

## 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

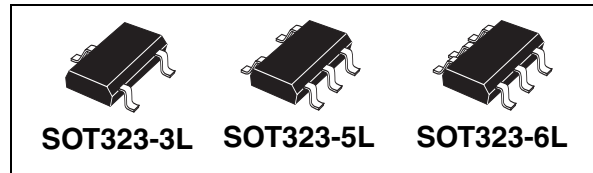
### Complies with the following standards

#### IEC61000-4-2

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

#### MIL STD 883E - Method 3015-7 Class 3

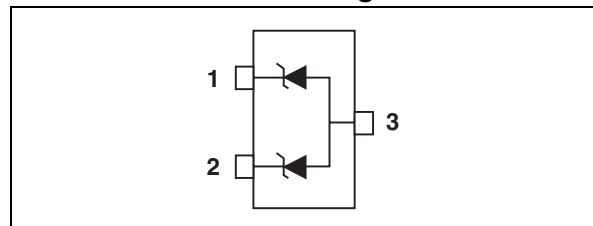
25 kV HBM (Human Body Model)



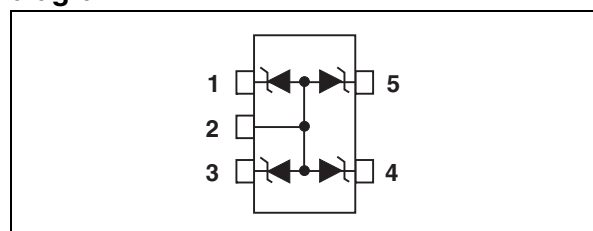
### Order codes

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

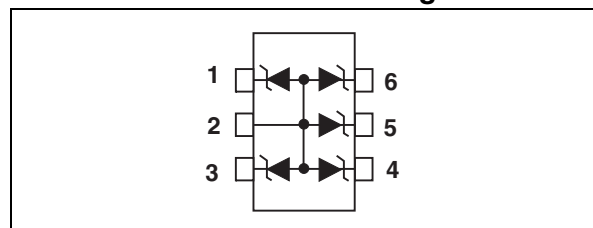
### ESDA25W Functional diagram



### ESDA6V1W5/ESDA25W5 Functional diagram



### ESDA6V1-5W6 Functional diagram



# 1 Characteristics

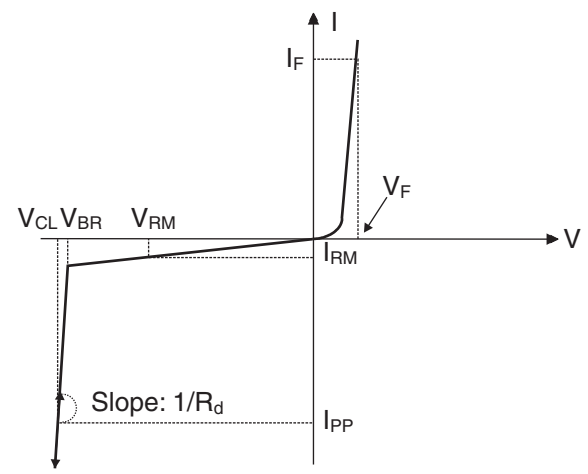
**Table 1. Absolute Ratings ( $T_{amb} = 25^{\circ}\text{C}$ )**

Symbol	Parameter	Value	Unit	
$P_{PP}$	Peak pulse power (8/20 $\mu\text{s}$ )	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 <sup>(1)</sup>	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  $\alpha T$  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
$\alpha T$	Voltage temperature coefficient
$V_F$	Forward voltage drop
C	Capacitance
$R_d$	Dynamic resistance



