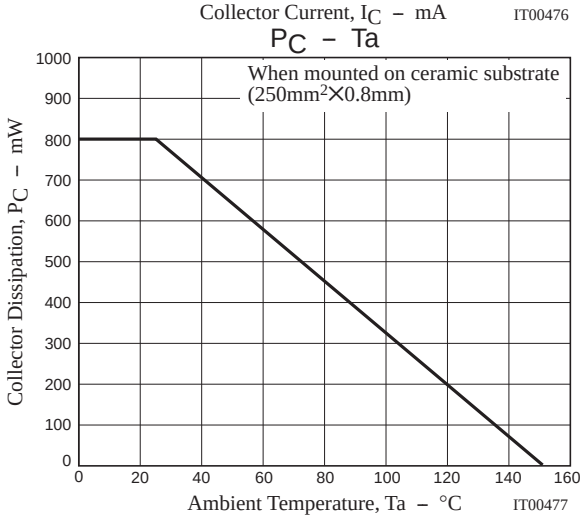



Cob – VCB
f=1MHz
Output Capacitance, Cob – pF
Collector-to-Base Voltage, VCB – V
IT00473


Cre – VCB
f=1MHz
Reverse Transfer Capacitance, Cre – pF
Collector-to-Base Voltage, VCB – V
IT00474


|S21e|2 – IC
f=1GHz
VCE=5V
2V
Forward Transfer Gain, |S21e|2 – dB
Collector Current, IC – mA
IT00476


NF – IC
f=1GHz
VCE=2V
5V
Noise Figure, NF – dB
Collector Current, IC – mA
IT00475


PC – Ta
When mounted on ceramic substrate
(250mm2×0.8mm)
Collector Dissipation, PC – mW
Ambient Temperature, Ta – °C
IT00477

S Parameters (Common emitter)

V_{CE}=2V, I_C=5mA, Z_O=50Ω

Freq(MHz)	$\|S_{11}\|$	$\angle S_{11}$	$\|S_{21}\|$	$\angle S_{21}$	$\|S_{12}\|$	$\angle S_{12}$	$\|S_{22}\|$	$\angle S_{22}$
100	0.799	–48.2	12.990	147.1	0.044	65.4	0.871	–26.6
200	0.678	–83.5	9.939	125.1	0.069	51.4	0.687	–42.9
400	0.557	–124.8	6.138	101.0	0.090	42.3	0.476	–57.0
600	0.514	–147.5	4.326	87.6	0.103	41.5	0.390	–63.7
800	0.497	–161.9	3.345	77.6	0.115	43.4	0.353	–69.1
1000	0.488	–173.8	2.740	68.9	0.129	45.3	0.337	–74.6
1200	0.484	177.2	2.324	61.3	0.144	46.7	0.335	–79.9
1400	0.484	169.3	2.030	54.5	0.150	47.8	0.340	–85.1
1600	0.483	161.1	1.804	48.3	0.177	48.3	0.346	–90.6
1800	0.482	153.5	1.638	42.3	0.196	48.1	0.355	–96.6
2000	0.487	146.4	1.493	36.6	0.215	47.4	0.367	–102.1

V_{CE}=2V, I_C=10mA, Z_O=50Ω

Freq(MHz)	$\|S_{11}\|$	$\angle S_{11}$	$\|S_{21}\|$	$\angle S_{21}$	$\|S_{12}\|$	$\angle S_{12}$	$\|S_{22}\|$	$\angle S_{22}$
100	0.683	–65.5	19.214	137.7	0.038	60.9	0.767	–38.0
200	0.550	–109.9	13.370	114.8	0.055	51.2	0.536	–55.8
400	0.440	–143.5	7.287	93.9	0.074	50.3	0.342	–69.5
600	0.443	–162.0	5.046	83.6	0.094	52.5	0.280	–75.8
800	0.457	–174.9	3.900	75.6	0.114	54.1	0.255	–81.6
1000	0.445	172.3	3.214	67.3	0.135	55.0	0.243	–87.7
1200	0.427	166.4	2.681	60.6	0.156	54.5	0.245	–92.6
1400	0.418	162.9	2.309	54.1	0.177	53.7	0.251	–97.6
1600	0.439	160.3	1.987	49.2	0.199	52.5	0.258	–102.6
1800	0.486	149.1	1.850	46.2	0.221	50.6	0.269	–107.7
2000	0.468	137.2	1.745	40.2	0.241	48.2	0.280	–112.9

