



# EMIF11-10002C4

IPAD™

## 9 LINES 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 EMIF11-10002C4 is a highly integrated devices designed to suppress EMI/RFI noise in all systems subjected to electromagnetic interferences.

This device includes 9 EMI filters & ESD protection circuitry which prevents the device from destruction when subjected to ESD surges up 15kV. In addition, the EMIF11 integrates 2 other ESD protection for data and 1 ESD protection for V<sub>CC</sub>.

### BENEFITS

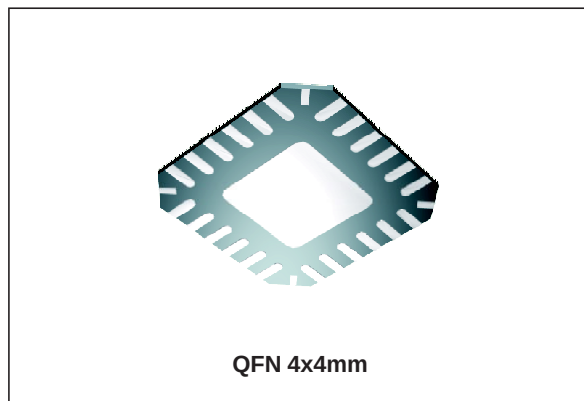
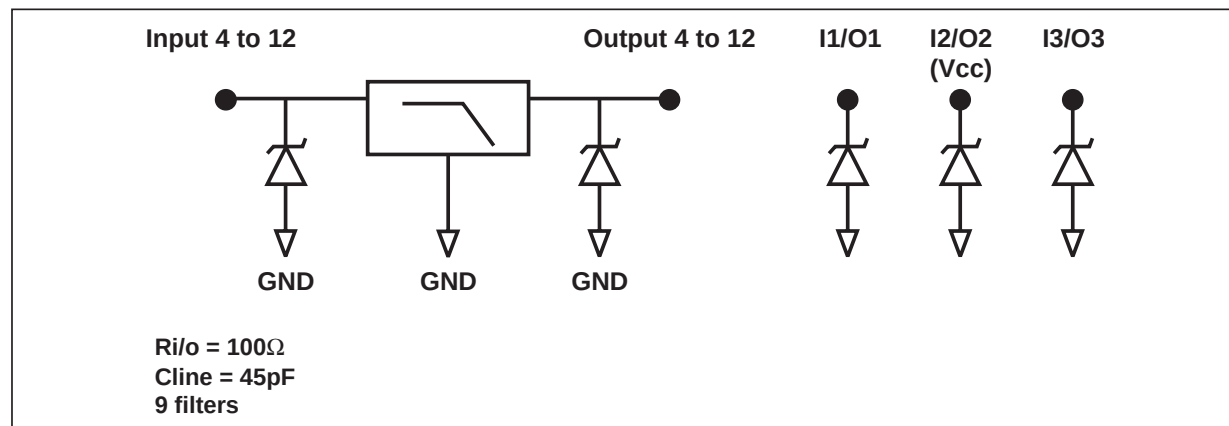
- EMI symmetrical (I/O) low-pass filter
- High efficiency in EMI filtering
- High efficiency in ESD suppression (IEC61000-4-2 level 4)
- High reliability offered by monolithic integration
- High reducing of parasitic elements through integration & wafer level packaging
- QFN 4x4mm package for an easy layout

### COMPLIES WITH THE FOLLOWING STANDARDS: IEC61000-4-2

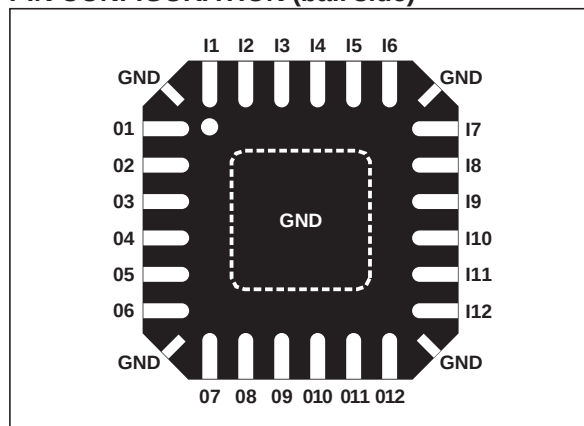
Level 4 on input pins 15kV (air discharge)  
8 kV (contact discharge)

