



# EMIF06-10006F2

IPAD™

## 6 line EMI filter and ESD protection

### Main product characteristics

Where EMI filtering in ESD sensitive equipment is required:

- Mobile phones and communication systems
- Computers, printers and MCU Boards

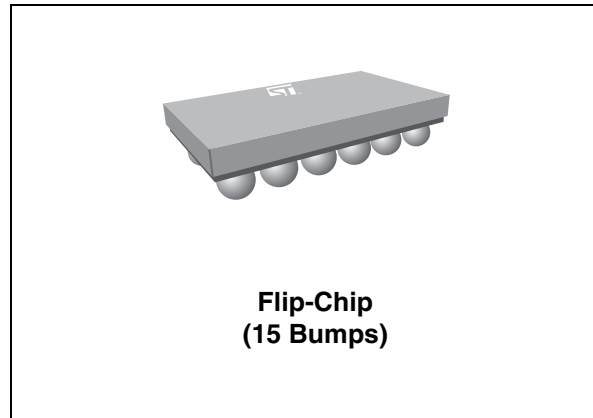
### Description

The EMIF06-10006F2 is a highly integrated device designed to suppress EMI/RFI noise in all systems subjected to electromagnetic interference. The EMIF06 Flip-Chip packaging means the package size is equal to the die size.

This filter includes an ESD protection circuitry which prevents damage to the application when subjected to ESD surges up to 15 kV. This device includes 6 EMIF filters.

### Benefits

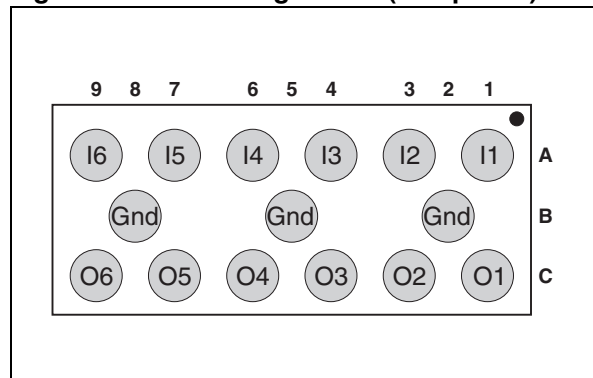
- EMI symmetrical (I/O) low-pass filter
- High efficiency in EMI filtering
- Lead free package
- Very low PCB space consumption  
2.92 mm x 1.29 mm
- Very thin package: 0.65 mm
- High efficiency in ESD suppression  
(IEC 61000-4-2 level 4)
- High reliability offered by monolithic integration
- High reduction of parasitic elements through integration and wafer level packaging



### Order code

| Part Number    | Marking |
|----------------|---------|
| EMIF06-10006F2 | FT      |

Figure 1. Pin configuration (bump side)



### Complies with the following standards:

IEC 61000-4-2 level 4:

15 kV (air discharge)

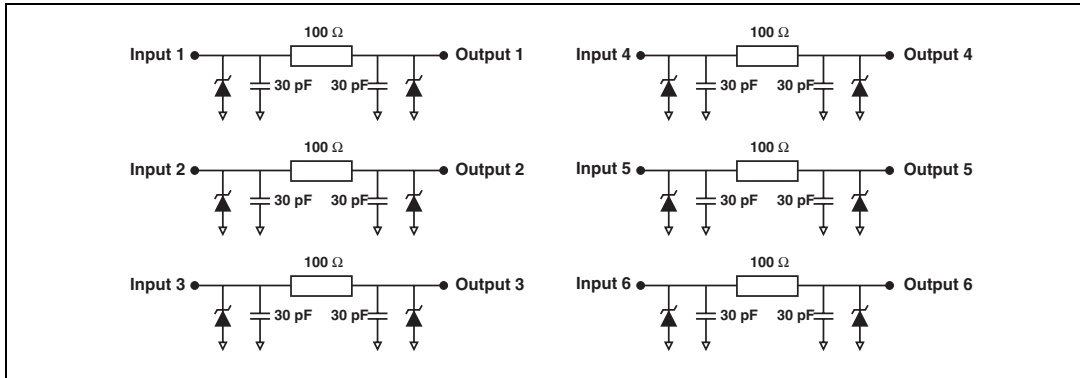
8 kV (contact discharge)

