BGF117

High-Speed Mini-/Micro-SD Card ESD Protection and EMI Filter

RF & Protection Devices

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BGF117

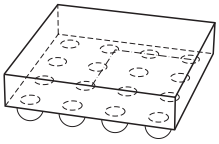
Revision History: 2010-01-15, V2.0

Previous Version:2009-09-28, V1.2

Page	Subjects (major changes since last revision)
All	Target status removed

High-Speed Mini-/Micro-SD Card ESD Protection and EMI Filter

Features



WLP-16-4-N

- Bidirectional ESD protection and EMI filter for High-Speed Mini-/Micro-SD card interface
- ESD protection according to IEC61000-4-2 for ±15 kV contact discharge on all external IOs
- ESD protection according to IEC61000-4-2 for ±2 kV contact discharge on all internal IOs
- Very good EMI filtering and very low cross talk due to small package parasitics
- Suitable for high speed applications due to low line capacitance of typical 8 pF
- Very low voltage dependency of line capacitance
- Very low leakage currents
- Integrated pull up resistors to enable proper line biasing
- Application requires very low PCB area using an optimized I/O arrangement
- 400 µm solder ball pitch
- RoHS and WEEE compliant package
- Complies with following standards:
  SD Card Specification V2.0, MicroSD Card Specification V1.0

RoHS

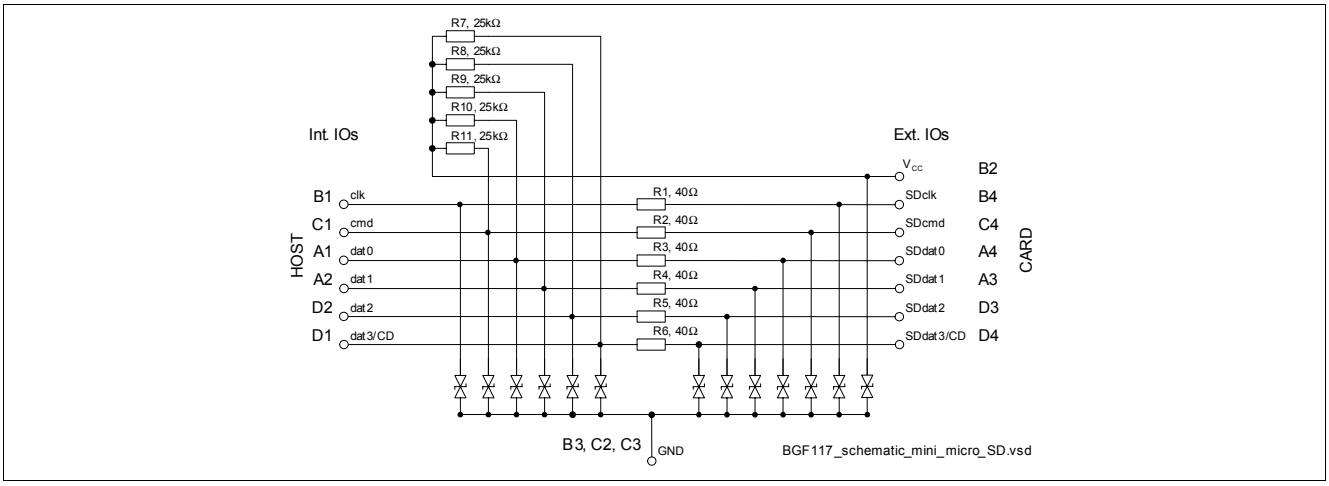


Figure 1 Schematic

Description

BGF117 is an ESD protection and EMI filter circuit for a high speed multi media card and mini-/micro-SD interface with integrated pull up resistors. External pins are protected for ±15 kV contact discharge according to IEC61000-4-2. Due to the low electrical capacitance of each line BGF117 is well suited for high speed applications. The wafer level package is a green lead-free and halogen-free package with a size of only 1.55 mm x 1.55 mm and a total height of 0.6 mm.

