EVVOSEMI®
THINK CHANGE DO

ESD TVS MOS LDO Diode Sensor DC-DC

# Product Specification

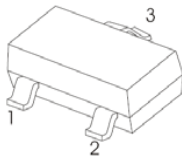
| | |
|---|---|
| Domestic Part Number | SSM3J332R |
| Overseas Part Number | SSM3J332R |
| Equivalent Part Number | SSM3J332R |

## P–CHANNEL MOSFET

### FEATURES

- $V_{DS\,(V)}$ = -30V
- $R_{DS(ON)}$ < 46mΩ ($V_{GS}$ = -10V)
- $R_{DS(ON)}$ < 54mΩ ($V_{GS}$ = -4.5V)

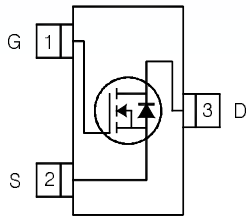
**SOT－23**




1. GATE
2. SOURCE
3. DRAIN

### APPLICATIONS

- For Mobile Computing
- Load Switch
- Notebook Adaptor Switch
- DC/DC Converter




### ABSOLUTEMAXIMUM RATINGS ($T_A$ = 25 °C, unless otherwise noted)

| Parameter | | Symbol | Limit | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | - 30 | V |
| Gate-Source Voltage | | $V_{GS}$ | ± 20 | |
| Continuous Drain Current ($T_J$ = 150 °C) | $T_C$ = 25 °C | $I_D$ | - 5.6 | A |
| | $T_C$ = 70 °C | | - 5.1 | |
| | $T_A$ = 25 °C | | - 5.4[b,c] | |
| | $T_A$ = 70 °C | | - 4.3[b,c] | |
| Pulsed Drain Current (t = 100 µs) | | $I_{DM}$ | - 18 | |
| Continous Source-Drain Diode Current | $T_C$ = 25 °C | $I_S$ | - 2.1 | |
| | $T_A$ = 25 °C | | - 1[b,c] | |
| Maximum Power Dissipation | $T_C$ = 25 °C | $P_D$ | 2.5 | W |
| | $T_C$ = 70 °C | | 1.6 | |
| | $T_A$ = 25 °C | | 1.25[b,c] | |
| | $T_A$ = 70 °C | | 0.8[b,c] | |
| Operating Junction and Storage Temperature Range | | $T_J$, $T_{stg}$ | - 55 to 150 | °C |

### THERMAL RESISTANCE RATINGS

| Parameter | | Symbol | Typical | Maximum | Unit |
|---|---|---|---|---|---|
| Maximum Junction-to-Ambient[b,d] | t ≤ 5 s | $R_{thJA}$ | 75 | 100 | °C/W |
| Maximum Junction-to-Foot (Drain) | Steady State | $R_{thJF}$ | 40 | 50 | |

Notes:
a. Based on $T_C$ = 25 °C.
b. Surface mounted on 1" x 1" FR4 board.
c. t = 5 s.
d. Maximum under steady state conditions is 166 °C/W.

## P–CHANNEL MOSFET

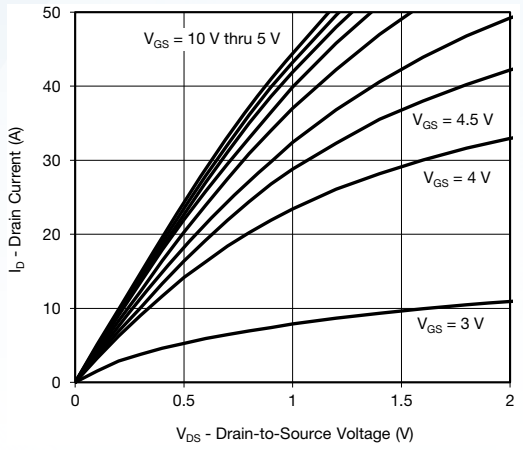
**SPECIFICATIONS** ($T_J$ = 25 °C, unless otherwise noted)

