Ordering number : EN6621A

# 5LP01SP

## P-Channel Small Signal MOSFET
## −50V, −0.07A, 23Ω, Single SPA

ON Semiconductor®
http://onsemi.com

### Features

- Low ON-resistance
- Ultrahigh-speed switching
- 2.5V drive
- Protection diode in

### Specifications

**Absolute Maximum Ratings** at Ta=25°C

| Parameter | Symbol | Conditions | value | Unit |
|---|---|---|---|---|
| Drain to Source Voltage | $V_{DSS}$ | | -50 | V |
| Gate to Source Voltage | $V_{GSS}$ | | ±10 | V |
| Drain Current (DC) | $I_D$ | | -0.07 | A |
| Drain Current (Pulse) | $I_{DP}$ | PW≤10μs, duty cycle≤1% | -0.28 | A |
| Power Dissipation | $P_D$ | | 0.25 | W |
| Junction Temperature | Tj | | 150 | °C |
| Storage Temperature | Tstg | | −55 to +150 | °C |

This product is designed to “ESD immunity < 200V*”, so please take care when handling.

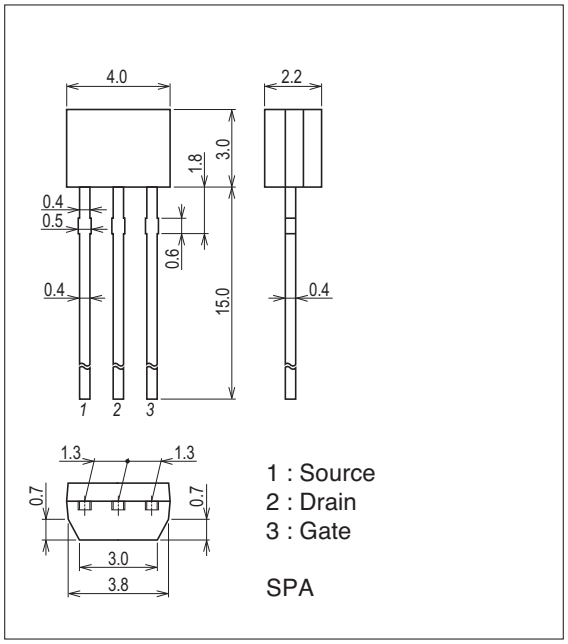
* Machine Model

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

### Package Dimensions

unit : mm (typ)

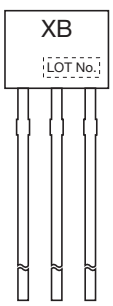
7524-007



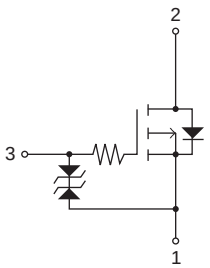

### Ordering & Package Information

| Device | Package | Shipping | memo |
|---|---|---|---|
| 5LP01SP | SPA SC-72 | 500pcs./bag | Pb-Free |
| 5LP01SP-AC | SPA SC-72 | 2,500pcs./box | |

### Marking




### Electrical Connection

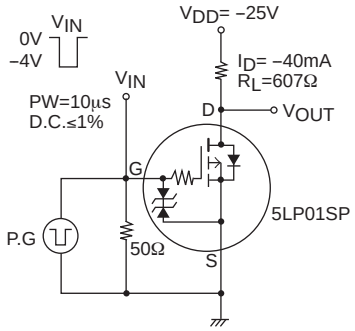


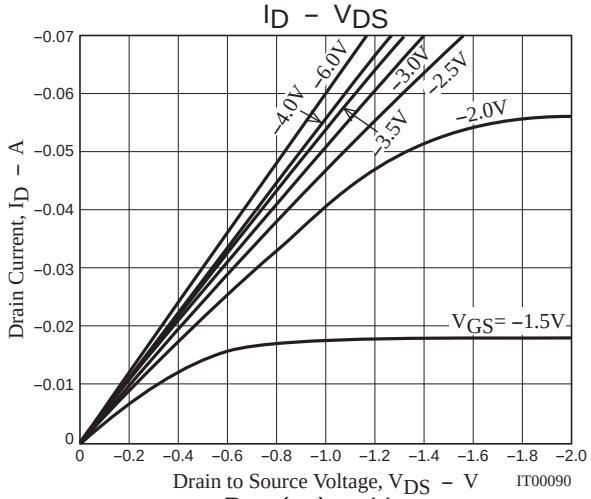
## Electrical Characteristics at Ta=25°C

