

# 1 Characteristics

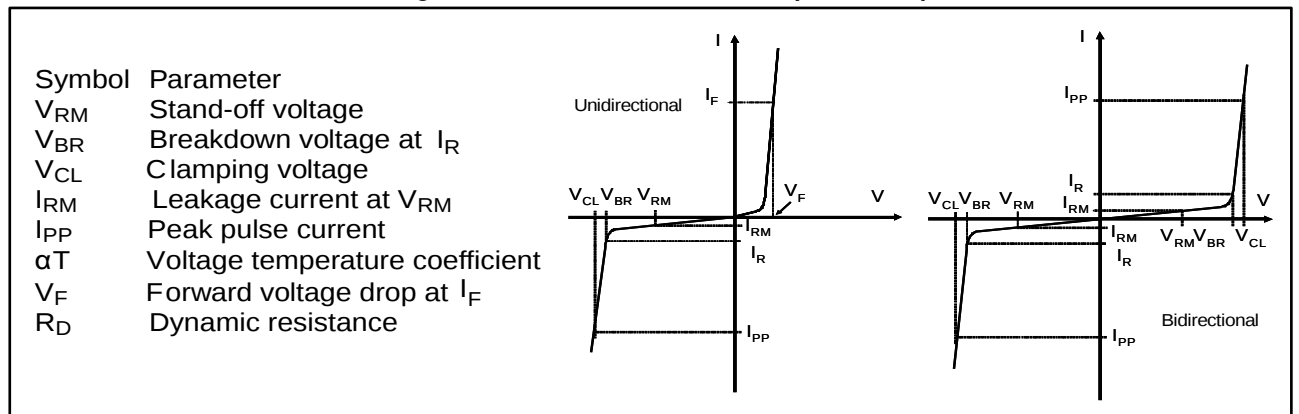
**Table 2: Absolute maximum ratings (limiting values at  $T_{amb} = 25\text{ °C}$  unless otherwise specified)**

| Symbol    | Parameter                                           |                                 | Value       | Unit               |
|-----------|-----------------------------------------------------|---------------------------------|-------------|--------------------|
| $I_{pp}$  | Peak pulse current (8/20 $\mu\text{s}$ )            | $T_j \text{ initial} = T_{amb}$ | 500         | A                  |
| $T_{stg}$ | Storage temperature range                           |                                 | -65 to +150 | $^{\circ}\text{C}$ |
| $T_j$     | Operating junction temperature range                |                                 | -55 to +150 | $^{\circ}\text{C}$ |
| $T_L$     | Maximum lead temperature for soldering during 10 s. |                                 | 260         | $^{\circ}\text{C}$ |

**Table 3: Thermal resistances**

| Symbol        | Parameter                                                        | Value | Unit                 |
|---------------|------------------------------------------------------------------|-------|----------------------|
| $R_{th(j-l)}$ | Junction to leads                                                | 15    | $^{\circ}\text{C/W}$ |
| $R_{th(j-a)}$ | Junction to ambient on printed circuit on recommended pad layout | 90    | $^{\circ}\text{C/W}$ |

**Figure 1: Electrical characteristics (definitions)**



**Table 4: Electrical characteristics ( $T_{amb} = 25\text{ °C}$ )**

| Order code       | $I_{RM}$ at $V_{RM}$  |                       |    | $V_{BR}$ at $I_R^{(1)}$ |      |      |    | $V_{CL}$ at $I_{PP}^{(2)} 1.2/50 \mu\text{s} - 8/20 \mu\text{s}$ |     | $R_D^{(3)}$<br>8/20 $\mu\text{s}$ | $\alpha T^{(4)}$         |
|------------------|-----------------------|-----------------------|----|-------------------------|------|------|----|------------------------------------------------------------------|-----|-----------------------------------|--------------------------|
|                  | 25 $^{\circ}\text{C}$ | 85 $^{\circ}\text{C}$ |    | Min.                    | Typ. | Max. |    | Max.                                                             |     | Typ.                              | Max.                     |
|                  | $\mu\text{A}$         |                       | V  | V                       |      |      | mA | V                                                                | A   | $\Omega$                          | 10-4/ $^{\circ}\text{C}$ |
| STIEC45-24AS/ACS | 0.2                   | 1                     | 24 | 26.7                    | 28.2 | 29.5 | 1  | 42                                                               | 500 | 0.025                             | 9.6                      |
| STIEC45-26AS/ACS | 0.2                   | 1                     | 26 | 28.9                    | 30.3 | 31.9 | 1  | 45                                                               | 500 | 0.026                             | 9.7                      |
| STIEC45-28AS/ACS | 0.2                   | 1                     | 28 | 31.1                    | 32.6 | 34.3 | 1  | 49                                                               | 500 | 0.029                             | 9.8                      |
| STIEC45-30AS/ACS | 0.2                   | 1                     | 30 | 33.3                    | 35   | 36.8 | 1  | 55                                                               | 500 | 0.036                             | 9.9                      |
| STIEC45-33AS/ACS | 0.2                   | 1                     | 33 | 36.7                    | 38.6 | 40.6 | 1  | 59                                                               | 500 | 0.036                             | 10                       |

