

Features

- ESD protection for one line with uni-directional
- Provide transient protection for one line to
IEC 61000-4-2 (ESD) $\pm 30\text{kV}$ (air/contact)
IEC 61000-4-4 (EFT) 80A (5/50ns)
IEC 61000-4-5 (Lightning) 170A (8/20 μs)
- Suitable for, **15V and below**, operating voltage applications
- 2.0mm x 2.0mm DFN package saves board space
- High surge protection
- Protect one I/O line or one power line
- Fast turn-on and low clamping voltage
- Solid-state silicon-avalanche and active circuit triggering technology
- **Green part**

Applications

- Power supply protection
- USB VBUS protection
- Cellular handsets and accessories
- Panel modules
- Portable devices
- Touch panels
- Notebooks and handhelds
- Peripherals

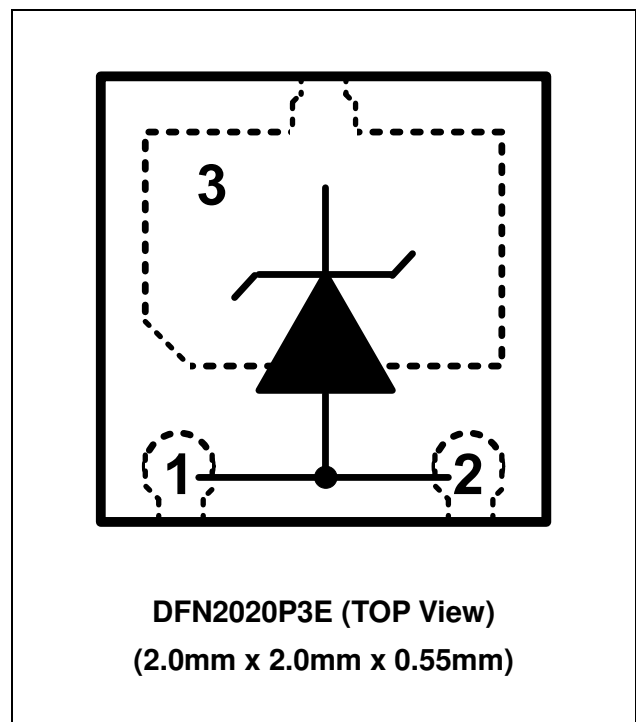
Description

AZ4715-01F is a design which includes a uni-directional surge rated clamping cell to protect one power line, or one control line, or one low-speed data line in an electronic system. The AZ4715-01F has been specifically designed to protect sensitive components which are connected to power and control lines from over-voltage damage and latch-up caused by Electrostatic Discharging (ESD), Electrical Fast Transient (EFT), Lightning, and Cable Discharge Event (CDE).

AZ4715-01F is a unique design which includes proprietary clamping cell in a single package. During transient conditions, the proprietary clamping cell prevents over-voltage on the power line or control/data lines, protecting any downstream component.

AZ4715-01F may be used to meet the ESD immunity requirements of IEC 61000-4-2, Level 4 ($\pm 15\text{kV}$ air, $\pm 8\text{kV}$ contact discharge).

Circuit Diagram / Pin Configuration





SPECIFICATIONS

| ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$, unless otherwise specified) | | | |
|---|-------------------|---------------|------------------|
| PARAMETER | SYMBOL | RATING | UNIT |
| Peak Pulse Current ($t_p = 8/20\mu\text{s}$) | I_{PP} (Note 1) | 170 | A |
| Operating Supply Voltage (pin-3 to pin-1 and pin-2) | V_{DC} | 16.5 | V |
| ESD per IEC 61000-4-2 (Air) | V_{ESD-1} | ± 30 | kV |
| ESD per IEC 61000-4-2 (Contact) | V_{ESD-2} | ± 30 | kV |
| Lead Soldering Temperature | T_{SOL} | 260 (10 sec.) | $^\circ\text{C}$ |
| Operating Temperature | T_{OP} | -55 to +125 | $^\circ\text{C}$ |
| Storage Temperature | T_{STO} | -55 to +150 | $^\circ\text{C}$ |

