

### Features

- ESD / transient protection of high speed data lines
  - IEC 61000-4-2 (ESD):  $\pm 30\text{kV}$  (air),  $\pm 30\text{kV}$  (contact)
- Low reverse stand-off voltage: 2.5V-12V
- Very low leakage current

HF



SOD-523

### Mechanical Data

- Case: SOD-523
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matte Tin-Plated Leads, Solderability-per MIL-STD-202, Method 208

### Ordering Information

| Part Number | Package | Shipping Quantity     | Marking Code |
|-------------|---------|-----------------------|--------------|
| ESD5Z2.5    | SOD-523 | 3000pcs / Tape & Reel | ZD           |
| ESD5Z3.3    | SOD-523 | 3000pcs / Tape & Reel | ZE           |
| ESD5Z5.0    | SOD-523 | 3000pcs / Tape & Reel | ZF           |
| ESD5Z6.0    | SOD-523 | 3000pcs / Tape & Reel | ZG           |
| ESD5Z7.0    | SOD-523 | 3000pcs / Tape & Reel | ZH           |
| ESD5Z12     | SOD-523 | 3000pcs / Tape & Reel | ZM           |

### Maximum Ratings (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

| Parameter                       | Symbol              | Value     | Unit |
|---------------------------------|---------------------|-----------|------|
| IEC 61000-4-2; ESD (Air)        | $V_{\text{ESD-A}}$  | $\pm 30$  | kV   |
| IEC 61000-4-2; ESD (Contact)    | $V_{\text{ESD-C}}$  | $\pm 30$  | kV   |
| JESD22-A114-B; ESD (Human Body) | $V_{\text{ESD-HB}}$ | $\pm 16$  | kV   |
| JESD22-A114-B; ESD (Machine)    | $V_{\text{ESD-M}}$  | $\pm 0.4$ | kV   |
| Total Power Dissipation         | $P_D$               | 0.15      | W    |

### Thermal Characteristics

| Parameter                           | Symbol           | Value       | Unit               |
|-------------------------------------|------------------|-------------|--------------------|
| Thermal Resistance Junction-to-Air  | $R_{\theta JA}$  | 834         | $^\circ\text{C/W}$ |
| Thermal Resistance Junction-to-Case | $R_{\theta JC}$  | 542         | $^\circ\text{C/W}$ |
| Thermal Resistance Junction-to-Lead | $R_{\theta JL}$  | 515         | $^\circ\text{C/W}$ |
| Junction Temperature                | $T_J$            | -55 to +150 | $^\circ\text{C}$   |
| Storage Temperature Range           | $T_{\text{STG}}$ | -55 to +150 | $^\circ\text{C}$   |