Type	Package	Marking	Chip
BGF117	WLP-16-4	17	N0740

Table 1 Maximum Ratings

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Voltage at all pins to GND	V_P	0		5.5	V	
Operating temperature range	T_{OP}	-40		+85	°C	
Storage temperature range	T_{STG}	-65		+150	°C	
Electrostatic Discharge According to IEC61000-4-2						
External IOs: A3, A4, B2, B4, C4, D3, D4	V_E	-15		15	kV	Contact discharge
Internal IOs: A1, A2, B1, C1, D1, D2	V_I	-2		2	kV	Contact discharge

Table 2 Electrical Characteristics[1)]

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Resistors $R_1...R_6$	$R_{1...6}$	36	40	44	Ω	
Resistors $R_7...R_{11}$	$R_{7...11}$	20	25	30	kΩ	
Reverse current of ESD protection diodes	I_R		5	100	nA	V_R = 3 V
Breakdown voltage of ESD diodes[2)]	$V_{(BR)}$	–	18.5 -12.5	–	V	$I_{(BR)}$ = 1 mA $I_{(BR)}$ = -1 mA
Line capacitance[3)] Capacitance of each line to GND	C_T		8	9.5	pF	V_R = 0 V

1) at T_A = 25 °C
2) After snap-back
3) B2 is connected to GND for measurement

Typical electrical characteristics

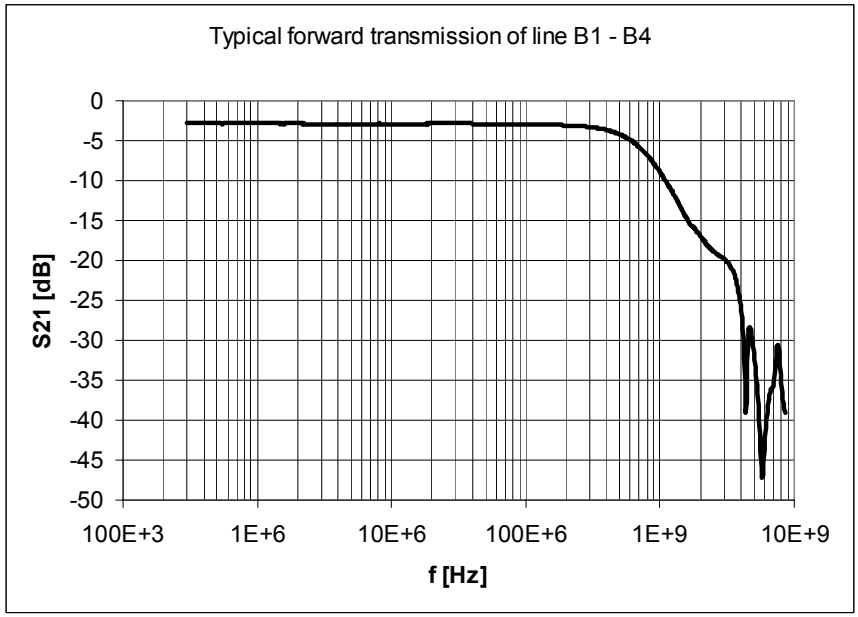


Figure 2 Typical filter characteristics of one filter channel (Z_S = Z_L= 50 Ohm, V_R=0V)

