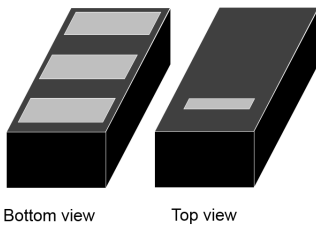
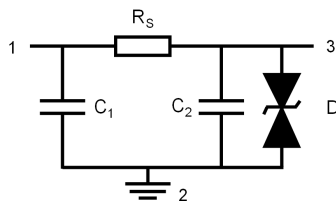
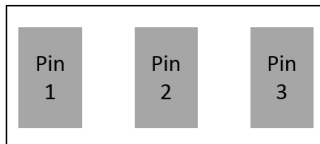


## Single-line low-pass filter and ESD protection



0201-3L package



### Product status

EMIF01-1008AF4

### Features

- Low clamping voltage
- Bidirectional ESD protection
- Stand-off voltage of 5.5 V
- Excellent rejection levels: < -30 dB from 600 MHz to 1.55 GHz
- 0201-3L package: 0.76 x 0.34 mm
- Very thin package: 0.24 mm maximum
- Resin coating on all 6 faces
- Complies with IEC 61000-4-2 level 4 on pin 3:
  - ±15 kV (air discharge)
  - ±8 kV (contact discharge)
- MIL STD 883G - Method 3015-7 on pin 1:
  - ±2 kV HBM (human body model)

### Applications

Where EMI filtering in ESD sensitive equipment is required:

- Smartphones, mobile phones and tablets
- Laptop, personal computers and printers
- MCU boards

### Description

The EMIF01-1008AF4 is a highly integrated device designed as a low-pass filter that rejects frequencies in the 600 MHz to 1.55 GHz band.

It also incorporates a bidirectional 5.5 V ESD protection to protect the system against electrostatic discharges up to 15 kV.

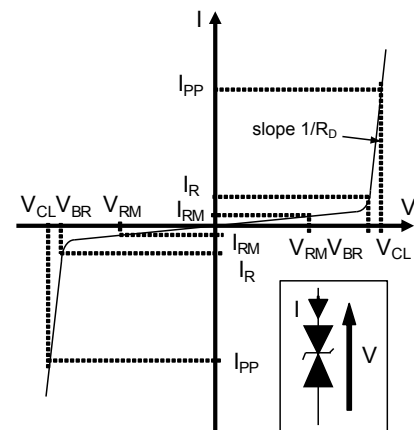
# 1 Characteristics

**Table 1. Absolute maximum ratings ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ )**

Symbol	Parameter		Value	Unit		
$V_{PP}$	Peak pulse voltage	Pin3 ESD discharge IEC 61000-4-2 Air discharge Contact discharge	15 8	kV		
		Pin1 HBM (Human Body Model) - MIL STD 883G - Method 3015-7	2			
		$T_{op}$	Maximum operating temperature range		-40 to +125	$^{\circ}\text{C}$
		$T_{stg}$	Storage temperature range		-55 to +150	

**Figure 1. Electrical characteristics (definitions)**

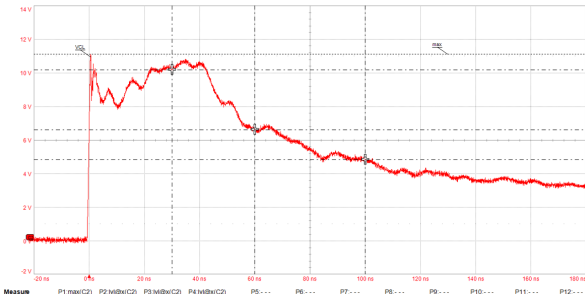
Symbol	Parameter
$V_{BR}$	= Breakdown voltage
$V_{CL}$	= Clamping voltage
$I_{RM}$	= Leakage current @ $V_{RM}$
$V_{RM}$	= Stand-off voltage
$I_{PP}$	= Peak pulse current
$R_D$	= Dynamic resistance
$I_R$	= Breakdown current


**Table 2. Electrical characteristics ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , , unless otherwise specified)**

