Ordering number : ENA1125A

SANYO Semiconductors

DATA SHEET

An ON Semiconductor Company

NPN Epitaxial Planar Silicon Composite Transistor

FH102A — High-Frequency Low-Noise Amplifier, Differential Amplifier Applications

Features

- Composite type with 2 transistors contained in the MCP package currently in use, improving the mounting efficiency greatly
- The FH102A is formed with two chips, being equivalent to the 2SC5226A, placed in one package
- Optimal for differential amplification due to excellent thermal equilibrium and pair capability

Specifications

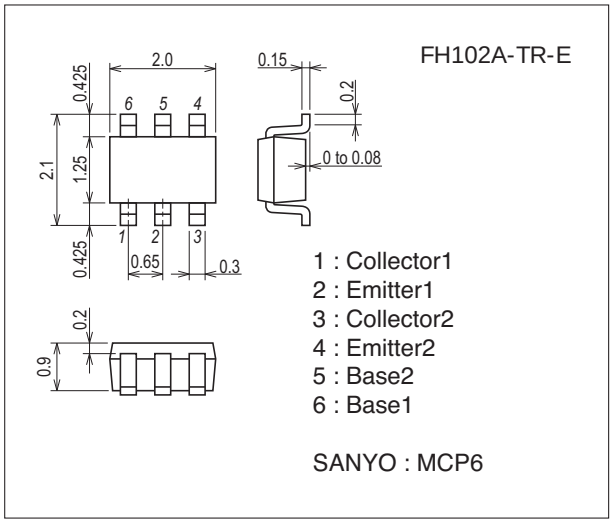
Absolute Maximum Ratings at Ta=25°C

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}		2	V
Collector Current	I_C		70	mA
Collector Dissipation	P_C	When mounted on ceramic substrate (250mm^2×0.8mm) 1unit	300	mW
Total Power Dissipation	P_T	When mounted on ceramic substrate (250mm^2×0.8mm)	500	mW
Junction Temperature	Tj		150	℃
Storage Temperature	Tstg		−55 to +150	℃

Package Dimensions

unit : mm (typ)

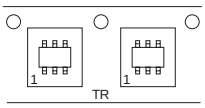
7026A-002



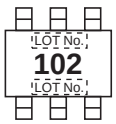
Product & Package Information

- Package : MCP6
- JEITA, JEDEC : SC-88, SC-70-6, SOT-363
- Minimum Packing Quantity : 3,000 pcs./reel