### MIL STD 883E - Method 3015-7 Class 3

### BASIC CELL CONFIGURATION



### PIN CONFIGURATION (ball side)

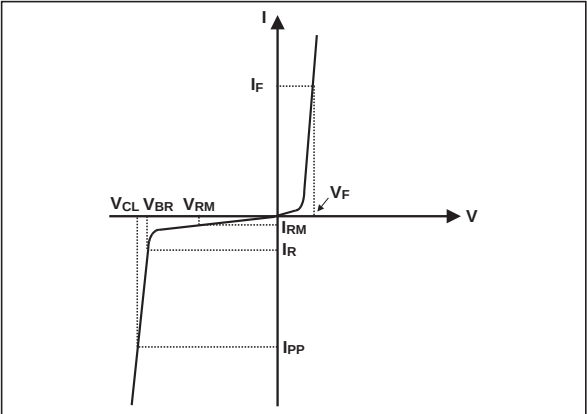


ABSOLUTE RATINGS (limiting values)

| Symbol    | Parameter and test conditions                     | Value       | Unit |
|-----------|---------------------------------------------------|-------------|------|
| $T_j$     | Maximum junction temperature                      | 150         | °C   |
| $T_L$     | Maximum lead temperature for soldering during 10s | 260         | °C   |
| $T_{op}$  | Operating temperature range                       | -40 to + 85 | °C   |
| $T_{stg}$ | Storage temperature range                         | -40 to +85  | °C   |

ELECTRICAL CHARACTERISTICS ( $T_{amb} = 25\text{ °C}$ )

| Symbol     | Parameter                                |
|------------|------------------------------------------|
| $V_{BR}$   | Breakdown voltage                        |
| $I_{RM}$   | Leakage current @ $V_{RM}$               |
| $V_{RM}$   | Stand-off voltage                        |
| $R_{I/O}$  | Series resistance between Input & Output |
| $C_{line}$ | Input capacitance per line               |



| Symbol     | Test conditions                   | Min. | Typ. | Max. | Unit          |
|------------|-----------------------------------|------|------|------|---------------|
| $V_{BR}$   | $I_R = 1\text{ mA}$               | 6    | 7    | 8    | V             |
| $I_{RM}$   | $V_{RM} = 3\text{V}$ per line     |      |      | 1    | $\mu\text{A}$ |
| $R_{I/O}$  | Cells 4 to 12                     | 90   | 100  | 110  | $\Omega$      |
| $C_{line}$ | $V_R = 0\text{V}$ (Cells 4 to 12) |      | 45   |      | pF            |

Fig. 1: S21(dB) attenuation measurement and Aplac simulation.