**Notes:**

(1) Pulse test :  $t_p < 50\text{ ms}$ .

(2) Surge capability given for both directions (unidirectional and bidirectional types).

(3) To calculate maximum clamping voltage at other surge levels:  $V_{CLmax} = R_D \times I_{PP} + V_{BRmax}$

(4) To calculate  $V_{BR}$  versus junction temperature:  $V_{BR}$  at  $T_j = V_{BR}$  at  $25\text{ °C} \times (1 + \alpha T \times (T_j - 25))$

## 1.1 Characteristics (curves)

Figure 2: Pulse form

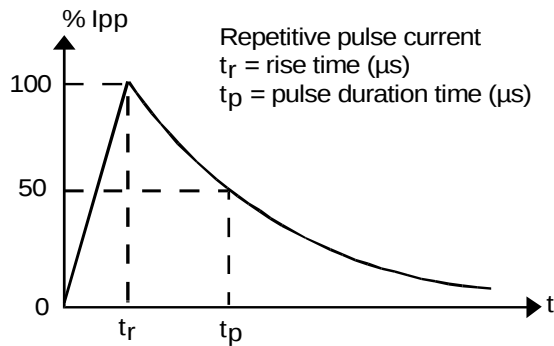
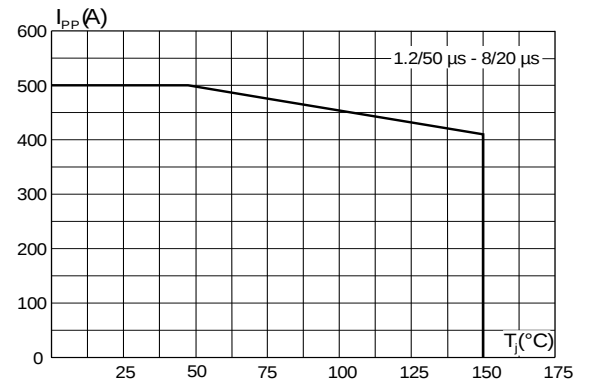
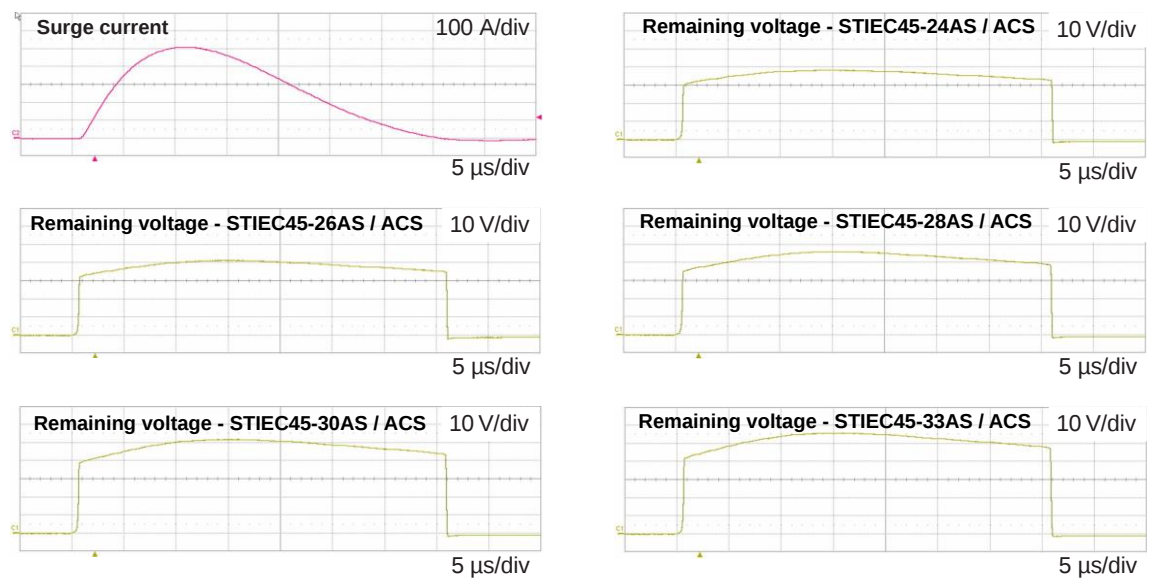