### Electrical Characteristics (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

| Parameter                                    | Symbol     | Test Condition                                 | Min. | Typ. | Max. | Unit          |
|----------------------------------------------|------------|------------------------------------------------|------|------|------|---------------|
| <b>ESD5Z2.5 TVS for 2.5V Lines</b>           |            |                                                |      |      |      |               |
| Reverse Stand-off Voltage                    | $V_{RWM}$  |                                                | -    | -    | 2.5  | V             |
| Peak Pulse Power ( $t_p = 8/20\mu\text{s}$ ) | $P_{PP}$   |                                                | -    | -    | 120  | W             |
| Reverse Breakdown Voltage                    | $V_{(BR)}$ | $I_T = 1\text{mA}$                             | 4    | -    | -    | V             |
| Reverse Leakage Current                      | $I_R$      | $V_{RWM} = 2.5\text{V}$                        | -    | -    | 6    | $\mu\text{A}$ |
| Clamping Voltage                             | $V_C$      | $I_{PP} = 5\text{A}, t_p = 8/20\mu\text{s}$    | -    | 6.5  | 8    | V             |
|                                              |            | $I_{PP} = 11\text{A}, t_p = 8/20\mu\text{s}$   | -    | -    | 10.9 | V             |
| Junction Capacitance                         | $C_J$      | $V_R = 0\text{V}, f = 1\text{MHz}$             | -    | 145  | -    | pF            |
| <b>ESD5Z3.3 TVS for 3.3V Lines</b>           |            |                                                |      |      |      |               |
| Reverse Stand-off Voltage                    | $V_{RWM}$  |                                                | -    | -    | 3.3  | V             |
| Peak Pulse Power ( $t_p = 8/20\mu\text{s}$ ) | $P_{PP}$   |                                                | -    | -    | 158  | W             |
| Reverse Breakdown Voltage                    | $V_{(BR)}$ | $I_T = 1\text{mA}$                             | 5    | -    | -    | V             |
| Reverse Leakage Current                      | $I_R$      | $V_{RWM} = 3.3\text{V}$                        | -    | -    | 1    | $\mu\text{A}$ |
| Clamping Voltage                             | $V_C$      | $I_{PP} = 5\text{A}, t_p = 8/20\mu\text{s}$    | -    | 8.4  | 10   | V             |
|                                              |            | $I_{PP} = 11.2\text{A}, t_p = 8/20\mu\text{s}$ | -    | -    | 14.1 | V             |
| Junction Capacitance                         | $C_J$      | $V_R = 0\text{V}, f = 1\text{MHz}$             | -    | 105  | -    | pF            |
| <b>ESD5Z5.0 TVS for 5.0V Lines</b>           |            |                                                |      |      |      |               |
| Reverse Stand-off Voltage                    | $V_{RWM}$  |                                                | -    | -    | 5.0  | V             |
| Peak Pulse Power ( $t_p = 8/20\mu\text{s}$ ) | $P_{PP}$   |                                                | -    | -    | 174  | W             |
| Reverse Breakdown Voltage                    | $V_{(BR)}$ | $I_T = 1\text{mA}$                             | 6.2  | -    | -    | V             |
| Reverse Leakage Current                      | $I_R$      | $V_{RWM} = 5\text{V}$                          | -    | -    | 0.05 | $\mu\text{A}$ |
| Clamping Voltage                             | $V_C$      | $I_{PP} = 5\text{A}, t_p = 8/20\mu\text{s}$    | -    | 11.6 | 13   | V             |
|                                              |            | $I_{PP} = 9.4\text{A}, t_p = 8/20\mu\text{s}$  | -    | -    | 18.6 | V             |
| Junction Capacitance                         | $C_J$      | $V_R = 0\text{V}, f = 1\text{MHz}$             | -    | 80   | -    | pF            |
| <b>ESD5Z6.0 TVS for 6.0V Lines</b>           |            |                                                |      |      |      |               |
| Reverse Stand-off Voltage                    | $V_{RWM}$  |                                                | -    | -    | 6.0  | V             |
| Peak Pulse Power ( $t_p = 8/20\mu\text{s}$ ) | $P_{PP}$   |                                                | -    | -    | 181  | W             |
| Reverse Breakdown Voltage                    | $V_{(BR)}$ | $I_T = 1\text{mA}$                             | 6.8  | -    | -    | V             |
| Reverse Leakage Current                      | $I_R$      | $V_{RWM} = 6\text{V}$                          | -    | -    | 0.01 | $\mu\text{A}$ |
| Clamping Voltage                             | $V_C$      | $I_{PP} = 5\text{A}, t_p = 8/20\mu\text{s}$    | -    | 12.4 | 14   | V             |
|                                              |            | $I_{PP} = 8.8\text{A}, t_p = 8/20\mu\text{s}$  | -    | -    | 20.5 | V             |
| Junction Capacitance                         | $C_J$      | $V_R = 0\text{V}, f = 1\text{MHz}$             | -    | 70   | -    | pF            |

