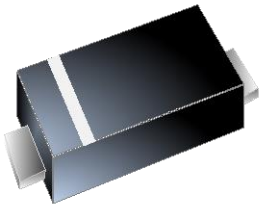
# CES5Z12V

**Transient Voltage Suppressor**

## Features

- 200 Watts Peak Pulse Power per Line (tp = 8/20μs)
- Protects one I/O or power line
- Low Clamping Voltage
- Working Voltage: 12V
- Low Leakage Current



**SOD-523**

## IEC COMPATIBILITY (EN61000-4)

- **IEC 61000-4-2 (ESD) ±30kV (air), ±30kV (contact)**
- **IEC 61000-4-4 (EFT) 40A (5/50ns)**
- **IEC 61000-4-5 (Lightning) 8A (8/20μs)**

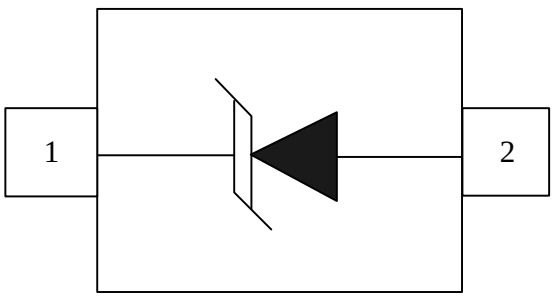
## Mechanical Characteristics

- JEDEC SOD-523 package
- Marking : Marking Code
- Packaging : Tape and Reel per EIA 481
- RoHS Compliant

## Applications

- Cellular Handsets & Accessories
- Personal Digital Assistants (PDAs)
- Notebooks & Handhelds
- Portable Instrumentation
- Digital Cameras
- MP3 players

## Schematic & PIN Configuration




SOD-523 (Top View)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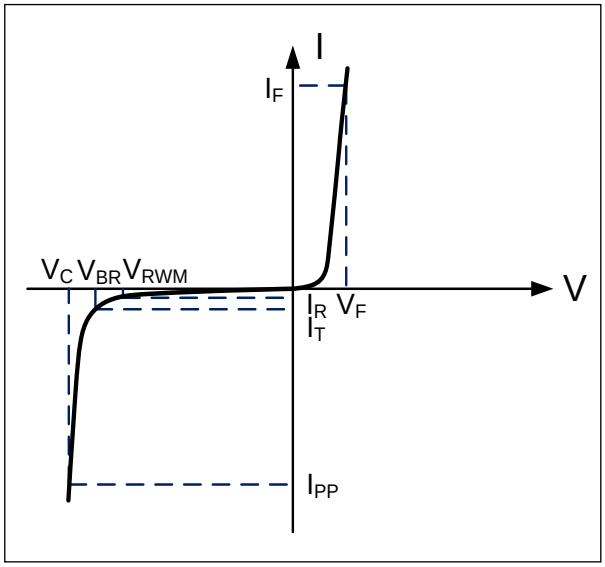
| Absolute Maximum Rating | | | |
|---|---|---|---|
| **Rating** | **Symbol** | **Value** | **Units** |
| Peak Pulse Power ($t_p$=8/20μs) | $P_{PP}$ | 200 | W |
| Peak Pulse Current ($t_p$=8/20μs) | $I_{PP}$ | 8 | A |
| Operating Temperature | $T_J$ | -55 to + 125 | °C |
| Storage Temperature | $T_{STG}$ | -55 to +150 | °C |

## Electrical Parameters (T=25℃)

| Symbol | Parameter |
|---|---|
| $I_{PP}$ | Reverse Peak Pulse Current |
| $V_C$ | Clamping Voltage @ $I_{PP}$ |
| $V_{RWM}$ | Working Peak Reverse Voltage |
| $I_R$ | Reverse Leakage Current @ $V_{RWM}$ |
| $V_{BR}$ | Breakdown Voltage @ $I_T$ |
| $I_T$ | Test Current |
| $I_F$ | Forward Current |
| $V_F$ | Forward Voltage @ $I_F$ |




