RF360 Europe GmbH

A Qualcomm – TDK Joint Venture

SAW components

SAW 2in1 filter

Series/type:	B4236
Ordering code:	B39811B4236H410
Date:	August 17, 2016
Version:	2.2

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EPCOS AG is a TDK Group Company.

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1 Application

- Low-loss 2in1 RF filter for Trunked Radio
- Device with two integrated Rx filters
- Low amplitude ripple
- Usable pass band 31 & 14 MHz
- No matching required for operation at 50Ω

2 Features

- Package code QCC8E
- Package size 3.0±0.08 mm × 2.5±0.08 mm
- Package height 0.98±0.115 mm
- Approximate weight 0.04 g
- RoHS compatible
- Package for Surface Mount Technology (SMT)
- Lead free soldering compatible with J-STD20C
- Electrostatic Sensitive Device (ESD)
- Moisture Sensitivity Level 1 (MSL1)

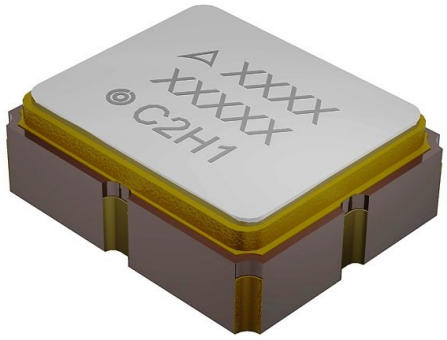
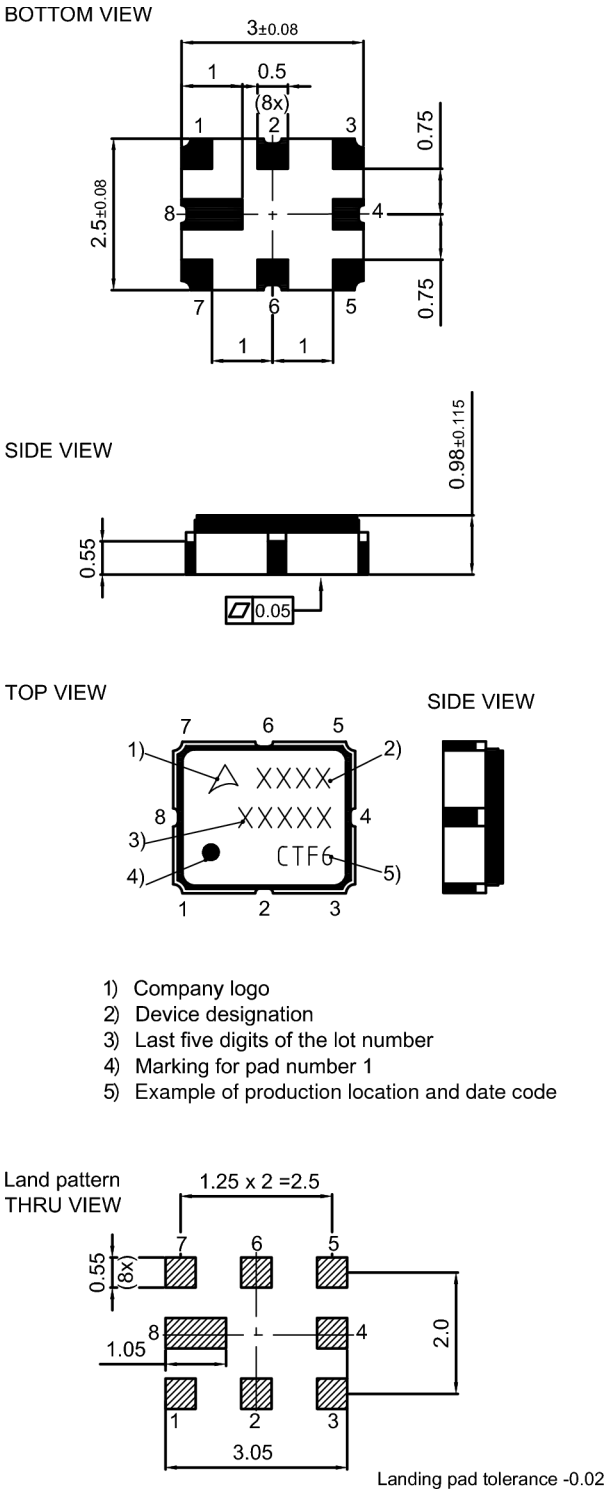


Figure 1: Picture of component with example of product marking.

3 Package



1) Company logo
2) Device designation
3) Last five digits of the lot number
4) Marking for pad number 1
5) Example of production location and date code

Figure 2: Drawing of package. See Sec. Package information (p. 19).

4 Pin configuration

- 1 Input (Filter1)
- 3 Input (Filter2)
- 5 Output (Filter2)
- 7 Output (Filter1)
- 2, 4, 6, 8 Ground