| ESD5Z7.0 TVS for 7.0V Lines            |            |                                  |      |      |      |         |
|----------------------------------------|------------|----------------------------------|------|------|------|---------|
| Reverse Stand-off Voltage              | $V_{RWM}$  |                                  | -    | -    | 7.0  | V       |
| Peak Pulse Power ( $t_p = 8/20\mu s$ ) | $P_{PP}$   |                                  | -    | -    | 200  | W       |
| Reverse Breakdown Voltage              | $V_{(BR)}$ | $I_T = 1mA$                      | 7.5  | -    | -    | V       |
| Reverse Leakage Current                | $I_R$      | $V_{RWM} = 7V$                   | -    | -    | 0.01 | $\mu A$ |
| Clamping Voltage                       | $V_C$      | $I_{PP} = 5A, t_p = 8/20\mu s$   | -    | 13.5 | 16   | V       |
|                                        |            | $I_{PP} = 8.8A, t_p = 8/20\mu s$ | -    | -    | 22.7 | V       |
| Junction Capacitance                   | $C_J$      | $V_R = 0V, f = 1MHz$             | -    | 65   | -    | pF      |
| ESD5Z12 TVS for 12V Lines              |            |                                  |      |      |      |         |
| Reverse Stand-off Voltage              | $V_{RWM}$  |                                  | -    | -    | 12   | V       |
| Peak Pulse Power ( $t_p = 8/20\mu s$ ) | $P_{PP}$   |                                  | -    | -    | 240  | W       |
| Reverse Breakdown Voltage              | $V_{(BR)}$ | $I_T = 1mA$                      | 14.1 | -    | -    | V       |
| Reverse Leakage Current                | $I_R$      | $V_{RWM} = 12V$                  | -    | -    | 0.01 | $\mu A$ |
| Clamping Voltage                       | $V_C$      | $I_{PP} = 5A, t_p = 8/20\mu s$   | -    | 17   | 20   | V       |
|                                        |            | $I_{PP} = 9.6A, t_p = 8/20\mu s$ | -    | -    | 25   | V       |
| Junction Capacitance                   | $C_J$      | $V_R = 0V, f = 1MHz$             | -    | 55   | -    | pF      |

Ratings and Characteristic Curves (@  $T_A = 25^\circ\text{C}$  unless otherwise specified)

