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TRANSIL™ array for data protection

Main applications

Where transient overvoltage protection in ESD sensitive equipment is required, such as :

- Computers
- Printers
- Communication systems
- Cellular phones handsets and accessories
- Wireline and wireless telephone sets
- Set top boxes

Features

- 2 up to 5 Unidirectional Transil functions
- Breakdown voltage:
 $V_{BR} = 6.1 \text{ V min. and } 25 \text{ V min.}$
- Low leakage current: $< 1 \mu\text{A}$
- Very small PCB area $< 4.2 \text{ mm}^2$ typically

Description

The ESDAxxxWx are monolithic suppressors designed to protect components connected to data and transmission lines against ESD.

These devices clamp the voltage just above the logic level supply for positive transients, and to a diode drop below ground for negative transients.

Benefits

- High ESD protection level: up to 25 kV
- High integration

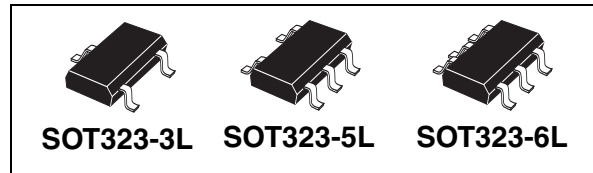
Complies with the following standards

IEC61000-4-2

Level 4 15 kV (air discharge)
 8 kV (contact discharge)

MIL STD 883E - Method 3015-7 Class 3

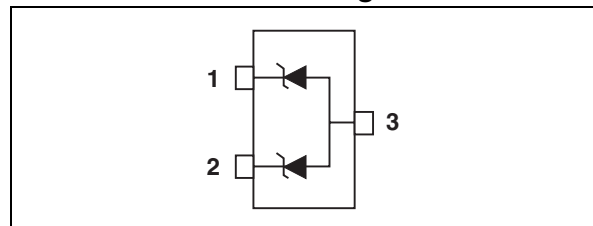
25 kV HBM (Human Body Model)



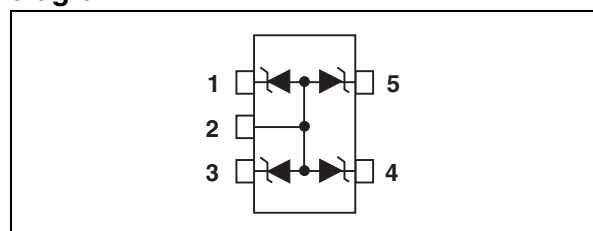
Order codes

| Part Numbers | Marking |
|--------------|---------|
| ESDA6V1W5 | E61 |
| ESDA6V1-5W6 | E62 |
| ESDA25W | E25 |
| ESDA25W5 | E25 |

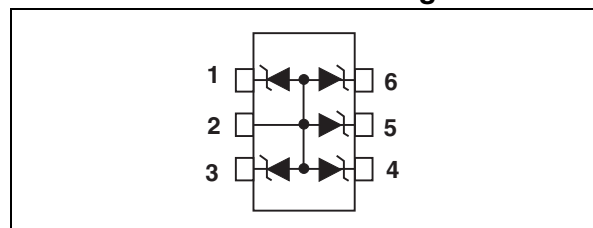
ESDA25W Functional diagram



ESDA6V1W5/ESDA25W5 Functional diagram



ESDA6V1-5W6 Functional diagram



1 Characteristics

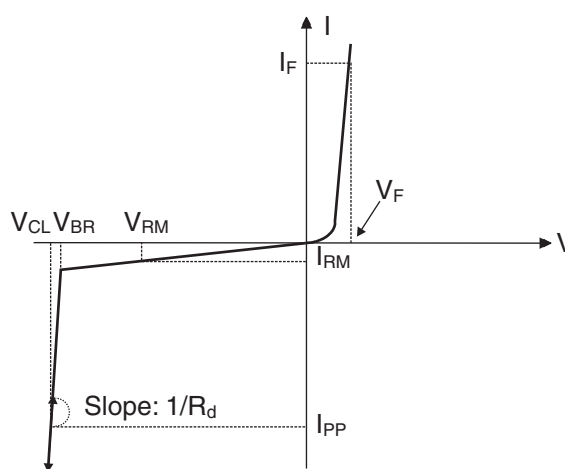
Table 1. Absolute Ratings ($T_{amb} = 25^{\circ}\text{C}$)