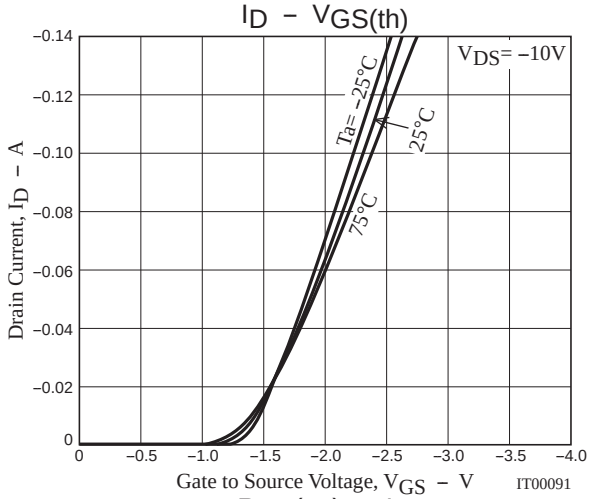
| Parameter | Symbol | Conditions | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | min | typ | max | |
| Drain to Source Breakdown Voltage | $V_{(BR)DSS}$ | $I_D$=-1mA, $V_{GS}$=0V | -50 | | | V |
| Zero-Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=-50V, $V_{GS}$=0V | | | 10 | μA |
| Gate to Source Leakage Current | $I_{GSS}$ | $V_{GS}$=±8V, $V_{DS}$=0V | | | ±10 | μA |
| Gate Threshold Voltage | $V_{GS}(th)$ | $V_{DS}$=-10V, $I_D$=-100μA | -0.4 | | -1.4 | V |
| Forward Transconductance | $g_{FS}$ | $V_{DS}$=-10V, $I_D$=-40mA | 70 | 100 | | mS |
| Static Drain to Source On-State Resistance | $R_{DS}(on)1$ | $I_D$=-40mA, $V_{GS}$=-4V | | 18 | 23 | Ω |
| | $R_{DS}(on)2$ | $I_D$=-20mA, $V_{GS}$=-2.5V | | 20 | 28 | Ω |
| | $R_{DS}(on)3$ | $I_D$=-5mA, $V_{GS}$=-1.5V | | 30 | 60 | Ω |
| Input Capacitance | Ciss | $V_{DS}$=-10V, f=1MHz | | 7.4 | | pF |
| Output Capacitance | Coss | | | 4.2 | | pF |
| Reverse Transfer Capacitance | Crss | | | 1.3 | | pF |
| Turn-ON Delay Time | $t_d(on)$ | See specified Test Circuit. | | 20 | | ns |
| Rise Time | $t_r$ | | | 35 | | ns |
| Turn-OFF Delay Time | $t_d(off)$ | | | 160 | | ns |
| Fall Time | $t_f$ | | | 150 | | ns |
| Total Gate Charge | Qg | $V_{DS}$=-10V, $V_{GS}$=-10V, $I_D$=-70mA | | 1.40 | | nC |
| Gate to Source Charge | Qgs | | | 0.16 | | nC |
| Gate to Drain “Miller” Charge | Qgd | | | 0.23 | | nC |
| Forward Diode Voltage | $V_{SD}$ | $I_S$=-70mA, $V_{GS}$=0V | | 0.85 | 1.2 | V |

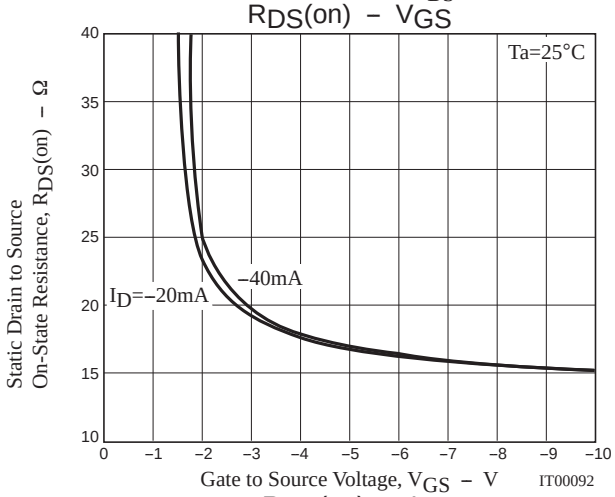
Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

