## 200V  N-Channel Enhancement Mode Power MOSFET

## Description

This Product uses advanced trench technology MOSFETs to provide excellent $R_{DS(ON)}$ and low gate charge. The complementary MOSFETs may be used to form a level shifted high side switch, and for a host of other applications.

## General Features

- $V_{DS}$                                    200V
- $I_D$ (at $V_{GS}$ = 10V)              1.7A
- $R_{DS(ON)}$ (at $V_{GS}$ = 10V)      < 1.5Ω
- $R_{DS(ON)}$ (at $V_{GS}$ = 4.5V)     < 1.7Ω
- 100% Avalanche Tested
- RoHS Compliant
- ESD (HBM)>5.0KV
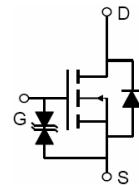
## Application

- Power switch
- DC/DC converters

SOT-23-3L

Schematic diagram

| Device | Package | Marking | Packaging |
|---|---|---|---|
| XPX17N20AS | SOT-23-3L | XPX17N20AS | 3000pcs/Reel |

## Absolute Maximum Ratings  $T_C$ = 25⁰C, unless otherwise noted

| Parameter | | Symbol | Value | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 200 | V |
| Continuous Drain Current | | $I_D$ | 1.7 | A |
| Pulsed Drain Current | (note1) | $I_{DM}$ | 6.8 | A |
| Gate-Source Voltage | | $V_{GS}$ | ±20 | V |
| Power Dissipation | | $P_D$ | 1.5 | W |
| Operating Junction and Storage Temperature Range | | $T_J$, $T_{stg}$ | -55 To 150 | ⁰C |

## Thermal Resistance

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Thermal Resistance, Junction-to-Ambient | $R_{thJA}$ | 83 | ⁰C/W |

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## Specifications  $T_J = 25ºC$, unless otherwise noted

| Parameter | Symbol | Test Conditions | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| **Static Parameters** | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS} = 0V, I_D = 250µA$ | 200 | -- | -- | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS} = 200V, V_{GS} = 0V$ | -- | -- | 1 | uA |
| Gate-Source Leakage | $I_{GSS}$ | $V_{GS} = \pm20V$ | -- | -- | $\pm30$ | uA |
| Gate-Source Threshold Voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250µA$ | 1 | 1.8 | 2 | V |
| Drain-Source On-Resistance | $R_{DS(on)}$ | $V_{GS} = 10V, I_D = 1A$ | -- | 0.95 | 1.5 | Ω |
| | | $V_{GS} = 4.5V, I_D = 1A$ | -- | 0.97 | 1.7 | |
| Forward Transconductance | $g_{FS}$ | $V_{DS}=15V, I_D=1.7A$ | -- | 8 | -- | S |
| **Dynamic Parameters** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{GS} = 0V,$ $V_{DS} = 25V,$ $f = 1.0MHz$ | -- | 580 | -- | pF |
| Output Capacitance | $C_{oss}$ | | -- | 90 | -- | |
| Reverse Transfer Capacitance | $C_{rss}$ | | -- | 30 | -- | |
| Total Gate Charge | $Q_g$ | $V_{DD} = 100V,$ $I_D = 1.7A,$ $V_{GS} = 10V$ | -- | 12 | -- | nC |
| Gate-Source Charge | $Q_{gs}$ | | -- | 2.5 | -- | |
| Gate-Drain Charge | $Q_{gd}$ | | -- | 3.8 | -- | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD} = 100V,$ $I_D = 1.7A,$ $R_G = 2.5Ω$ | -- | 10 | -- | ns |
| Turn-on Rise Time | $t_r$ | | -- | 12 | -- | |
| Turn-off Delay Time | $t_{d(off)}$ | | -- | 15 | -- | |
| Turn-off Fall Time | $t_f$ | | -- | 15 | -- | |
| **Drain-Source Body Diode Characteristics** | | | | | | |
| Continuous Body Diode Current | $I_S$ | $T_C = 25ºC$ | -- | -- | 1.7 | A |
| Body Diode Voltage | $V_{SD}$ | $T_J = 25ºC, I_{SD} = 1.7A, V_{GS} = 0V$ | -- | -- | 1.2 | V |