| Symbol | Parameter | Value | Unit | |
|-----------|---|--------------------------------|--------------------|--------------------|
| P_{PP} | Peak pulse power (8/20 μs) | ESDA25W | 400 | W |
| | | ESDA25W5 / ESDA6V1W5 | 150 | |
| | | ESDA6V1-5W6 | 100 | |
| T_j | Junction temperature | 125 | $^{\circ}\text{C}$ | |
| T_{stg} | Storage temperature range | -55 to +150 | $^{\circ}\text{C}$ | |
| T_L | Maximum lead temperature for soldering during 10s | 260 | $^{\circ}\text{C}$ | |
| T_{op} | Operating temperature range ⁽¹⁾ | ESDA25W / ESDA25W5 / ESDA6V1W5 | -40 to +125 | $^{\circ}\text{C}$ |
| | | ESDA6V1-5W6 | -40 to +125 | |

1. The values of the operating parameters versus temperature are given through curves and αT parameter.

1.1 Electrical Characteristics ($T_{amb} = 25^{\circ}\text{C}$)

| Symbol | Parameter |
|------------|---------------------------------|
| V_{RM} | Stand-off voltage |
| V_{BR} | Breakdown voltage |
| V_{CL} | Clamping voltage |
| I_{RM} | Leakage current |
| I_{PP} | Peak pulse current |
| I_R | Reverse leakage current |
| I_F | Forward current |
| αT | Voltage temperature coefficient |
| V_F | Forward voltage drop |
| C | Capacitance |
| R_d | Dynamic resistance |



| Part Numbers | V_{BR} | | | I_{RM} @ V_{RM} | | V_F @ I_F | | R_d | αT | C |
|--------------|----------|------|---------|---------------------|----|---------------|-----|---------------------|---------------------|------|
| | min. | max. | @ I_R | | | max. | | typ. ⁽¹⁾ | max. ⁽²⁾ | typ. |
| | V | V | mA | μA | V | V | mA | Ω | $10^{-4}/^{\circ}C$ | pF |
| ESDA25W | 25 | 30 | 1 | 1 | 24 | 1.2 | 10 | 1.1 | 10 | 65 |
| ESDA25W5 | 25 | 30 | 1 | 1 | 24 | 1.2 | 10 | 1.9 | 10 | 30 |
| ESDA6V1-5W6 | 6.1 | 7.2 | 1 | 1 | 3 | 1.25 | 200 | 0.61 | 6 | 50 |
| ESDA6V1W5 | 6.1 | 7.2 | 1 | 1 | 3 | 1.25 | 200 | 0.35 | 6 | 90 |

1. Square pulse $I_{pp} = 15 A$, $t_p = 2.5 \mu s$
2. $V_{BR} = aT * (T_{amb} - 25^{\circ}C) * V_{BR}(25^{\circ}C)$

Figure 1. Peak power dissipation versus initial junction temperature

Figure 2. Peak pulse power versus exponential pulse duration (T_j initial = 25°C) (ESDA25W)

