



**THE DATASHEET OF
1N5908**

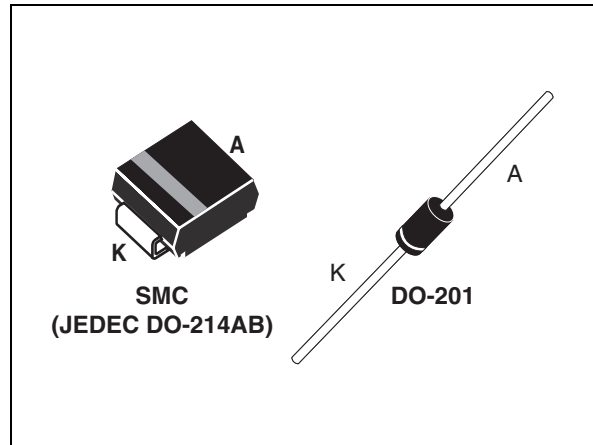


Features

- Peak pulse power:
 - 1500 W (10/1000 μ s)
- Stand off voltage: 5 V
- Unidirectional
- Operating $T_{j\max}$: 175 °C
- High power capability at $T_{j\max}$:
 - 1500 W (10/1000 μ s)
- JEDEC registered package outline

Complies with the following standards

- IEC 61000-4-2 level 4:
 - 15 kV (air discharge)
 - 8 kV (contact discharge)
- IEC 61000-4-5
- MIL STD 883G, method 3015-7 Class 3B
 - 25 kV HBM (human body model)
- Resin meets UL 94, V0
- MIL-STD-750, method 2026 solderability
- EIA STD RS-481 and IEC 60286-3 packing
- IPC 7531 footprint



Description

This Transil series has been designed to protect sensitive equipment against electrostatic discharges according to IEC 61000-4-2, and MIL STD 883, method 3015, and electrical over stress according to IEC 61000-4-4 and 5. These devices are more generally used against surges below 1500 W (10/1000 μ s).

The Planar technology makes it compatible with high-end equipment and SMPS where low leakage current and high junction temperature are required to provide reliability and stability over time.

They are packaged in SMC (SMC footprint in accordance with IPC 7531 standard) and DO-201.

TM: Transil is a trademark of STMicroelectronics

1 Characteristics

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

| Symbol | Parameter | Value | Unit |
|-----------|---|-----------------------------------|--------------------|
| P_{PP} | Peak pulse power dissipation ⁽¹⁾ | T_j initial = T_{amb} 1500 | W |
| T_{stg} | Storage temperature range | -65 to +175 | $^{\circ}\text{C}$ |
| T_j | Operating junction temperature range | -55 to +175 | $^{\circ}\text{C}$ |
| 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 resistances

| Symbol | Parameter | Value | Unit |
|---------------|--|--------|------|
| $R_{th(j-l)}$ | Junction to leads | SMC | 15 |
| | | DO-201 | 20 |
| $R_{th(j-a)}$ | Junction to ambient on printed circuit on recommended pad layout | SMC | 90 |
| | Junction to ambient | DO-201 | 75 |

