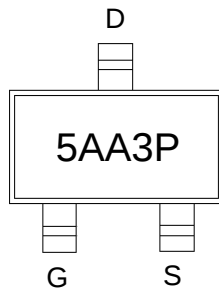


## Features

- P-Channel
- High density cell design for ultra low Rdson
- Enhancement mode
- Logic Level
- dv/dt rated

## Application

- PWM applications
- Power management
- Load switch



5AA3P: Device code

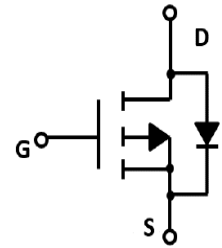
Marking and pin assignment

## Product Summary

| $V_{DS}$ | $R_{DS(ON)}$ TYP | $I_D$ |
|----------|------------------|-------|
| -500V    | 90Ω@-10V         | -0.3A |



SOT-23-3L top view



Schematic diagram



Pb-Free



Halogen-Free

## Absolute Maximum Ratings (TA=25°C unless otherwise noted)

| Symbol | Parameter | Rating | Unit |
|--------|-----------|--------|------|
|--------|-----------|--------|------|

## Common Ratings (TC=25°C Unless Otherwise Noted)

|           |                                  |                           |    |
|-----------|----------------------------------|---------------------------|----|
| $V_{DS}$  | Drain-Source Breakdown Voltage   | -500                      | V  |
| $V_{GS}$  | Gate-Source Voltage              | ±20                       | V  |
| $T_J$     | Maximum Junction Temperature     | 150                       | °C |
| $T_{STG}$ | Storage Temperature Range        | -55 to 150                | °C |
| $I_S$     | Diode Continuous Forward Current | $T_c=25^{\circ}C$<br>-0.3 | A  |

## Mounted on Large Heat Sink

|                 |                                        |                           |      |
|-----------------|----------------------------------------|---------------------------|------|
| $I_{DM}$        | Pulse Drain Current Tested             | $T_c=25^{\circ}C$<br>-1   | A    |
| $I_D$           | Continuous Drain Current               | $T_c=25^{\circ}C$<br>-0.3 | A    |
| $P_D$           | Maximum Power Dissipation              | $T_c=25^{\circ}C$<br>1    | W    |
| $R_{\theta JA}$ | Thermal Resistance Junction-to-Ambient | 125                       | °C/W |

## Ordering Information (Example)

| Type      | Package   | Marking | Minimum Package(pcs) | Inner Box Quantity(pcs) | Outer Carton Quantity(pcs) | Delivery Mode |
|-----------|-----------|---------|----------------------|-------------------------|----------------------------|---------------|
| MLSK5AA3P | SOT-23-3L | 5AA3P   | 3,000                | 45,000                  | 180,000                    | 7"reel        |

**Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)**

| Symbol | Parameter | Condition | Min | Typ | Max | Unit |
|--------|-----------|-----------|-----|-----|-----|------|
|--------|-----------|-----------|-----|-----|-----|------|

**Static Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated)**

|                       |                                  |                                                           |      |    |      |    |
|-----------------------|----------------------------------|-----------------------------------------------------------|------|----|------|----|
| BV <sub>(BR)DSS</sub> | Drain-Source Breakdown Voltage   | V <sub>GS</sub> =0V, I <sub>D</sub> =-250μA               | -500 | -- | --   | V  |
| I <sub>DSS</sub>      | Zero Gate Voltage Drain Current  | V <sub>DS</sub> =-500V, V <sub>GS</sub> =0V               | --   | -- | -1.0 | μA |
| I <sub>GSS</sub>      | Gate-Body Leakage Current        | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V                | --   | -- | ±100 | nA |
| V <sub>GS(th)</sub>   | Gate Threshold Voltage           | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA | -0.8 | -- | -2.0 | V  |
| R <sub>DS(on)</sub>   | Drain-Source On-State Resistance | V <sub>GS</sub> =-10V, I <sub>D</sub> =-0.2A              | --   | 90 | 150  | Ω  |

**Dynamic Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated)**

|                  |                              |                                                    |    |      |    |    |
|------------------|------------------------------|----------------------------------------------------|----|------|----|----|
| C <sub>ISS</sub> | Input Capacitance            | V <sub>DS</sub> =-25V, V <sub>GS</sub> =0V, f=1MHz | -- | 36.5 | -- | pF |
| C <sub>OSS</sub> | Output Capacitance           |                                                    | -- | 7    | -- | pF |
| C <sub>RSS</sub> | Reverse Transfer Capacitance |                                                    | -- | 1.55 | -- | pF |

