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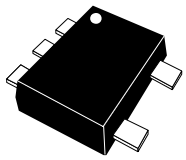
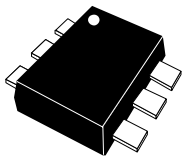
ESDALC6V1Px

Low capacitance Transil™ arrays for ESD protection

Datasheet - production data



SOT-665



SOT-666IP

Features

- 2 to 4 unidirectional Transil functions
- Breakdown voltage V_{BR} = 6.1 V min
- Low leakage current < 100 nA
- Low diode capacitance (7.5 pF at 3 V)
- Very small PCB area < 2.6 mm²

Benefits

- High ESD protection level
- High integration

Complies with the following standards

- IEC 61000-4-2 (exceeds level 4)
  - 20 kV (air discharge)
  - 8 kV (contact discharge)
- MIL STD 883E - Method 3015-7: class 3
  - 25 kV HBM (human body model)

Applications

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

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

Description

These devices are monolithic suppressors designed to protect components connected to data and transmission lines against ESD. They clamp the voltage just above the logic level supply for positive transients and to a diode drop below ground for negative transients.

Figure 1: ESDALC6V1P5 functional diagram

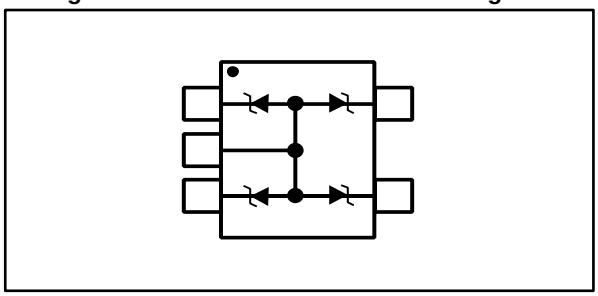
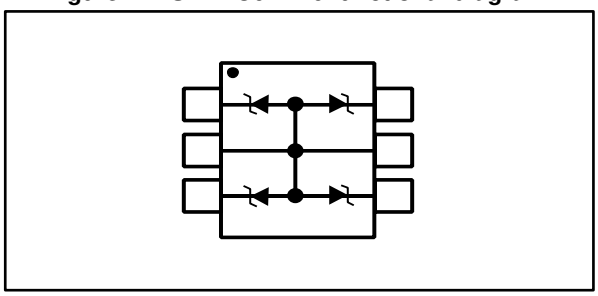


Figure 2: ESDALC6V1P6 functional diagram



TM: Transil is a trademark of STMicroelectronics

1 Characteristics

Table 1: Absolute maximum ratings (T_{amb} = 25 °C)

Symbol	Parameter		Value	Unit
V_{PP}	Peak pulse voltage	IEC 61000-4-2: Contact discharge Air discharge	 8 20	kV
		MIL STD 883G - method 3015-7: Class3	25	
P_{PP}	Peak pulse power	8/20µs, T_j initial = T_{amb}	30	W
T_{stg}	Storage temperature range		-55 to +150	°C
T_j	Junction temperature		150	
T_L	Maximum lead temperature for soldering during 10 s		260	
T_{op}	Operating temperature range		-40 to +150	

Figure 3: Electrical characteristics (definitions)

Symbol		Parameter
V_{BR}	=	Breakdown voltage
V_{CL}	=	Clamping voltage
I_{RM}	=	Leakage current
I_F	=	Forward current
I_{PP}	=	Peak pulse current
I_R	=	Breakdown current
V_F	=	Forward voltage drop
C	=	Capacitance
R_d	=	Dynamic impedance
αT	=	Voltage temperature

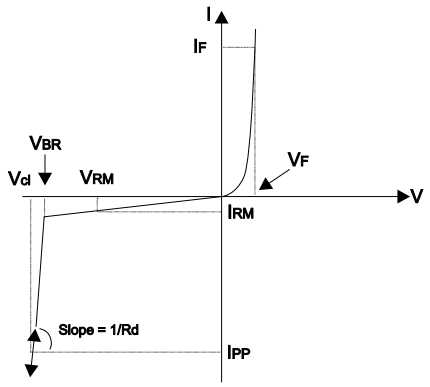


Table 2: Electrical characteristics (T_{amb} = 25 °C)

Order code	V_{BR} at I_R			I_{RM} at V_{RM}			R_d	αT	C
	Min.	Max.		Typ.	Max.		Typ.	Typ.	Typ. at 3 V
	V	V	mA	nA	µA	V	Ω	10^{-4}/°C	pF
ESDALC6V1P5 ESDALC6V1P6	6.1	7.2	1	10	0.1	3	1.5	4.5	7.5

