

### General Purpose Plastic Rectifier



#### FEATURES

- Low forward voltage drop
- Low leakage current
- High forward surge capability
- Solder dip 275 °C max. 10 s, per JESD 22-B106
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC



**RoHS**  
COMPLIANT

#### TYPICAL APPLICATIONS

For use in general purpose rectification of power supplies, inverters, converters and freewheeling diodes application.

#### Note

- These devices are not AEC-Q101 qualified.

#### MECHANICAL DATA

**Case:** DO-204AL, molded epoxy body  
Molding compound meets UL 94 V-0 flammability rating  
Base P/N-E3 - RoHS compliant, commercial grade

**Terminals:** Matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

E3 suffix meets JESD 201 class 1A whisker test

**Polarity:** Color band denotes cathode end

| PRIMARY CHARACTERISTICS              |                |
|--------------------------------------|----------------|
| $I_{F(AV)}$                          | 1.0 A          |
| $V_{RRM}$                            | 50 V to 1000 V |
| $I_{FSM}$ (8.3 ms sine-wave)         | 30 A           |
| $I_{FSM}$ (square wave $t_p = 1$ ms) | 45 A           |
| $V_F$                                | 1.1 V          |
| $I_R$                                | 5.0 $\mu$ A    |
| $T_J$ max.                           | 150 °C         |

| MAXIMUM RATINGS (T <sub>A</sub> = 25 °C unless otherwise noted)                                             |                                   |                  |        |        |        |        |        |        |                  |
|-------------------------------------------------------------------------------------------------------------|-----------------------------------|------------------|--------|--------|--------|--------|--------|--------|------------------|
| PARAMETER                                                                                                   | SYMBOL                            | 1N4001           | 1N4002 | 1N4003 | 1N4004 | 1N4005 | 1N4006 | 1N4007 | UNIT             |
| Maximum repetitive peak reverse voltage                                                                     | V <sub>RRM</sub>                  | 50               | 100    | 200    | 400    | 600    | 800    | 1000   | V                |
| Maximum RMS voltage                                                                                         | V <sub>RMS</sub>                  | 35               | 70     | 140    | 280    | 420    | 560    | 700    | V                |
| Maximum DC blocking voltage                                                                                 | V <sub>DC</sub>                   | 50               | 100    | 200    | 400    | 600    | 800    | 1000   | V                |
| Maximum average forward rectified current<br>0.375" (9.5 mm) lead length at T <sub>A</sub> = 75 °C          | I <sub>F(AV)</sub>                | 1.0              |        |        |        |        |        |        | A                |
| Peak forward surge current 8.3 ms single half<br>sine-wave superimposed on rated load                       | I <sub>FSM</sub>                  | 30               |        |        |        |        |        |        | A                |
| Non-repetitive peak forward<br>surge current square waveform<br>T <sub>A</sub> = 25 °C (fig. 3)             | t <sub>p</sub> = 1 ms             | I <sub>FSM</sub> | 45     |        |        |        |        |        | A                |
|                                                                                                             | t <sub>p</sub> = 2 ms             |                  | 35     |        |        |        |        |        |                  |
|                                                                                                             | t <sub>p</sub> = 5 ms             |                  | 30     |        |        |        |        |        |                  |
| Maximum full load reverse current, full cycle<br>average 0.375" (9.5 mm) lead length T <sub>L</sub> = 75 °C | I <sub>R(AV)</sub>                | 30               |        |        |        |        |        |        | μA               |
| Rating for fusing (t < 8.3 ms)                                                                              | I <sup>2</sup> t <sup>(1)</sup>   | 3.7              |        |        |        |        |        |        | A <sup>2</sup> s |
| Operating junction and<br>storage temperature range                                                         | T <sub>J</sub> , T <sub>STG</sub> | - 50 to + 150    |        |        |        |        |        |        | °C               |

#### Note

<sup>(1)</sup> For device using on bridge rectifier application

| ELECTRICAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted) |                 |                         |                |        |        |        |        |        |        |        |      |
|----------------------------------------------------------------------------|-----------------|-------------------------|----------------|--------|--------|--------|--------|--------|--------|--------|------|
| PARAMETER                                                                  | TEST CONDITIONS |                         | SYMBOL         | 1N4001 | 1N4002 | 1N4003 | 1N4004 | 1N4005 | 1N4006 | 1N4007 | UNIT |
| Maximum instantaneous forward voltage                                      | 1.0 A           |                         | V <sub>F</sub> | 1.1    |        |        |        |        |        |        | V    |
| Maximum DC reverse current at rated DC blocking voltage                    |                 | T <sub>A</sub> = 25 °C  | I <sub>R</sub> | 5.0    |        |        |        |        |        |        | μA   |
|                                                                            |                 | T <sub>A</sub> = 125 °C |                | 50     |        |        |        |        |        |        |      |
| Typical junction capacitance                                               | 4.0 V, 1 MHz    |                         | C <sub>J</sub> | 15     |        |        |        |        |        |        | pF   |

| THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted) |                                 |        |        |        |        |        |        |        |      |
|-------------------------------------------------------------------------|---------------------------------|--------|--------|--------|--------|--------|--------|--------|------|
| PARAMETER                                                               | SYMBOL                          | 1N4001 | 1N4002 | 1N4003 | 1N4004 | 1N4005 | 1N4006 | 1N4007 | UNIT |
| Typical thermal resistance                                              | R <sub>θJA</sub> <sup>(1)</sup> | 50     |        |        |        |        |        |        | °C/W |
|                                                                         | R <sub>θJL</sub> <sup>(1)</sup> | 25     |        |        |        |        |        |        |      |

**Note**

(1) Thermal resistance from junction to ambient at 0.375" (9.5 mm) lead length, PCB mounted

| <b>ORDERING INFORMATION</b> (Example) |                 |                        |               |                                  |
|---------------------------------------|-----------------|------------------------|---------------|----------------------------------|
| PREFERRED P/N                         | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                    |
| 1N4004-E3/54                          | 0.33            | 54                     | 5500          | 13" diameter paper tape and reel |
| 1N4004-E3/73                          | 0.33            | 73                     | 3000          | Ammo pack packaging              |

**RATINGS AND CHARACTERISTICS CURVES**

( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)



Fig. 1 - Forward Current Derating Curve



Fig. 2 - Maximum Non-repetitive Peak Forward Surge Current



Fig. 3 - Non-Repetitive Peak Forward Surge Current



Fig. 6 - Typical Junction Capacitance

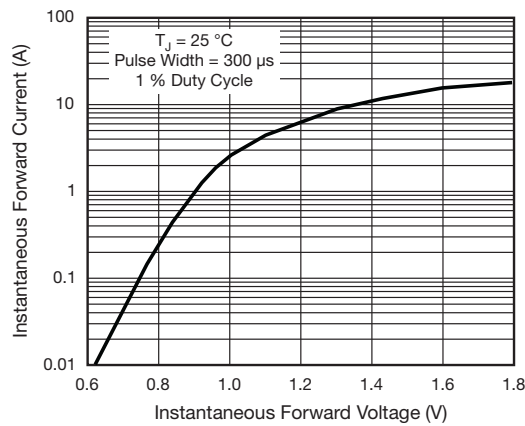


Fig. 4 - Typical Instantaneous Forward Characteristics



Fig. 7 - Typical Transient Thermal Impedance



Fig. 5 - Typical Reverse Characteristics

## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

### DO-204AL (DO-41)



#### Note

- Lead diameter is  $\frac{0.026}{0.023}$  (0.66 / 0.58) for suffix "E" part numbers



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