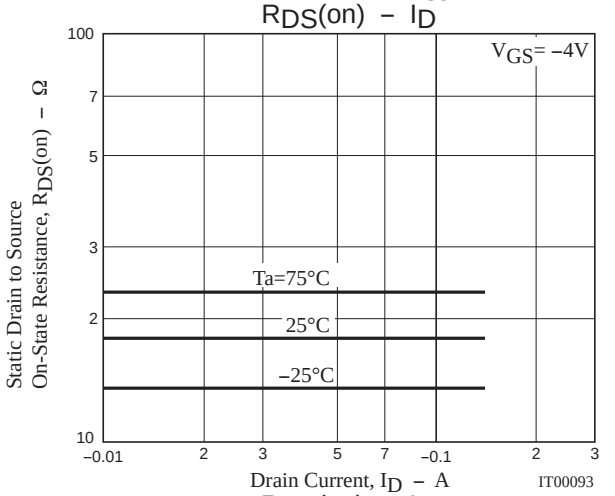
## Switching Time Test Circuit

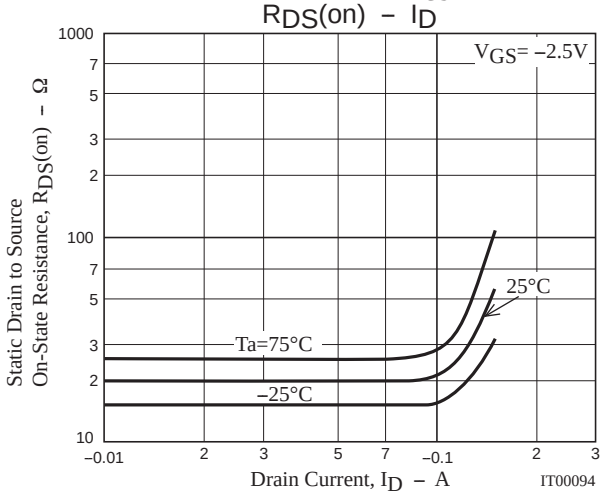


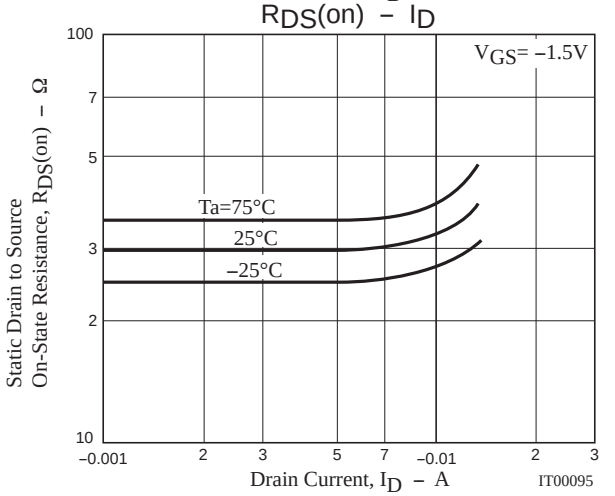

ID – VDS
Drain Current, ID – A
Drain to Source Voltage, VDS – V
IT00090
–4.0V
–6.0V
–3.0V
–2.5V
–3.5V
–2.0V
VGS= –1.5V

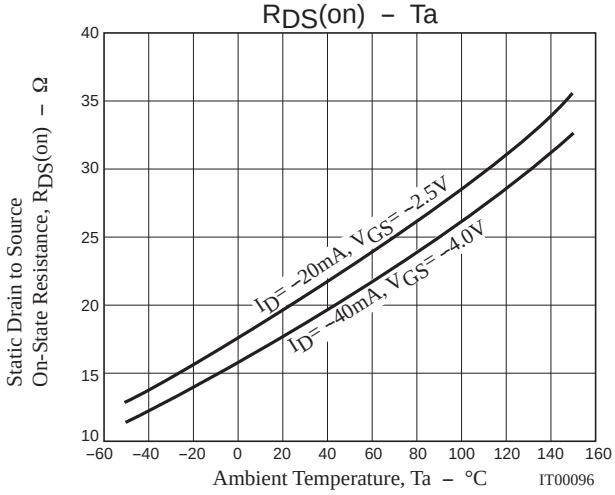

ID – VGS(th)
Drain Current, ID – A
Gate to Source Voltage, VGS – V
IT00091
VDS= –10V
Ta= –25°C
25°C
75°C

