

# BGF110

## SD Card Interface ESD Protection

Small Signal Discretes



Never stop thinking

**Edition 2007-07-04**

**Published by  
Infineon Technologies AG  
81726 München, Germany**

**© Infineon Technologies AG 2007.  
All Rights Reserved.**

### **Legal Disclaimer**

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics ("Beschaffenhheitsgarantie"). With respect to any examples or hints given herein, any typical values stated herein and/or any information regarding the application of the device, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of any third party.

### **Information**

For further information on technology, delivery terms and conditions and prices please contact your nearest Infineon Technologies Office ([www.infineon.com](http://www.infineon.com)).

### **Warnings**

Due to technical requirements components may contain dangerous substances. For information on the types in question please contact your nearest Infineon Technologies Office.

Infineon Technologies Components may only be used in life-support devices or systems with the express written approval of Infineon Technologies, if a failure of such components can reasonably be expected to cause the failure of that life-support device or system, or to affect the safety or effectiveness of that device or system. Life support devices or systems are intended to be implanted in the human body, or to support and/or maintain and sustain and/or protect human life. If they fail, it is reasonable to assume that the health of the user or other persons may be endangered.

---

**BGF110**

**Revision History: 2007-07-04, V2.2**

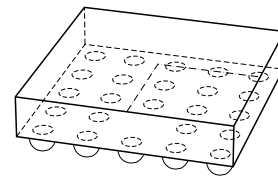
**Previous Version: 2006-10-17**

<b>Page</b>	<b>Subjects (major changes since last revision)</b>
4	EMI and cross talk feature added
4	Contact discharge added

## SD Card Interface ESD Protection

### Feature

- ESD protection for SD Card interface
- Integrated ESD protection up to 15 kV contact discharge
- Very good EMI filtering with very low cross talk
- Green wafer level package with SnAgSu solder balls
- 400  $\mu\text{m}$  solder ball pitch



WLP-24-2



### Description

The BGF110 is an ESD protection for the SD Card interface using a green wafer level package. External pins are protected up to 15 kV contact discharge according to IEC61000-4-2. A RF filter functionality provides very good RF and EMI suppression on the digital lines with very low cross talk. Sensitivity of the line capacitance on the bias voltage is very low. The wafer level package has a 400  $\mu\text{m}$  solder ball pitch and 250  $\mu\text{m}$  ball diameter (before ball attach).

Type	Package	Marking	Chip
BGF110	WLP-24-2	BGF110	N0720

**Table 1 Maximum Ratings**

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Voltage at all pins to GND	$V_P$	-14		14	V	
Operating temperature range	$T_{OP}$	-40		+85	$^{\circ}\text{C}$	
Storage temperature range	$T_{STG}$	-65		+150	$^{\circ}\text{C}$	
Maximum current at all pins	$I_{max}$			113 <sup>1)</sup>	mA	
Electrostatic discharge according to IEC61000-4-2 (contact discharge)						
Ext. IOs: A4, A5, B4, B5, C4, C5, D4, D5, E4, E5	$V_E$	-15		15	kV	
Int. IOs: A1, A2, B1, B2, C1, C2, C3, D1, D2, E1, E2	$V_I$	-2		2	kV	

