



## Glass Passivated Junction Plastic Rectifier

SUPERECTIFIER®



DO-204AL (DO-41)

## PRIMARY CHARACTERISTICS

|                                      |                                                 |
|--------------------------------------|-------------------------------------------------|
| $I_{F(AV)}$                          | 1.0 A                                           |
| $V_{RRM}$                            | 50 V, 100 V, 200 V, 400 V, 600 V, 800 V, 1000 V |
| $I_{FSM}$ (8.3 ms sine-wave)         | 30 A                                            |
| $I_{FSM}$ (square wave $t_p = 1$ ms) | 45 A                                            |
| $I_R$                                | 5.0 $\mu$ A                                     |
| $V_F$                                | 1.1 V                                           |
| $T_J$ max.                           | 175 °C                                          |
| Package                              | DO-204AL (DO-41)                                |
| Diode variations                     | Single die                                      |

## TYPICAL APPLICATIONS

For use in general purpose rectification of power supplies, inverters, converters and freewheeling diodes for both consumer, and automotive applications.

## FEATURES

- Superectifier structure for high reliability application
- Cavity-free glass-passivated junction
- Low forward voltage drop
- Low leakage current, typical  $I_R$  less than 0.1  $\mu$ A
- High forward surge capability
- Solder dip 275 °C max. 10 s, per JESD 22-B106
- AEC-Q101 qualified
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

RoHS  
COMPLIANT

## MECHANICAL DATA

**Case:** DO-204AL (DO-41), molded epoxy over glass body  
Molding compound meets UL 94 V-0 flammability rating  
Base P/N-E3 - RoHS-compliant, commercial grade  
Base P/NHE3 - RoHS-compliant, AEC-Q101 qualified

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

E3 suffix meets JESD 201 class 1A whisker test, HE3 suffix meets JESD 201 class 2 whisker test

**Polarity:** Color band denotes cathode end

## Note

- For part numbers with "E" suffix, they are "E3" commercial grade only

MAXIMUM RATINGS ( $T_A = 25$  °C unless otherwise noted)

| PARAMETER                                                                                                | SYMBOL                                           | 1N4001GP      | 1N4002GP | 1N4003GP | 1N4004GP | 1N4005GP | 1N4006GP | 1N4007GP | 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> <sup>(1)</sup>                  | 35            | 70       | 140      | 280      | 420      | 560      | 700      | V                |
| Maximum DC blocking voltage                                                                              | V <sub>DC</sub> <sup>(1)</sup>                   | 50            | 100      | 200      | 400      | 600      | 800      | 1000     | V                |
| Maximum average forward rectified current 0.375" (9.5 mm) lead length at T <sub>A</sub> = 75 °C          | I <sub>F(AV)</sub> <sup>(1)</sup>                | 1.0           |          |          |          |          |          |          | A                |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load                       | I <sub>FSM</sub> <sup>(1)</sup>                  | 30            |          |          |          |          |          |          | A                |
| Non-repetitive peak forward surge current square waveform<br>T <sub>A</sub> = 25 °C (fig. 3)             | t <sub>p</sub> = 1 ms                            | 45            |          |          |          |          |          |          | A                |
|                                                                                                          | t <sub>p</sub> = 2 ms                            | 35            |          |          |          |          |          |          |                  |
|                                                                                                          | t <sub>p</sub> = 5 ms                            | 30            |          |          |          |          |          |          |                  |
| Maximum full load reverse current, full cycle average 0.375" (9.5 mm) lead length T <sub>A</sub> = 75 °C | I <sub>R(AV)</sub> <sup>(1)</sup>                | 30            |          |          |          |          |          |          | μA               |
| Rating for fusing (t < 8.3 ms)                                                                           | I <sup>2</sup> t <sup>(2)</sup>                  | 3.7           |          |          |          |          |          |          | A <sup>2</sup> s |
| Operating junction and storage temperature range                                                         | T <sub>J</sub> , T <sub>STG</sub> <sup>(1)</sup> | - 65 to + 175 |          |          |          |          |          |          | °C               |

## Notes

(1) JEDEC® registered values

(2) For device using on bridge rectifier application

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

| PARAMETER                                               | TEST CONDITIONS                                                                | SYMBOL                        | 1N4001GP | 1N4002GP | 1N4003GP | 1N4004GP | 1N4005GP | 1N4006GP | 1N4007GP | 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> <sup>(1)</sup> | 5.0      |          |          |          |          |          |          | μA   |
|                                                         | T <sub>A</sub> = 125 °C                                                        |                               | 50       |          |          |          |          |          |          |      |
| Typical reverse recovery time                           | I <sub>F</sub> = 0.5 A,<br>I <sub>R</sub> = 1.0 A,<br>I <sub>rr</sub> = 0.25 A | t <sub>rr</sub>               | 2.0      |          |          |          |          |          |          | μs   |
| Typical junction capacitance                            | 4.0 V,<br>1 MHz                                                                | C <sub>J</sub>                | 8.0      |          |          |          |          |          |          | pF   |