1.1 Characteristics (curves)

Figure 4: Peak pulse power dissipation versus initial junction temperature

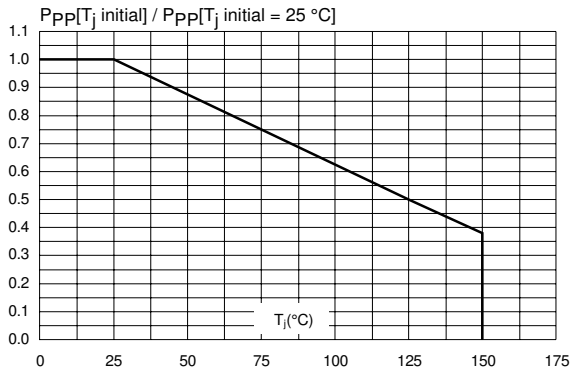


Figure 5: Peak pulse power versus exponential pulse duration (T_j initial = 25 °C)

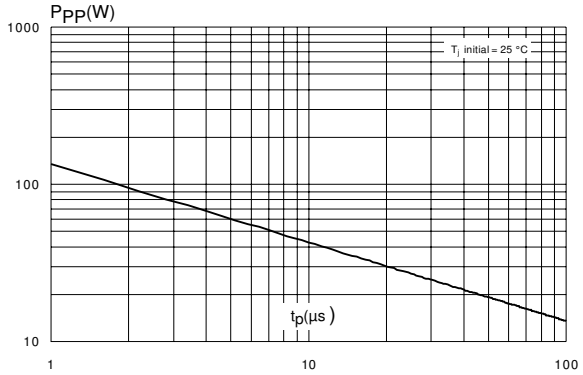


Figure 6: Clamping voltage versus peak pulse current (typical values, rectangular waveform)

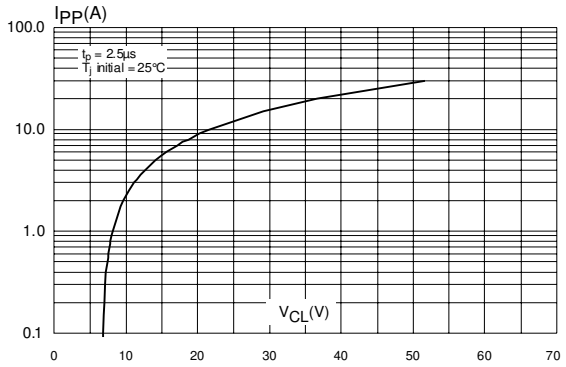


Figure 7: Forward voltage drop versus peak forward current (typical values)

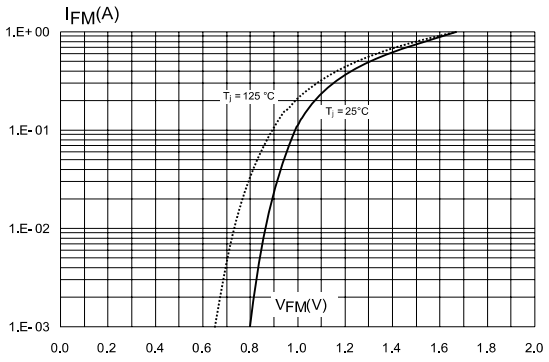


Figure 8: Junction capacitance versus reverse applied voltage (typical values)

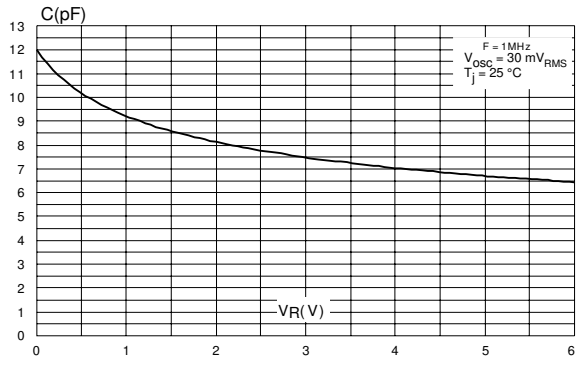


Figure 9: Relative variation of leakage current versus junction temperature (typical values)