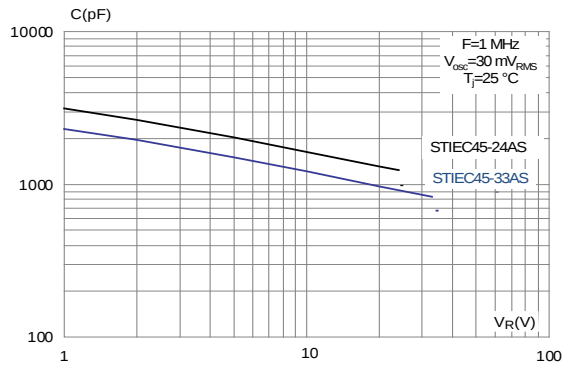
Figure 3: Peak pulse current versus initial junction temperature

Figure 4: Clamping voltage at 500 A (1.2/50  $\mu\text{s}$  - 8/20  $\mu\text{s}$ )

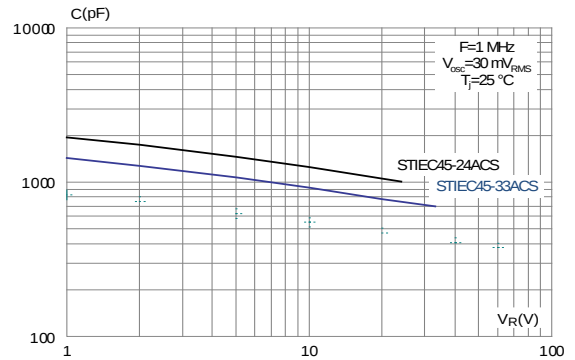
## Characteristics

## STIEC45-xxAS, STIEC45-xxACS

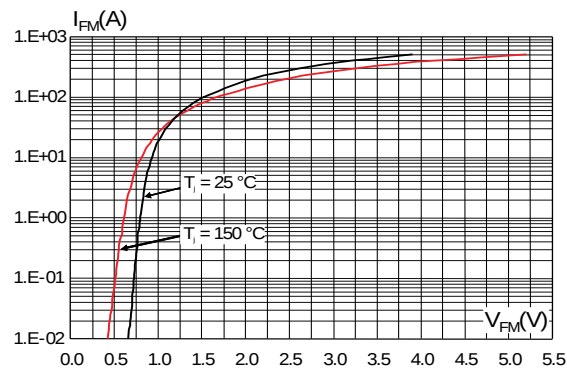
**Figure 5: Junction capacitance versus reverse applied voltage (unidirectional devices)**



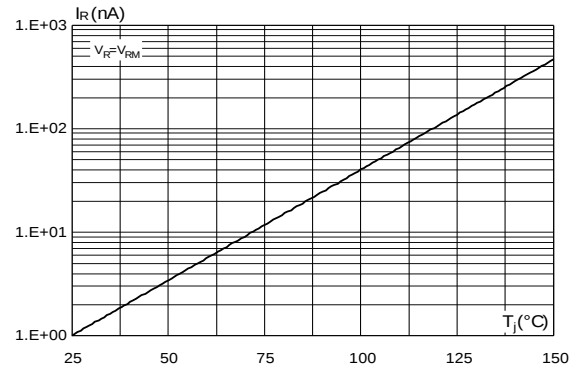
**Figure 6: Junction capacitance versus reverse applied voltage (bidirectional devices)**