Figure 1. Electrical characteristics - definitions

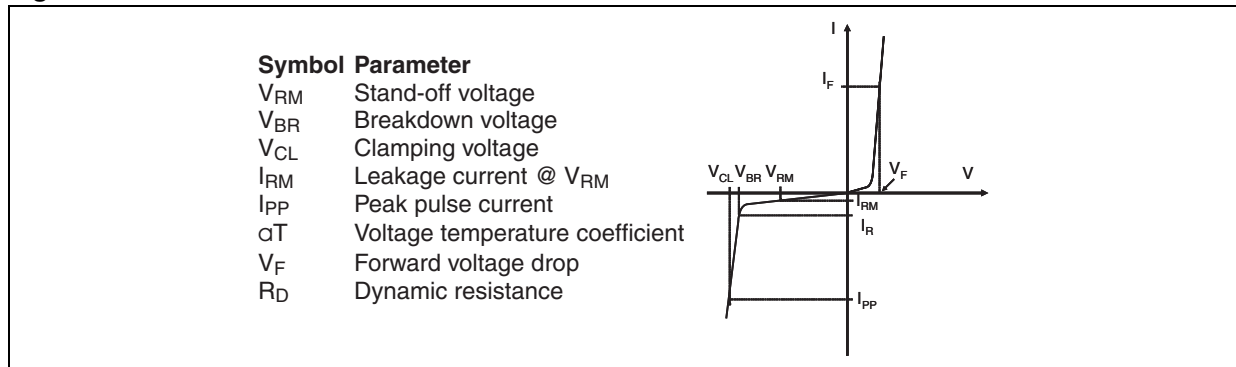


Figure 2. Pulse definition for electrical characteristics

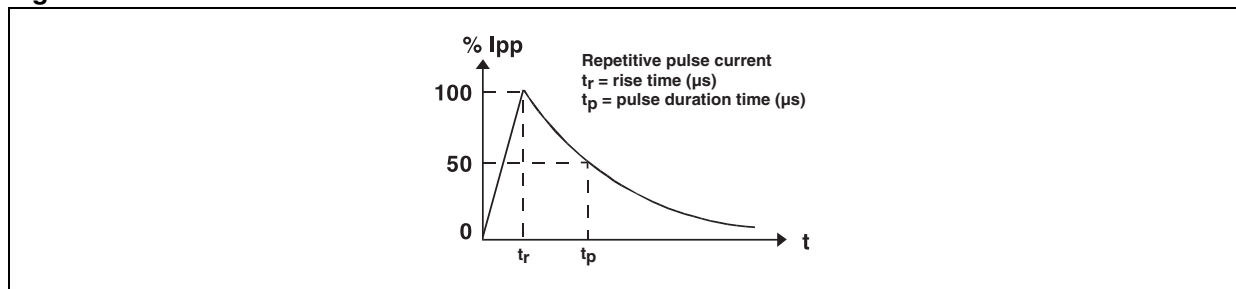


Table 3. Electrical characteristics - parameter values ($T_{amb} = 25\text{ }^{\circ}\text{C}$)

| Order code | $I_{RM} @ V_{RM}$ | | $V_{BR} @ I_R^{(1)}$ | | $V_{CL} @ I_{PP}, 10/1000\text{ }\mu\text{s}$ | | $V_{CL} @ I_{PP}, 10/1000\text{ }\mu\text{s}$ | | $V_{CL} @ I_{PP}, 10/1000\text{ }\mu\text{s}$ | | $\alpha T^{(2)}$ | C |
|------------|-------------------|---|----------------------|----|---|------------------|---|------------------|---|------------------|--------------------------|------|
| | max | | min | | max | | max | | max | | max | typ |
| | μA | V | V | mA | V | A ⁽³⁾ | V | A ⁽³⁾ | V | A ⁽³⁾ | 10-4/ $^{\circ}\text{C}$ | pF |
| 1N5908 | 300 | 5 | 6 | 1 | 7.6 | 30 | 8 | 60 | 8.5 | 120 | 5.7 | 9500 |
| SM5908 | | | | | | | | | | | | |

1. Pulse tes: $t_p < 50\text{ ms}$
2. To calculate V_{BR} or V_{CL} versus junction temperature, use the following formulas:
 $V_{BR} @ T_J = V_{BR} @ 25^{\circ}\text{C} \times (1 + \alpha T \times (T_J - 25))$
 $V_{CL} @ T_J = V_{CL} @ 25^{\circ}\text{C} \times (1 + \alpha T \times (T_J - 25))$
3. Surge capability given for both directions

