Nov 2026 Ver.5.0P
TDK Corporation

Thin-Film Directional Coupler

For 2.4GHz W-LAN & Bluetooth / 5GHz W-LAN

TFS Series 0.65x0.5mm [EIA 0202] TYPE

P/N: **TFSC06054125-2120A1X**

[Features]

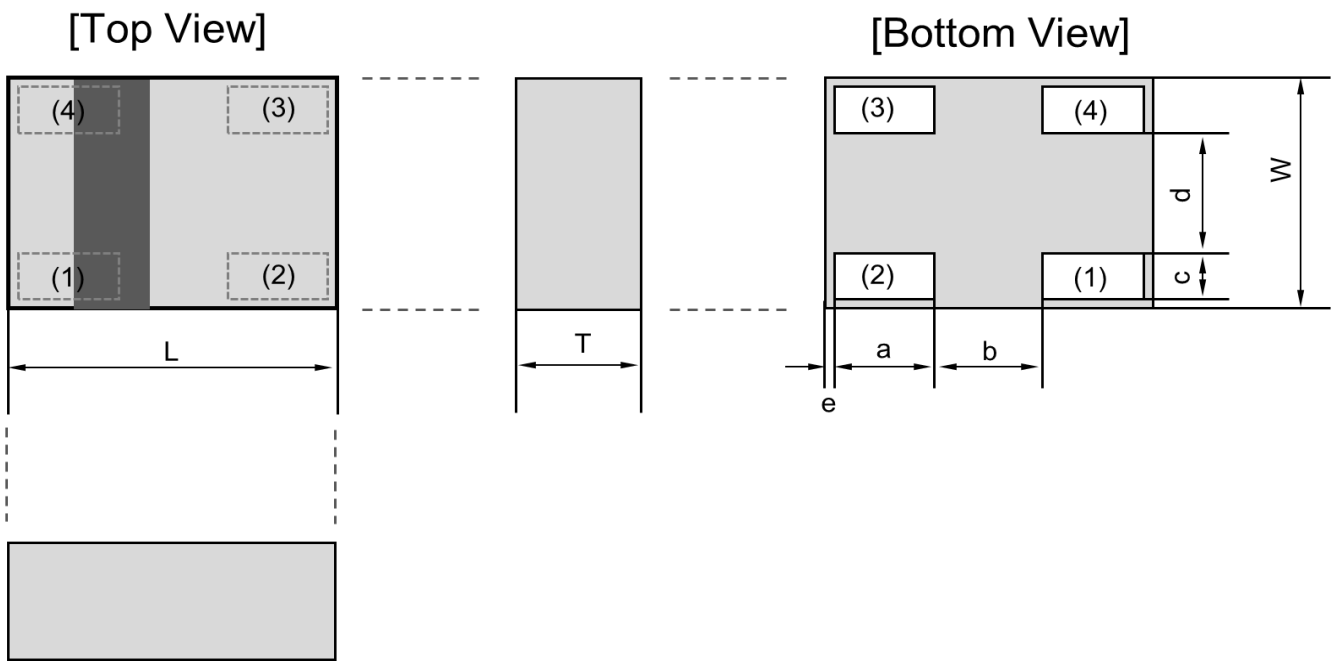
- Small Size (0.65mm * 0.5mm)
- Low Profile (0.25mm)
- High Directivity
- Small Coupling Deviation

All specifications are subject to change without notice.
Before using these products, be sure to request the delivery specifications.

Nov. 2026 Ver.5.0P
TDK Corporation

TFSC06054125-2120A1X

■ SHAPES AND DIMENSIONS



Dimensions (mm)

L	W	T	a	b	c	d	e
0.65 +/-0.04	0.50 +/-0.04	0.25 +/-0.05	0.20 +/-0.04	0.20 +/-0.04	0.10 +/-0.04	0.25 +/-0.04	0.025 +/-0.025

Terminal functions

(1)	Coupling Port
(2)	50ohm Termination
(3)	Output Port
(4)	Input Port

■ TERMINATION FINISH

Material
Au plate

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Nov. 2026 Ver.5.0P
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TFSC06054125-2120A1X

■ ELECTRICAL CHARACTERISTICS

(Measurement)

Parameter		TDK Spec			Units
		Min.	Nominal	Max.	
Frequency Range	Low, f1	2400	-	2500	MHz
	High, f2	5150	-	5850	
VSWR	Low, f1	-	1.03	1.2	-
	High, f2	-	1.14	1.25	
Coupling factor	Low, f1	18.6	19.4	20	dB
	High, f2	12	12.8	14	
Directivity	Low, f1	16	19.9	-	
	High, f2	20	23.8	-	
Insertion Loss	Low, f1	-	0.07	0.2	
	High, f2	-	0.34	0.5	

