

# 1 Characteristics

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

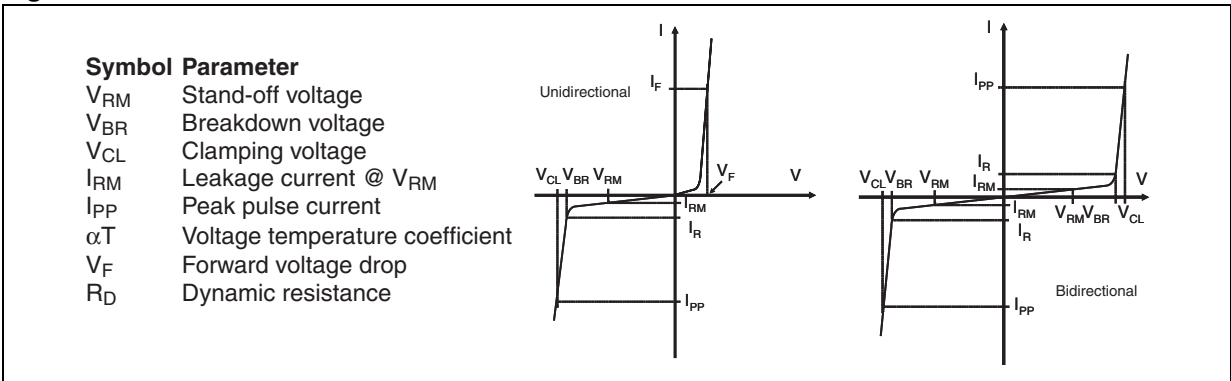
| Symbol    | Parameter                                                                       | Value        | Unit               |
|-----------|---------------------------------------------------------------------------------|--------------|--------------------|
| $P_{PP}$  | Peak pulse power dissipation <sup>(1)</sup><br>$T_{j\text{ initial}} = T_{amb}$ | 1500         | W                  |
| $T_{stg}$ | 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          | $^{\circ}\text{C}$ |

1. For a surge greater than the maximum values, the diode will fail in short-circuit.

**Table 2. Thermal parameter**

| 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**



**Figure 2. Pulse definition for electrical characteristics**

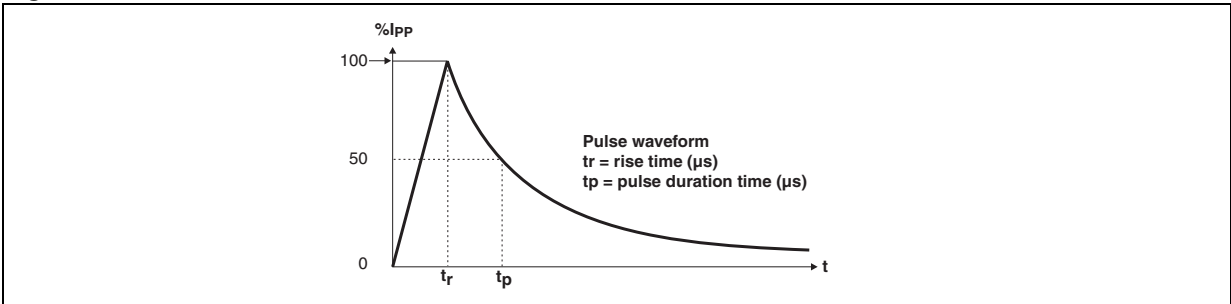


Table 3. Electrical characteristics, parameter values ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ )