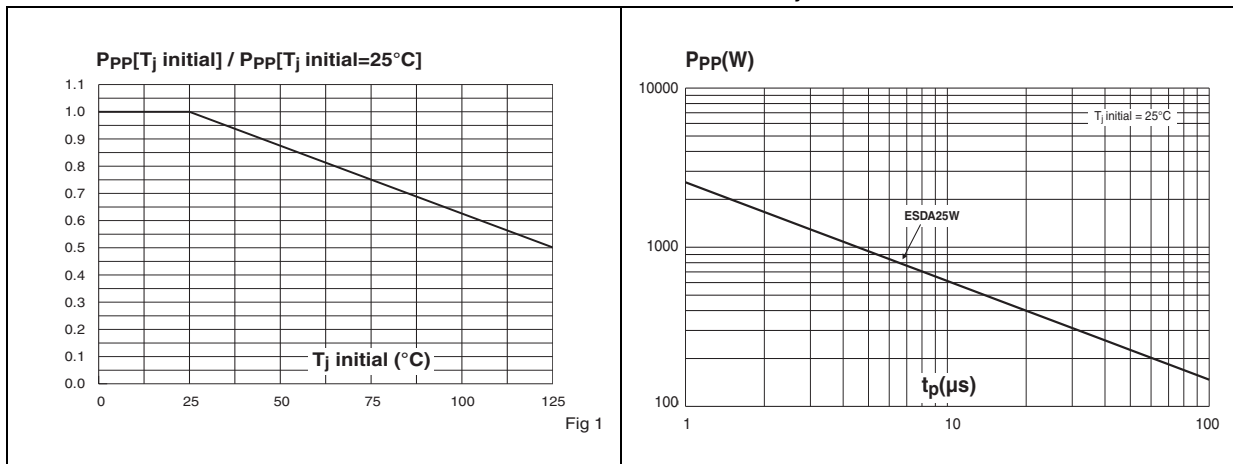
The graph shows the relationship between current (I) and voltage (V). The x-axis is voltage (V) and the y-axis is current (I). Key points on the graph include:  $V_{CL}$  (clamping voltage),  $V_{BR}$  (breakdown voltage),  $V_{RM}$  (stand-off voltage),  $I_{RM}$  (leakage current),  $I_{PP}$  (peak pulse current),  $I_F$  (forward current), and  $V_F$  (forward voltage drop). A slope of  $1/R_d$  is indicated for the dynamic resistance region.

Part Numbers	$V_{BR}$			$I_{RM}$ @ $V_{RM}$		$V_F$ @ $I_F$		$R_d$	$\alpha T$	$C$
	min.	max.	@ $I_R$			max.		typ. <sup>(1)</sup>	max. <sup>(2)</sup>	typ.
	V	V	mA	$\mu A$	V	V	mA	$\Omega$	$10^{-4}/^{\circ}C$	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

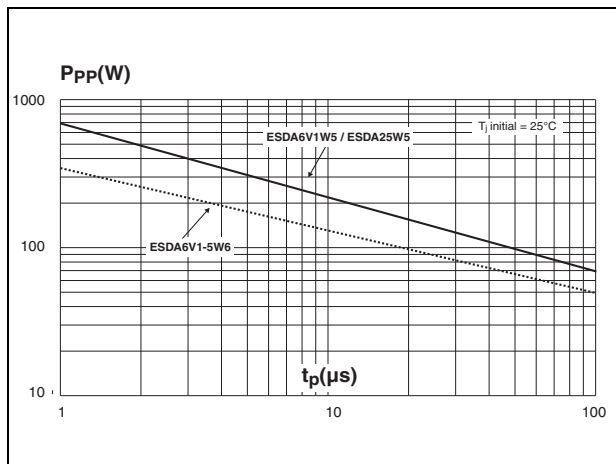
1. Square pulse  $I_{pp} = 15 A$ ,  $t_p = 2.5 \mu s$
2.  $V_{BR} = aT * (T_{amb} - 25^{\circ}C) * V_{BR}(25^{\circ}C)$

Figure 1. Peak power dissipation versus initial junction temperature

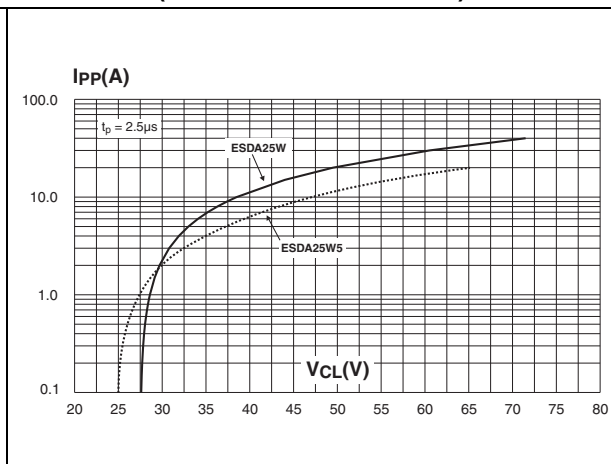
Figure 2. Peak pulse power versus exponential pulse duration ( $T_j$  initial =  $25^{\circ}C$ ) (ESDA25W)