MIL STD 883E - Method 3015-6 Class 3: 30 kV

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# 1 Characteristics

**Figure 2. Basic cell configuration**



**Table 1. Absolute Ratings (limiting values)**

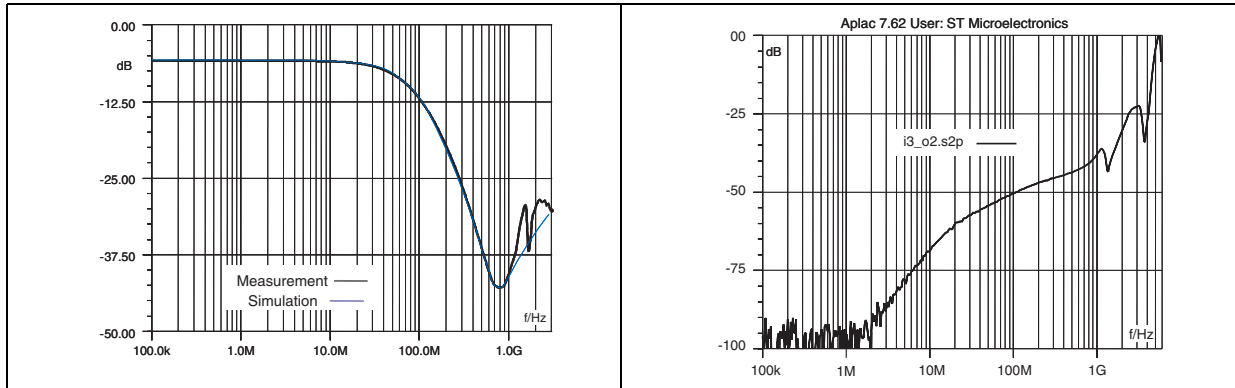
| Symbol    | Parameter and test conditions | Value        | Unit |
|-----------|-------------------------------|--------------|------|
| $P_R$     | DC power per resistance       | 0.1          | W    |
| $P_T$     | Total DC power per package    | 0.6          | W    |
| $T_j$     | Maximum junction temperature  | 125          | °C   |
| $T_{op}$  | Operating temperature range   | - 40 to + 85 | °C   |
| $T_{stg}$ | Storage temperature range     | 125          | °C   |

**Table 2. Electrical Characteristics ( $T_{amb} = 25\text{ °C}$ )**

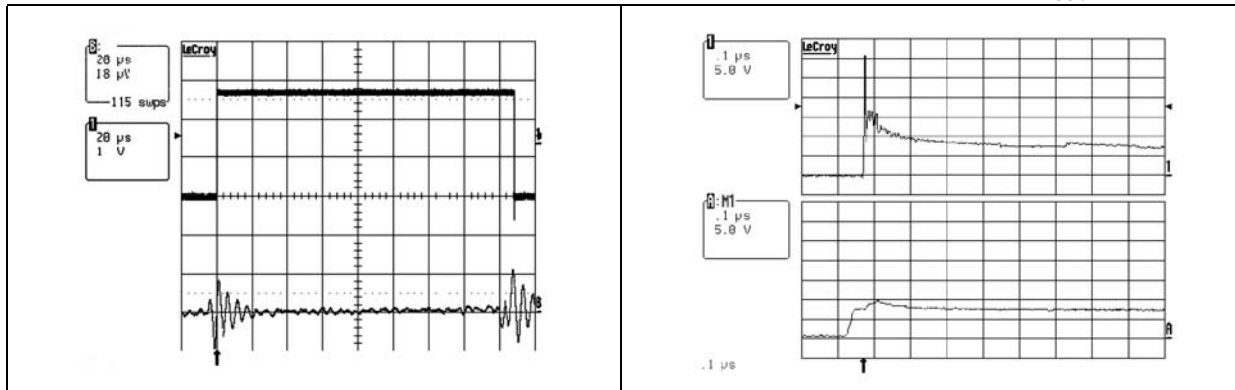
| Symbol     | Parameter                                  |
|------------|--|
| $V_{BR}$   | Breakdown voltage                          |
| $I_{RM}$   | Leakage current @ $V_{RM}$                 |
| $V_{RM}$   | Stand-off voltage                          |
| $V_{CL}$   | Clamping voltage                           |
| $R_d$      | Dynamic impedance                          |
| $I_{PP}$   | Peak pulse current                         |
| $R_{I/O}$  | Series resistance between Input and output |
| $C_{line}$ | Capacitance per line                       |