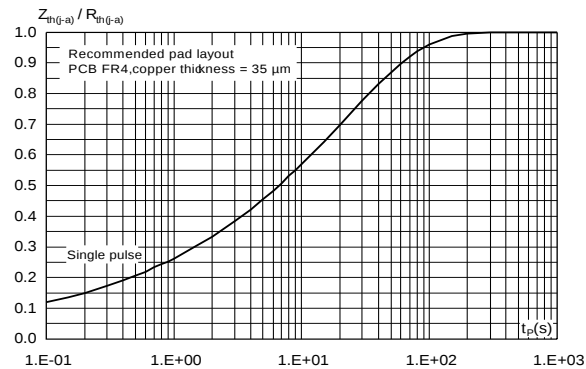
**Figure 7: Peak forward voltage drop versus peak forward current (unidirectional devices)**



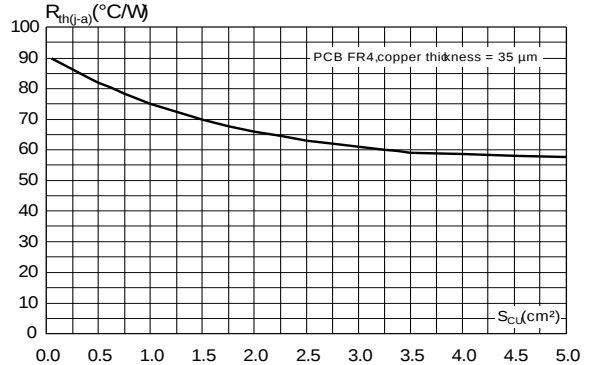
**Figure 8: Leakage current versus junction temperature**



**Figure 9: Relative variation of thermal impedance, junction to ambient, versus pulse duration**



**Figure 10: Thermal resistance junction to ambient versus copper surface under each lead**



## 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](http://www.st.com). ECOPACK® is an ST trademark.

### 2.1 SMC package information

Figure 11: SMC package outline

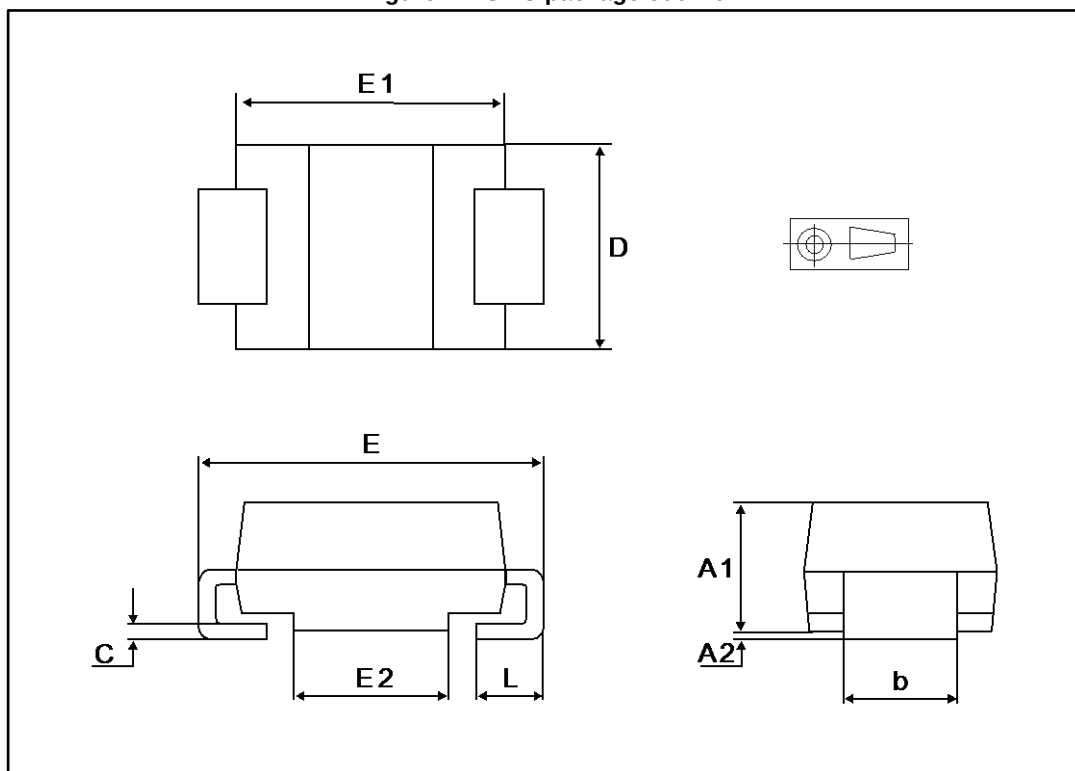
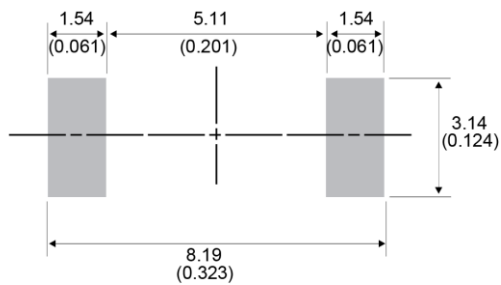
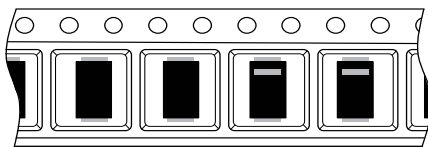