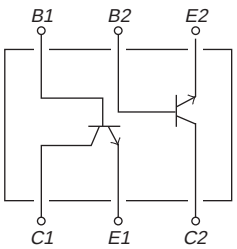
Packing Type : TR



Marking



Electrical Connection



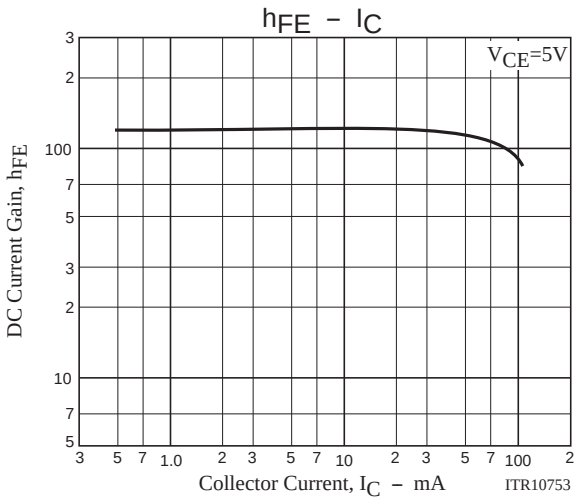
Electrical Characteristics at Ta=25°C

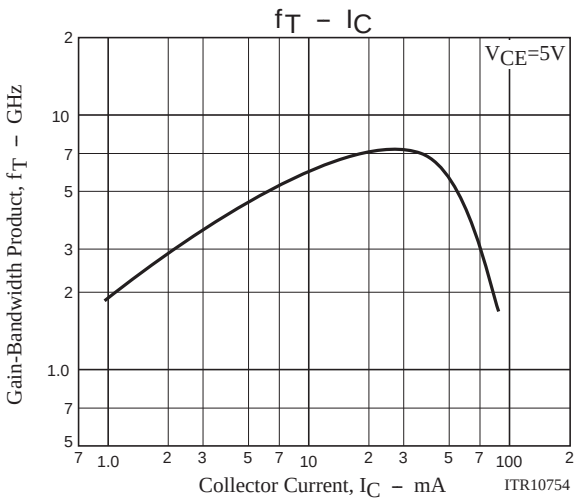
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	V_{CB}=10V, I_E=0A			1.0	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=1V, I_C=0A			10	μA
DC Current Gain	h_{FE}	V_{CE}=5V, I_C=20mA	90		200	
DC Current Gain Ratio	h_{FE}(small/large)	V_{CE}=5V, I_C=20mA	0.7	0.95		
Base-to-Emitter Voltage Diffrence	V_{BE}(large-small)	V_{CE}=5V, I_C=20mA		10		mV
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	V_{CB}=10V, f=1MHz		0.5		pF
Forward Transfer Gain	$|S21e|^2$1	V_{CE}=5V, I_C=20mA, f=1GHz	9	12		dB
	$|S21e|^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

Note) The specifications shown above are for each individual transistor except the hFE(small/large) and VBE (large-small) for which pair capability is also shown.