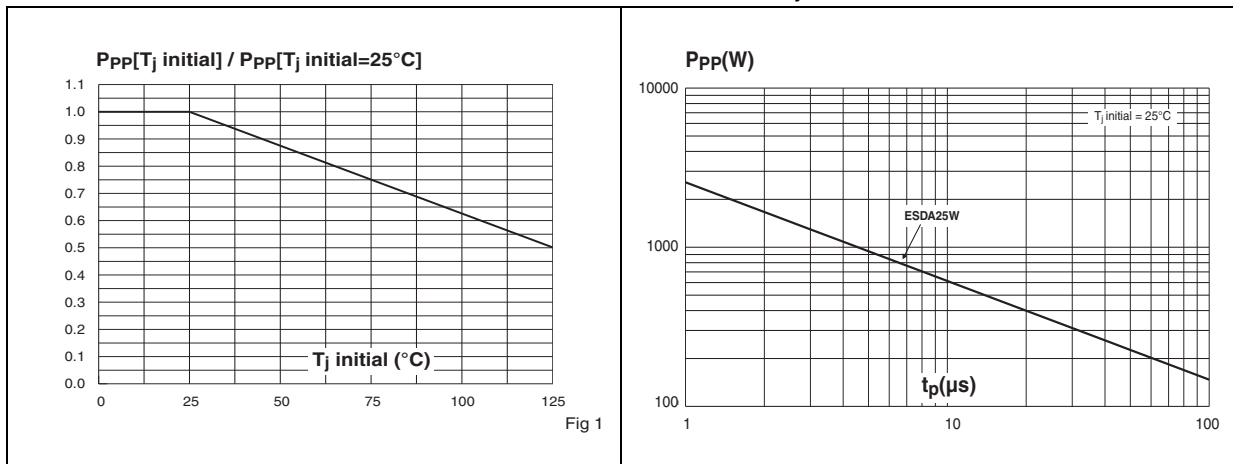


Figure 3. Peak pulse power versus exponential pulse duration (T_j initial = 25°C) (ESDA25W5 / ESDA6V1W5 / ESDA6V1-5W6)

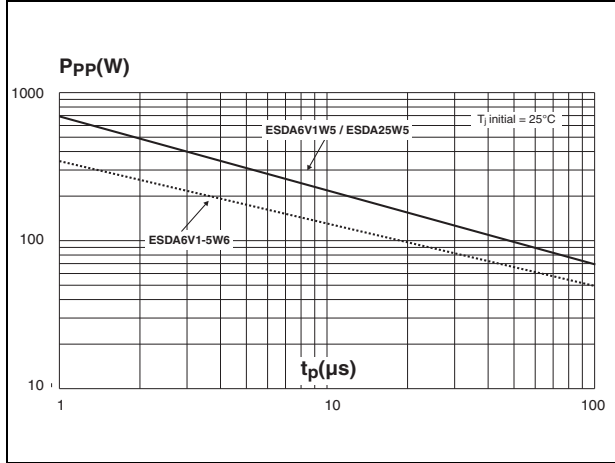


Figure 4. Clamping voltage versus peak pulse current (T_j initial = 25°C, rectangular waveform, t_p = 2.5 μs) (ESDA25W / ESDA25W5)

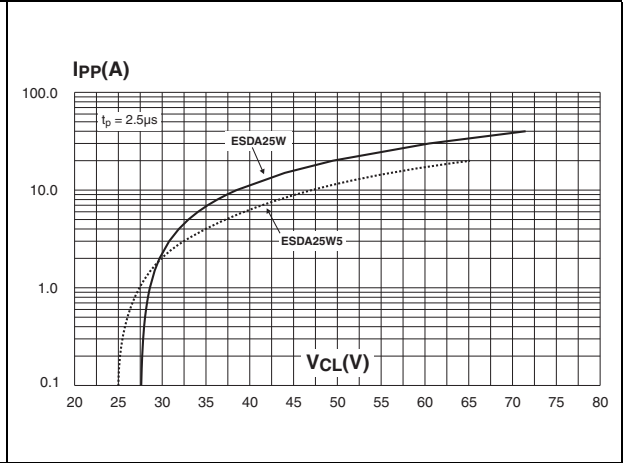


Figure 5. Clamping voltage versus peak pulse current (T_j initial = 25°C, rectangular waveform, t_p = 2.5 μs) (ESDA6V1W5 / ESDA6V1-5W6)

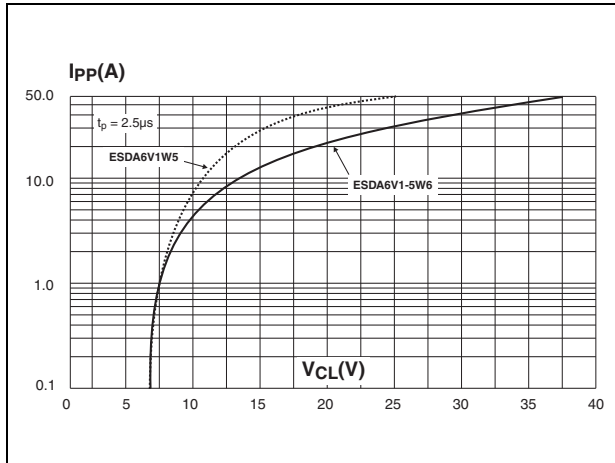


Figure 6. Capacitance versus reverse applied voltage (typical values) (ESDA25W / ESDA25W5)