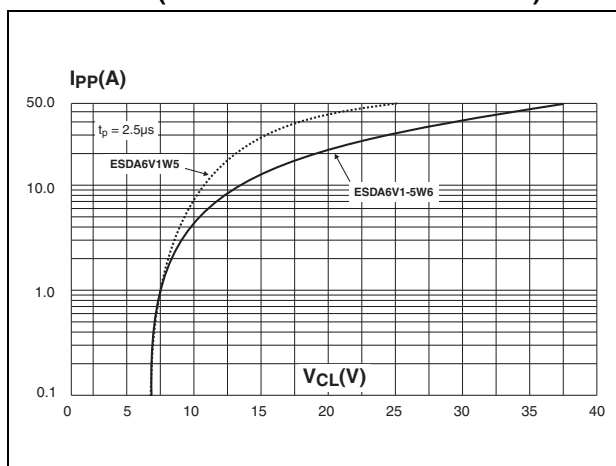
**Figure 3. Peak pulse power versus exponential pulse duration ( $T_j$  initial = 25°C) (ESDA25W5 / ESDA6V1W5 / ESDA6V1-5W6)**



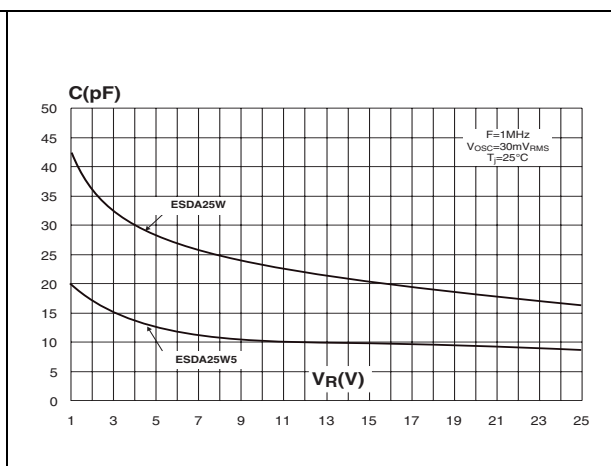
**Figure 4. Clamping voltage versus peak pulse current ( $T_j$  initial = 25°C, rectangular waveform,  $t_p = 2.5 \mu s$ ) (ESDA25W / ESDA25W5)**



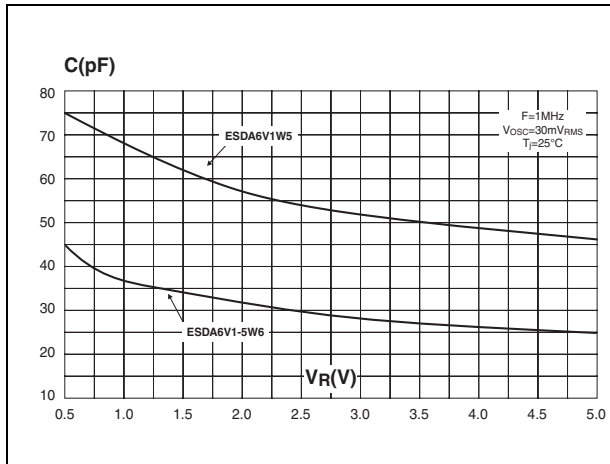
**Figure 5. Clamping voltage versus peak pulse current ( $T_j$  initial = 25°C, rectangular waveform,  $t_p = 2.5 \mu s$ ) (ESDA6V1W5 / ESDA6V1-5W6)**



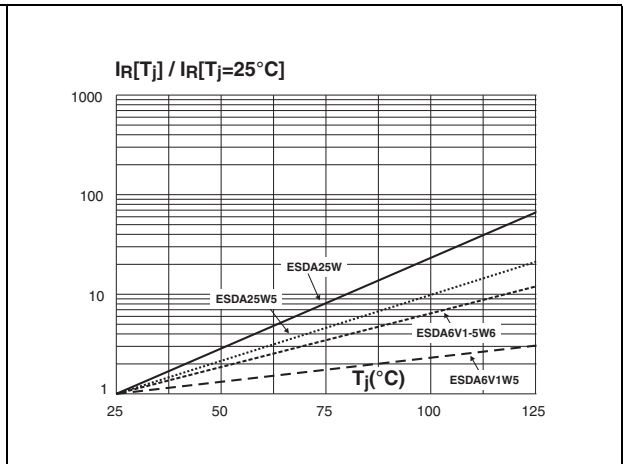
**Figure 6. Capacitance versus reverse applied voltage (typical values) (ESDA25W / ESDA25W5)**