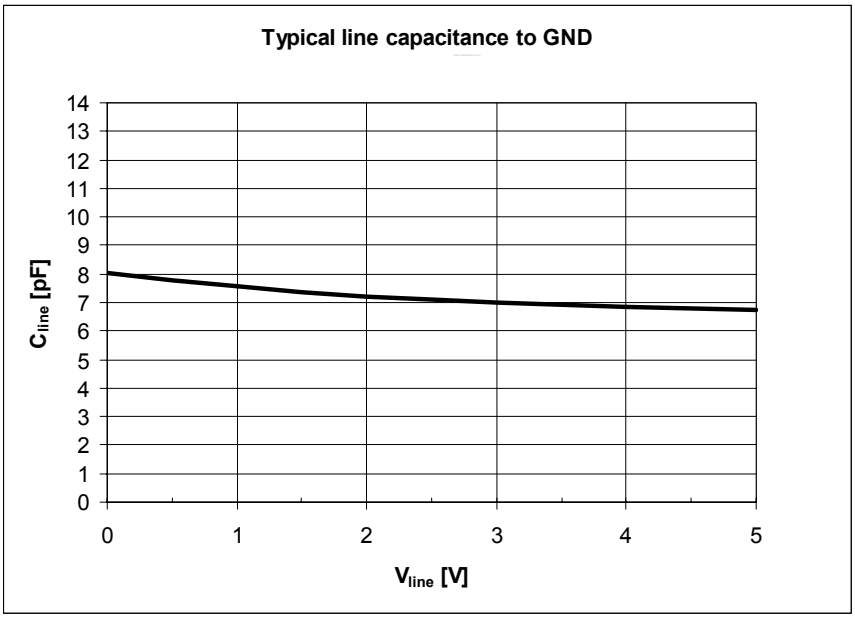


Figure 3 Typical line capacitance versus bias voltage

Application & signal routing

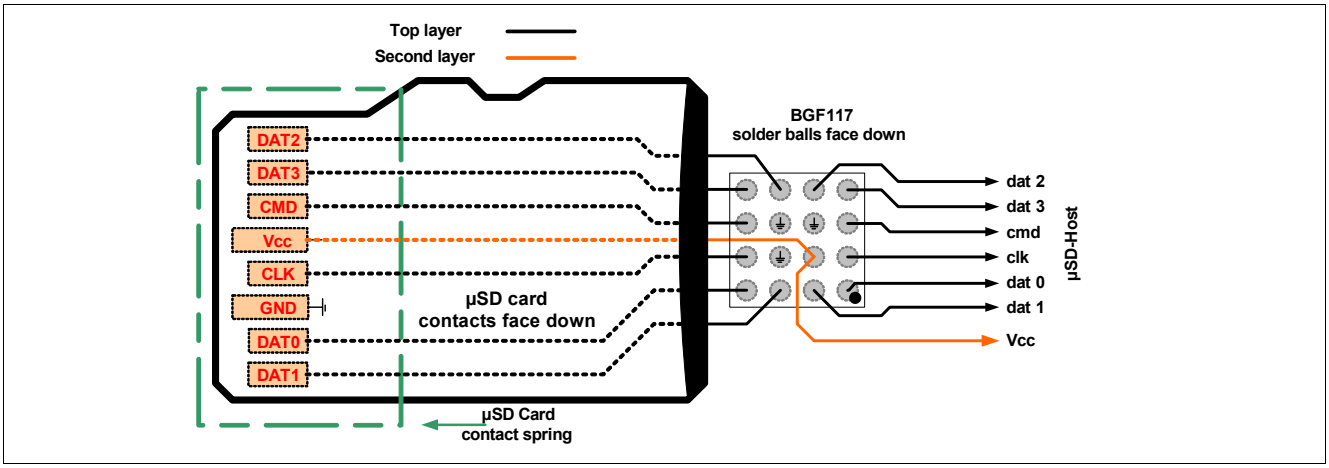


Figure 4 Application example with signal routing

Pull-up resistors for the data and command lines are integrated in BGF117 (R7 to R11) to prevent bus floating in case no card is inserted or all card drivers are in high impedance mode.