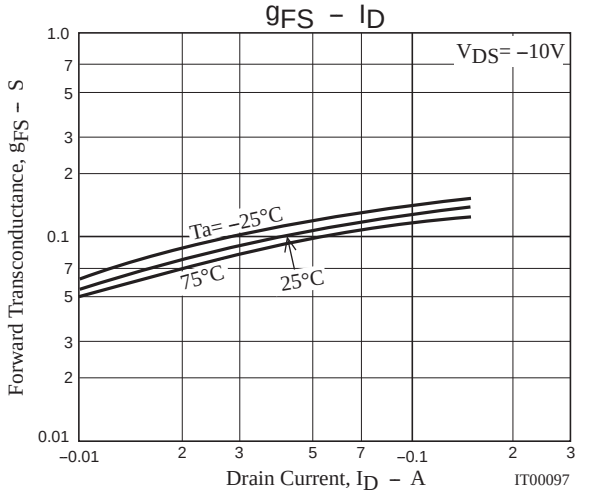

RDS(on) – VGS
Static Drain to Source On-State Resistance, RDS(on) – Ω
Gate to Source Voltage, VGS – V
IT00092
Ta=25°C
–40mA
ID=–20mA

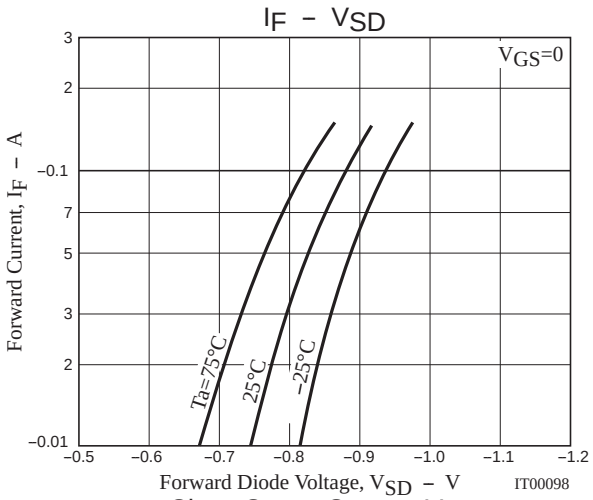

RDS(on) – ID
Static Drain to Source On-State Resistance, RDS(on) – Ω
Drain Current, ID – A
IT00093
VGS= –4V
Ta=75°C
25°C
–25°C

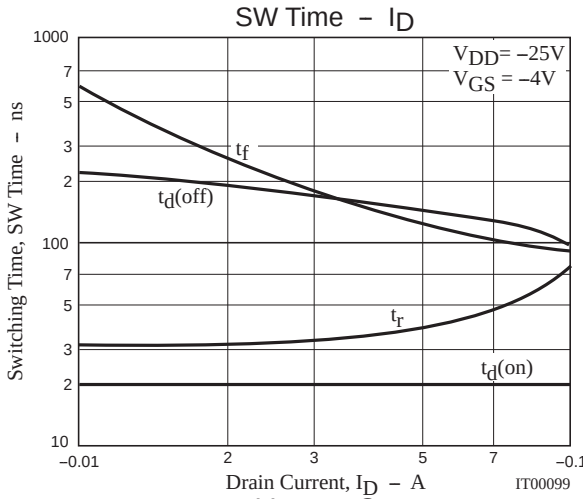

RDS(on) – ID
Static Drain to Source On-State Resistance, RDS(on) – Ω
Drain Current, ID – A
IT00094
VGS= –2.5V
25°C
Ta=75°C
–25°C

