# J509, J510, J511 Current Regulator Diode

## Features

- InterFET N0016H Geometry
- Low Noise: 5 nV/√Hz Typical
- Low Capacitance: 2pF Typical
- RoHS Compliant
- SMT, TH, and Bare Die Package options.

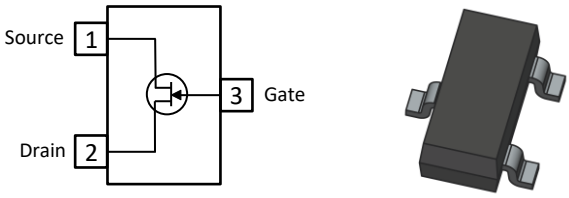
## Applications

- Current Regulation
- Current Limiting

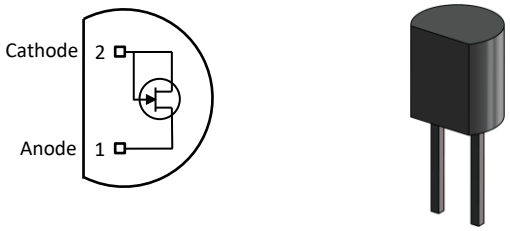
## Description

The 50V InterFET J509, J510, and J511 JFET's are targeted for current regulation and limiting applications. The SOT23 package is pinned out as a standard JFET and is required by the user to connect the Gate to the Source or Drain.

**SOT23 Top View**




**TO-92 Bottom View**




## Product Summary

| Parameters | | J509 Min | J510 Min | J511 Min | Unit |
|---|---|---|---|---|---|
| $V_{OP}$ | Peak Operating Voltage | 50 | 50 | 50 | V |
| $I_{F1}$ | Forward Current | 2.4 | 2.9 | 3.8 | mA |
| $V_L$ | Limiting Voltage | 2.5 (typ) | 2.8 (typ) | 3.0 (typ) | V |

## Ordering Information Custom Part and Binning Options Available

| Part Number | Description | Case | Packaging |
|---|---|---|---|
| J509; J510; J511 | Through-Hole | TO-92-2L | Bulk |
| SMPJ509; SMPJ510; SMPJ511 | Surface Mount | SOT23 | Bulk |
| SMPJ509TR; SMPJ510TR; SMPJ511TR | 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 |
| J509COT; J510COT; J511COT | Chip Orientated Tray (COT Waffle Pack) | COT | 400/Waffle Pack |
| J509CFT; J510CFT; J511CFT | Chip Face-up Tray (CFT Waffle Pack) | CFT | 400/Waffle Pack |

**Disclaimer:** It is the Buyers responsibility for designing, validating and testing the end application under all field use cases and extreme use conditions. Guaranteeing the application meets required standards, regulatory compliance, and all safety and security requirements is the responsibility of the Buyer. These resources are subject to change without notice.

# Electrical Characteristics

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

| Parameters | | Value | Unit |
|---|---|---|---|
| $V_{OP}$ | Peak Operating Voltage | 50 | V |
| $I_{FG}$ | Continuous Forward Gate Current | 20 | mA |
| $P_D$ | Continuous Device Power Dissipation | 360 | mW |
| P | Power Derating | 3.27 | mW/°C |
| $T_J$ | Operating Junction Temperature | -55 to 135 | °C |
| $T_{STG}$ | Storage Temperature | -55 to 135 | °C |

## Static Characteristics (@ TA = 25°C, Unless otherwise specified)

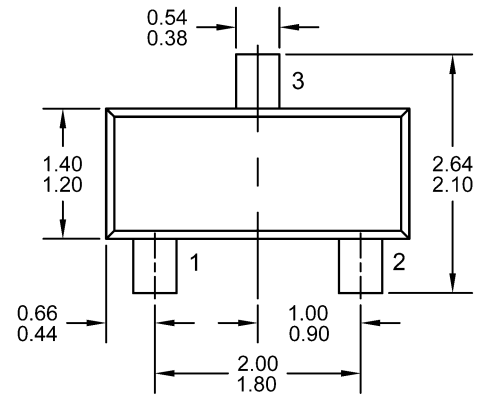
| Parameters | | Conditions | J509 | | | J510 | | | J511 | | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | |
| $I_{F1}$ | Forward Current | $V_F$ = 25V | 2.4 | 3.0 | 3.6 | 2.9 | 3.6 | 4.3 | 3.8 | 4.7 | 5.6 | mA |
| $V_L$ | Limiting Voltage | $I_F = 0.9\ I_{F(MIN)}$ | | 2.5 | 3.5 | | 2.8 | 3.9 | | 3.0 | 4.2 | V |
| $V_{OP}$ | Peak Operating Voltage | $I_F = 1.1\ I_{F(MAX)}$ | 50 | | | 50 | | | 50 | | | V |