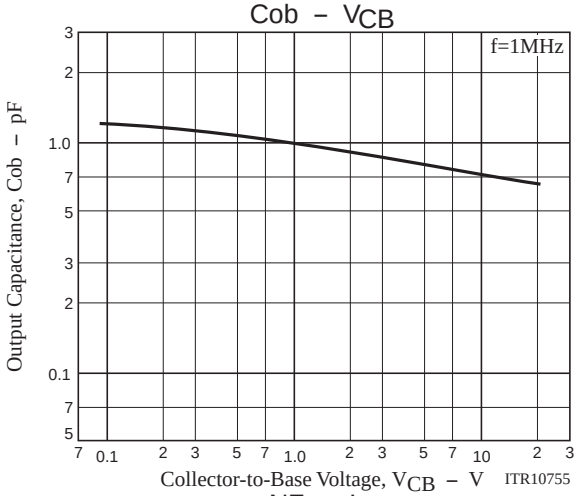
Ordering Information

Device	Package	Shipping	memo
FH102A-TR-E	MCP6	3,000pcs./reel	Pb Free

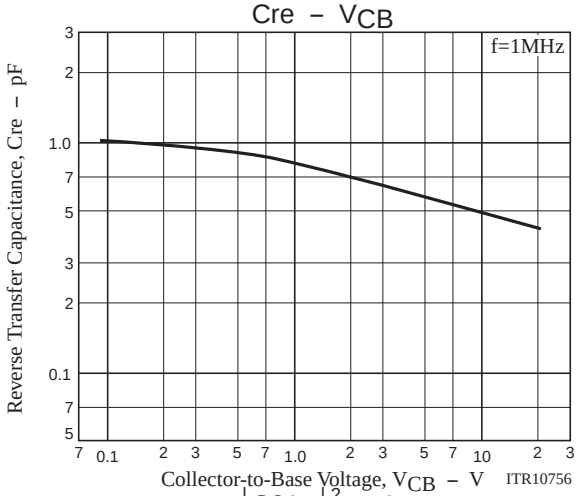




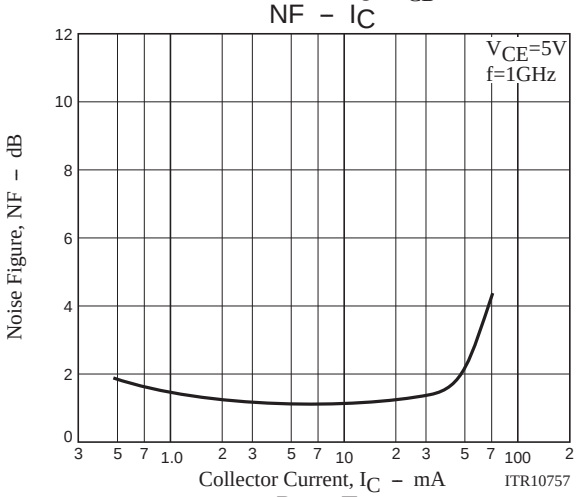
Cob – V_{CB}



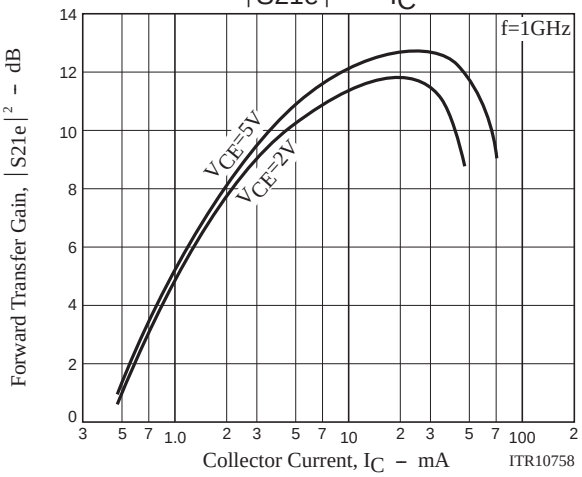
Cre – V_{CB}



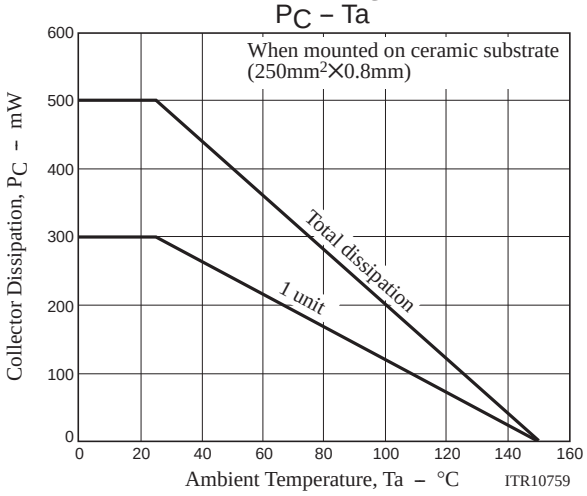
NF – I_C



$|S21e|^2$ – I_C

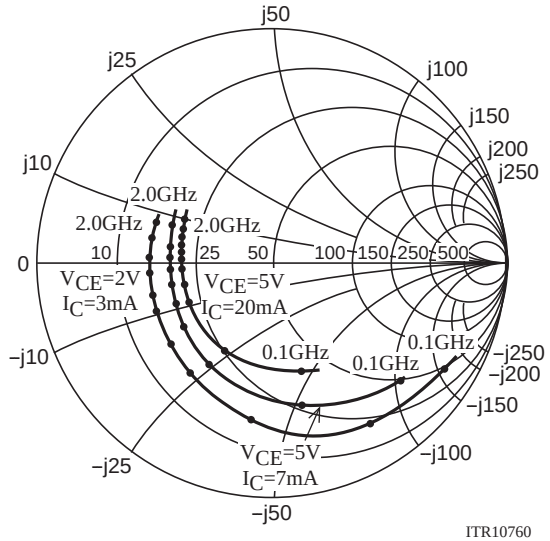


P_C – Ta

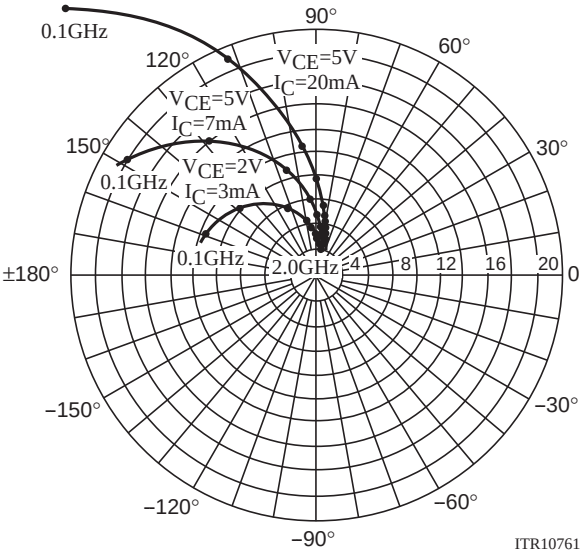


S Parameter

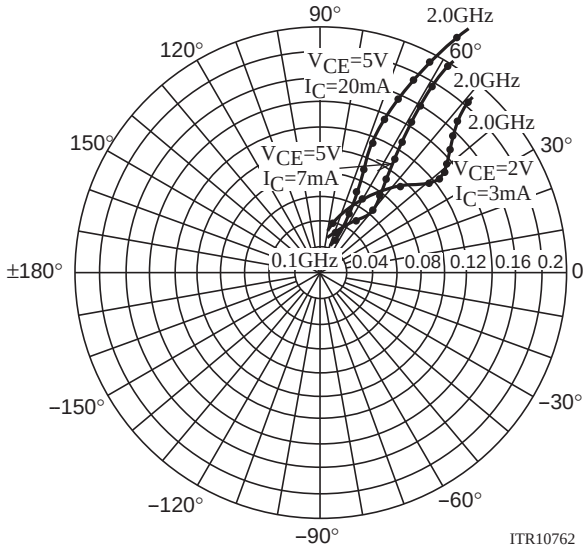
f=100MHz, 200 to 2000MHz(200MHz Step)



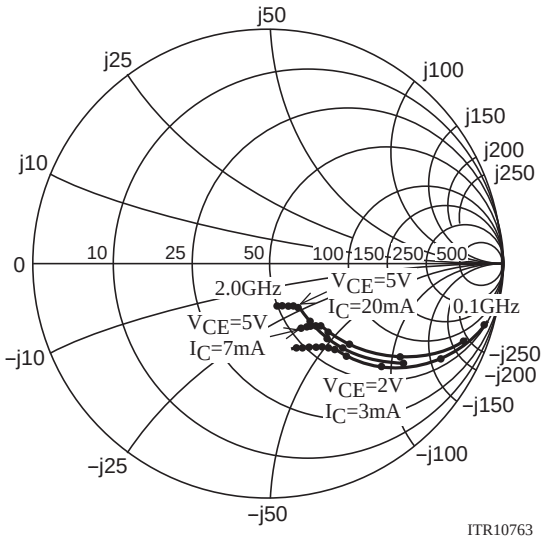
f=100MHz, 200 to 2000MHz(200MHz Step)



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



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



S Parameters (Common emitter)

V_{CE}=5V, I_C=7mA, Z_O=50Ω

Freq(MHz)	|S11|	∠S11	|S21|	∠S21	|S12|	∠S12	|S22|	∠S22
100	0.720	-46.0	17.973	148.5	0.030	68.5	0.880	-23.6
200	0.612	-80.9	13.927	127.3	0.047	57.1	0.697	-37.6
400	0.497	-121.3	8.656	105.0	0.066	51.3	0.479	-47.6
