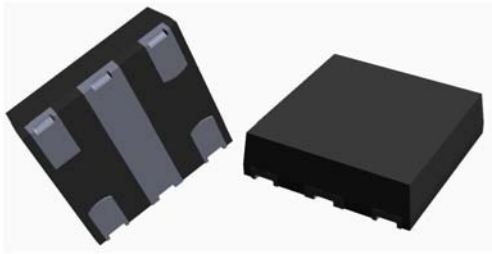
EMIF02-02OABRY

IPAD™ automotive grade integrated protected low pass filter for BroadR Reach™ interface

Datasheet - production data



Features

- Attenuation profile compliant with BroadR Reach™ requirements from -40 °C to 125 °C
- Return loss (S_{dd11}) at 60 MHz: -20 dB
- Components matching: 1% (between line 1 and 2)
- Package:
  - Dimensions: 3.0 x 3.0 mm
  - Pitch: 1.1 µm
  - Wettable flank QFN
- AEC-Q101 compliant

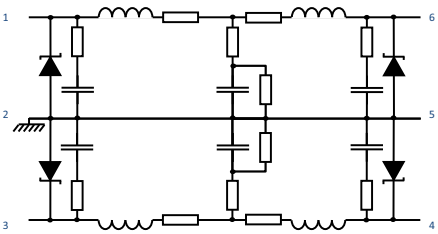
Complies with the following standards

- ISO 10605 (330 Ω / 330 pF) (pins 1 and 3):
  - 15 kV (air discharge)
  - 15 kV (contact discharge)
- ISO 7637-3 (pins 1 and 3):
  - Pulse 3a: -150 V
  - Pulse 3b: +100 V
- MIL-STD883J (HBM) (pins 4 and 6)
  - ±2 kV

Description

The EMIF02-02OABRY is a highly integrated solution designed to suppress EMI noise in BroadR Reach™ interfaces in automotive applications. This low pass filter includes a 15 kV ISO10605 protection and is housed in a 3 x 3 mm² wettable flanks QFN.

Figure 1. EMIF02-02OABRY equivalent circuit



TM: IPAD is a trademark of STMicroelectronics.

This is information on a product in full production. www.st.com

1 Characteristics

Table 1. Absolute ratings (T_{amb} = 25 °C)

Symbol	Parameter and test conditions	Value	Unit
V_{PP}	External pins (pin 1 and pin 3): IEC 61000-4-2 (330 Ω / 150 pF) air discharge contact discharge	 ±15 ±15	kV
	External pins (pin 1 and pin 3): ISO 10605 (330 Ω / 330 pF) air discharge contact discharge	 ±15 ±15	
V_{PP}	Transceiver side pins: HBM (pin 4 and pin 6)	±2	kV
T_L	Maximum lead temperature for soldering 10 s	260	°C
T_{op}	Operating junction temperature range	-40 to +125	°C
T_{stg}	Storage temperature range	-55 to +125	°C

Table 2. Electrical characteristics (T_{amb} = 25 °C)

Symbol	Conditions	Min.	Typ.	Max.	Unit
V_{BR}	Internal protection diode breakdown voltage, I_R = 20 mA	6			V
V_{CL}	I_{PP} = 1 A, 8/20 µs		10.5		V
R_{DC}	Serial resistance (pins 3 to 4 or 1 to 6)		12		Ω
S_{dd11}	From 10 MHz to 60 MHz, T_j = -40 °C to 125 °C			-20	dB
S_{dd22}				-20	
S_{cd21} S_{dc21}				-50	

