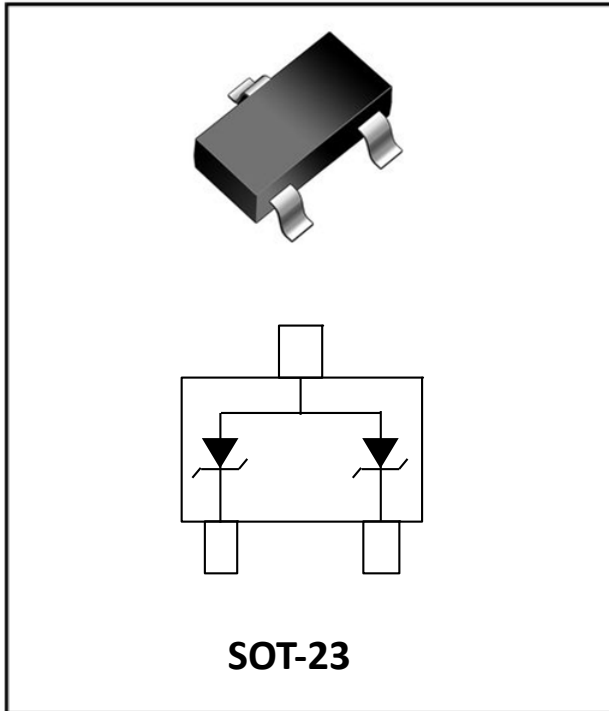


## 2- Line, Uni-directional, ESD protection diode



### Features

- Transient protection for each line according to  
IEC61000-4-2(ESD):  $\pm 30\text{kV}$  contact,  $\pm 30\text{kV}$  air  
IEC61000-4-5:20A( $t_p=8/20\mu\text{s}$ )
- Low leakage current
- Ultra low clamping voltage
- RoHS Compliant
- Part no. with suffix "Q" means AEC-Q101 qualified

### Applications

- Switches / Buttons
- Test Equipment/Instrumentation
- Point-of-Sale Terminals
- Medical Equipment
- Notebooks / Desktops / Servers
- Computer Peripherals
- CAN Bus protection
- Automotive applications

### Mechanical Data

- Package: SOT-23
- Lead Finish: Matte Tin
- Case Material: "Green" Molding Compound
- Moisture Sensitivity: Level 1 per J-STD-020

### ■ Definitions of electrical characteristics





# ESD0502EQ

## ■Maximum Ratings

| PARAMETER                                       | SYMBOL    | LIMITS   | UNIT        |
|-------------------------------------------------|-----------|----------|-------------|
| Peak pulse power ( $t_p = 8/20\mu s$ )          | $P_{pk}$  | 300      | W           |
| ESD according to IEC61000-4-2 air discharge     | $V_{ESD}$ | $\pm 30$ | KV          |
| ESD according to IEC61000-4-2 contact discharge |           | $\pm 30$ |             |
| Junction temperature                            | $T_J$     | -55~150  | $^{\circ}C$ |
| Storage temperature                             | $T_{STG}$ | -55~150  | $^{\circ}C$ |

Notes:

CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the component. This is a stress only rating and operation of the component at these or any other conditions above those indicated in the operational sections of this specification is not implied.

## ■Electrical Characteristics ( $T_J=25^{\circ}C$ )

| PARAMETER                        | Symbol    | UNIT     | Conditions                       | Min | Typ   | Max |
|----------------------------------|-----------|----------|----------------------------------|-----|-------|-----|
| Reverse Standoff Voltage         | $V_{RWM}$ | V        | $I_R \leq 1\mu A$                |     |       | 5   |
| Reverse breakdown voltage        | $V_{BR}$  | V        | $I_{BR} = 1mA$                   | 6.2 |       | 7.5 |
| Reverse leakage current          | $I_R$     | $\mu A$  | $V_{RWM} = 5V$                   |     |       | 1.0 |
| Forward Voltage                  | $V_F$     | V        | $I_F = 10mA$                     |     |       | 1.1 |
| Clamping voltage <sup>1)</sup>   | $V_C$     | V        | $I_{PP} = 5A, t_p = 8/20\mu s$   |     |       | 9   |
|                                  |           |          | $I_{PP} = 15A, t_p = 8/20\mu s$  |     |       | 12  |
|                                  |           |          | $I_{PP} = 20A, t_p = 8/20\mu s$  |     |       | 15  |
| Dynamic resistance <sup>2)</sup> | $R_{DYN}$ | $\Omega$ | TLP, $t_p=100ns$ , I/O to Ground |     | 0.089 |     |
| Peak Pulse Current               | $I_{PP}$  | A        | $t_p = 8/20\mu s$                |     |       | 20  |
| Junction capacitance             | $C_J$     | pF       | $V_R = 0V, f = 1MHz$             |     | 140   | 160 |

Notes:

(1). Non-repetitive current pulse, according to IEC61000-4-5.

