# IFN3993/A, IFN3994/A P-Channel JFET

## Features

- InterFET P0099F Geometry
- Typical Noise: 8 nV/√Hz
- Fast Switching
- Replacement for 2N3993,4 Parts
- RoHS Compliant
- SMT, TH, and Bare Die Package options.

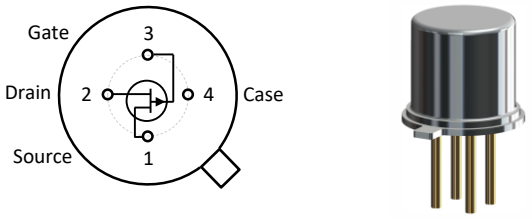
## Applications

- Choppers
- High Speed Commutators

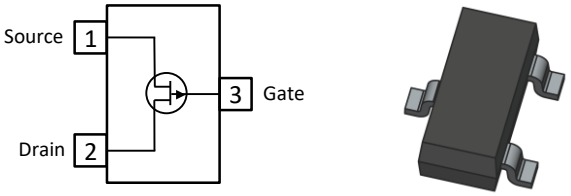
## Description

The 25V InterFET IFN3993/A and IFN3994/A are targeted for choppers and high speed commutator designs. The on resistance is typically less than 100 Ohms at room temperatures. The TO-72 package is hermetically sealed and suitable for military applications.

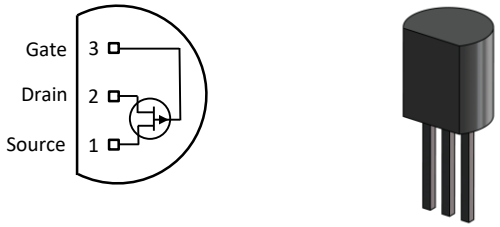
**TO-72 Bottom View**




**SOT23 Top View**




**TO-92 Bottom View**




## Product Summary (Highlighted values = A variant)

| Parameters | | IFN3993/A Min | IFN3994/A Min | Unit |
|---|---|---|---|---|
| $BV_{GSS}$ | Gate to Source Breakdown Voltage | 25 | 25 | V |
| $I_{DSS}$ | Drain to Source Saturation Current | -10 | -2 | mA |
| $V_{GS(off)}$ | Gate to Source Cutoff Voltage | 4 | 1 | V |
| $G_{FS}$ | Forward Transconductance | 6 | 4 | µS |
| | | 7 | 5 | |

## Ordering Information Custom Part and Binning Options Available

| Part Number | Description | Case | Packaging |
|---|---|---|---|
| IFN3993; IFN3994<br>IFN3993A; IFN3994A | Through-Hole | TO-72 | Bulk |
| PN3993; PN3994<br>PN3993A; PN3994A | Through-Hole | TO-92 | Bulk |
| SMP3993; SMP3994<br>SMP3993A; SMP3994A | Surface Mount | SOT23 | Bulk |
| SMP3993TR; SMP3994TR<br>SMP3993ATR; SMP3994ATR | 7" Tape and Reel: Max 3,000 Pieces<br>13" Tape and Reel: Max 9,000 Pieces | SOT23 | Minimum 1,000 Pieces<br>Tape and Reel |
| IFN3993COT; IFN3994COT<br>IFN3993ACOT; IFN3994ACOT | Chip Orientated Tray (COT Waffle Pack) | COT | 400/Waffle Pack |
| IFN3993CFT; IFN3994CFT<br>IFN3993ACFT; IFN3994ACFT | Chip Face-up Tray (CFT Waffle Pack) | CFT | 400/Waffle Pack |

# Electrical Characteristics

## Maximum Ratings (@ $T_A$ = 25°C, Unless otherwise specified)

| Parameters | | Value | Unit |
|---|---|---|---|
| $V_{RGS}$ | Reverse Gate Source and Gate Drain Voltage | 25 | V |
| $I_{FG}$ | Continuous Forward Gate Current | -10 | mA |
| $P_D$ | Continuous Device Power Dissipation | 300 | mW |
| P | Power Derating | 2.4 | mW/°C |
| $T_J$ | Operating Junction Temperature | -55 to 125 | °C |
| $T_{STG}$ | Storage Temperature | -65 to 150 | °C |

