



RF360
Europe GmbH

SAW components

SAW diplexer

Automotive telematics
TD-SCDMA bands 34 & 39

Series/type:	B4372
Ordering code:	B39202B4372P810
Date:	March 28, 2017
Version:	2.0

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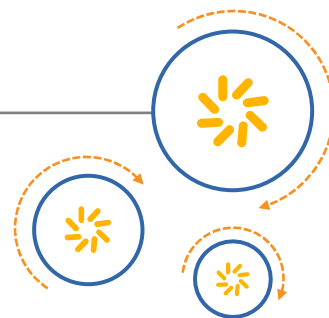
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A Qualcomm – TDK Joint Venture

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SAW duplexer	1900 / 2017.5 MHz

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1 Application

- Low-loss 2in1 RF filter for TD-SCDMA band 34 and TD-SCDMA band 39 systems
- TD-SCDMA B34: 15MHz
- TD-SCDMA B39: 40MHz
- Unbalanced to unbalanced operation for both filters
- Low amplitude ripple
- Component can be used bidirectionally as output(s) can also be used as input(s).

2 Features

- Package size $2.0 \pm 0.1 \text{ mm} \times 1.6 \pm 0.1 \text{ mm}$
- Package height 0.45 mm (max.)
- Approximate weight 6 mg
- RoHS compatible
- Package for Surface Mount Technology (SMT)
- Ni/Au-plated terminals
- Filter surface passivated
- Electrostatic Sensitive Device (ESD)
- Moisture Sensitivity Level 2a (MSL2a)
- AEC-Q200 qualified component family (Grade 3: $-40 \text{ }^{\circ}\text{C}$ to $+85 \text{ }^{\circ}\text{C}$)



Figure 1: Picture of component with example of product marking.

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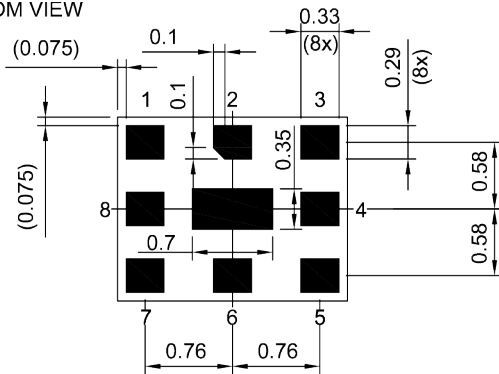
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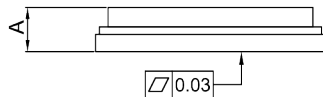
Data sheet

3 Package

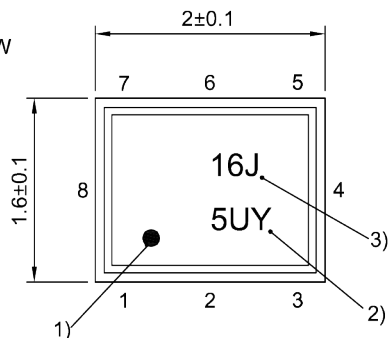
BOTTOM VIEW

Pad and pitch tolerance ± 0.05

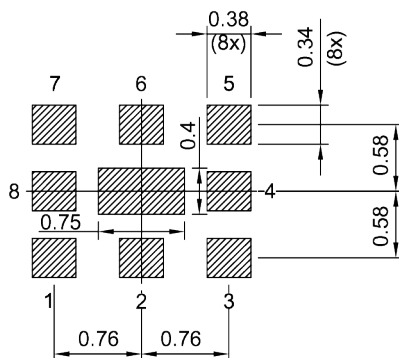
SIDE VIEW



TOP VIEW



- 1) Marking for pad number 1
- 2) Example of encoded lot number
- 3) Example of encoded filter type number

Land pattern
THRU VIEWLanding pad tolerance -0.02 4 Pin configuration¹⁾

- 1 Output (B39)
- 3 Output (B34)
- 6 Input (B34 & B39)
- 2, 4, 5, 7, 8, 9 Ground

¹⁾ Note that the component can be used bidirectionally as output(s) can also be used as input(s).

Figure 2: Drawing of package with package height A = 0.45 mm (max.). See Sec. Package information (p. 20).