Figure 2. BroadR Reach application schematic

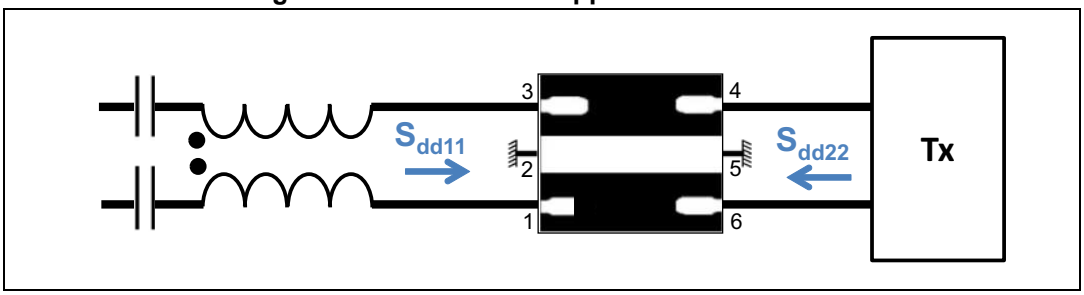


Figure 3. S_{dd11} differential return loss curve -external pins

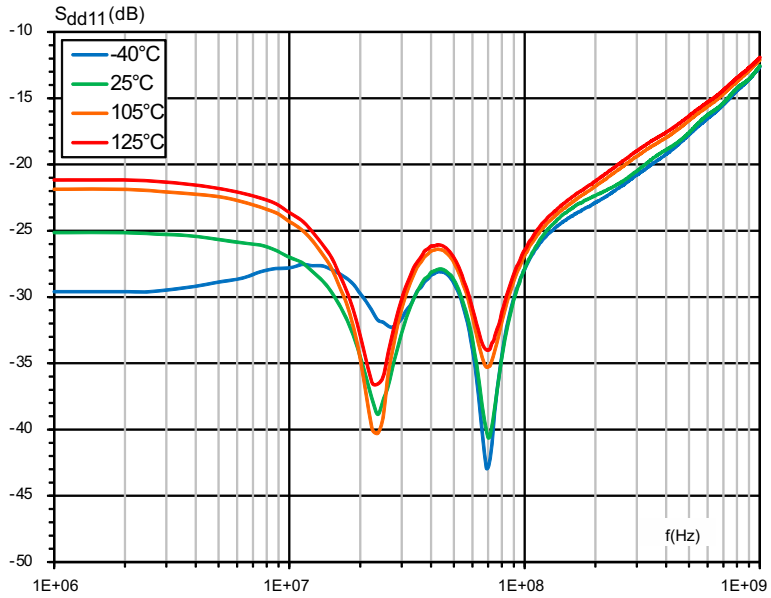


Figure 4. S_{dd22} differential return loss curve -transceiver side pins

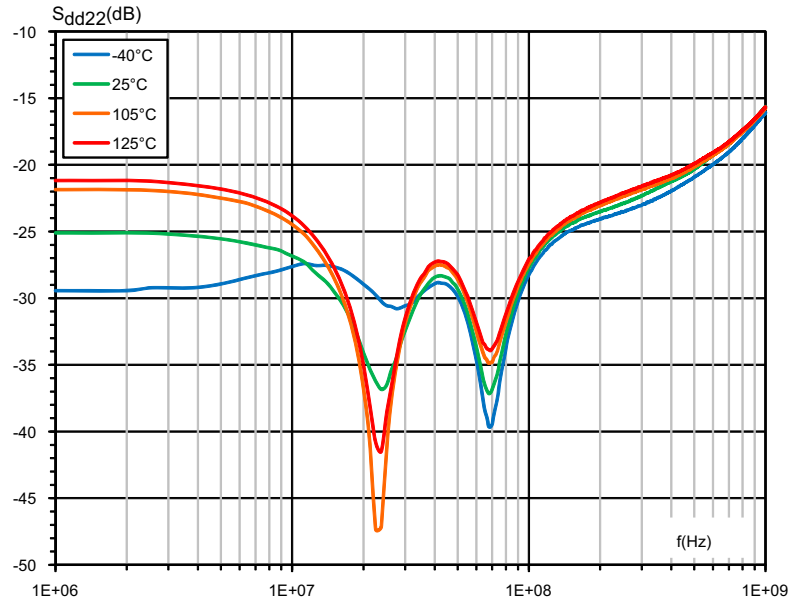


Figure 5. S_{dd21} attenuation curve

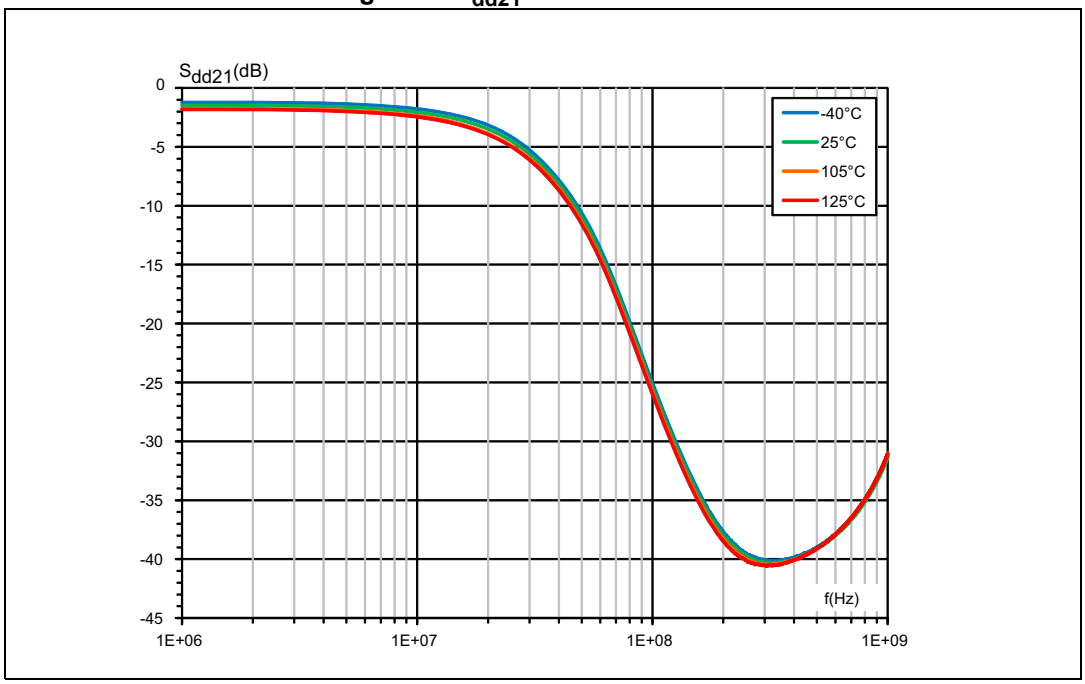


