



**THE DATASHEET OF
PMEG4005EGWJ**





PMEG4005EGW

40 V, 0.5 A low VF MEGA Schottky barrier rectifier

12 October 2023

Product data sheet

1. General description

Planar Maximum Efficiency General Application (MEGA) Schottky barrier rectifier with an integrated guard ring for stress protection encapsulated in small SOD123 Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- Forward current: $I_F \leq 0.5$ A
- Reverse voltage: $V_R \leq 40$ V
- Low forward voltage typ. $V_F = 420$ mV
- Low reverse current typ. $I_R = 30$ μ A
- Small SMD plastic package

3. Applications

- Low voltage rectification
- High efficiency DC-to-DC conversion
- Switch mode power supply
- Reverse polarity protection
- Low power consumption applications

4. Quick reference data



Table 1. Quick reference data

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------|-----------------|---|-----|-----|-----|---------|
| I_F | forward current | $T_{sp} \leq 55$ °C | - | - | 0.5 | A |
| V_R | reverse voltage | $T_j = 25$ °C | - | - | 40 | V |
| V_F | forward voltage | $I_F = 500$ mA; $t_p \leq 300$ μ s; $\delta \leq 0.02$; $T_j = 25$ °C | - | 420 | 470 | mV |
| I_R | reverse current | $V_R = 40$ V; pulsed; $T_j = 25$ °C | [1] | 30 | 100 | μ A |

[1] Very short test pulse to prevent junction self-heating.

5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|-----|--------|-------------|---|---|
| 1 | K | cathode[1] |  SOD123 |  sym001 |
| 2 | A | anode | | |

[1] The marking bar indicates the cathode.

6. Ordering information

Table 3. Ordering information

| Type number | Package | | |
|-----------------------------|---------|---|------------------------|
| | Name | Description | Version |
| PMEG4005EGW | SOD123 | plastic, surface-mounted package; 2 leads; 2.675 mm x 1.6 mm x 1.15 mm body | SOD123 |

7. Marking

Table 4. Marking codes

| Type number | Marking code |
|-------------|--------------|
| PMEG4005EGW | G4 |

8. Limiting values

Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

| Symbol | Parameter | Conditions | | Min | Max | Unit |
|-------------|-------------------------------------|--|-----|-----|-----|------|
| V_R | reverse voltage | $T_j = 25\text{ °C}$ | | - | 40 | V |
| I_F | forward current | $T_{sp} \leq 55\text{ °C}$ | | - | 0.5 | A |
| $I_{F(AV)}$ | average forward current | $\delta = 0.5$; $f = 20\text{ kHz}$; square wave; $T_{amb} \leq 120\text{ °C}$ | [1] | - | 0.5 | A |
| | | $\delta = 0.5$; $f = 20\text{ kHz}$; square wave; $T_{sp} \leq 145\text{ °C}$ | | - | 0.5 | A |
| I_{FRM} | repetitive peak forward current | $t_p \leq 1\text{ ms}$; $\delta \leq 0.25$ | | - | 7 | A |
| I_{FSM} | non-repetitive peak forward current | $t_p = 8\text{ ms}$; square wave; $T_{j(\text{init})} = 25\text{ °C}$ | | - | 10 | A |
| P_{tot} | total power dissipation | $T_{amb} \leq 25\text{ °C}$ | [2] | - | 400 | mW |
| | | | [1] | - | 660 | mW |
| T_j | junction temperature | | | - | 150 | °C |
| T_{amb} | ambient temperature | | | -55 | 150 | °C |
| T_{stg} | storage temperature | | | -65 | 150 | °C |

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm^2 .

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

9. Thermal characteristics

Table 6. Thermal characteristics

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|----------------|--|-------------|---------|-----|-----|-----|------|
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | in free air | [1] [2] | - | - | 310 | K/W |
| | | | [1] [3] | - | - | 190 | K/W |
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point | | [4] | - | - | 29 | K/W |

[1] For Schottky barrier diodes thermal runaway has to be considered, as in some applications the reverse power losses P_R are a significant part of the total power losses.

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm^2 .

[4] Soldering point of cathode tab.