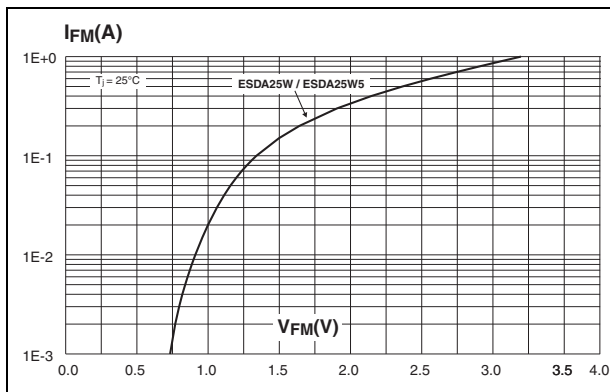
**Figure 7. Capacitance versus reverse applied voltage (typical values) (ESDA6V1W5 / ESDA6V1-5W6)**



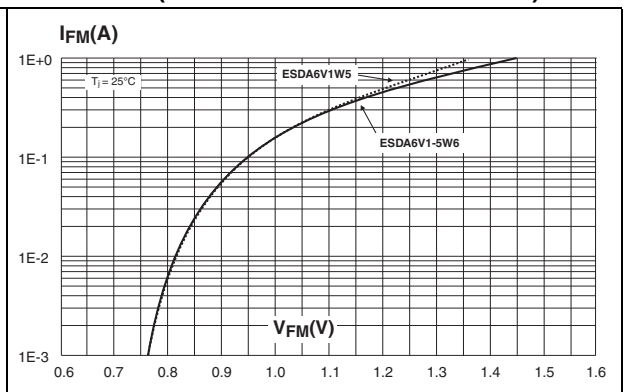
**Figure 8. Relative variation of leakage current versus junction temperature (typical values)**



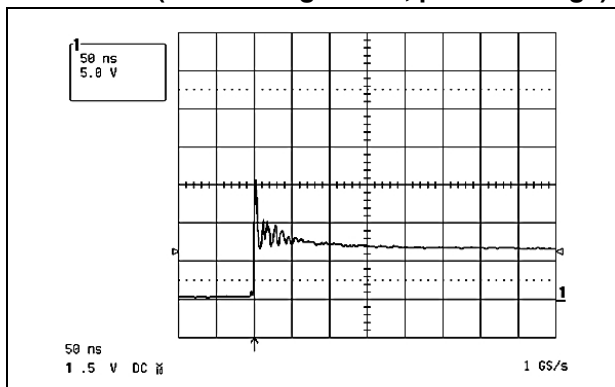
**Figure 9. Peak forward voltage drop versus peak forward current (typical values) (ESDA25W / ESDA25W5)**



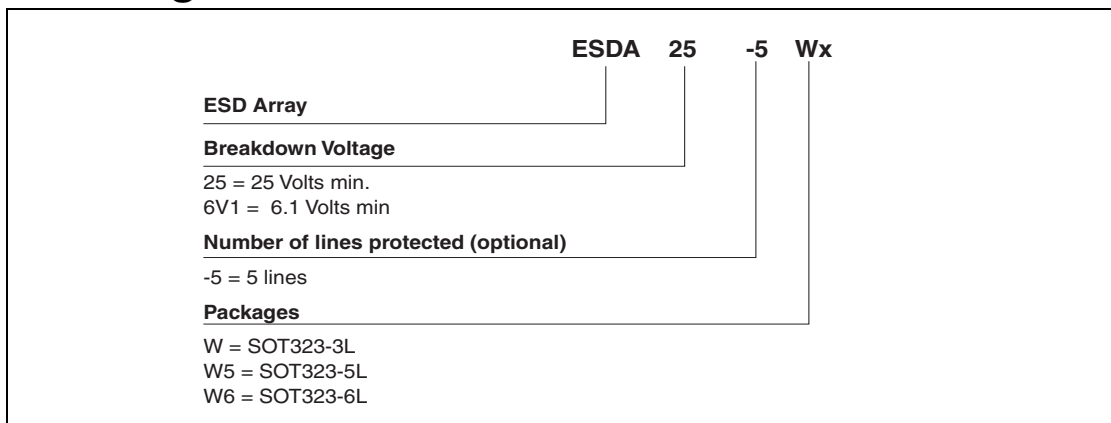
**Figure 10. Peak forward voltage drop versus peak forward current (typical values) (ESDA6V1W5 / ESDA6V1-5W6)**