V_{CE}=2V, I_C=20mA, Z_O=50Ω

Freq(MHz)	$\|S_{11}\|$	$\angle S_{11}$	$\|S_{21}\|$	$\angle S_{21}$	$\|S_{12}\|$	$\angle S_{12}$	$\|S_{22}\|$	$\angle S_{22}$
100	0.540	–87.3	24.533	127.8	0.032	58.3	0.646	–49.3
200	0.469	–125.4	14.920	107.9	0.045	55.2	0.411	–67.4
400	0.437	–157.2	8.009	91.0	0.067	59.1	0.256	–81.3
600	0.430	–171.6	5.453	81.5	0.091	61.2	0.210	–89.3
800	0.428	178.4	4.148	74.0	0.116	61.3	0.197	–95.4
1000	0.427	170.3	3.373	67.4	0.140	60.3	0.196	–100.5
1200	0.424	163.2	2.840	61.0	0.164	58.5	0.201	–105.2
1400	0.424	156.9	2.484	55.3	0.189	56.7	0.208	–109.8
1600	0.423	150.0	2.201	50.1	0.212	54.6	0.218	–114.2
1800	0.420	144.2	1.999	44.8	0.236	52.0	0.228	–119.0
2000	0.422	136.2	1.825	39.5	0.257	49.0	0.238	–123.8

V_{CE}=2V, I_C=30mA, Z_O=50Ω

Freq(MHz)	$\|S_{11}\|$	$\angle S_{11}$	$\|S_{21}\|$	$\angle S_{21}$	$\|S_{12}\|$	$\angle S_{12}$	$\|S_{22}\|$	$\angle S_{22}$
100	0.487	–101.2	26.240	123.1	0.029	58.4	0.579	–54.7
200	0.446	–136.8	15.309	104.6	0.041	58.0	0.356	–72.3
400	0.435	–163.5	8.071	89.3	0.065	62.9	0.223	–86.1
600	0.437	–176.4	5.488	80.4	0.090	64.2	0.186	–94.2
800	0.433	174.9	4.181	73.3	0.117	63.7	0.178	–100.3
1000	0.435	166.8	3.388	66.7	0.142	62.3	0.180	–105.7
1200	0.433	160.8	2.855	60.5	0.168	60.1	0.187	–110.1
1400	0.427	154.6	2.491	54.8	0.192	57.9	0.195	–114.4
1600	0.432	147.9	2.211	49.7	0.217	55.4	0.205	–118.8
1800	0.428	141.8	2.002	44.3	0.241	52.7	0.217	–123.3
2000	0.430	134.8	1.831	39.4	0.261	49.4	0.227	–127.9

S Parameters (Common emitter)