(2). TLP parameter:  $Z_0 = 50\Omega$ ,  $t_p = 100ns$ ,  $t_r = 2ns$ , averaging window from 60ns to 80ns.  $R_{DYN}$  is calculated from 4A to 16A.

## ■Ordering Information (Example)

| PREFERRED P/N | PACKING CODE | UNIT WEIGHT(mg) | MINIMUM PACKAGE(pcs) | INNER BOX QUANTITY(pcs) | OUTER CARTON QUANTITY(pcs) | DELIVERY MODE |
|---------------|--------------|-----------------|----------------------|-------------------------|----------------------------|---------------|
| ESD0502EQ     | F2           | Approximate 10  | 3000                 | 30000                   | 120000                     | 7 reel        |



## ■ Characteristics (Typical)

Fig.1: Non-Repetitive Peak Pulse Power vs. Pulse Time

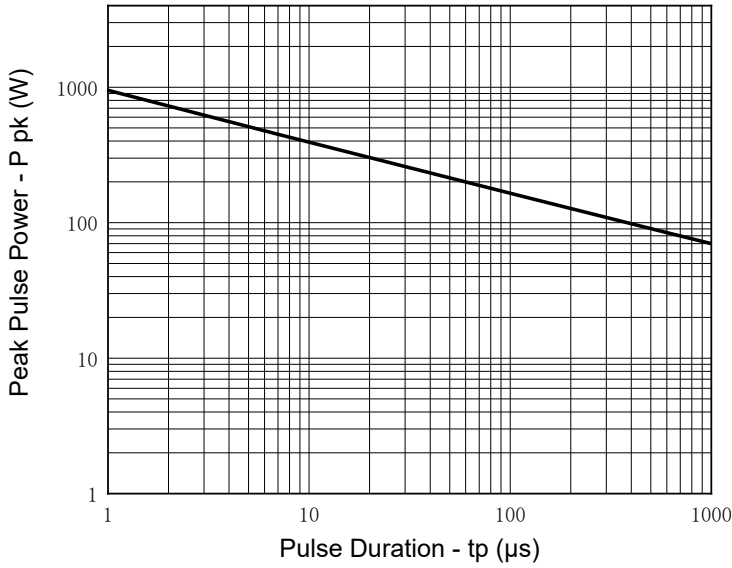


Fig.2: Capacitance vs. Bias

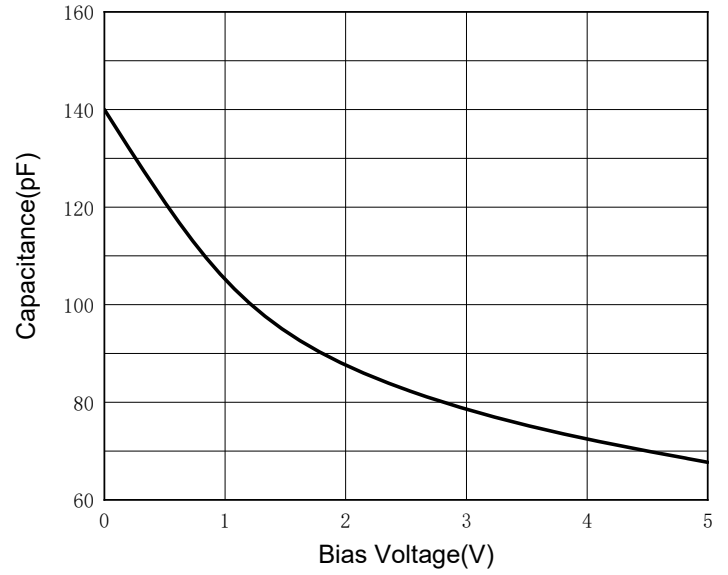


Fig.3: Power Derating Curve

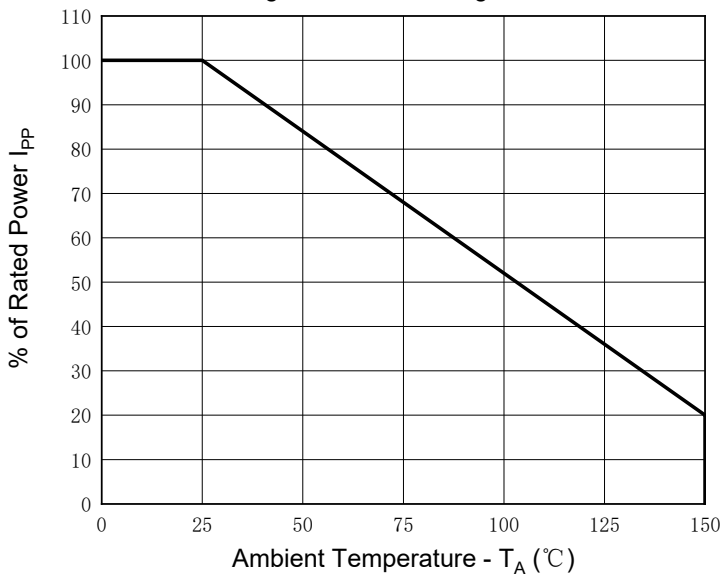


Fig.4: 8/20μs Pulse Waveform

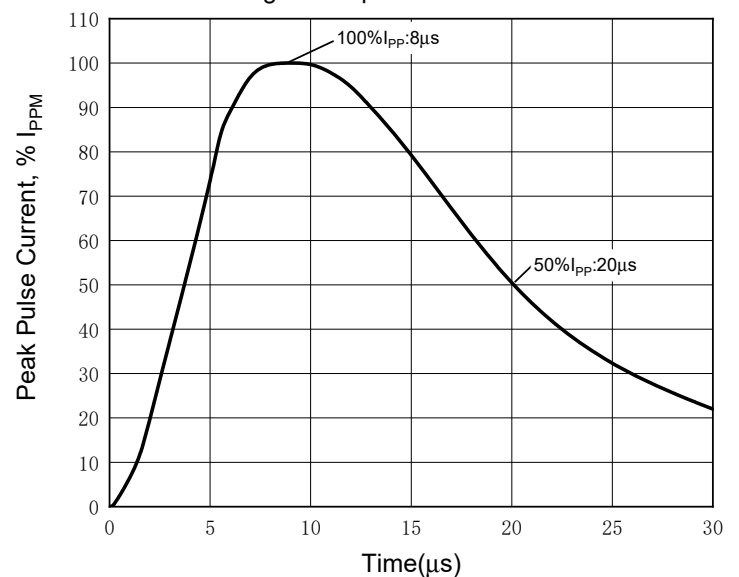


Fig.5: Transmission Line Pulsing (TLP) Plot

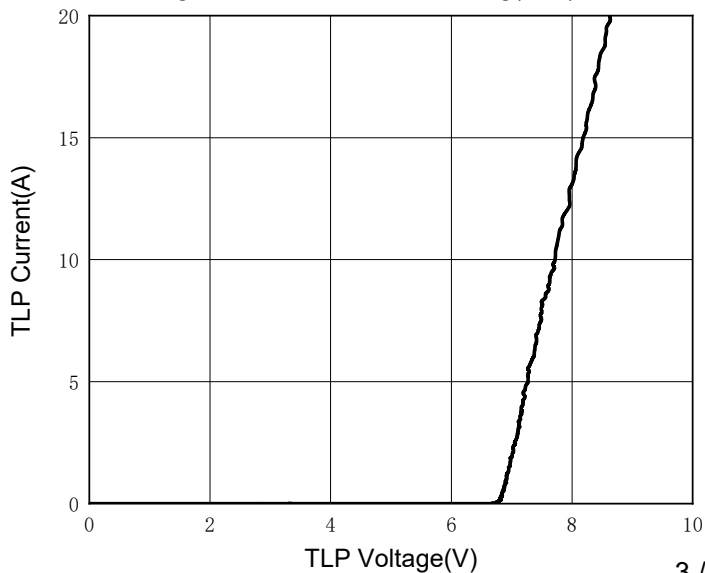
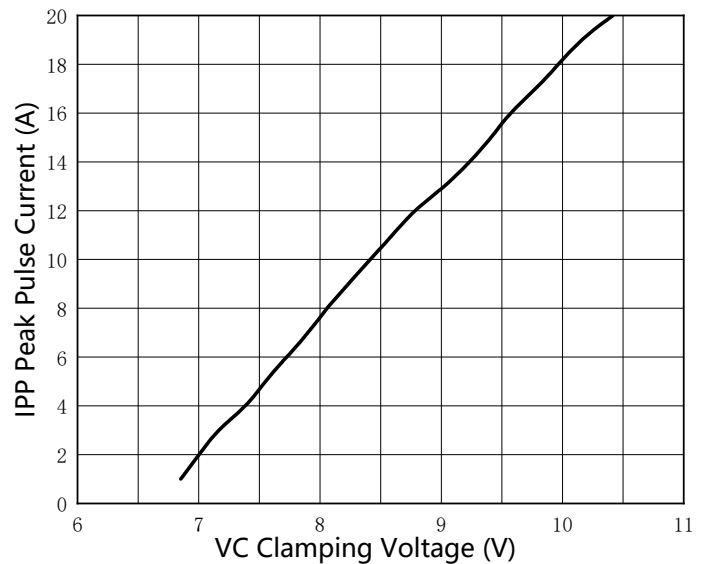


