



# SAW Components

## SAW diplexer for base stations

Band 34 and band 39

**Series/type:** B5187  
**Ordering code:** B39192B5187U510

**Date:** January 15, 2014  
**Version:** 2.2

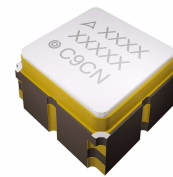
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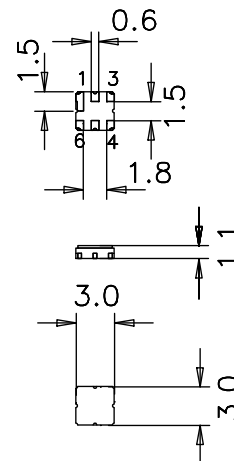
**Data sheet**

**Application**

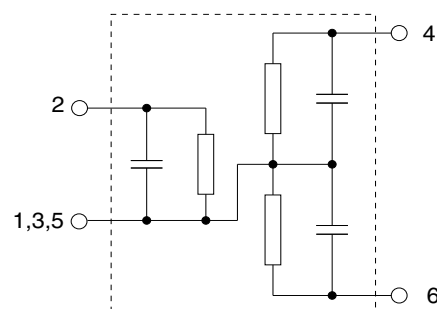
- Low-loss 2in1 RF diplex filter for band 34 and tight-ened band 39
- Usable passband :
  - Filter 1 (TD-SCDMA 1897.5): 35 MHz
  - Filter 2 (TD-SCDMA 2017.5): 15 MHz
- Unbalanced to unbalanced operation
- Matching required for operation at 50 Ω


**Features**

- Package size 3.0 x 3.0 x 1.1 mm<sup>3</sup>
- Package code DCC6D
- RoHS compatible
- Approximate weight 0.037 g
- Package for **Surface Mount Technology (SMT)**
- Ni, gold-plated terminals
- **Electrostatic Sensitive Device (ESD)**
- **Moisture Sensitivity Level 1**
- Filter surface passivated


**Pin configuration**

- 2 Input unbalanced
- 4 Output unbalanced(Filter 2)
- 6 Output unbalanced(Filter 1)
- 1,3,5 To be grounded



Data sheet


**Characteristics**

Temperature range for specification:	$T = -40\text{ °C to }+85\text{ °C}$
Terminating source impedance:	$Z_S = 50\ \Omega$ and matching network
Terminating load impedance:	$Z_L = 50\ \Omega$

		<b>B5187</b>			
		<b>min.</b>	<b>typ. @ 25 °C</b>	<b>max.</b>	
<b>Normal frequency</b>	$f_N$	—	1897.5	—	MHz
<b>Maximum insertion attenuation</b>	$\alpha_{\max}$	—	3.0	4.0	dB
1880.0 ... 1915.0 MHz					
<b>Amplitude ripple (p-p)</b>	$\Delta\alpha$	—	1.0	2.0	dB
1880.0 ... 1915.0 MHz					
<b>VSWR (input/output)</b>		—	1.5:1	2.5:1	
1880.0 ... 1915.0 MHz					
<b>Group delay</b>	$\tau_{\max}$	—	30	40	ns
1880.0 ... 1915.0 MHz					
<b>Group delay ripple (p-p)</b>	$\Delta\tau$	—	5	15	ns
1880.0 ... 1915.0 MHz					
<b>Absolute attenuation</b>	$\alpha$				
1.0 <sup>1)</sup> ... 1500.0 MHz		30	37	—	dB
1500.0 ... 1700.0 MHz		28	38	—	dB
1700.0 ... 1846.0 MHz		25	30	—	dB
1944.0 ... 2000.0 MHz		20	25	—	dB
2000.0 ... 2300.0 MHz		30	33	—	dB
2300.0 ... 5000.0 MHz		15	23	—	dB

1) Final electrical test starts at 10MHz

Data sheet


**Characteristics**

Temperature range for specification:	$T = -40\text{ °C to }+100\text{ °C}$
Terminating source impedance:	$Z_S = 50\ \Omega$ and matching network
Terminating load impedance:	$Z_L = 50\ \Omega$

		<b>B5187</b>			
		<b>min.</b>	<b>typ. @ 25 °C</b>	<b>max.</b>	
<b>Normal frequency</b>	$f_N$	—	1897.5	—	MHz
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1700.0 ... 1846.0 MHz		25	30	—	dB
1944.0 ... 2000.0 MHz		20	25	—	dB
2000.0 ... 2300.0 MHz		30	33	—	dB
2300.0 ... 5000.0 MHz		15	23	—	dB