Table 5: SMC package mechanical data

| Ref. | Dimensions  |      |        |       |
|------|-------------|------|--------|-------|
|      | Millimeters |      | Inches |       |
|      | Min.        | Max. | Min.   | Max.  |
| A1   | 1.90        | 2.45 | 0.075  | 0.096 |
| A2   | 0.05        | 0.20 | 0.002  | 0.008 |
| b    | 2.90        | 3.20 | 0.114  | 0.126 |
| c    | 0.15        | 0.40 | 0.006  | 0.016 |
| D    | 5.55        | 6.25 | 0.218  | 0.246 |
| E    | 7.75        | 8.15 | 0.305  | 0.321 |
| E1   | 6.60        | 7.15 | 0.260  | 0.281 |
| E2   | 4.40        | 4.70 | 0.173  | 0.185 |
| L    | 0.75        | 1.50 | 0.030  | 0.060 |

**Figure 12: Footprint recommendation, dimensions in mm (inches)****Figure 13: Marking layout**

E : ECOPACK grade  
 XXXX : Marking  
 Z : Manufacturing location  
 Y : Year  
 WW : week

**Figure 14: Package orientation in reel**

Taped according to EIA-481

Note: Pocket dimensions are not on scale  
 Pocket shape may vary depending on package  
 On bidirectional devices, marking and logo may be not always in the same direction

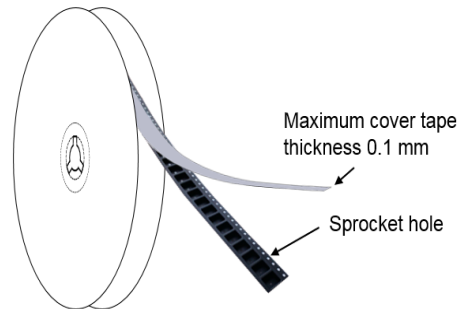
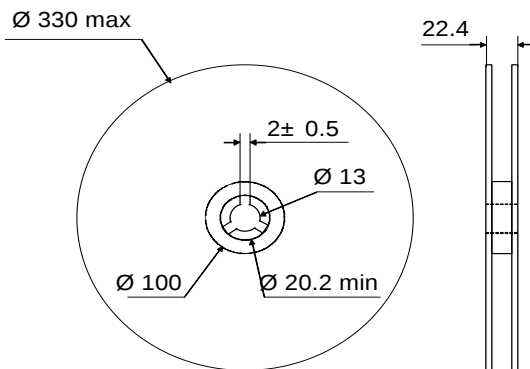
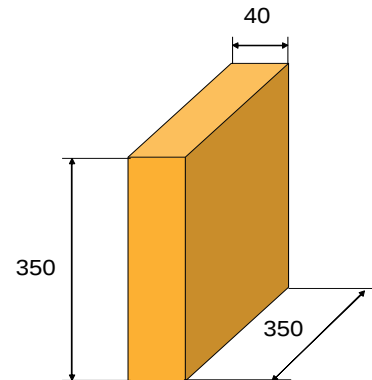
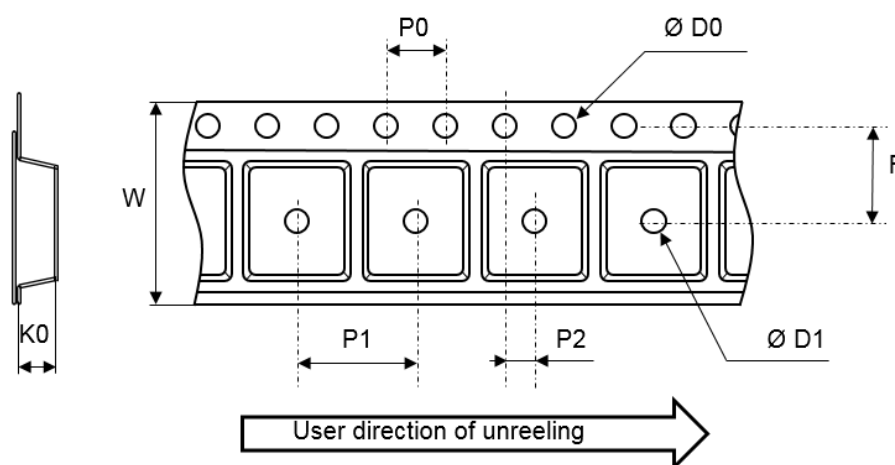
**Figure 15: Tape and reel orientation****Figure 16: 13" reel dimensions (mm)****Figure 17: Inner box dimensions (mm)**