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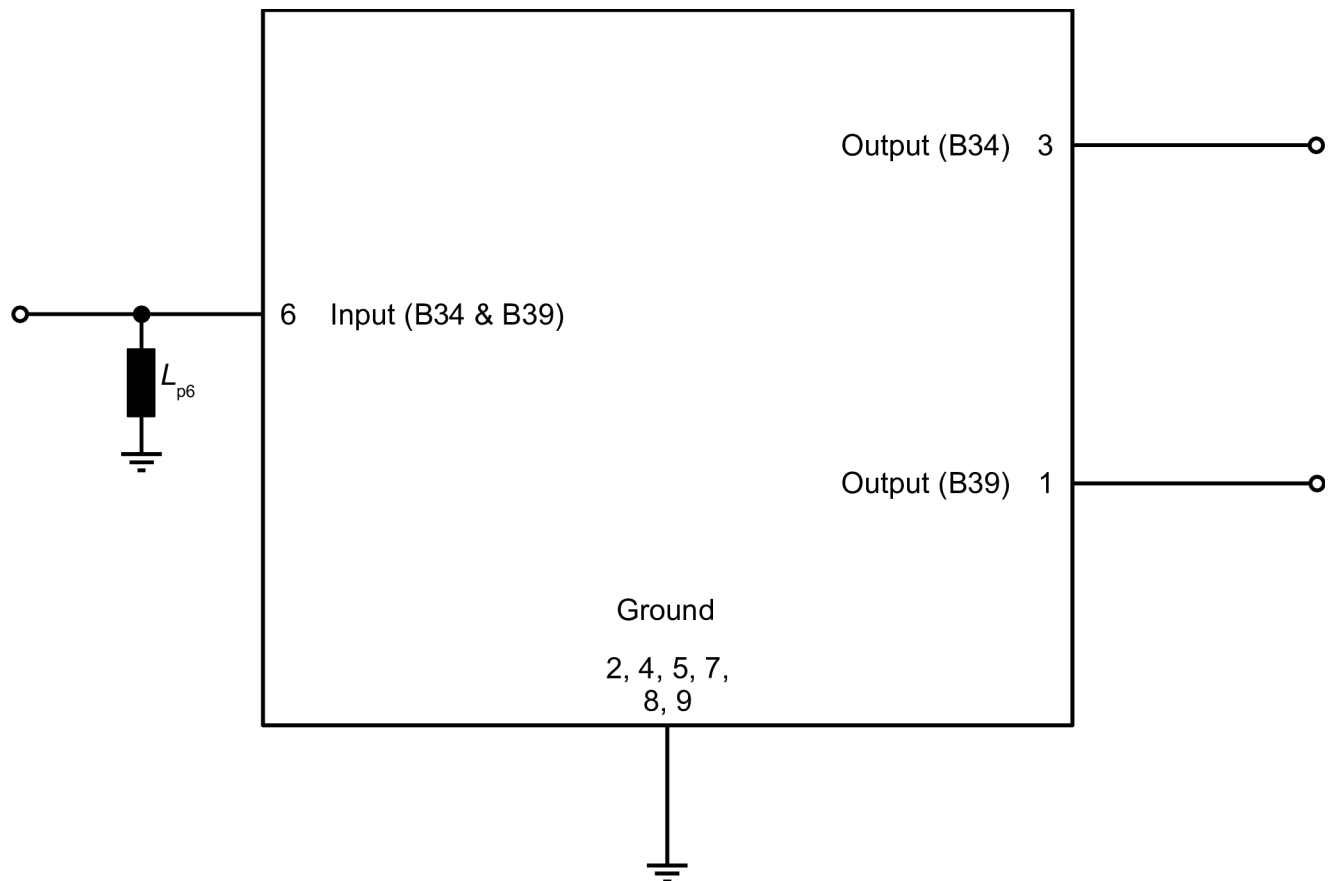
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5 Matching circuit

■ $L_{p6} = 4.3 \text{ nH}$ **Figure 3:** Schematic of matching circuit.

Note that the component can be used bidirectionally as output(s) can also be used as input(s).

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6 Characteristics TD-SCDMA B34

Temperature range for specification	T_{SPEC}	= -40 °C ... +85 °C
Input terminating impedance	Z_{IN}	= 50 Ω with par. 4.3 nH ¹⁾
B34 output terminating impedance	$Z_{\text{B34 OUT}}$	= 50 Ω
B39 output terminating impedance	$Z_{\text{B39 OUT}}$	= 50 Ω

Characteristics TD-SCDMA B34				min. for T_{SPEC}	typ. @ +25 °C	max. for T_{SPEC}	
Center frequency			f_{C}	—	2017.5	—	MHz
Maximum insertion attenuation			α_{max}	—	1.5	1.9	dB
	2010... 2025	MHz					
Amplitude ripple (p-p)			$\Delta\alpha$	—	0.2	0.6	dB
	2010... 2025	MHz					
Maximum VSWR			VSWR_{max}	—	1.3	1.7	
@ input port	2010... 2025	MHz					
@ B34 output port	2010... 2025	MHz		—	1.3	1.7	
Minimum attenuation			α_{min}				
	50... 869	MHz		40	46	—	dB
	869... 894	MHz		40	45	—	dB
	925... 960	MHz		40	44	—	dB
	1805... 1850	MHz		35	45	—	dB
	2110... 2170	MHz		38	43	—	dB
	2400... 2500	MHz		35	42	—	dB
	4020... 4050	MHz		38	45	—	dB
	6030... 6075	MHz		25	36	—	dB

¹⁾ See Sec. Matching circuit (p. 6).

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7 Characteristics TD-SCDMA B39

Temperature range for specification	T_{SPEC}	= -40 °C ... +85 °C
Input terminating impedance	Z_{IN}	= 50 Ω with par. 4.3 nH ¹⁾
B34 output terminating impedance	$Z_{\text{B34 OUT}}$	= 50 Ω
B39 output terminating impedance	$Z_{\text{B39 OUT}}$	= 50 Ω

Characteristics TD-SCDMA B39			min. for T_{SPEC}	typ. @ +25 °C	max. for T_{SPEC}	
Center frequency		f_{C}	—	1900	—	MHz
Maximum insertion attenuation	1880... 1920	MHz	α_{max}	1.6	2.4	dB
Amplitude ripple (p-p)	1880... 1920	MHz	$\Delta\alpha$	0.5	1.3	dB
Maximum VSWR		VSWR_{max}				
@ input port	1880... 1920	MHz	—	1.5	2.0	
@ B39 output port	1880... 1920	MHz	—	1.4	2.0	
Minimum attenuation		α_{min}				
	50... 869	MHz	38	43	—	dB
	869... 894	MHz	38	43	—	dB
	925... 960	MHz	38	42	—	dB
	1805... 1830	MHz	43	48	—	dB
	1830... 1850	MHz	35	44	—	dB
	2110... 2170	MHz	35	39	—	dB
	2400... 2500	MHz	35	39	—	dB
	2496... 2690	MHz	34	38	—	dB
	3760... 3840	MHz	40	49	—	dB
	5640... 5760	MHz	33	48	—	dB

¹⁾ See Sec. Matching circuit (p. 6).