| Parameter | Symbol | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| **Static** | | | | | | |
| Drain-Source Breakdown Voltage | $V_{DS}$ | $V_{GS}$ = 0 V, $I_D$ = - 250 µA | - 30 | | | V |
| $V_{DS}$ Temperature Coefficient | $\Delta V_{DS}/T_J$ | $I_D$ = - 250 µA | | - 19 | | mV/°C |
| $V_{GS(th)}$ Temperature Coefficient | $\Delta V_{GS(th)}/T_J$ | | | 4 | | |
| Gate-Source Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$ , $I_D$ = - 250 µA | - 0.5 | | - 2.0 | V |
| Gate-Source Leakage | $I_{GSS}$ | $V_{DS}$ = 0 V, $V_{GS}$ = ± 20 V | | | ± 100 | nA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = - 30 V, $V_{GS}$ = 0 V | | | - 1 | µA |
| | | $V_{DS}$ = - 30 V, $V_{GS}$ = 0 V, $T_J$ = 55 °C | | | - 5 | |
| On-State Drain Current[a] | $I_{D(on)}$ | $V_{DS} \leq$ - 5 V, $V_{GS}$ = - 10 V | - 2.5 | | | A |
| Drain-Source On-State Resistance[a] | $R_{DS(on)}$ | $V_{GS}$ = - 10 V, $I_D$ = - 4.4 A | | 46 | 55 | mΩ |
| | | $V_{GS}$ = - 4.5 V, $I_D$ = - 3.6 A | | 54 | 63 | |
| Forward Transconductance[a] | $g_{fs}$ | $V_{DS}$ = - 15 V, $I_D$ = - 3.4 A | | 18 | | S |
| **Dynamic[b]** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$ = - 15 V, $V_{GS}$ = 0 V, f = 1 MHz | | 1295 | | pF |
| Output Capacitance | $C_{oss}$ | | | 150 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 130 | | |
| Total Gate Charge | $Q_g$ | $V_{DS}$ = - 15 V, $V_{GS}$ = - 10 V, $I_D$ = - 5.4 A | | 24 | 36 | nC |
| | | $V_{DS}$ = - 15 V, $V_{GS}$ = - 4.5 V, $I_D$ = - 5.4 A | | 11.4 | 17 | |
| Gate-Source Charge | $Q_{gs}$ | | | 3.4 | | |
| Gate-Drain Charge | $Q_{gd}$ | | | 3.8 | | |
| Gate Resistance | $R_g$ | f = 1 MHz | 1.5 | 7.7 | 15.4 | Ω |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DD}$ = - 15 V, $R_L$ = 3.5 Ω<br>$I_D \cong$ - 4.3 A, $V_{GEN}$ = - 10 V, $R_g$ = 1 Ω | | 13 | 20 | ns |
| Rise Time | $t_r$ | | | 4 | 8 | |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 38 | 57 | |
| Fall Time | $t_f$ | | | 6 | 12 | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DD}$ = - 15 V, $R_L$ = 3.5 Ω<br>$I_D \cong$ - 4.3 A, $V_{GEN}$ = - 4.5 V, $R_g$ = 1 Ω | | 28 | 42 | |
| Rise Time | $t_r$ | | | 16 | 24 | |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 30 | 45 | |
| Fall Time | $t_f$ | | | 10 | 20 | |
| **Drain-Source Body Diode Characteristics** | | | | | | |
| Continuous Source-Drain Diode Current | $I_S$ | $T_C$ = 25 °C | | | - 2.1 | A |
| Pulse Diode Forward Current (t = 100 µs) | $I_{SM}$ | | | | - 80 | |
| Body Diode Voltage | $V_{SD}$ | $I_S$ = - 4.3 A, $V_{GS}$ = 0 V | | - 0.8 | - 1.2 | V |
| Body Diode Reverse Recovery Time | $t_{rr}$ | $I_F$ = - 4.3 A, dI/dt = 100 A/µs, $T_J$ = 25 °C | | 15 | 23 | ns |
| Body Diode Reverse Recovery Charge | $Q_{rr}$ | | | 7 | 14 | nC |
| Reverse Recovery Fall Time | $t_a$ | | | 8 | | ns |
| Reverse Recovery Rise Time | $t_b$ | | | 7 | | |

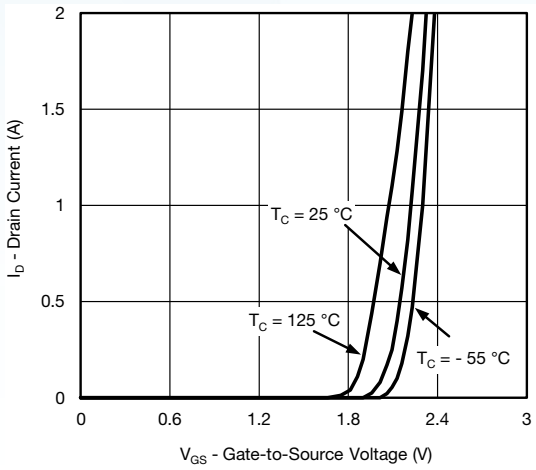
Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.