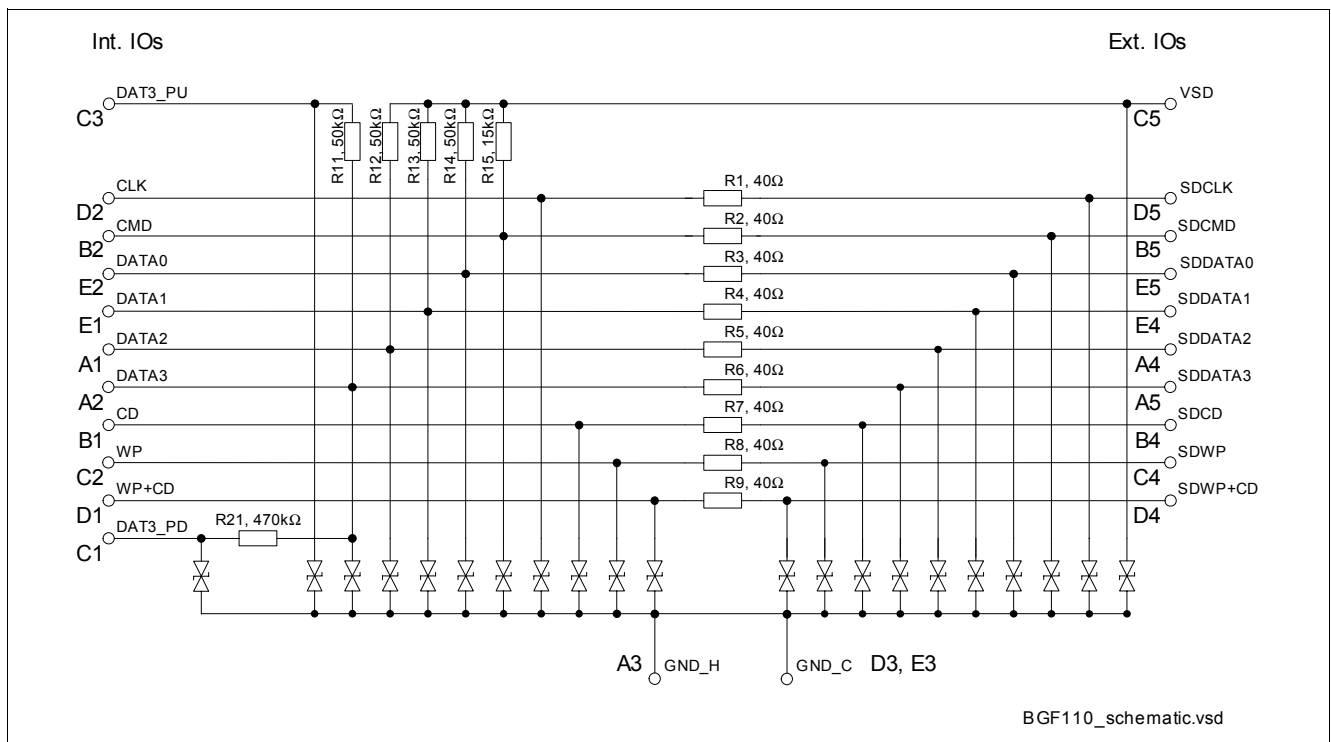
1) Can be applied for 24 hours if thermal power dissipation into PCB is considered properly

**Table 2 Electrical Characteristics<sup>1)</sup>**

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Series Resistors						
$R_1, R_2, R_3, R_4, R_5, R_6, R_7, R_8, R_9$	$R_{1...9}$	32	40	48	$\Omega$	
$R_{11}, R_{12}, R_{13}, R_{14}$	$R_{11...14}$	35	50	65	k $\Omega$	
$R_{15}$	$R_{15}$	10.5	15	19.5	k $\Omega$	
$R_{21}$	$R_{21}$	329	470	611	k $\Omega$	
Reverse current of ESD protection diodes	$I_R$		0.1	120	nA	$V_R = 3\text{ V}$
			0.1	120	$\mu\text{A}$	$V_R = 14\text{ V}$
Line capacitance	$C_T$		13.5	20	pF	$V_R = 0\text{ V}$
Capacitance of each line to GND <sup>2)</sup>			11.5			$V_R = 5\text{ V}$

