



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



## Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



## 10-line IPAD™, EMI filter and ESD protection for LCD and cameras

### Features

- Lead-free package
- EMI symmetrical (I/O) low-pass filter
- High efficiency in EMI filtering
- 400 µm pitch
- Compatible with high speed data rate
- Very low PCB space occupation: < 4 mm<sup>2</sup>
- Very thin package: 0.60 mm
- High efficiency in ESD suppression
- High reliability offered by monolithic integration
- High reduction of parasitic elements through integration and wafer level packaging

### Complies with the following standards

- IEC 61000-4-2 level 4 on inputs and outputs
  - 15 kV (air discharge)
  - 8 kV (contact discharge)
- MIL STD 883G - Method 3015-6 Class 3

### Applications

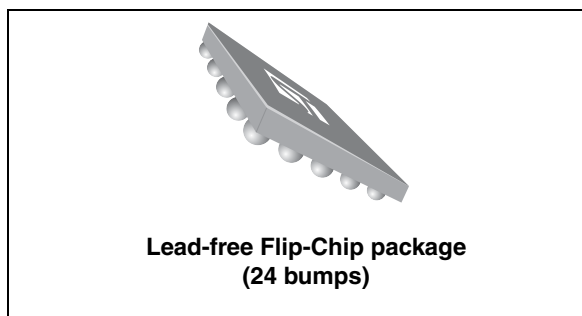
Where EMI filtering in ESD sensitive equipment is required:

- LCD for mobile phones
- Computers and printers
- Communication systems
- MCU boards

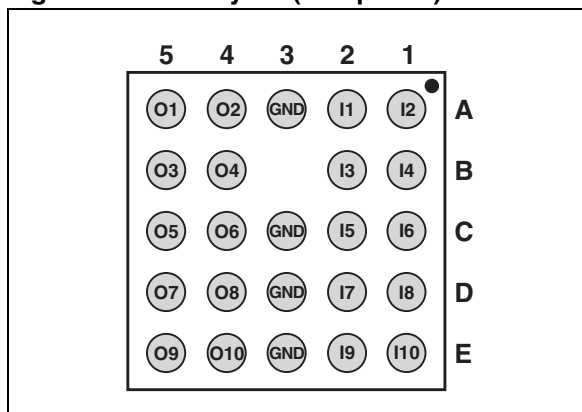
### Description

The EMIF10-LCD02F3 is a 10-line highly integrated device designed to suppress EMI/RFI noise in all systems subjected to electromagnetic interference. The EMIF10 Flip-Chip packaging means the package size is equal to the die size.

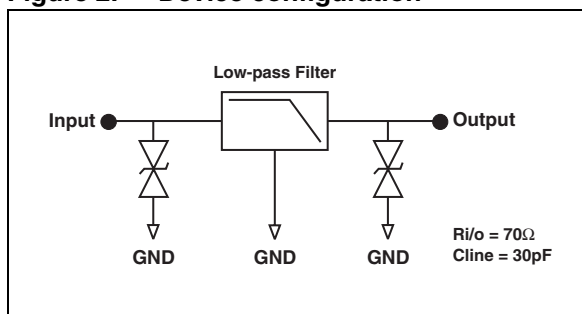
This filter includes ESD protection circuitry, which prevents damage to the protected device when subjected to ESD surges up to 15 kV.