600	0.456	-143.5	6.080	92.8	0.079	52.9	0.382	-50.5
800	0.440	-157.6	4.725	84.3	0.094	55.4	0.339	-51.8
1000	0.436	-167.5	3.864	77.0	0.110	56.8	0.323	-53.4
1200	0.434	-176.1	3.258	70.3	0.126	57.9	0.312	-55.8
1400	0.433	176.6	2.847	64.5	0.143	58.4	0.304	-58.3
1600	0.433	170.9	2.329	57.4	0.160	58.9	0.296	-62.0
1800	0.434	165.0	2.252	54.2	0.178	58.6	0.293	-65.0
2000	0.439	159.6	2.057	49.2	0.197	58.1	0.294	-68.1

V_{CE}=5V, I_C=20mA, Z_O=50Ω

Freq(MHz)	|S11|	∠S11	|S21|	∠S21	|S12|	∠S12	|S22|	∠S22
100	0.481	-78.8	29.795	132.9	0.022	63.9	0.707	-38.2
200	0.420	-119.2	19.008	112.2	0.033	60.8	0.470	-51.1
400	0.391	-151.6	10.416	95.4	0.052	64.7	0.296	-55.3
600	0.386	-166.4	7.084	86.6	0.071	67.2	0.236	-56.1
800	0.381	-175.9	5.407	80.1	0.092	68.4	0.213	-56.6
1000	0.382	178.2	4.401	74.1	0.114	67.8	0.208	-57.9
1200	0.385	172.1	3.701	68.5	0.134	66.8	0.204	-60.7
1400	0.388	166.7	3.217	63.6	0.156	65.6	0.202	-63.5
1600	0.390	162.1	2.839	58.8	0.176	64.0	0.199	-67.9
1800	0.391	156.7	2.534	54.3	0.197	62.4	0.197	-71.2
2000	0.394	152.1	2.319	50.1	0.219	60.6	0.197	-74.2