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8 Maximum ratings

Operable temperature	$T_{OP} = -40\text{ °C} \dots +85\text{ °C}$	
Storage temperature	$T_{STG}^{1)} = -40\text{ °C} \dots +85\text{ °C}$	
DC voltage	$ V_{DC} ^{2)} = 0\text{ V}$	
Input power	P_{IN}	
@ B39 port: 1880 ... 1920 MHz	29 dBm	LTE 5 MHz Uplink for 5000 h @ 55 °C.
@ B34 port: 2010 ... 2025 MHz	29 dBm	LTE 5 MHz Uplink for 5000 h @ 55 °C.

1) Not valid for packaging material. Storage temperature for packaging material is -25 °C to +40 °C.

2) In case of applied DC voltage blocking capacitors are mandatory.

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9 Transmission coefficient TD-SCDMA B34

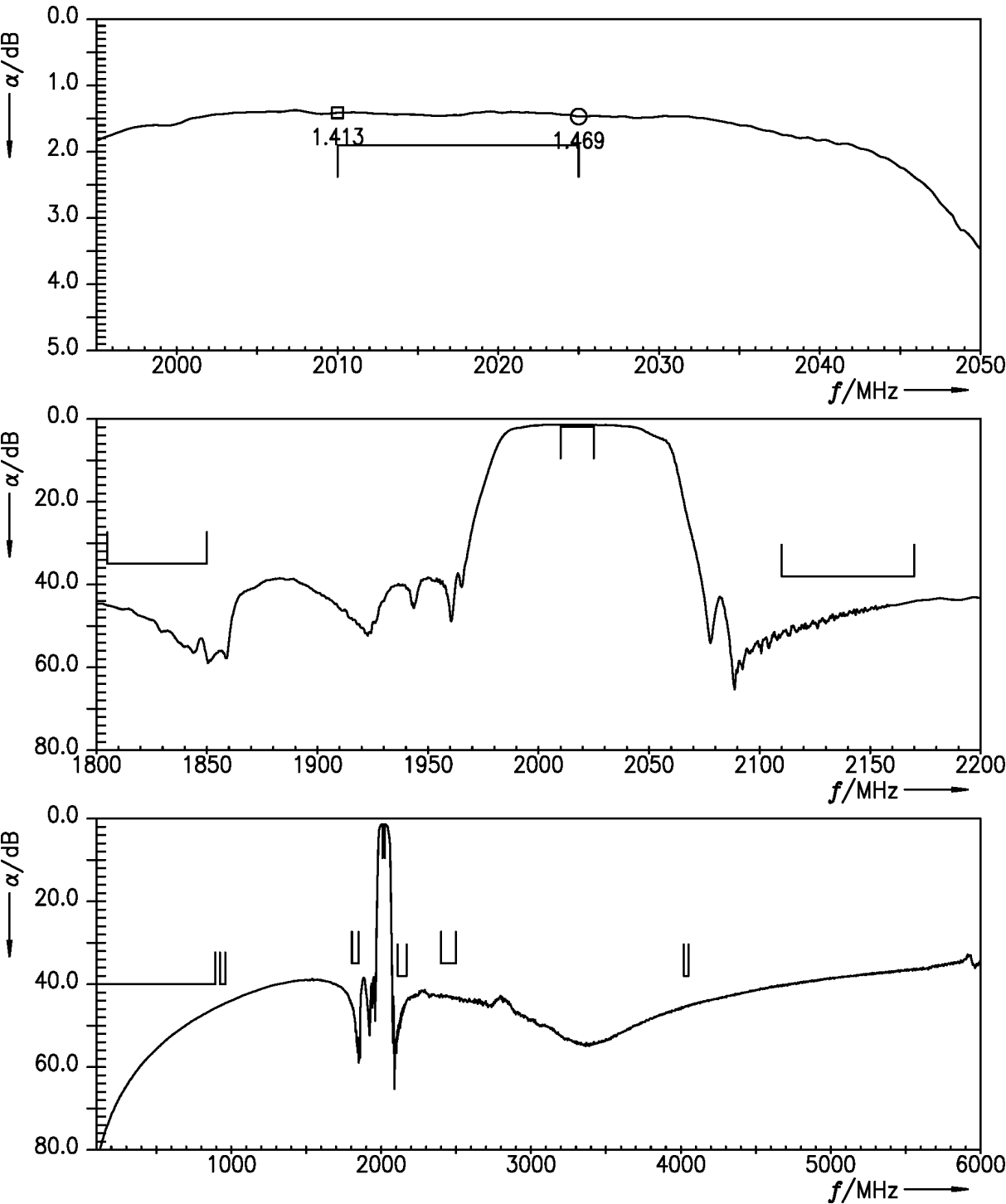


Figure 4: Attenuation TD-SCDMA B34.

