Ordering number : ENA1839A

SMA5101

MMIC

Mixer, IIP3=15dBm, Gc=-0.5dB@450MHz, MCPH6

ON Semiconductor®

http://onsemi.com

Features

- Wide band : up to Ku band
- Low distortion : IIP3=20dBm (@I_{CC} > 11mA)
- SMT, Ultra small package : 2.0×2.1×0.85mm
- High conversion gain : –0.5dB (@450MHz)
- Low voltage available : 1.2V and above
- Halogen free compliance

Specifications

Absolute Maximum Ratings at Ta=25°C

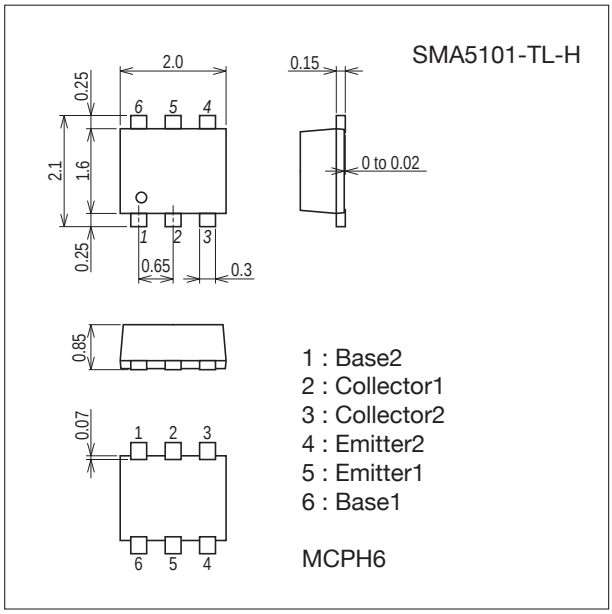
Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CBO}		8	V
Collector-to-Emitter Voltage	V_{CEO}		6	V
Emitter-to-Base Voltage	V_{EBO}		2	V
Collector Current	I_{CC}		50	mA
Max Power Dissipation	P_C		280	mW
Operating Temperature	Topr		–40 to +85	°C
Storage Temperature	Tstg		–55 to +150	°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)

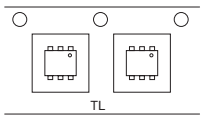
7022A-020



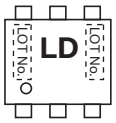
Product & Package Information

- Package : MCPH6
- JEITA, JEDEC : SC-88, SC-70-6, SOT-363
- Minimum Packing Quantity : 3,000 pcs./reel

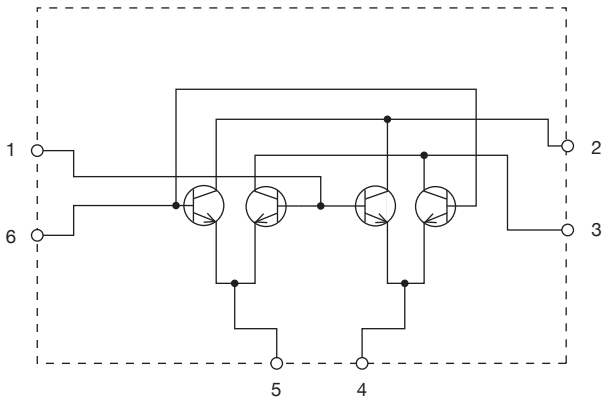
Packing Type : TL



Marking



Equivalent Circuit



IT15506

Recommended Operating Condition at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Supply Voltage	V_{C1E1}		1.2	3	6	V
	V_{C2E1}		1.2	3	6	V
	V_{C1E2}		1.2	3	6	V
	V_{C2E2}		1.2	3	6	V