Package outline

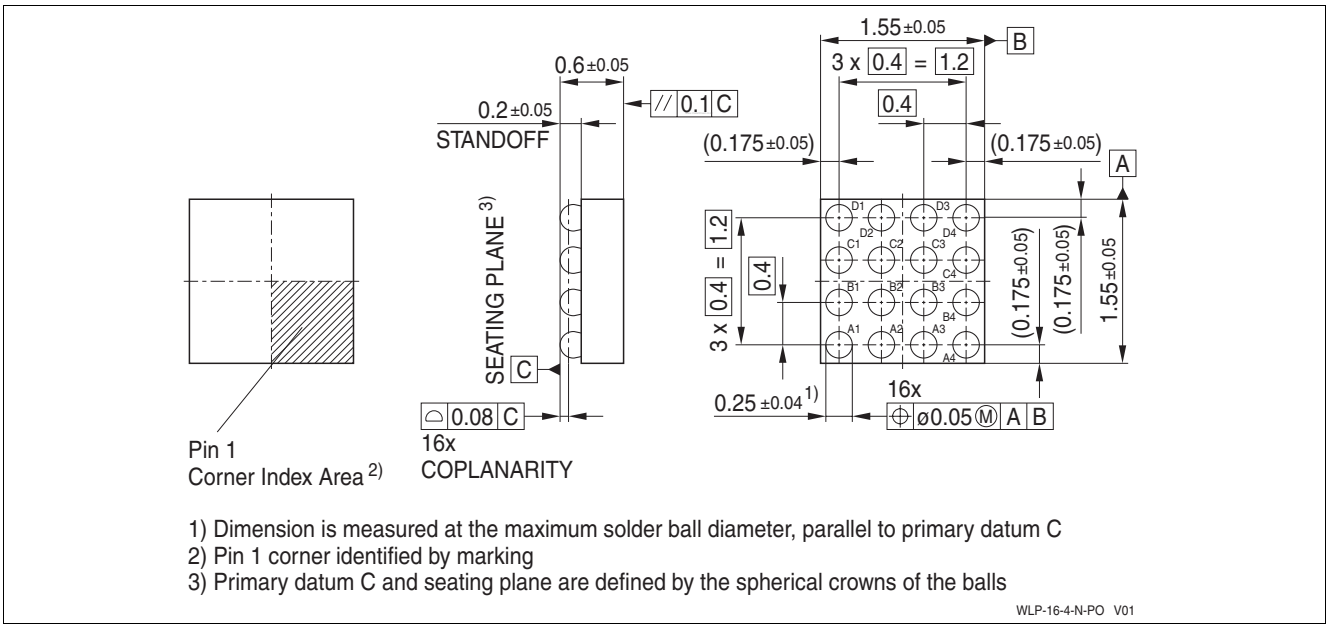


Figure 5 Package outline for WLP-16-4 (dimensions in mm)

Footprint

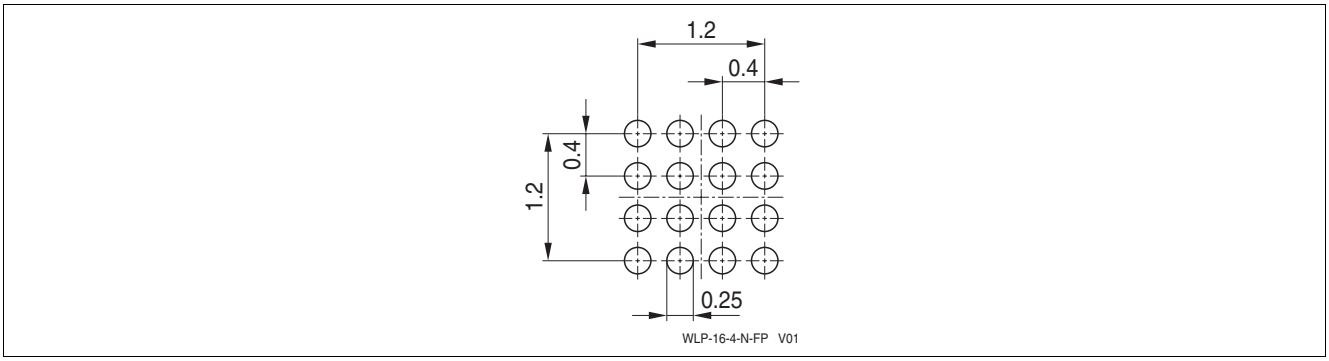


Figure 6 Recommended PCB pad design for reflow soldering (dimensions in mm)

Tape

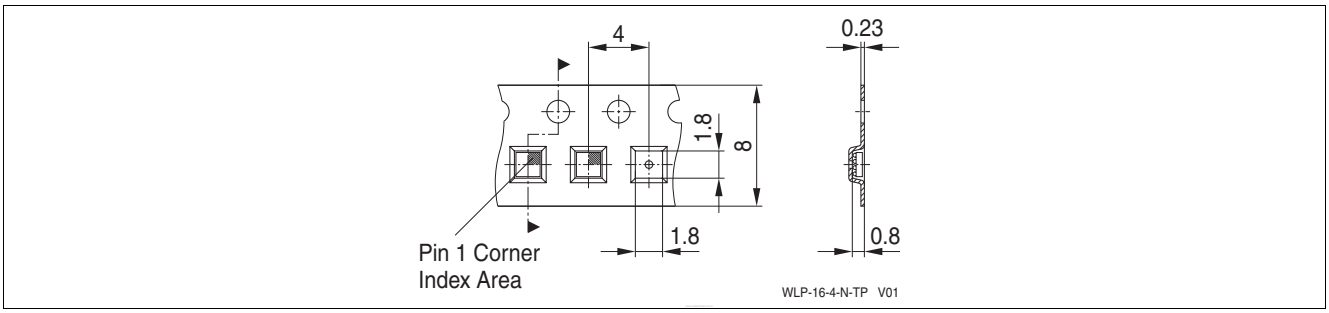


Figure 7 Tape for BGF117 / WLP-16-4 (dimensions in mm)