**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

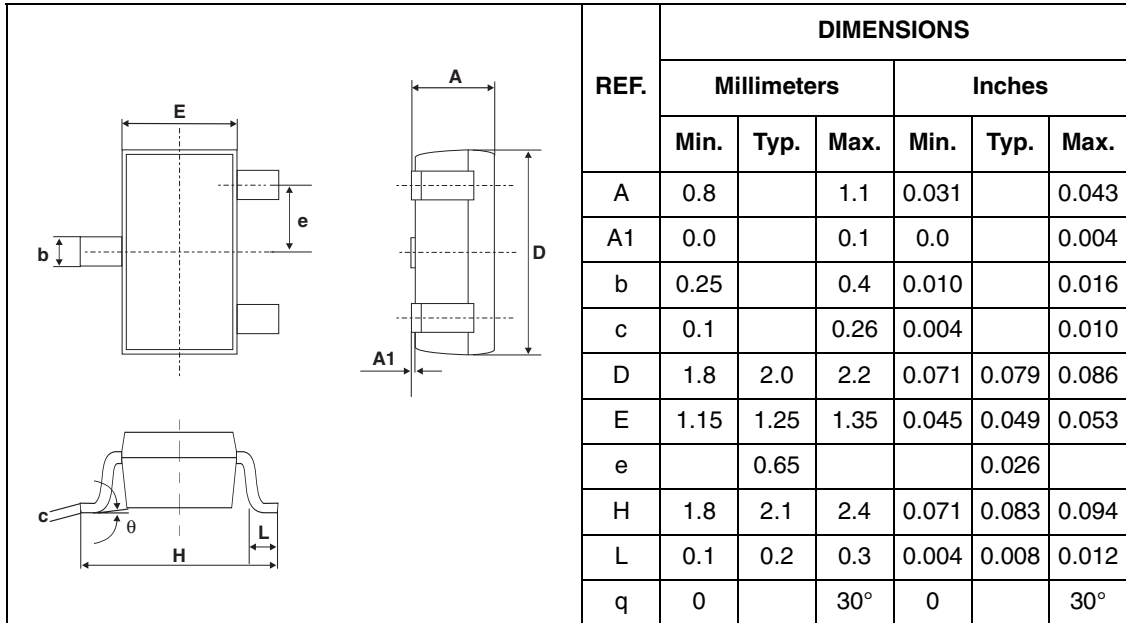
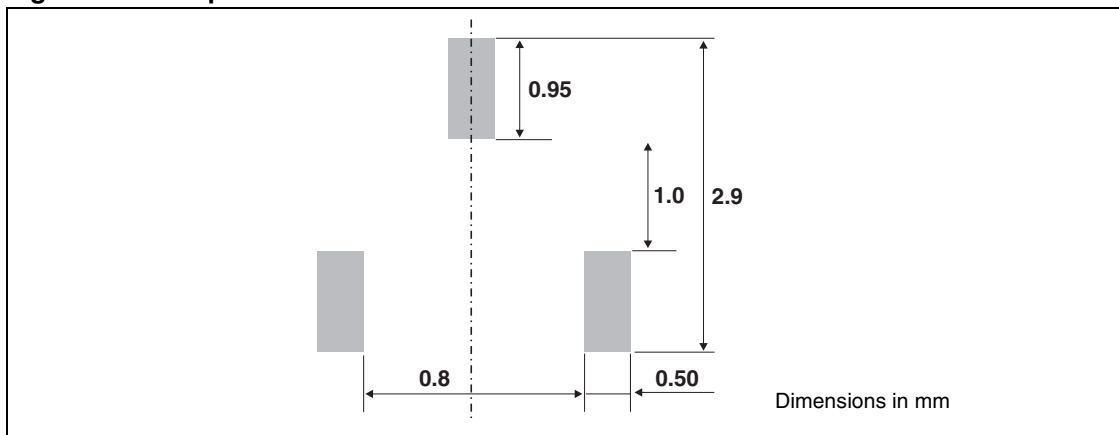