1) Final electrical test starts at 10MHz

**Maximum ratings**

Operable temperature range	T	-40/+100	°C	
Storage temperature range	T <sub>stg</sub>	-55/+125	°C	
DC voltage	V <sub>DC</sub>	0	V	
ESD voltage	V <sub>ESD</sub>	50 <sup>1)</sup>	V	Machine Model
ESD voltage	V <sub>ESD</sub>	150 <sup>2)</sup>	V	Human Body Model
Input power				
1880.0 ... 1915.0 MHz	P <sub>IN</sub>	20	dBm	cw,1000 h, 85°C
1880.0 ... 1915.0 MHz	P <sub>IN</sub>	23	dBm	cw,2 h, 85°C

1) According to JESD-A115B (MM - Machine Model), 10 negative & 10 positive pulses

2) According to JESD-A114F (HBM - Human Body Model), 1 negative & 1 positive pulses

Data sheet


**Characteristics**

Temperature range for specification:	$T = -40\text{ °C to }+85\text{ °C}$
Terminating source impedance:	$Z_S = 50\ \Omega$ and matching network
Terminating load impedance:	$Z_L = 50\ \Omega$

		B5187			
		min.	typ. @ 25 °C	max.	
<b>Normal frequency</b>	$f_N$	—	2017.5	—	MHz
<b>Maximum insertion attenuation</b>	$\alpha_{\max}$	—	3.5	4.0	dB
2010.0 ... 2025.0 MHz					
<b>Amplitude ripple (p-p)</b>	$\Delta\alpha$	—	1.3	2.0	dB
2010.0 ... 2025.0 MHz					
<b>VSWR (input/output)</b>		—	1.5:1	2.5:1	
2010.0 ... 2025.0 MHz					
<b>Group delay</b>	$\tau_{\max}$	—	30	40	ns
2010.0 ... 2025.0 MHz					
<b>Group delay ripple (p-p)</b>	$\Delta\tau$	—	5	15	ns
2010.0 ... 2025.0 MHz					
<b>Absolute attenuation</b>	$\alpha$				
1.0 <sup>1)</sup> ... 1500.0 MHz		30	40	—	dB
1500.0 ... 1900.0 MHz		25	28	—	dB
1900.0 ... 1962.0 MHz		20	27	—	dB
2055.0 ... 2100.0 MHz		20	25	—	dB
2100.0 ... 2300.0 MHz		30	35	—	dB
2300.0 ... 5000.0 MHz		15	25	—	dB

1) Final electrical test starts at 10MHz

Data sheet


**Characteristics**

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Terminating source impedance:	$Z_S = 50\ \Omega$ and matching network
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		B5187			
		min.	typ. @ 25 °C	max.	
<b>Normal frequency</b>	$f_N$	—	2017.5	—	MHz
<b>Maximum insertion attenuation</b>	$\alpha_{\max}$	—	3.5	4.0	dB
2010.0 ... 2025.0 MHz					
<b>Amplitude ripple (p-p)</b>	$\Delta\alpha$	—	1.3	2.0	dB
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<b>VSWR (input/output)</b>		—	1.5:1	2.5:1	
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1900.0 ... 1962.0 MHz		20	27	—	dB
2055.0 ... 2100.0 MHz		20	25	—	dB
2100.0 ... 2300.0 MHz		30	35	—	dB
2300.0 ... 5000.0 MHz		15	25	—	dB

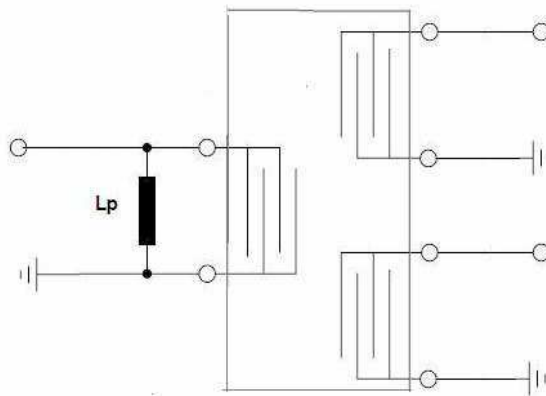
1) Final electrical test starts at 10MHz