Figure 6. ESD response to ISO 10605-
C = 330 pF, R = 330 Ω (+15 kV contact)

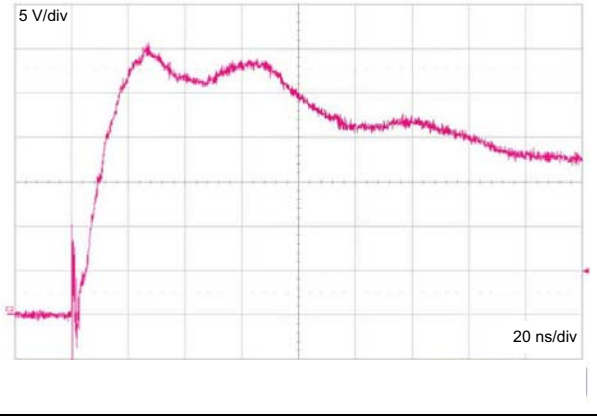


Figure 7. ESD response to ISO 10605-
C = 330 pF, R = 330 Ω (-15 kV contact)

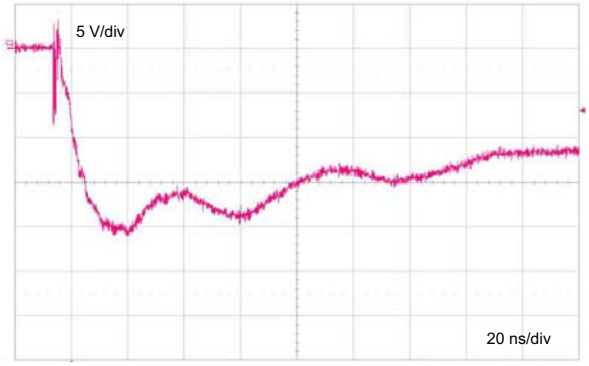


Figure 8. Response to ISO 7637-3 (pulse 3a) Us = -150 V

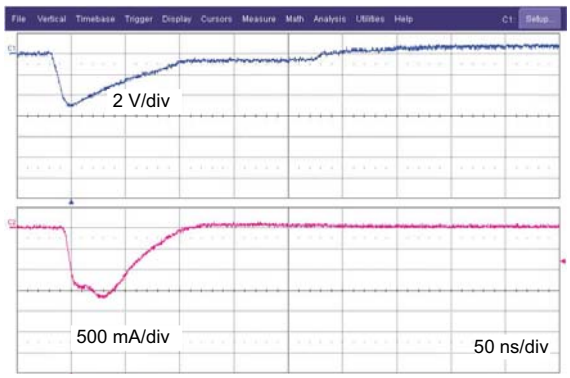
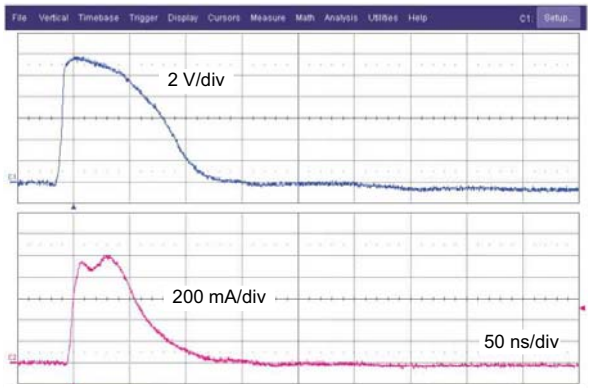