V_{CE}=5V, I_C=5mA, Z_O=50Ω

Freq(MHz)	|S_{11}|	∠S_{11}	|S_{21}|	∠S_{21}	|S_{12}|	∠S_{12}	|S_{22}|	∠S_{22}
100	0.822	–42.5	13.211	150.0	0.035	68.2	0.901	–20.9
200	0.684	–77.8	10.639	128.5	0.056	54.8	0.743	–34.0
400	0.516	–116.3	6.681	103.3	0.076	45.3	0.548	–44.9
600	0.481	–140.7	4.776	89.6	0.087	44.9	0.467	–49.9
800	0.477	–157.6	3.714	80.0	0.098	46.3	0.433	–54.2
1000	0.454	–172.9	3.055	71.0	0.110	48.5	0.419	–58.8
1200	0.435	179.1	2.572	63.0	0.124	50.1	0.416	–64.0
1400	0.431	173.9	2.213	56.2	0.138	51.7	0.419	–68.9
1600	0.449	169.6	1.922	50.7	0.154	52.8	0.424	–74.4
1800	0.495	157.8	1.789	46.3	0.171	52.8	0.431	–80.3
2000	0.482	145.3	1.669	39.6	0.188	52.4	0.440	–85.7

V_{CE}=5V, I_C=10mA, Z_O=50Ω

Freq(MHz)	|S_{11}|	∠S_{11}	|S_{21}|	∠S_{21}	|S_{12}|	∠S_{12}	|S_{22}|	∠S_{22}
100	0.690	–57.0	20.017	141.0	0.031	64.0	0.813	–29.6
200	0.552	–93.8	14.091	118.9	0.046	54.8	0.599	–43.3
400	0.447	–133.6	8.190	97.6	0.064	52.8	0.419	–51.2
600	0.413	–154.2	5.664	86.0	0.080	55.0	0.355	–54.8
800	0.402	–167.0	4.314	77.6	0.098	56.9	0.329	–58.9
1000	0.399	–177.7	3.519	70.1	0.116	57.8	0.320	–63.5
1200	0.395	173.3	2.985	63.3	0.135	57.5	0.322	–68.5
1400	0.390	165.6	2.590	57.2	0.154	57.1	0.325	–73.5
1600	0.396	158.1	2.293	51.4	0.173	56.1	0.332	–78.8
1800	0.398	150.8	2.069	45.7	0.193	54.6	0.341	–84.4
2000	0.396	143.4	1.881	40.4	0.211	52.8	0.350	–90.0

V_{CE}=5V, I_C=30mA, Z_O=50Ω

Freq(MHz)	|S_{11}|	∠S_{11}	|S_{21}|	∠S_{21}	|S_{12}|	∠S_{12}	|S_{22}|	∠S_{22}
100	0.481	–85.7	28.955	127.1	0.024	61.8	0.649	–41.0
200	0.403	–123.6	17.443	107.7	0.035	60.6	0.427	–51.3
400	0.370	–155.2	9.326	91.5	0.056	64.6	0.292	–54.9
600	0.363	–170.7	6.348	82.3	0.078	66.1	0.256	–57.9
800	0.359	179.9	4.826	75.3	0.100	65.9	0.245	–62.2
1000	0.360	171.2	3.907	68.5	0.123	64.8	0.244	–67.4
1200	0.360	164.4	3.288	62.7	0.145	63.1	0.249	–72.7
1400	0.356	157.3	2.871	57.0	0.167	61.2	0.256	–78.0
1600	0.362	151.2	2.541	51.8	0.188	59.0	0.265	–83.6
1800	0.361	143.6	2.290	46.5	0.210	56.5	0.274	–89.4
2000	0.363	137.2	2.076	41.4	0.229	53.6	0.284	–95.1

V_{CE}=5V, I_C=50mA, Z_O=50Ω

Freq(MHz)	|S_{11}|	∠S_{11}	|S_{21}|	∠S_{21}	|S_{12}|	∠S_{12}	|S_{22}|	∠S_{22}
100	0.426	–101.6	29.939	122.4	0.021	62.6	0.587	–42.4
200	0.389	–137.3	17.324	104.3	0.032	63.2	0.385	–49.1
400	0.379	–163.4	9.137	89.5	0.053	67.9	0.277	–50.5
600	0.378	–176.3	6.195	80.8	0.076	68.9	0.252	–53.4
800	0.375	175.0	4.700	74.0	0.098	68.3	0.245	–58.2
1000	0.380	167.8	3.799	67.9	0.121	66.8	0.248	–64.0
1200	0.379	161.2	3.196	61.8	0.143	64.9	0.255	–69.8
1400	0.378	154.9	2.787	56.1	0.165	62.8	0.262	–75.4
1600	0.382	148.6	2.469	50.9	0.187	60.5	0.271	–81.4
1800	0.382	142.5	2.227	45.8	0.209	57.8	0.281	–87.6
2000	0.385	135.6	2.027	40.7	0.228	55.0	0.291	–93.3