| Symbol     | Test conditions  | Min. | Typ. | Max. | Unit |
|------------|--|------|------|------|------|
| $V_{BR}$   | $I_R = 1\text{ mA}$  | 5.5  | 7    | 9    | V    |
| $I_{RM}$   | $V_{RM} = 3.3\text{ V per line}$                                       |      |      | 500  | nA   |
| $R_{I/O}$  | $I = 10\text{ mA}$   | 80   | 100  | 120  | Ω    |
| $C_{line}$ | $V_R = 2.5\text{ V}, F = 1\text{ MHz}, 30\text{ mV (on filter cells)}$ | 50   | 60   | 70   | pF   |

**Figure 3. S21 (db) attenuation measurements** **Figure 4. Analog crosstalk measurements and Aplac simulation**



**Figure 5. Digital crosstalk measurements** **Figure 6. ESD response to IEC 61000-4-2 (+15 kV air discharge) on one input (V<sub>in</sub>) and one output (V<sub>out</sub>)**



**Figure 7. ESD response to IEC 61000-4-2 (-15 kV air discharge) on one input (V<sub>in</sub>) and one output (V<sub>out</sub>)** **Figure 8. Line capacitance versus applied voltage for filter**

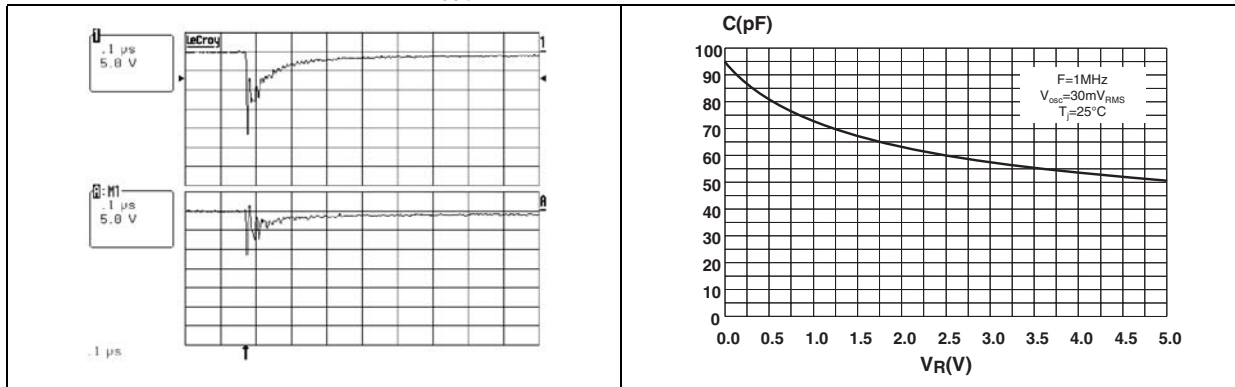


Figure 9. Aplac model

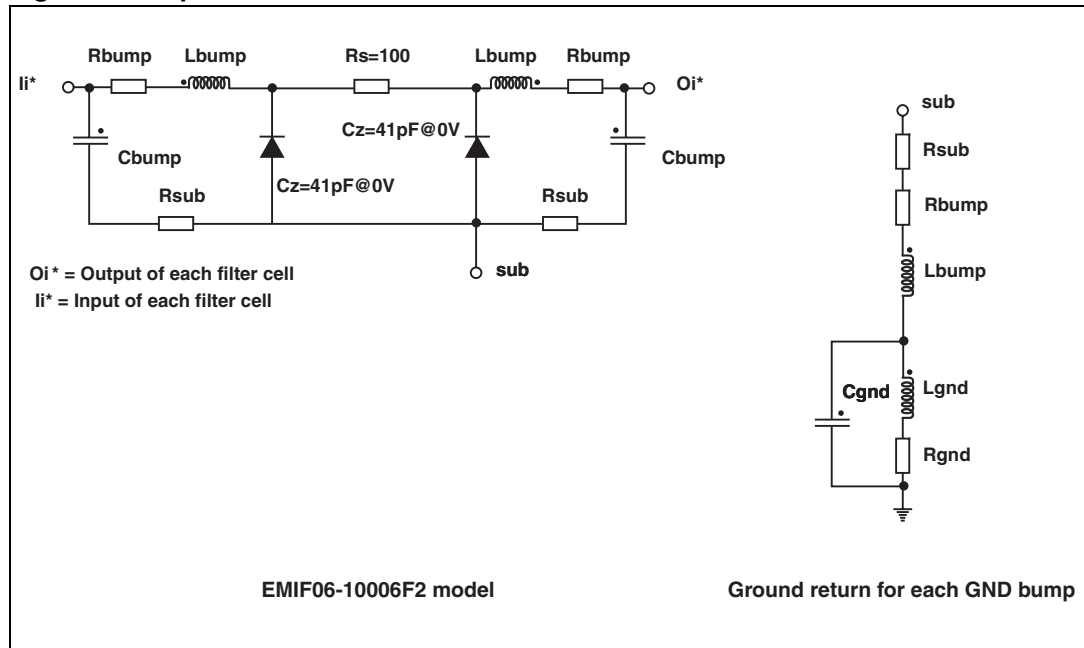
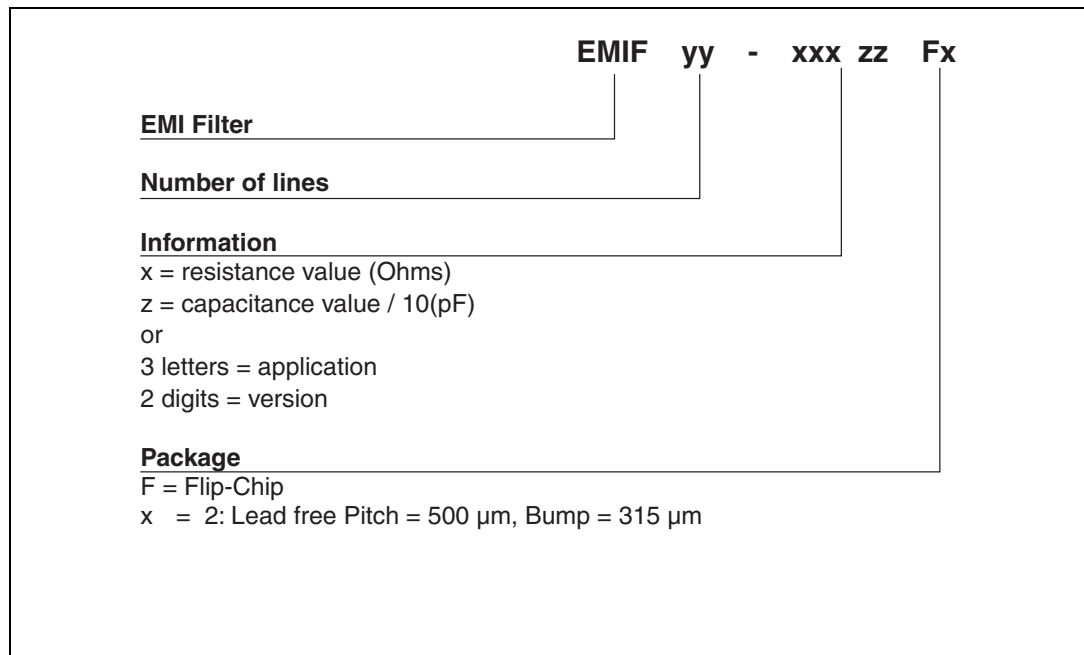


Figure 10. Figure 10: Aplac parameters

|                |         |
|----------------|---------|
| aplacvar RS    | 100Ω    |
| aplacvar Cz    | 41 pF   |
| aplacvar Lbump | 50 pH   |
| aplacvar Rbump | 20 m    |
| aplacvar Cbump | 1.2 pF  |
| aplacvar Rsub  | 100 m   |
| aplacvar Rgnd  | 100 m   |
| aplacvar Lgnd  | 100 pH  |
| aplacvar Cgnd  | 0.15 pF |