Electrical Characteristics at Ta=25°C

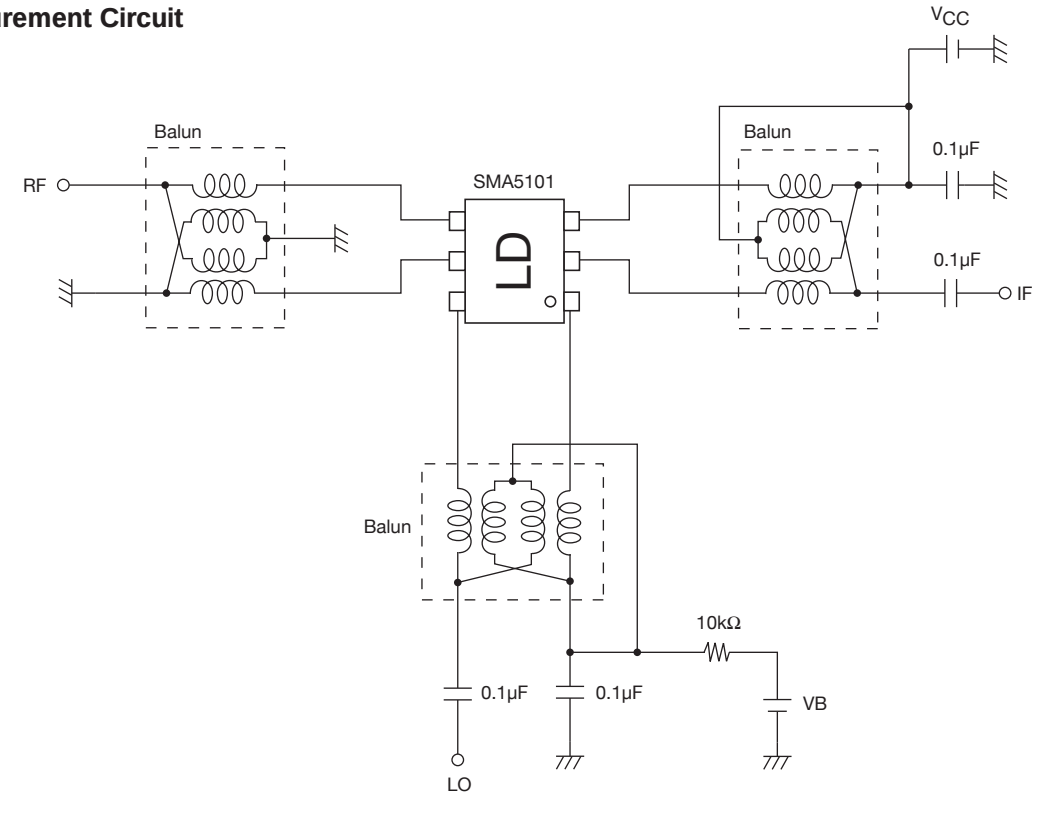
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{C1B1O}	V_{C1B1}=5V			1	μA
	I_{C2B1O}	V_{C2B1}=5V			1	μA
	I_{C1B2O}	V_{C1B2}=5V			1	μA
	I_{C2B2O}	V_{C2B2}=5V			1	μA
Emitter Cutoff Current	I_{E1B1O}	V_{E1B1}=1V			1	μA
	I_{E2B1O}	V_{E2B1}=1V			1	μA
	I_{E1B2O}	V_{E1B2}=1V			1	μA
	I_{E2B2O}	V_{E2B2}=1V			1	μA
DC Current Gain	h_{FE1}	V_{C1E1}=1V, I_{C1E1}=3mA	20		120	
	h_{FE2}	V_{C2E1}=1V, I_{C2E1}=3mA	20		120	
	h_{FE3}	V_{C1E2}=1V, I_{C1E2}=3mA	20		120	
	h_{FE4}	V_{C2E2}=1V, I_{C2E2}=3mA	20		120	
Conversion Gain *1	Gc	V_{CC}=5V, I_{CC}=6mA, f(RF)=450MHz, f(LO)=500MHz, P(RF)=−15dBm, P(LO)=−6dBm		−0.5		dB
Input Intercept Point *1	IIP3	V_{CC}=5V, I_{CC}=6mA, f(RF1)=450MHz, f(RF2)=451MHz, f(LO)=500MHz, P(RF1)=P(RF2)=−15dBm, P(LO)=−6dBm		15		dBm