Figure 9. Response to ISO 7637-3 (pulse 3b) Us = +100 V



2 Package information

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

2.1 QFN package information

Figure 10. QFN package outline

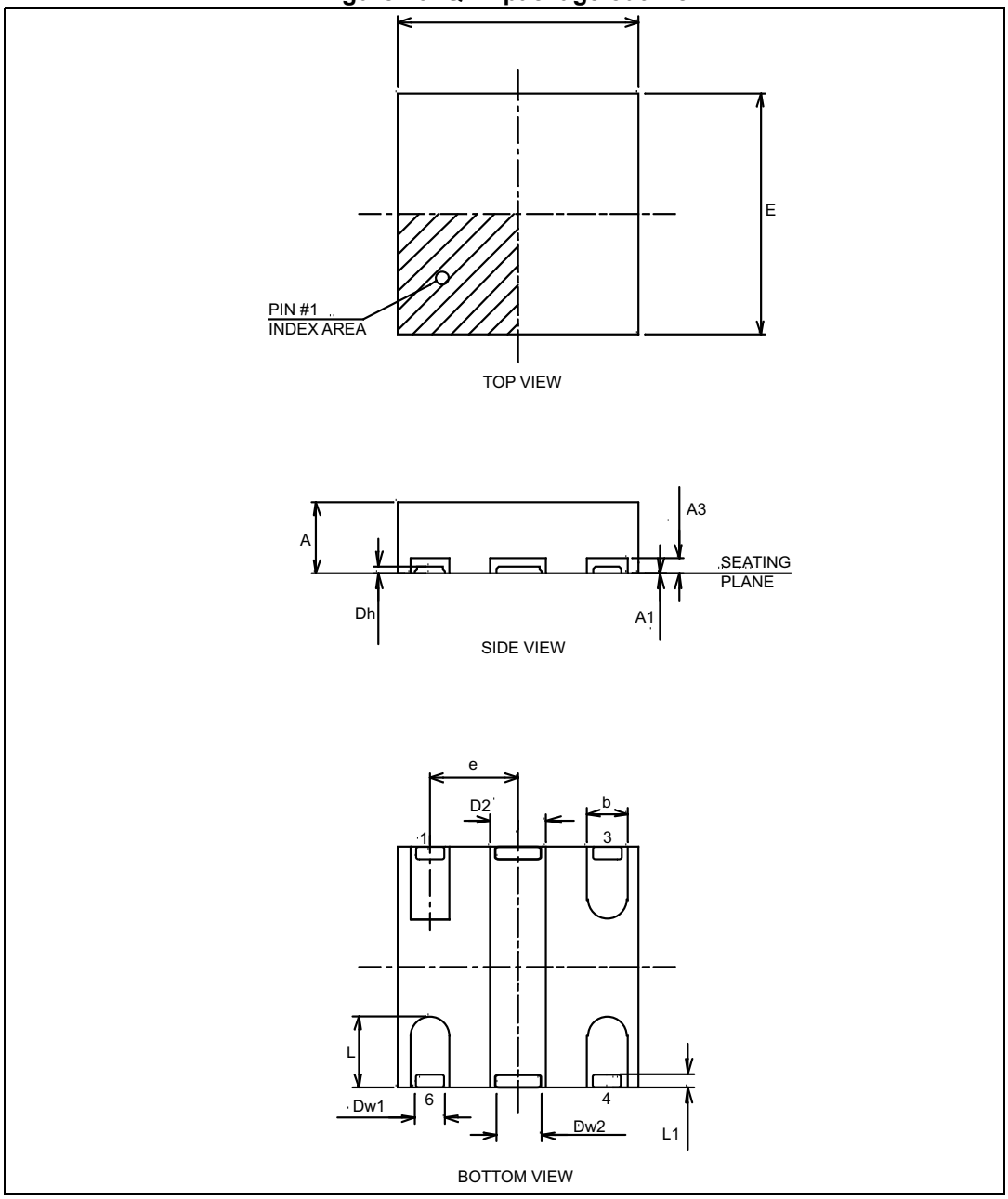


Table 3. QFN package mechanical data

Ref.	Dimensions					
	Millimeters			Inches[1]		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.80	0.85	0.90	0.0315	0.0335	0.0354
A1	0.00	0.02	0.05	0.00	0.0008	0.0020
A3		0.203			0.0080	
b	0.45	0.50	0.55	0.0178	0.0197	0.0217
D	2.95	3.00	3.05	0.1161	0.1181	0.1201