5 Matching circuit

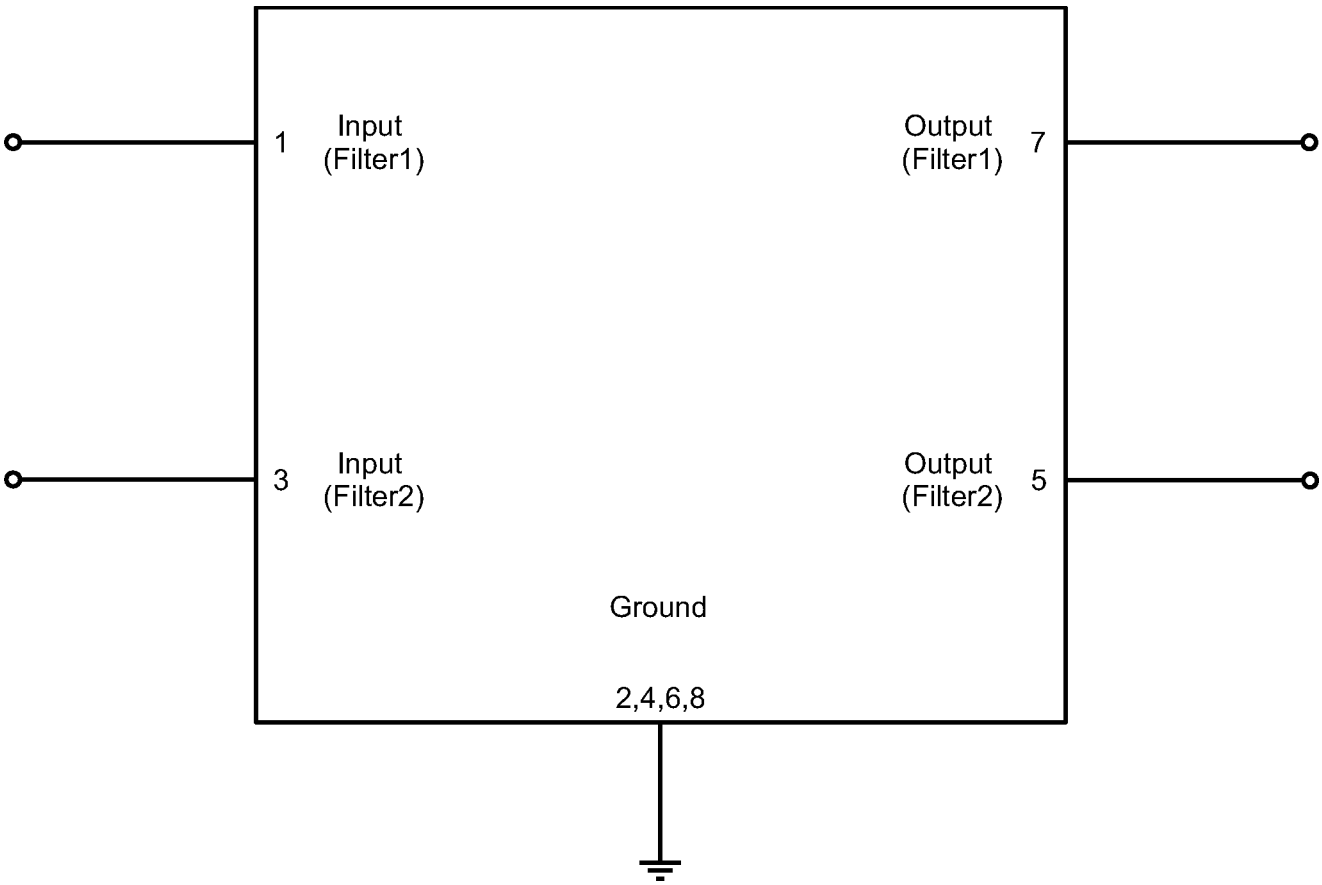


Figure 3: Schematic of matching circuit. No external matching components required.

6 Characteristics Filter1

Temperature range for specification T_{SPEC} = −30 °C ... +85 °C
Filter1 input terminating impedance $Z_{Filter1\ IN}$ = 50 Ω
Filter1 output terminating impedance $Z_{Filter1\ OUT}$ = 50 Ω

Characteristics Filter1				min. for T_{SPEC}	typ. @+25 °C	max. for T_{SPEC}	
Center frequency			f_C	—	809.5	—	MHz
Maximum insertion attenuation			α_{max}				
	794... 825	MHz		—	2.3	3.3[1]	dB
Amplitude ripple (p-p)			$\Delta\alpha$				
	794... 825	MHz		—	0.9	1.9[2]	dB
Maximum VSWR			$VSWR_{max}$				
@ Filter1 input port	794... 825	MHz		—	2.1	2.4	
@ Filter1 output port	794... 825	MHz		—	2.1	2.4	
Minimum attenuation			α_{min}				
	10... 645	MHz		40	62	—	dB
	674... 735	MHz		30	56	—	dB
	735... 777	MHz		20	28	—	dB
	851... 884	MHz		20	28	—	dB
	884... 945	MHz		30	56	—	dB
	974... 1065	MHz		40	54	—	dB
	1065... 1564.5	MHz		20	42	—	dB
	1564.5... 1594.5	MHz		30	43	—	dB
	2326.5... 2371.5	MHz		36	41	—	dB
Group delay ripple			$\Delta\tau_{var}$				
	794... 825	MHz		—	27	75[3]	ns

1) 2.8 dB at 25±2°C.
2) 1.4 dB at 25±2°C.
3) 50 ns at 25±2°C.

7 Characteristics Filter2

Temperature range for specification T_{SPEC} = −30 °C ... +85 °C
Filter2 input terminating impedance $Z_{Filter2\ IN}$ = 50 Ω
Filter2 output terminating impedance $Z_{Filter2\ OUT}$ = 50 Ω

Characteristics Filter2				min. for T_{SPEC}	typ. @+25 °C	max. for T_{SPEC}	
Center frequency			f_C	—	769	—	MHz
Maximum insertion attenuation			α_{max}				
	762... 776	MHz		—	1.7	2.6[1)]	dB
Amplitude ripple (p-p)			Δα				
	762... 776	MHz		—	0.4	1.0	dB
Maximum VSWR			$VSWR_{max}$				
@ Filter2 input port	762... 776	MHz		—	1.5	1.7	
@ Filter2 output port	762... 776	MHz		—	1.5	1.7	
Minimum attenuation			α_{min}				
	10... 431	MHz		57	60	—	dB
	431... 604	MHz		50	60	—	dB
	604... 690	MHz		30	58	—	dB
	690... 733	MHz		20	52	—	dB
	733... 752	MHz		9	22	—	dB
	804... 847	MHz		25	36	—	dB
	847... 892.7	MHz		30	52	—	dB
	892.7... 910.7	MHz		50	56	—	dB
	910.7... 995.3	MHz		47	54	—	dB
	995.3... 1121	MHz		42	52	—	dB
	1524... 1554	MHz		30	42	—	dB
	2286... 2331	MHz		30	39	—	dB
Group delay ripple			$\Delta\tau_{var}$				
	762... 776	MHz		—	22	50	ns

1) 2.4 dB at 25±2°C.