*1 : On evaluation board

Ordering Information

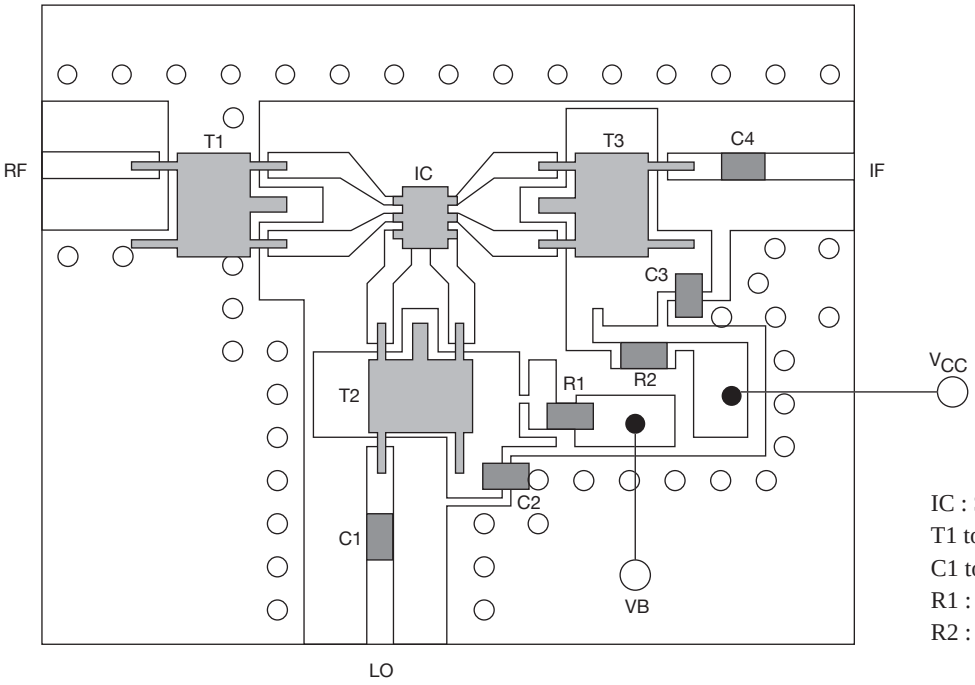
Device	Package	Shipping	memo
SMA5101-TL-H	MCPH6	3,000pcs./reel	Pb Free and Halogen Free