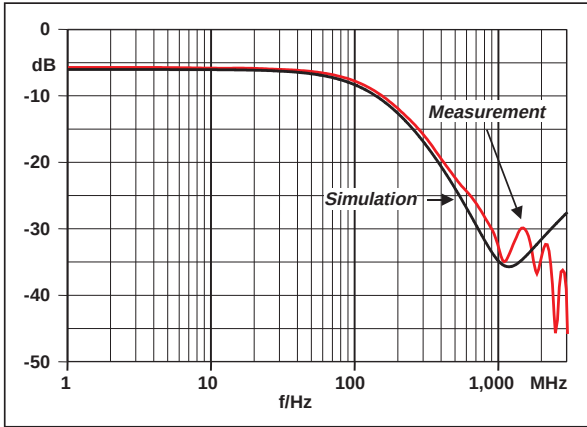
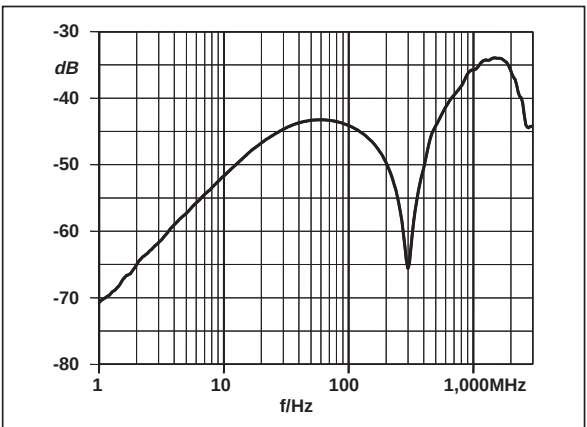
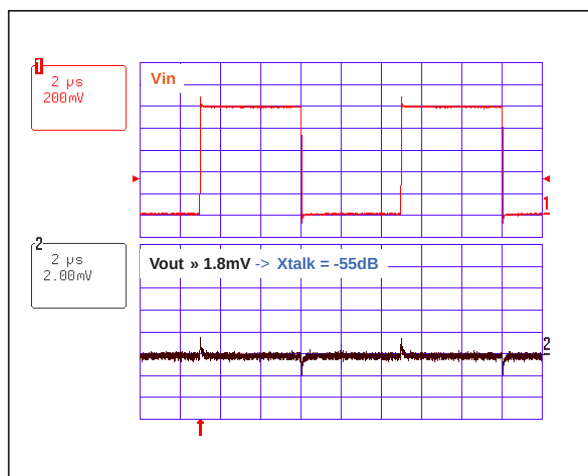
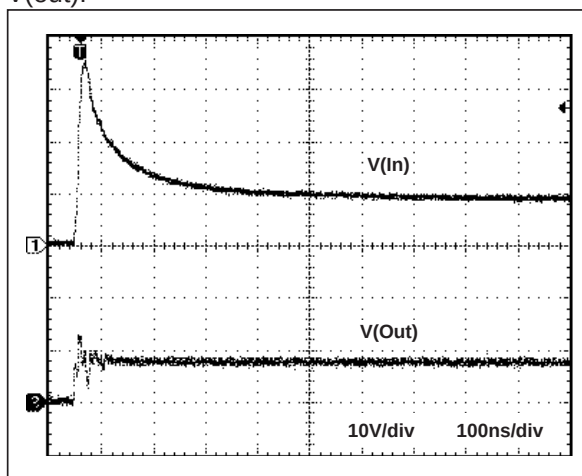