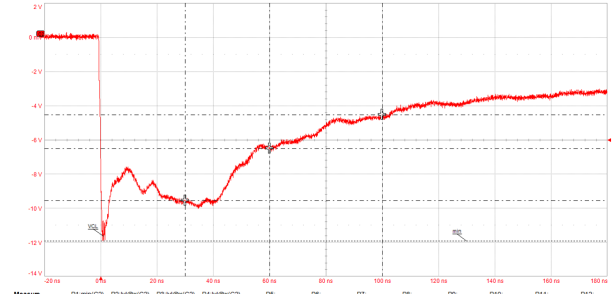
Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_{RM}$	Stand-off voltage				5.5	V
$V_{BR}$	Breakdown voltage	$I_R = 1\text{ mA}$	6	8		V
$I_{RM}$	Leakage current	$V_R = V_{RM}$			500	nA
$R_D$	Dynamic resistance	TLP		0.1		$\Omega$
$V_{CL}$	Clamping voltage	TLP, $I_{PP} = 16\text{ A peak}$		10.5		V
$R_S$	Series resistance	$T_{OP}$ from $-40\text{ }^{\circ}\text{C}$ to $+85\text{ }^{\circ}\text{C}$	90	100	110	$\Omega$
$C_{LINE}$	Total line capacitance	$F = 1\text{ MHz}$ , $V_{osc} = 30\text{ mV}$ , $T_{OP}$ from $-40\text{ }^{\circ}\text{C}$ to $+85\text{ }^{\circ}\text{C}$	72	80	88	pF

## 1.1 Characteristics curves

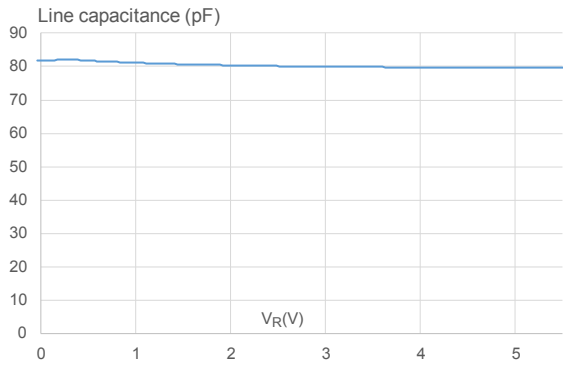
**Figure 2. ESD response to IEC 61000-4-2 (+8 kV contact discharge)**



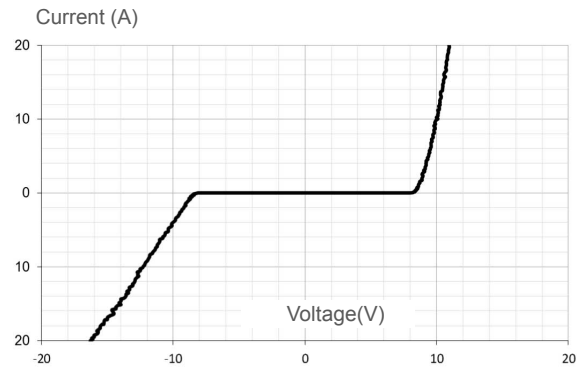
**Figure 3. ESD response to IEC 61000-4-2 (-8 kV contact discharge)**



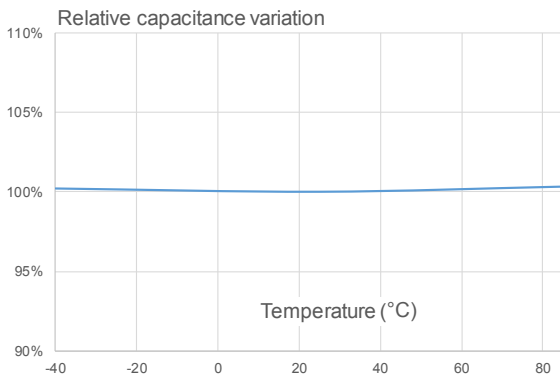
**Figure 4. Total line capacitance variation versus applied voltage**