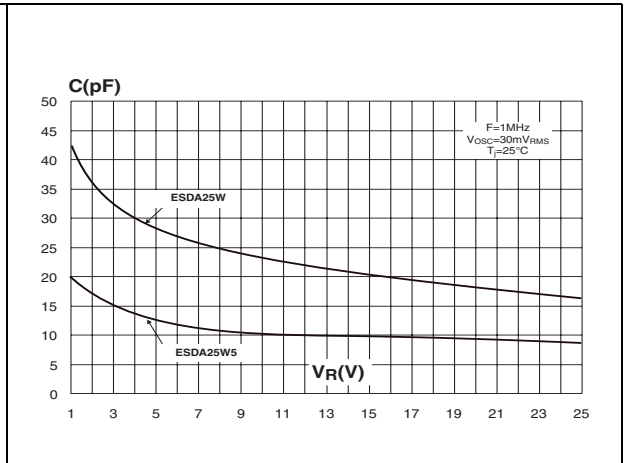


Figure 7. Capacitance versus reverse applied voltage (typical values) (ESDA6V1W5 / ESDA6V1-5W6)

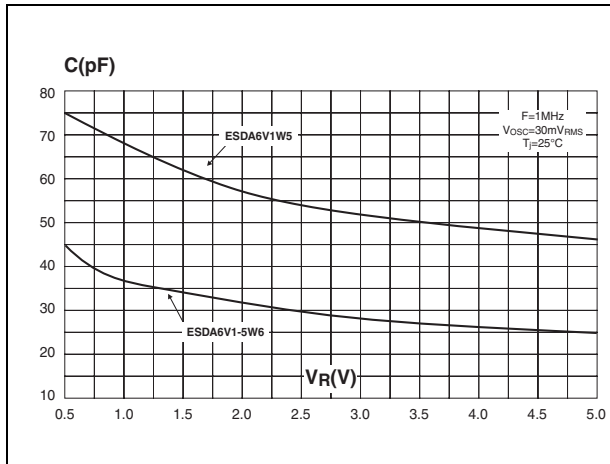


Figure 8. Relative variation of leakage current versus junction temperature (typical values)

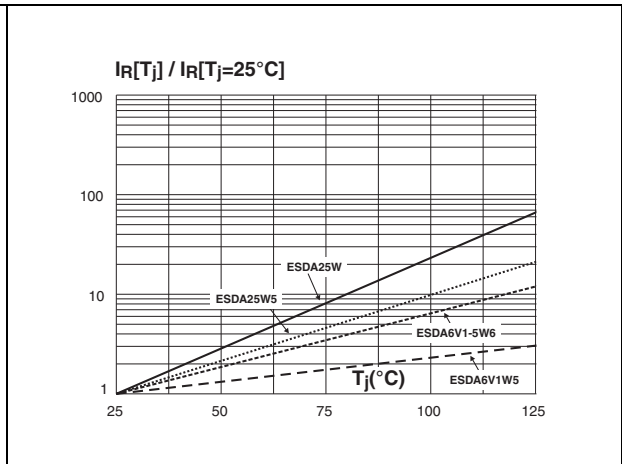


Figure 9. Peak forward voltage drop versus peak forward current (typical values) (ESDA25W / ESDA25W5)

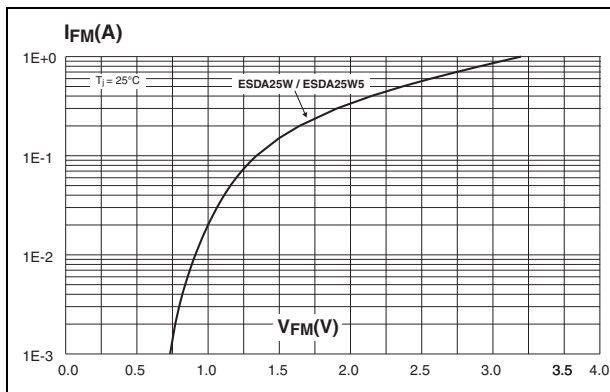


Figure 10. Peak forward voltage drop versus peak forward current (typical values) (ESDA6V1W5 / ESDA6V1-5W6)