**Note**<sup>(3)</sup> JEDEC® registered values**THERMAL CHARACTERISTICS** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)

| PARAMETER                  | SYMBOL                          | 1N4001GP | 1N4002GP | 1N4003GP | 1N4004GP | 1N4005GP | 1N4006GP | 1N4007GP | UNIT     |
|----------------------------|---------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|
| Typical thermal resistance | R <sub>θJA</sub> <sup>(1)</sup> | 55       |          |          |          |          |          |          | °C/<br>W |
|                            | R <sub>θJL</sub> <sup>(1)</sup> | 25       |          |          |          |          |          |          |          |

**Note**<sup>(1)</sup> 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                    |
|-------------------------------|-----------------|------------------------|---------------|----------------------------------|
| 1N4004GP-E3/54                | 0.335           | 54                     | 5500          | 13" diameter paper tape and reel |
| 1N4004GP-E3/73                | 0.335           | 73                     | 3000          | Ammo pack packaging              |
| 1N4004GPHE3/54 <sup>(1)</sup> | 0.335           | 54                     | 5500          | 13" diameter paper tape and reel |
| 1N4004GPHE3/73 <sup>(1)</sup> | 0.335           | 73                     | 3000          | Ammo pack packaging              |

**Note**<sup>(1)</sup> AEC-Q101 qualified**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

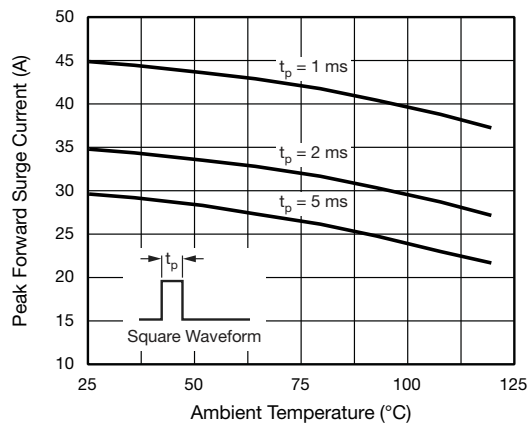


Fig. 3 - Non-Repetitive Peak Forward Surge Current

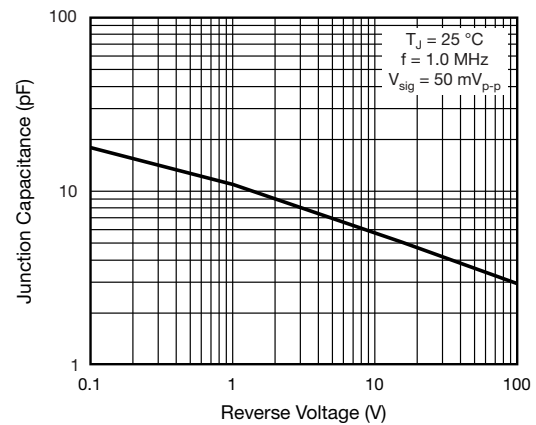


Fig. 6 - Typical Junction Capacitance

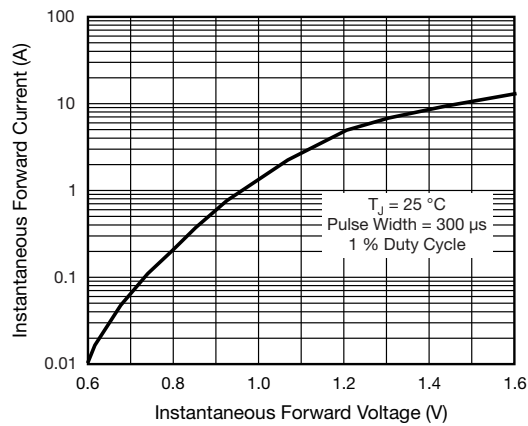


Fig. 4 - Typical Instantaneous Forward Characteristics

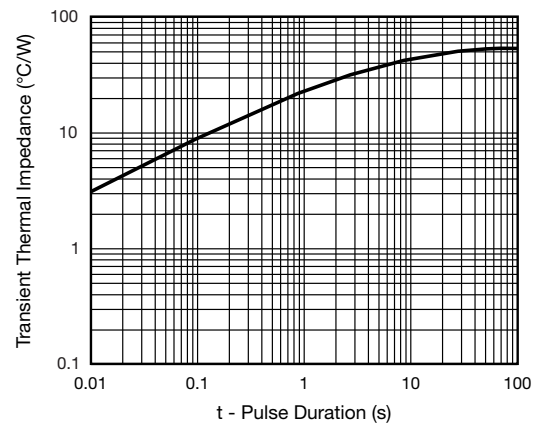


Fig. 7 - Typical Transient Thermal Impedance

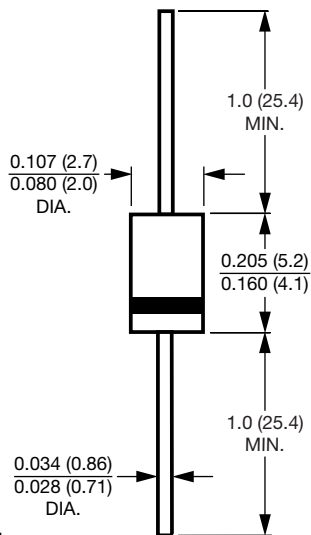


Fig. 5 - Typical Reverse Characteristics



**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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