



May. 2021 Ver.1.3a
TDK Corporation

Multilayer Triplexer

For 617-960 / 1447.9-2690 / 3300-5000 MHz

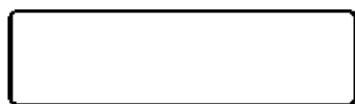
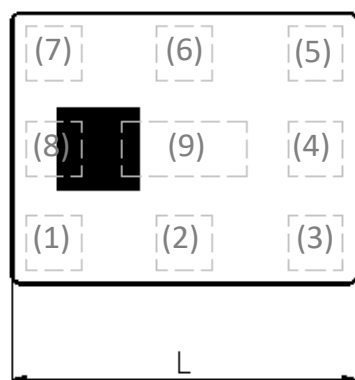
TPX Series 2.5x2.0mm [EIA 1008] TYPE

P/N: **TPX255000MT-7090A1**

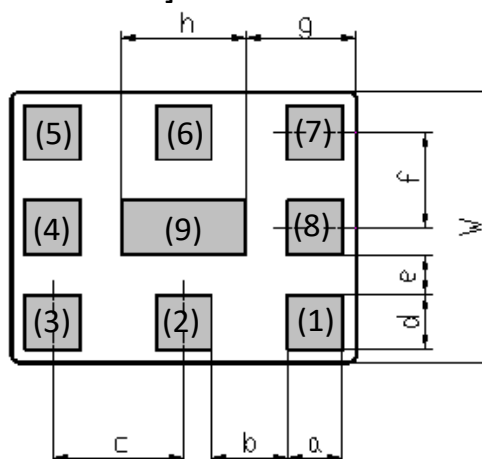
TPX255000MT-7090A1

SHAPES AND DIMENSIONS

[Top View]



[Bottom View]



Dimensions (mm)

L	W	T	a	b	c	d	e	f	g	h
2.50	2.00	0.75	0.40	0.55	0.95	0.40	0.30	0.70	0.80	0.90
+/-0.15	+/-0.15	Max	+/-0.10	+/-0.10	+/-0.15	+/-0.10	+/-0.10	+/-0.15	+/-0.15	+/-0.15

Terminal functions

(1)	High-Band Port
(2)	GND
(3)	Middle-Band Port
(4)	GND
(5)	Low-Band Port

(6)	GND
(7)	Common Port
(8)	GND
(9)	GND

TERMINATION FINISH

Material
Ag

TPX255000MT-7090A1

■ ELECTRICAL CHARACTERISTICS

(Measurement)

Low-Band

Parameter	Frequency (MHz)	TDK Spec		
		Min.	Typ.	Max.
Insertion Loss (dB)	617 to 960	-	0.50	0.65
	to			
Insertion Loss (dB) (-40 to +85 °C)	617 to 960	-	-	0.72
	to			
Return Loss@Common (dB)	617 to 960	12	16.2	-
	to			
Return Loss@Low-Band (dB)	617 to 960	12	15.7	-
	to			
Attenuation (dB)	1164 to 1189	1	2.2	-
	1447.9 to 1700	18	25.3	-
	1700 to 2200	25	30.4	-
	2200 to 6000	25	28.5	-
	6000 to 9000	28	34.7	-
	9000 to 12750	15	22.3	-
	to			
Characteristic Impedance (ohm)		50 (Nominal)		

Ta = +25+/-5°C

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■ ELECTRICAL CHARACTERISTICS

(Measurement)

Middle-Band

Parameter	Frequency (MHz)	TDK Spec		
		Min.	Typ.	Max.
Insertion Loss (dB)	1447.9 to 2690	-	0.71	0.85
	to			
Insertion Loss (dB) (-40 to +85 °C)	1447.9 to 2690	-	-	0.97
	to	-		
Return Loss@Common (dB)	1447.9 to 2690	12	19.0	-
	to			
Return Loss@Middle-Band (dB)	1447.9 to 2690	12	19.9	-
	to			
Attenuation (dB)	0 to 960	23	25.8	-
	1164 to 1189	3	7.2	-
	3300 to 3500	18	23.8	-
	3500 to 6000	19	22.2	-
	6000 to 9000	12	20.0	-
	9000 to 12750	12	18.5	-
	to			
Characteristic Impedance (ohm)		50 (Nominal)		