Figure 12. Footprint dimensions



### 3.2 SOT323-5L package

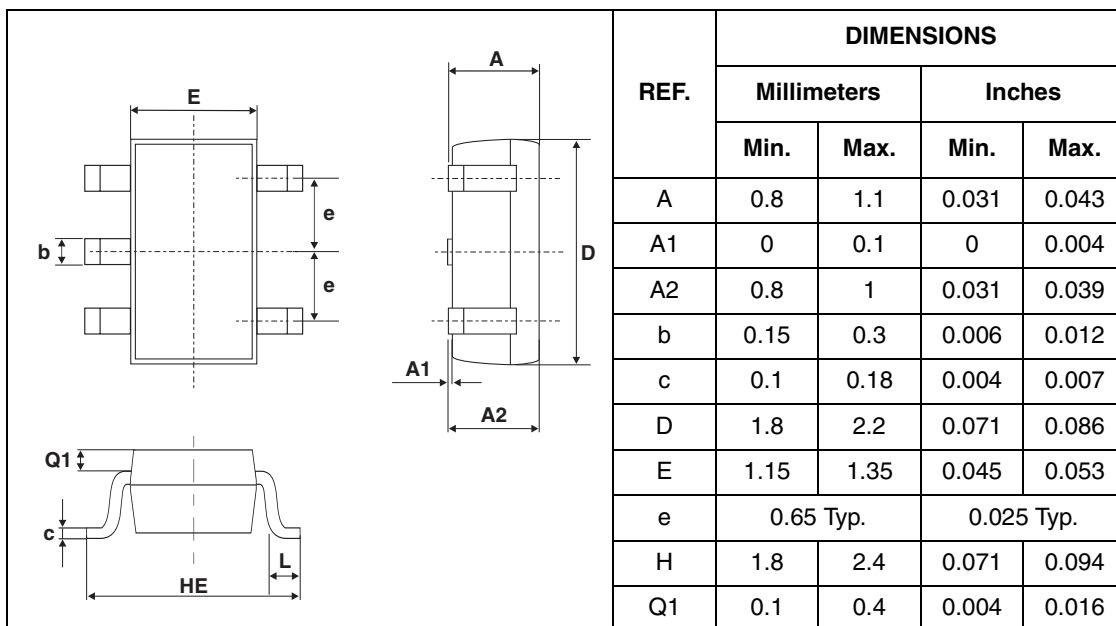
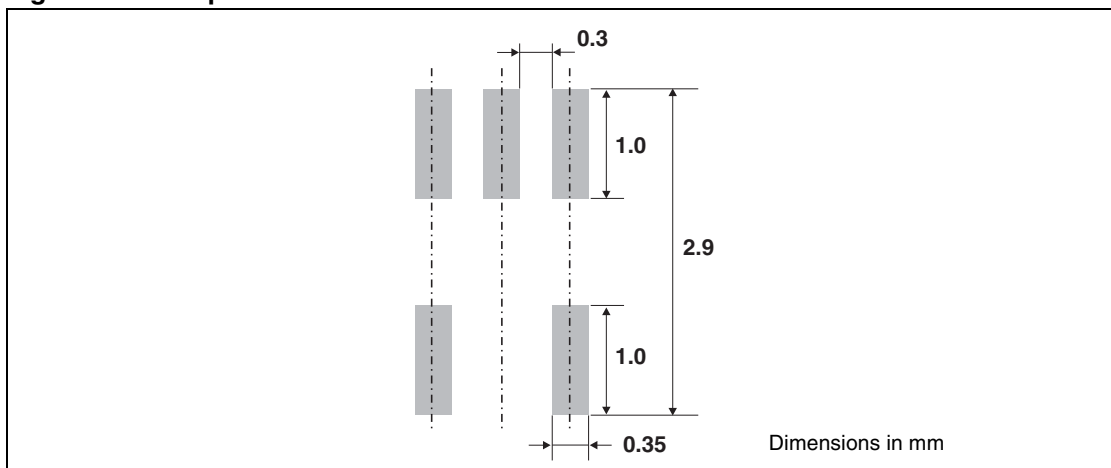