**Figure 5. TLP characteristic**



**Figure 6. Total line capacitance variation versus operating temperature**



**Figure 7. Total series resistance variation versus operating temperature**

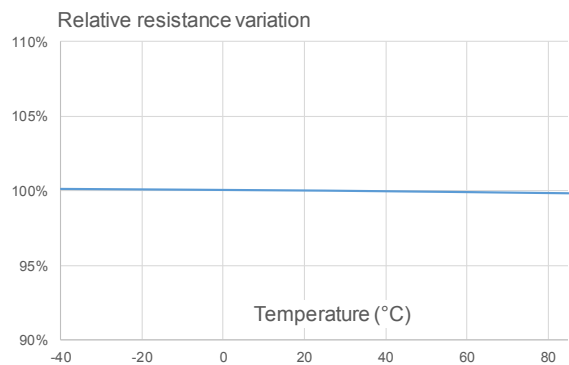
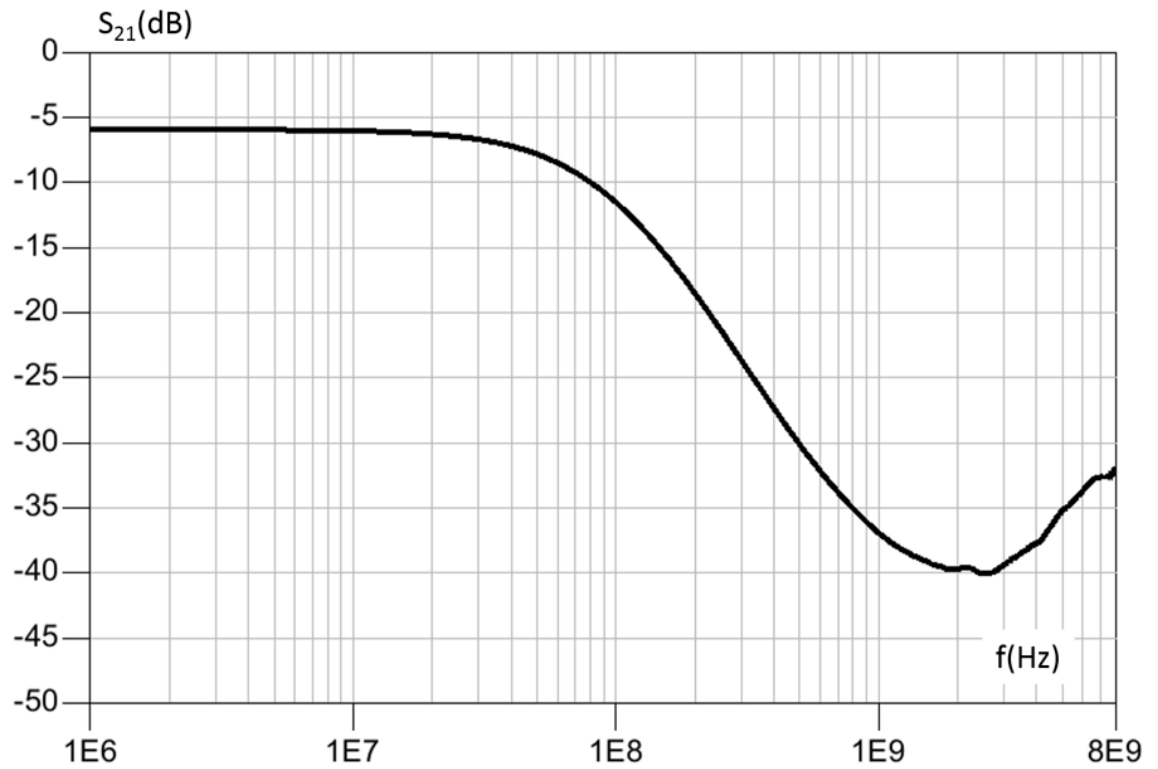