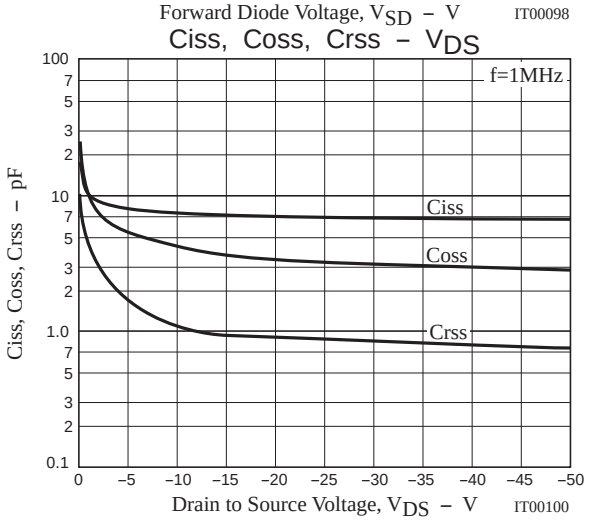

RDS(on) – ID
Static Drain to Source On-State Resistance, RDS(on) – Ω
Drain Current, ID – A
IT00095
VGS= –1.5V
Ta=75°C
25°C
–25°C

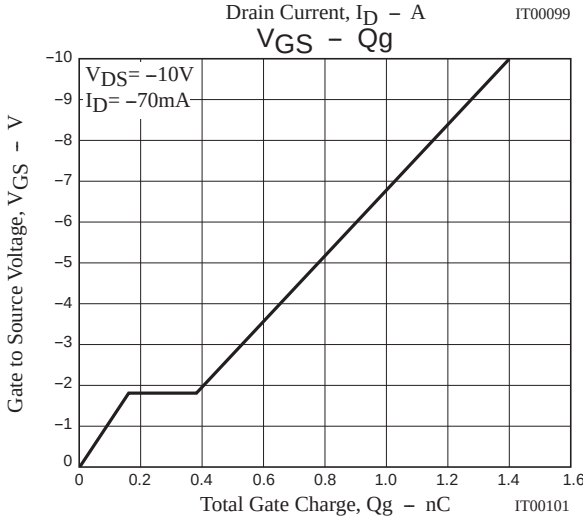

RDS(on) – Ta
Static Drain to Source On-State Resistance, RDS(on) – Ω
Ambient Temperature, Ta – °C
IT00096
ID= –20mA, VGS= –2.5V
ID= –40mA, VGS= –4.0V

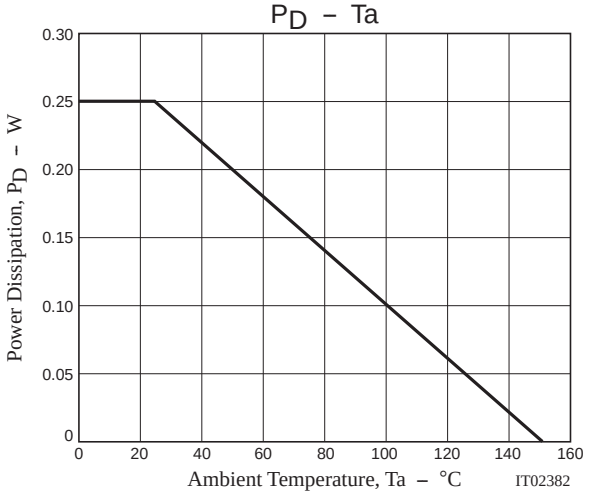

gFS – ID
Forward Transconductance, gFS – S
Drain Current, ID – A
IT00097
VDS= –10V
Ta= –25°C
75°C
25°C


IF – VSD
VGS=0
Ta=75°C
25°C
–25°C
Forward Current, IF – A
Forward Diode Voltage, VSD – V
IT00098


SW Time – ID
VDD= –25V
VGS = –4V
tf
td(off)
tr
td(on)
Switching Time, SW Time – ns
Drain Current, ID – A
IT00099