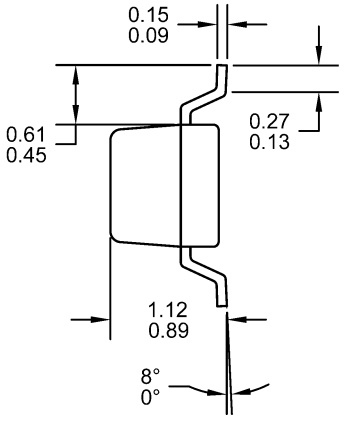
## Dynamic Characteristics (@ TA = 25°C, Unless otherwise specified)

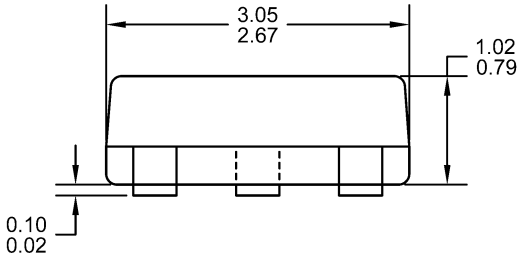
| Parameters | | Conditions | J509 | | | J510 | | | J511 | | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | |
| $Z_{fi}$ | Dynamic Impedance | $V_F$ = 25V, f = 1kHz | 0.15 | 0.6 | | 0.15 | 0.5 | | 0.12 | 0.3 | | MΩ |
| $C_F$ | Anode-Cathode Capacitance | $V_F$ = 25V, f = 1kHz | | 2 | | | 2 | | | 2 | | pF |

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

## Package Outline Data

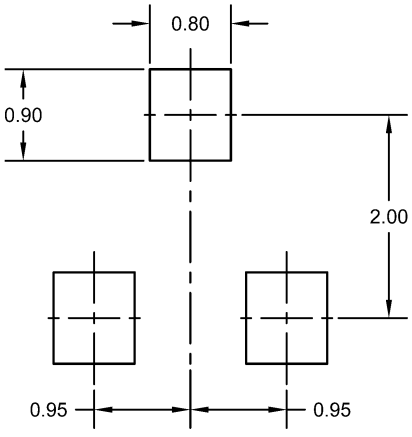



1. All linear dimensions are in millimeters.
2. Package weight approximately 0.12 grams
3. Molded plastic case UL 94V-0 rated
4. For Tape and Reel specifications refer to InterFET CTC-021 Tape and Reel Specification, Document number: IF39002
5. Bulk product is shipped in standard ESD shipping material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

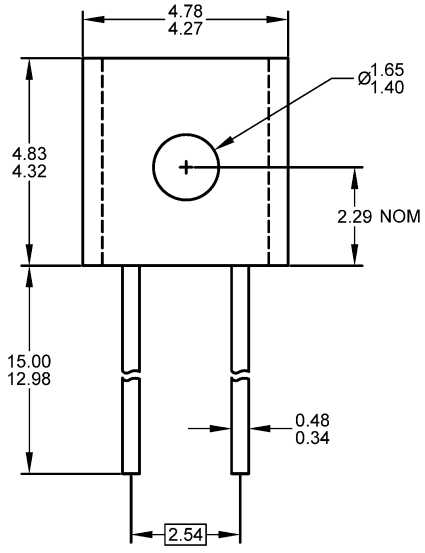
## Suggested Pad Layout

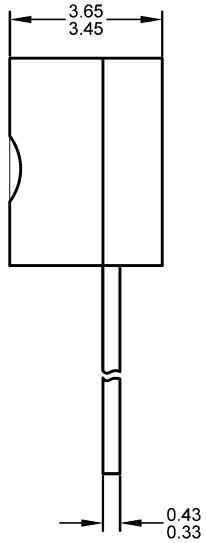


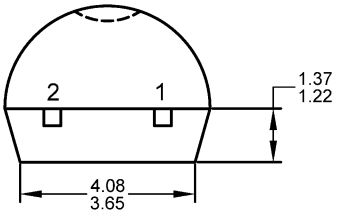

1. All linear dimensions are in millimeters.
2. The suggested land pattern dimensions have been provided for reference only. A more robust pattern may be desired for wave soldering.

# TO-92-2L Mechanical and Layout Data

## Package Outline Data

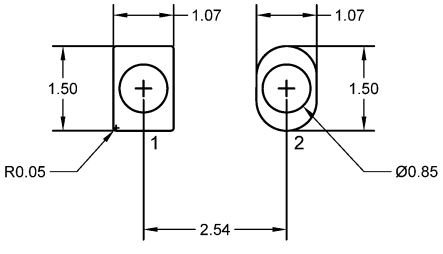



1. All linear dimensions are in millimeters.
2. Package weight approximately 0.19 grams
3. Molded plastic case UL 94V-0 rated
4. Bulk product is shipped in standard ESD shipping material
5. Refer to JEDEC standards for additional information.

## 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.