Measurement Circuit



IT15507

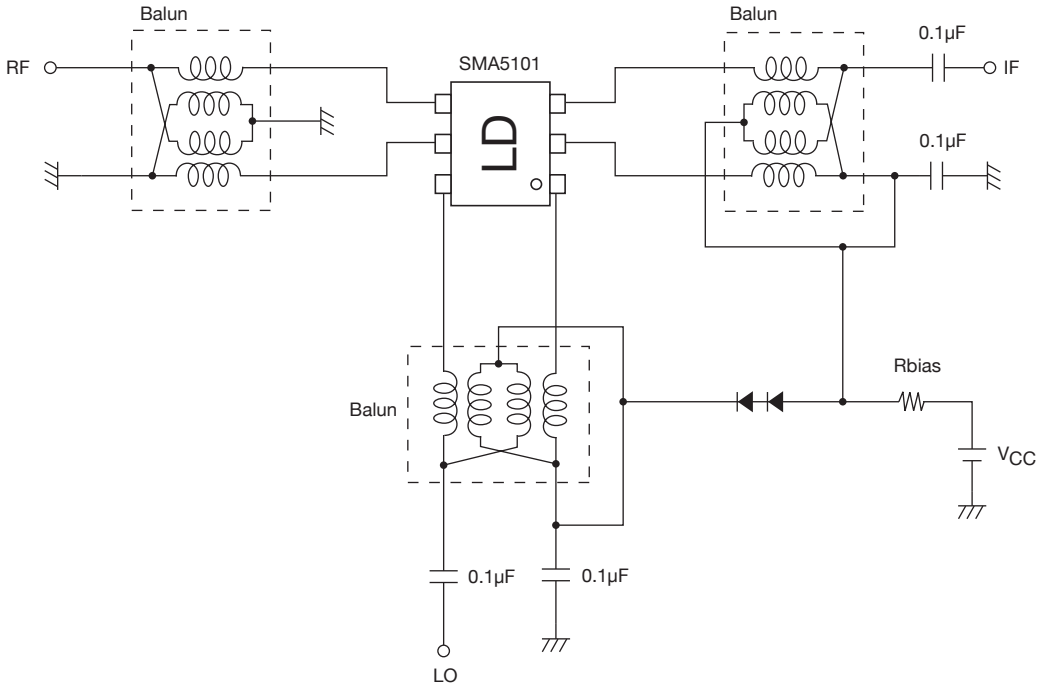
Evaluation Board



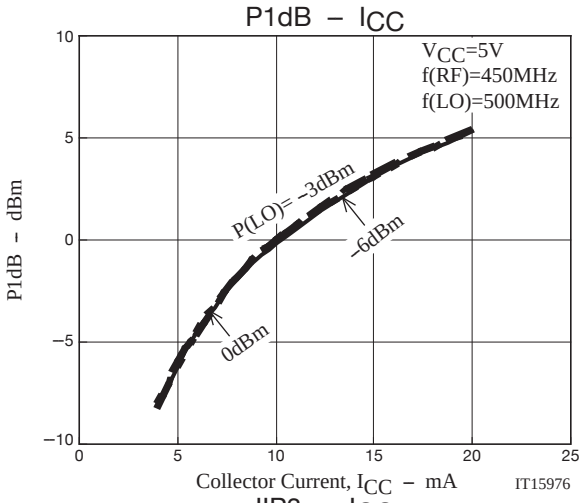
IC : SMA5101
T1 to T3 : Balun
C1 to C4 : 0.1μF
R1 : 10kΩ
R2 : 0Ω (short)

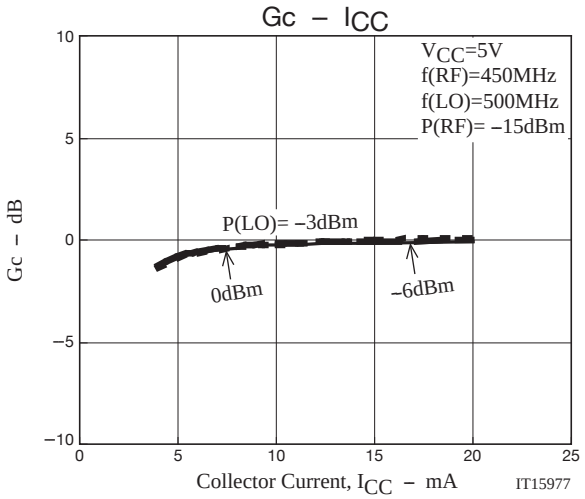
IT15508

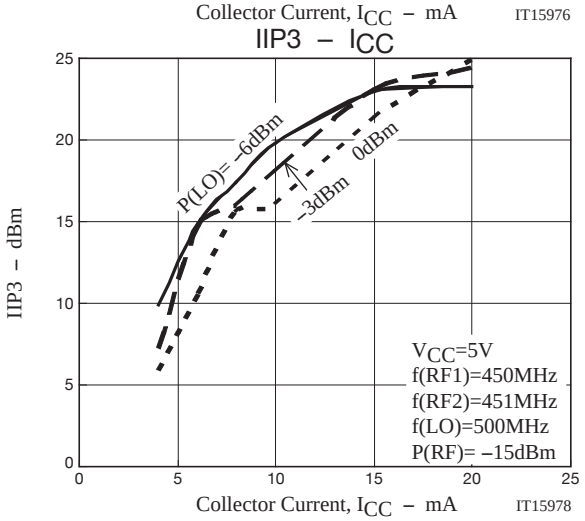
Circuit Example (Self Bias)



IT15509


P1dB – ICC
VCC=5V
f(RF)=450MHz
f(LO)=500MHz
P(LO)= –3dBm
–6dBm
0dBm
P1dB – dBm
Collector Current, ICC – mA
IT15976


Gc – ICC
VCC=5V
f(RF)=450MHz
f(LO)=500MHz
P(RF)= –15dBm
P(LO)= –3dBm
0dBm
–6dBm
Gc – dB
Collector Current, ICC – mA
IT15977