Ta = +25+/-5°C

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■ ELECTRICAL CHARACTERISTICS

(Measurement)

High-Band

Parameter	Frequency (MHz)	TDK Spec		
		Min.	Typ.	Max.
Insertion Loss (dB)	3300 to 5000	-	0.93	1.30
	to			
Insertion Loss (dB) (-40 to +85 °C)	3300 to 5000	-	-	1.50
	to			
Return Loss@Common (dB)	3300 to 5000	10	19.4	-
	to			
Return Loss@High-Band (dB)	3300 to 5000	10	17.9	-
	to			
Attenuation (dB)	0 to 1000	22	24.9	-
	1164 to 1189	21	23.9	-
	1447.9 to 2690	18	22.0	-
	5100	0.5	1.0	-
	6000 to 9000	15	21.9	-
	9000 to 12750	15	21.5	-
	to			
Characteristic Impedance (ohm)		50 (Nominal)		

Ta = +25+/-5°C

Isolation

Parameter		Frequency (MHz)	TDK Spec		
			Min.	Typ.	Max.
Isolation (dB)	LB - MB	617 to 960	23	25.8	-
		1447.9 to 2690	18	24.6	-
		to			
	LB - HB	617 to 960	22	25.2	-
		3300 to 5000	30	44.5	-
		to			
	MB - HB	1447.9 to 2690	18	22.0	-
		3300 to 5000	18	22.2	-
		to			

Ta = +25+/-5°C

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■ MAXIMUM RATINGS

Parameter		TDK Spec	Conditions
Operating temperature (°C)		−40 to +85 °C	
Storage temperature (°C)		−40 to +85 °C	
Power Handling (W) *1	Frequency (MHz)		
	Low-Band	617 to 960	1 CW Duty 100%
	Middle-Band	1447.9 to 2690	1 CW Duty 100%
	High-Band	3300 to 5000	1 CW Duty 100%
Human Body Model : HBM @Each Port (V)		+/-1000	100pF / 1500ohm
Machine Model : MM @Each Port (V)		+/-150	200pF / 0ohm
Charged Device Model : CDM @Each Port (V)		+/-500	Humidity : 60%RH max

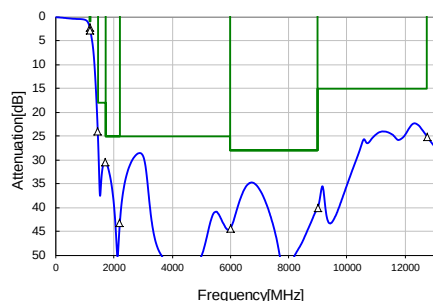
*1 : Refer to 3GPP TS 38.101-1 V15.2.0

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FREQUENCY CHARACTERISTICS

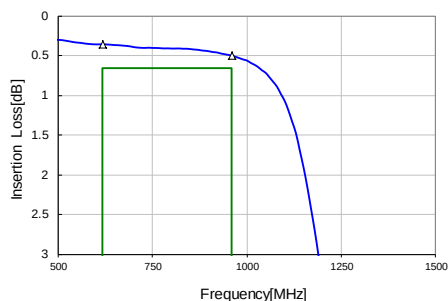
S21 Attenuation



Attenuation

1164 MHz	2.2 dB
1189 MHz	2.7 dB
1447.9 MHz	25.3 dB
1700 MHz	30.4 dB
2200 MHz	43.1 dB
6000 MHz	44.3 dB
9000 MHz	40.1 dB
12750 MHz	25.0 dB