Ta = +25+/-5°C

Coupler Type

Daisy Chain Available	Yes
Bi-Directional	Yes

■ MAXIMUM RATINGS

Parameter	TDK Spec		Conditions
	Min.	Max.	
Operating temperature (°C)	–40 to +85 °C		
Storage temperature (°C)	–40 to +85 °C		
Power Handling (W)	-	3	CW
Human Body Model : HBM @Each Port (V)	-	1000	100pF / 1500ohm
Machine Model : MM @Each Port (V)	-	100	200pF / 0ohm
Charged Device Model : CDM @Each Port (V)	-	500	Relative humidity : 60%RH max

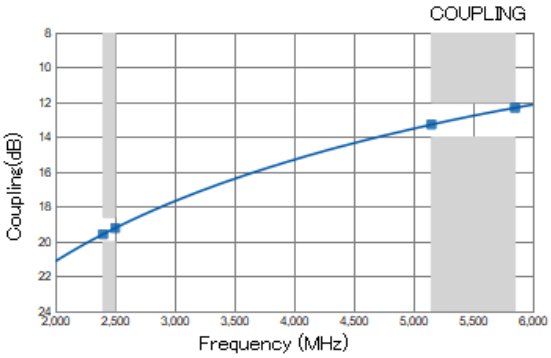
Ambient temperature : +25+/-5°C

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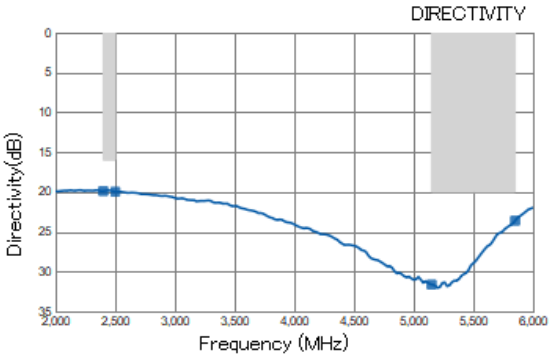
Nov. 2026 Ver.5.0P
TDK Corporation

TFSC06054125-2120A1X

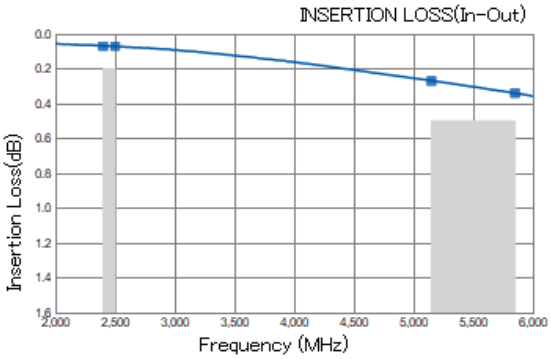
FREQUENCY CHARACTERISTICS



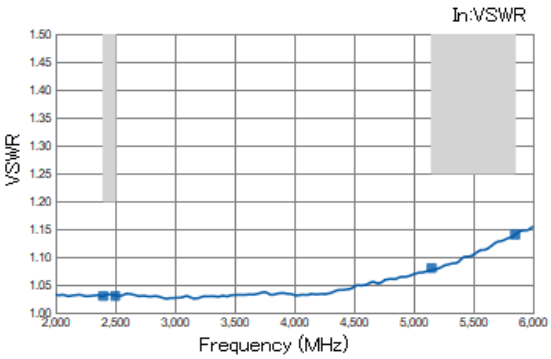
P/N	TFSC-2120A1X
Freq	
2400	19.57
2500	19.22
5150	13.27
5850	12.31



P/N	TFSC-2120A1X
Freq	
2400	19.90
2500	19.97
5150	31.63
5850	23.61



P/N	TFSC-2120A1X
Freq	
2400	0.07
2500	0.07
5150	0.27
5850	0.34



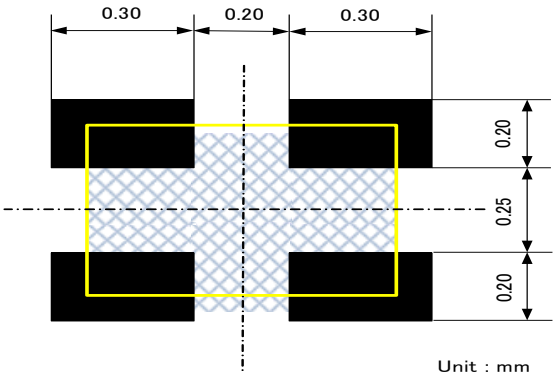
P/N	TFSC-2120A1X
Freq	
2400	1.03
2500	1.03
5150	1.08
5850	1.14