Figure 3. Peak pulse power dissipation versus initial junction temperature

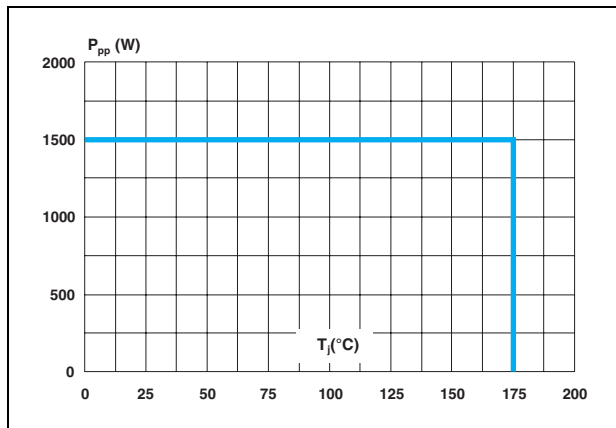


Figure 4. Peak pulse power versus exponential pulse duration (T_j initial = $25\text{ }^{\circ}\text{C}$)

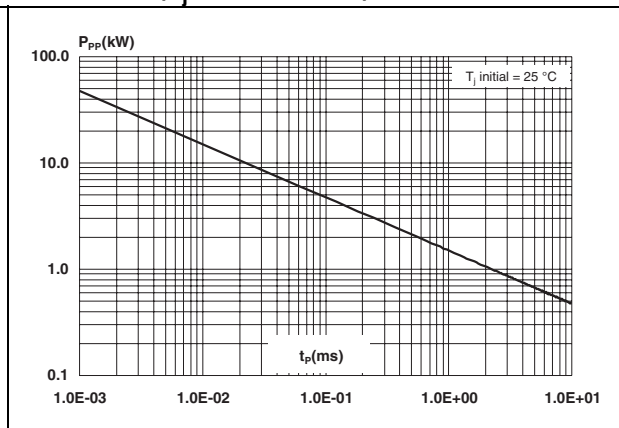


Figure 5. Clamping voltage versus peak pulse current (exponential waveform, typical values)

