## MR4045

## Automotive Transient Voltage Suppressor

## 34 V - 45 V

Designed for Automotive Applications (Alternator) requiring Reverse Avalanche Capability for use as Transient Voltage Suppressor. Developed to suppress transients in automotive systems, this device operates in the forward mode as Standard Rectifier or in Reverse as Transient Voltage Suppressor for Centralized Protection.

For further information referring to Mounting or Operating Conditions, contact your nearest ON Semiconductor Sales Representative.

## Mechanical Characteristics

- Finish: $100 \%$ Tin Plated

All External Surfaces are Corrosion Resistant

- Weight: 2.6 Grams (Approximately)


## Packaging/Labeling

- Two Sealed Bags into a Cardboard Box
- Device Number Labeled on the Bag


## Marking

- The Pieces are Laser Marked on the Epoxy of the Diode
- The part, divided into 4 quarters, has the following marking: - On the top quarter: 1 digit for the polarity ( N or P ), 1 digit for the voltage code ( 2 for $34-45 \mathrm{~V}$ ), 4 digits for the date code (YYMM)
- On the left and right quarter: 1 digit for the polarity ( N or P )
- On the bottom quarter: 2 digits for the site code (NL for Czech

Republic) and 3 digits for the assembly lot number

## MAXIMUM RATING

| Rating | Symbol | Value | Unit |
| :---: | :---: | :---: | :---: |
| DC Blocking Voltage | $\mathrm{V}_{\mathrm{R}}$ | 30 | Volts |
| Average Forward Current (Single Phase, Resistive Load, $\mathrm{T}_{\mathrm{C}}=185^{\circ} \mathrm{C}$ ) | Io | 40 | Amps |
| Peak Repetitive Reverse Surge Current (Time Constant $=10 \mathrm{~ms}, \mathrm{~T}_{\mathrm{C}}=25^{\circ} \mathrm{C}$ ) (Time Constant $=80 \mathrm{~ms}, \mathrm{~T}_{\mathrm{C}}=25^{\circ} \mathrm{C}$ ) | $\begin{aligned} & \text { IRSM } \\ & \text { IRSM } \end{aligned}$ | $\begin{aligned} & 55 \\ & 25 \end{aligned}$ | Amps |
| Non-Repetitive Peak Surge Current (Halfwave, Single Phase, 50 Hz ) | ${ }^{\text {I FSM }}$ | 500 | Amps |
| Storage Temperature Range | $\mathrm{T}_{\text {stg }}$ | $\begin{aligned} & -40 \text { to } \\ & +200 \end{aligned}$ | ${ }^{\circ} \mathrm{C}$ |
| Maximum Operating Junction Temperature | TJ | 200 | ${ }^{\circ} \mathrm{C}$ |

## ON Semiconductor

Formerly a Division of Motorola http://onsemi.com


N SUFFIX
(Anode to Cup) P SUFFIX
(Cathode to Cup)
CASE 193A

ORDERING INFORMATION

| Device | Package | Shipping |
| :--- | :---: | :---: |
| MR4045N | Button Can | $5000 /$ Box |
| MR4045P | Button Can | $5000 /$ Box |

THERMAL CHARACTERISTICS

| Characteristic | Symbol | Value | Unit |
| :--- | :---: | :---: | :---: |
| Thermal Resistance Junction to Case | $\mathrm{R}_{\theta \mathrm{JC}}$ | 0.4 | ${ }^{\circ} \mathrm{C} / \mathrm{W}$ |

## ELECTRICAL CHARACTERISTICS

| Characteristic | Symbol | Min | Max | Unit |
| :---: | :---: | :---: | :---: | :---: |
| Instantaneous Forward Voltage(1) ( $\left.\mathrm{I}_{\mathrm{F}}=100 \mathrm{Amps}, \mathrm{T}_{\mathrm{C}}=25^{\circ} \mathrm{C}\right)$ | ${ }^{\text {VF }}$ | - | 1.1 | Volts |
| Reverse Current ${ }^{(1)} \quad\left(\mathrm{V}_{\mathrm{R}}=28 \mathrm{Vdc}, \mathrm{T}_{\mathrm{C}}=25^{\circ} \mathrm{C}\right)$ | IR | - | 1.0 | $\mu \mathrm{A}$ |
| Breakdown Voltage( ${ }^{(1)} \quad\left(\mathrm{I}_{\mathrm{R}}=100 \mathrm{~mA}, \mathrm{~T}^{\text {C }}=25^{\circ} \mathrm{C}\right)$ | $\mathrm{V}_{\text {( }} \mathrm{BR}$ ) | 34 | 45 | Volts |
| Breakdown Voltage $\begin{aligned} & \left(\mathrm{I}_{\mathrm{R}}=80 \mathrm{Amps}, \mathrm{~T} \mathrm{C}=25^{\circ} \mathrm{C}, \mathrm{PW}=80 \mu \mathrm{~s}\right) \\ & \left(\mathrm{IR}=80 \mathrm{Amps}, \mathrm{~T}_{\mathrm{C}} \mathrm{C}=85^{\circ} \mathrm{C}, \mathrm{PW}=80 \mu \mathrm{~s}\right) \end{aligned}$ | $V_{\text {(BR) }}$ | - | $\begin{aligned} & 53 \\ & 55 \end{aligned}$ | Volts |
| Breakdown Voltage Temperature Coefficient | $\mathrm{V}_{\text {(BR) }} \mathrm{TC}$ | 0.095* |  | \%/ ${ }^{\circ} \mathrm{C}$ |
| Forward Voltage Temperature Coefficient ( $\mathrm{I}_{\mathrm{F}}=10 \mathrm{~mA}$ ) | $\mathrm{V}_{\text {FTC }}$ | $-2^{*}$ |  | $\mathrm{mV} /{ }^{\circ} \mathrm{C}$ |

(1) Pulse Test: Pulse Width < $300 \mu \mathrm{~s}$, Duty Cycle $<2 \%$.
*Typical


Figure 1. Typical Reverse Current


Figure 3. Maximum Peak Reverse Current
t , TIME CONSTANT (mS)
Figure 4. Maximum Peak Reverse Power


Figure 5. Maximum Reverse Energy



Figure 8. Load Dump Test Circuit

Figure 7. Typical Capacitance


Figure 9. Load Dump Pulse Current

## PACKAGE DIMENSIONS

N SUFFIX
(Anode to Cup)
P SUFFIX
(Cathode to Cup)
CASE 193A-02
ISSUE A


NOTES:

1. DIMENSIONING AND TOLERANCING PER ANS Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER

| DIM | MILLIMETERS |  | INCHES |  |
| :---: | ---: | ---: | ---: | ---: |
|  | MIN | MAX | MIN | MAX |
| A | 11.4 | 11.6 | 0.449 | 0.457 |
| B | 9.3 | 9.7 | 0.366 | 0.382 |
| C | 4.3 | 4.9 | 0.169 | 0.193 |
| D | 5.4 | 5.6 | 0.213 | 0.220 |
| E | 3.6 | 4.2 | 0.142 | 0.165 |
| F | 1.0 | 2.0 | 0.039 | 0.079 |

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