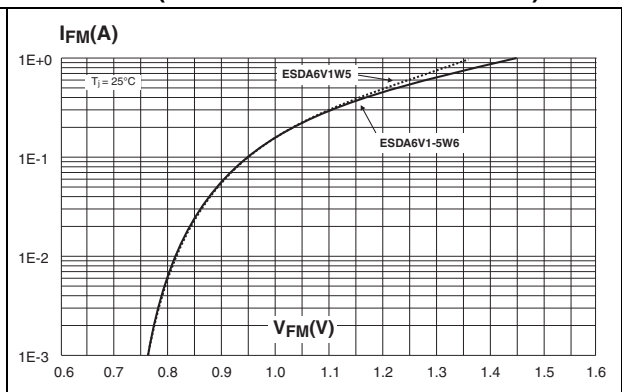
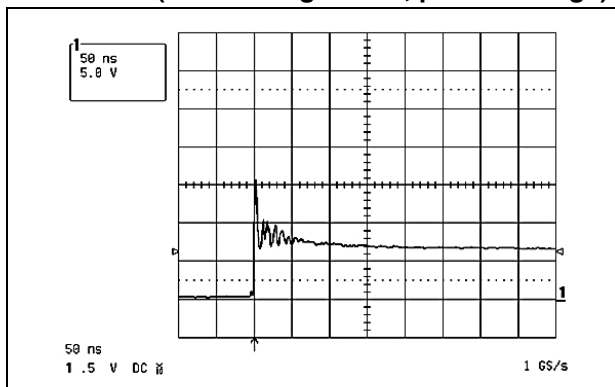
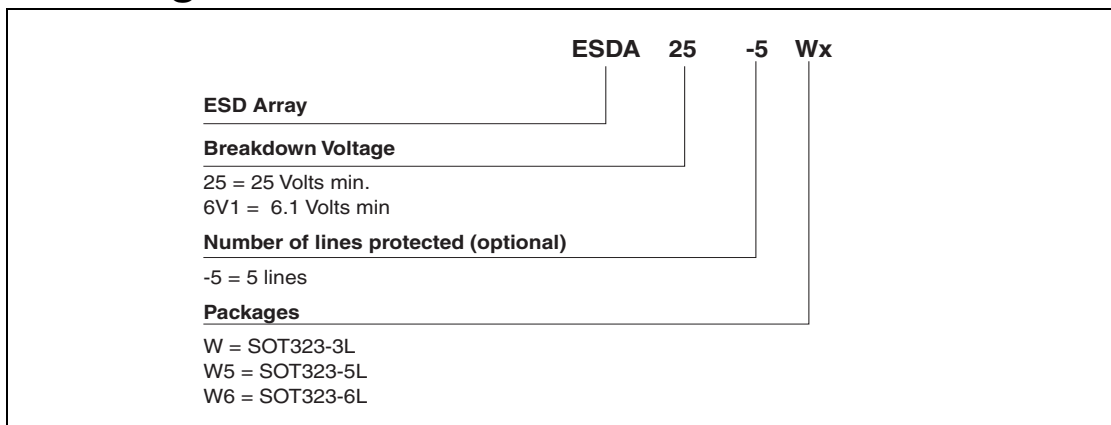


Figure 11. ESD response to IEC61000-4-2 (air discharge 15 kV, positive surge)