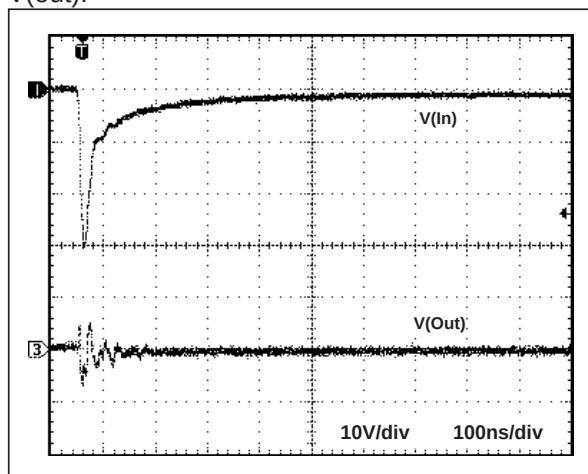
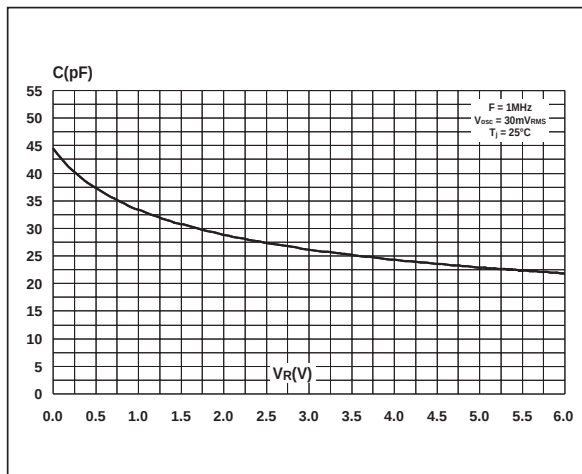
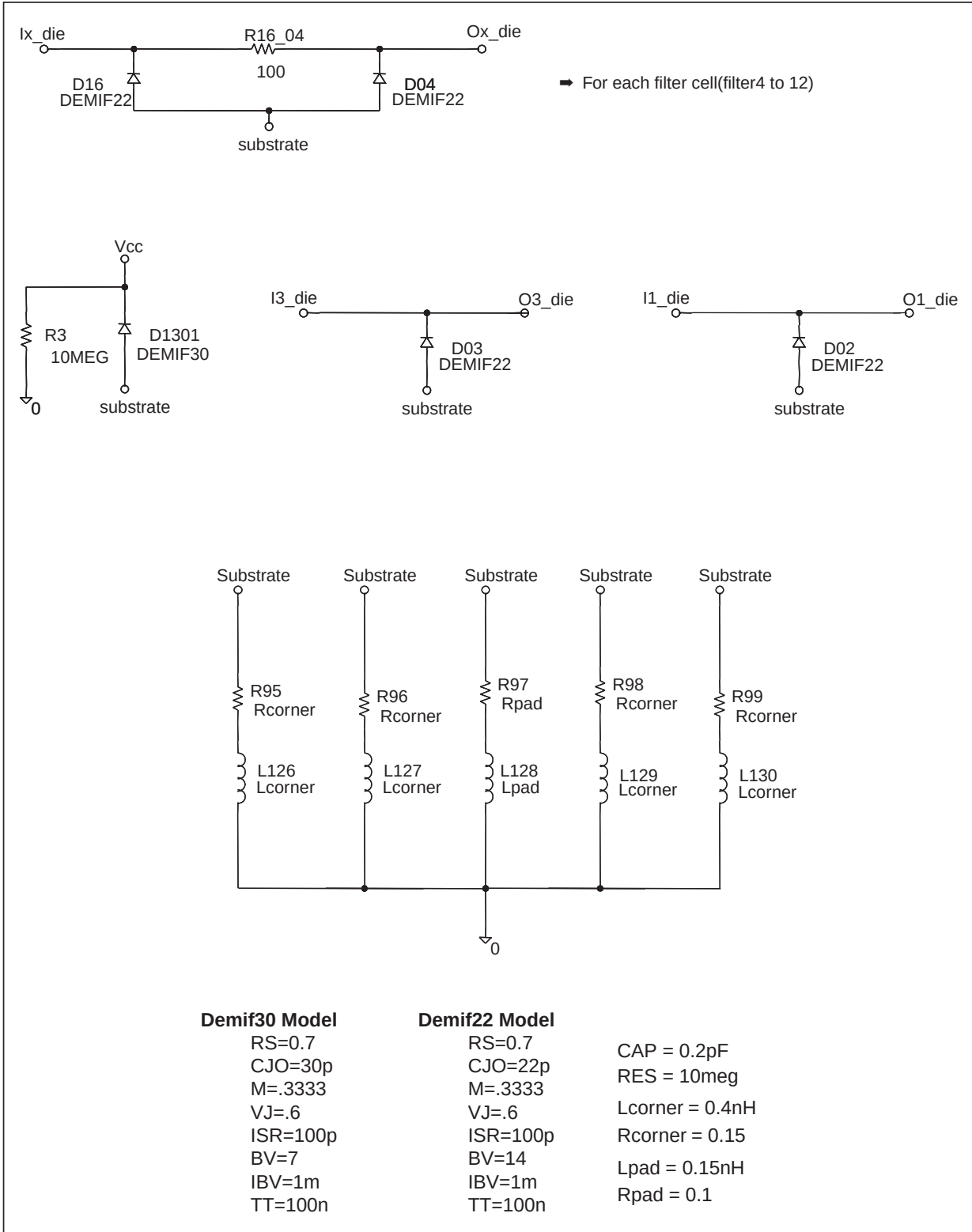