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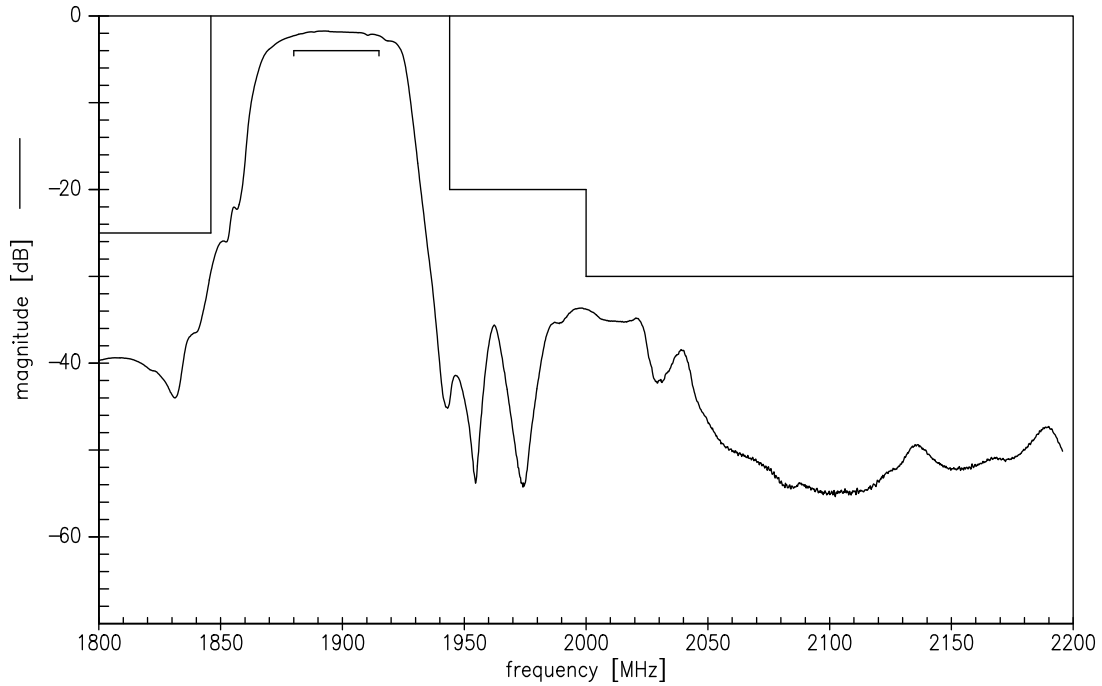
**Matching network to 50 Ω input/50 Ω output:**