## 2 Ordering Information Scheme



### 3 Package information

Figure 11. Flip-Chip Package dimensions

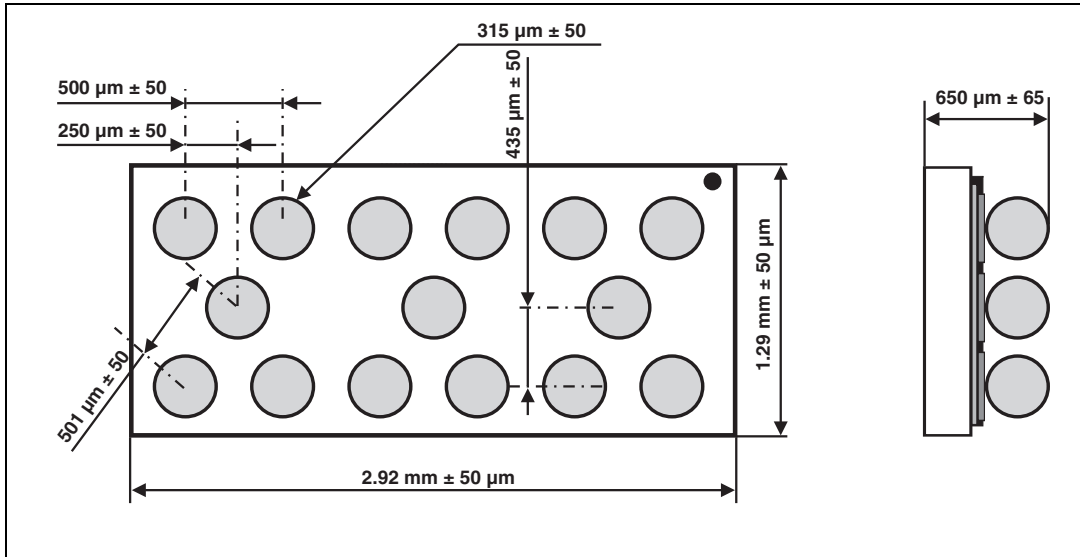
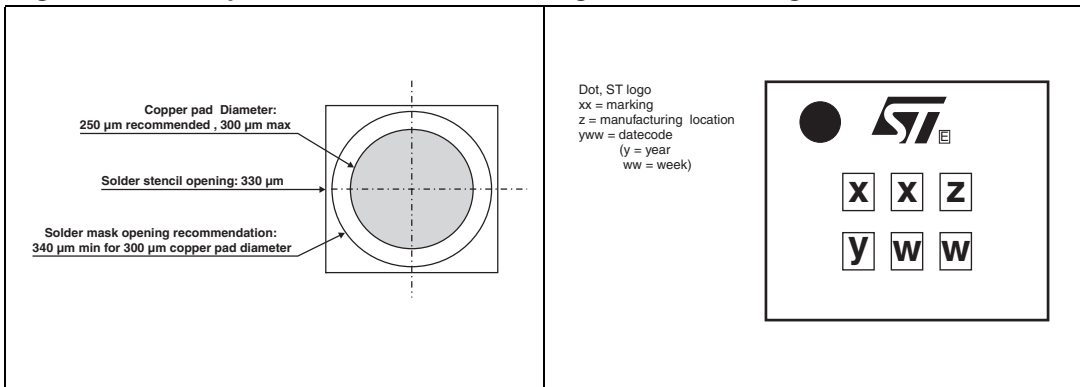


Figure 12. Foot print recommendations Figure 13. Marking





## 4 Ordering Information

| Ordering code  | Marking | Package   | Weight | Base qty | Delivery mode    |
|----------------|---------|-----------|--------|----------|------------------|
| EMIF06-10006F2 | FT      | Flip-Chip | 5.4 mg | 5000     | Tape and reel 7" |

## 5 Revision History

| Date        | Revision | Description of Changes   |
|-------------|----------|--|
| Sep-2004    | 1        | First issue  |
| 19-Nov-2004 | 2        | Figure 2 on page 2:<br>Basic cell configuration corrected for I/O5 and I/O6. |
| 11-Apr-2006 | 3        | Reformatted to current standard. Marking corrected in ordering information.  |
| 17-Nov-2006 | 4        | Ordering code in ordering information corrected.                             |



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