2 Ordering information scheme



3 Package mechanical data

3.1 SOT323-3L package

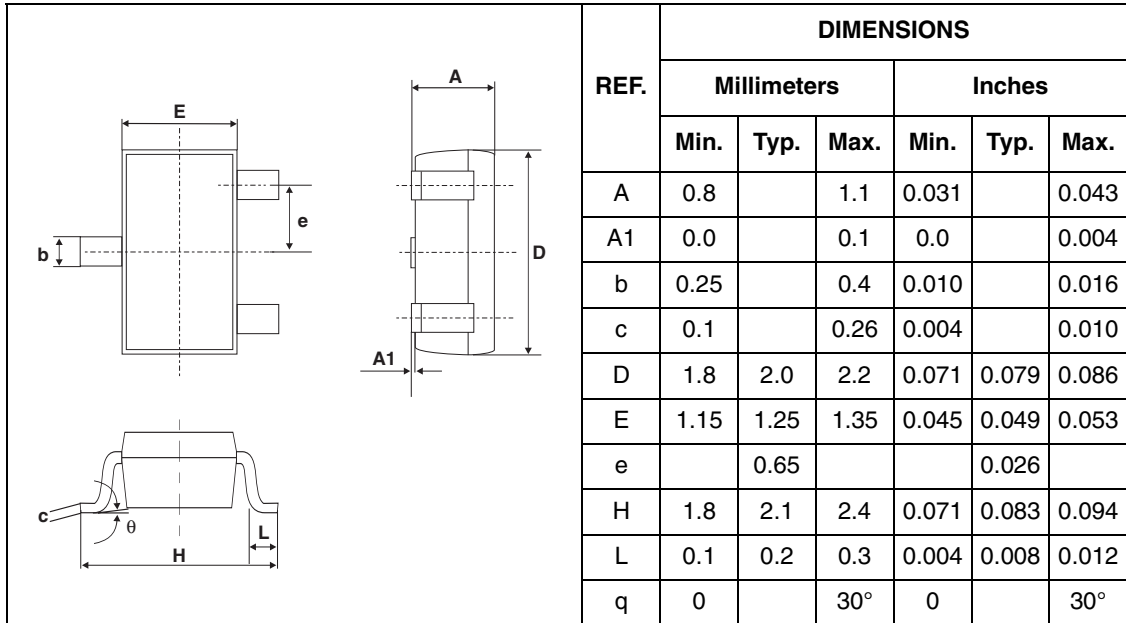
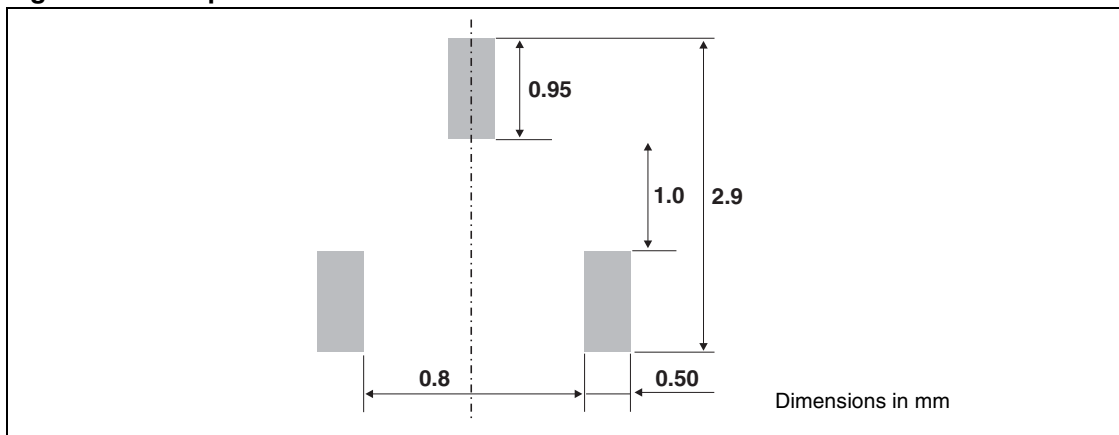