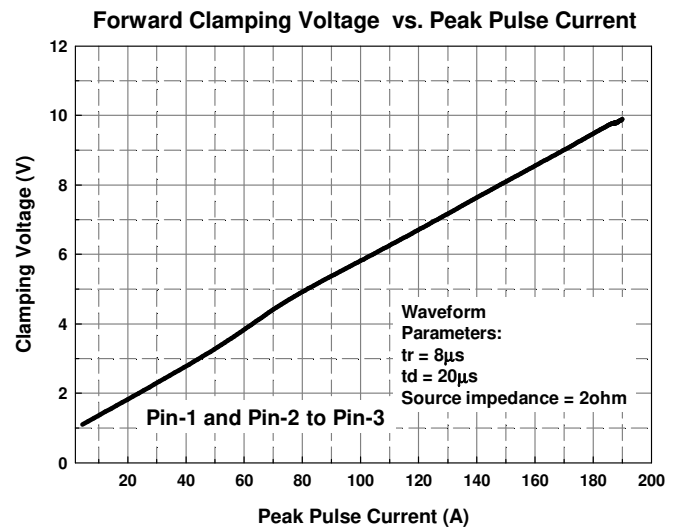
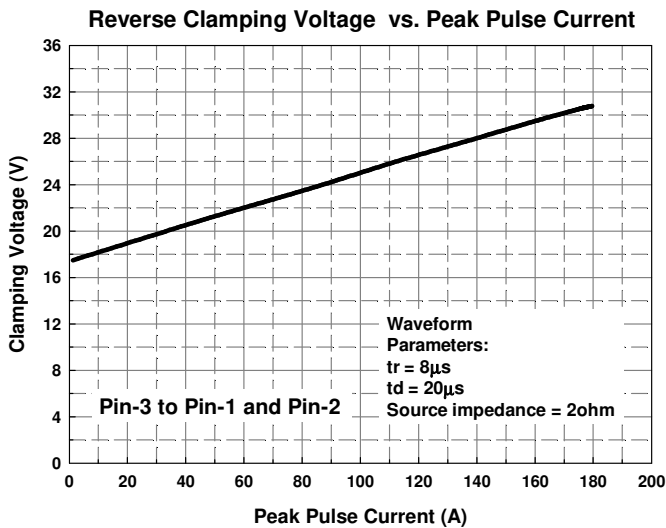
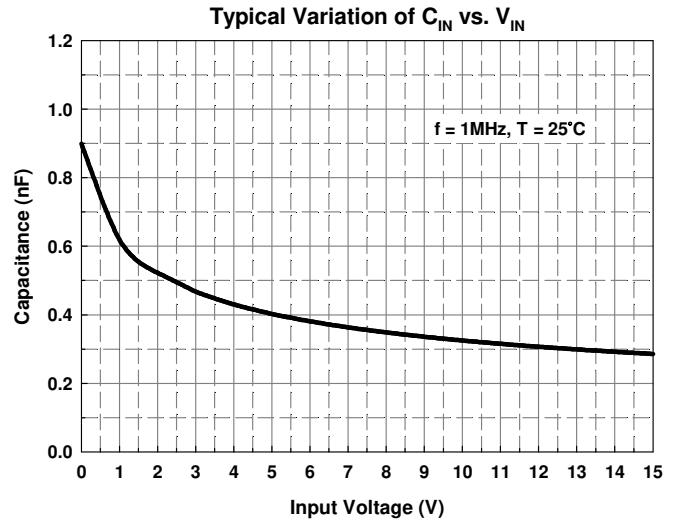
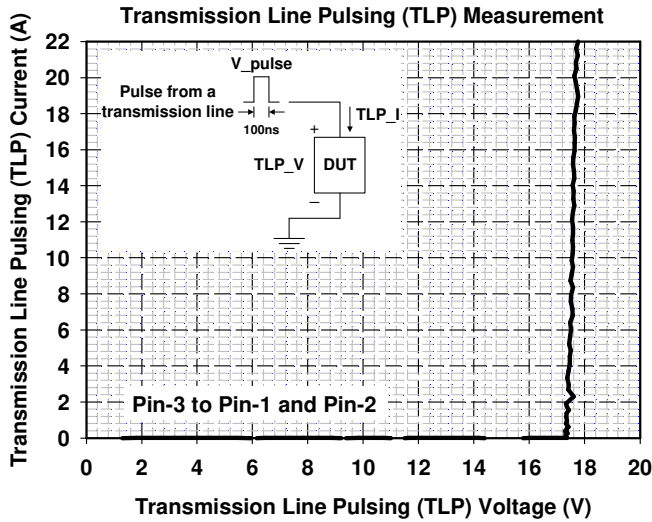
| ELECTRICAL CHARACTERISTICS | | | | | | |
|---------------------------------|----------------|---|------|------|------|---------------|
| PARAMETER | SYMBOL | CONDITION | MIN | TYP | MAX | UNIT |
| Reverse Stand-Off Voltage | V_{RWM} | pin-3 to pin-1 and pin-2, $T = 25^\circ\text{C}$. | | | 15 | V |
| Reverse Leakage Current | I_{Leak} | $V_{RWM} = 15\text{V}$, $T = 25^\circ\text{C}$, pin-3 to pin-1 and pin-2. | | | 0.5 | μA |
| Reverse Breakdown Voltage | V_{BV} | $I_{BV} = 1\text{mA}$, $T = 25^\circ\text{C}$, pin-3 to pin-1 and pin-2. | 16.5 | | 19.5 | V |
| Forward Voltage | V_F | $I_F = 15\text{mA}$, $T = 25^\circ\text{C}$, pin-1 and pin-2 to pin-3. | 0.6 | | 1.2 | V |
| Surge Clamping Voltage (Note 1) | $V_{CL-surge}$ | $I_{PP} = 170\text{A}$, $t_p = 8/20\mu\text{s}$, $T = 25^\circ\text{C}$, pin-3 to pin-1 and pin-2. | | 30 | | V |
| ESD Clamping Voltage (Note 2) | V_{CL-ESD} | IEC 61000-4-2 +8kV ($I_{TLP} = 16\text{A}$), $T = 25^\circ\text{C}$, Contact mode, pin-3 to pin-1 and pin-2. | | 18 | | V |
| ESD Dynamic Turn-on Resistance | $R_{dynamic}$ | IEC 61000-4-2 0~+8kV, $T = 25^\circ\text{C}$, Contact mode, pin-3 to pin-1 and pin-2. | | 0.04 | | Ω |
| Channel Input Capacitance | C_{IN} | $V_R = 0\text{V}$, $f = 1\text{MHz}$, $T = 25^\circ\text{C}$, pin-3 to pin-1 and pin-2. | | 0.9 | 1.1 | nF |