IIP3 – ICC
P(LO)= –6dBm
0dBm
–3dBm
VCC=5V
f(RF1)=450MHz
f(RF2)=451MHz
f(LO)=500MHz
P(RF)= –15dBm
IIP3 – dBm
Collector Current, ICC – mA
IT15978

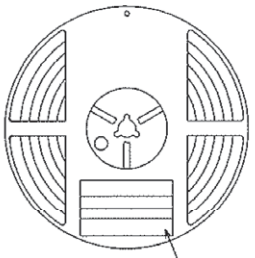
Embossed Taping Specification

SMA5101-TL-H

1. Packing Format

Package Name	Carrier Tape Type	Maximun Number of devices contained (pcs)			Packing format	
		Reel	Inner box	Outer box	Inner BOX (C-1)	Outer BOX (A-7)
MCPH6	MCP4	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

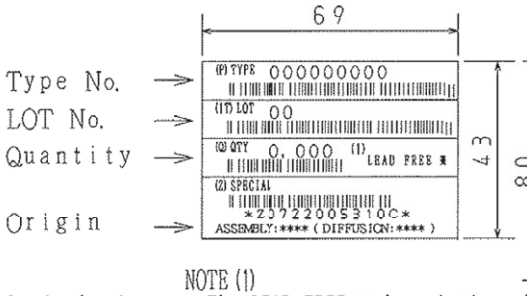
Packing method



Reel label

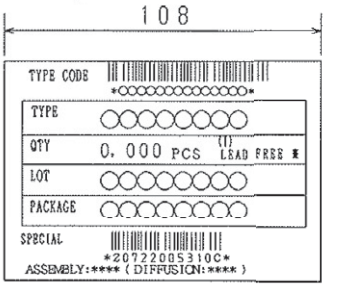
Reel label, Inner box label

(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.



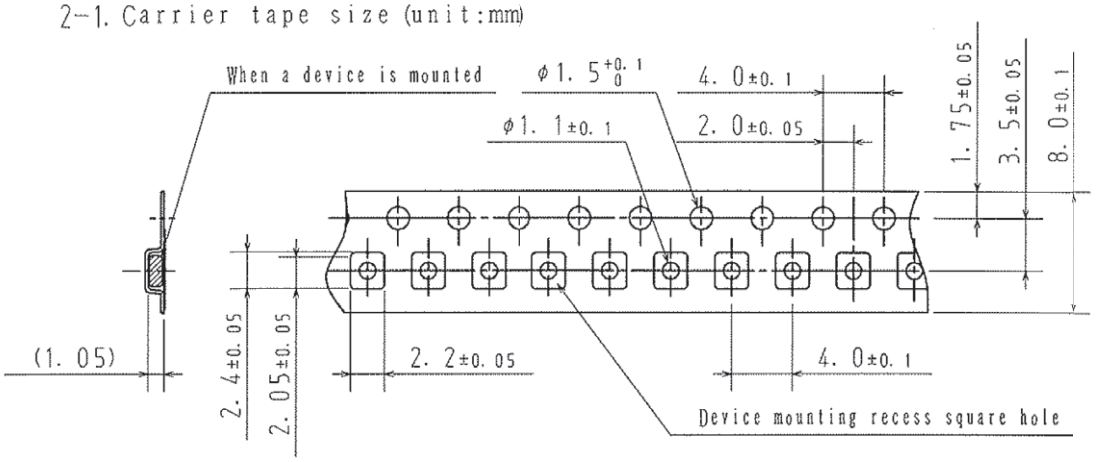
NOTE (1)

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

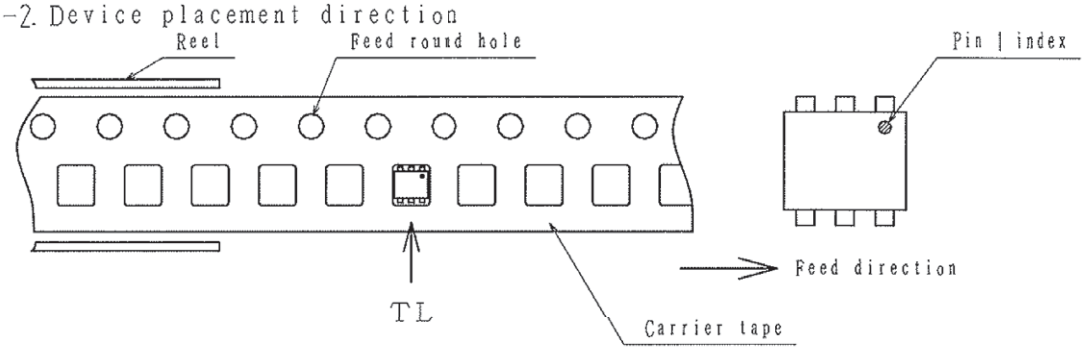
Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A
LEAD FREE 4	JEITA Phase 3