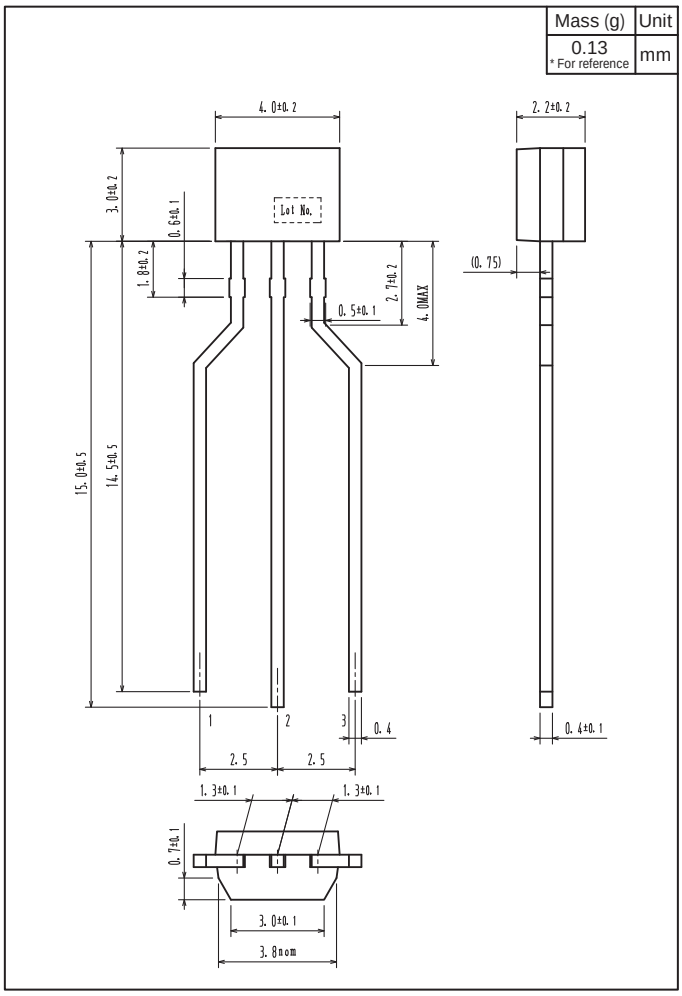

Ciss, Coss, Crss – VDS
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain to Source Voltage, VDS – V
IT00100


VGS – Qg
VDS= –10V
ID= –70mA
Gate to Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT00101


PD – Ta
Power Dissipation, PD – W
Ambient Temperature, Ta – °C
IT02382

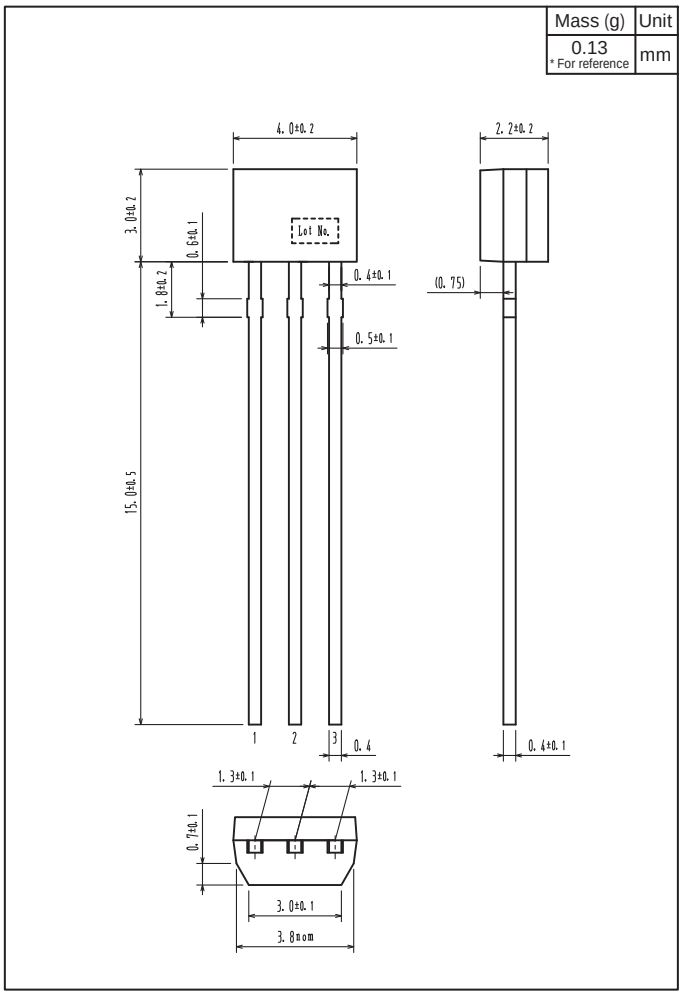
## Outline Drawing

5LP01SP-AC



## Outline Drawing

5LP01SP




Note on usage : Since the 5LP01SP is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.