8 Maximum ratings

Operable temperature	T_{OP} = −40 °C ... +125 °C	
Storage temperature	T_{STG} [1)] = −40 °C ... +125 °C	
DC voltage	$\|V_{DC}\|$ = 5.0 V (max.)	
ESD voltage	V_{ESD} [2)] = 100 V (max.)	Machine model.
Input power	P_{IN}	
@ Filter1 input port: 794 ... 825 MHz	15 dBm (max.)	Source and load impedance 50 Ω
@ Filter2 input port: 762 ... 776 MHz	15 dBm (max.)	Source and load impedance 50 Ω

1) Not valid for packaging material. Storage temperature for packaging material is −25 °C to +40 °C.
2) According to JESD22-A115B (MM – Machine Model), 10 negative & 10 positive pulses.

9 Transmission coefficient Filter1

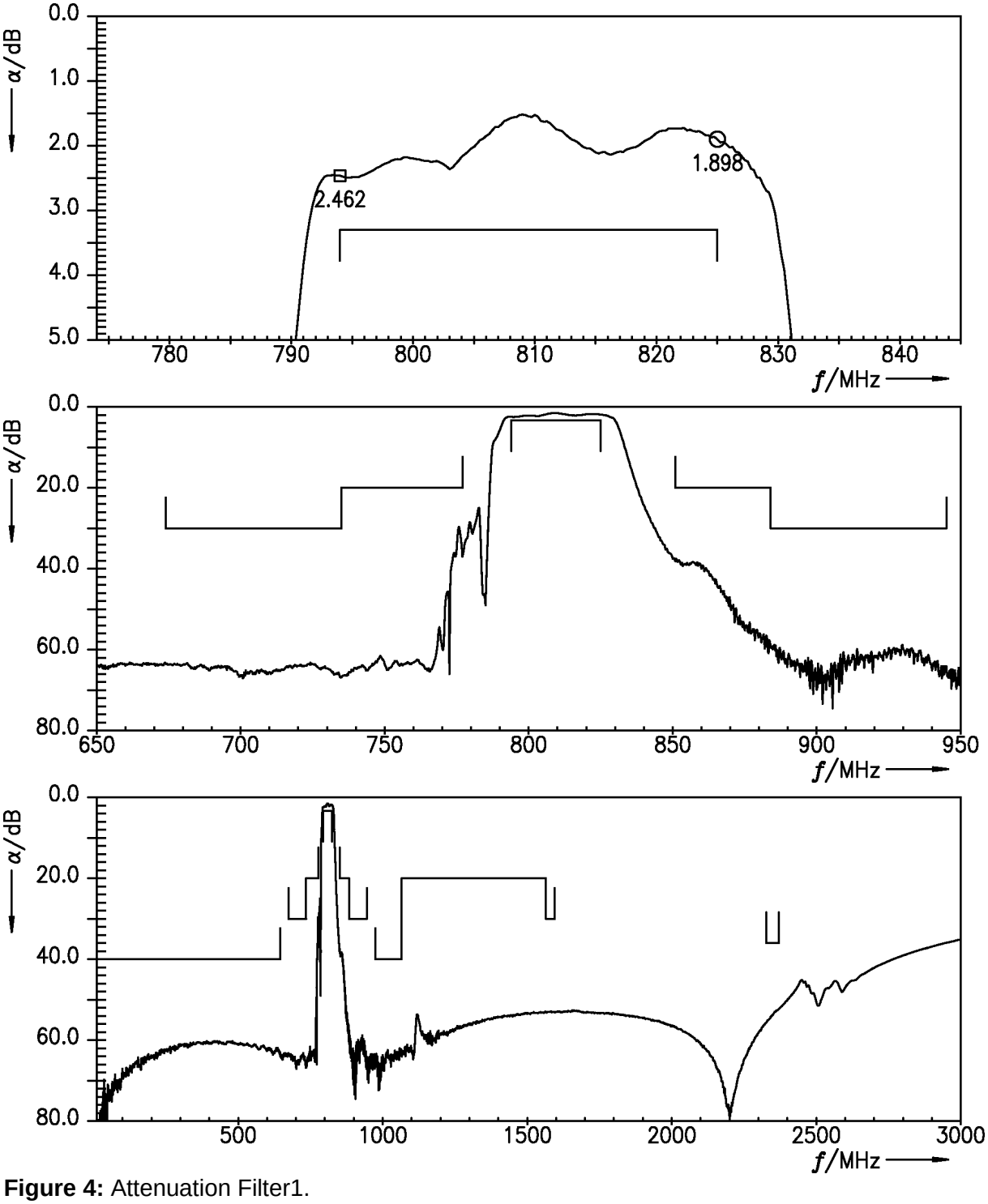


Figure 4: Attenuation Filter1.

10 Reflection coefficients Filter1

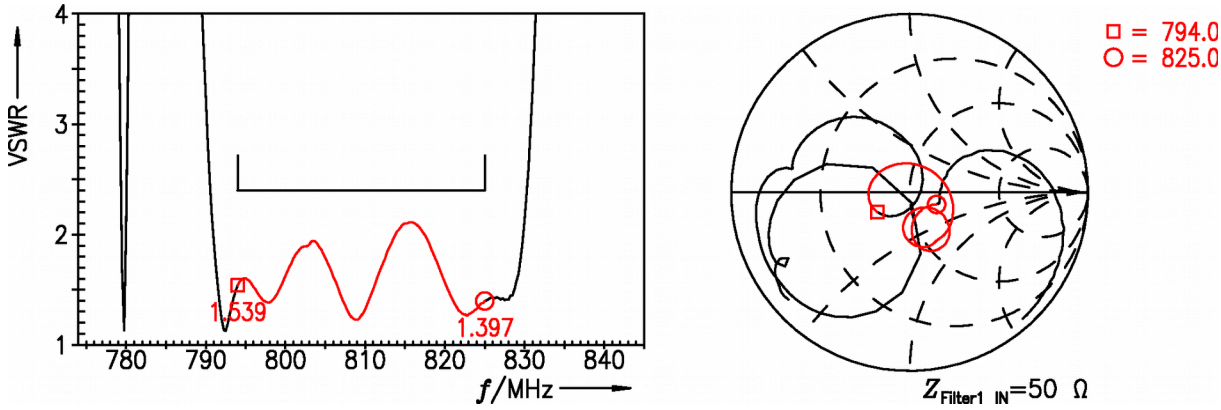


Figure 5: Reflection coefficient Filter1 at IN port.