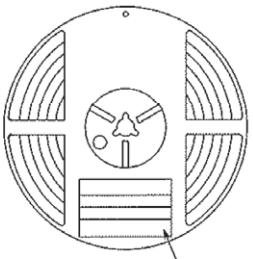
Embossed Taping Specification

CPH6001A-TL-E

1. Packing Format

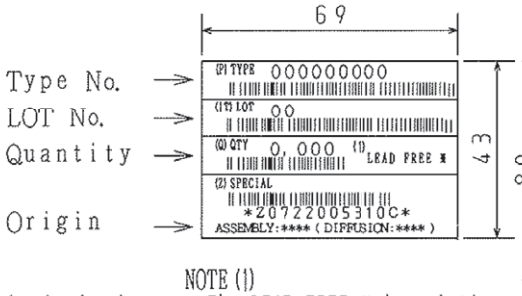
Package Name	Carrier Tape Type	Maximum Number of devices contained (pcs)			Packing format	
		Reel	Inner box	Outer box	Inner BOX (C-1)	Outer BOX (A-7)
CPH6	CPH6	3,000	15,000	90,000	5 reels contained Dimensions:mm (external) 183×72×185	6 inner boxes contained Dimensions:mm (external) 440×195×210

Packing method



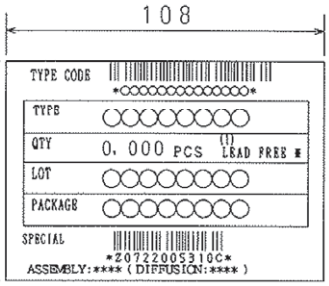
Reel label, Inner box label

(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.

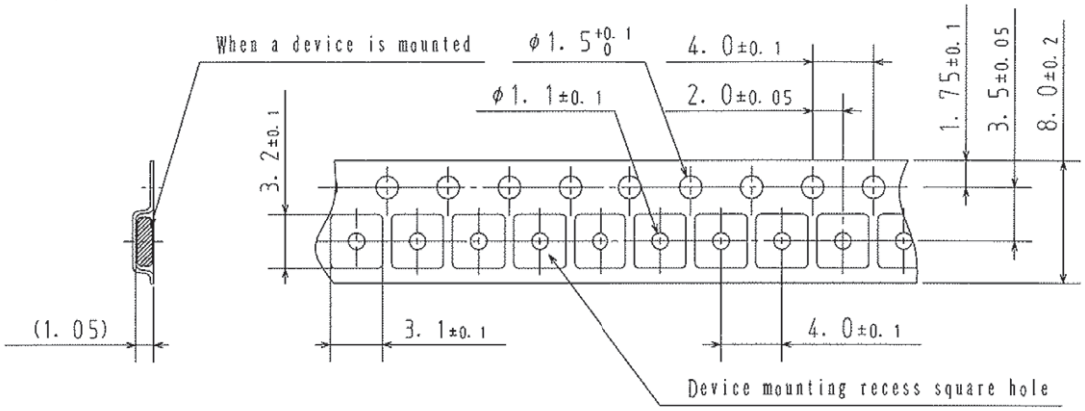


NOTE (1)
The LEAD FREE ※ description shows that the surface treatment of the terminal is lead free.