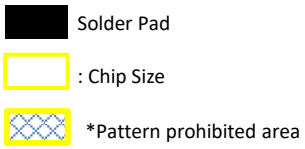
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Nov. 2026 Ver.5.0P
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TFSC06054125-2120A1X

RECOMMENDED LAND PATTERN

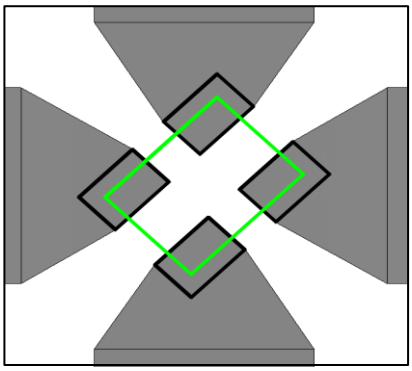


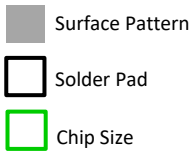


Line width be designed to mach 50 ohm characteristic impedance depending on PCB Material and thickness

*Pattern prohibited area:Since TFS series products have functional layers in the underside of the product, do not place any copper pattern on the first layer under the product.

EVALUATION BOARD





Materal & Layer	Thickness
Copper Surface Pattern	0.035mm
Teflon	0.320mm
Copper Bottom GND	0.035mm

Electrical performance, insertion loss and/or attenuation, can be changed if the product is mounted on a PCB which has different configuration, material and/or thickness, from our evaluation board.

ENVIRONMENT INFORMATION

RoHS Statement
RoHS Compliance

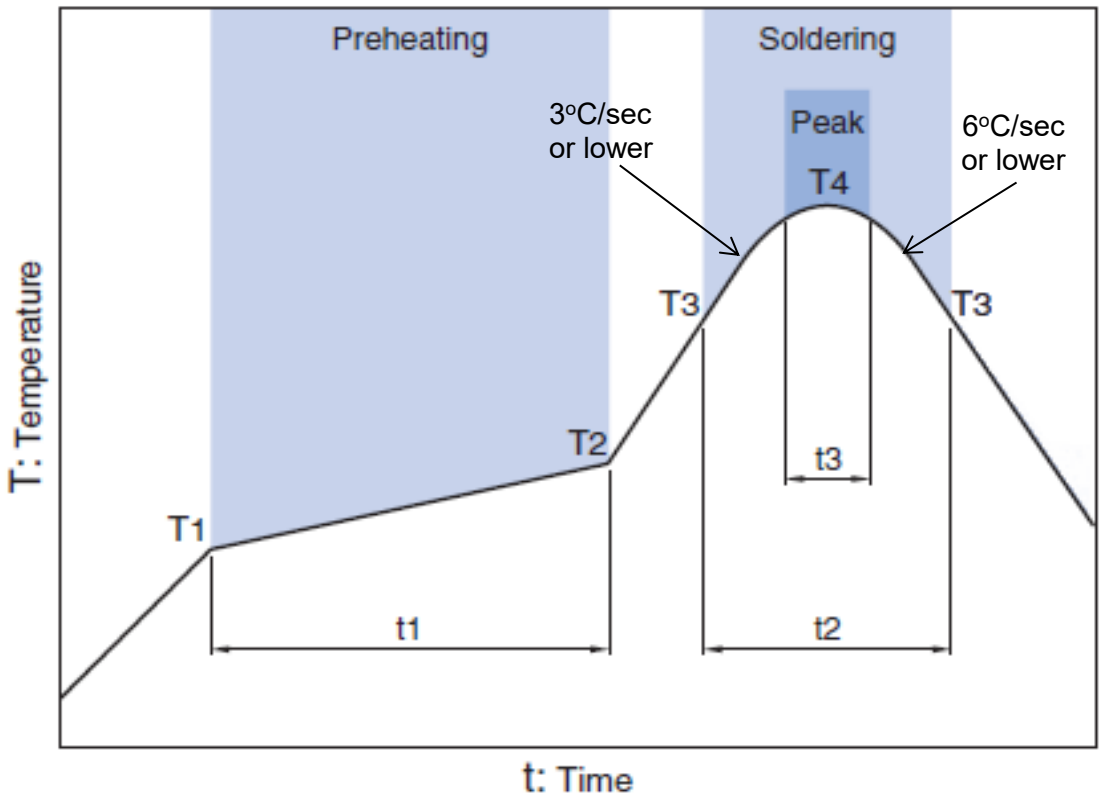
Moisture Sensitivity Level (MSL) : 1

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Nov. 2026 Ver.5.0P
TDK Corporation

TFSC06054125-2120A1X

■ 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.