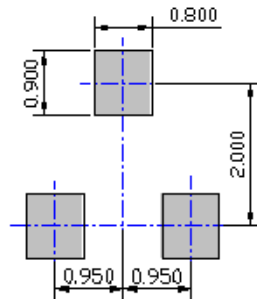
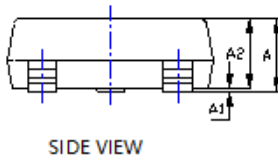
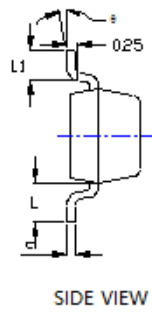
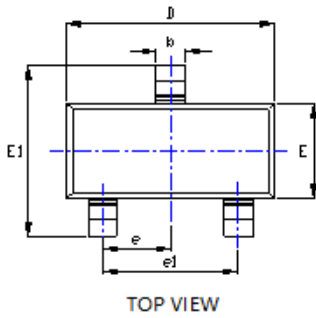
Fig.6: Peak Pulse Current vs Clamping Voltage





# ESD0502EQ

## Outline Dimensions

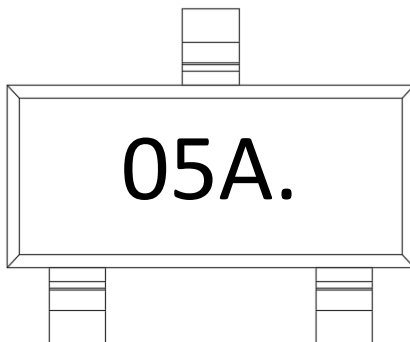


UNIT: mm

| SYMBOL | DIMENSIONS |       |            |       |
|--------|------------|-------|------------|-------|
|        | INCHES     |       | Millimeter |       |
|        | MIN.       | MAX.  | MIN.       | MAX.  |
| A      | 0.035      | 0.045 | 0.900      | 1.150 |
| A1     | 0.000      | 0.004 | 0.000      | 0.100 |
| A2     | 0.035      | 0.041 | 0.900      | 1.050 |
| b      | 0.012      | 0.020 | 0.300      | 0.500 |
| c      | 0.004      | 0.008 | 0.100      | 0.200 |
| D      | 0.110      | 0.118 | 2.800      | 3.000 |
| E      | 0.047      | 0.055 | 1.200      | 1.400 |
| E1     | 0.089      | 0.100 | 2.250      | 2.550 |
| e      | 0.037TYP   |       | 0.950TYP   |       |
| e1     | 0.071      | 0.079 | 1.800      | 2.000 |
| L      | 0.022REF   |       | 0.550REF   |       |
| L1     | 0.012      | 0.020 | 0.300      | 0.500 |
| θ      | 0°         | 8°    | 0°         | 8°    |

NOTE:  
 1. PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.  
 2. TOLERANCE 0.1mm UNLESS OTHERWISE SPECIFIED.  
 3. THE PAD LAYOUT IS FOR REFERENCE PURPOSES ONLY.

## Marking Information



Note:

1. All marking is at middle of the product body
2. All marking is in laser marking
3. Body color: Black



### Disclaimer

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