1) at  $T_A = 25\text{ }^\circ\text{C}$

2) Without line coupling by resistors  $R_{11} - R_{21}$



**Figure 1 Schematic**

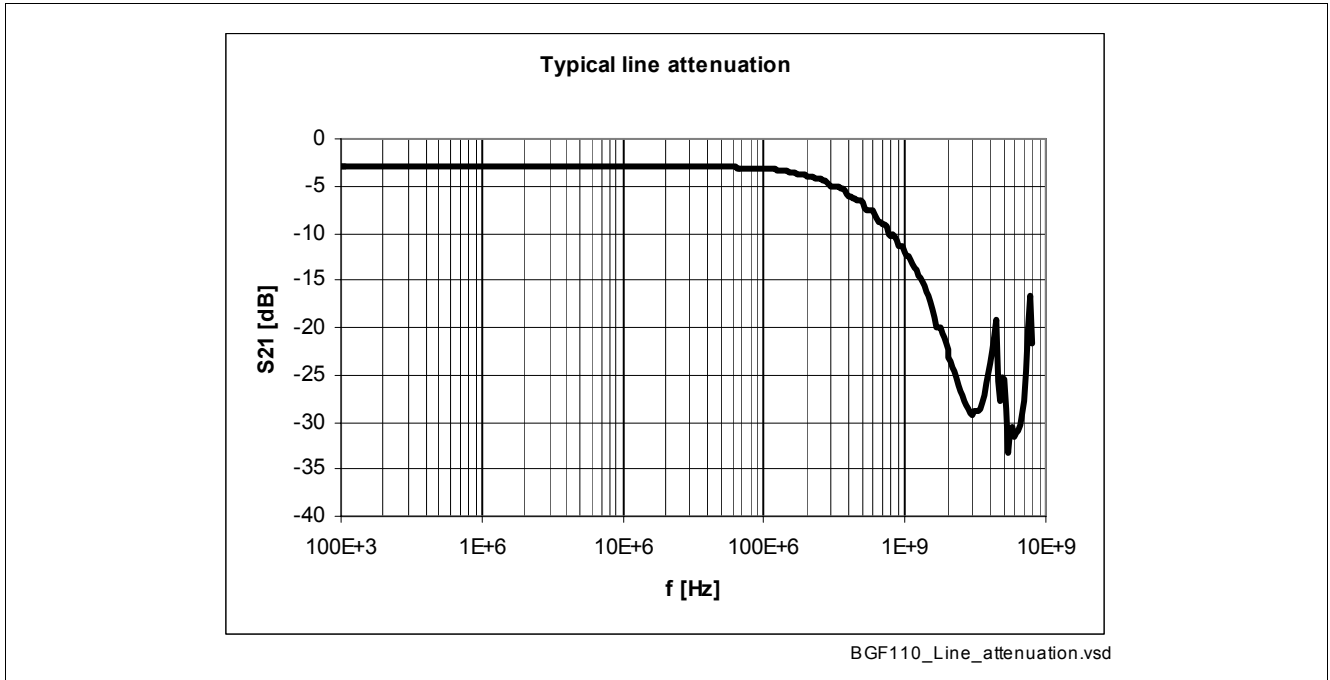


Figure 2 Line attenuation  $Z_S = Z_L = 50 \Omega$