**Switching Characteristics**

|                     |                     |                                                                                              |    |      |    |    |
|---------------------|---------------------|----------------------------------------------------------------------------------------------|----|------|----|----|
| Q <sub>g</sub>      | Total Gate Charge   | V <sub>DS</sub> =-25V, I <sub>D</sub> =-0.2A,<br>V <sub>GS</sub> =-10V                       | -- | 2.1  | -- | nC |
| Q <sub>gs</sub>     | Gate Source Charge  |                                                                                              | -- | 0.65 | -- | nC |
| Q <sub>gd</sub>     | Gate Drain Charge   |                                                                                              | -- | 0.25 | -- | nC |
| t <sub>d(on)</sub>  | Turn-on Delay Time  | V <sub>DD</sub> =-25V, I <sub>D</sub> =-0.2A,<br>V <sub>GS</sub> =-10V, R <sub>G</sub> =3.3Ω | -- | 5.2  | -- | nS |
| t <sub>r</sub>      | Turn-on Rise Time   |                                                                                              | -- | 7.5  | -- | nS |
| t <sub>d(off)</sub> | Turn-Off Delay Time |                                                                                              | -- | 8.4  | -- | nS |
| t <sub>f</sub>      | Turn-Off Fall Time  |                                                                                              | -- | 2.8  | -- | nS |

**Source- Drain Diode Characteristics**

|                 |                    |                                             |    |    |      |   |
|-----------------|--------------------|---------------------------------------------|----|----|------|---|
| V <sub>SD</sub> | Forward on voltage | T <sub>J</sub> =25°C, I <sub>S</sub> =-0.2A | -- | -- | -1.2 | V |
|-----------------|--------------------|---------------------------------------------|----|----|------|---|