**Notes**

1.   Repetitive Rating: Pulse width limited by maximum junction temperature

2.   Identical low side and high side switch with identical $R_G$

**Gate Charge Test Circuit**
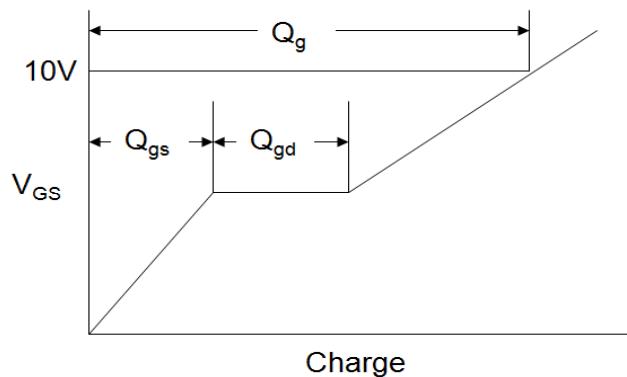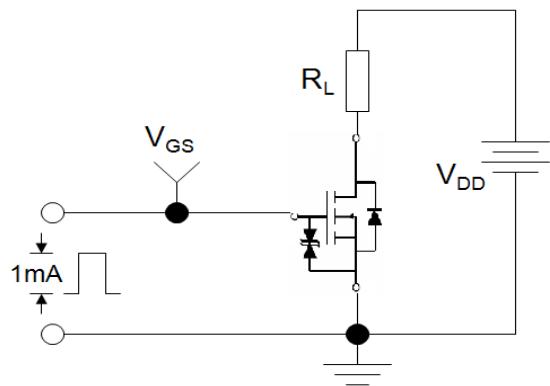


**Switch Time Test Circuit**



**EAS Test Circuit**

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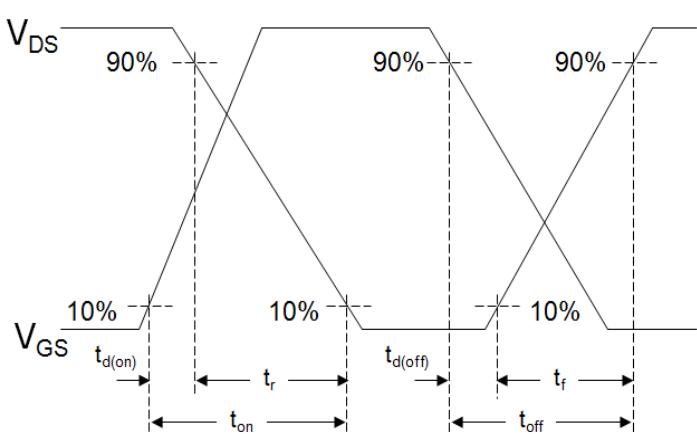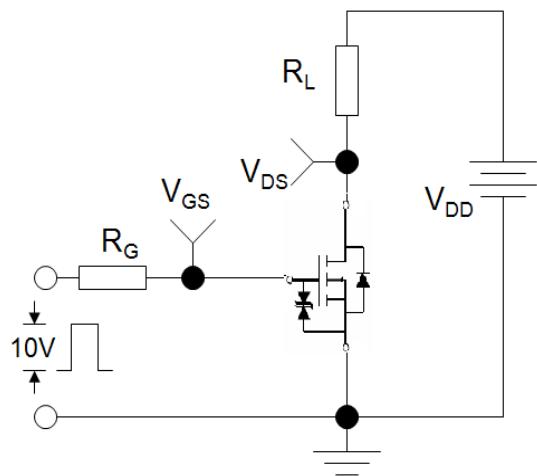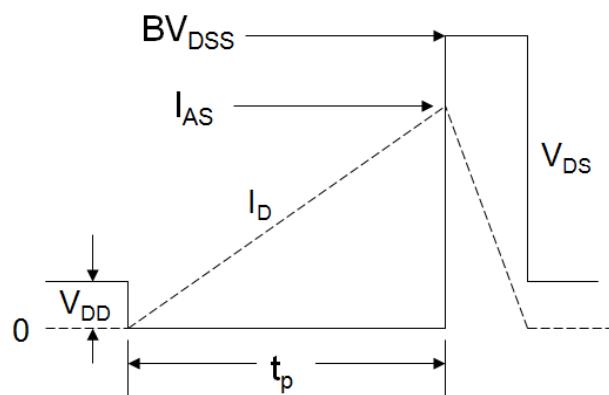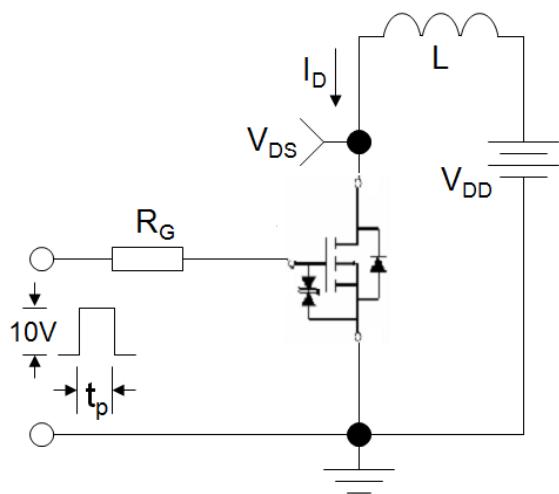
**Typical Characteristics**  $T_J$ = 25⁰C, unless otherwise noted