Fig. 2: Analog crosstalk measurements.

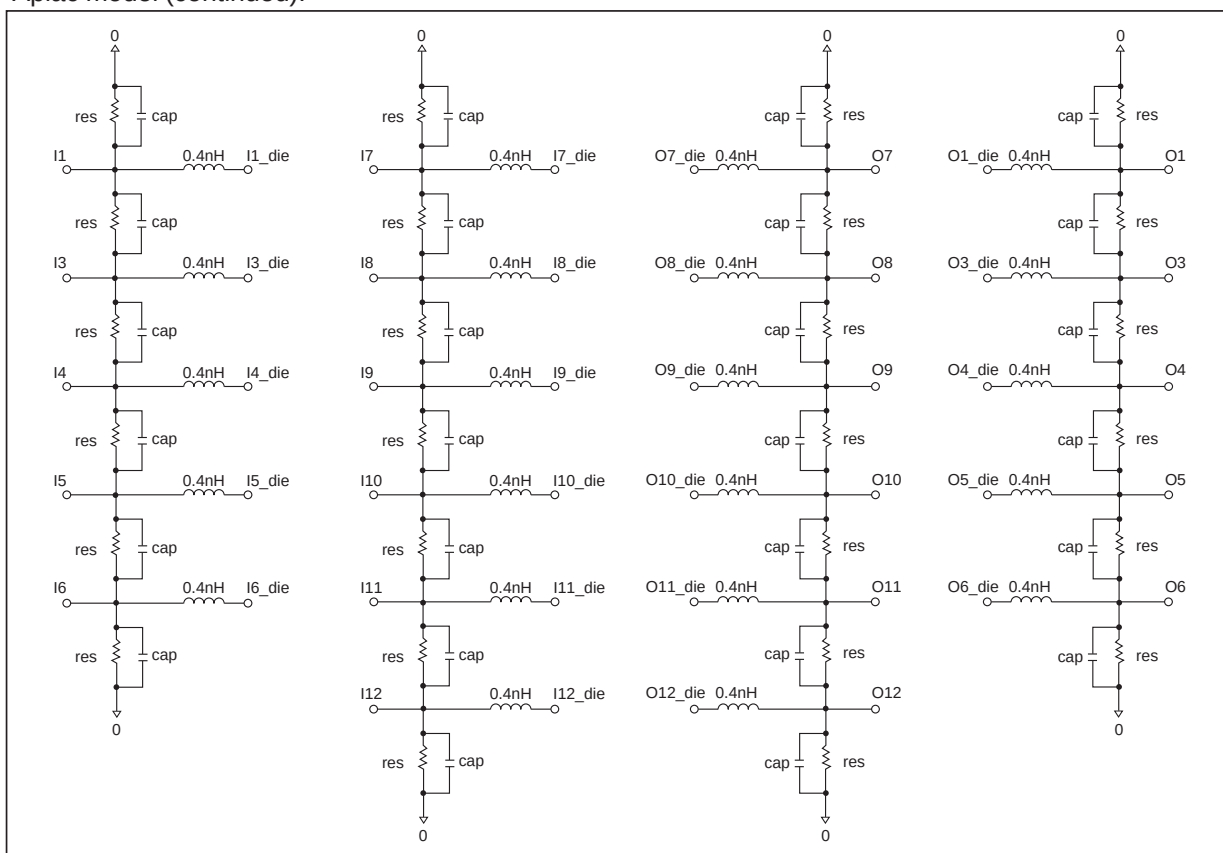


**Fig. 3:** Digital crosstalk measurement.**Fig. 4:** ESD response to IEC61000-4-2 (+15kV air discharge) on one input  $V_{in}$  and on one output  $V_{out}$ .**Fig. 5:** ESD response to IEC61000-4-2 (-15kV air discharge) on one input  $V_{in}$  and on one output  $V_{out}$ .**Fig. 6:** Line capacitance of filter cells versus applied voltage.