## Static Characteristics (@ TA = 25°C, Unless otherwise specified, Highlighted values = A variant)

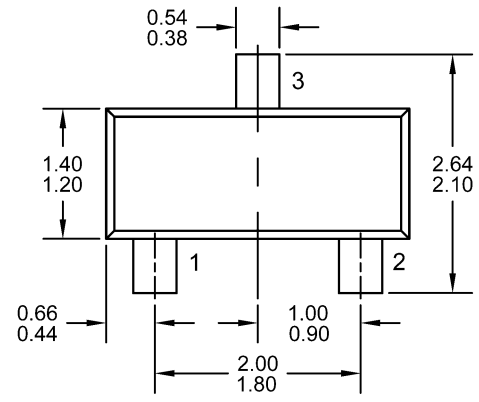
| Parameters | | Conditions | IFN3993/A | | IFN3994/A | | Unit |
|---|---|---|---|---|---|---|---|
| | | | Min | Max | Min | Max | |
| $V_{(BR)GSS}$ | Gate to Source Breakdown Voltage | $V_{DS}$ = 0V, $I_G$ = 1µA | 25 | | 25 | | V |
| $V_{GS(OFF)}$ | Gate to Source Cutoff Voltage | $V_{DS}$ = -10V, $I_D$ = -1µA | 4 | 9.5 | 1 | 5.5 | V |
| $I_{DSS}$ | Drain to Source Saturation Current | $V_{GS}$ = 0V, $V_{DS}$ = -10V (Pulsed) | -10 | | -2 | | mA |
| $I_{DGO}$ | Drain Reverse Current | $V_{GS}$ = -15V, $I_S$ = 0A, $T_A$ = 25°C<br>$V_{GS}$ = -15V, $I_S$ = 0A, $T_A$ = 150°C | | -1.2 | | -1.2 | nA<br>µA |
| $I_{D(OFF)}$ | Drain Cutoff Current | $V_{DS}$ = -10V, $V_{GS}$ = 10V, $T_A$ = 25°C<br>$V_{DS}$ = -10V, $V_{GS}$ = 10V, $T_A$ = 150°C | | -1.2<br>-1 | | -1.2<br>-1 | nA<br>µA |

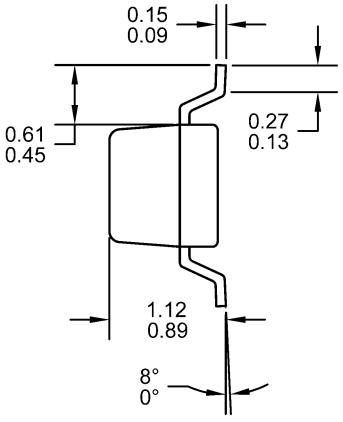
## Dynamic Characteristics (@ TA = 25°C, Unless otherwise specified, Highlighted values = A variant)

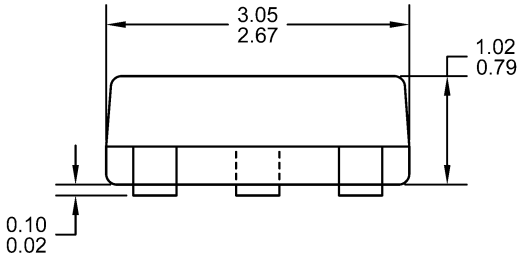
| Parameters | | Conditions | IFN3993/A | | IFN3994/A | | Unit |
|---|---|---|---|---|---|---|---|
| | | | Min | Max | Min | Max | |
| $G_{FS}$ | Forward Transconductance | $V_{DS}$ = -10V, $V_{GS}$ = 0V, f = 1kHz | 6<br>7 | 12<br>12 | 4<br>5 | 10<br>10 | mS |
| $R_{DS(ON)}$ | Drain to Source ON Resistance | $V_{GS}$ = 0V, $I_D$ = 0A, f = 1kHz | | 150 | | 300 | Ω |
| $C_{iss}$ | Input Capacitance | $V_{DS}$ = -10V, $V_{GS}$ = 0V, f = 1MHz | | 16<br>12 | | 16<br>12 | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | $V_{DS}$ = 0V, $V_{GS}$ = 10V, f = 1MHz | | 4.5<br>3 | | 5<br>3.5 | pF |

# SOT23 (TO-236AB) Mechanical and Layout Data

## Package Outline Data

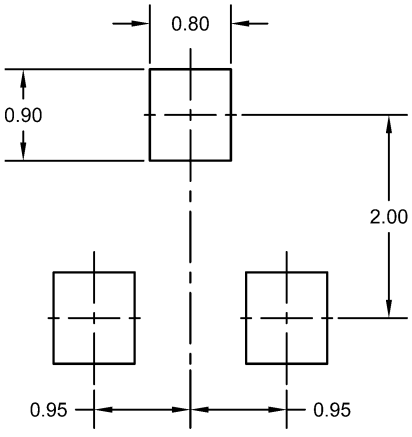



1. All linear dimensions are in millimeters.
2. Package weight approximately 0.12 grams
3. Molded plastic case UL 94V-0 rated
4. For Tape and Reel specifications refer to InterFET CTC-021 Tape and Reel Specification, Document number: IF39002
5. Bulk product is shipped in standard ESD shipping material
6. Refer to JEDEC standards for additional information.