2. Taping configuration

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



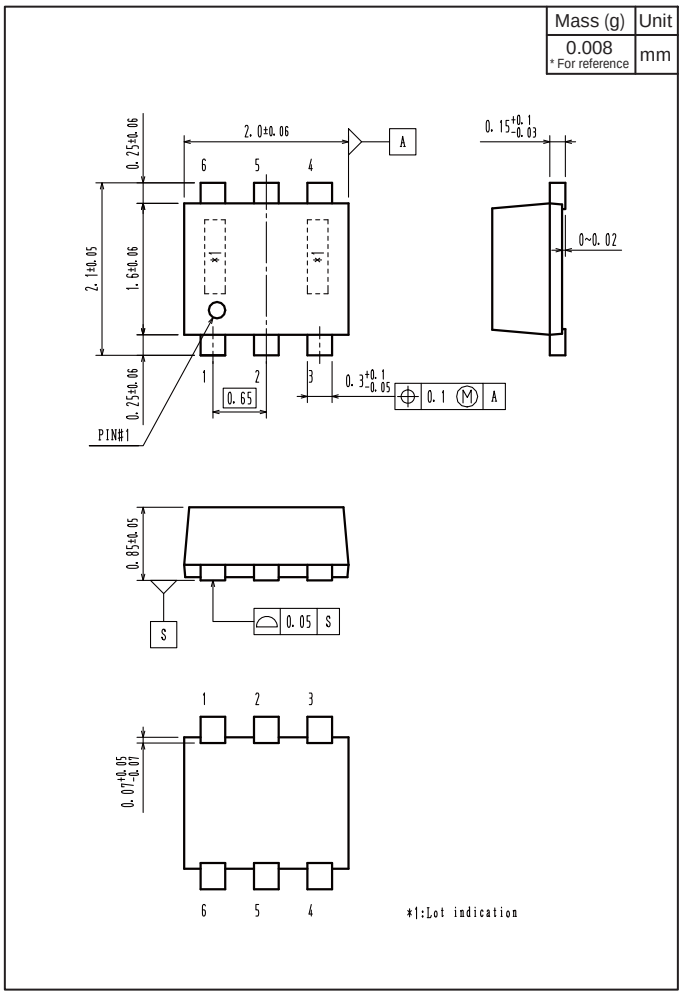
2-2. Device placement direction



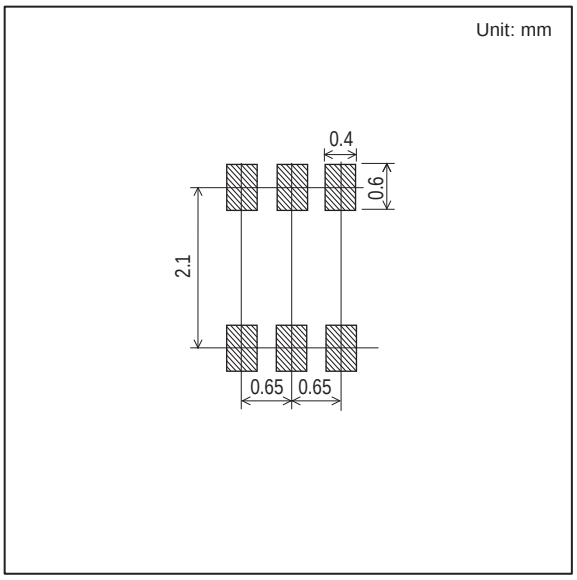
Those with pin 1 index on the feed hole side·····TL

Outline Drawing

SMA5101-TL-H



Land Pattern Example



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