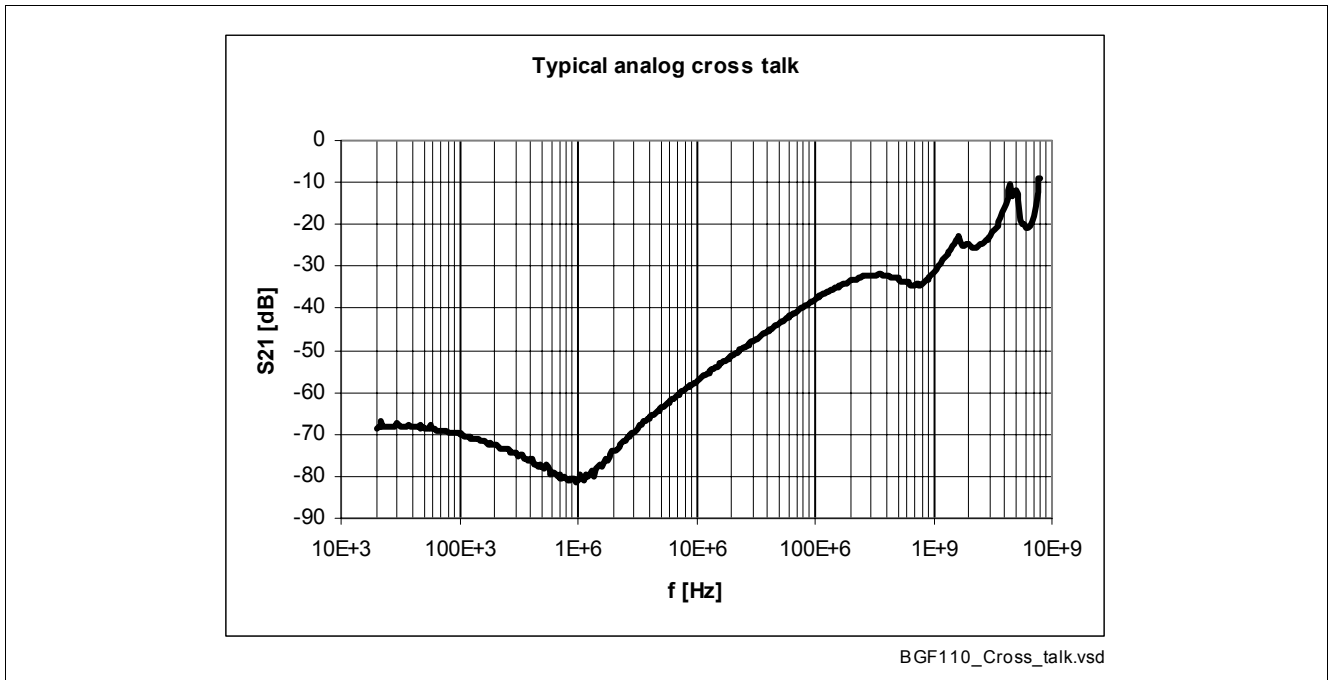


Figure 3 Analog cross talk,  $Z_S = Z_L = 50 \Omega$

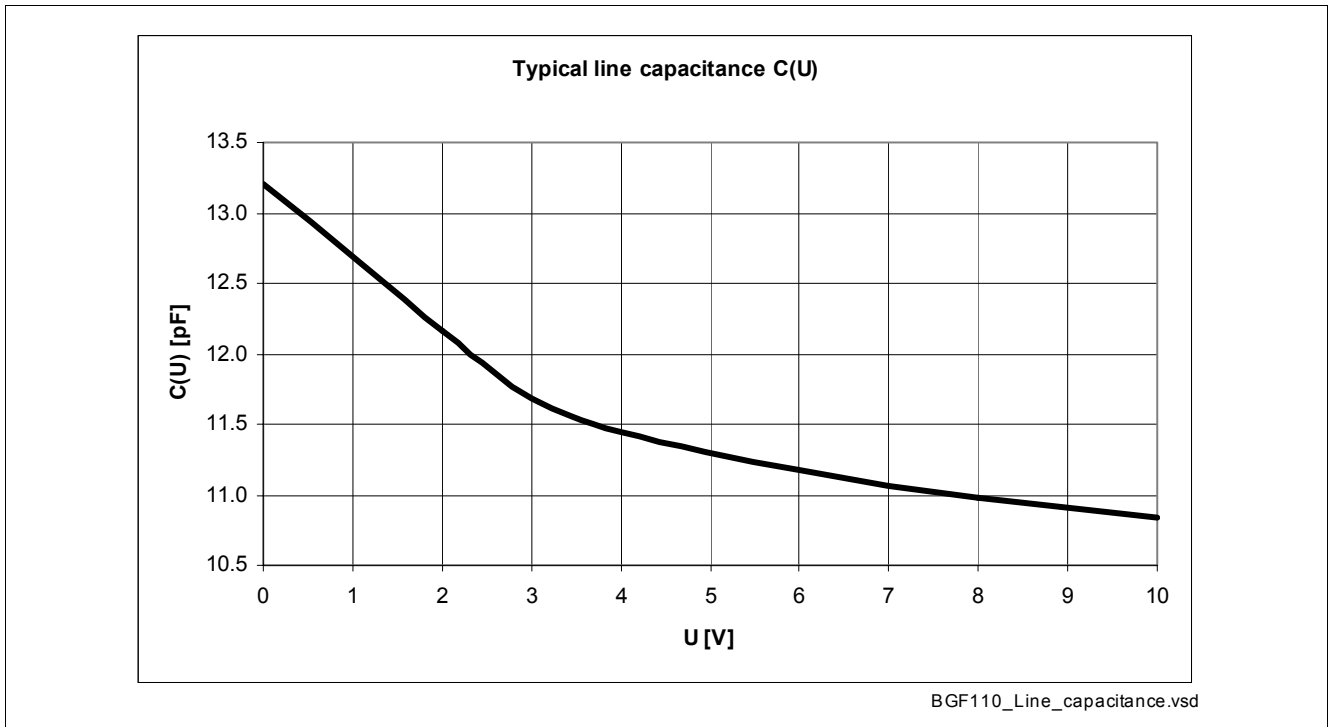


Figure 4 Line capacitance versus bias voltage