**Figure 1. Pin layout (bump side)**



**Figure 2. Device configuration**



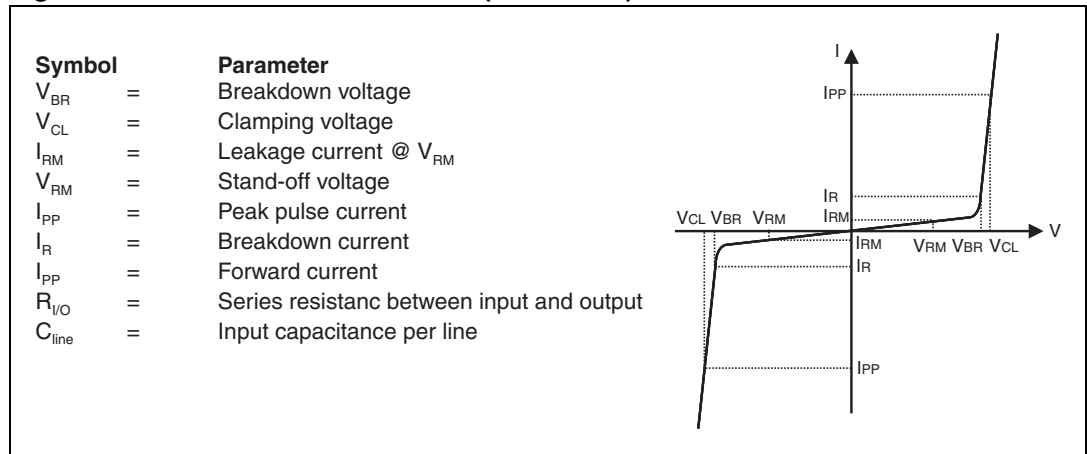
**TM:** IPAD is a trademark of STMicroelectronics.

# 1 Characteristics

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

Symbol	Parameter and test conditions	Value	Unit
$T_j$	Maximum junction temperature	125	$^{\circ}\text{C}$
$T_{op}$	Operating temperature range	-40 to +85	$^{\circ}\text{C}$
$T_{stg}$	Storage temperature range	-55 to 150	$^{\circ}\text{C}$

**Figure 3. Electrical characteristics (definitions)**



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

Symbol	Test conditions	Min.	Typ.	Max.	Unit
$V_{BR}$	$I_R = 1\text{ mA}$	6	8	10	V
$I_{RM}$	$V_{RM} = 3\text{ V}$		50	200	nA
$R_2$	Tolerance $\pm 20\%$		70		$\Omega$
$C_{line}$	$V_{line} = 0\text{ V}, V_{OSC} = 30\text{ mV}, F = 1\text{ MHz}$			30	pF

Figure 4. S21 all lines attenuation measurement

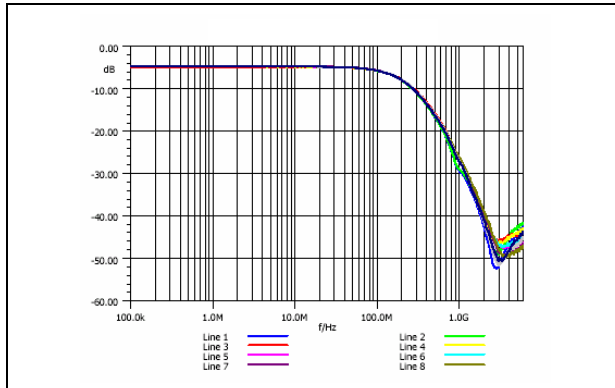


Figure 5. Analog cross talk measurement

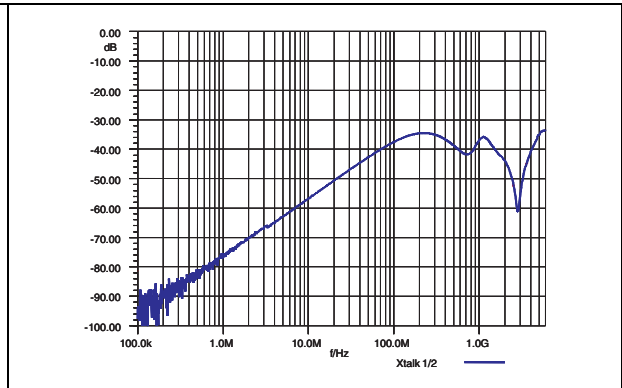


Figure 6. ESD response to IEC 61000-4-2 (+15 kV air discharge) on one input and on one output