## P–CHANNEL MOSFET

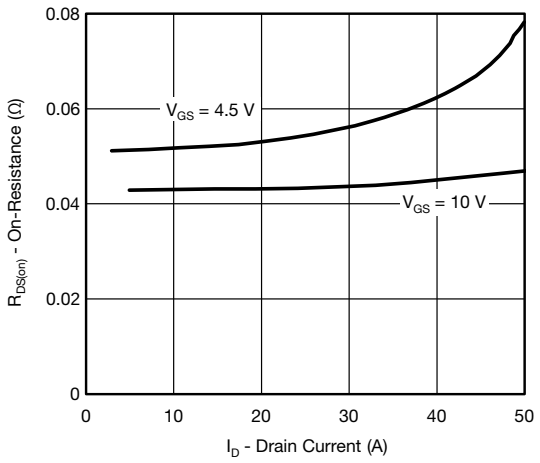
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



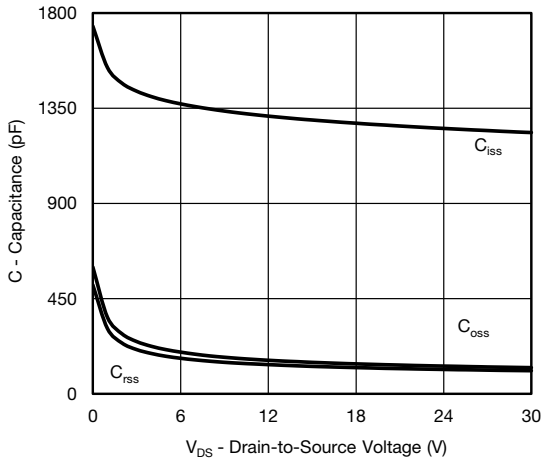

**Output Characteristics**



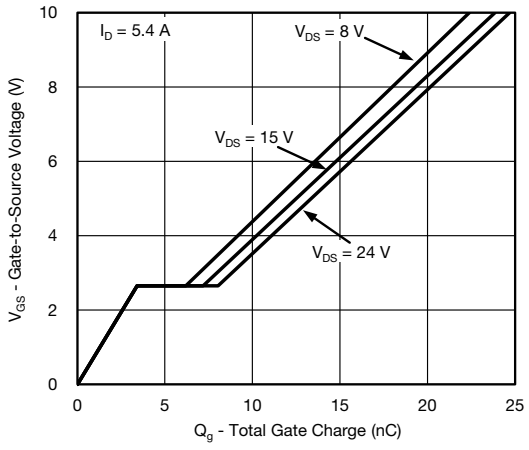

**Transfer Characteristics**



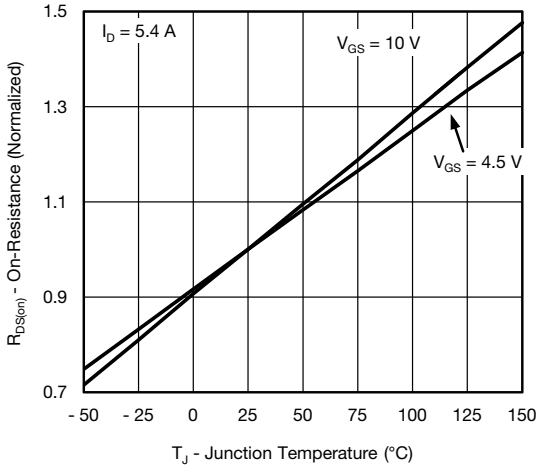