| Order code   | $I_{RM} \text{ max}@V_{RM}$ |                       |      | $V_{BR} @I_R^{(1)}$ |     |      |    | $V_{CL} @I_{PP}$<br>10/1000 $\mu\text{s}$ |                  | $R_D$<br>10/1000 $\mu\text{s}$ | $V_{CL} @I_{PP}$<br>8/20 $\mu\text{s}$ |                  | $R_D$<br>8/20 $\mu\text{s}$ | $\alpha T^{(2)}$         |
|--------------|-----------------------------|-----------------------|------|---------------------|-----|------|----|-------------------------------------------|------------------|--------------------------------|----------------------------------------|------------------|-----------------------------|--------------------------|
|              | 25 $^{\circ}\text{C}$       | 85 $^{\circ}\text{C}$ |      | min                 | typ | max  |    | max                                       |                  |                                | max                                    |                  |                             | max                      |
|              | $\mu\text{A}$               |                       | V    | V                   |     |      | mA | V <sup>(3)</sup>                          | A <sup>(4)</sup> | $\Omega$                       | V <sup>(3)</sup>                       | A <sup>(4)</sup> | $\Omega$                    | 10-4/ $^{\circ}\text{C}$ |
| SM15T6V8A/CA | 500                         | 2000                  | 5.8  | 6.45                | 6.8 | 7.14 | 10 | 10.5                                      | 143              | 0.023                          | 13.4                                   | 746              | 0.008                       | 5.7                      |
| SM15T7V5A/CA | 250                         | 1000                  | 6.4  | 7.13                | 7.5 | 7.88 | 10 | 11.3                                      | 132              | 0.026                          | 14.5                                   | 690              | 0.010                       | 6.1                      |
| SM15T10A/CA  | 10                          | 50                    | 8.55 | 9.5                 | 10  | 10.5 | 1  | 14.5                                      | 103              | 0.039                          | 18.6                                   | 538              | 0.015                       | 7.3                      |
| SM15T12A/CA  | 0.2                         | 1                     | 10.2 | 11.4                | 12  | 12.6 | 1  | 16.7                                      | 90               | 0.046                          | 21.7                                   | 461              | 0.020                       | 7.8                      |
| SM15T15A/CA  | 0.2                         | 1                     | 12.8 | 14.3                | 15  | 15.8 | 1  | 21.2                                      | 71               | 0.076                          | 27.2                                   | 368              | 0.031                       | 8.4                      |
| SM15T18A/CA  | 0.2                         | 1                     | 15.3 | 17.1                | 18  | 18.9 | 1  | 25.2                                      | 59.5             | 0.106                          | 32.5                                   | 308              | 0.044                       | 8.8                      |
| SM15T22A/CA  | 0.2                         | 1                     | 18.8 | 20.9                | 22  | 23.1 | 1  | 30.6                                      | 49               | 0.153                          | 39.3                                   | 254              | 0.064                       | 9.2                      |
| SM15T24A/CA  | 0.2                         | 1                     | 20.5 | 22.8                | 24  | 25.2 | 1  | 33.2                                      | 45               | 0.178                          | 42.8                                   | 234              | 0.075                       | 9.4                      |
| SM15T27A/CA  | 0.2                         | 1                     | 23.1 | 25.7                | 27  | 28.4 | 1  | 37.5                                      | 40               | 0.228                          | 48.3                                   | 207              | 0.096                       | 9.6                      |
| SM15T30A/CA  | 0.2                         | 1                     | 25.6 | 28.5                | 30  | 31.5 | 1  | 41.5                                      | 36               | 0.278                          | 53.5                                   | 187              | 0.12                        | 9.7                      |
| SM15T33A/CA  | 0.2                         | 1                     | 28.2 | 31.4                | 33  | 34.7 | 1  | 45.7                                      | 33               | 0.333                          | 59.0                                   | 169              | 0.14                        | 9.8                      |
| SM15T36A/CA  | 0.2                         | 1                     | 30.8 | 34.2                | 36  | 37.8 | 1  | 49.9                                      | 30               | 0.403                          | 64.3                                   | 156              | 0.17                        | 9.9                      |
| SM15T39A/CA  | 0.2                         | 1                     | 33.3 | 37.1                | 39  | 41.0 | 1  | 53.9                                      | 28               | 0.461                          | 69.7                                   | 143              | 0.20                        | 10.0                     |
| SM15T68A/CA  | 0.2                         | 1                     | 58.1 | 64.6                | 68  | 71.4 | 1  | 92                                        | 16.3             | 1.26                           | 121                                    | 83               | 0.60                        | 10.4                     |
| SM15T75A/CA  | 0.2                         | 1                     | 64.1 | 71.3                | 75  | 78.8 | 1  | 103                                       | 14.6             | 1.66                           | 134                                    | 75               | 0.74                        | 10.5                     |
| SM15T100A/CA | 0.2                         | 1                     | 85.5 | 95.0                | 100 | 105  | 1  | 137                                       | 11               | 2.91                           | 178                                    | 56               | 1.30                        | 10.6                     |
| SM15T150A/CA | 0.2                         | 1                     | 128  | 143                 | 150 | 158  | 1  | 207                                       | 7.2              | 6.81                           | 265                                    | 38               | 2.82                        | 10.8                     |
| SM15T200A/CA | 0.2                         | 1                     | 171  | 190                 | 200 | 210  | 1  | 274                                       | 5.5              | 11.6                           | 353                                    | 28               | 5.11                        | 10.8                     |
| SM15T220A/CA | 0.2                         | 1                     | 188  | 209                 | 220 | 231  | 1  | 328                                       | 4.6              | 21.1                           | 388                                    | 26               | 6.04                        | 10.8                     |