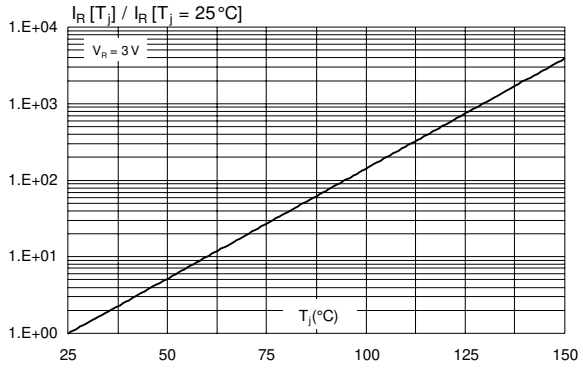


Figure 10: ESD response to IEC 61000-4-2 (air discharge 15 kV positive surge)

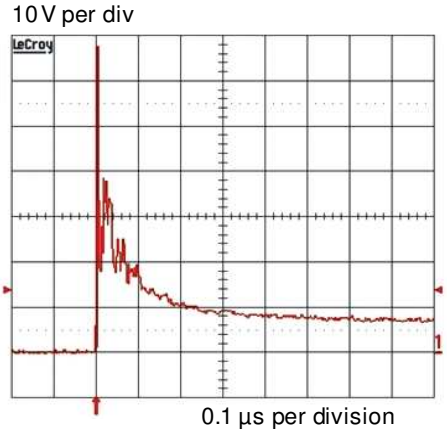


Figure 11: Analog crosstalk measurement

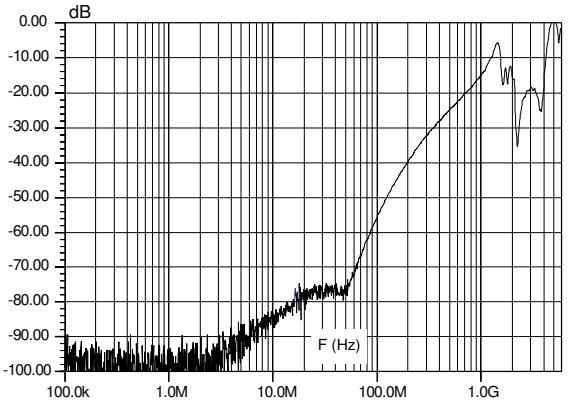
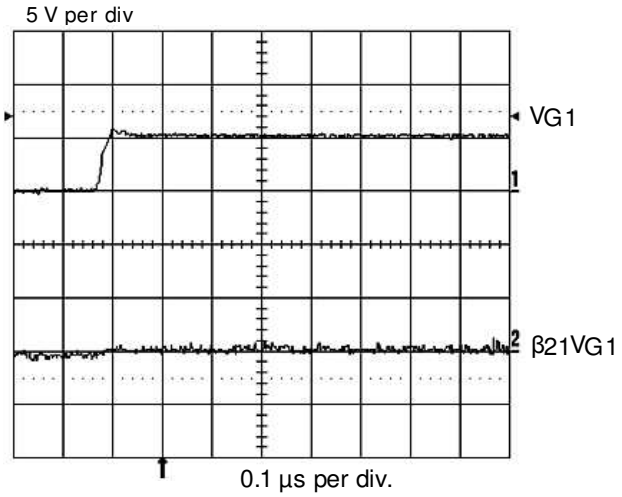


Figure 12: Digital crosstalk test measurement



2 Package information

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: ***www.st.com***. ECOPACK® is an ST trademark.