$$L_p = 4.3 \text{ nH}$$

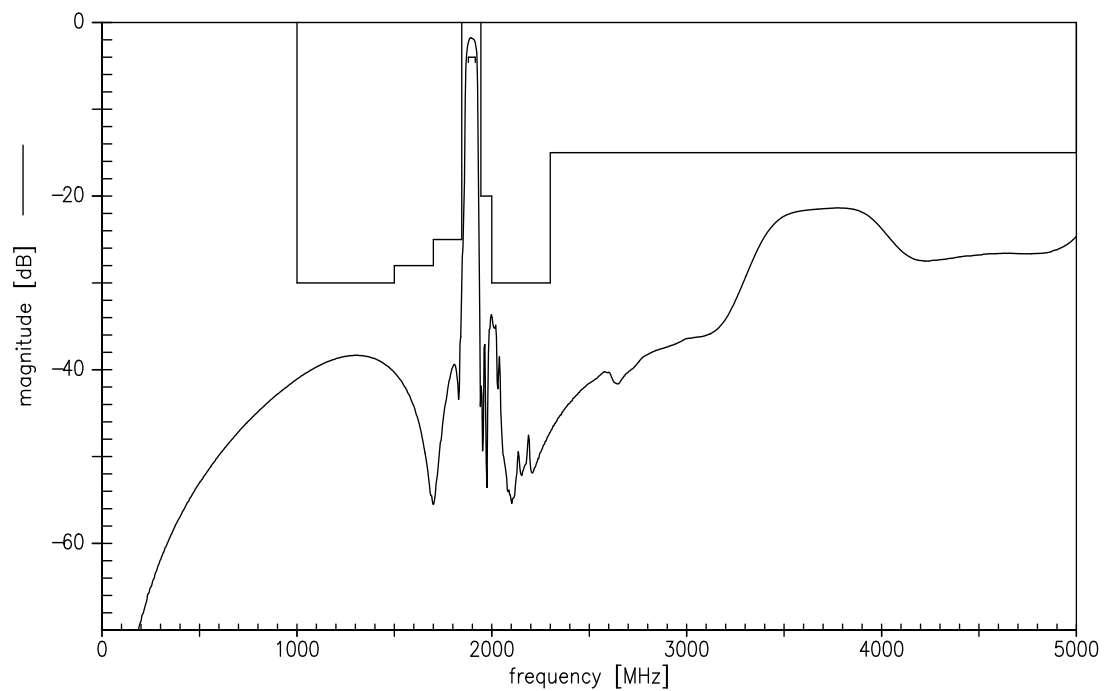
Element values depend on PCB layout



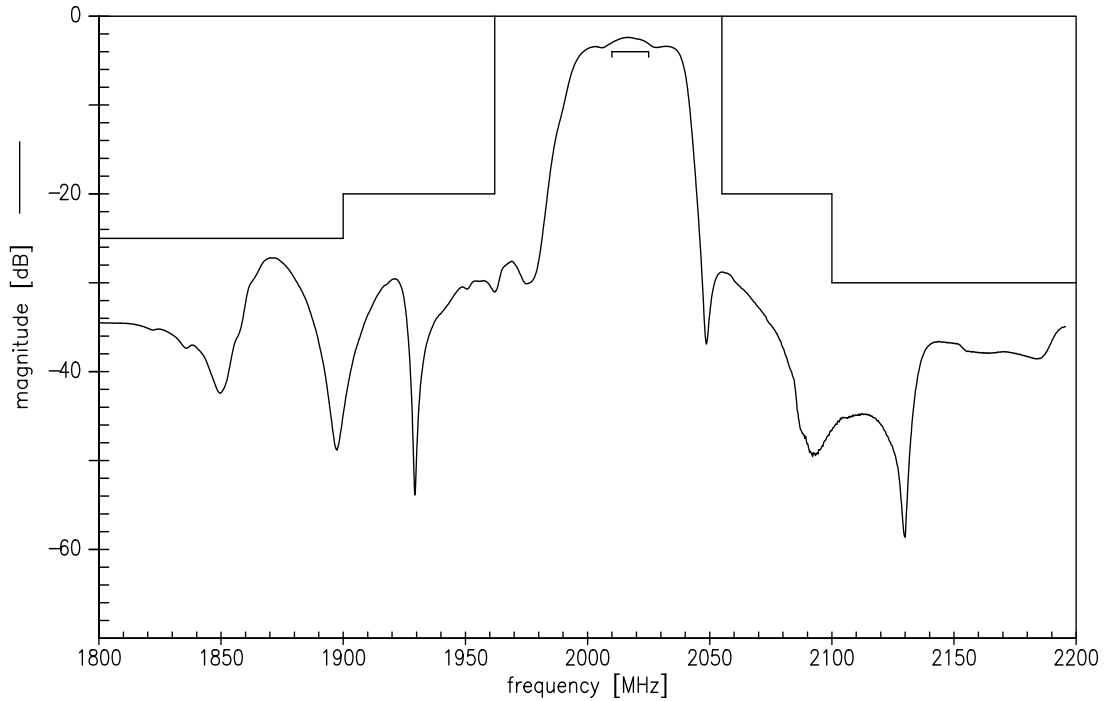
Transfer function Filter 1 (Narrow band)