**On-Resistance vs. Drain Current**




**Capacitance**

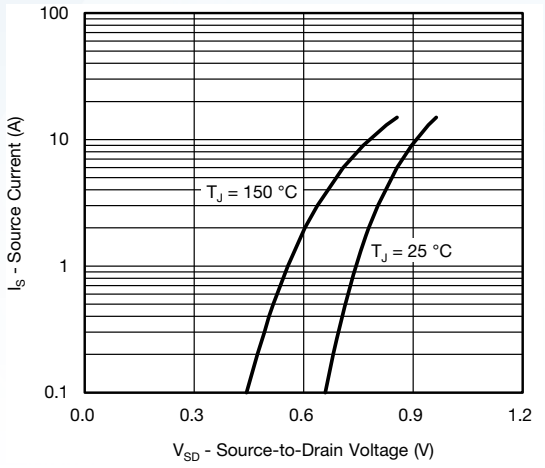



**Gate Charge**

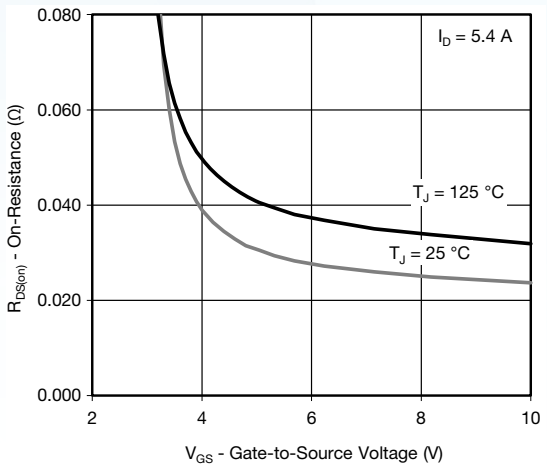



**On-Resistance vs. Junction Temperature**

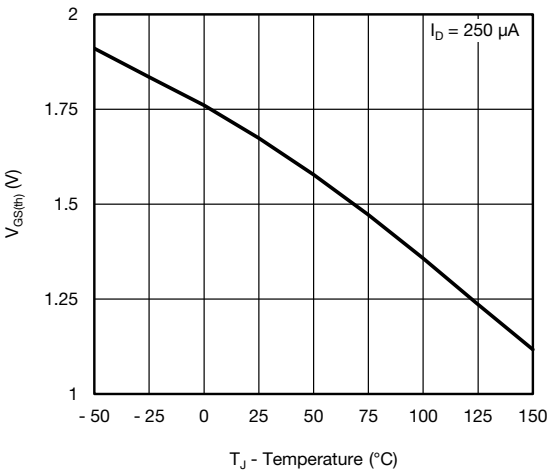
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