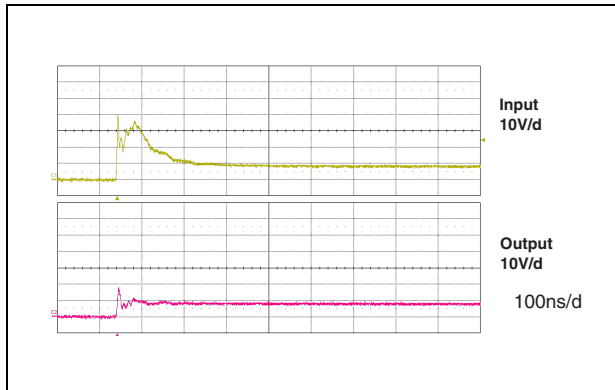


Figure 7. ESD response to IEC 61000-4-2 (-15 kV air discharge) on one input and on one output

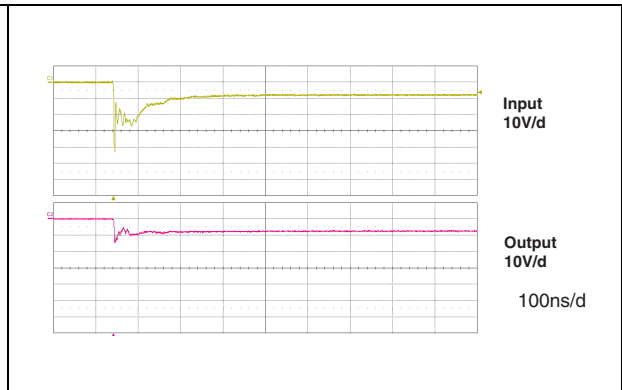
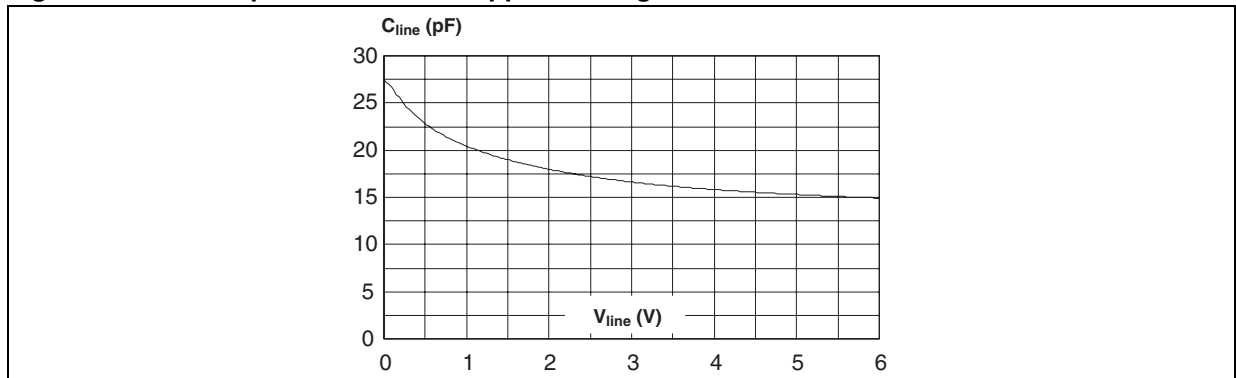
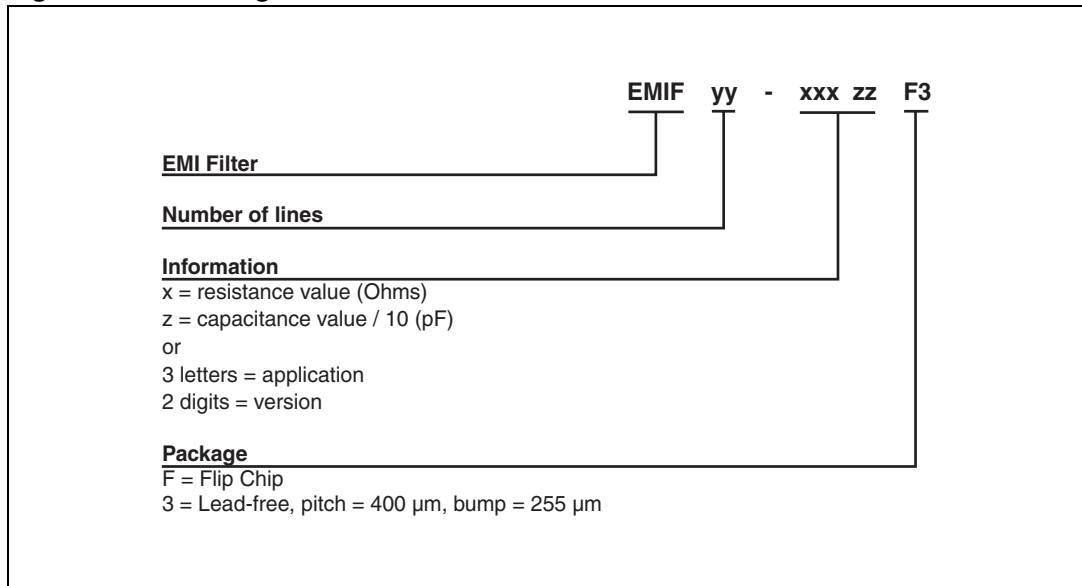