Note 1: The Peak Pulse Current measured conditions: $t_p = 8/20\mu\text{s}$, 2Ω source impedance.

Note 2: ESD Clamping Voltage was measured by Transmission Line Pulsing (TLP) System.

TLP conditions: $Z_0 = 50\Omega$, $t_p = 100\text{ns}$, $t_r = 1\text{ns}$.

Typical Characteristics





Application Information

The AZ4715-01F is designed to protect one line against system ESD/EFT/Lightning pulses by clamping them to an acceptable reference.

The usage of the AZ4715-01F is shown in Fig. 1. Protected lines, such as data lines, control lines, or power lines, are connected to pin 3. The pin 1 and pin 2 should be connected directly to a ground plane on the board. All path lengths connected to the pins of AZ4715-01F should be kept as short as possible to minimize parasitic inductance in the board traces.

In order to obtain enough suppression of ESD induced transient, a good circuit board is critical. Thus, the following guidelines are recommended:

- Minimize the path length between the protected lines and the AZ4715-01F.
- Place the AZ4715-01F near the input terminals or connectors to restrict transient coupling.
- The ESD current return path to ground should be kept as short as possible.
- Use ground planes whenever possible.
- NEVER route critical signals near board edges and near the lines which the ESD transient easily injects to.

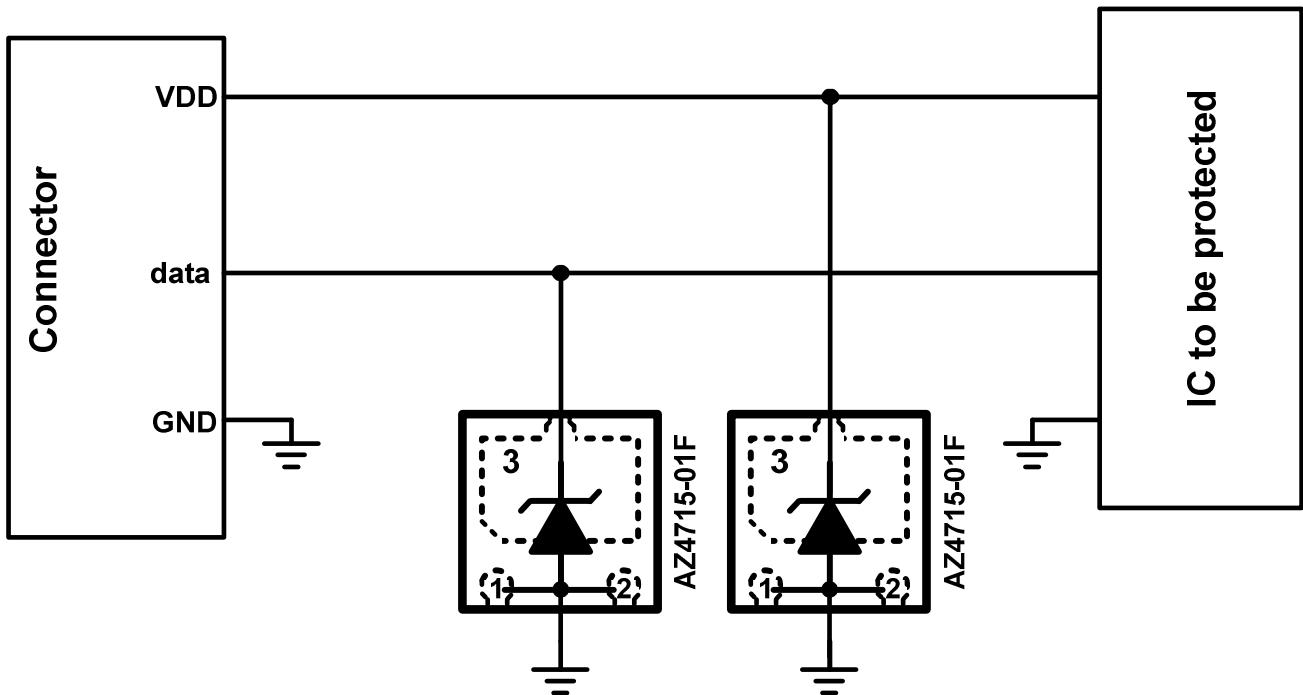


Fig. 1



Fig. 2 shows another simplified example of using low-speed data lines, and power lines from ESD AZ4715-01F to protect the control lines, transient stress.