Figure 8. Attenuation versus frequency

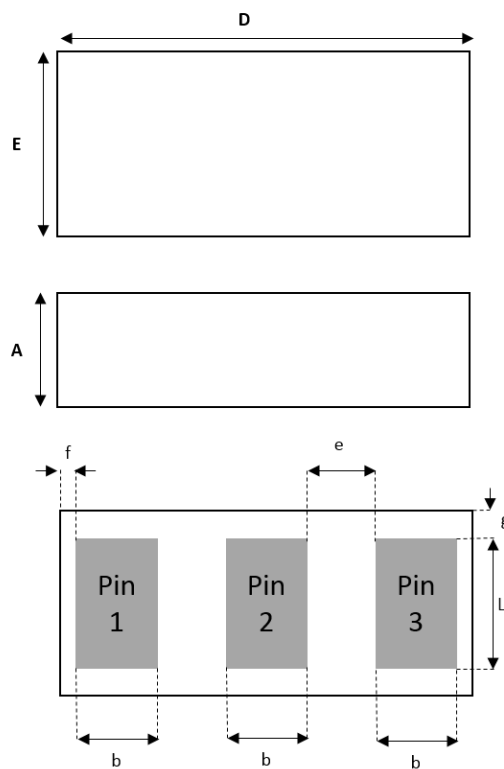


## 2 Package information

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](http://www.st.com). ECOPACK® is an ST trademark.

### 2.1 0201-3L package information

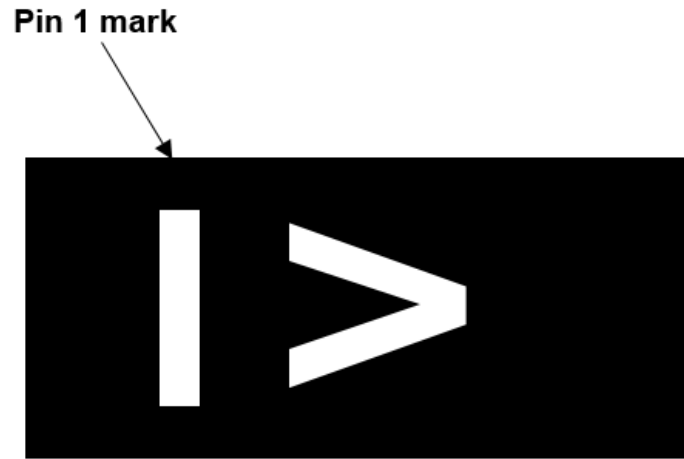
**Figure 9. 0201-3L package outline**



**Table 3. 0201-3L package mechanical data**

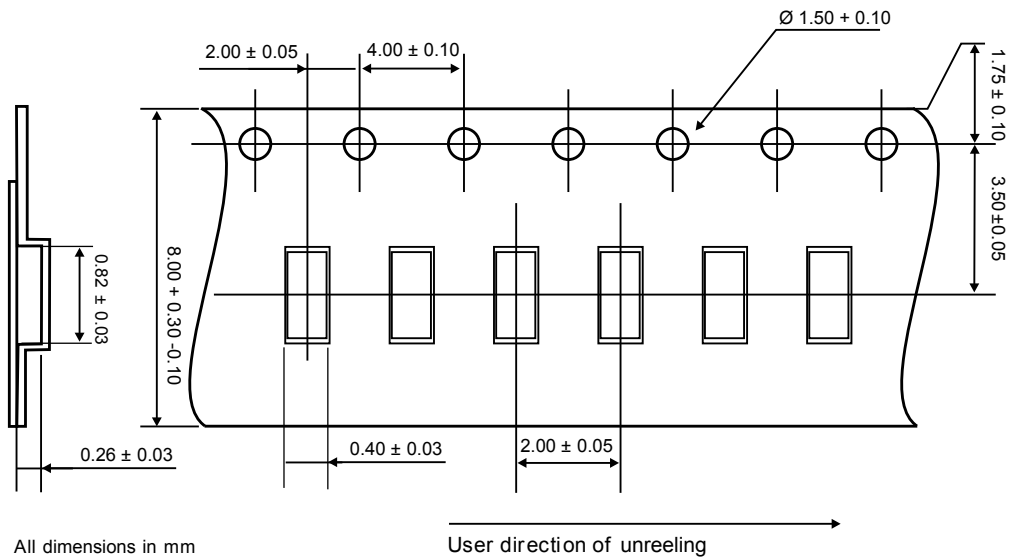
Ref.	Dimensions		
	Millimeters		
	Min.	Typ.	Max.
A	0.180	0.210	0.240
b	0.130	0.150	0.170
D	0.740	0.760	0.780
E	0.320	0.340	0.360
L	0.220	0.240	0.260
e	0.105	0.125	0.145
f		0.030	
g		0.050	

Figure 10. Marking layout



*Note:* The marking codes can be rotated by 90 ° or 180° to differentiate assembly location. In no case should this product marking be used to orient the component for its placement on a PCB. Only pin 1 mark is to be used for this purpose.