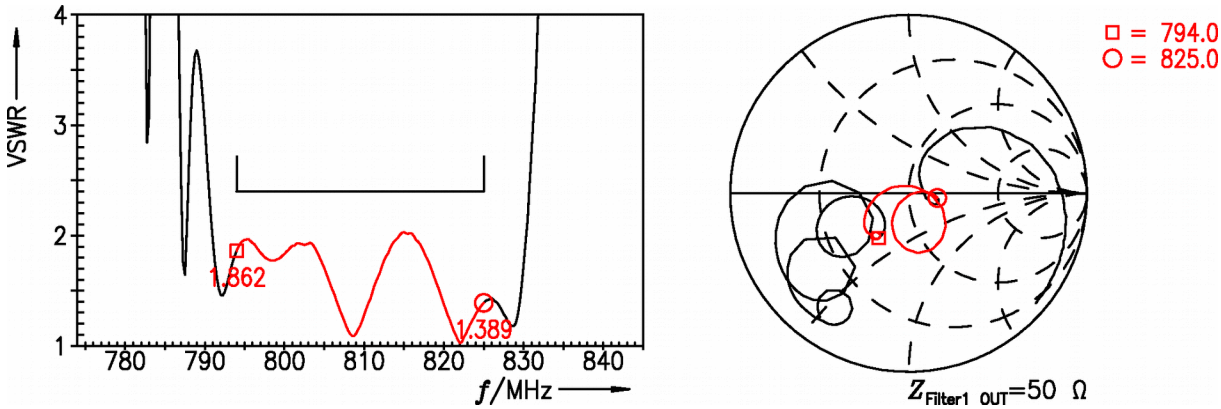


Figure 6: Reflection coefficient Filter1 at OUT port.

11 Transmission coefficient Filter2

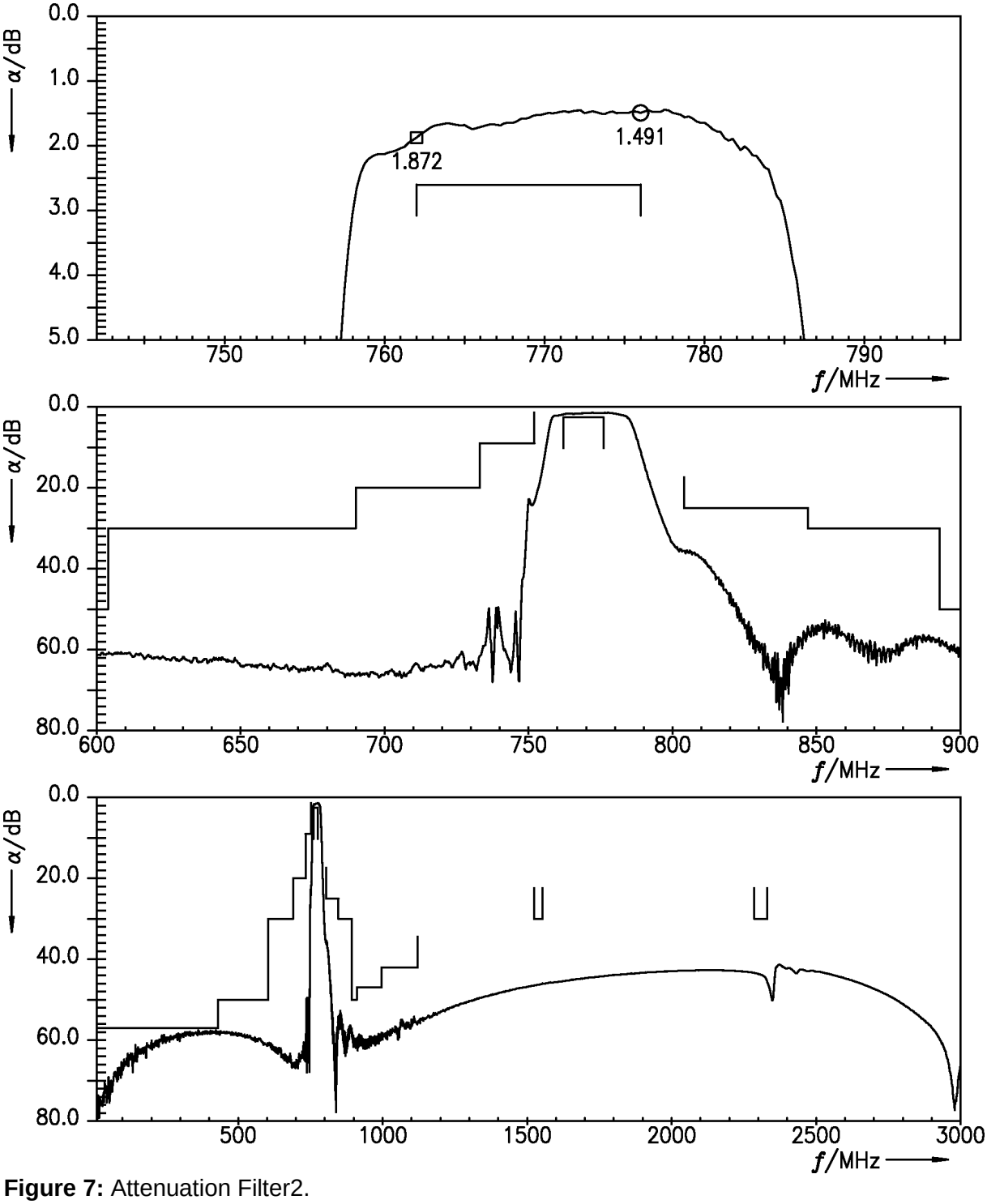


Figure 7: Attenuation Filter2.