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10 Reflection coefficients TD-SCDMA B34

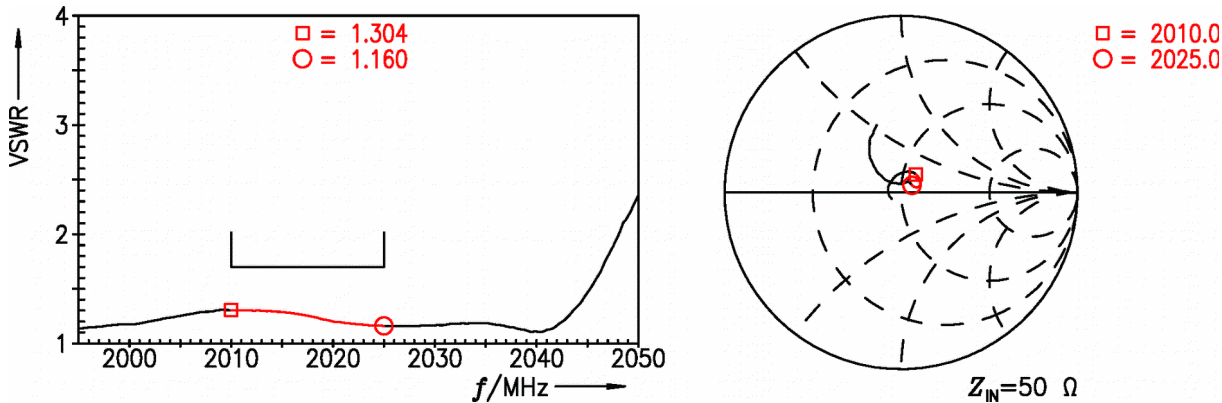


Figure 5: Reflection coefficient TD-SCDMA B34 at IN port.

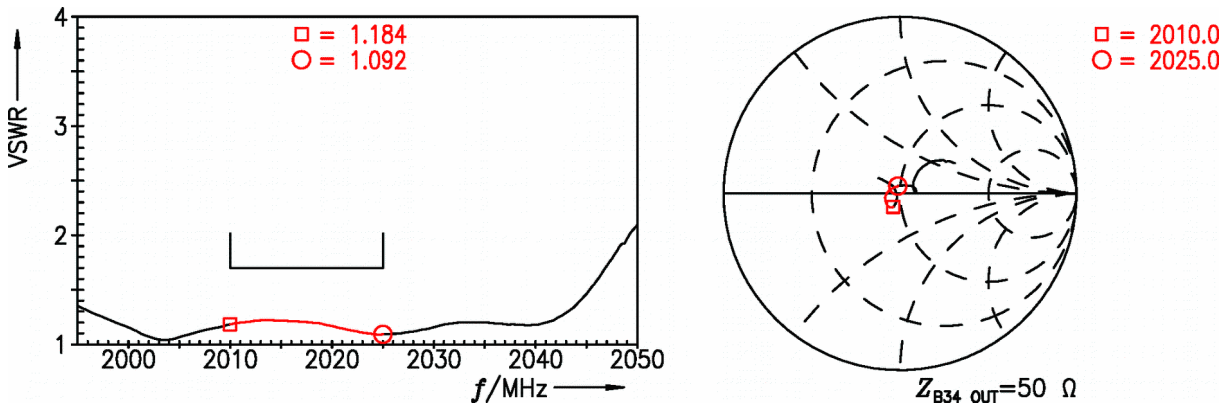


Figure 6: Reflection coefficient TD-SCDMA B34 at OUT port.

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11 Transmission coefficient TD-SCDMA B39