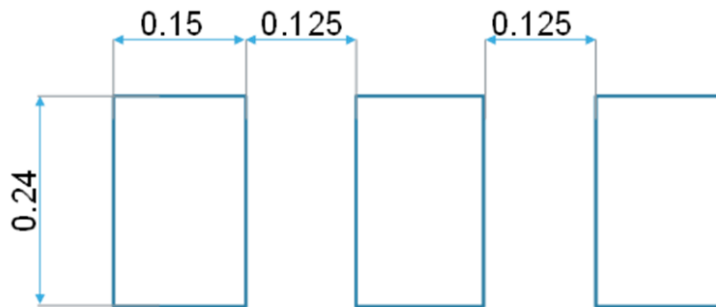
Figure 11. Tape and reel outline



### 3 Recommendation PCB assembly

#### 3.1 Footprint

Figure 12. Footprint in mm

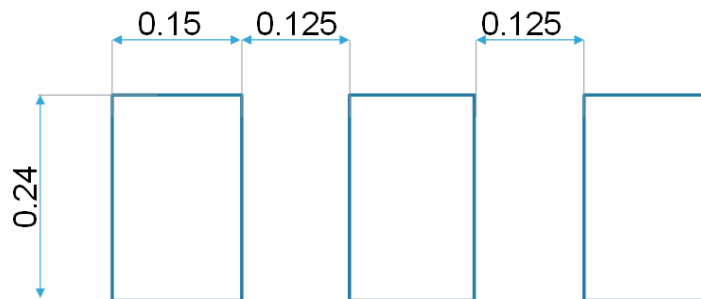


SMD footprint design is recommended.

#### 3.2 Stencil opening design

Stencil opening thickness: 75  $\mu\text{m}$  / 3 mils

Figure 13. Stencil opening recommendations in mm



### 3.3 Solder paste

1. Halide-free flux qualification ROL0 according to ANSI/J-STD-004.
2. “No clean” solder paste is recommended.
3. Offers a high tack force to resist component movement during PCB movement.
4. Solder paste with fine particles: Type 4 (powder particle size 20-38  $\mu\text{m}$  per IPCJ STD-005).

### 3.4 Placement

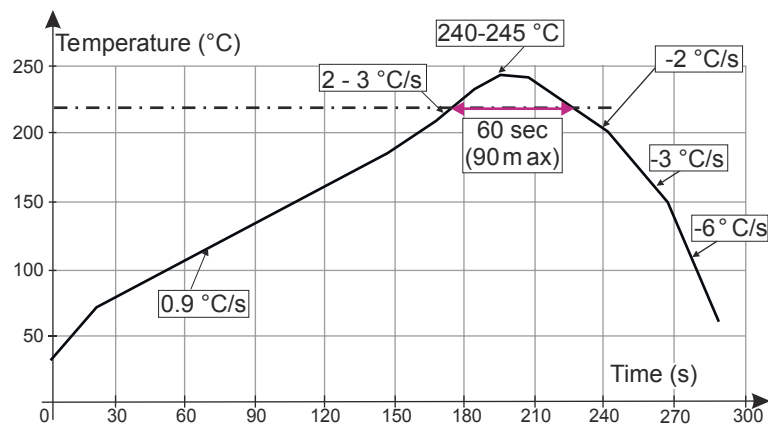
1. Manual positioning is not recommended.
2. It is recommended to use the lead recognition capabilities of the placement system, not the outline centering
3. Standard tolerance of  $\pm 0.05$  mm is recommended.
4. 3.5 N placement force is recommended. Too much placement force can lead to squeezed out solder paste and cause solder joints to short. Too low placement force can lead to insufficient contact between package and solder paste that could cause open solder joints or badly centered packages.
5. To improve the package placement accuracy, a bottom side optical control should be performed with a high resolution tool.
6. For assembly, a perfect supporting of the PCB (all the more on flexible PCB) is recommended during solder paste printing, pick and place and reflow soldering by using optimized tools.