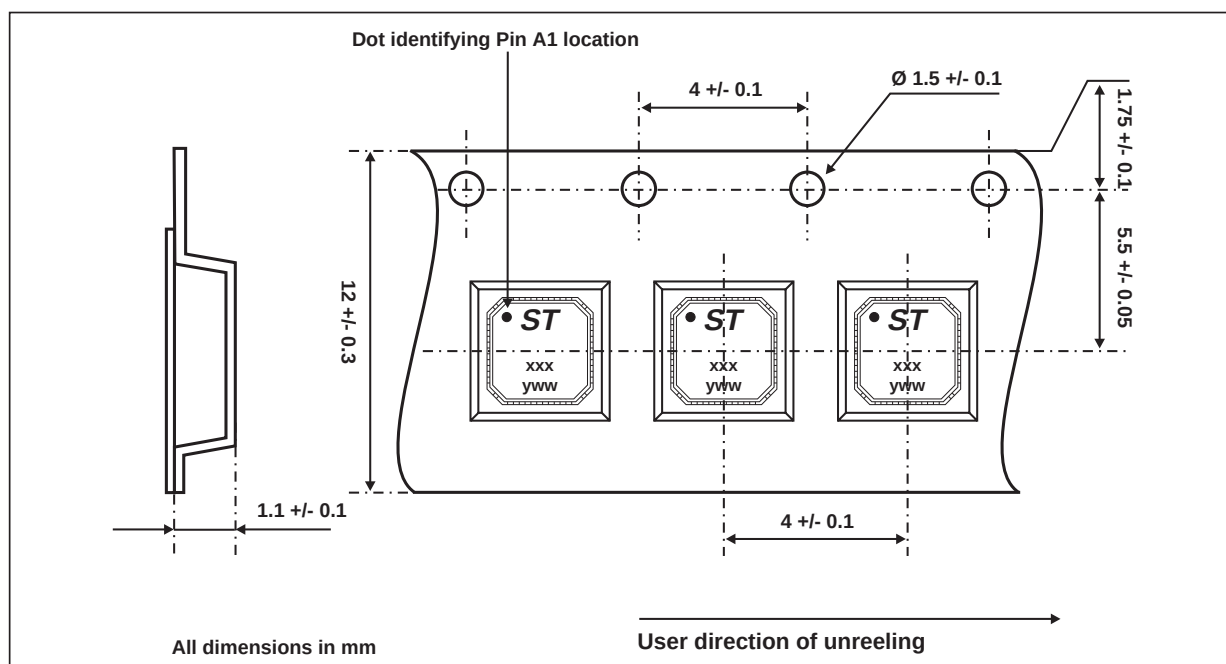
Aplac model.



Aplac model (continued).



## PACKING



## EMIF11-10002C4

### PACKAGE MECHANICAL DATA

QFN 4x4mm

| REF. | DIMENSIONS  |       |      |        |       |       |
|------|-------------|-------|------|--------|-------|-------|
|      | Millimeters |       |      | Inches |       |       |
|      | Min.        | Typ.  | Max. | Min.   | Typ.  | Max.  |
| A    | 0.80        |       | 1.00 | 0.031  |       | 0.040 |
| A1   | 0           |       | 0.05 | 0      |       | 0.002 |
| A2   |             | 0.65  | 0.80 |        | 0.026 | 0.031 |
| D    |             | 4.00  |      |        | 0.157 |       |
| D1   |             | 3.75  |      |        | 0.148 |       |
| E    |             | 4.00  |      |        | 0.157 |       |
| E1   |             | 3.75  |      |        | 0.148 |       |
| Ø    |             |       | 12°  |        |       | 12°   |
| P    | 0.24        | 0.42  | 0.60 | 0.009  | 0.017 | 0.024 |
| R    | 0.13        | 0.17  | 0.23 | 0.005  | 0.007 | 0.009 |
| e    |             | 0.50  |      |        | 0.020 |       |
| N    |             | 24.00 |      |        | 0.945 |       |
| Nd   |             | 6.00  |      |        | 0.236 |       |
| Ne   |             | 6.00  |      |        | 0.236 |       |
| L    | 0.30        | 0.40  | 0.50 | 0.012  | 0.016 | 0.020 |
| b    | 0.18        |       | 0.30 | 0.007  |       | 0.012 |
| Q    |             | 0.20  | 0.45 |        | 0.008 | 0.018 |
| D2   | 1.95        | 2.10  | 2.25 | 0.077  | 0.083 | 0.089 |
| E2   | 1.95        | 2.10  | 2.25 | 0.077  | 0.083 | 0.089 |

### OTHER INFORMATION

| Ordering code  | Marking | Package   | Weight | Base qty | Delivery mode    |
|----------------|---------|-----------|--------|----------|------------------|
| EMIF11-10002C4 | E11U    | QFN 4x4mm | 235 mg | 4000     | Tape & reel (7") |

Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is a registered trademark of STMicroelectronics.

All other names are the property of their respective owners.

© 2003 STMicroelectronics - All rights reserved.

STMicroelectronics GROUP OF COMPANIES

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany -  
Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Singapore - Spain -  
Sweden - Switzerland - United Kingdom - United States

[www.st.com](http://www.st.com)