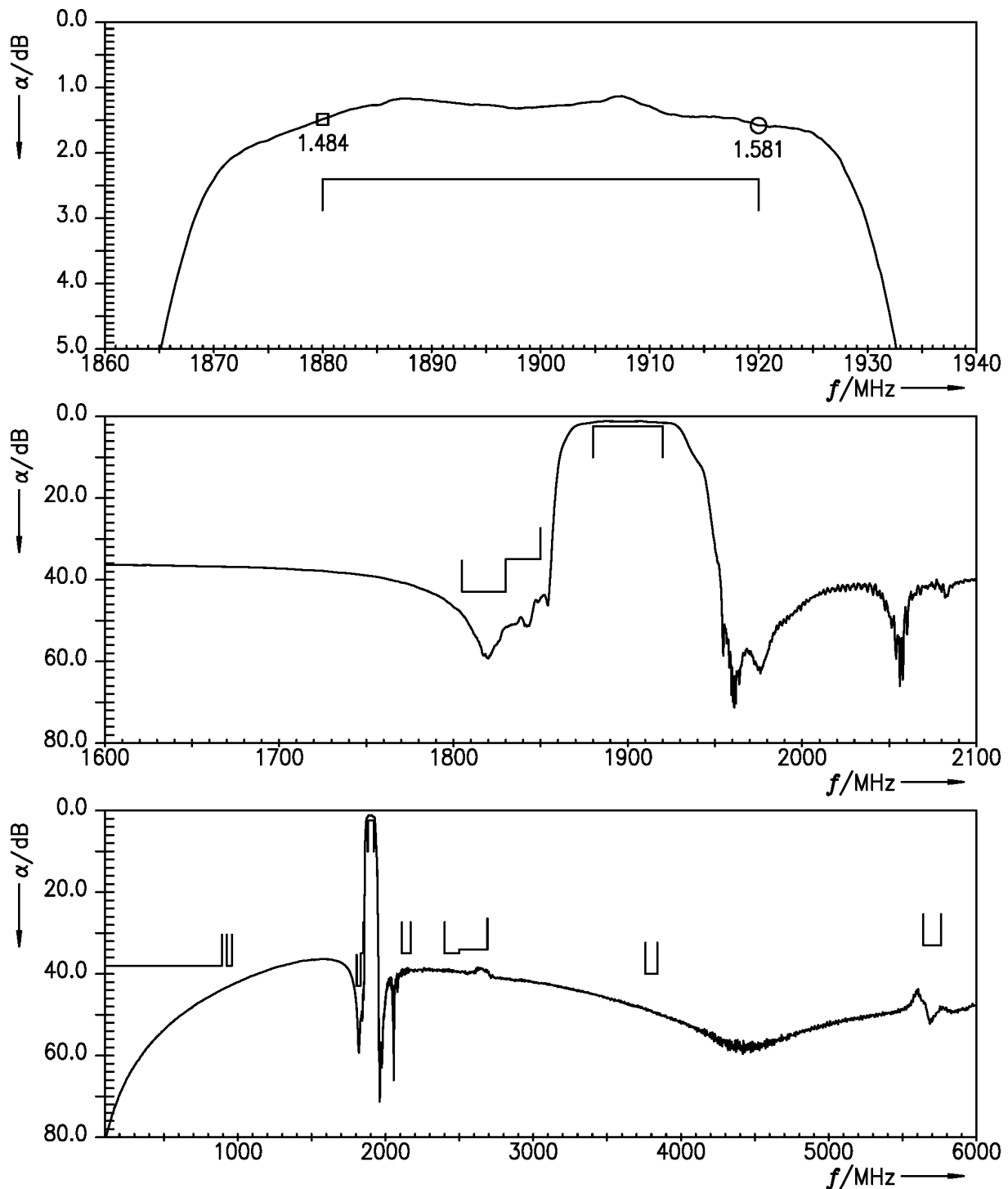


Figure 7: Attenuation TD-SCDMA B39.

Data sheet

12 Reflection coefficients TD-SCDMA B39

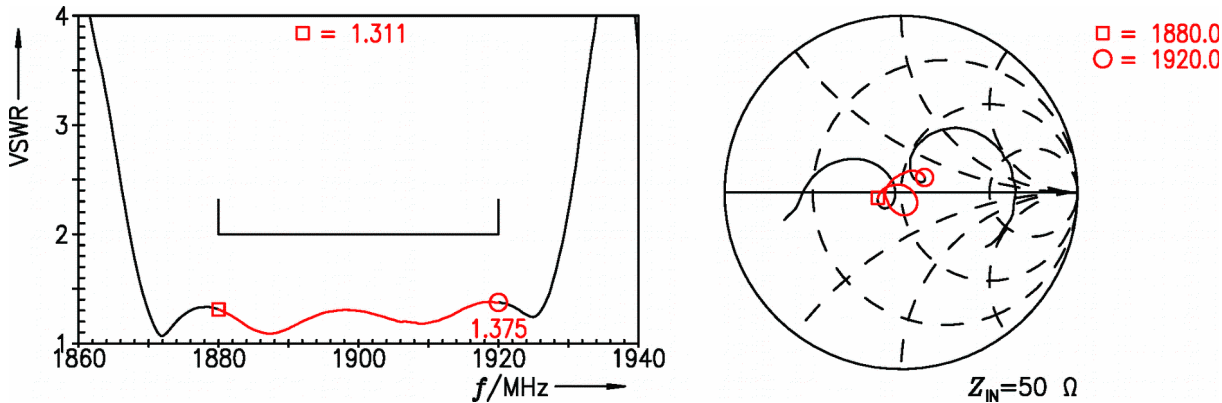


Figure 8: Reflection coefficient TD-SCDMA B39 at IN port.

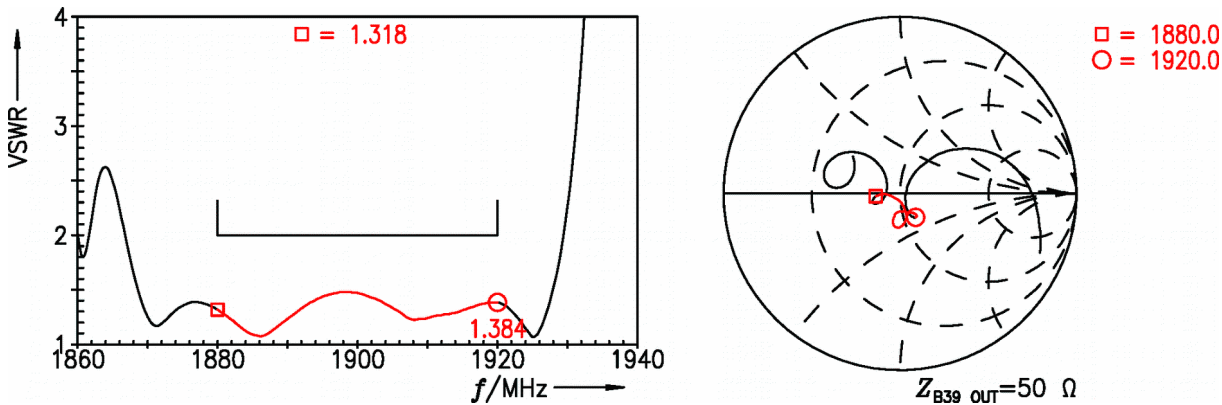


Figure 9: Reflection coefficient TD-SCDMA B39 at OUT port.

