

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

#### Note

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

| ELECTRICAL CHARACTERISTICS ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) |                                   |        |        |        |        |        |        |        |        |               |
|---|-----------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|---------------|
| PARAMETER   | TEST CONDITIONS                   | SYMBOL | 1N4001 | 1N4002 | 1N4003 | 1N4004 | 1N4005 | 1N4006 | 1N4007 | UNIT          |
| Maximum instantaneous forward voltage   | 1.0 A                             | $V_F$  | 1.1    |        |        |        |        |        |        | V             |
| Maximum DC reverse current at rated DC blocking voltage                               | $T_A = 25\text{ }^\circ\text{C}$  | $I_R$  | 5.0    |        |        |        |        |        |        | $\mu\text{A}$ |
|   | $T_A = 125\text{ }^\circ\text{C}$ |        | 50     |        |        |        |        |        |        |               |
| Typical junction capacitance  | 4.0 V, 1 MHz                      | $C_J$  | 15     |        |        |        |        |        |        | pF            |

| THERMAL CHARACTERISTICS ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) |                       |        |        |        |        |        |        |        |                    |  |
|--|-----------------------|--------|--------|--------|--------|--------|--------|--------|--------------------|--|
| PARAMETER  | SYMBOL                | 1N4001 | 1N4002 | 1N4003 | 1N4004 | 1N4005 | 1N4006 | 1N4007 | UNIT               |  |
| Typical thermal resistance   | $R_{\theta JA}^{(1)}$ | 50     |        |        |        |        |        |        | $^\circ\text{C/W}$ |  |
|  | $R_{\theta JL}^{(1)}$ | 25     |        |        |        |        |        |        |                    |  |

**Note**

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

| ORDERING INFORMATION (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

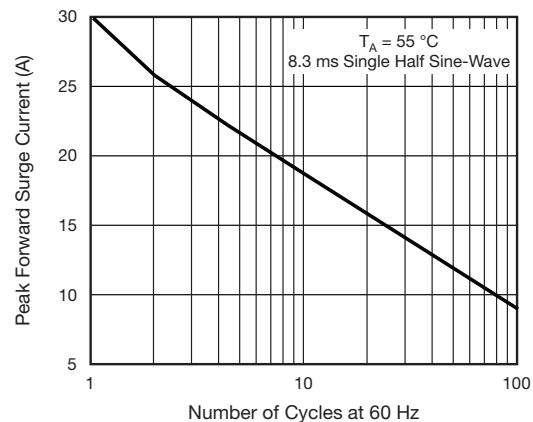


Fig. 2 - Maximum Non-repetitive Peak Forward Surge Current



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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