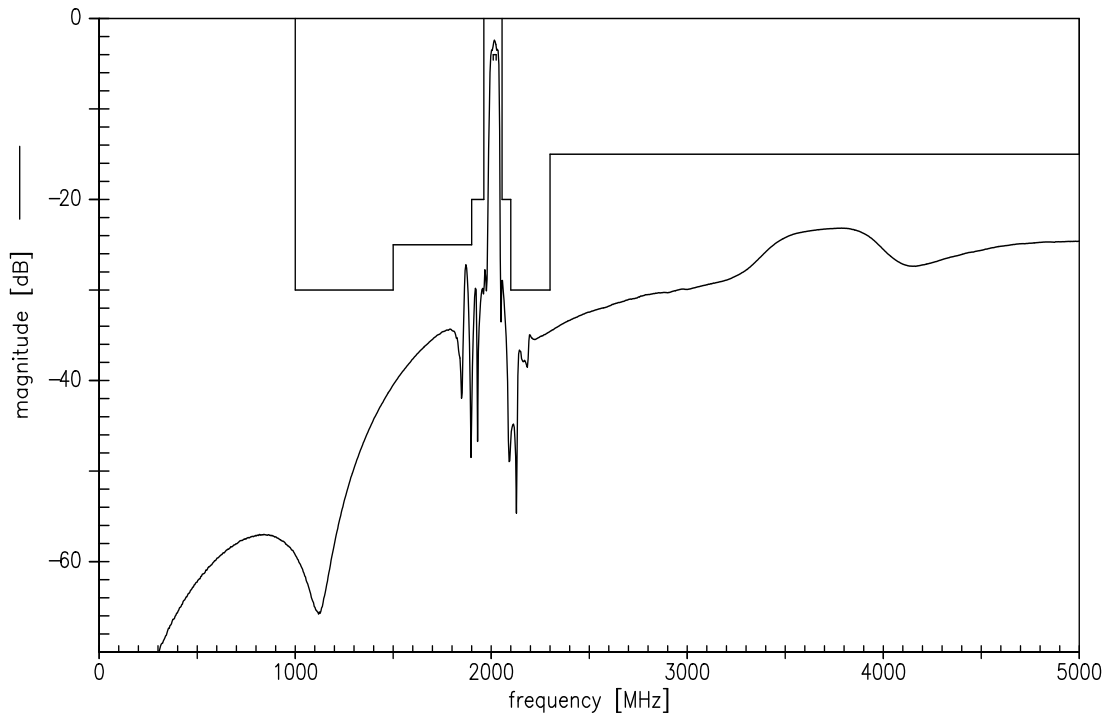
Transfer function (Wide band)



Transfer function Filter2 (Narrow band)



Transfer function (Wide band)

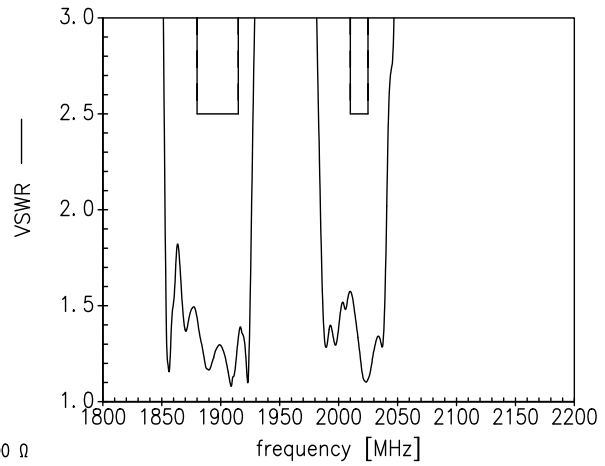
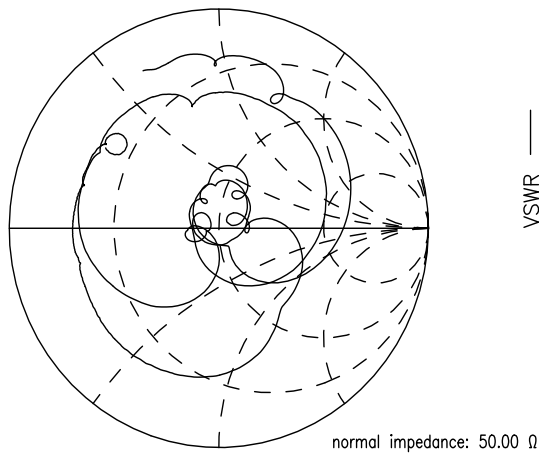