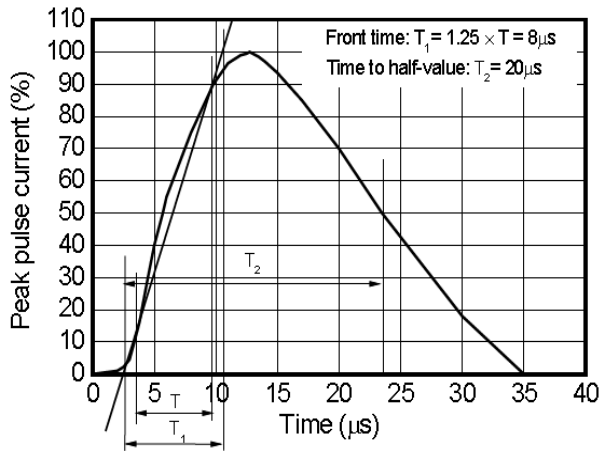


Fig 1 8/20  $\mu\text{s}$  waveform per IEC61000-4-5

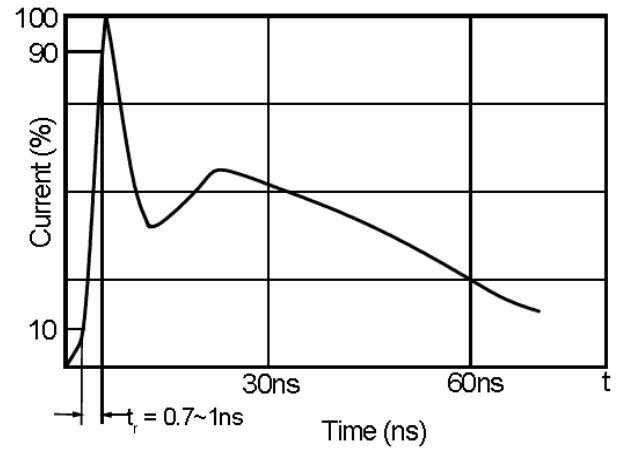


Fig 2 ESD pulse waveform according to IEC61000-4-2

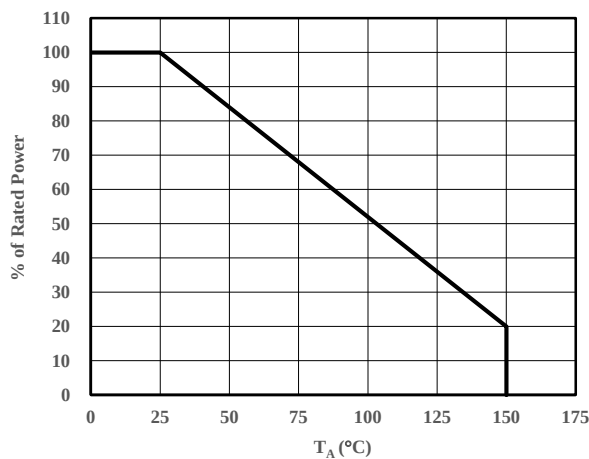


Fig 3 Power Derating Curve

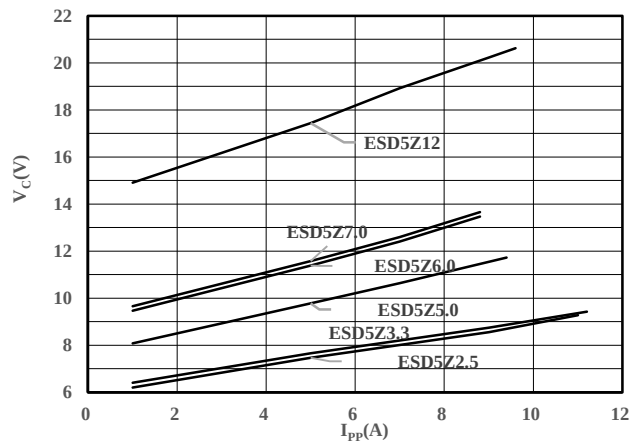
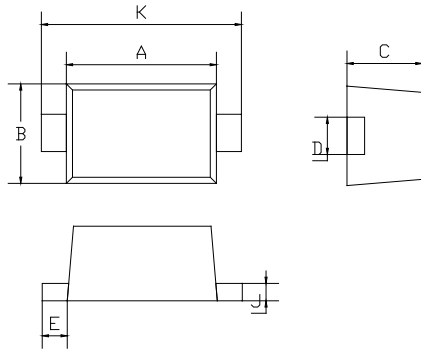


Fig 4 Clamping Voltage vs. Peak Pulse Current

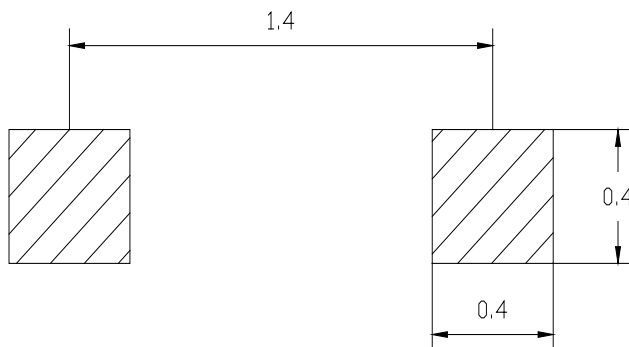
## Package Outline Dimensions (Unit: mm)



| SOD-523   |      |      |
|-----------|------|------|
| Dimension | Min. | Max. |
| A         | 1.10 | 1.30 |
| B         | 0.70 | 0.90 |
| C         | 0.50 | 0.70 |
| D         | 0.25 | 0.35 |
| E         | 0.15 | 0.25 |
| J         | 0.05 | 0.15 |
| K         | 1.50 | 1.70 |

## Package Outline Dimensions (Unit: mm)

### SOD-523



## IMPORTANT NOTICE

Changzhou Galaxy Century Microelectronics (GME) reserves the right to make changes without further notice to any product information (copyrighted) herein to make corrections, modifications, improvements, or other changes. GME does not assume any liability arising out of the application or use of any product described herein; neither does it convey any license under its patent rights, nor the rights of others.