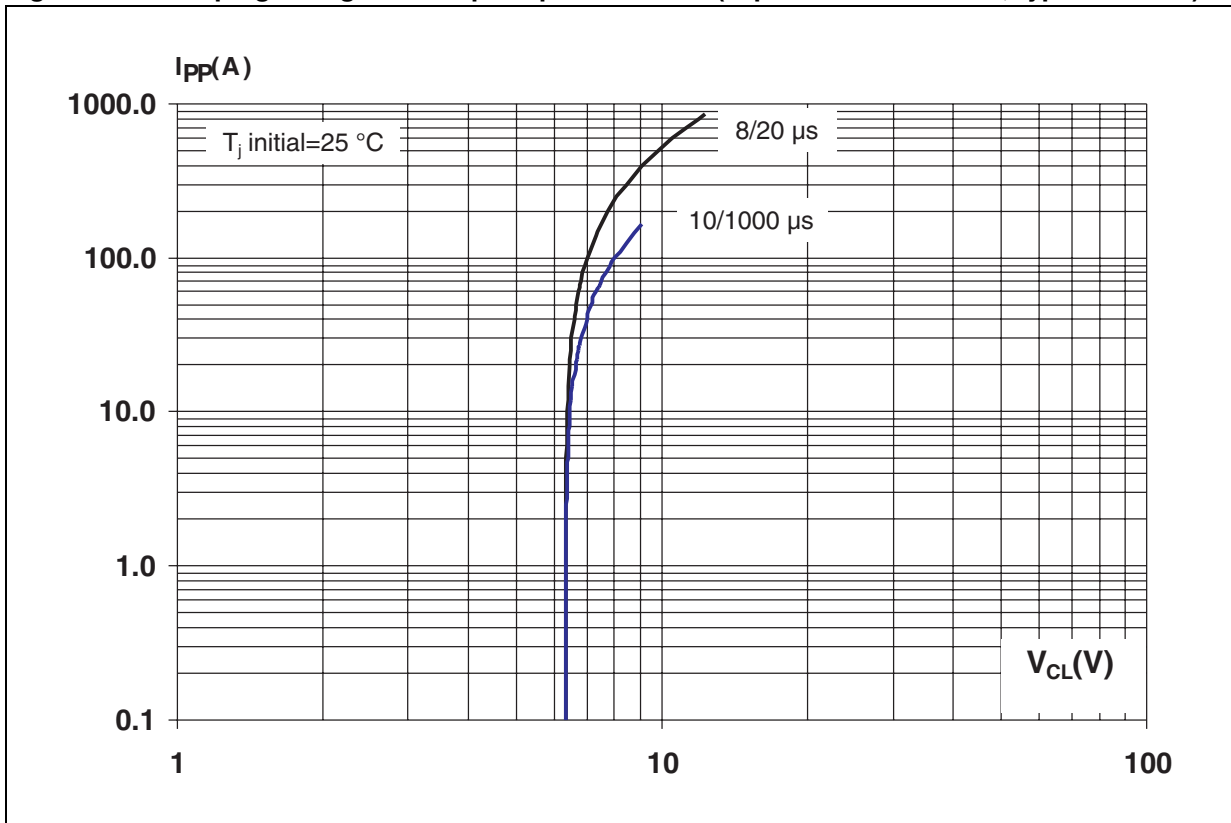


Figure 6. Junction capacitance versus reverse applied voltage (typical values)

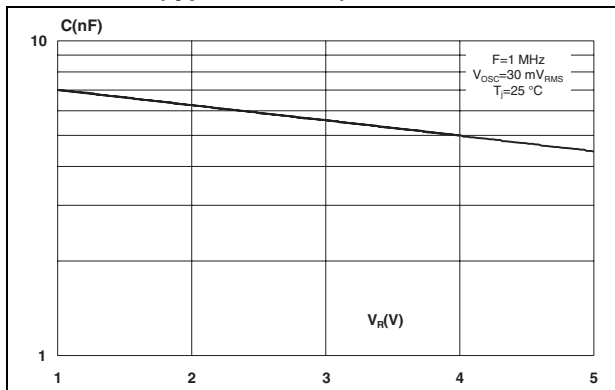


Figure 7. Peak forward voltage drop versus peak forward current (typical values)

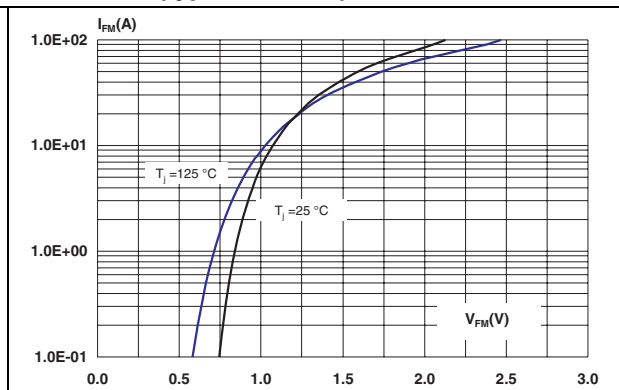


Figure 8. Relative variation of thermal impedance, junction to ambient, versus pulse duration (SMC)

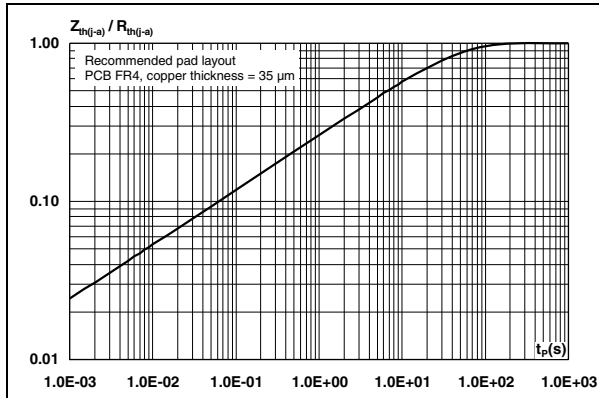


Figure 9. Relative variation of thermal impedance, junction to ambient, versus pulse duration (DO-201)