Data sheet

13 Packing material

13.1 Tape

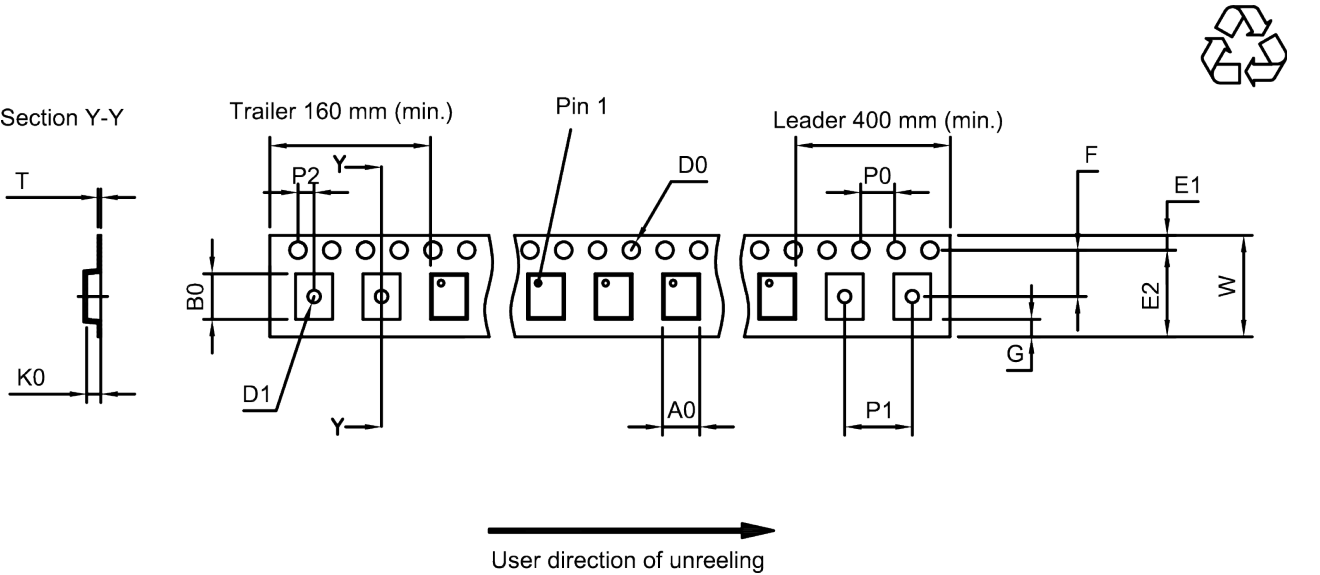


Figure 10: Drawing of tape (first-angle projection) with tape dimensions according to Table 1.

A ₀	1.8±0.05 mm	E ₂	6.25 mm (min.)	P ₁	4.0±0.1 mm
B ₀	2.25±0.05 mm	F	3.5±0.05 mm	P ₂	2.0±0.05 mm
D ₀	1.5+0.1/-0 mm	G	0.75 mm (min.)	T	0.25±0.03 mm
D ₁	1.0 mm (min.)	K ₀	0.6±0.05 mm	W	8.0+0.3/-0.1 mm
E ₁	1.75±0.1 mm	P ₀	4.0±0.1 mm		

Table 1: Tape dimensions.

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13.2 Reel with diameter of 180 mm

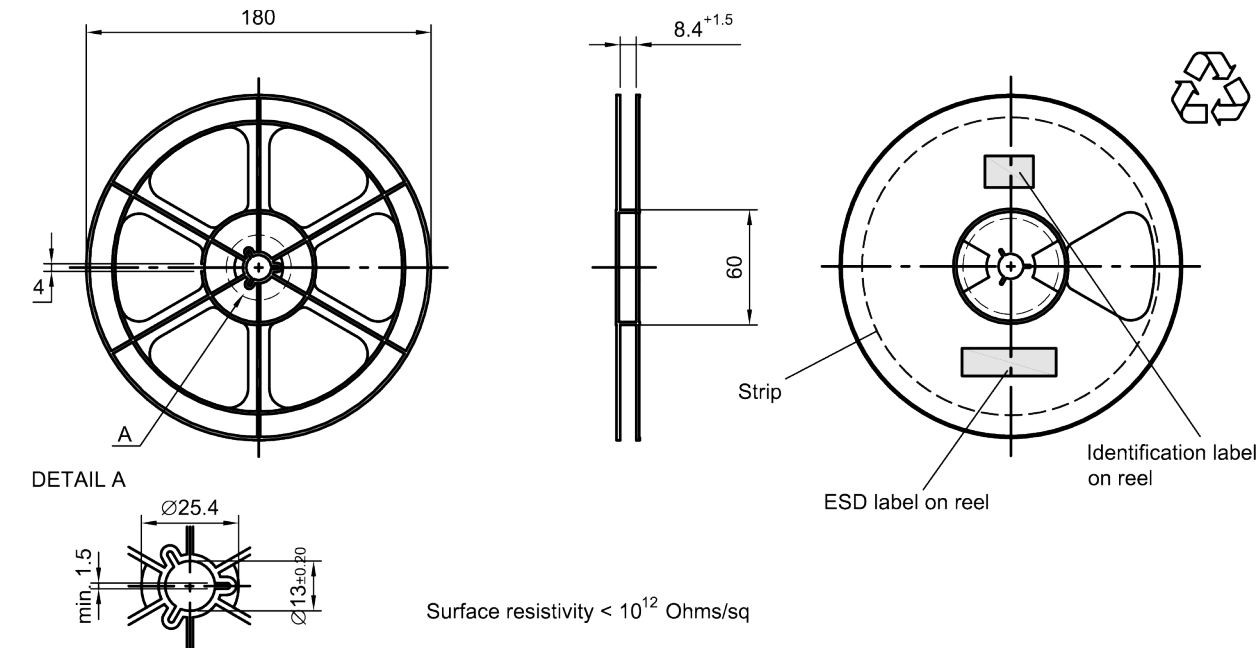


Figure 11: Drawing of reel (first-angle projection) with diameter of 180 mm.