Package Outline

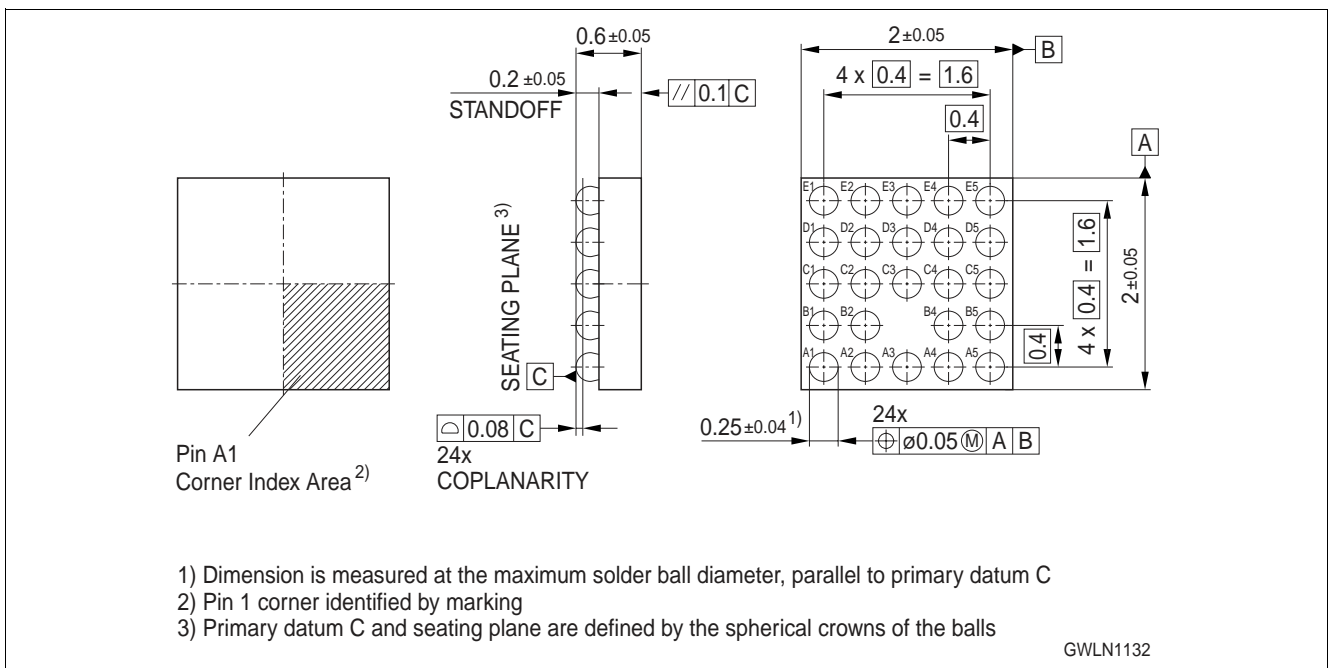


Figure 5 Package WLP-24-2

Tape and reel specification

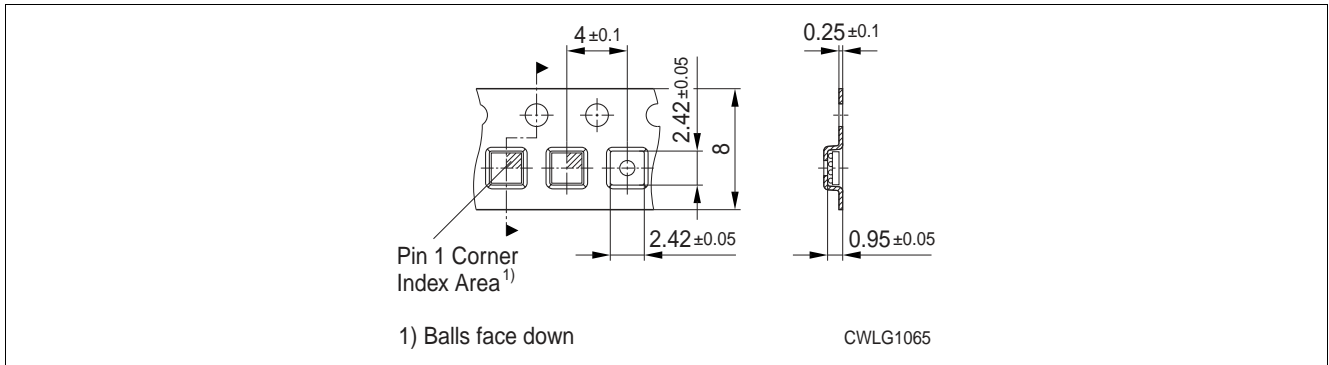


Figure 6 Tape for WLP-24-2