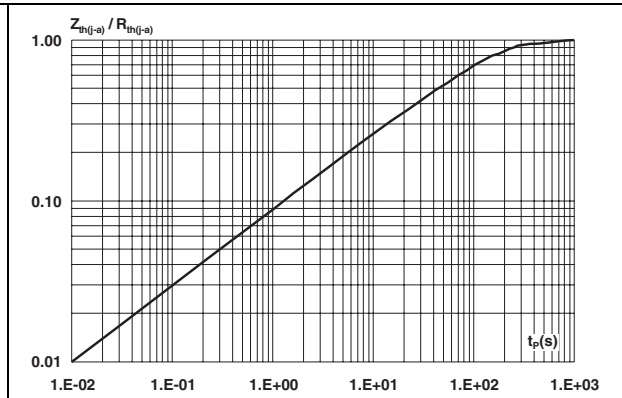


Figure 10. Thermal resistance junction to ambient versus copper surface under each lead (SMC)

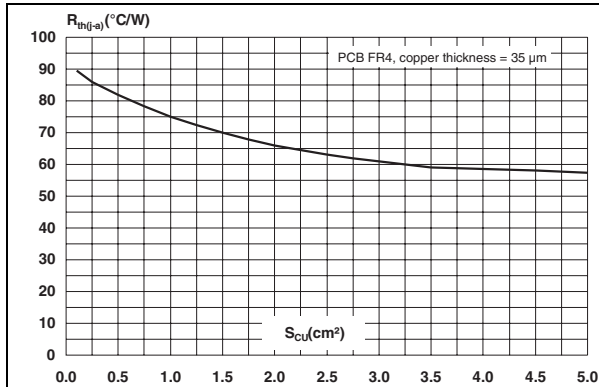
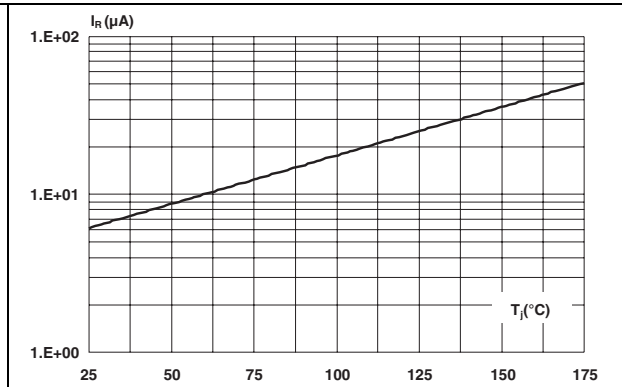


Figure 11. Leakage current versus junction temperature (typical values)



2 Package information

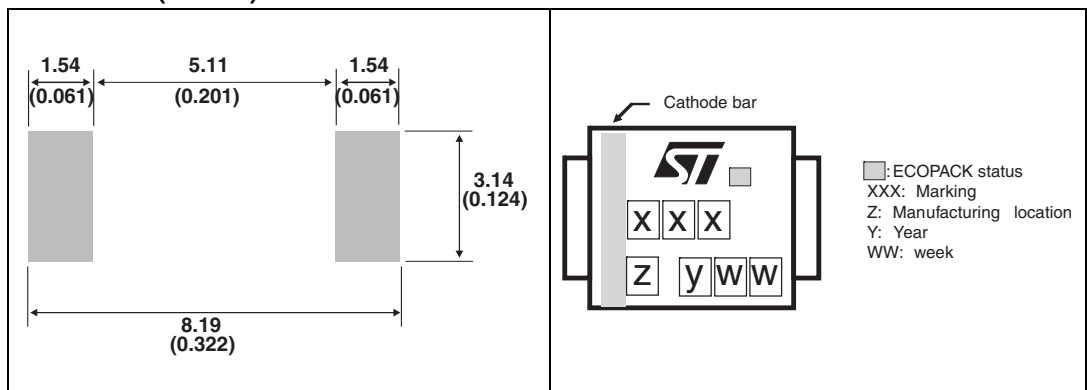
- Case: JEDEC DO-214AB molded plastic over planar junction
- Terminals: solder plated, solderable per MIL-STD-750, Method 2026
- Polarity: for unidirectional types the band indicates cathode
- Flammability: epoxy is rated UL94V-0
- RoHS package