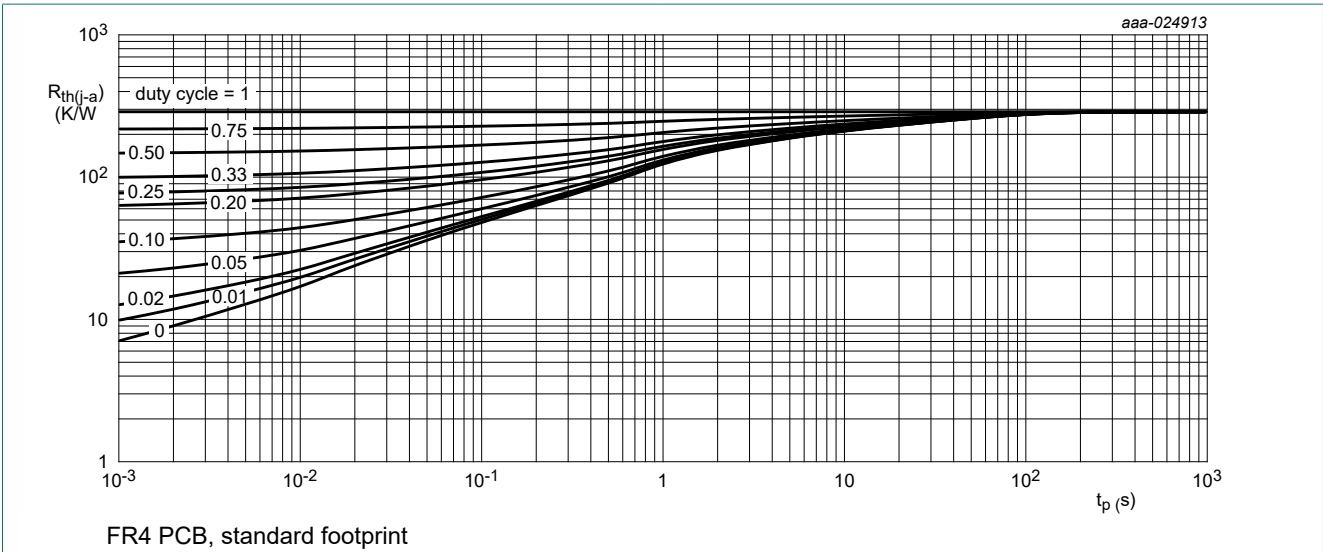


Fig. 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

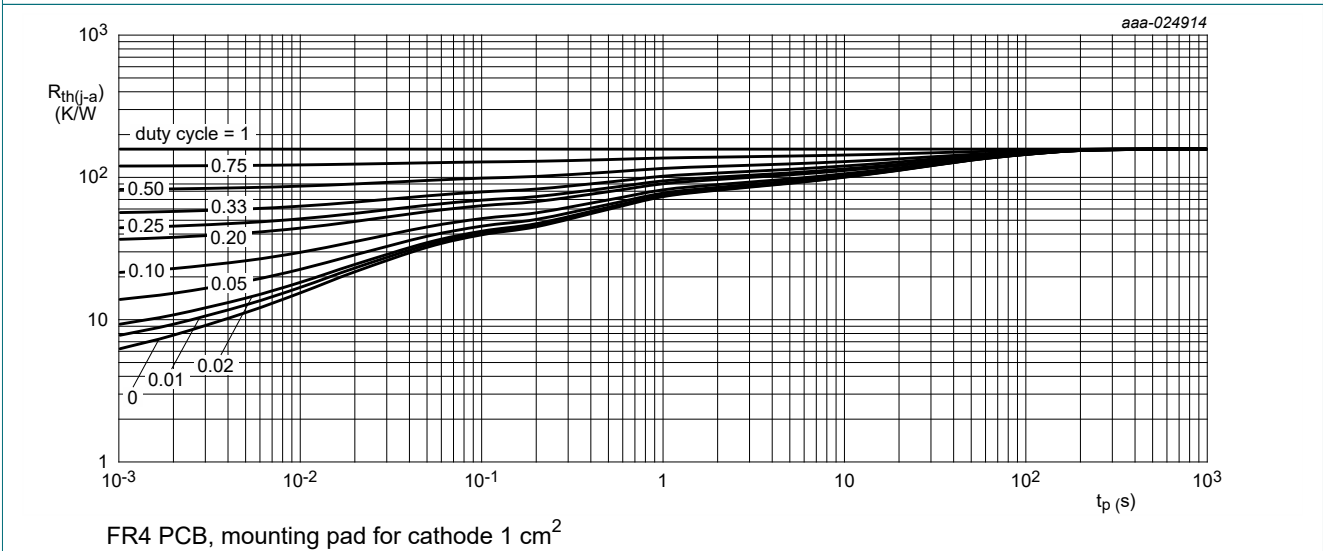