## Electrical Characteristics

| CES5Z12V | | | | | | |
|---|---|---|---|---|---|---|
| **Parameter** | **Symbol** | **Conditions** | **Minimum** | **Typical** | **Maximum** | **Units** |
| Reverse Stand-Off Voltage | $V_{RWM}$ | | | | 12 | V |
| Reverse Breakdown Voltage | $V_{BR}$ | $I_T$=1mA | 13.3 | | | V |
| Forward Voltage | $V_F$ | $I_T$=10mA | 0.5 | | 1.0 | V |
| Reverse Leakage Current | $I_R$ | $V_{RWM}$=12V, T=25°C | | | 500 | nA |
| Clamping Voltage | $V_C$ | $I_{PP}$=8A, $t_p$=8/20μs | | 21 | 30 | V |
| Dynamic Resistance[1,2] | $R_{DYN}$ | TLP=0.2/100ns | | 0.22 | | Ω |
| ESD Clamping Voltage[1] | $V_C$ | IPP = 4A,<br>tp = 0.2/100ns (TLP) | | 15.3 | | V |
| ESD Clamping Voltage[1] | $V_C$ | IPP = 16A,<br>tp = 0.2/100ns (TLP) | | 17.9 | | V |
| Junction Capacitance | $C_j$ | $V_R$ = 0V, f= 1MHz | | 40 | 55 | pF |

Notes：1、TLP Setting：$t_p$=100ns, $t_r$=0.2ns, $I_{TLP}$ and $V_{TLP}$ sample window:$t_1$=70ns to $t_2$=90ns.
2、Dynamic resistance calculated from $I_{PP}$=4A to $I_{PP}$=16A using “Best Fit”.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## Typical Characteristics