Figure 13. Footprint dimensions





### 3.3 SOT323-6L package

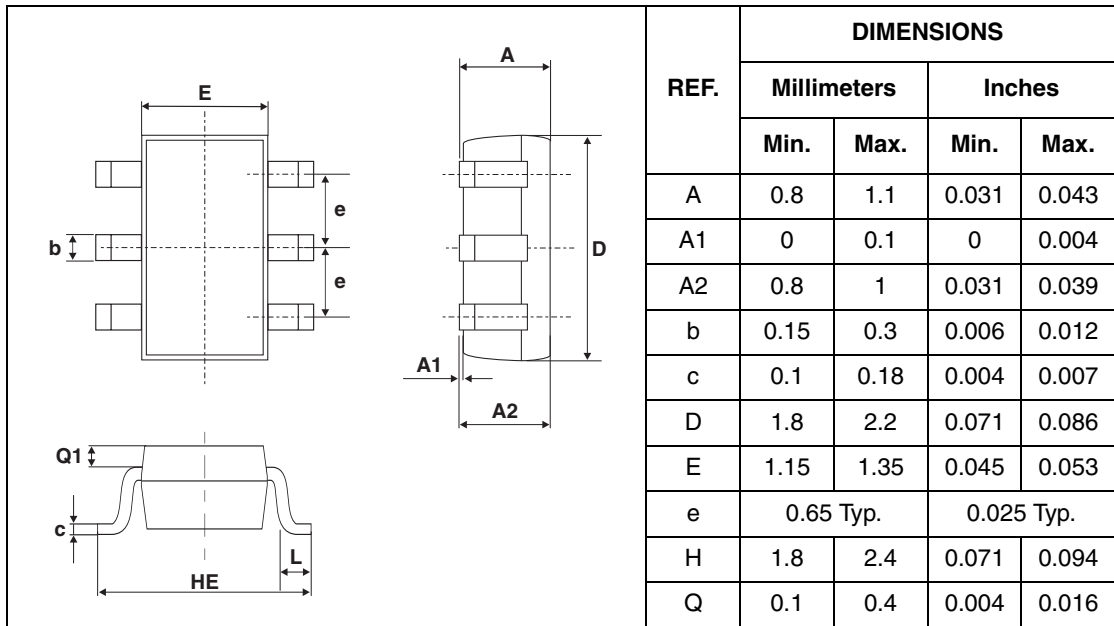
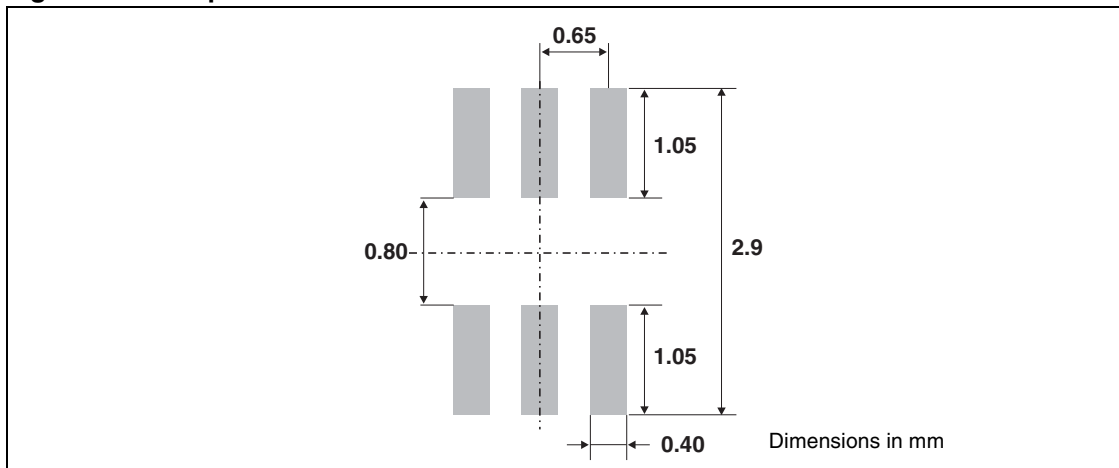


Figure 14. Footprint dimensions



## 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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