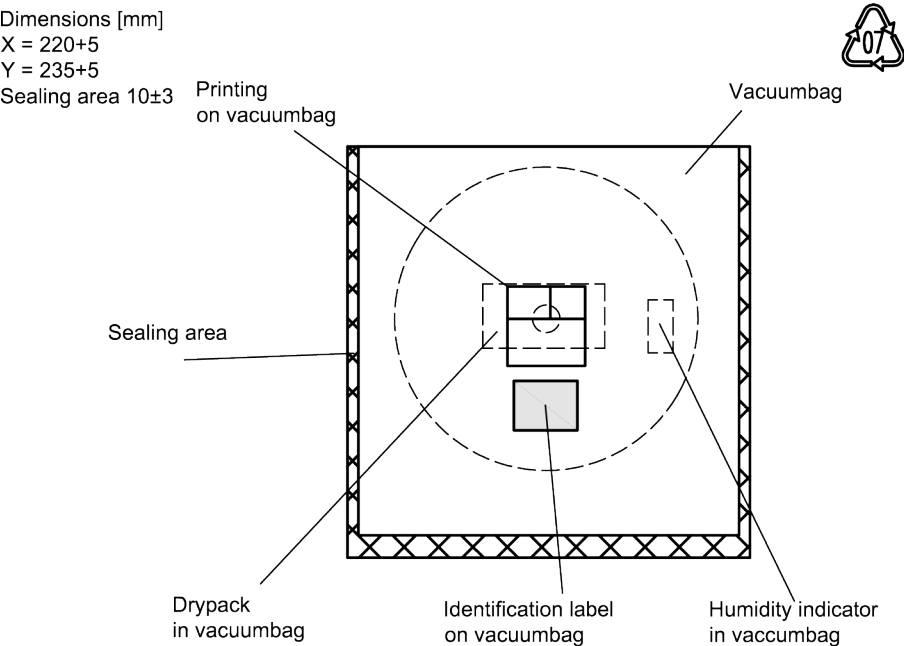


Figure 12: Drawing of moisture barrier bag (MBB) for reel with diameter of 180 mm.

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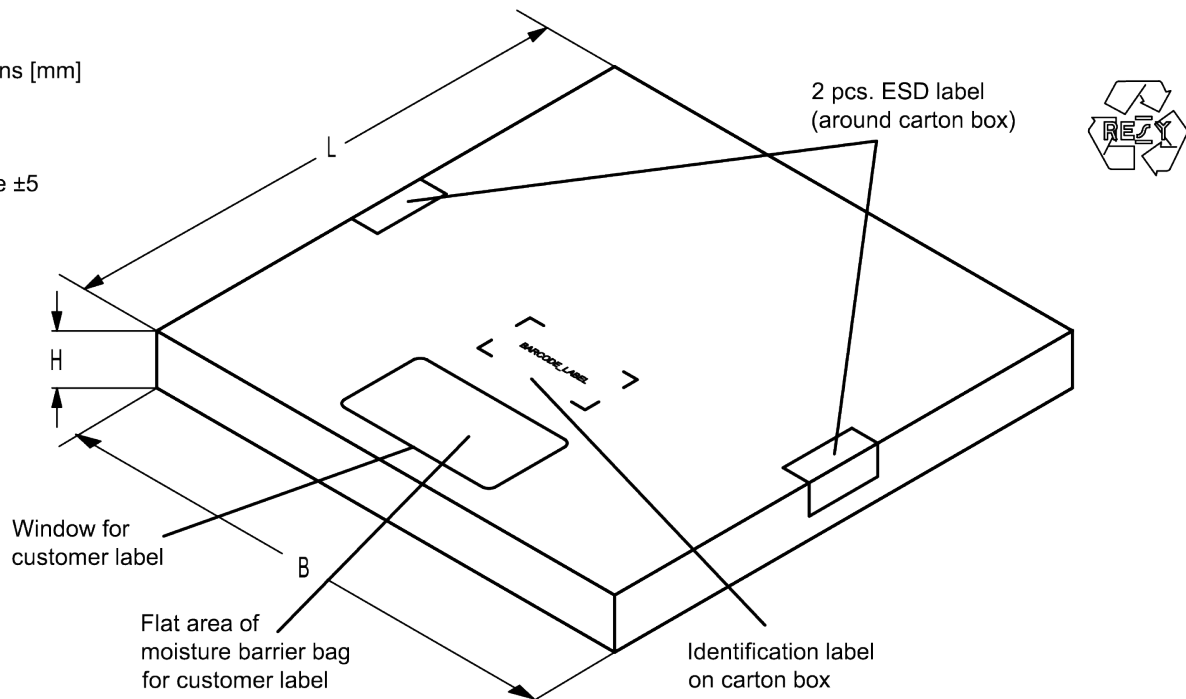
Data sheet

Dimensions [mm]

L = 188

B = 188

H = 30

Tolerance ± 5 **Figure 13:** Drawing of folding box for reel with diameter of 180 mm.

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14 Marking

Products are marked with product type number and lot number encoded according to Table 2:

■ Type number:

The 4 digit type number of the ordering code, e.g., B3xxxxB**1234**xxxx,
is encoded by a special BASE32 code into a 3 digit marking.

Example of decoding	type number marking on device	in decimal code.
16J	=>	1234
$1 \times 32^2 + 6 \times 32^1 + 18 (=J) \times 32^0$	=	1234

The BASE32 code for product type B4372 is 48M.

■ Lot number:

The last 5 digits of the lot number, e.g., **12345**,
are encoded based on a special BASE47 code into a 3 digit marking.

