BGF101

USB ESD Protection

AIM
Discrete Semiconductors

Never stop thinking.

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BGF101
Data sheet
Revision History: 2005-06-01

Previous Version:	2004-03-08
Page	Subjects (major changes since last revision)
all	Preliminary status removed

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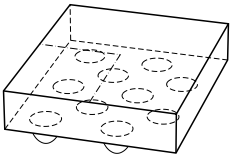
Features

- ESD protection circuit for full speed USB interfaces
- Integrated ESD protection according to IEC61000-4-2 up to 15 kV contact discharge
- Green wafer level package with SnAgCu balls
- 500 µm diagonal ball pitch
- 300 µm ball diameter



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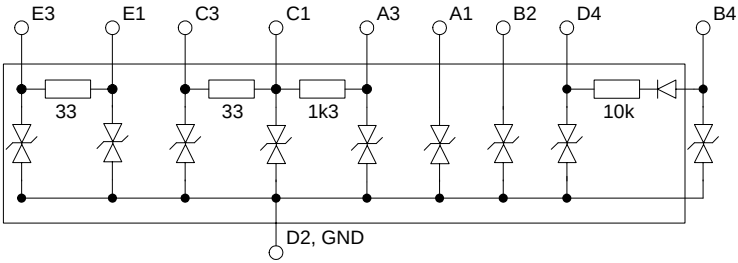


Description

The BGF101 is an ESD protection circuit for a full speed USB interface (12 Mbit/sec). External pins are protected against ESD up to 15 kV contact discharge according to IEC61000-4-2. The wafer level package is a green package with a size of only 1.65 mm x 2.0 mm and a total height of 0.65 mm.

Type	Package	Marking	Chip
BGF101	WLP-10-1	GF101	N0706

Maximum Ratings

Parameter	Symbol	Value	Unit
Voltage at all pins to GND	V_P	7	V
Operating temperature range	T_{OP}	-40 ... +85	°C
Storage temperature range	T_{STG}	-65 ... +150	°C
Summed up input power for all pins, T_S < 70°C	P_{IN}	60	mW
Electrostatic discharge according to IEC61000-4-2[1)] at pins A1, A3, B2, C1, C3, D4, E1, E3 at pin B2	V_{ESD}	 15 8	kV

1) Contact discharge

Electrical Characteristics at T_A=25°C

Parameter	Symbol	min.	typ.	max.	Unit
Resistors					
R1, R2	$R_{1,2}$	31.3	33	34.7	Ω
R3	R_3	1235	1300	1365	Ω
R4[1)]	R_4	9.5	10	10.5	kΩ
Temperature coefficient [2)]	$\|TCR\|$		100	130	ppm/K
ESD protection diodes					
Reverse current	I_R				
V_R = 3 V to GND			1	100	nA
V_R = 7 V to GND			1	100	µA
Pin capacitance					
Cap. of pins A3, C1, C3, E1, E3 to GND	C_T				pF
V_R = 0 V[3)]			48	53	
Diode D1					
Forward voltage	V_F				V
I_F = 1 µA			0.27	0.35	

1) in production not tested separately, but correlated to R3

2) averaged over full operating temperature range from -40 to +85°C, see figure 2

3) not subject to production test, verified by design/ characterization

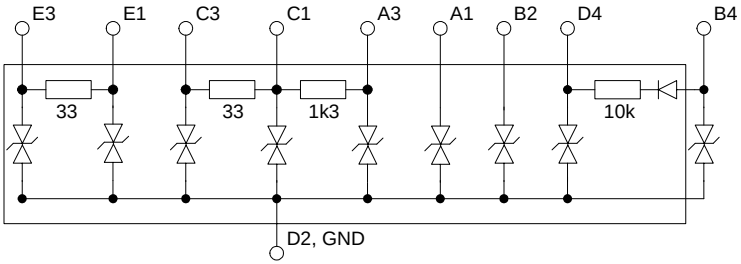


Fig.1: Schematic

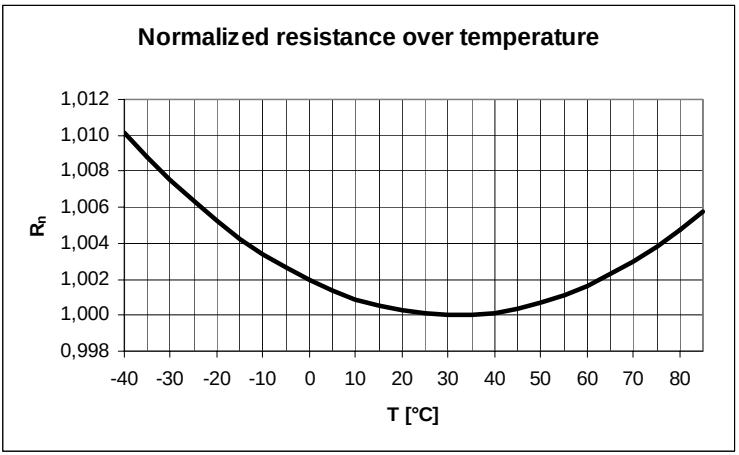
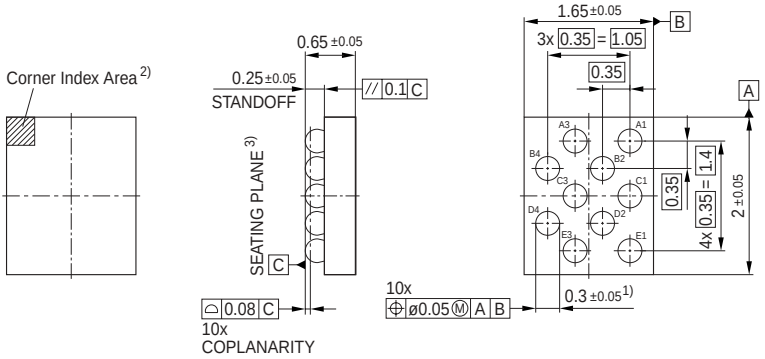


Fig.2: Normalized resistance over temperature

Package Outline



1) Dimension is measured at the maximum ball diameter, parallel to primary datum C
2) A1 corner identified by marking
3) Primary datum C and seating plane are defined by the domed crowns of the balls

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