S21 Insertion Loss

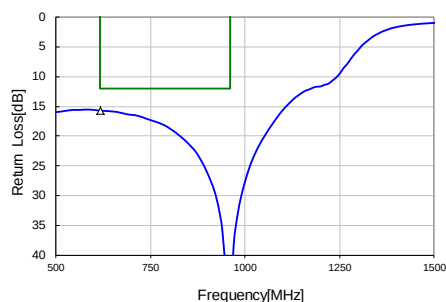


— TDK SPEC

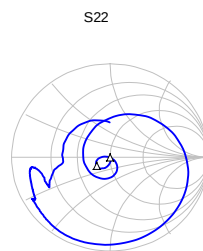
Attenuation

617 MHz	0.35 dB
960 MHz	0.50 dB

S22 Return Loss

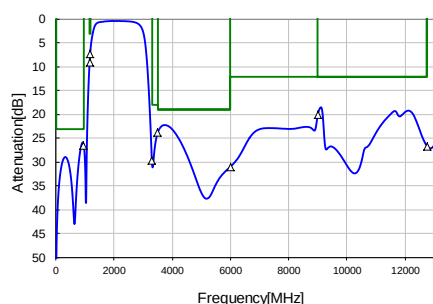


S22 Smith Chart



617 MHz	
37.31	-6.87
960 MHz	
50.18	-0.24

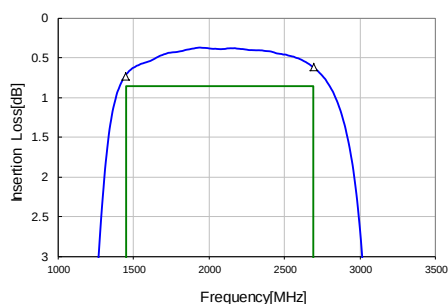
S31 Attenuation



Attenuation

960 MHz	26.5 dB
1164 MHz	9.1 dB
1189 MHz	7.2 dB
3300 MHz	29.7 dB
3500 MHz	23.8 dB
6000 MHz	30.9 dB
9000 MHz	20.0 dB
12750 MHz	26.6 dB

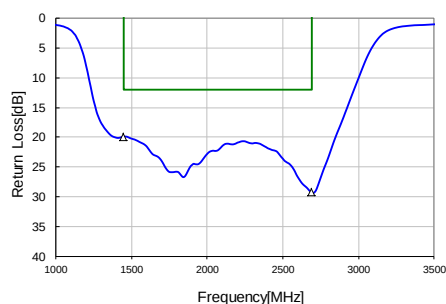
S31 Insertion Loss



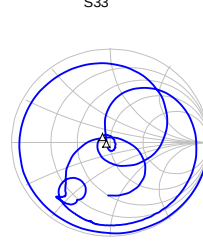
Attenuation

1447.9 MHz	0.71 dB
2690 MHz	0.62 dB

S33 Return Loss



S33 Smith Chart



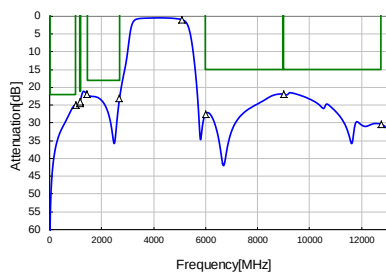
1447.9 MHz	
42.56	5.66
2690 MHz	
46.69	-0.45

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FREQUENCY CHARACTERISTICS

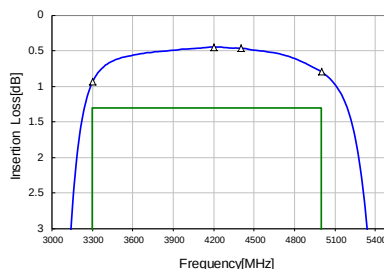
S41 Attenuation



Attenuation

1000 MHz	24.9 dB
1164 MHz	24.5 dB
1189 MHz	23.9 dB
1447.9 MHz	22.0 dB
2690 MHz	23.0 dB
5100 MHz	1.0 dB
6000 MHz	27.5 dB
9000 MHz	21.9 dB
12750 MHz	30.4 dB