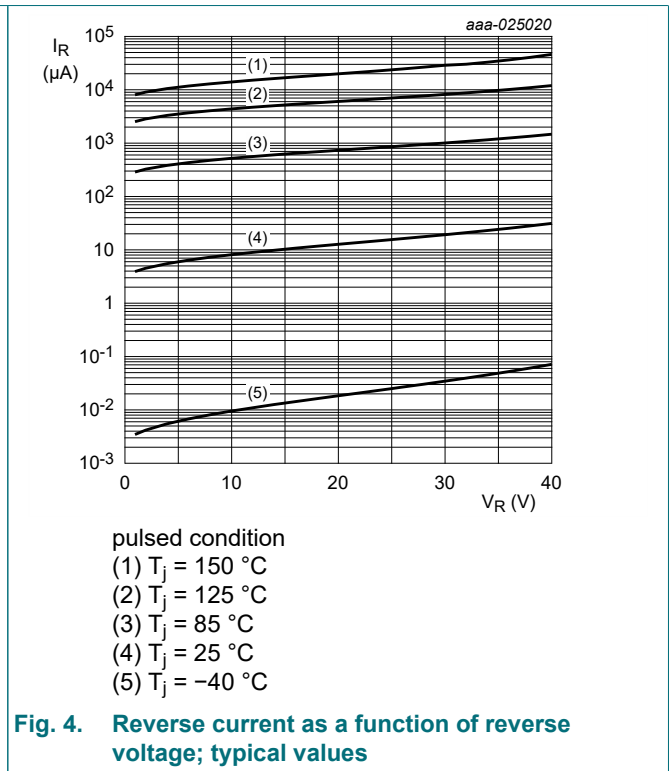
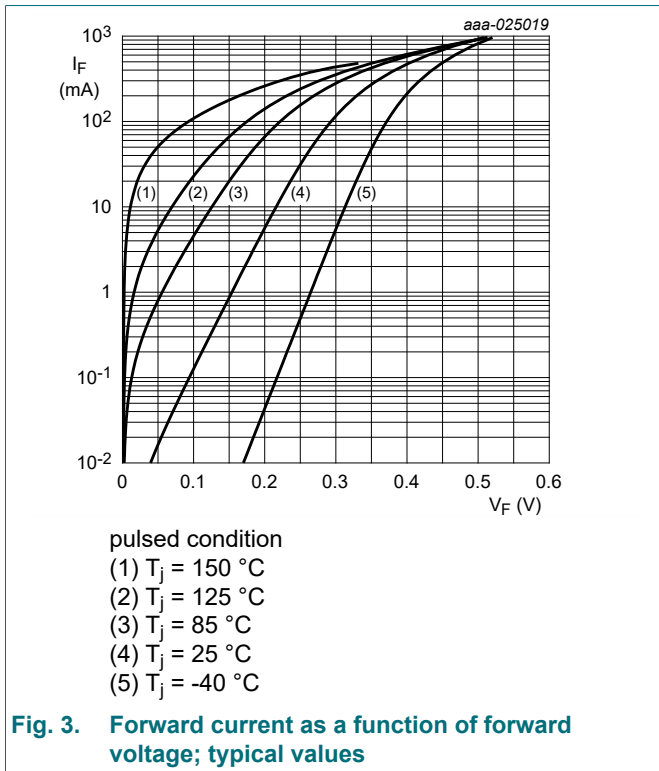
Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