■ GENERAL TECHNICAL INFORMATION

https://product.tdk.com/ja/system/files/dam/doc/product/rf/rf/filter/general_tech_info/rf_general-technical-info_02_en.pdf

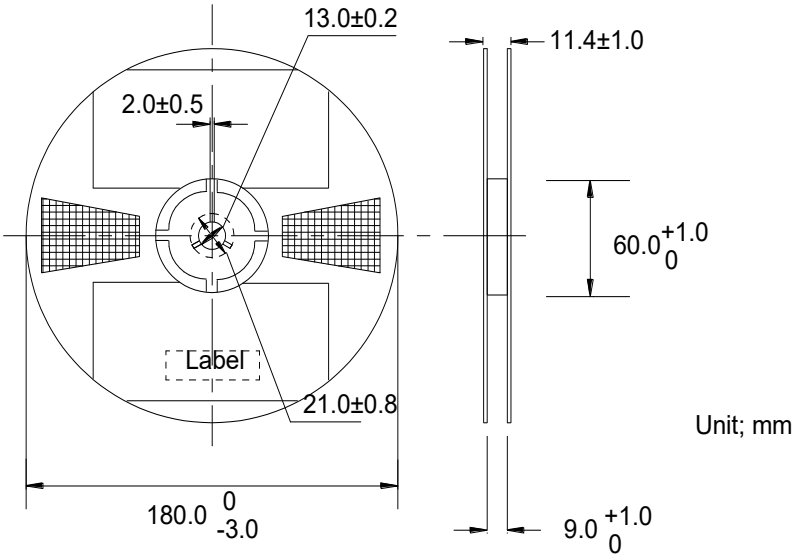
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TDK Corporation

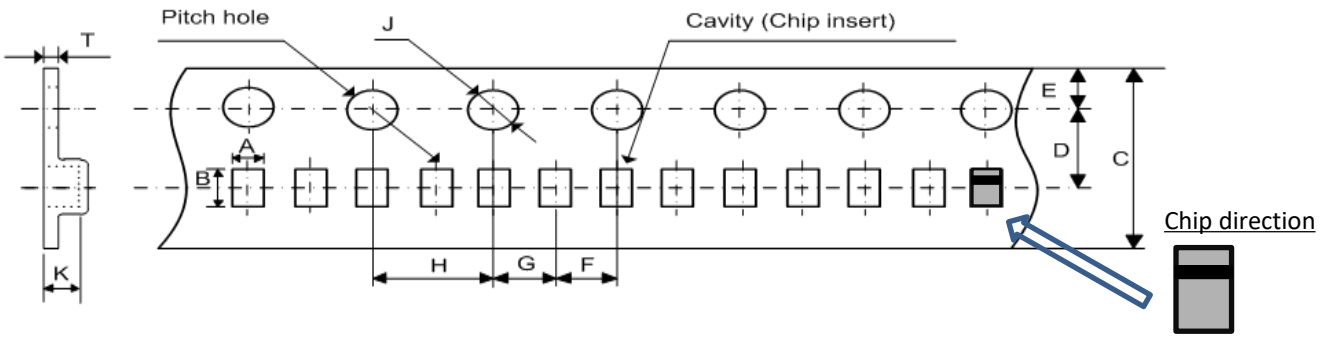
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■ PACKAGING STYLE

Reel Dimensions



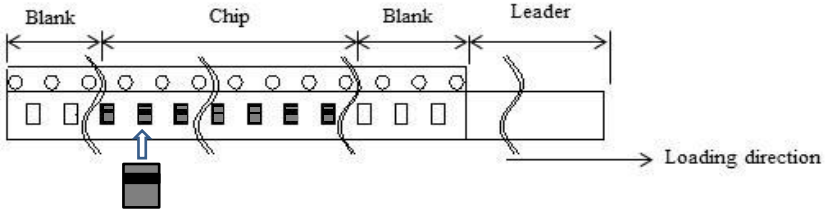
Carrier Tape



Symbol	A	B	C	D	E	F
Dimension	0.63 ±0.03	0.81 ±0.03	8.0 +0.3/-0.1	3.5 ±0.05	1.75 ±0.1	2.0 ±0.05

Symbol	G	H	J	K	T
Dimension	2.0 ±0.05	4.0 ±0.1	1.5 +0.1/-0.0	0.34 ±0.03	0.2 ±0.05

(Unit:mm)



STANDARD PACKAGE QUANTITY (pieces/reel)
10,000

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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.

Do not use the products or the technical information for the development of mass-destruction weapons or for military purposes. Please comply with applicable export-related laws and regulations such as the “Foreign Exchange and Foreign Trade Act” and the “U.S. Export Administration Regulations,” and carry out all necessary procedures as stipulated by these laws.