Example of decoding lot number marking on device	in decimal code.
5UY	=> 12345
$5 \times 47^2 + 27 (=U) \times 47^1 + 31 (=Y) \times 47^0$	= 12345

Adopted BASE32 code for type number			
Decimal value	Base32 code	Decimal value	Base32 code
0	0	16	G
1	1	17	H
2	2	18	J
3	3	19	K
4	4	20	M
5	5	21	N
6	6	22	P
7	7	23	Q
8	8	24	R
9	9	25	S
10	A	26	T
11	B	27	V
12	C	28	W
13	D	29	X
14	E	30	Y
15	F	31	Z

Adopted BASE47 code for lot number			
Decimal value	Base47 code	Decimal value	Base47 code
0	0	24	R
1	1	25	S
2	2	26	T
3	3	27	U
4	4	28	V
5	5	29	W
6	6	30	X
7	7	31	Y
8	8	32	Z
9	9	33	b
10	A	34	d
11	B	35	f
12	C	36	h
13	D	37	n
14	E	38	r
15	F	39	t
16	G	40	v
17	H	41	\
18	J	42	?
19	K	43	{
20	L	44	}
21	M	45	<
22	N	46	>
23	P		

Table 2: Lists for encoding and decoding of marking.

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15 Soldering profile

The recommended soldering process is in accordance with IEC 60068-2-58 – 3rd edit and IPC/JEDEC J-STD-020B.

ramp rate	$\leq 3 \text{ K/s}$
preheat	125 °C to 220 °C, 150 s to 210 s, 0.4 K/s to 1.0 K/s
$T > 220 \text{ °C}$	30 s to 70 s
$T > 230 \text{ °C}$	min. 10 s
$T > 245 \text{ °C}$	max. 20 s
$T \geq 255 \text{ °C}$	–
peak temperature T_{peak}	250 °C $\pm 0/-5 \text{ °C}$
wetting temperature T_{min}	230 °C $\pm 5/-0 \text{ °C}$ for 10 s $\pm 1 \text{ s}$
cooling rate	$\leq 3 \text{ K/s}$
soldering temperature T	measured at solder pads

Table 3: Characteristics of recommended soldering profile for lead-free solder (Sn95.5Ag3.8Cu0.7).

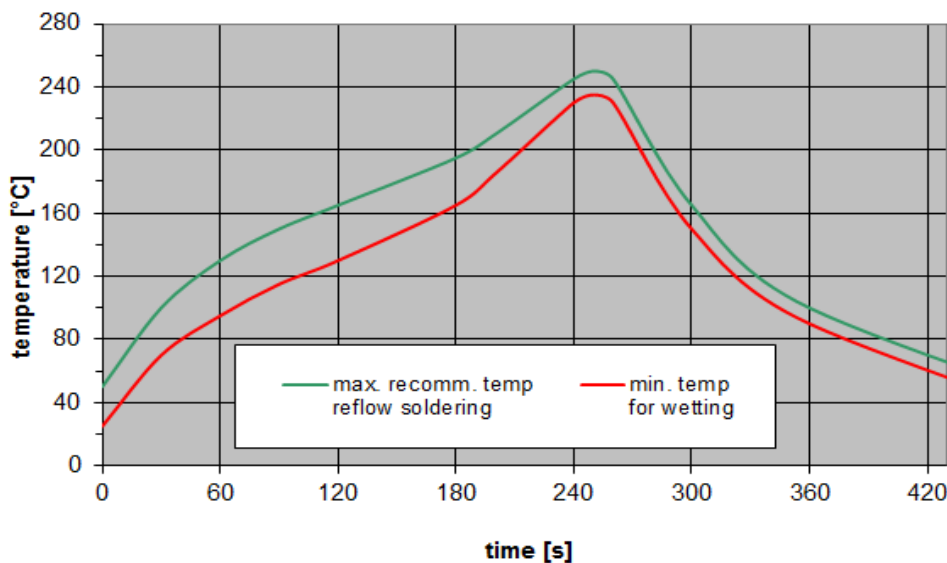


Figure 14: Recommended reflow profile for convection and infrared soldering – lead-free solder.

[Data sheet](#)

16 Annotations

16.1 Matching coils

See TDK inductor pdf-catalog <http://www.tdk.co.jp/tefe02/coil.htm#aname1> and Data Library for circuit simulation <http://www.tdk.co.jp/etvcl/index.htm>.

16.2 RoHS compatibility

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.

16.3 Scattering parameters (S-parameters)

The pin/port assignment is available in the headers of the S-parameter files. Please contact your local RF360 sales office.

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17 Cautions and warnings

17.1 Display of ordering codes for RF360 products

The ordering code for one and the same product can be represented differently in data sheets, data books, other publications and the website of RF360, or in order-related documents such as shipping notes, order confirmations and product labels. The varying representations of the ordering codes are due to different processes employed and do not affect the specifications of the respective products. Detailed information can be found on the Internet under www.rf360jv.com/orderingcodes.

17.2 Material information

Due to technical requirements components may contain dangerous substances. For information on the type in question please also contact one of our sales offices.

For information on recycling of tapes and reels please contact one of our sales offices.

17.3 Moldability

Before using in overmolding environment, please contact your local RF360 sales office.

17.4 Package information

Landing area

The printed circuit board (PCB) land pattern (landing area) shown is based on RF360 internal development and empirical data and illustrated for example purposes, only. As customers' SMD assembly processes may have a plenty of variants and influence factors which are not under control or knowledge of RF360, additional careful process development on customer side is necessary and strongly recommended in order to achieve best soldering results tailored to the particular customer needs.

Dimensions

Unless otherwise specified all dimensions are understood using unit millimeter (mm).

Dimensions do not include burrs.

Projection method

Unless otherwise specified first-angle projection is applied.

Important notes

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