S41 Insertion Loss

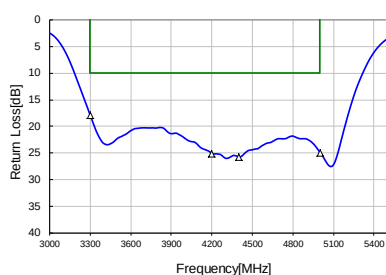


— TDK SPEC

Insertion Loss

3300 MHz	0.93 dB
4200 MHz	0.44 dB
4400 MHz	0.46 dB
5000 MHz	0.79 dB

S44 Return Loss

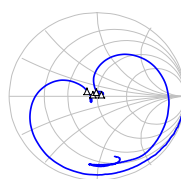


Return Loss

3300 MHz	17.9 dB
4200 MHz	25.1 dB
4400 MHz	25.8 dB
5000 MHz	24.9 dB

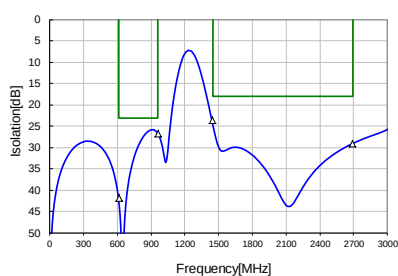
S44 Smith Chart

S44



3300 MHz	39.67	4.95
4200 MHz	45.15	2.18
4400 MHz	48.75	4.93
5000 MHz	55.52	2.40

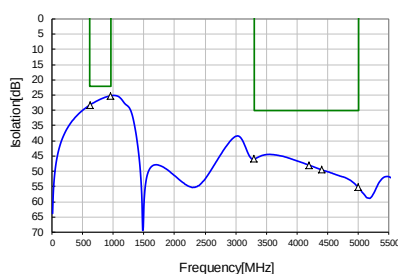
S23 Isolation



Attenuation

617 MHz	41.7 dB
960 MHz	26.6 dB
1447.9 MHz	24.6 dB
2690 MHz	29.0 dB

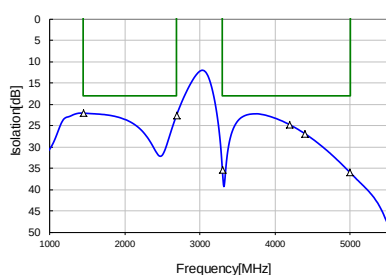
S24 Isolation



Attenuation

617 MHz	28.4 dB
960 MHz	25.2 dB
3300 MHz	45.9 dB
4200 MHz	48.1 dB
4400 MHz	49.6 dB
5000 MHz	55.3 dB

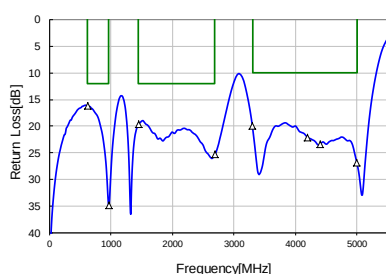
S34 Isolation



Insertion Loss

1447.9 MHz	22.0 dB
2690 MHz	22.5 dB
3300 MHz	35.3 dB
4200 MHz	24.8 dB
4400 MHz	26.8 dB
5000 MHz	35.9 dB

S11 Return Loss

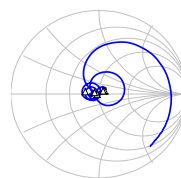


Return Loss

617 MHz	16.2 dB
960 MHz	34.8 dB
1447.9 MHz	19.7 dB
2690 MHz	25.3 dB
3300 MHz	20.0 dB
4200 MHz	22.2 dB
4400 MHz	23.4 dB
5000 MHz	26.8 dB

S11 Smith Chart

S11



617 MHz	36.72	2.27
960 MHz	48.31	0.57
1447.9 MHz	41.30	-3.75
2690 MHz	45.07	1.48
3300 MHz	49.95	-10.05
4200 MHz	56.68	4.97
4400 MHz	55.22	4.86
5000 MHz	53.71	2.98

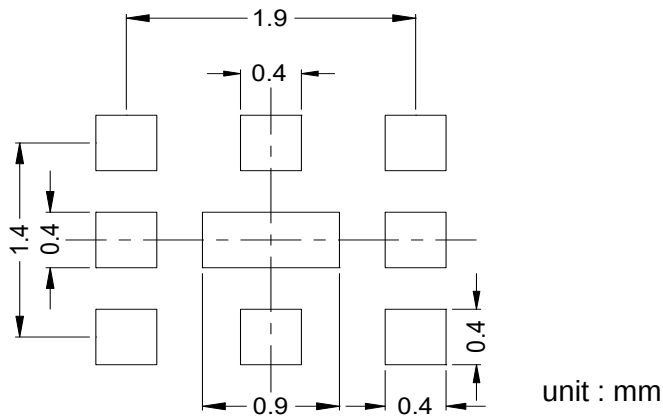
All specifications are subject to change without notice.