2.1 SOT-665 package information

Figure 13: SOT-665 package outline

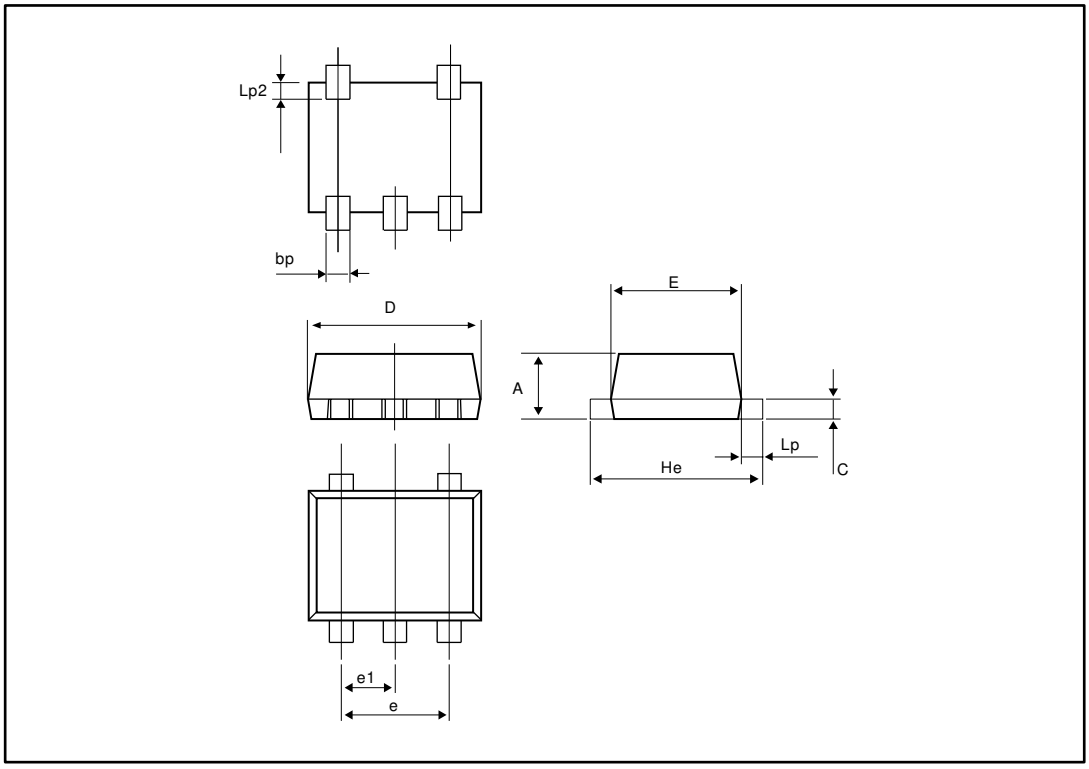
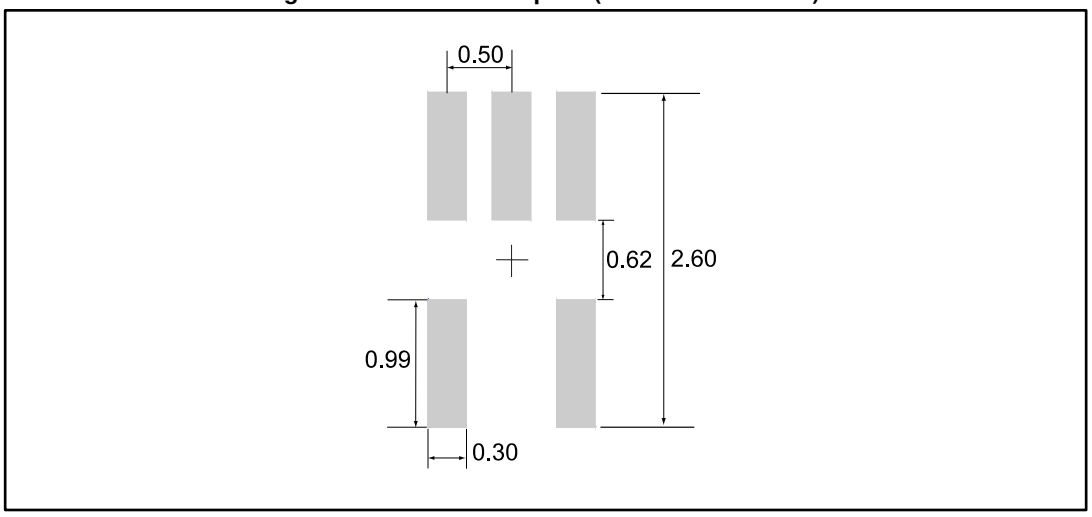


Table 3: SOT-665 package mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.5		0.62	0.020		0.024
bp	0.17		0.27	0.007		0.011
c	0.08		0.18	0.003		0.007
D	1.5		1.7	0.060		0.067
E	1.1		1.3	0.043		0.051
e		1			0.039	
e1		0.5			0.020	
He	1.5		1.7	0.059		0.067
Lp	0.1		0.3	0.004		0.012
Lp2	0.11		0.26	0.004		0.010

Figure 14: SOT-665 footprint (dimensions in mm)