Figure 12. Footprint dimensions



3.2 SOT323-5L package

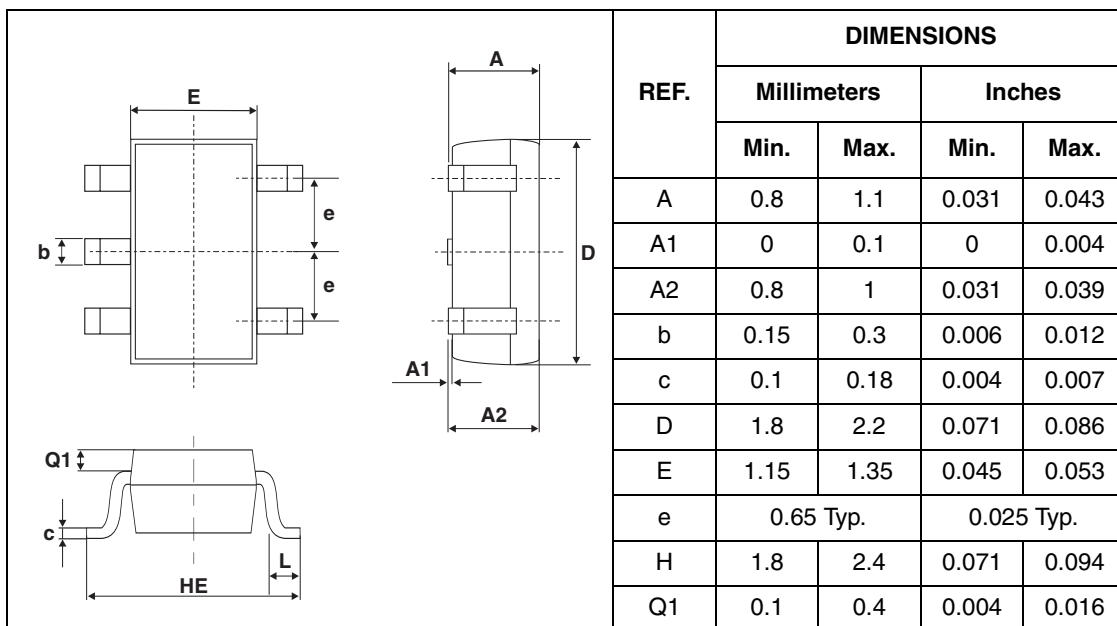
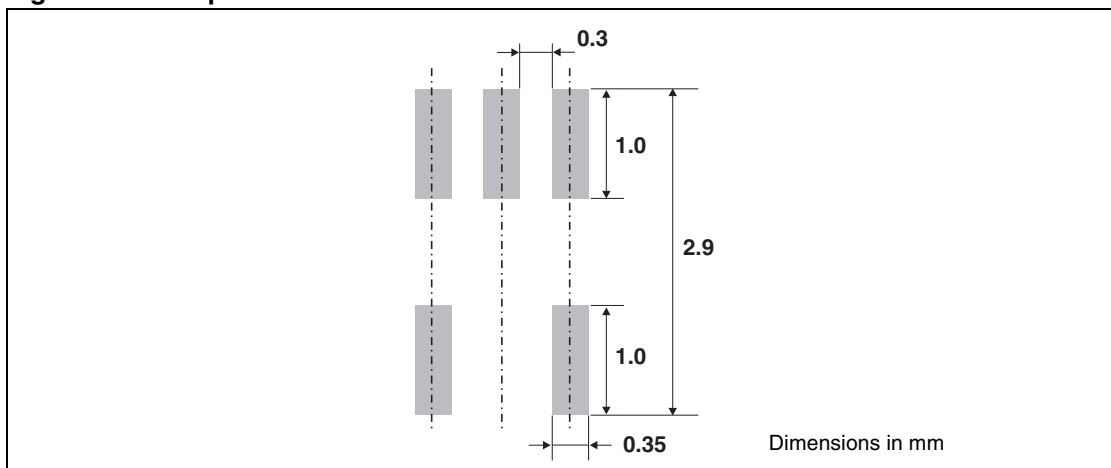