12 Reflection coefficients Filter2

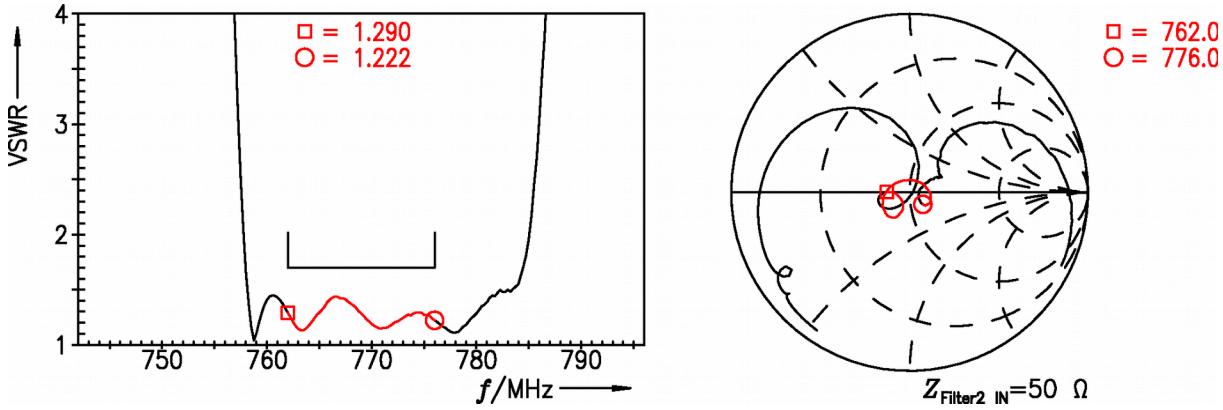


Figure 8: Reflection coefficient Filter2 at IN port.

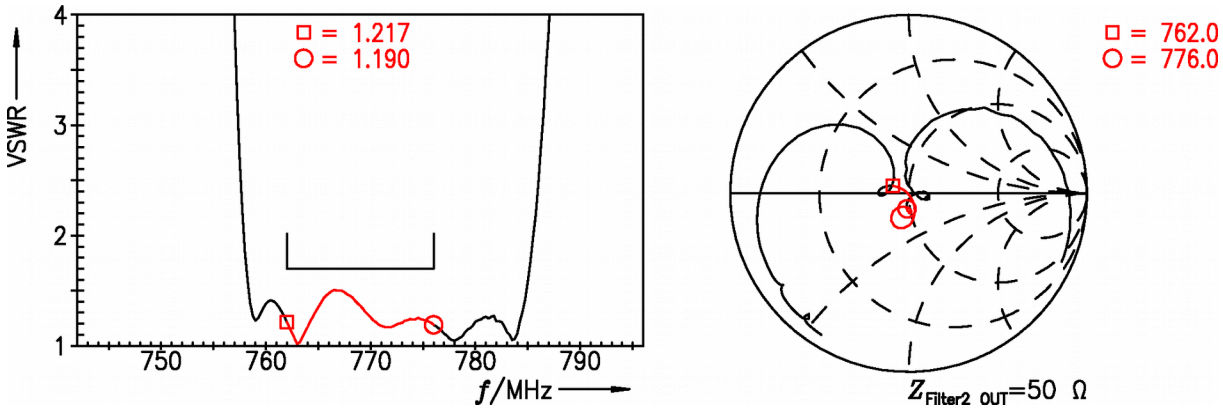


Figure 9: Reflection coefficient Filter2 at OUT port.

13 Packing material

13.1 Tape

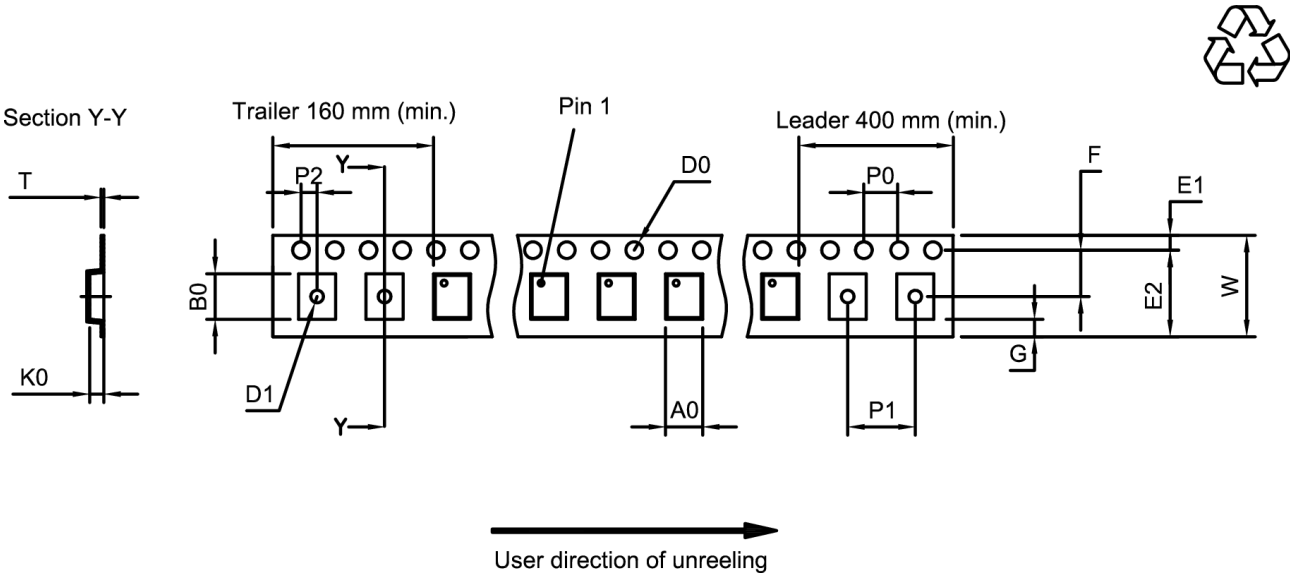


Figure 10: Drawing of tape (first-angle projection) with tape dimensions according to Table 1.