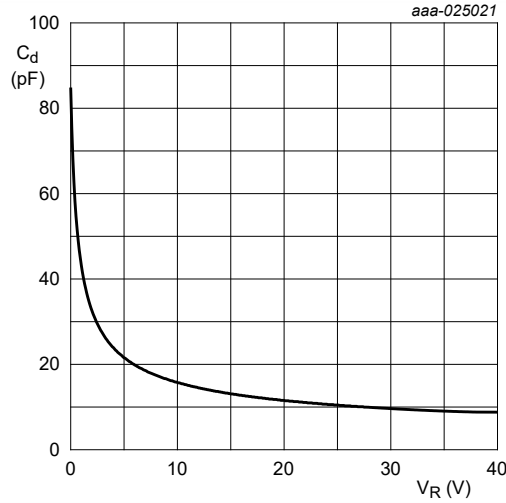
10. Characteristics

Table 7. Characteristics

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-------------|---------------------------|---|-----|-----|-----|---------------|
| $V_{(BR)R}$ | reverse breakdown voltage | $I_R = 1 \text{ mA}$; $t_p \leq 300 \text{ }\mu\text{s}$; $\delta \leq 0.02$; $T_j = 25 \text{ }^\circ\text{C}$ | 40 | - | - | V |
| V_F | forward voltage | $I_F = 0.1 \text{ mA}$; $t_p \leq 300 \text{ }\mu\text{s}$; $\delta \leq 0.02$; $T_j = 25 \text{ }^\circ\text{C}$ | - | 95 | 130 | mV |
| | | $I_F = 1 \text{ mA}$; $t_p \leq 300 \text{ }\mu\text{s}$; $\delta \leq 0.02$; $T_j = 25 \text{ }^\circ\text{C}$ | - | 155 | 210 | mV |
| | | $I_F = 10 \text{ mA}$; $t_p \leq 300 \text{ }\mu\text{s}$; $\delta \leq 0.02$; $T_j = 25 \text{ }^\circ\text{C}$ | - | 220 | 270 | mV |
| | | $I_F = 100 \text{ mA}$; $t_p \leq 300 \text{ }\mu\text{s}$; $\delta \leq 0.02$; $T_j = 25 \text{ }^\circ\text{C}$ | - | 295 | 350 | mV |
| | | $I_F = 500 \text{ mA}$; $t_p \leq 300 \text{ }\mu\text{s}$; $\delta \leq 0.02$; $T_j = 25 \text{ }^\circ\text{C}$ | - | 420 | 470 | mV |
| I_R | reverse current | $V_R = 10 \text{ V}$; pulsed; $T_j = 25 \text{ }^\circ\text{C}$ | [1] | 7 | 20 | μA |
| | | $V_R = 40 \text{ V}$; pulsed; $T_j = 25 \text{ }^\circ\text{C}$ | [1] | 30 | 100 | μA |
| C_d | diode capacitance | $V_R = 1 \text{ V}$; $f = 1 \text{ MHz}$; $T_j = 25 \text{ }^\circ\text{C}$ | - | 43 | 50 | pF |

[1] Very short test pulse to prevent junction self-heating.





f = 1 MHz; T_{amb} = 25 °C

Fig. 5. Diode capacitance as a function of reverse voltage; typical values

11. Test information

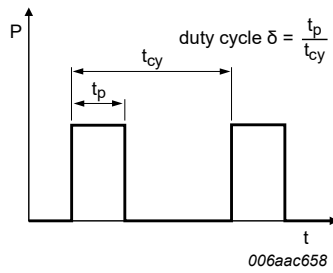


Fig. 6. Duty cycle definition

The current ratings for the typical waveforms are calculated according to the equations:
 $I_{F(AV)} = I_M \times \delta$ with I_M defined as peak current, $I_{RMS} = I_{F(AV)}$ at DC, and $I_{RMS} = I_M \times \sqrt{\delta}$ with I_{RMS} defined as RMS current.