### Figure 1. Output Characteristics



$V_{GS}$ = 10 thru 4 V

$I_D$, Drain Current (A)

$V_{DS}$, Drain-to-Source Voltage (V)
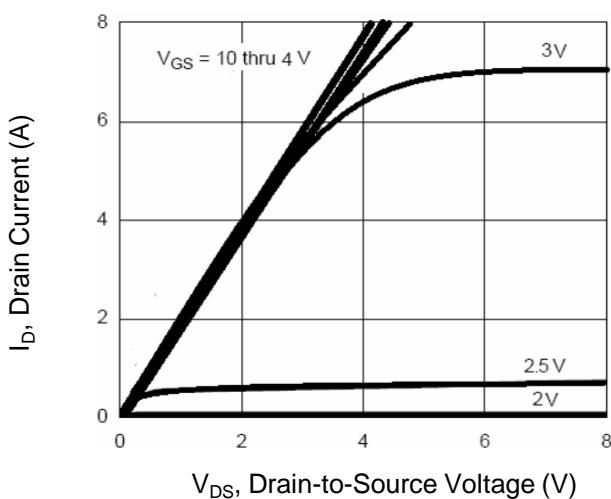
### Figure 2. Transfer Characteristics



$T_C$ = 125°C

25°C

$I_D$, Drain Current (A)

$V_{GS}$, Gate-to-Source Voltage (V)
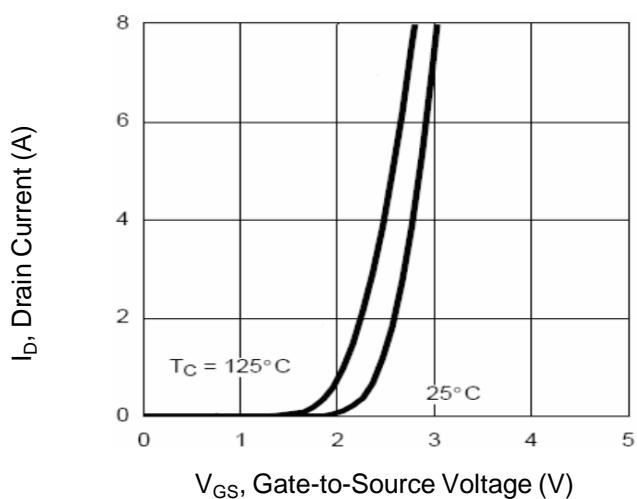
### Figure 3.Drain Source On Resistance



$V_{GS}$ = 4.5V

$V_{GS}$ = 10V

$R_{DS(on)}$, On-Resistance (Ω)