### 3.5 PCB design preference

1. To control the solder paste amount, the closed via is recommended instead of open vias.
2. The position of tracks and open vias in the solder area should be well balanced. A symmetrical layout is recommended, to avoid any tilt phenomena caused by asymmetrical solder paste due to solder flow away.

### 3.6 Reflow profile

**Figure 14. ST ECOPACK<sup>®</sup> 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-STD-020.



## 4 Ordering information

Figure 15. Ordering information scheme

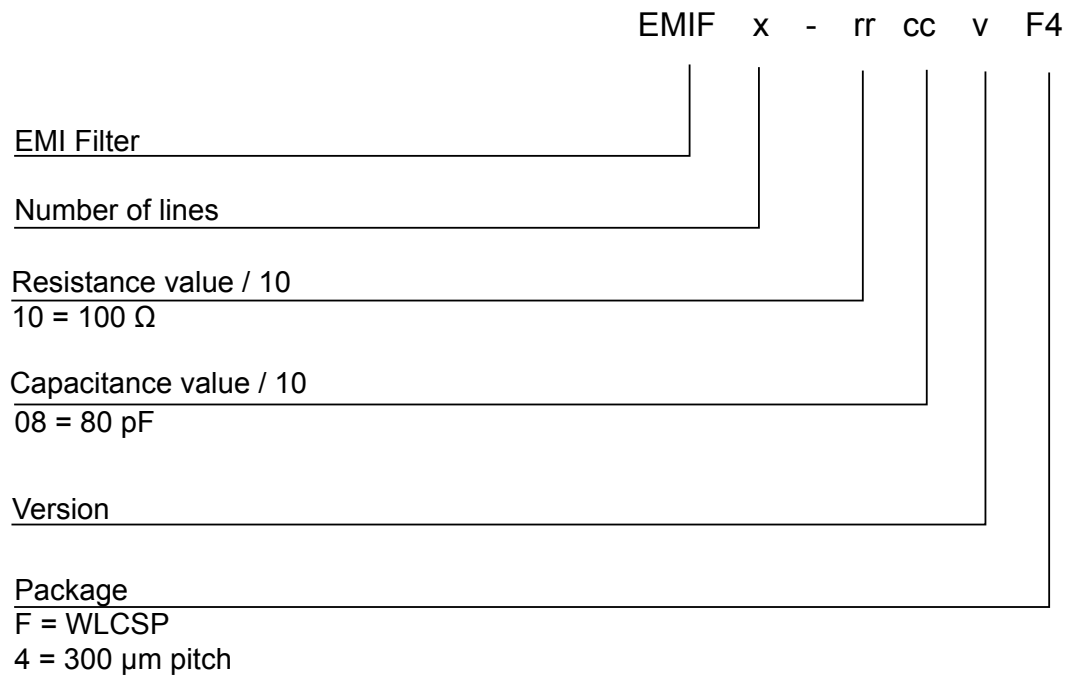


Table 4. Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
EMIF01-1008AF4	V <sup>(1)</sup>	0201-3L	0.145 mg	15000	Tape and reel

1. The marking can be rotated by 90° to differentiate assembly location

## Revision history

**Table 5. Document revision history**

Date	Revision	Changes
12-Mar-2019	1	Initial release.

**IMPORTANT NOTICE – PLEASE READ CAREFULLY**

STMicroelectronics NV and its subsidiaries (“ST”) reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST’s terms and conditions of sale in place at the time of order acknowledgement.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of Purchasers’ products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. For additional information about ST trademarks, please refer to [www.st.com/trademarks](http://www.st.com/trademarks). All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

© 2019 STMicroelectronics – All rights reserved