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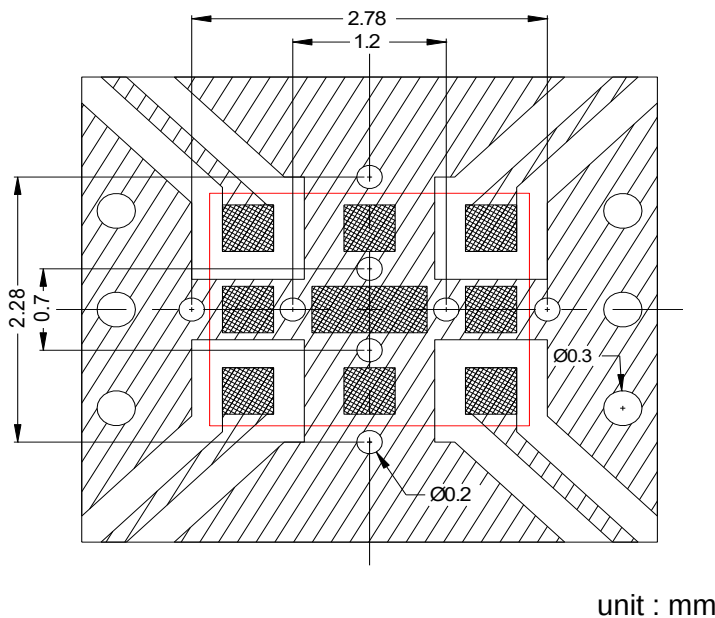
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RECOMMENDED LAND PATTERN



EVALUATION BOARD



- Thru Hole
- ▨ Surface Pattern
- ▤ Land Pattern
- DUT

Material & Layer	Thickness
Copper Surface Pattern	0.035 mm
FR-4	0.10 mm
Inner GND	0.018 mm
FR-4	0.30 mm
Copper Bottom GND	0.035 mm

* Line width should be designed to match 50 ohm characteristic impedance depending on PCB material and thickness.