$I_D$-Drain Current（A）

### Figure 4. Gate Charge



$V_{DS}$ = 100V
$I_D$=1.7A

Vgs Gate-Source Voltage（V）
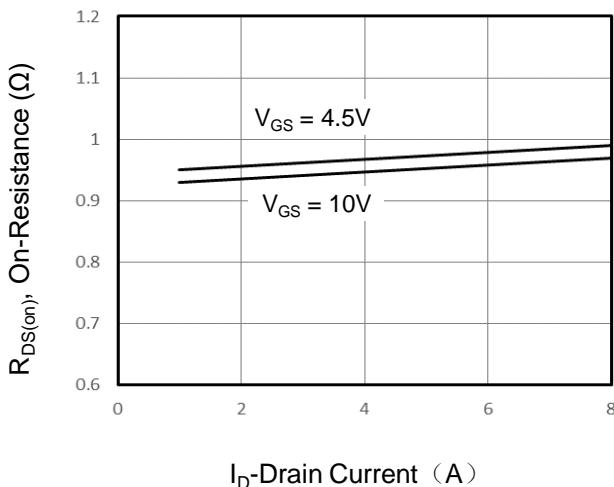
Qg Gate Charge（nC）
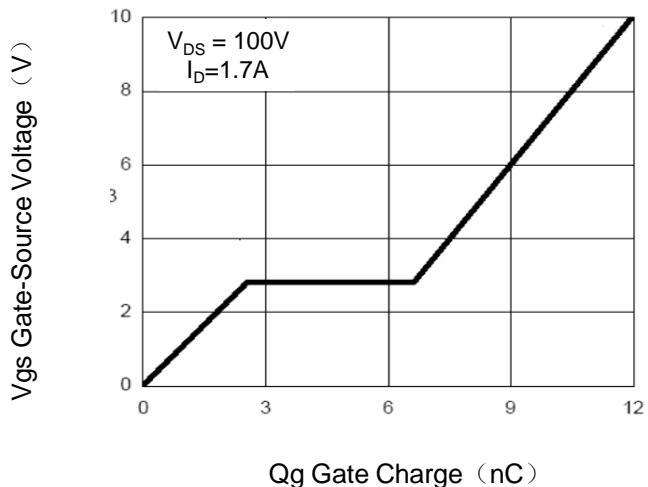
### Figure 5. Capacitance vs Vds



$C_{iss}$

$C_{rss}$

$C_{oss}$

Capacitance(pF)

Vds Drain-Source Voltage(V)
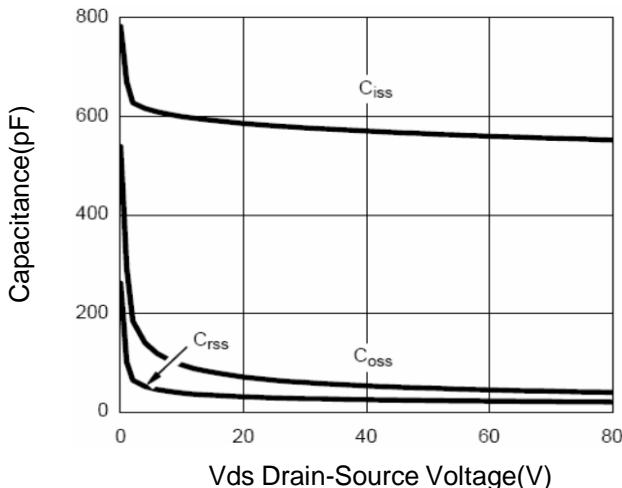
### Figure 6. Source-Drain Diode Forward



$T_J$ = 150°C

$T_J$ = 25°C

$I_s$, Reverse Drain Current (A)

$V_{SD}$, Source-to-Drain Voltage (V)

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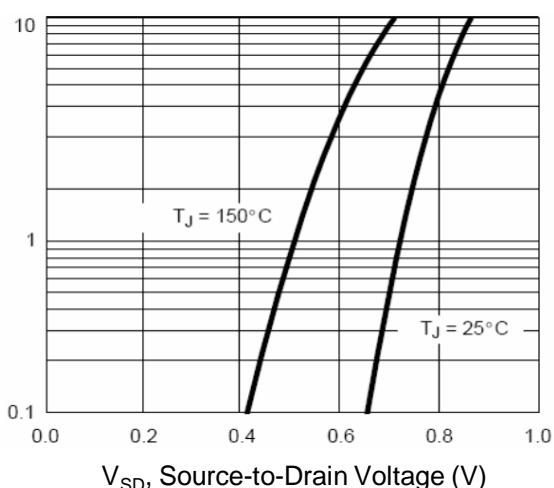
**Typical Characteristics** $T_J = 25^0C$, unless otherwise noted