V_{CE}=2V, I_C=3mA, Z_O=50Ω

Freq(MHz)	|S11|	∠S11	|S21|	∠S21	|S12|	∠S12	|S22|	∠S22
100	0.858	-32.4	9.413	157.2	0.040	72.6	0.945	-16.5
200	0.782	-60.7	8.187	138.5	0.070	59.2	0.833	-29.3
400	0.653	-101.1	5.855	113.8	0.101	44.5	0.637	-43.2
600	0.588	-126.5	4.337	98.4	0.114	39.1	0.515	-50.0
800	0.557	-143.7	3.444	87.7	0.122	38.0	0.454	-53.8
1000	0.543	-156.3	2.871	78.5	0.130	38.6	0.426	-57.1
1200	0.536	-166.8	2.446	70.5	0.137	40.3	0.407	-60.3
1400	0.533	-175.5	2.145	63.5	0.146	42.5	0.393	-63.8
1600	0.527	177.0	1.904	57.1	0.155	45.0	0.382	-68.0
1800	0.525	170.3	1.714	51.7	0.168	47.3	0.379	-72.0
2000	0.528	163.8	1.564	45.9	0.183	49.2	0.378	-75.8

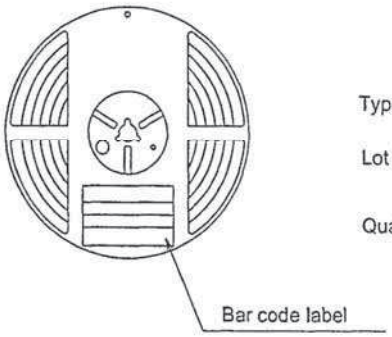
Embossed Taping Specification

FH102A-TR-E

Storage package Outline name	Carrier tape Type number	Maximum Number of devices contained (pcs.)			Packing format	
		Reel	Inner box	Outer box	Inner box BOX (C-1)	Outer box BOX (A-7)
MCP6	MCP6	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

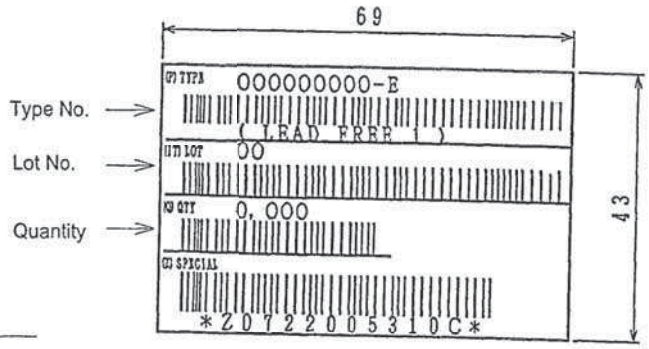
1. Packing format

Packing method



Bar code label

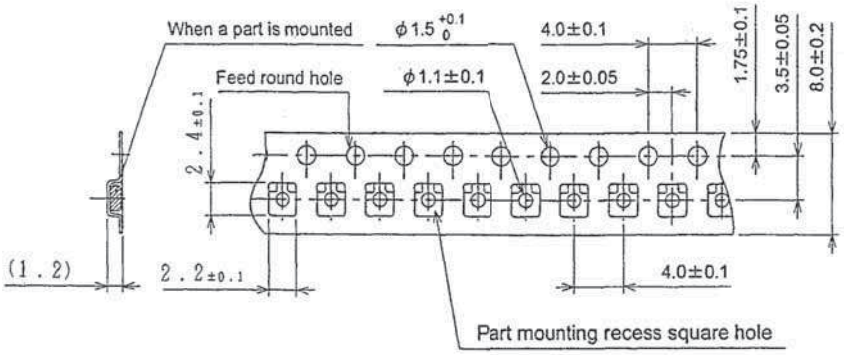
(Unit : mm)



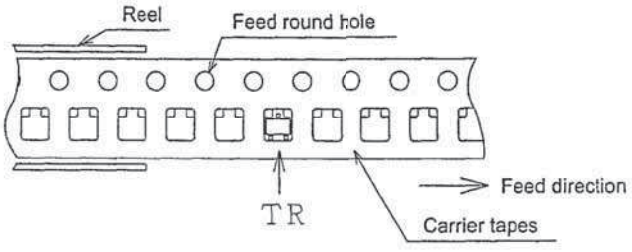
* LEAD FREE 1 :
Lead-free external terminal surface treatment product.