E	2.95	3.00	3.05	0.1161	0.1181	0.1201
e		1.105			0.0436	
L	0.85	0.90	0.95	0.0335	0.0354	0.0374
D2	0.60	0.70	0.80	0.0236	0.0276	0.0315
L1	0.07	0.15	0.23	0.0028	0.0060	0.0091
Dw1	0.30	0.35	0.40	0.0118	0.0138	0.0157
Dh[2]	0.10			0.0039		
Dw2[2]	0.50	0.55	0.60	0.0197	0.0217	0.0236

1. Values in inches are converted from mm and rounded to 4 decimal digits.
2. Solder filled dimples

Figure 11. Footprint recommendations (in mm)

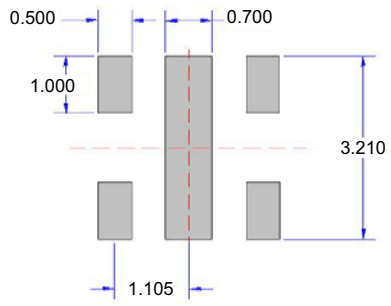
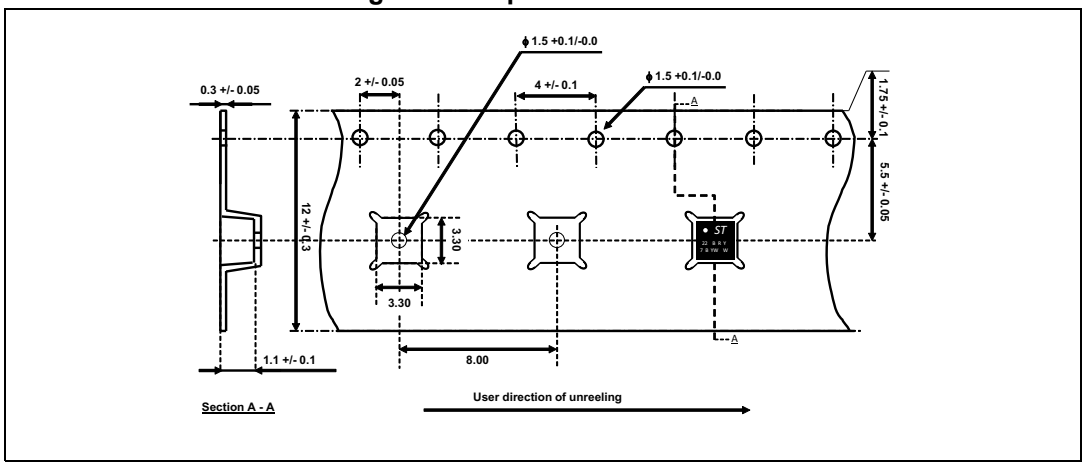