Figure 18: Tape and reel outline

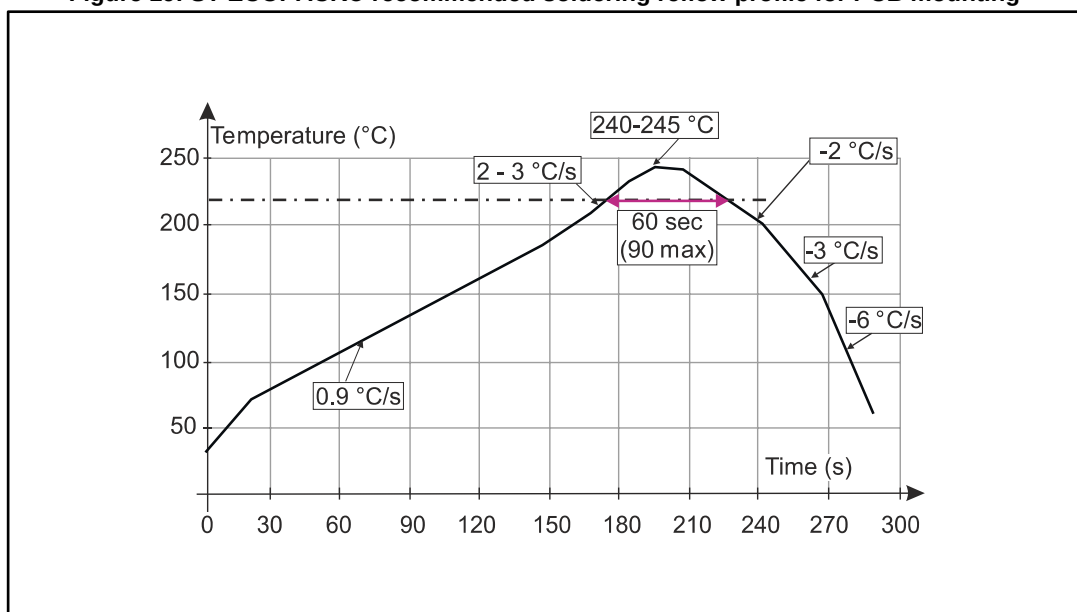


Note: Pocket dimensions are not on scale  
Pocket shape may vary depending on package

Table 6: Tape and reel mechanical data

| Ref.          | Dimensions  |      |      |
|---------------|-------------|------|------|
|               | Millimeters |      |      |
|               | Min.        | Typ. | Max. |
| $\text{Ø D0}$ | 1.4         | 1.5  | 1.6  |
| $\text{Ø D1}$ | 1.5         | -    | -    |
| F             | 7.4         | 7.5  | 7.6  |
| K0            | 2.39        | 2.49 | 2.59 |
| P0            | 3.9         | 4.0  | 4.1  |
| P1            | 7.9         | 8    | 8.1  |
| P2            | 1.9         | 2    | 2.1  |
| W             | 15.7        | 16   | 16.3 |

Figure 19: ST ECOPACK® recommended soldering reflow profile for PCB mounting



Minimize air convection currents in the reflow oven to avoid component movement. Maximum soldering profile corresponds to the latest IPC/JEDEC J-STD-020.