2. Taping structure

2－1. Carrier tape size (Unit : mm)



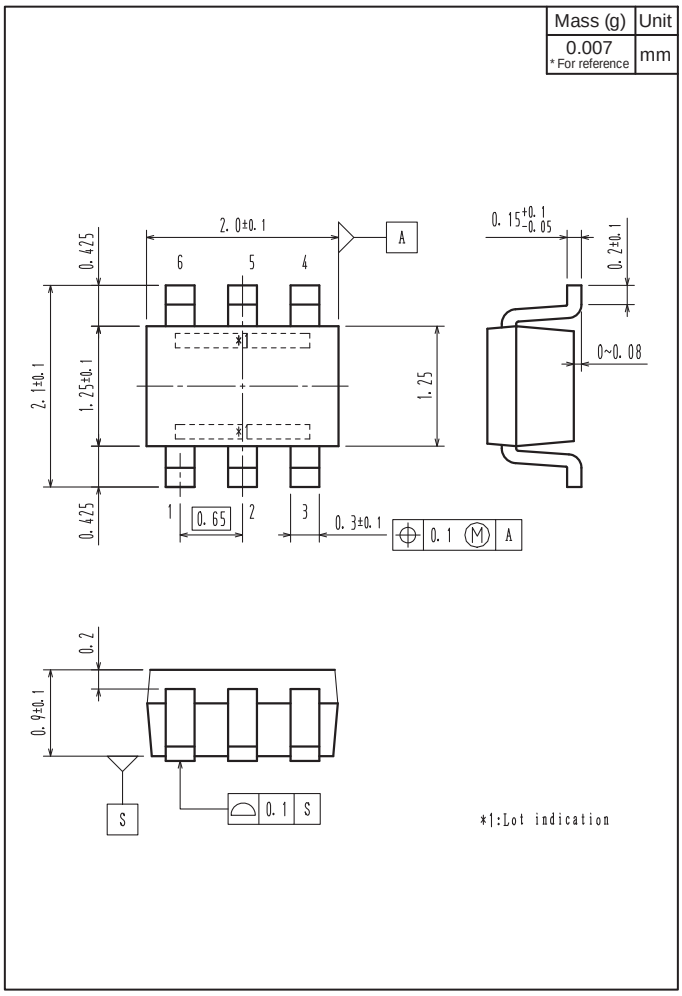
2－2. Parts placement direction



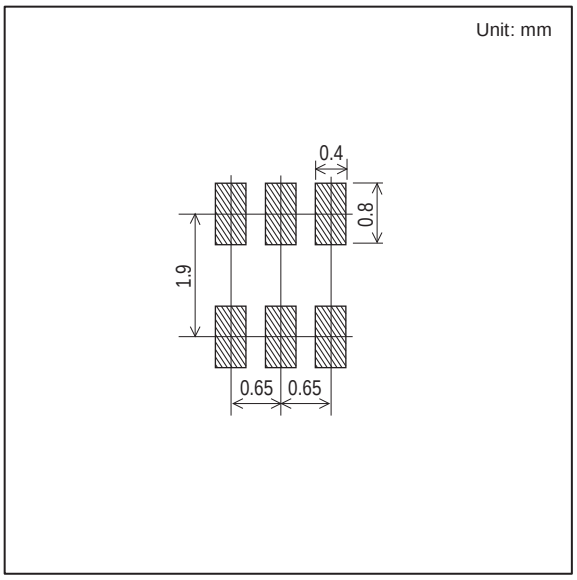
Those with 1 electrode pin on the feed hole side・・・・TR

Outline Drawing

FH102A-TR-E



Land Pattern Example



This catalog provides information as of December, 2012. Specifications and information herein are subject to change without notice.