1. Pulse test :  $t_p < 50\text{ ms}$ 2. To calculate  $V_{BR}$  versus junction temperature, use the following formula:  $V_{BR} @ T_J = V_{BR} @ 25^{\circ}\text{C} \times (1 + \alpha T \times (T_J - 25))$ .3. To calculate maximum clamping voltage at other surge level, use the following formula:  $V_{CL} = R_D \times I_{PP} + V_{BRmax}$ .

4. Surge capability given for both directions for unidirectional and bidirectional types.

Figure 3. Peak pulse power dissipation versus initial junction temperature (printed circuit board)

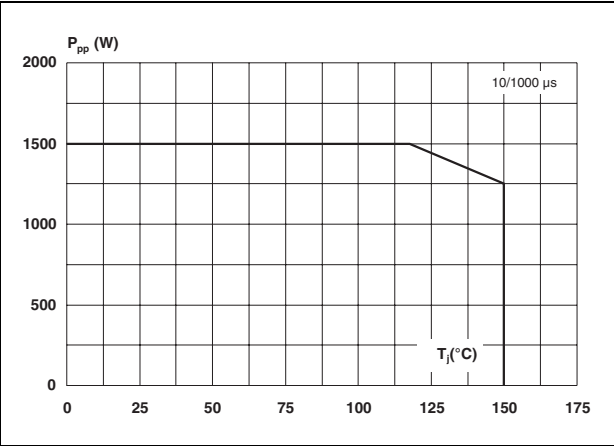


Figure 4. Peak pulse power versus exponential pulse duration

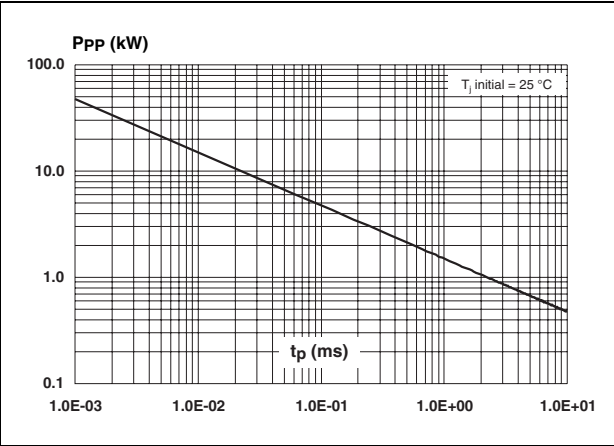
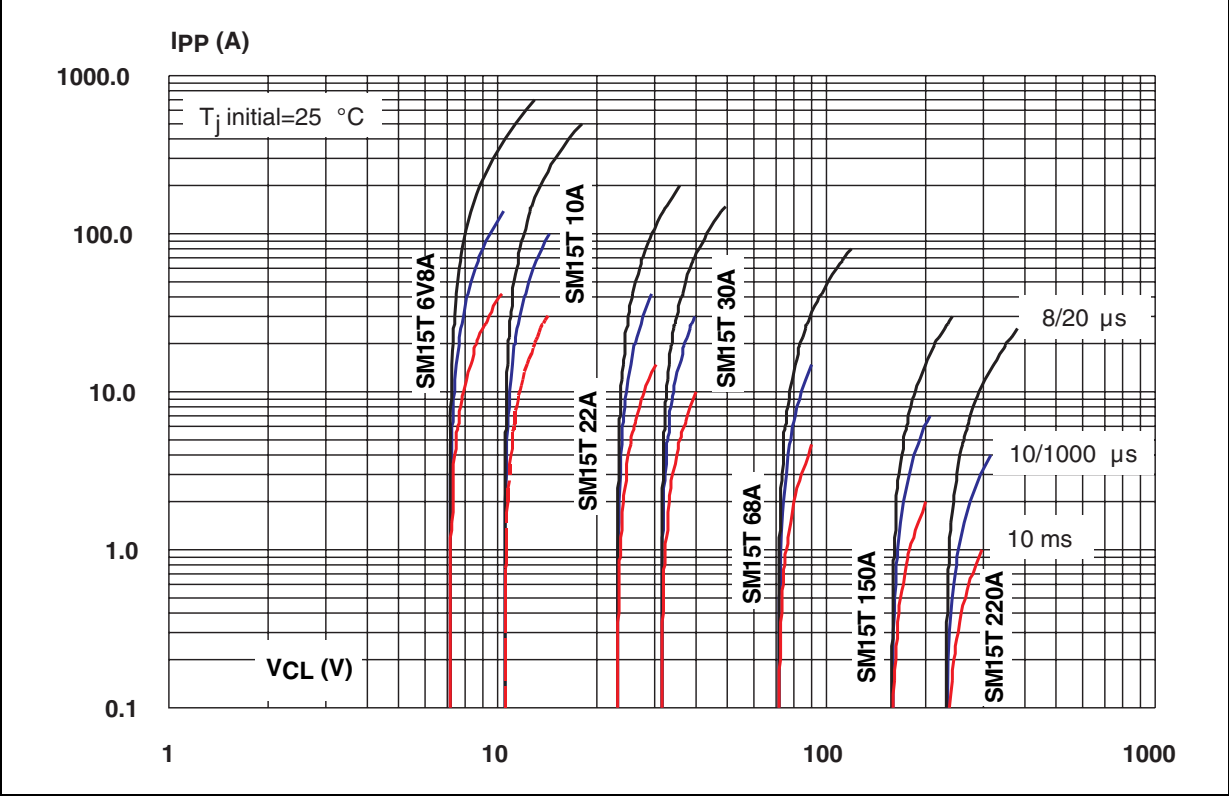
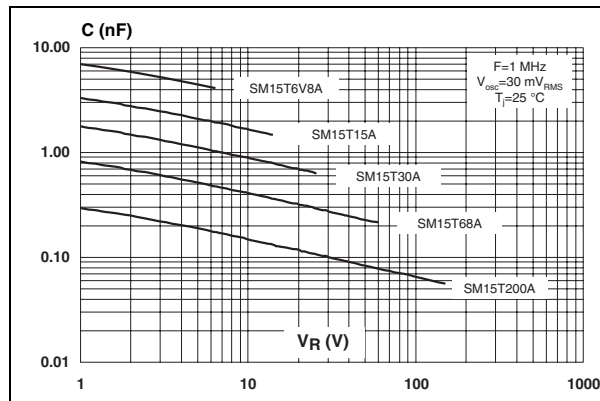