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.

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 | 3.2 | 0.114 | 0.126 |
| c | 0.15 | 0.41 | 0.006 | 0.016 |
| 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 |
| D | 5.55 | 6.25 | 0.218 | 0.246 |
| L | 0.75 | 1.60 | 0.030 | 0.063 |

Figure 12. SMC footprint dimensions mm **Figure 13. SMC marking layout⁽¹⁾**
(inches)

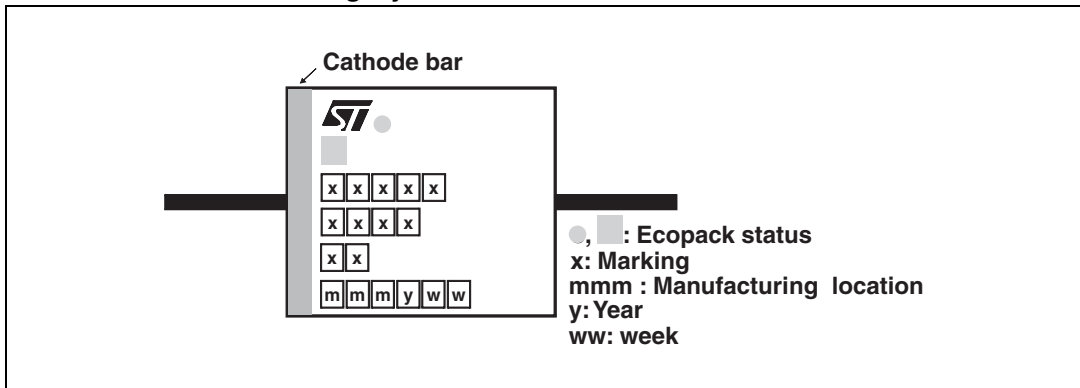


1. Marking layout can vary according to assembly location.

Table 5. DO-201 Dimensions

| | Dimensions | | | | |
|-----|-------------|------|--------|-------|-------|
| | Millimeters | | Inches | | |
| | Min. | Max. | Min. | Max. | |
| | A | 8.5 | 9.5 | 0.335 | 0.374 |
| | B | 25.4 | | 1 | |
| Ø C | 4.8 | 5.3 | 0.189 | 0.209 | |
| Ø D | 0.96 | 1.06 | 0.038 | 0.042 | |

Table 6. DO-201 marking layout



3 Ordering information

Table 7. Ordering information

| Order code | Marking | Package | Weight | Base qty | Delivery mode |
|------------|---------|---------|--------|----------|---------------|
| SM5908 | MDC | SMC | 0.25 g | 2500 | Tape and reel |
| 1N5908 | 1N5908 | DO-201 | 0.9 g | 600 | Ammopack |

4 Revision history

Table 8. Document revision history

| Date | Revision | Changes |
|-------------|----------|---|
| Aug-1999 | 2A | Previous release |
| 20-Sep-2011 | 3 | Added cathode bands. Added standards compliance statements. Updated Description . Updated Table 1 and Table 2 . Updated Figures 3 through 11 . Updated Section 2: Package information . |

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