A_0	2.85±0.1 mm
B_0	3.3±0.1 mm
D_0	1.5+0.1/−0 mm
D_1	1.5 mm (min.)
E_1	1.75±0.1 mm

E_2	10.25 mm (min.)
F	5.5±0.05 mm
G	0.75 mm (min.)
K_0	1.3±0.1 mm
P_0	4.0±0.1 mm

P_1	4.0±0.1 mm
P_2	2.0±0.1 mm
T	0.3±0.05 mm
W	12.0+0.3/−0.1 mm

Table 1: Tape dimensions.

13.2 Reel with diameter of 180 mm

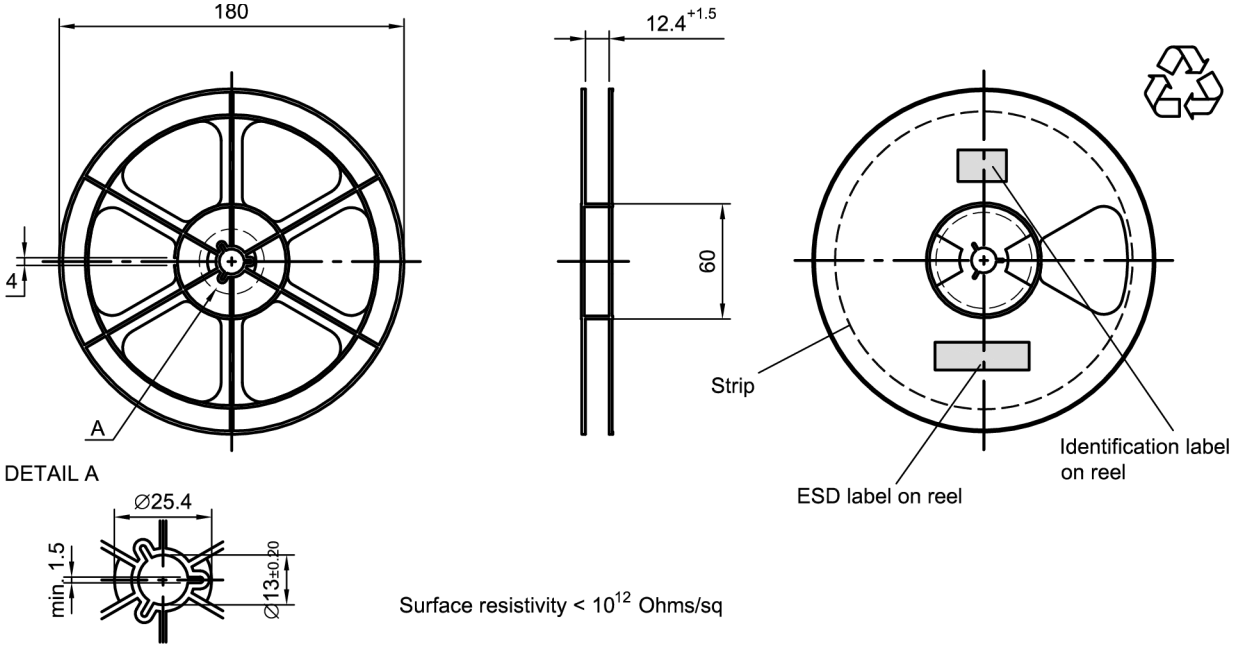
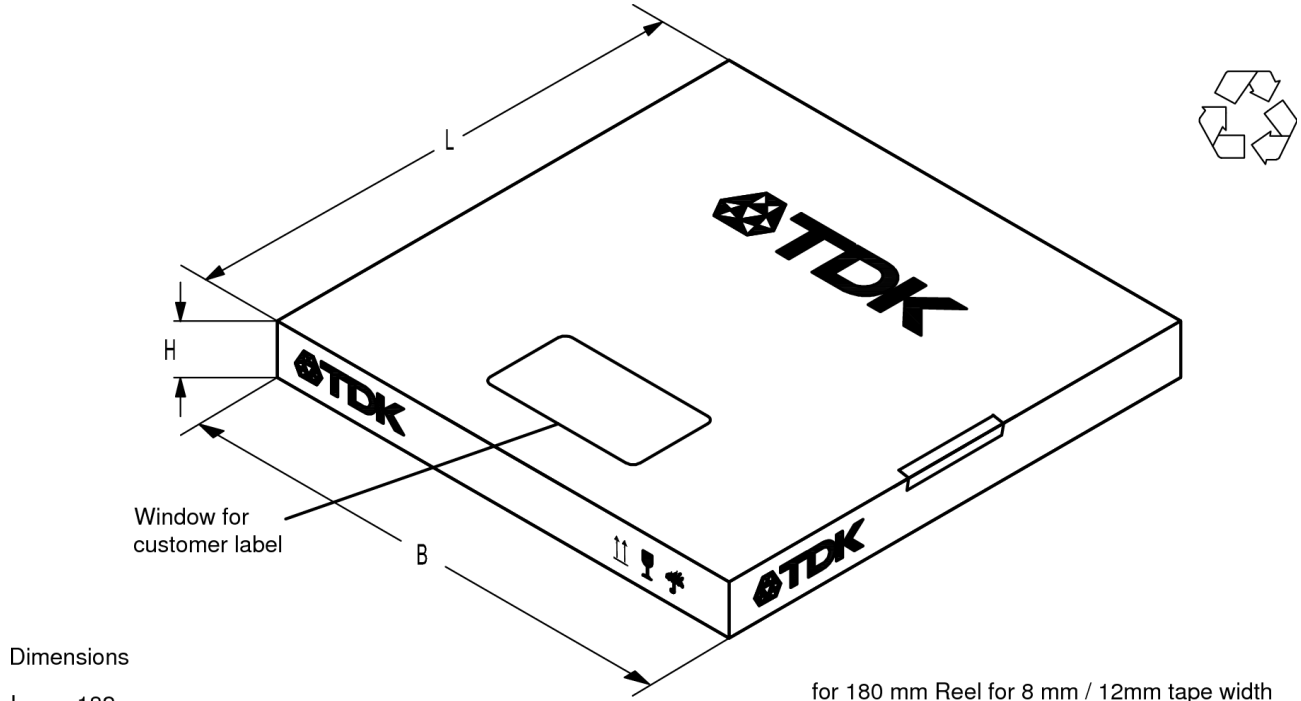