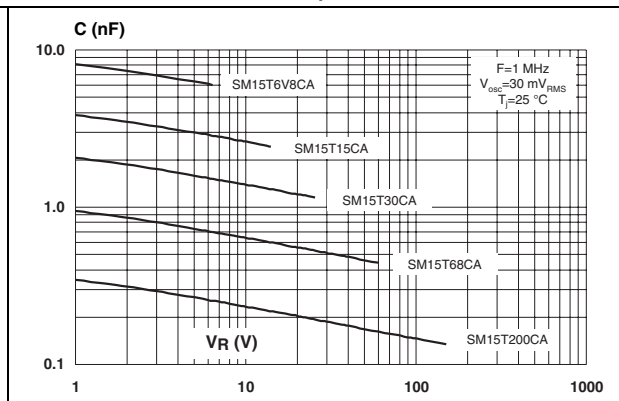
Figure 5. Clamping voltage versus peak pulse current (maximum values)



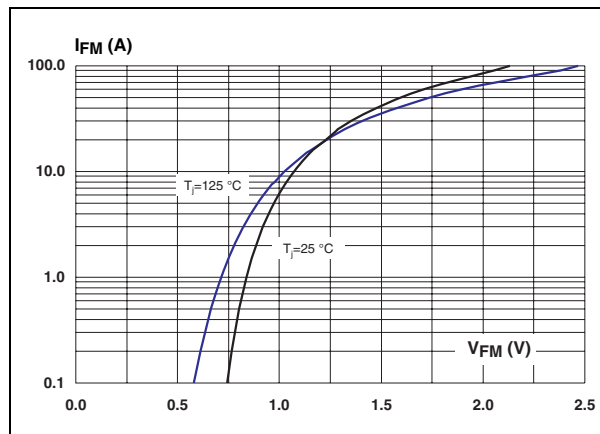
**Figure 6. Capacitance versus reverse applied voltage (typical values, SM15TxxA)**



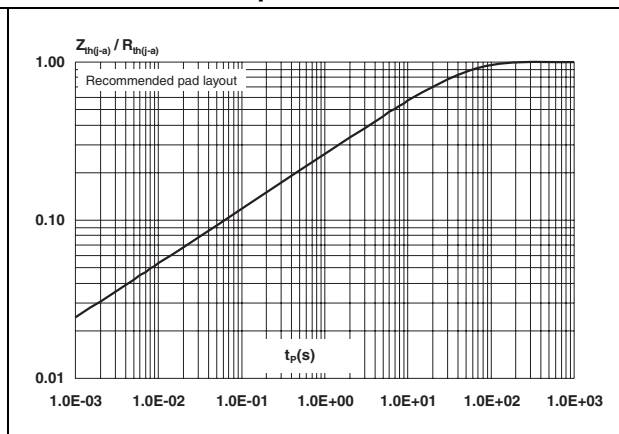
**Figure 7. Capacitance versus reverse applied voltage (typical values, SM15TxxCA)**



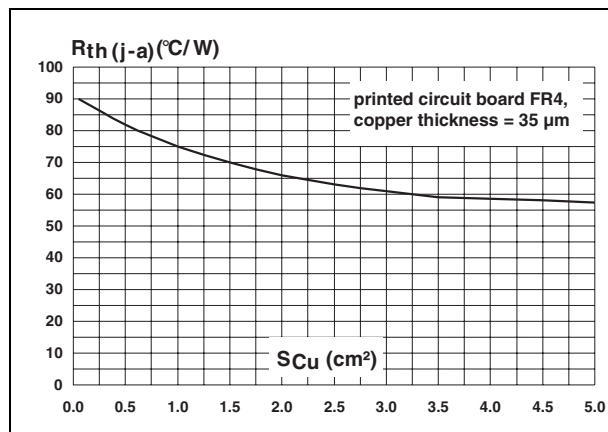
**Figure 8. Peak forward voltage drop versus forward current (typical values)**