### Figure 7. Drain-Source On-Resistance



$V_{GS} = 10V$
$I_D = 1.7A$

$R_{DS(on)}$, (Normalized)

$T_J$, Junction Temperature ($^0$C)
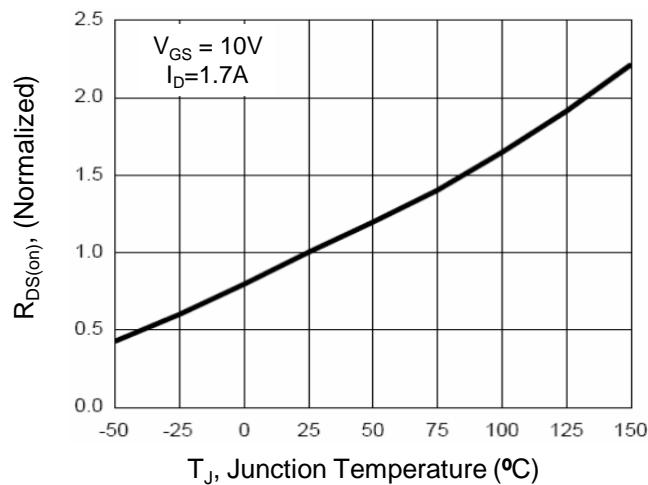
### Figure 8. Safe Operation Area



$I_{D(on)}$ Limited

$P(t) = 0.0001$
$P(t) = 0.001$
$P(t) = 0.01$
$P(t) = 0.1$
$P(t) = 1$
$P(t) = 10$
dc

$T_A = 25°C$
Single Pulse

$BV_{DSS}$ Limited

$I_D$, Drain Current(A)

$V_{DS}$, Drain-Source Voltage(V)
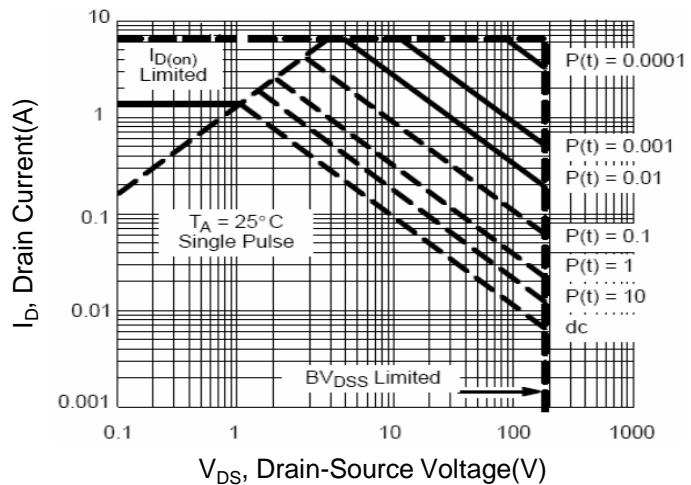
### Figure 9. Normalized Maximum Transient Thermal Impedance



Duty Cycle = 0.5

0.2
0.1
0.05
0.02

Single Pulse

$Z_{thJC}$, Thermal Impedance ($^0$C/W)

Notes:

$P_{DM}$

$t_1$
$t_2$

1. Duty Cycle, D = $\frac{t_1}{t_2}$
2. Per Unit Base = $R_{thJA}$
3. $T_{JM} - T_A = P_{DM}Z_{thJA}^{(t)}$
4. Surface Mounted

Pulse Width (s)