### 3 Ordering information

Figure 20: Ordering information scheme

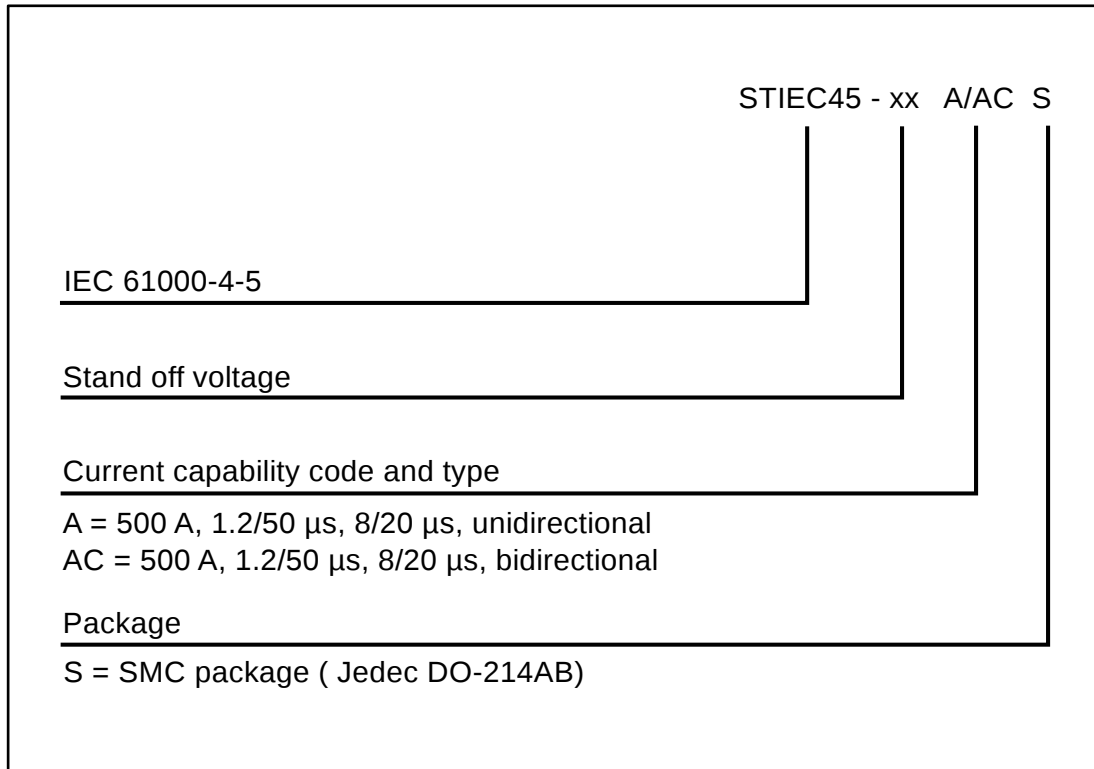


Table 7: Ordering information

| Order code    | Marking | Package | Weight | Base qty. | Delivery mode |
|---------------|---------|---------|--------|-----------|---------------|
| STIEC45-24AS  | 4524A   | SMC     | 0.25 g | 2500      | Tape and reel |
| STIEC45-26AS  | 4526A   |         |        |           |               |
| STIEC45-28AS  | 4528A   |         |        |           |               |
| STIEC45-30AS  | 4530A   |         |        |           |               |
| STIEC45-33AS  | 4533A   |         |        |           |               |
| STIEC45-24ACS | 4524C   |         |        |           |               |
| STIEC45-26ACS | 4526C   |         |        |           |               |
| STIEC45-28ACS | 4528C   |         |        |           |               |
| STIEC4530ACS  | 4530C   |         |        |           |               |
| STIEC45-33ACS | 4533C   |         |        |           |               |

## 4 Revision history

**Table 8: Document revision history**

| Date        | Revision | Changes                                                                          |
|-------------|----------|----------------------------------------------------------------------------------|
| 07-Dec-2017 | 1        | First issue                                                                      |
| 11-Jan-2017 | 2        | Added bidirectional types and updated stand-off voltage range from 24 V to 68 V. |
| 13-Nov-2017 | 3        | Updated SMC package information. Updated $V_{RM}$ range from 24 V to 33 V.       |

## 5 Disclaimer

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