Data sheet

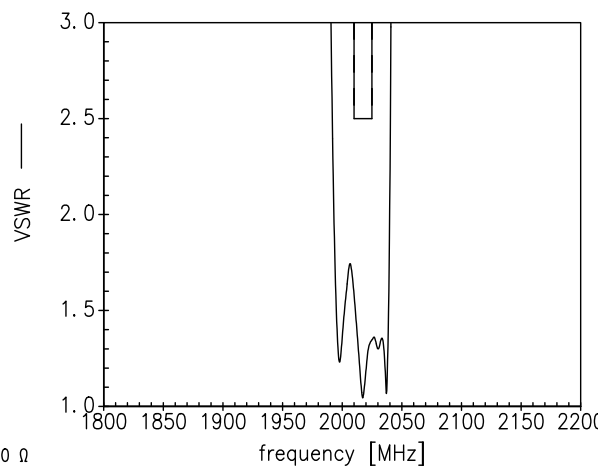
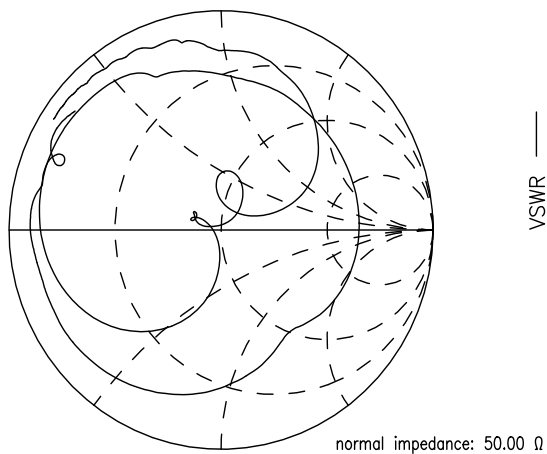


Smith charts

$S_{11}$  function



$S_{22}$  function

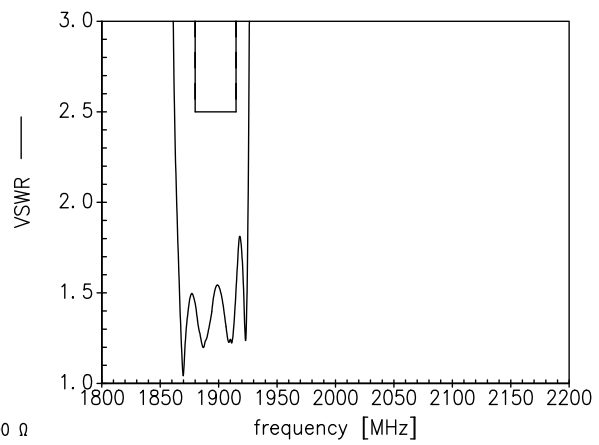
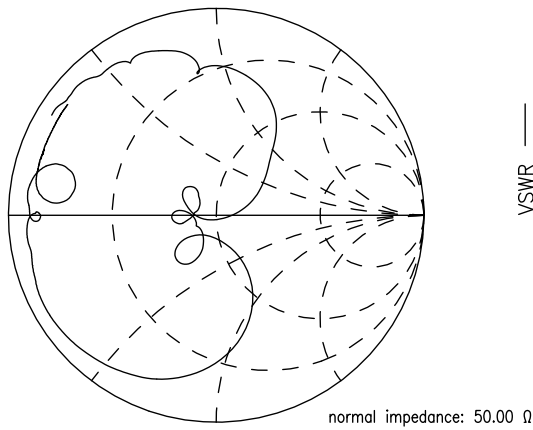


Data sheet

**SMD**

Smith charts

$S_{33}$  function



<b>SAW Components</b>	<b>B5187</b>
<b>SAW diplexer for base stations</b>	<b>1897.5 / 2017.5 MHz</b>
Data sheet	

## References

<b>Type</b>	B5187
<b>Ordering code</b>	B39192B5187U510
<b>Marking and package</b>	C61157-A7-A68
<b>Packaging</b>	F61074-V8228-Z000
<b>Date codes</b>	L_1126
<b>S-parameters</b>	B5187_NB.s3p B5187_WB.s3p see file header for port/pin assignment table
<b>Soldering profile</b>	S_6001
<b>RoHS compatible</b>	RoHS-compatible means that products are compatible with the requirements according to Art. 4 (substance restrictions) of Directive 2011/65/EU of the European Parliament and of the Council of June 8th, 2011, on the restriction of the use of certain hazardous substances in electrical and electronic equipment ("Directive") with due regard to the application of exemptions as per Annex III of the Directive in certain cases.
<b>Matching coils</b>	See Inductor pdf-catalog <a href="http://www.tdk.co.jp/tefe02/coil.htm#aname1">http://www.tdk.co.jp/tefe02/coil.htm#aname1</a> and Data Library for circuit simulation <a href="http://www.tdk.co.jp/etvcl/index.htm">http://www.tdk.co.jp/etvcl/index.htm</a> for a large variety of matching coils.

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