**Xinpuxin** Semiconductor

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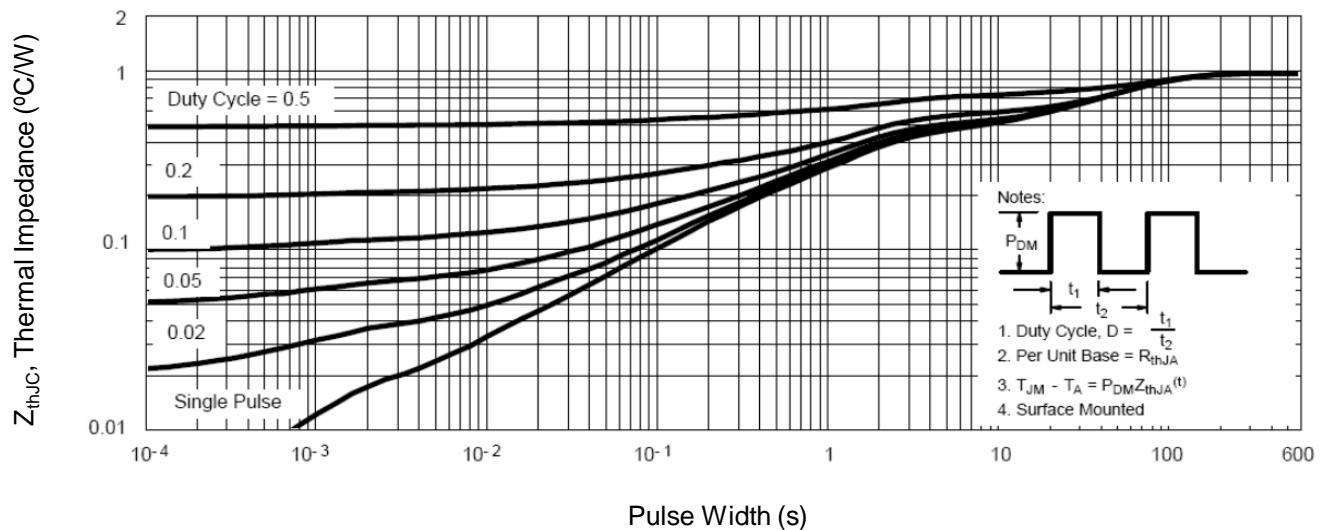
**SOT-23-3L Package Information**
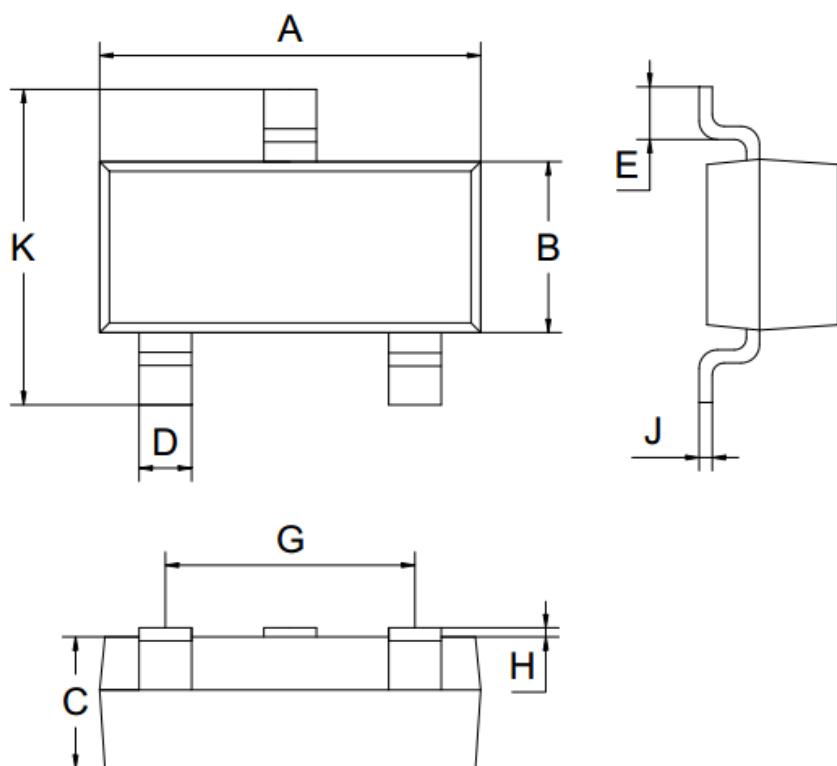


| Symbol | Dimensions in Millimeters | | |
|--------|------|------|------|
| | MIN. | NOM. | MAX. |
| A | 2.80 | 2.90 | 3.00 |
| B | 1.50 | 1.60 | 1.70 |
| C | 1.00 | 1.10 | 1.20 |
| D | 0.30 | 0.40 | 0.50 |
| E | 0.25 | 0.40 | 0.55 |
| G | 1.90 | | |
| H | 0.00 | - | 0.10 |
| J | 0.047 | 0.127 | 0.207 |
| K | 2.60 | 2.80 | 3.00 |
| All Dimensions in mm | | | |