** The position of the thru hole which have possibility of influence to the performance are indicated by dimension line.

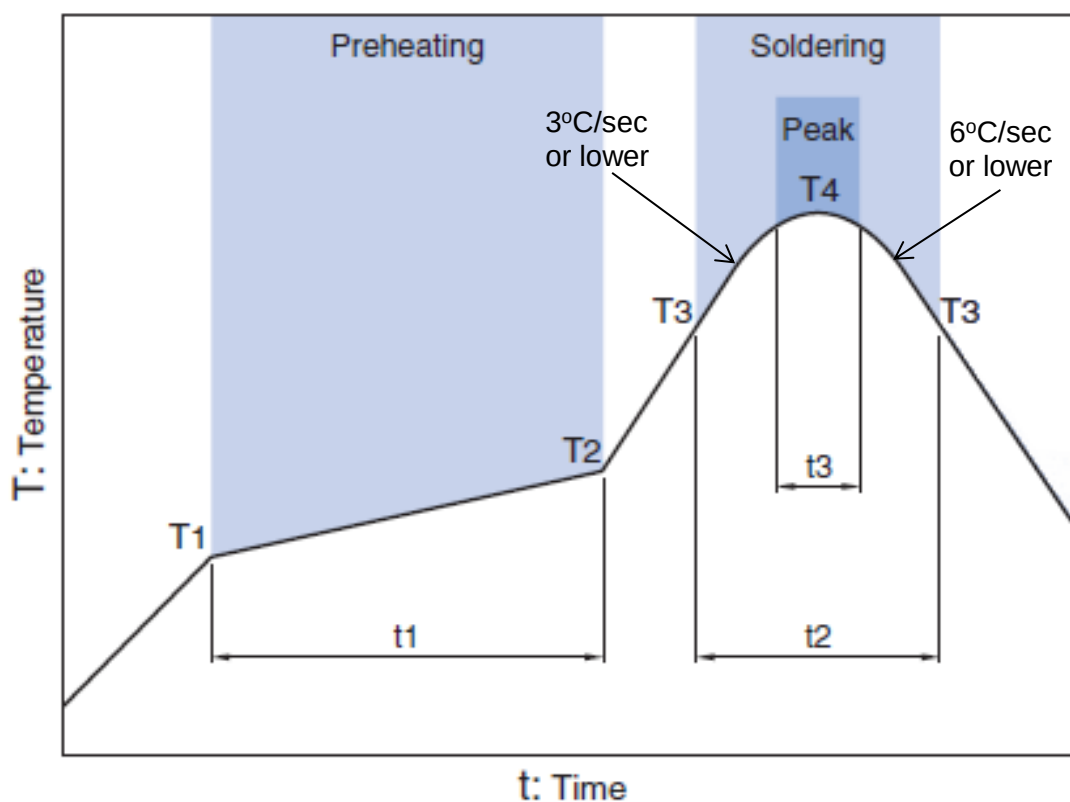
ENVIRONMENT INFORMATION

RoHS Statement
RoHS Compliance

All specifications are subject to change without notice.
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RECOMMENDED REFLOW PROFILE



Preheating			Soldering			
			Critical zone (T3 to T4)		Peak	
Temp.		Time	Temp.	Time	Temp.	Time
T1	T2	t1	T3	t2	T4	t3 *
150°C	200°C	60 to 120sec	217°C	60 to 120sec	240 to 260°C	30 sec Max

* t3 : Time within 5°C of actual peak temperature

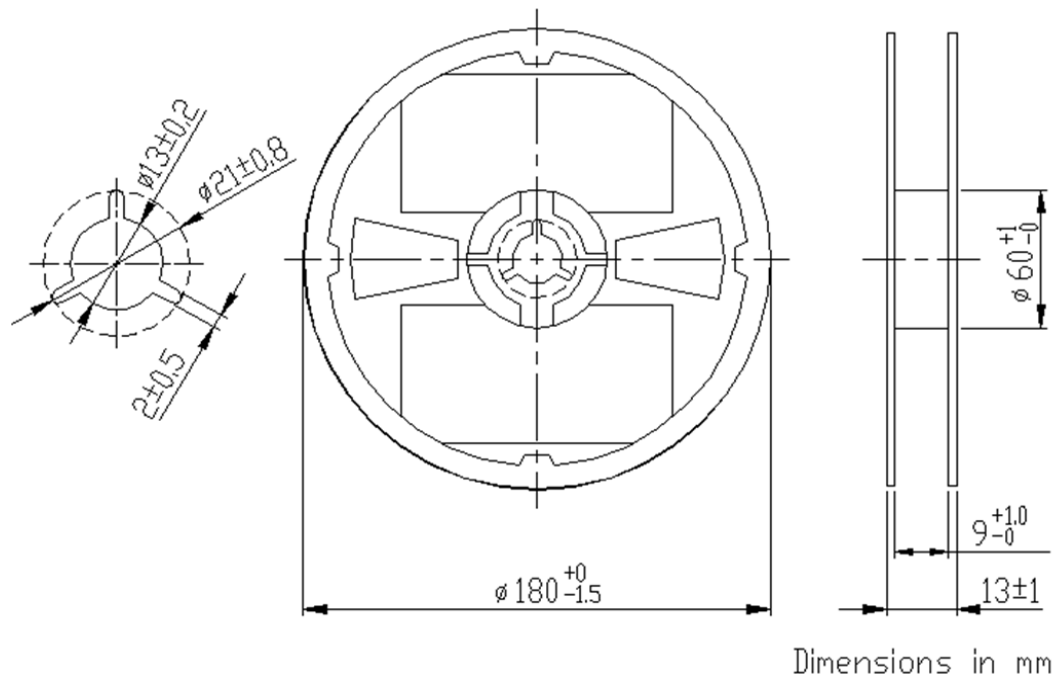
The maximum number of reflow is 3.