**Figure 1: Peak Pulse Power vs. Pulse Time**

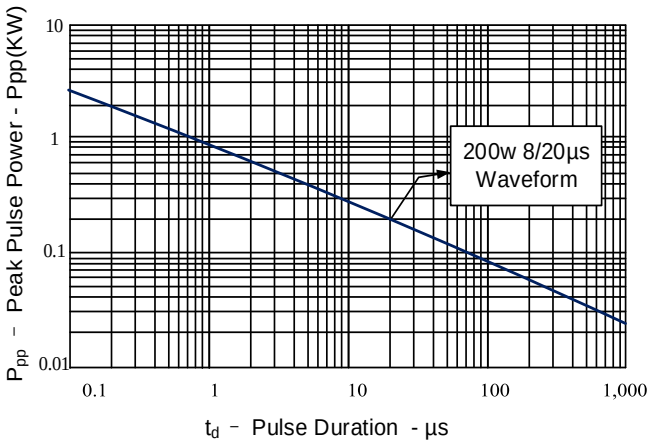



**Figure 2: Power Derating Curve**

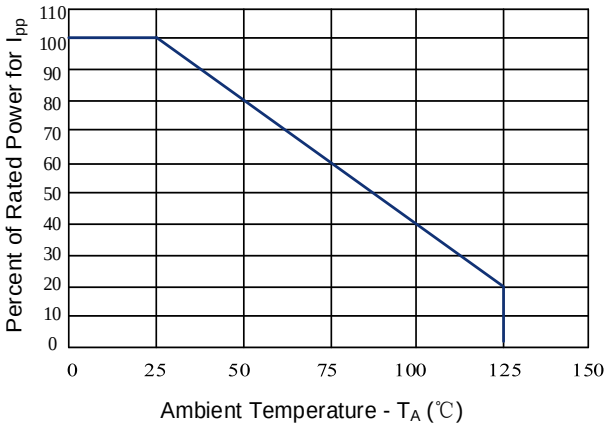



**Figure 3: Clamping Voltage vs. Peak Pulse Current**

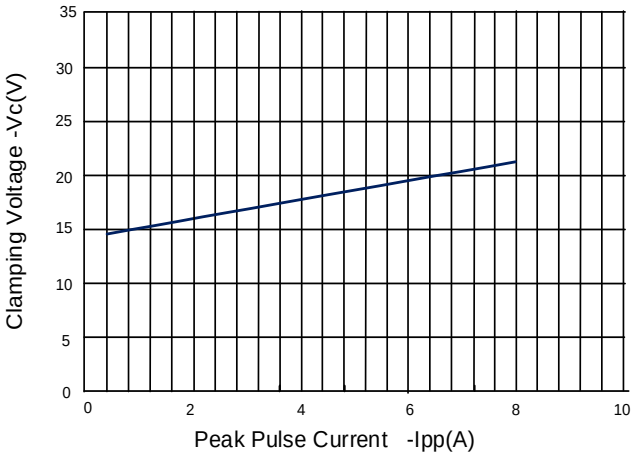



**Figure 4: Normalized Junction Capacitance vs. Reverse Voltage**

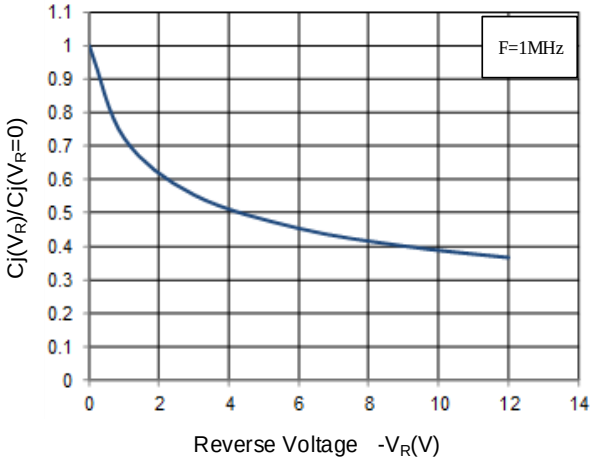



**Figure 5: Pulse Waveform**

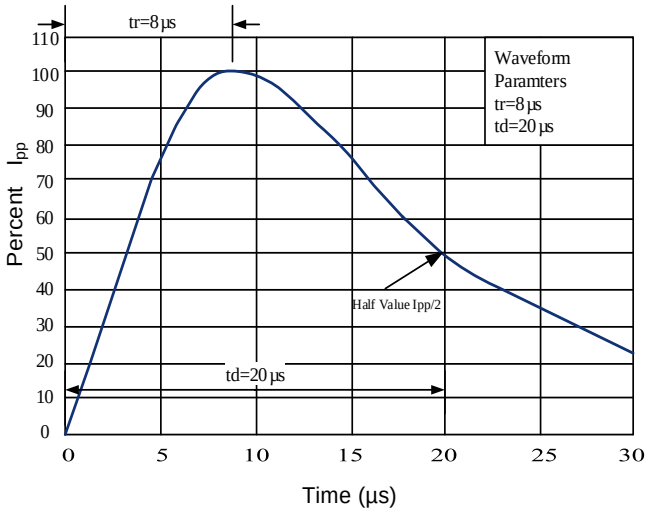
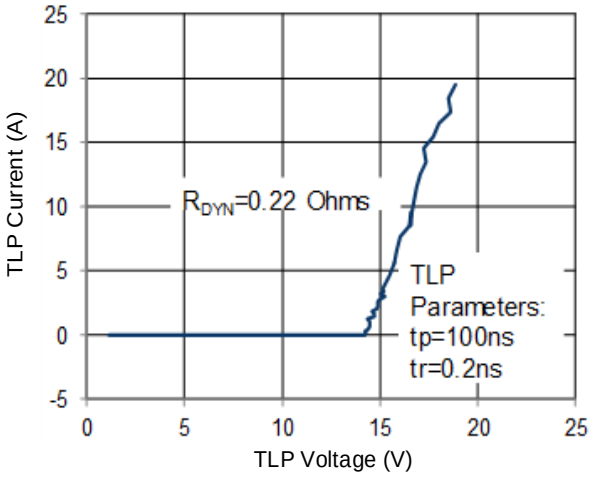