2.2 SOT-666IP package information

Figure 15: SOT-666IP package outline

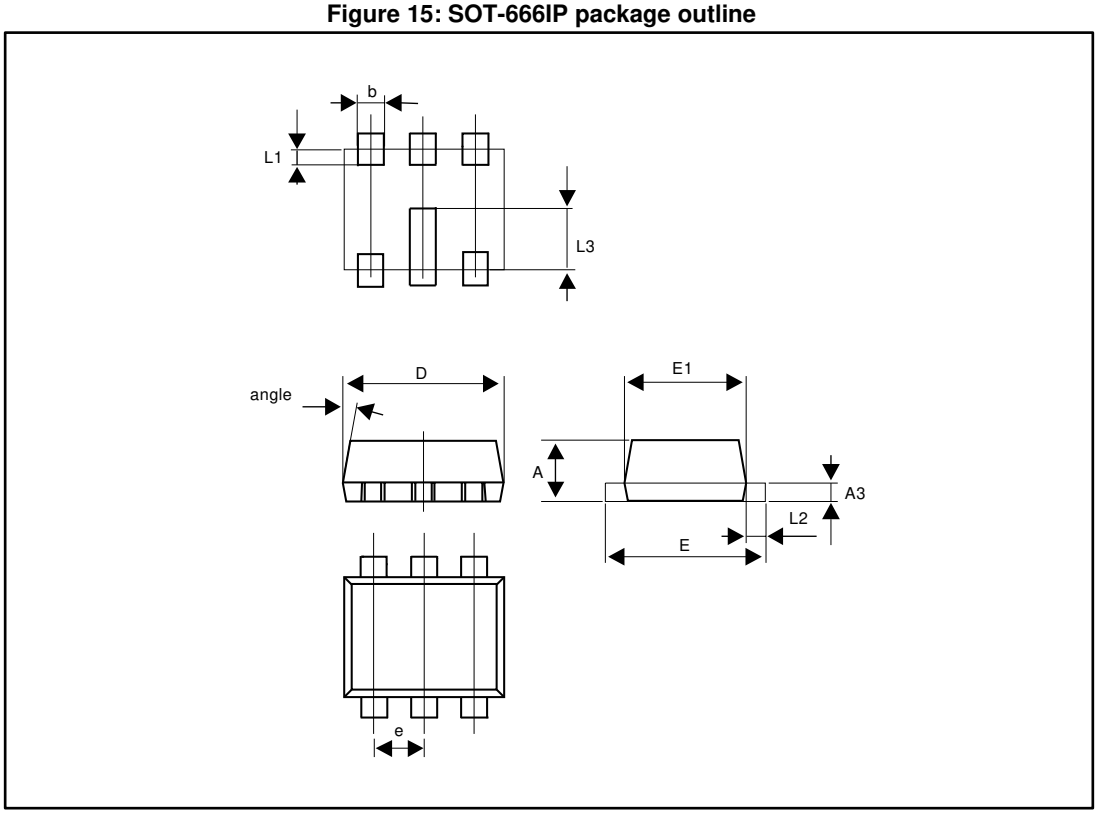
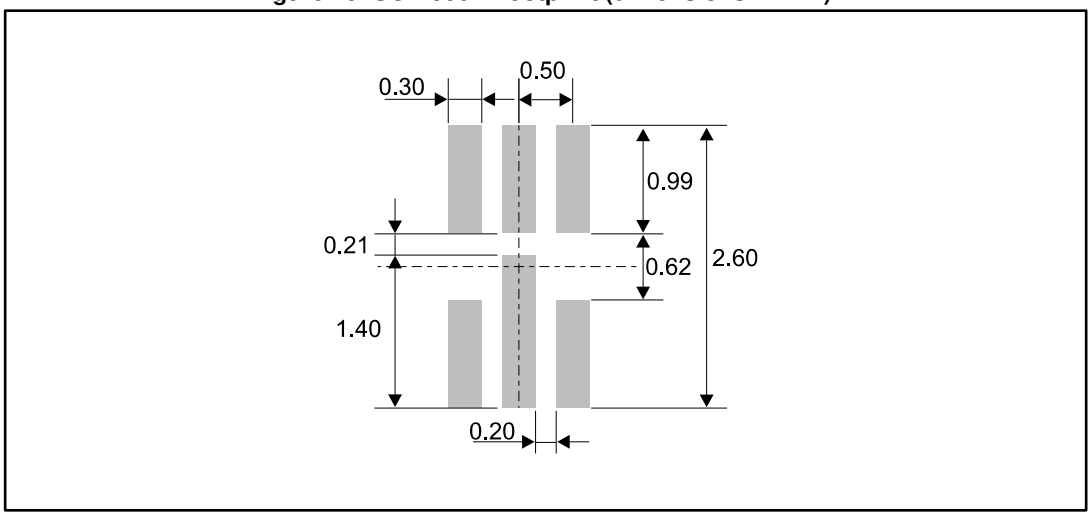