Figure 13. Footprint dimensions



3.3 SOT323-6L package

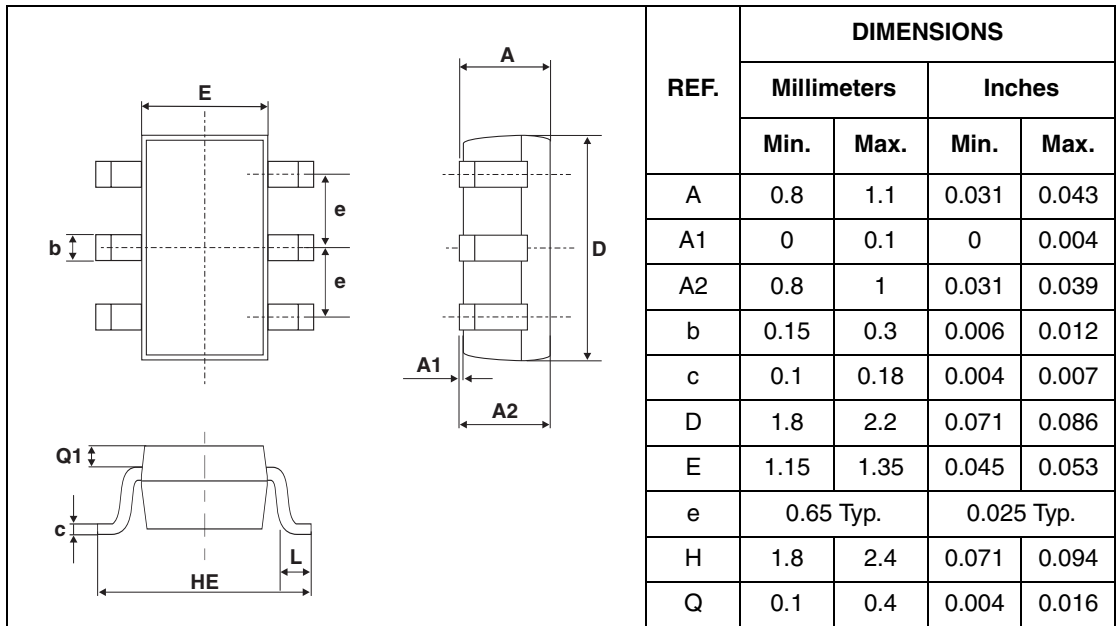
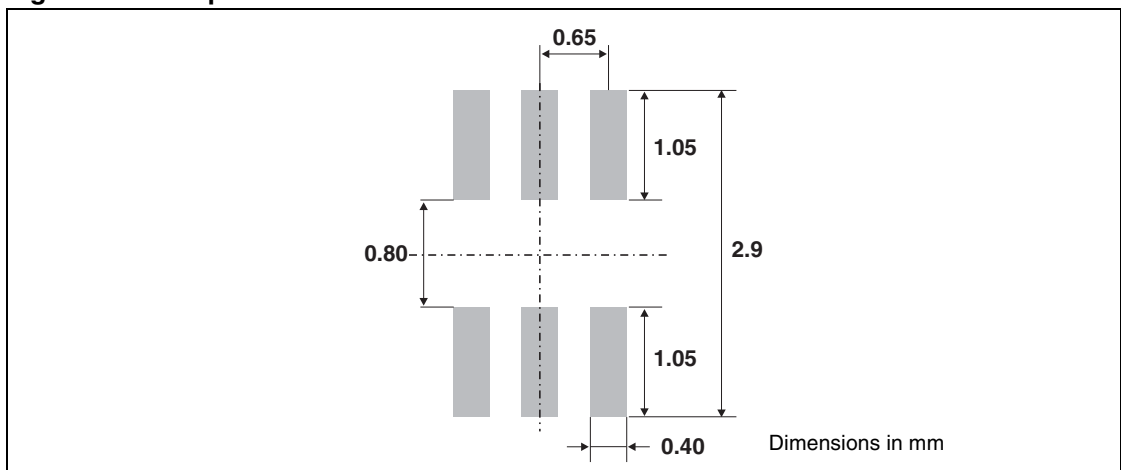


Figure 14. Footprint dimensions



4 Ordering information

| Part Number | Marking | Package | Weight | Base qty | Delivery mode |
|-------------|---------|-----------|--------|----------|---------------|
| ESDA6V1W5 | E61 | SOT323-5L | 6 mg | 3000 | Tape & reel |
| ESDA6V1-5W6 | E62 | SOT323-6L | | | |
| ESDA25W | E25 | SOT323-3L | | | |
| ESDA25W5 | E25 | SOT323-5L | | | |

5 Revision history

| Date | Revision | Changes |
|-------------|----------|---|
| 20-Jul-2005 | 1 | Initial release |
| 29-Aug-2005 | 2 | Added notes to table on page2, removed annotations in Figure 1. |

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