**Figure 6: TLP I-V Curve**





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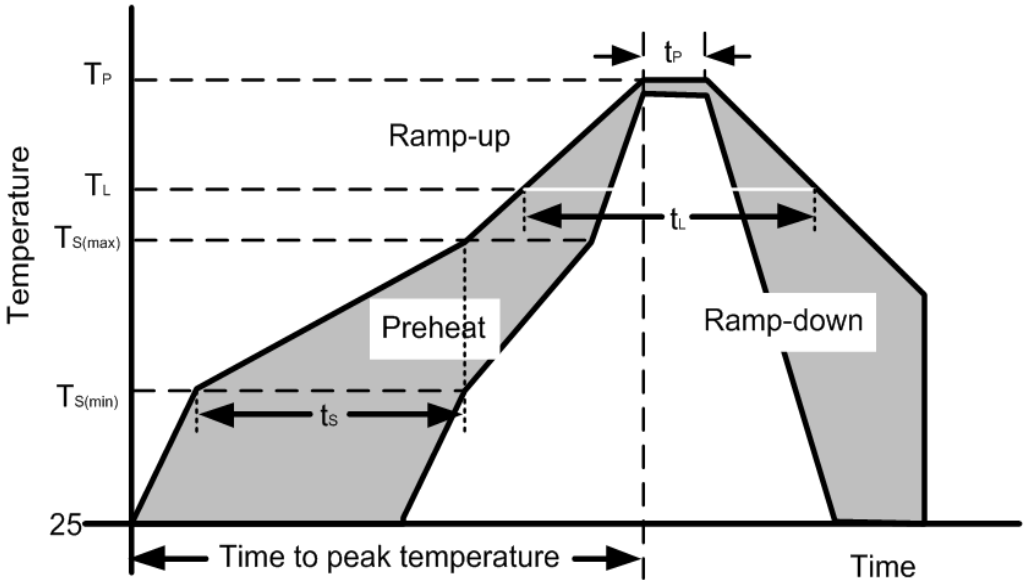
## Soldering Parameters

| Reflow Condition | | Pb – Free assembly |
|---|---|---|
| Pre Heat | Temperature Min ($T_{s(min)}$) | 150°C |
| | Temperature Max ($T_{s(max)}$) | 200°C |
| | Time (min to max) (ts ) | 60 – 190 secs |
| Average ramp up rate (Liquidus Temp) ($T_L$) to peak | | 5°C/second max |
| $T_{S(max)}$ to $T_L$——Ramp-up Rate | | 5°C/second max |
| Reflow | Temperature ($T_L$) (Liquidus) | 217°C |
| | Temperature ($t_L$) | 60 – 150 seconds |
| Peak Temperature ($T_P$) | | 260+0/-5 °C |
| Time within actual peak Temperature ($t_p$ ) | | 20 – 40 seconds |
| Ramp-down Rate | | 5°C/second max |
| Time 25°C to peak Temperature ($T_P$) | | 8 minutes Max. |
| Do not exceed | | 280°C |





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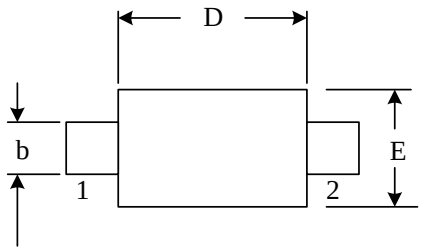
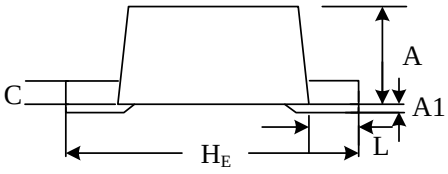
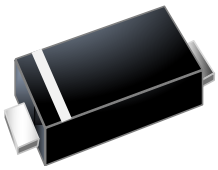
## Outline Drawing –SOD-523

### PACKAGE OUTLINE

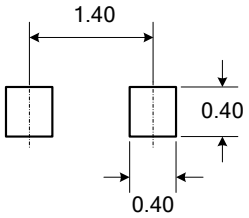


SOD-523

| DIMENSIONS | | | | |
|---|---|---|---|---|
| SYMBOL | MILLIMETERS | | INCHES | |
| | MIN | MAX | MIN | MAX |
| A | 0.50 | 0.70 | 0.020 | 0.028 |
| A1 | 0.00 | 0.07 | 0.000 | 0.003 |
| b | 0.25 | 0.35 | 0.010 | 0.014 |
| C | 0.07 | 0.20 | 0.003 | 0.008 |
| D | 1.10 | 1.30 | 0.043 | 0.051 |
| E | 0.70 | 0.90 | 0.028 | 0.035 |
| $H_E$ | 1.50 | 1.70 | 0.059 | 0.067 |
| L | 0.15 | 0.25 | 0.006 | 0.010 |




DIMENSIONS: MILLIMETERS

**Notes:**
Controlling Dimension: Millimeter.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