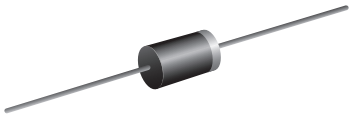
# Glass Passivated Junction Plastic Rectifier

**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 µA |
| $V_F$ | 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 µA
- 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

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 | $V_{RRM}$ | 50 | 100 | 200 | 400 | 600 | 800 | 1000 | V |
| Maximum RMS voltage | $V_{RMS}$ (1) | 35 | 70 | 140 | 280 | 420 | 560 | 700 | V |
| Maximum DC blocking voltage | $V_{DC}$ (1) | 50 | 100 | 200 | 400 | 600 | 800 | 1000 | V |
| Maximum average forward rectified current 0.375" (9.5 mm) lead length at $T_A$ = 75 °C | $I_{F(AV)}$ (1) | 1.0 | | | | | | | A |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load | $I_{FSM}$ (1) | 30 | | | | | | | A |
| Non-repetitive peak forward surge current square waveform $T_A$ = 25 °C (fig. 3) $t_p$ = 1 ms | $I_{FSM}$ (1) | 45 | | | | | | | A |
| Non-repetitive peak forward surge current square waveform $T_A$ = 25 °C (fig. 3) $t_p$ = 2 ms | | 35 | | | | | | | |
| Non-repetitive peak forward surge current square waveform $T_A$ = 25 °C (fig. 3) $t_p$ = 5 ms | | 30 | | | | | | | |
| Maximum full load reverse current, full cycle average 0.375" (9.5 mm) lead length $T_A$ = 75 °C | $I_{R(AV)}$ (1) | 30 | | | | | | | µA |
| Rating for fusing (t < 8.3 ms) | $I^2t$ (2) | 3.7 | | | | | | | $A^2s$ |
| Operating junction and storage temperature range | $T_J$, $T_{STG}$ (1) | - 65 to + 175 | | | | | | | °C |

**Notes**

(1) JEDEC® registered values

(2) For device using on bridge rectifier application



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| **ELECTRICAL CHARACTERISTICS** ($T_A$ = 25 °C unless otherwise noted) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **PARAMETER** | **TEST CONDITIONS** | **SYMBOL** | **1N4001GP** | **1N4002GP** | **1N4003GP** | **1N4004GP** | **1N4005GP** | **1N4006GP** | **1N4007GP** | **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 °C | $I_R$ (1) | 5.0 | | | | | | | µA |
| | $T_A$ = 125 °C | | 50 | | | | | | | |
| Typical reverse recovery time | $I_F$ = 0.5 A, $I_R$ = 1.0 A, $I_{rr}$ = 0.25 A | $t_{rr}$ | 2.0 | | | | | | | µs |
| Typical junction capacitance | 4.0 V, 1 MHz | $C_J$ | 8.0 | | | | | | | pF |

**Note**

(3) JEDEC® registered values

| **THERMAL CHARACTERISTICS** ($T_A$ = 25 °C unless otherwise noted) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **PARAMETER** | **SYMBOL** | **1N4001GP** | **1N4002GP** | **1N4003GP** | **1N4004GP** | **1N4005GP** | **1N4006GP** | **1N4007GP** | **UNIT** |
| Typical thermal resistance | $R_{\theta JA}$ (1) | 55 | | | | | | | °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** |
| 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 (1) | 0.335 | 54 | 5500 | 13" diameter paper tape and reel |
| 1N4004GPHE3/73 (1) | 0.335 | 73 | 3000 | Ammo pack packaging |