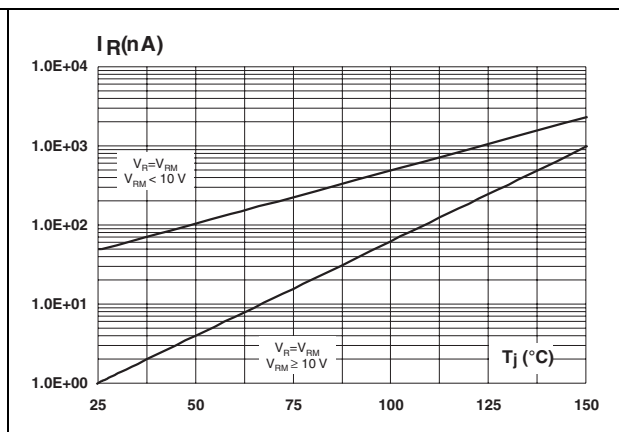
**Figure 9. Relative variation of thermal impedance junction to ambient versus pulse duration**



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

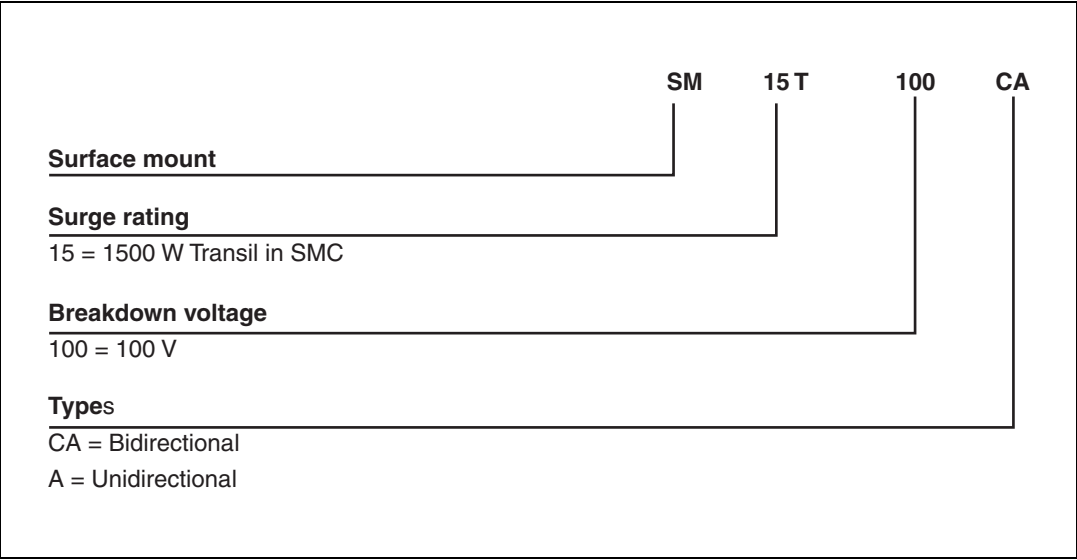


**Figure 11. Leakage current versus junction temperature (typical values)**



## 2      Ordering information scheme

Figure 12.   Ordering information scheme



### 3 Package information

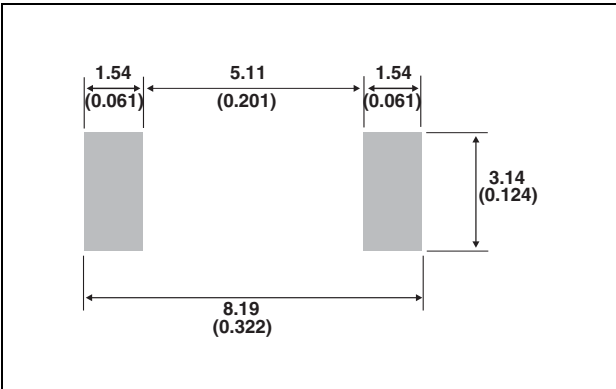
- Case: JEDEC DO-214AB molded plastic over planar junction
- Terminals: solder plated, solderable as per MIL-STD-750, Method 2026
- Polarity: for unidirectional types the band indicates cathode
- Flammability: epoxy is rated UL 94, V0
- RoHS package