Figure 8. Line capacitance versus applied voltage



## 2 Ordering information scheme

Figure 9. Ordering information scheme



### 3 Package information

- Epoxy meets UL94, V0
- Lead-free packages

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.

Figure 10. Package dimensions

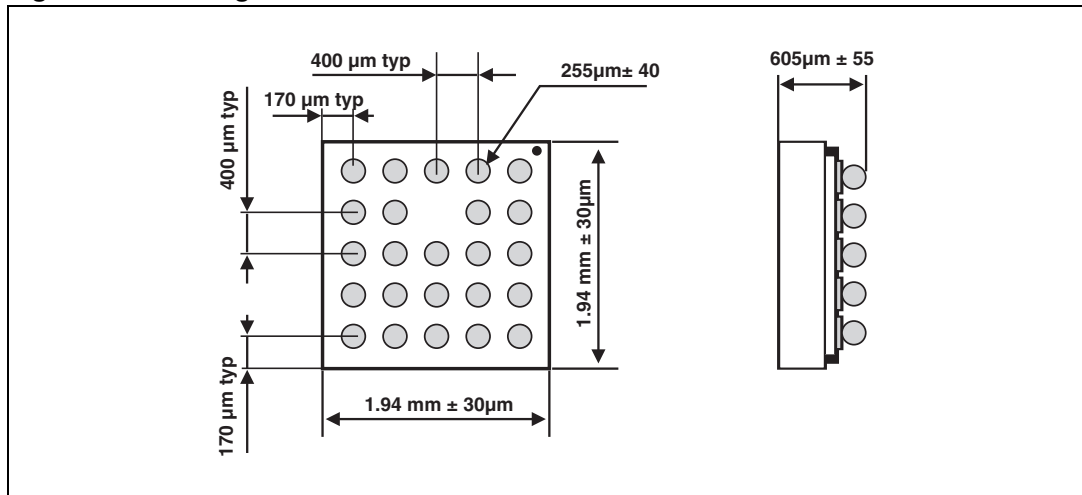


Figure 11. Footprint

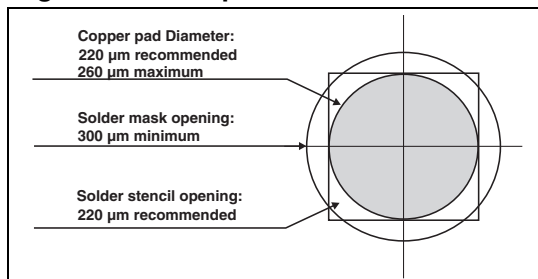


Figure 12. Marking

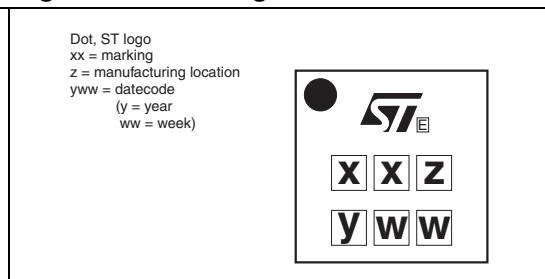
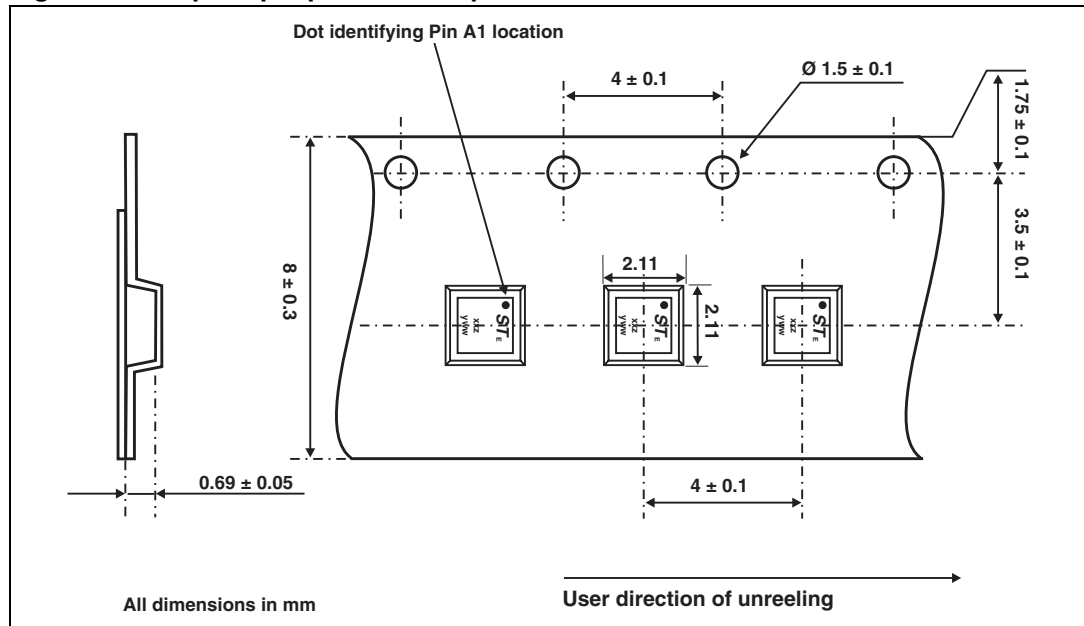


Figure 13. Flip-Chip tape and reel specification



Note: More information is available in the application notes:  
 AN2348: "STMicroelectronics 400 micro-metre Flip-Chip: Package description and recommendation for use"  
 AN1751: "EMI Filters: Recommendations and measurements"

## 4 Ordering information

Table 3. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
EMIF10-LCD02F3	GY	Flip-Chip	5.0 mg	5000	Tape and reel 7"

## 5 Revision history

Table 4. Document revision history

Date	Revision	Changes
11-Jul-2005	1	First issue.
28-Apr-2008	2	Updated ECOPACK statement. Updated <a href="#">Figure 9</a> , <a href="#">Figure 10</a> , <a href="#">Figure 11</a> and <a href="#">Figure 13</a> . Reformatted to current standards.
18-Nov-2009	3	Updated <a href="#">Figure 10</a> for die dimension reduction. Updated <a href="#">Figure 13</a> for scaling.



**Please Read Carefully:**

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST's terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

**UNLESS OTHERWISE SET FORTH IN ST'S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.**

**UNLESS EXPRESSLY APPROVED IN WRITING BY AN AUTHORIZED ST REPRESENTATIVE, ST PRODUCTS ARE NOT RECOMMENDED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE. ST PRODUCTS WHICH ARE NOT SPECIFIED AS "AUTOMOTIVE GRADE" MAY ONLY BE USED IN AUTOMOTIVE APPLICATIONS AT USER'S OWN RISK.**

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

© 2009 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 - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

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