12. Package outline

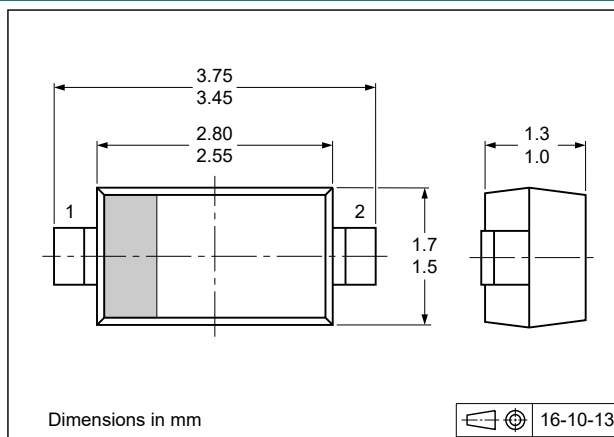


Fig. 7. Package outline SOD123

13. Soldering

SOD123

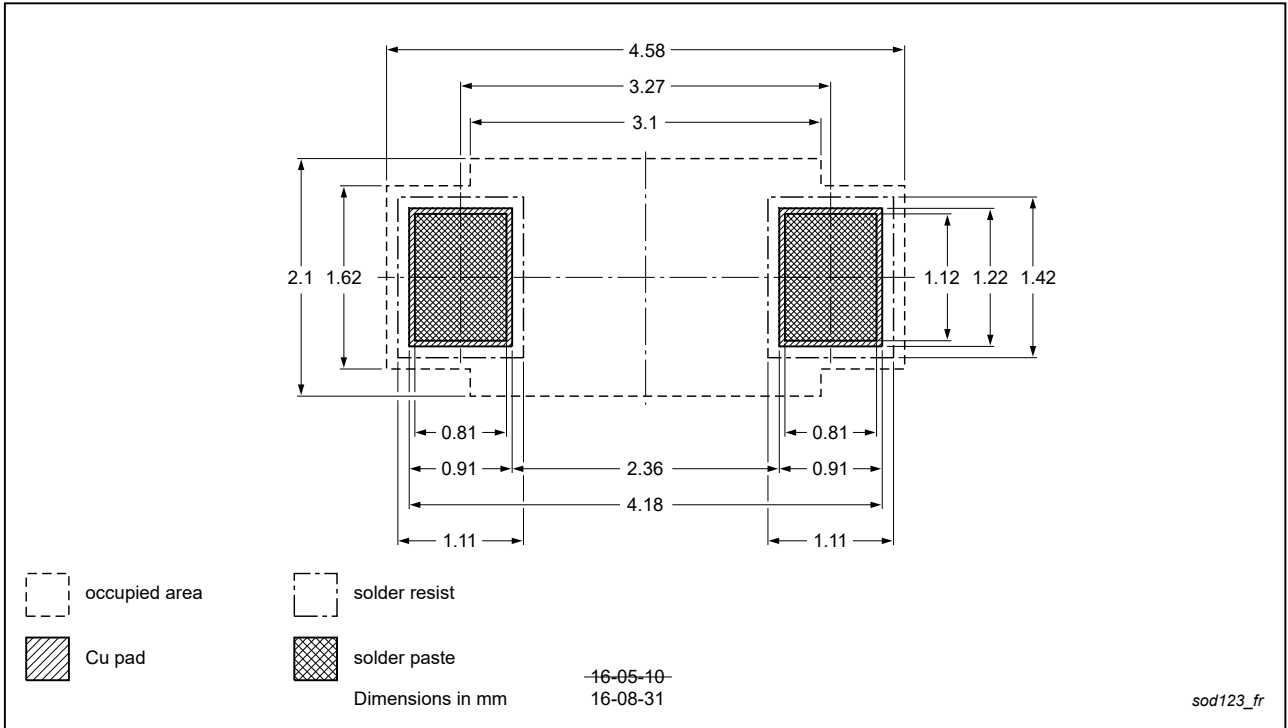


Fig. 8. Reflow soldering footprint for SOD123

SOD123

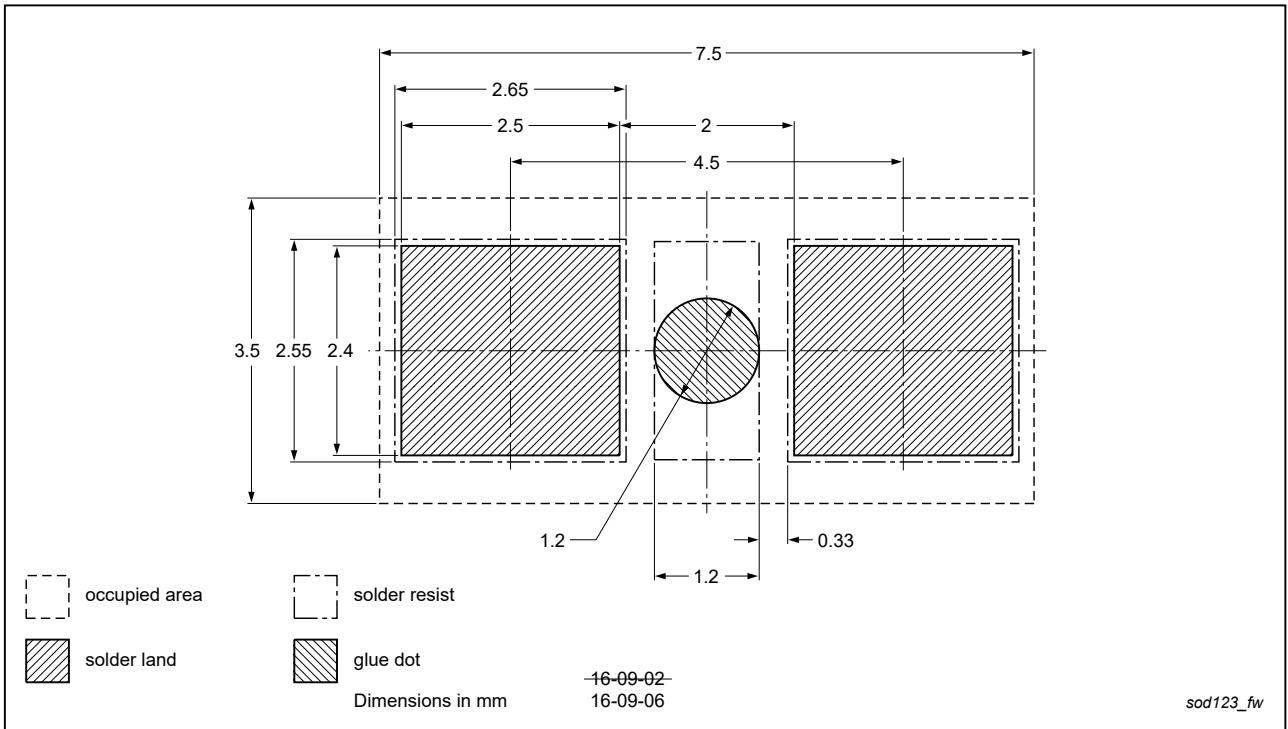


Fig. 9. Wave soldering footprint for SOD123

14. Revision history

Table 8. Revision history

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|-----------------|---|------------------------|---------------|-----------------|
| PMEG4005EGW v.3 | 20231012 | Product data sheet | - | PMEG4005EGW v.2 |
| Modifications: | • Product changed to non automotive. Please refer to the automotive product(s) with -Q. | | | |
| PMEG4005EGW v.2 | 20161205 | Product data sheet | - | PMEG4005EGW v.1 |
| PMEG4005EGW v.1 | 20161123 | Preliminary data sheet | - | - |

15. Legal information

Data sheet status

| Document status [1][2] | Product status [3] | Definition |
|--------------------------------|--------------------|---|
| Objective [short] data sheet | Development | This document contains data from the objective specification for product development. |
| Preliminary [short] data sheet | Qualification | This document contains data from the preliminary specification. |
| Product [short] data sheet | Production | This document contains the product specification. |

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Contents



| | |
|---------------------------------|---|
| 1. General description..... | 1 |
| 2. Features and benefits..... | 1 |
| 3. Applications..... | 1 |
| 4. Quick reference data..... | 1 |
| 5. Pinning information..... | 2 |
| 6. Ordering information..... | 2 |
| 7. Marking..... | 2 |
| 8. Limiting values..... | 3 |
| 9. Thermal characteristics..... | 3 |
| 10. Characteristics..... | 5 |
| 11. Test information..... | 6 |
| 12. Package outline..... | 6 |
| 13. Soldering..... | 7 |
| 14. Revision history..... | 8 |
| 15. Legal information..... | 9 |

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