Figure 12. Marking



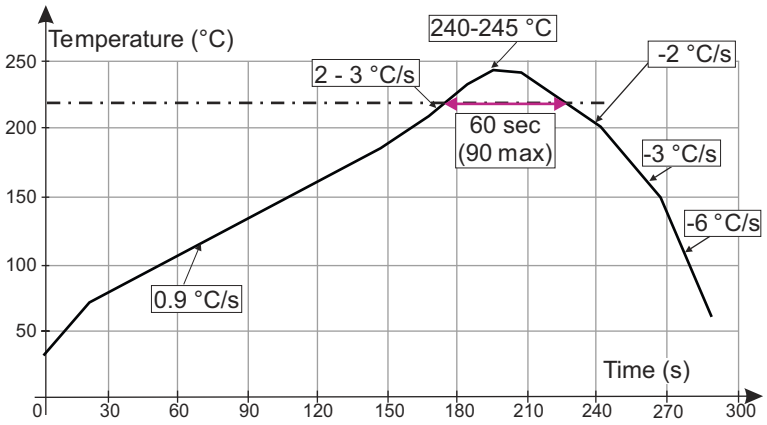
Figure 13. Tape and reel outline



3 Recommendation on PCB assembly

3.1 Reflow profile

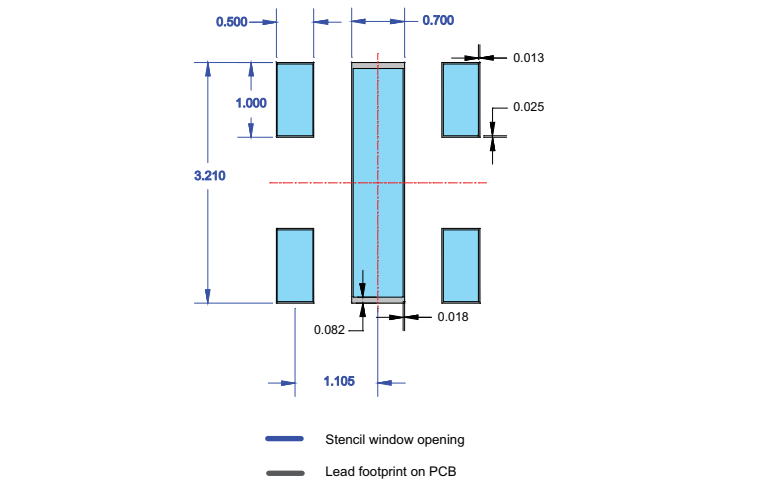
Figure 14. ST ECOPACK® recommended soldering reflow profile for PCB mounting



Note: Minimize air convection currents in the reflow oven to avoid component movement. Maximum soldering profile corresponds to the latest IPC/JEDEC J-ST-020.

3.2 Stencil opening design

Figure 15. Recommended stencil window position in mm (inches)



4 Ordering information

Figure 16. Ordering information scheme

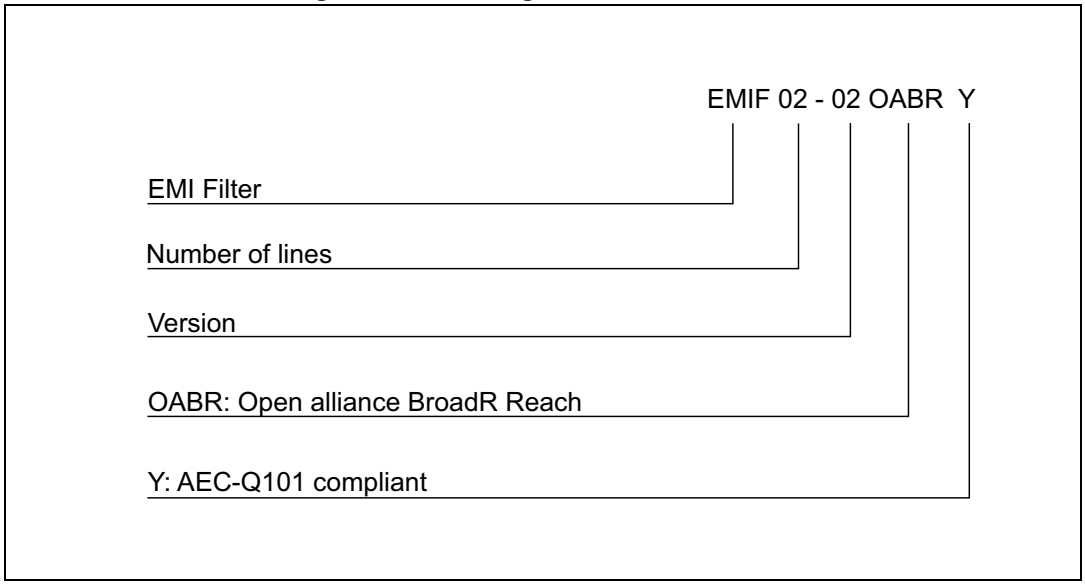


Table 4. Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
EMIF02-02OABRY	22BRY	QFN 3x3 - 6L- (wettable flank)	22.5 mg	3000	Tape and reel

5 Revision history

Table 5. Document revision history

Date	Revision	Changes
24-Jun-2016	1	Initial release

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