## Typical Operating Characteristics

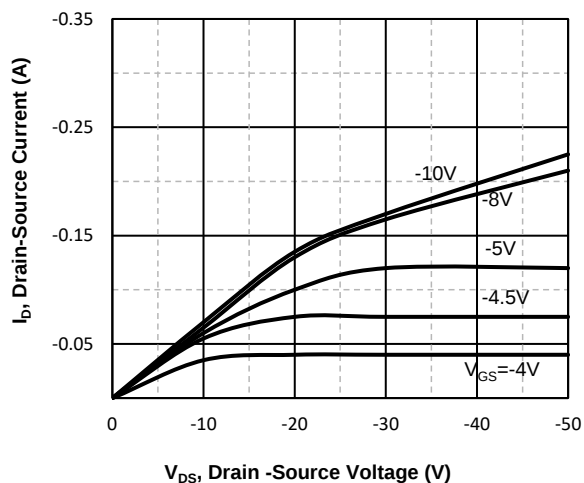


Fig1. Typical Output Characteristics

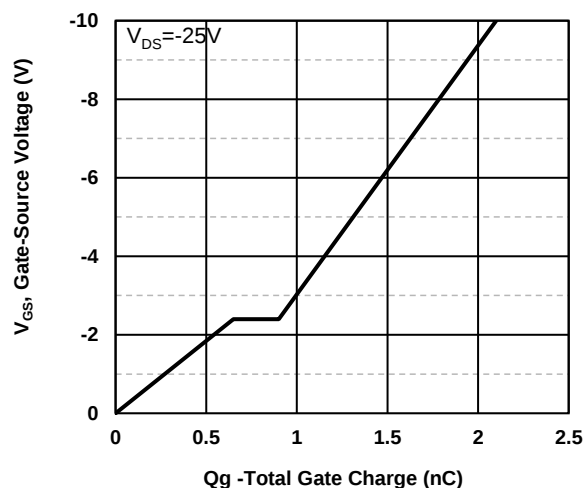


Fig2. Typical Gate Charge Vs. Gate-Source Voltage

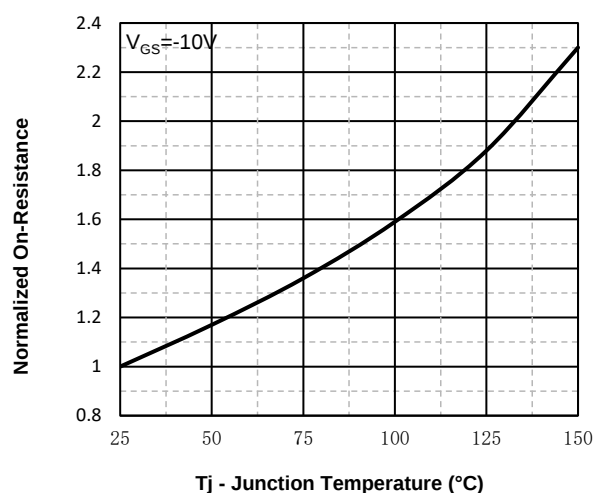


Fig3. Normalized On-Resistance Vs. Temperature

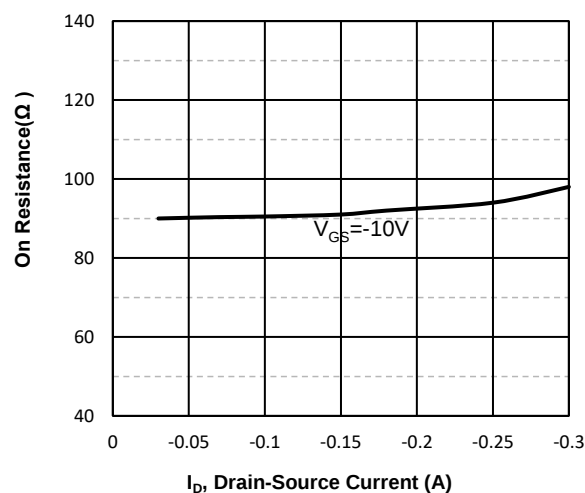


Fig4. On Resistance Vs. Drain-Source Current

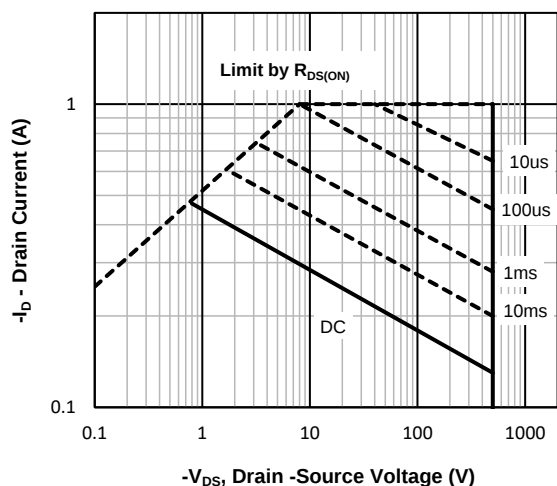


Fig5. Maximum Safe Operating Area

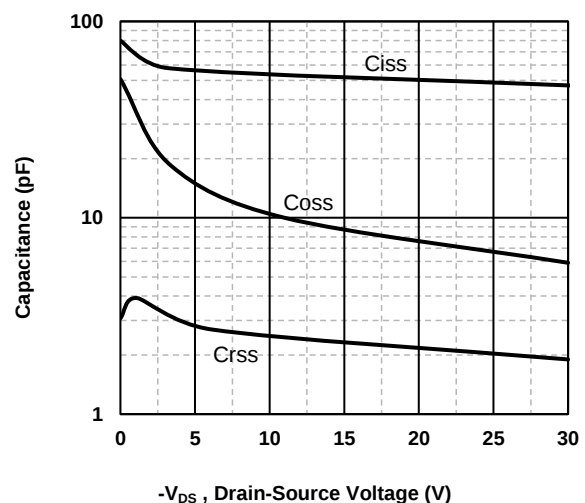
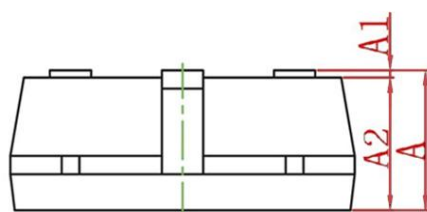
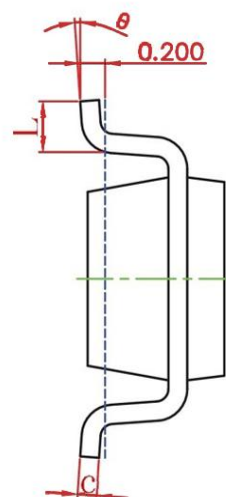
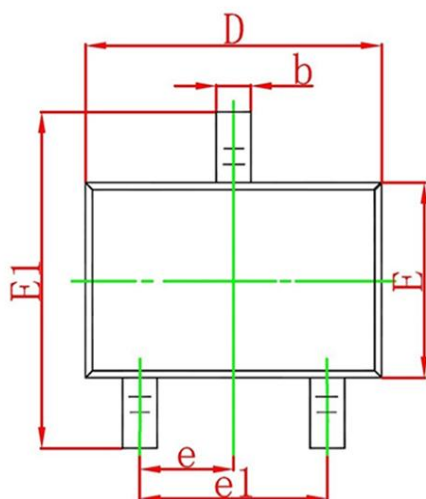


Fig6. Typical Capacitance Vs. Drain-Source Voltage

SOT-23-3L Package information



| Symbol   | Dimensions in Millimeters(mm) |       | Dimensions In Inches |       |
|----------|-------------------------------|-------|----------------------|-------|
|          | Min                           | Max   | Min                  | Max   |
| A        | 1.050                         | 1.250 | 0.042                | 0.050 |
| A1       | 0.000                         | 0.100 | 0.000                | 0.004 |
| A2       | 1.050                         | 1.150 | 0.042                | 0.046 |
| b        | 0.300                         | 0.500 | 0.012                | 0.020 |
| c        | 0.100                         | 0.200 | 0.004                | 0.008 |
| D        | 2.820                         | 3.020 | 0.112                | 0.120 |
| E        | 1.500                         | 1.700 | 0.060                | 0.068 |
| E1       | 2.650                         | 2.950 | 0.106                | 0.118 |
| e        | 0.950TYP                      |       | 0.037TYP             |       |
| e1       | 1.800                         | 2.000 | 0.071                | 0.079 |
| L        | 0.300                         | 0.600 | 0.012                | 0.024 |
| $\theta$ | 0°                            | 8°    | 0°                   | 8°    |