Note: Lead free solder is recommended.
Recommended solder is Sn-3.0Ag-0.5Cu. (M705 by Senju Metal Industry)

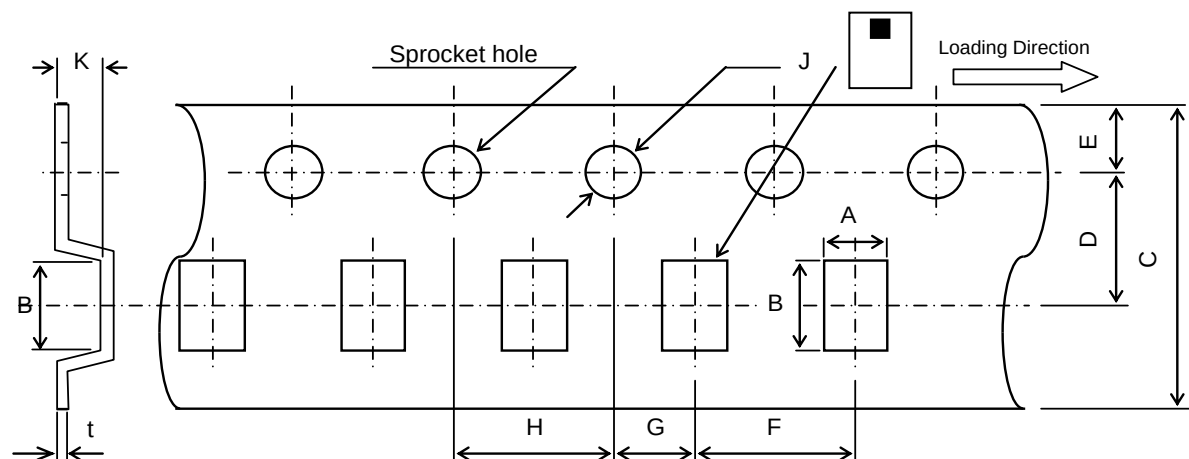
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PACKAGING STYLE

Reel Dimensions



Carrier Tape



Dimensions (mm)

A	B	C	D	E	F	G	H	J	K	t
2.2	2.7	8.0	3.5	1.75	4.0	2.0	4.0	1.5	1.15	0.25
± 0.05	± 0.05	$\pm 0.3/-0.1$	± 0.05	± 0.1	± 0.1	± 0.05	± 0.1	$\pm 0.1/-0$	MAX	± 0.05

STANDARD PACKAGE QUANTITY (pieces/reel)

2,000

REMINDERS FOR USING THESE PRODUCTS

Before using these products, be sure to request the delivery specifications.

SAFETY REMINDERS

Please pay sufficient attention to the warnings for safe designing when using these products.



REMINDERS

The products listed on this specification sheet are intended for use in general electronic equipment (AV equipment, telecommunications equipment, home appliances, amusement equipment, computer equipment, personal equipment, office equipment, measurement equipment, industrial robots) under a normal operation and use condition.

The products are not designed or warranted to meet the requirements of the applications listed below, whose performance and/or quality require a more stringent level of safety or reliability, or whose failure, malfunction or trouble could cause serious damage to society, person or property. Please understand that we are not responsible for any damage or liability caused by use of the products in any of the applications below or for any other use exceeding the range or conditions set forth in this specification sheet.

1. Aerospace/Aviation equipment
2. Transportation equipment (cars, electric trains, ships, etc.)
3. Medical equipment
4. Power-generation control equipment
5. Atomic energy-related equipment
6. Seabed equipment
7. Transportation control equipment
8. Public information-processing equipment
9. Military equipment
10. Electric heating apparatus, burning equipment
11. Disaster prevention/crime prevention equipment
12. Safety equipment
13. Other applications that are not considered general-purpose applications

When using this product in general-purpose applications, you are kindly requested to take into consideration securing protection circuit/equipment or providing backup circuits, etc., to ensure higher safety.