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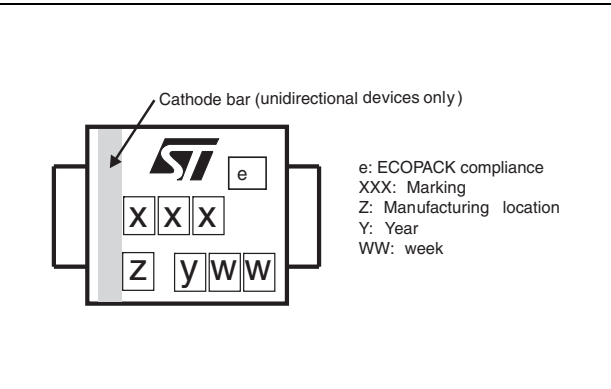
**Table 4. SMC dimensions**

| 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  | 0.059 |

**Figure 13. SMC footprint dimensions in mm (inches)**



**Figure 14. Marking layout<sup>(1)</sup>**



1. Marking layout can vary according to assembly location.

**Table 5. Marking**

| Order code | Marking | Order code | Marking |
|------------|---------|------------|---------|
| SM15T6V8A  | MDE     | SM15T6V8CA | BDE     |
| SM15T7V5A  | MDG     | SM15T7V5CA | BDG     |
| SM15T10A   | MDP     | SM15T10CA  | BDP     |
| SM15T12A   | MDT     | SM15T12CA  | BDT     |
| SM15T15A   | MDX     | SM15T15CA  | BDX     |
| SM15T18A   | MEE     | SM15T18CA  | BEE     |
| SM15T22A   | MEK     | SM15T22CA  | BEK     |
| SM15T24A   | MEM     | SM15T24CA  | BEM     |
| SM15T27A   | MEP     | SM15T27CA  | BEP     |
| SM15T30A   | MER     | SM15T30CA  | BER     |
| SM15T33A   | MET     | SM15T33CA  | BET     |
| SM15T36A   | MEV     | SM15T36CA  | BEV     |
| SM15T39A   | MEX     | SM15T39CA  | BEX     |
| SM15T68A   | MFP     | SM15T68CA  | BFP     |
| SM15T75A   | MFO     | SM15T75CA  | BFO     |
| SM15T100A  | MFX     | SM15T100CA | BFX     |
| SM15T150A  | MGK     | SM15T150CA | BGK     |
| SM15T200A  | MGV     | SM15T200CA | BGV     |
| SM15T220A  | MGX     | SM15T220CA | BGX     |

## 4 Ordering information

**Table 6. Ordering information**

| Order code                  | Marking                               | Package | Weight | Base qty | Delivery mode |
|-----------------------------|---------------------------------------|---------|--------|----------|---------------|
| SM15TxxxA/CA <sup>(1)</sup> | See <a href="#">Table 5 on page 8</a> | SMC     | 0.25 g | 2500     | Tape and reel |

1. Where xxx is nominal value of  $V_{BR}$  and A or CA indicates unidirectional or bidirectional version. See [Table 3](#) for list of available devices and their order codes

## 5 Revision history

**Table 7. Document revision history**

| Date           | Revision | Description of changes                                                                                                                                             |
|----------------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| September-2001 | 3B       | Last issue                                                                                                                                                         |
| 19-Feb-2007    | 4        | Peak pulse power <a href="#">Figure 4 on page 4</a> updated.                                                                                                       |
| 04-Feb-2009    | 5        | Updated ECOPACK statement. Added $R_D$ columns in <a href="#">Table 3</a> . Updated characteristic curves, <a href="#">Figure 3</a> to <a href="#">Figure 11</a> . |
| 17-Sep-2009    | 6        | Document updated for low leakage current.                                                                                                                          |

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