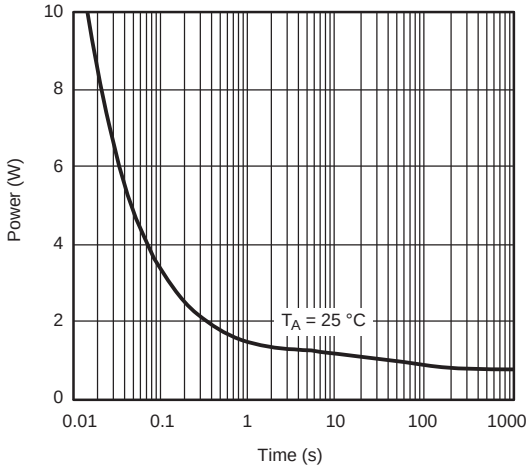

**Source-Drain Diode Forward Voltage**



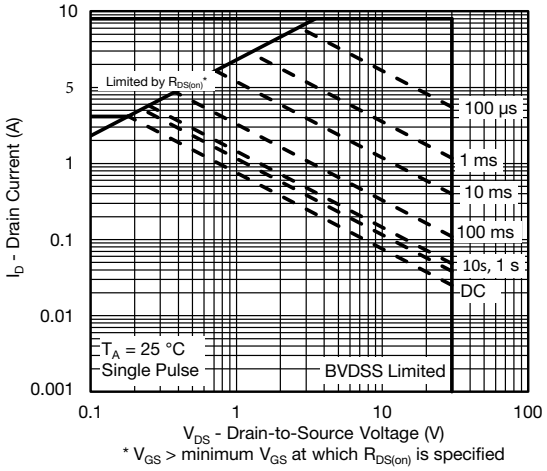

**On-Resistance vs. Gate-to-Source Voltage**




**Threshold Voltage**

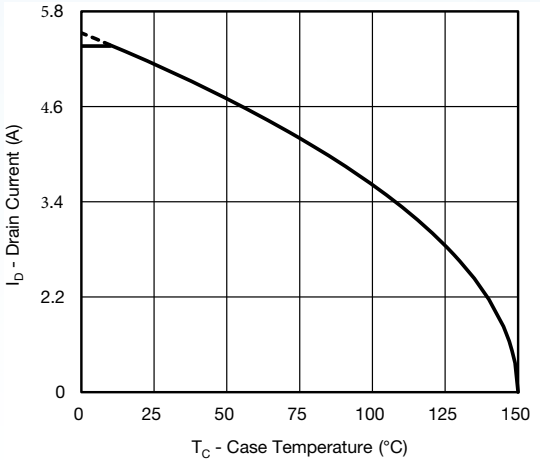



**Single Pulse Power (Junction-to-Ambient)**

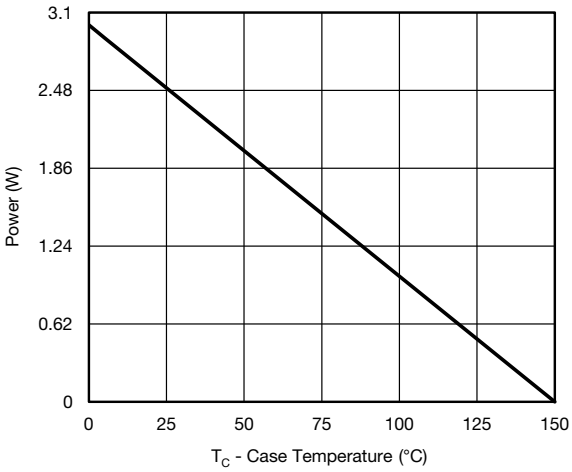



**Safe Operating Area, Junction-to-Ambient**

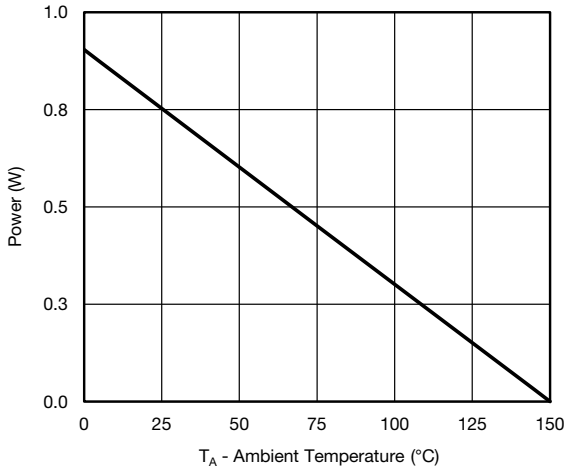
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)