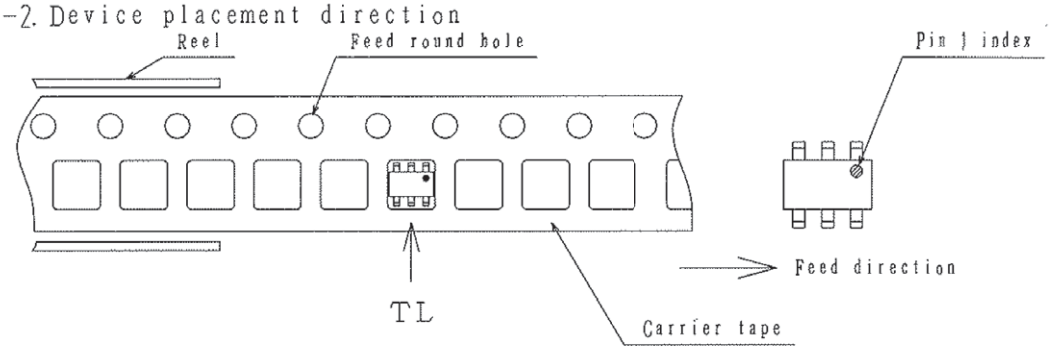
Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A
LEAD FREE 4	JEITA Phase 3

2. Taping configuration

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



2-2. Device placement direction

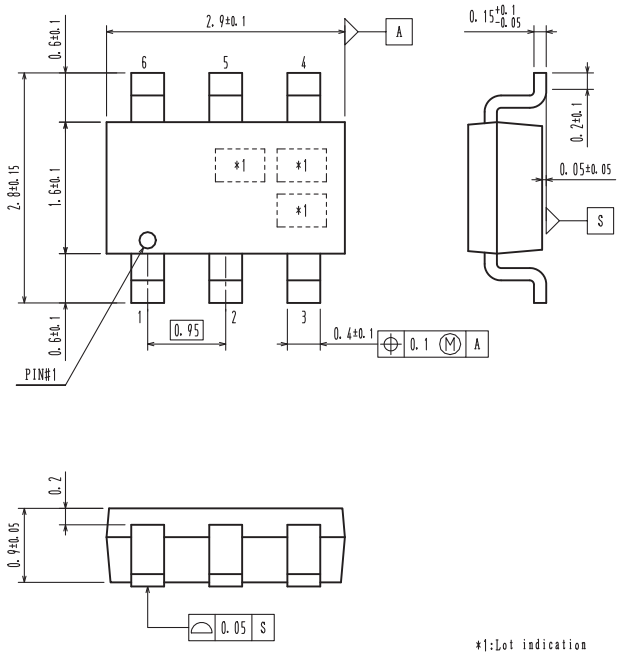


Those with pin 1 index on the feed hole side·····TL

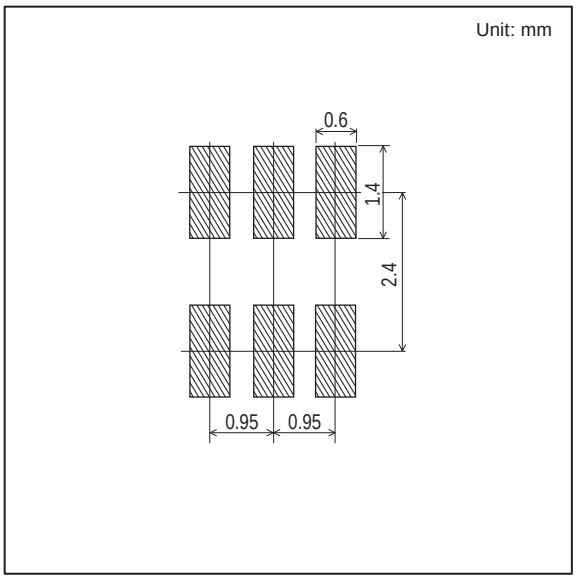
Outline Drawing

CPH6001A-TL-E

Mass (g)	Unit
0.015 * For reference	mm



Land Pattern Example



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