**Note**

(1) AEC-Q101 qualified

## RATINGS AND CHARACTERISTICS CURVES ($T_A$ = 25 °C unless otherwise noted)

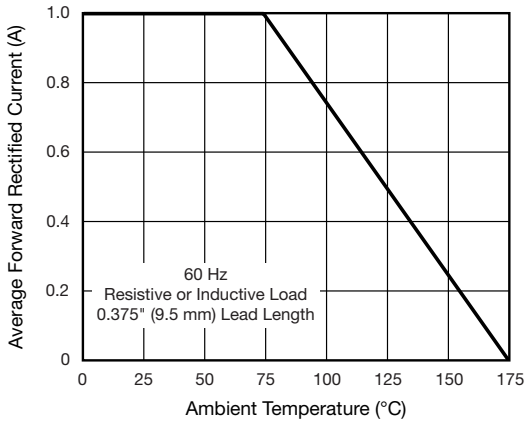


Fig. 1 - Forward Current Derating Curve

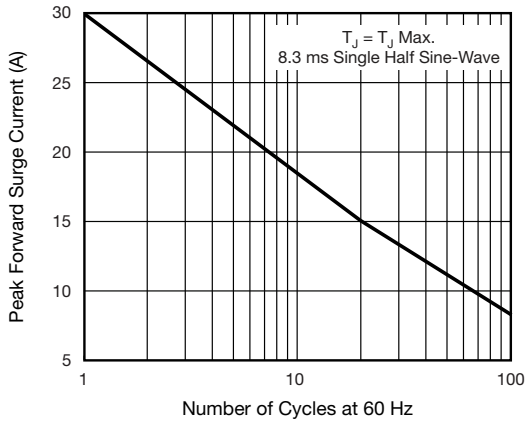


Fig. 2 - Maximum Non-repetitive Peak Forward Surge Current


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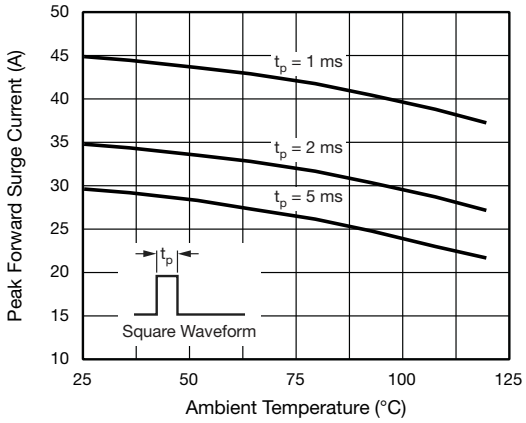


Fig. 3 - Non-Repetitive Peak Forward Surge Current

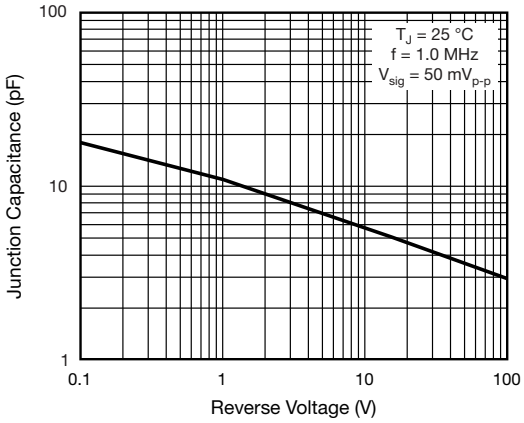


Fig. 6 - Typical Junction Capacitance

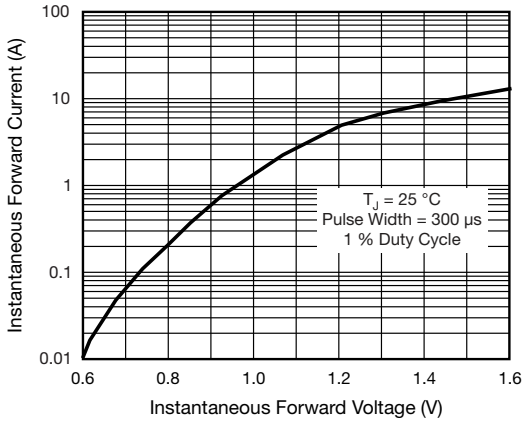


Fig. 4 - Typical Instantaneous Forward Characteristics

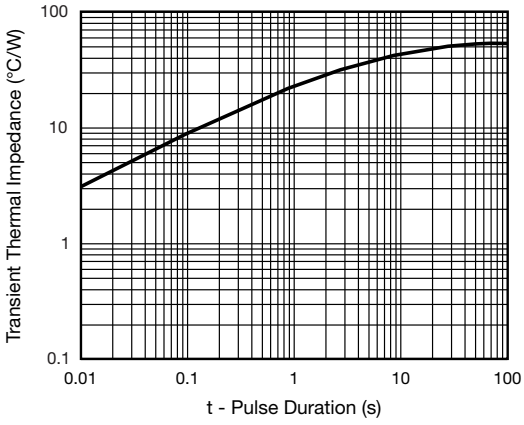


Fig. 7 - Typical Transient Thermal Impedance

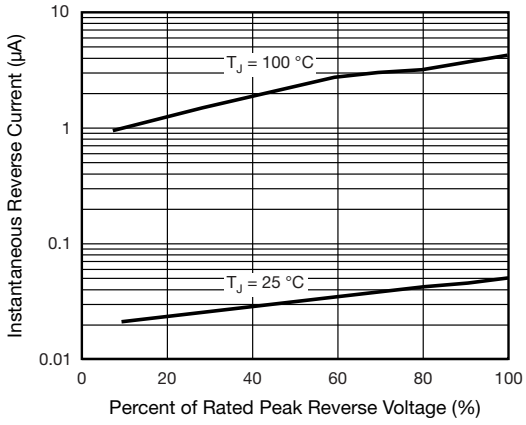


Fig. 5 - Typical Reverse Characteristics


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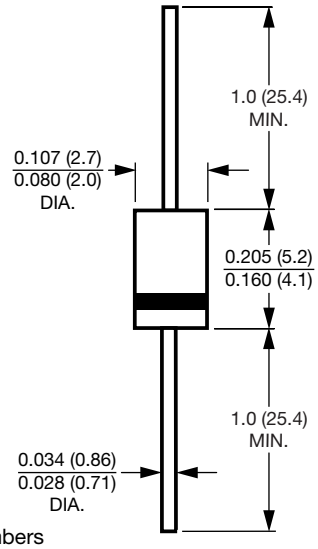
**PACKAGE OUTLINE DIMENSIONS** in inches (millimeters)

**DO-204AL (DO-41)**




**Note**

• Lead diameter is $\frac{0.026\ (0.66)}{0.023\ (0.58)}$ for suffix “E” part numbers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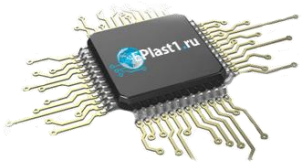


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