**Current Derating***



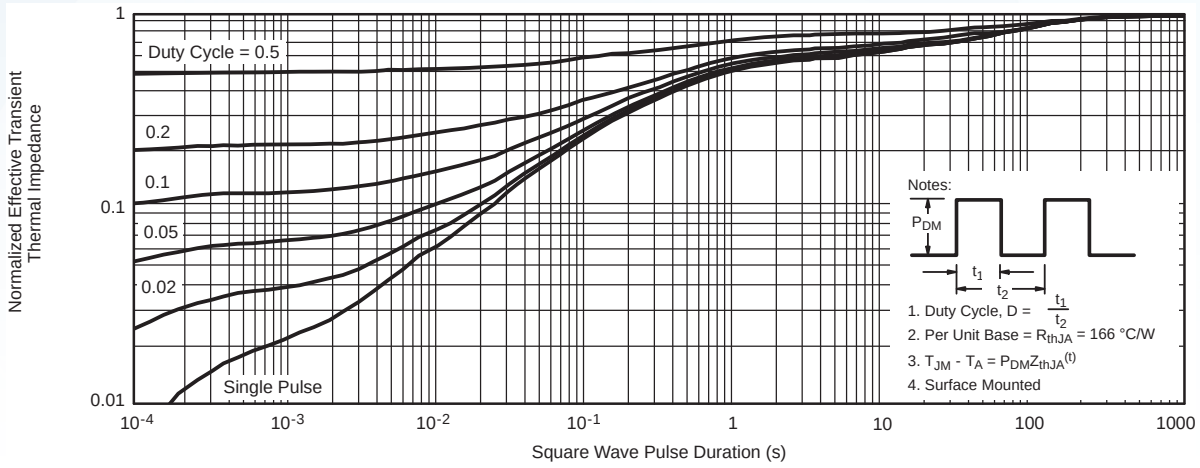

**Power, Junction-to-Foot**



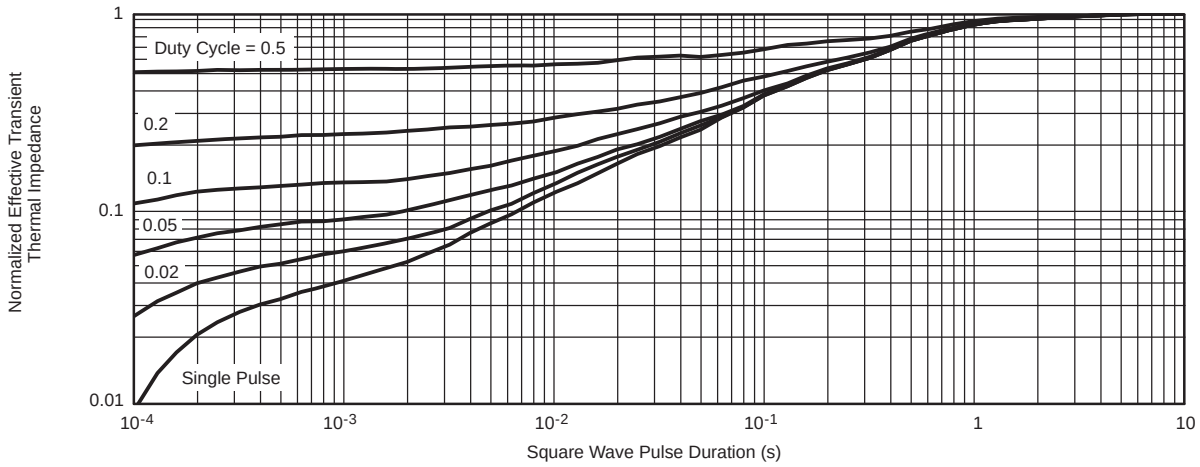

**Power, Junction-to-Ambient**

* The power dissipation $P_D$ is based on $T_{J(max.)}$ = 150 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



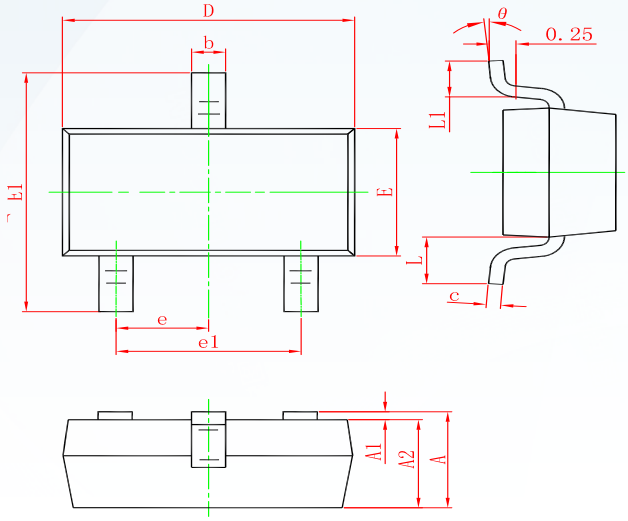

**Normalized Thermal Transient Impedance, Junction-to-Ambient**




**Normalized Thermal Transient Impedance, Junction-to-Foot**

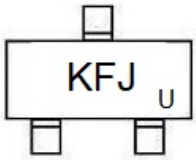
**P–CHANNEL MOSFET**

## SOT-23 PACKAGE OUTLINE DIMENSIONS




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min. | Max. | Min. | Max. |
| A | 0.900 | 1.150 | 0.035 | 0.045 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 0.900 | 1.050 | 0.035 | 0.041 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.080 | 0.150 | 0.003 | 0.006 |
| D | 2.800 | 3.000 | 0.110 | 0.118 |
| E | 1.200 | 1.400 | 0.047 | 0.055 |
| E1 | 2.250 | 2.550 | 0.089 | 0.100 |
| e | 0.950 TYP. | | 0.037 TYP. | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.550 REF. | | 0.022 REF. | |
| L1 | 0.300 | 0.500 | 0.012 | 0.020 |
| θ | 0° | 8° | 0° | 8° |

## Marking




## Ordering information

| Order code | Package | Baseqty | Deliverymode |
|---|---|---|---|
| SSM3J332R | SOT-23 | 3000 | Tape and reel |

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