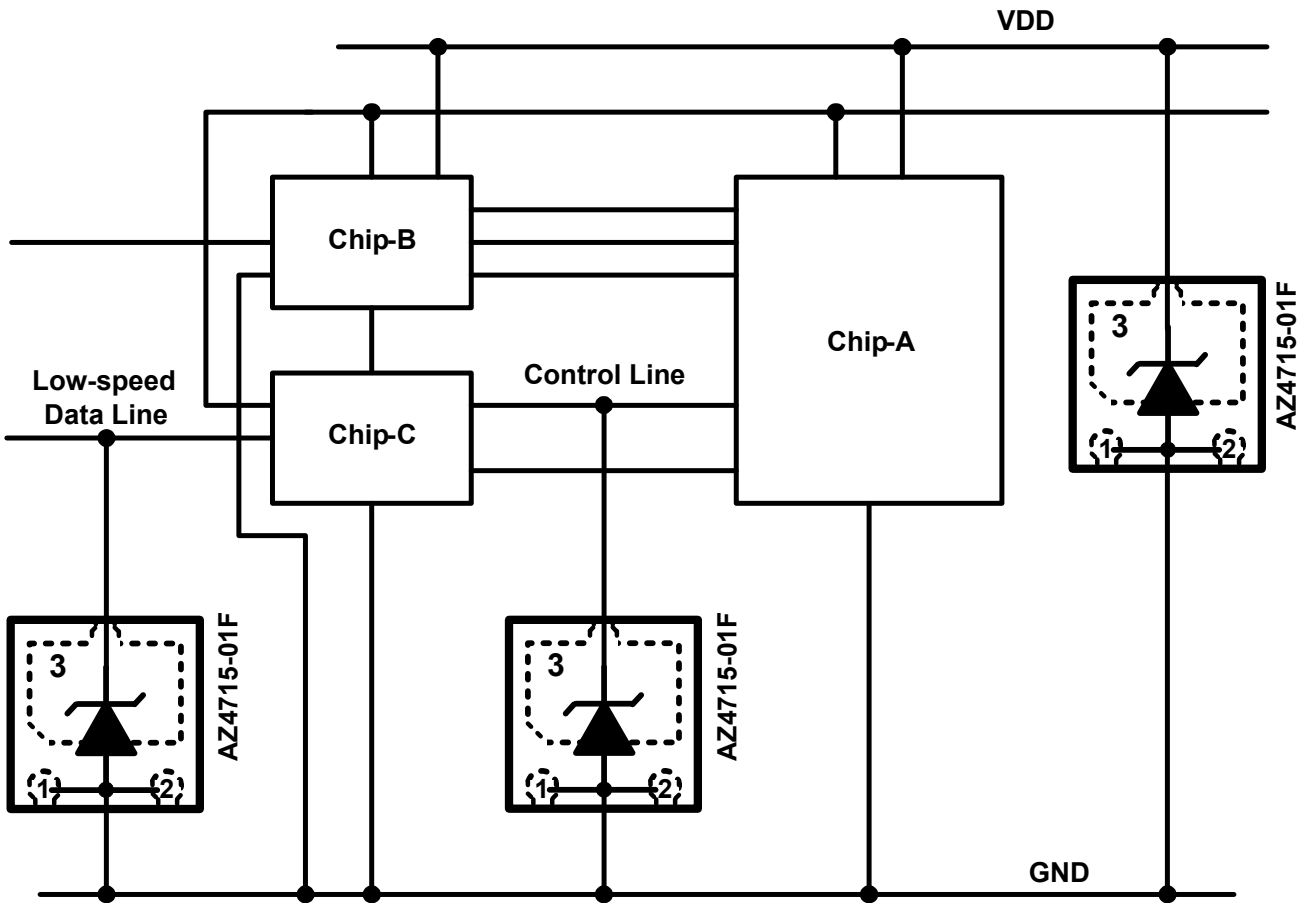
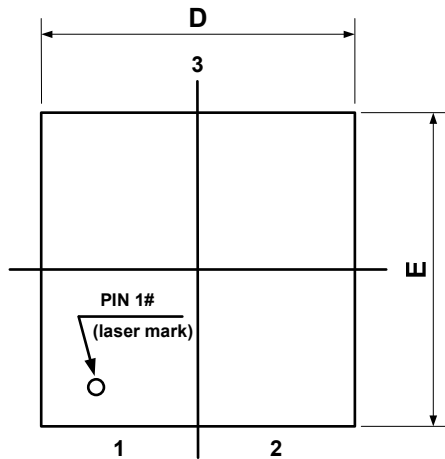