Figure 11: Drawing of reel (first-angle projection) with diameter of 180 mm.



Dimensions

L = 182
B = 185
H = 26

for 180 mm Reel for 8 mm / 12mm tape width SMD packages

Figure 12: Drawing of folding box for reel with diameter of 180 mm.

13.3 Reel with diameter of 330 mm

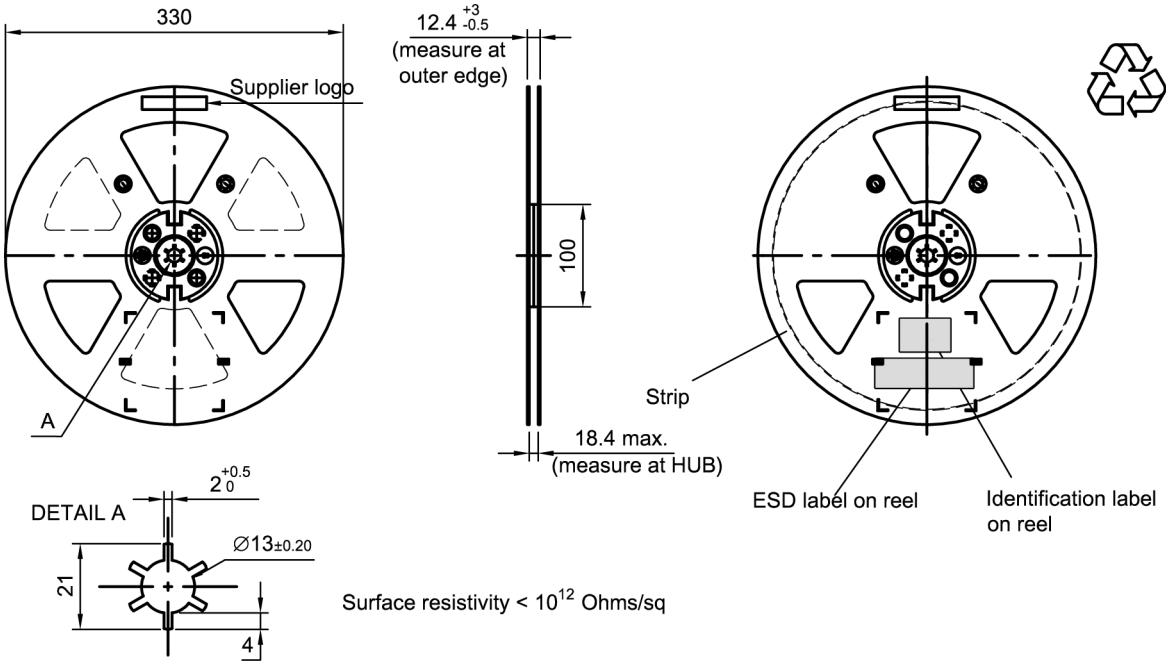
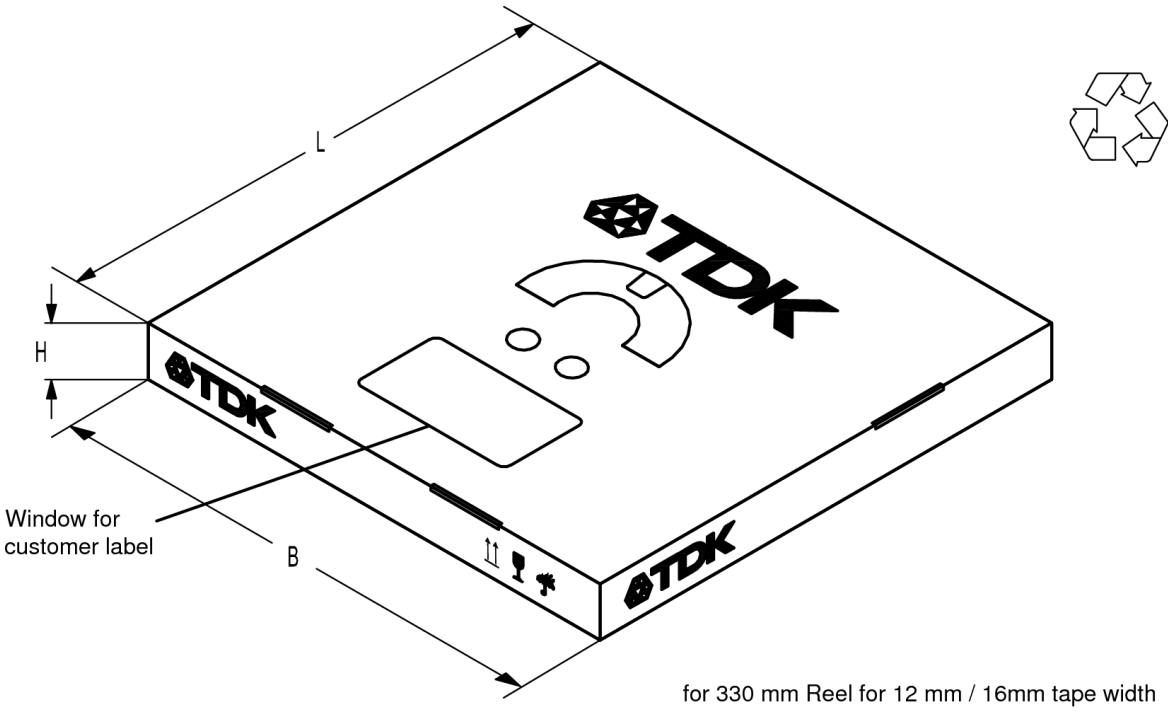


Figure 13: Drawing of reel (first-angle projection) with diameter of 330 mm.