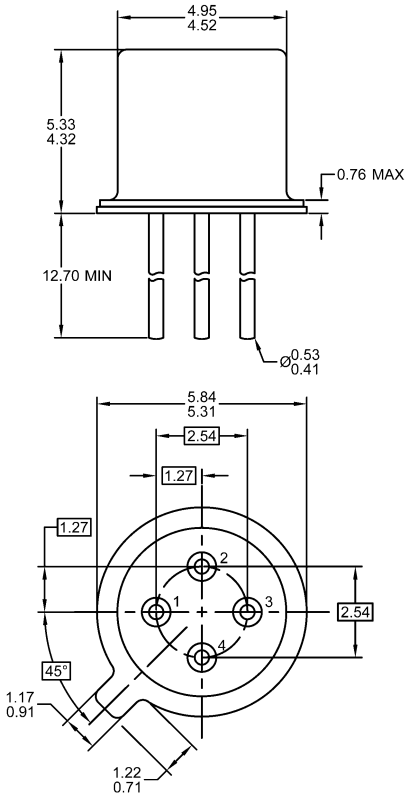
## Suggested Pad Layout




1. All linear dimensions are in millimeters.
2. The suggested land pattern dimensions have been provided for reference only. A more robust pattern may be desired for wave soldering.

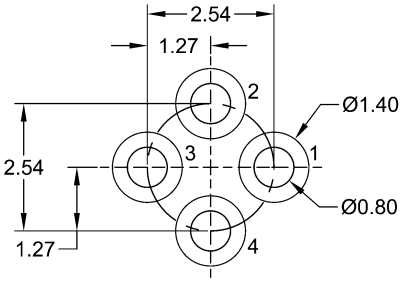
# TO-72 Mechanical and Layout Data

## Package Outline Data




1. All linear dimensions are in millimeters.
2. Four leaded device. Not all leads are shown in drawing views.
3. Package weight approximately 0.31 grams
4. Bulk product is shipped in standard ESD shipping material
5. Refer to JEDEC standards for additional information.

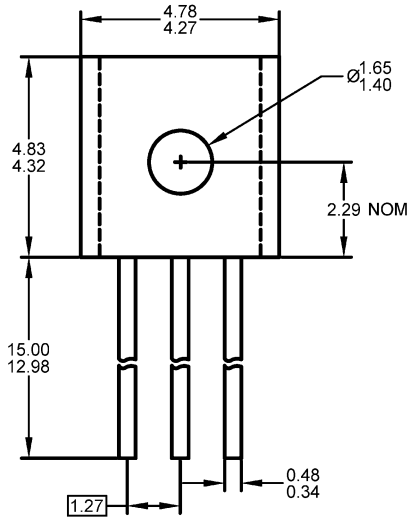
## Suggested Through-Hole Layout

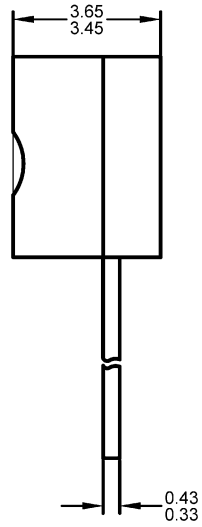


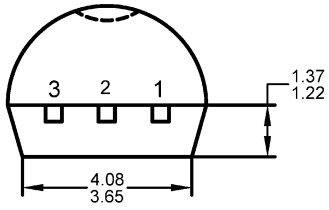

1. All linear dimensions are in millimeters.
2. The suggested land pattern dimensions have been provided as a straight lead reference only. A more robust pattern may be desired for wave soldering and/or bent lead configurations.

# TO-92 Mechanical and Layout Data

## Package Outline Data

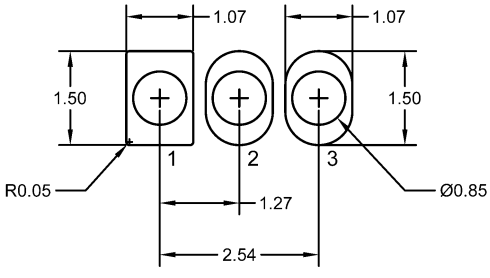



1. All linear dimensions are in millimeters.
2. Package weight approximately 0.19 grams
3. Molded plastic case UL 94V-0 rated
4. Bulk product is shipped in standard ESD shipping material
5. Refer to JEDEC standards for additional information.

## Suggested Through-Hole Layout




1. All linear dimensions are in millimeters.
2. The suggested land pattern dimensions have been provided as a straight lead reference only. A more robust pattern may be desired for wave soldering and/or bent lead configurations.

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