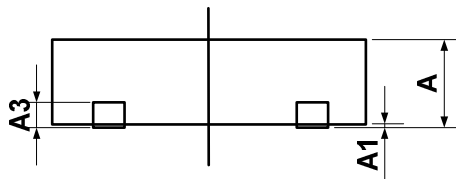
Fig. 2

Mechanical Details

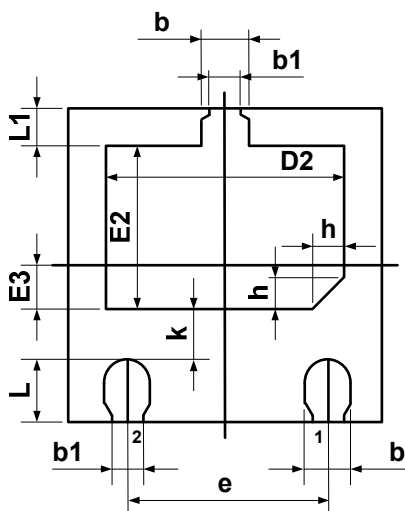
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PACKAGE DIAGRAMS



TOP VIEW



SIDE VIEW

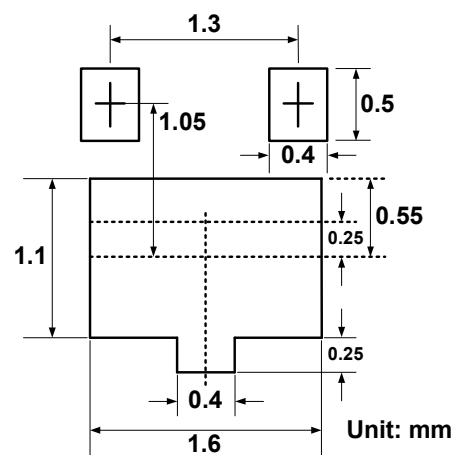


BOTTOM VIEW

PACKAGE DIMENSIONS

| Symbol | Millimeters | | |
|--------|-------------|------|------|
| | MIN | NOM | MAX |
| A | 0.50 | 0.55 | 0.60 |
| A1 | 0.00 | 0.02 | 0.05 |
| b | 0.25 | 0.30 | 0.35 |
| b1 | 0.20BSC | | |
| A3 | 0.152BSC | | |
| D | 1.90 | 2.00 | 2.10 |
| D2 | 1.40 | 1.50 | 1.60 |
| e | 1.30BSC | | |
| E | 1.90 | 2.00 | 2.10 |
| E2 | 0.95 | 1.05 | 1.15 |
| E3 | 0.20 | 0.30 | 0.40 |
| L | 0.35 | 0.40 | 0.45 |
| L1 | 0.20 | 0.25 | 0.30 |
| h | 0.20REF | | |
| k | 0.20 | 0.30 | 0.40 |

LAND LAYOUT

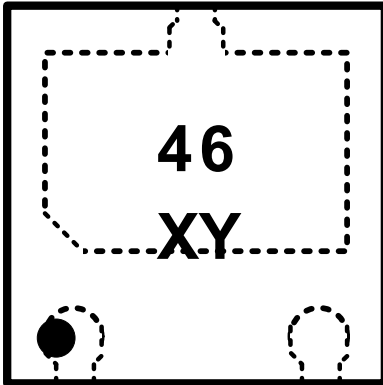


Notes:

This LAND LAYOUT is for reference purposes only. Please consult your manufacturing partners to ensure your company's PCB design guidelines are met.



MARKING CODE



46 = Device Code
X = Date Code ; Y = Control Code

| Part Number | Marking Code |
|--------------------------------|--------------|
| AZ4715-01F.R7G (Green Part) | 46 XY |

Note : Green means Pb-free, RoHS, and Halogen free compliant.

Ordering Information

| PN# | Material | Type | Reel size | MOQ | MOQ/internal box | MOQ/carton |
|----------------|----------|------|-----------|------------|----------------------|-------------------------|
| AZ4715-01F.R7G | Green | T/R | 7 inch | 3,000/reel | 4 reels = 12,000/box | 6 boxes = 72,000/carton |

Revision History

| Revision | Modification Description |
|---------------------|--------------------------|
| Revision 2018/03/06 | Formal Release. |
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