Dimensions

L = 340
B = 340
H = 25

for 330 mm Reel for 12 mm / 16mm tape width SMD packages

Figure 14: Drawing of folding box for reel with diameter of 330 mm.

14 Marking

Products are marked with device designation, lot number, as well as production location and date code.

- Device designation: The 4-character device designation of the ordering code is used for the marking.

  Example for 4-character device designation: B3xxxxB**1234**xxxx

- Lot number: The last 5 digits of the lot number are used for the marking.

  Example: **12345**

- Production location and date code: The production location is Wuxi (encoded in the first character 'C'). The production date code is encoded in the last three characters according to Table 2.

1st digit (day)					
Day	Code	Day	Code	Day	Code
1	1	11	A	21	M
2	2	12	B	22	N
3	3	13	C	23	P
4	4	14	D	24	R
5	5	15	E	25	S
6	6	16	F	26	T
7	7	17	H	27	U
8	8	18	J	28	V
9	9	19	K	29	W
10	0	20	L	30	X
				31	Z

2nd digit (year)			
Year	Code	Year	Code
2010	A	2022	P
2011	B	2023	R
2012	C	2024	S
2013	D	2025	T
2014	E	2026	U
2015	F	2027	V
2016	H	2028	W
2017	J	2029	X
2018	K	2030	Z
2019	L	2031	A
2020	M	2032	B
2021	N	and so on	

3rd digit (month)			
Month	Code	Month	Code
Jan	1	Jul	7
Feb	2	Aug	8
Mar	3	Sep	9
Apr	4	Oct	0
May	5	Nov	N
Jun	6	Dec	D

Table 2: Production date code.

Example of how to decode production location and date code:

Code: **C T F 6**

Location: C → Wuxi
Day: T → 26th
Year: F → 2015
Month: 6 → June

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

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

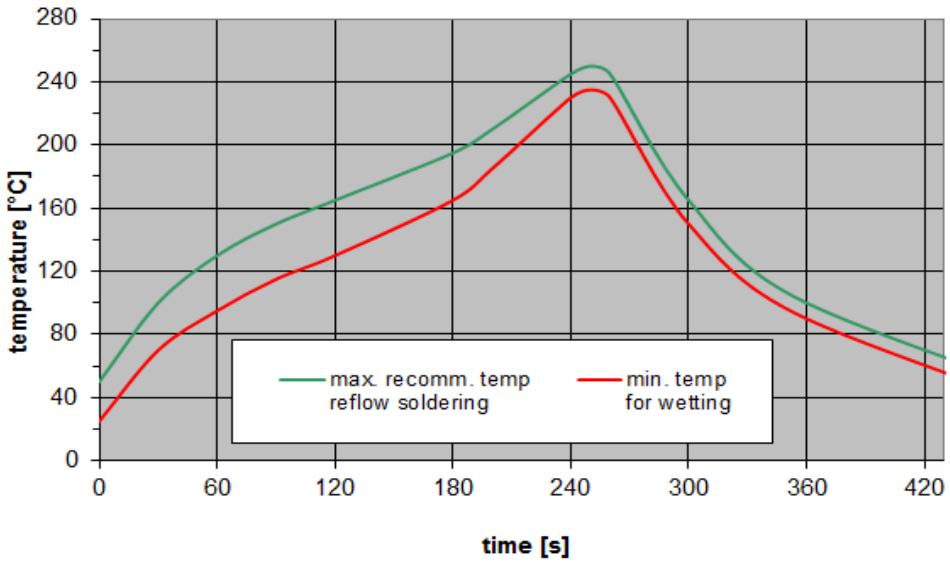


Figure 15: Recommended reflow profile for convection and infrared soldering – lead-free solder.

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 EPCOS sales office.

17 Cautions and warnings

17.1 Display of ordering codes for EPCOS 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 EPCOS, 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.epcos.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 EPCOS sales office.

17.4 Package information

Landing area

The printed circuit board (PCB) land pattern (landing area) shown is based on EPCOS 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 EPCOS, 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).

Projection method

Unless otherwise specified first-angle projection is applied.

Important notes

The following applies to all products named in this publication:

1. Some parts of this publication contain **statements about the suitability of our products for certain areas of application**. These statements are based on our knowledge of typical requirements that are often placed on our products in the areas of application concerned. We nevertheless expressly point out **that such statements cannot be regarded as binding statements about the suitability of our products for a particular customer application.** As a rule, EPCOS is either unfamiliar with individual customer applications or less familiar with them than the customers themselves. For these reasons, it is always ultimately incumbent on the customer to check and decide whether an EPCOS product with the properties described in the product specification is suitable for use in a particular customer application.
2. We also point out that **in individual cases, a malfunction of electronic components or failure before the end of their usual service life cannot be completely ruled out in the current state of the art, even if they are operated as specified.** In customer applications requiring a very high level of operational safety and especially in customer applications in which the malfunction or failure of an electronic component could endanger human life or health (e.g. in accident prevention or life-saving systems), it must therefore be ensured by means of suitable design of the customer application or other action taken by the customer (e.g. installation of protective circuitry or redundancy) that no injury or damage is sustained by third parties in the event of malfunction or failure of an electronic component.
3. **The warnings, cautions and product-specific notes must be observed.**
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