Table 4: SOT-666IP package mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.45		0.62	0.018		0.024
A3	0.08		0.18	0.003		0.007
b	0.17		0.34	0.007		0.0013
D	1.50		1.70	0.059		0.067
E	1.50		1.70	0.059		0.067
E1	1.10		1.30	0.043		0.051
e		0.5			0.020	
L1		0.19			0.007	
L2	0.1		0.3	0.004		0.012
L3		0.6			0.024	

Figure 16: SOT-666IP footprint (dimensions in mm)



3 Ordering information

Figure 17: Ordering information scheme

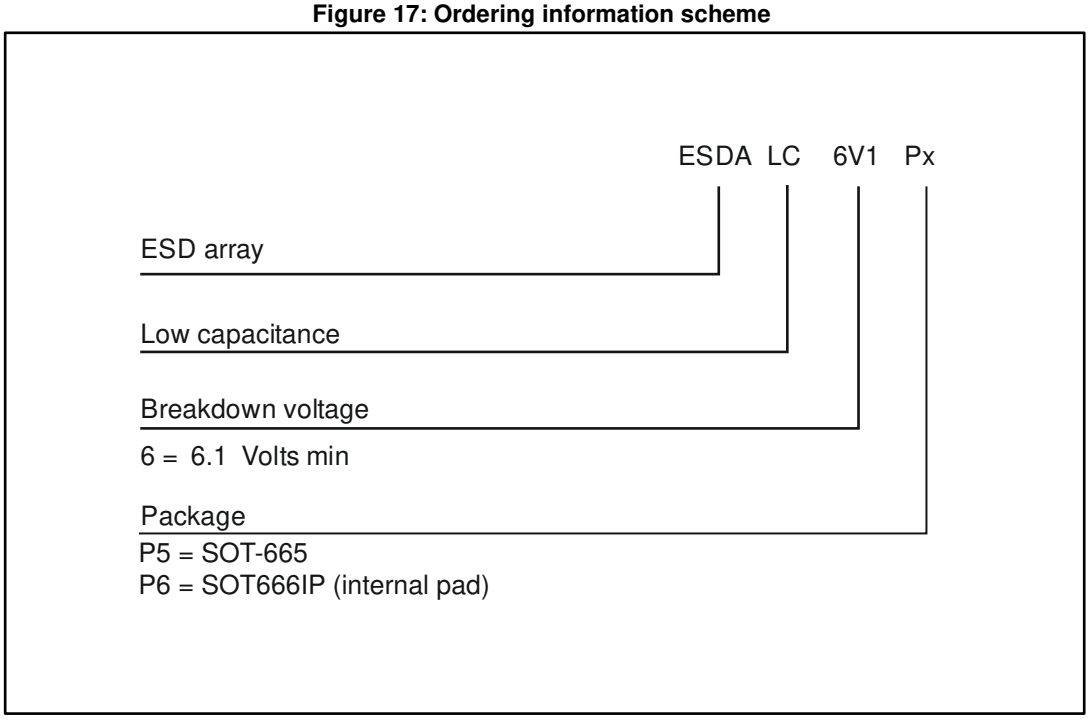


Table 5: Ordering information

Order code	Marking[1]	Package	Weight	Base qty.	Delivery mode
ESDALC6V1P5	A1	SOT-665	2.9 mg	3000	Tape and reel
ESDALC6V1P6	D	SOT-666IP			

Notes:

(1)The marking can be rotated by multiples of 90° to differentiate assembly location

5 Revision history

Table 6: Document revision history

Date	Revision	Changes
16-Aug-2006	1	ESDALC6V1P3, ESDALC6V1P5, and ESDALC6V1P6 merged and reformatted to current standards.
23-Aug-2006	2	Table 1 on page 2: Temperature range upgraded to T_j max = 150 °C
11-Oct-2006	3	Added values for V_{PP} in Table 1.
23-Apr-2008	4	Reformatted to current standards. Added I_{RM} typical value in *Table 2*. Update minimum dimension for L2 of SOT-663 in *Table 3*.
15-Jan-2010	5	Updated *Figure 17: SOT-665 footprint (dimensions in mm).*
03-Dec-2014	6	Updated SOT-666IP dimension definitions and reformatted to current standard.
17-Mar-2017	7	Removed SOT-663 package. Updated *Table 1: "Absolute maximum ratings (Tamb = 25 °C)"*. Updated *Table 3: "SOT-665 package mechanical data"* and *Table 3: "SOT-665 package mechanical data"*.

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