

## General Description

This MOSFET uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as -2.5V. This device is suitable for use as a wide variety of applications.

## Features

- High Dense Design
- Ultra Low On-Resistance
- Reliable and Rugged



## Applications

- PWM applications
- Power management
- Load switch

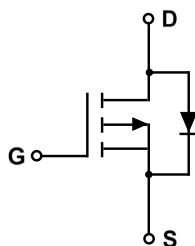
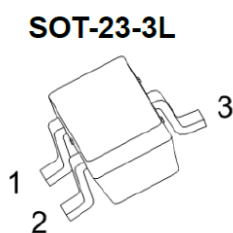
## Key Performance Parameters

| Parameter                         | Value | Unit       |
|-----------------------------------|-------|------------|
| $V_{DS}$                          | -30   | V          |
| $R_{DS(ON), max} @ V_{GS} = -10V$ | 65    | m $\Omega$ |

## Marking Information

| Product Name | Package   | Marking |
|--------------|-----------|---------|
| OSHL3401A    | SOT-23-3L | L3401A  |

## Package & Pin information



**Absolute Maximum Ratings** at  $T_j=25^{\circ}\text{C}$  unless otherwise noted

| Parameter                          | Symbol         | Value      | Unit               |
|------------------------------------|----------------|------------|--------------------|
| Drain-source voltage               | $V_{DS}$       | -30        | V                  |
| Gate-source voltage                | $V_{GS}$       | $\pm 12$   | V                  |
| Continuous Drain Current           | $I_D$          | -4.2       | A                  |
| Pulsed Drain Current <sup>1)</sup> | $I_{D,pulse}$  | -21        | A                  |
| Power Dissipation                  | $P_D$          | 1.0        | W                  |
| Operation and storage temperature  | $T_{stg}, T_j$ | -55 to 150 | $^{\circ}\text{C}$ |

**Thermal Characteristics**

| Parameter                                          | Symbol          | Value | Unit                 |
|----------------------------------------------------|-----------------|-------|----------------------|
| Thermal resistance, junction-ambient <sup>2)</sup> | $R_{\theta JA}$ | 125   | $^{\circ}\text{C/W}$ |

**Electrical Characteristics** at  $T_j=25^{\circ}\text{C}$  unless otherwise specified

| Parameter                        | Symbol       | Min. | Typ. | Max.      | Unit             | Test condition                                   |
|----------------------------------|--------------|------|------|-----------|------------------|--------------------------------------------------|
| Drain-source breakdown voltage   | $BV_{DSS}$   | -30  |      |           | V                | $V_{GS}=0\text{ V}, I_D=-250\text{ }\mu\text{A}$ |
| Gate threshold voltage           | $V_{GS(th)}$ | -0.6 | -0.8 | -1.3      | V                | $V_{DS}=V_{GS}, I_D=-250\text{ }\mu\text{A}$     |
| Drain-source on-state resistance | $R_{DS(ON)}$ |      | 50   | 65        | $\text{m}\Omega$ | $V_{GS}=-10\text{ V}, I_D=-4\text{ A}$           |
| Drain-source on-state resistance | $R_{DS(ON)}$ |      | 60   | 75        | $\text{m}\Omega$ | $V_{GS}=-4.5\text{ V}, I_D=-3.7\text{ A}$        |
| Drain-source on-state resistance | $R_{DS(ON)}$ |      | 78   | 87        | $\text{m}\Omega$ | $V_{GS}=-2.5\text{ V}, I_D=-2\text{ A}$          |
| Gate-source leakage current      | $I_{GSS}$    |      |      | $\pm 100$ | nA               | $V_{GS}=\pm 12\text{ V}, V_{DS}=0\text{ V}$      |
| Drain-source leakage current     | $I_{DSS}$    |      |      | -1        | $\mu\text{A}$    | $V_{DS}=-30\text{ V}, V_{GS}=0\text{ V}$         |

### Dynamic Characteristics

| Parameter                    | Symbol       | Min. | Typ. | Max. | Unit | Test condition                                                                                  |
|------------------------------|--------------|------|------|------|------|-------------------------------------------------------------------------------------------------|
| Input capacitance            | $C_{iss}$    |      | 888  |      | pF   | $V_{GS}=0\text{ V}$ ,<br>$V_{DS}=-15\text{ V}$ ,<br>$f=1.0\text{ MHz}$                          |
| Output capacitance           | $C_{oss}$    |      | 107  |      | pF   |                                                                                                 |
| Reverse transfer capacitance | $C_{rss}$    |      | 67   |      | pF   |                                                                                                 |
| Turn-on Delay Time           | $t_{d(on)}$  |      | 8.1  |      | ns   | $V_{GS}=-4.5\text{ V}$ ,<br>$V_{DS}=-15\text{ V}$ ,<br>$R_L=5\ \Omega$ ,<br>$R_{GEN}=2\ \Omega$ |
| Turn-on Rise Time            | $t_r$        |      | 4.6  |      | ns   |                                                                                                 |
| Turn-Off Delay Time          | $t_{d(off)}$ |      | 47   |      | ns   |                                                                                                 |
| Turn-Off Fall Time           | $t_f$        |      | 13   |      | ns   |                                                                                                 |

### Gate Charge Characteristics

| Parameter          | Symbol   | Min. | Typ. | Max. | Unit | Test condition                                                           |
|--------------------|----------|------|------|------|------|--------------------------------------------------------------------------|
| Total gate charge  | $Q_g$    |      | 8.7  |      | nC   | $V_{GS}=-4.5\text{ V}$ ,<br>$V_{DS}=-15\text{ V}$ ,<br>$I_D=-3\text{ A}$ |
| Gate-source charge | $Q_{gs}$ |      | 1.5  |      | nC   |                                                                          |
| Gate-drain charge  | $Q_{gd}$ |      | 2.4  |      | nC   |                                                                          |

### Body Diode Characteristics

| Parameter                         | Symbol   | Min. | Typ. | Max. | Unit | Test condition                             |
|-----------------------------------|----------|------|------|------|------|--------------------------------------------|
| Source drain current (Body Diode) | $I_{SD}$ |      | -3.8 |      | A    | $T_A=25^\circ\text{C}$                     |
| Diode forward voltage             | $V_{SD}$ |      | -1.2 |      | V    | $I_S=-3\text{ A}$ ,<br>$V_{GS}=0\text{ V}$ |

**Note:** 1) Pulse width limited by maximum allowable junction temperature.  
 2) Repetitive Rating: Pulse width limited by maximum junction temperature.

## Electrical Characteristics Diagrams

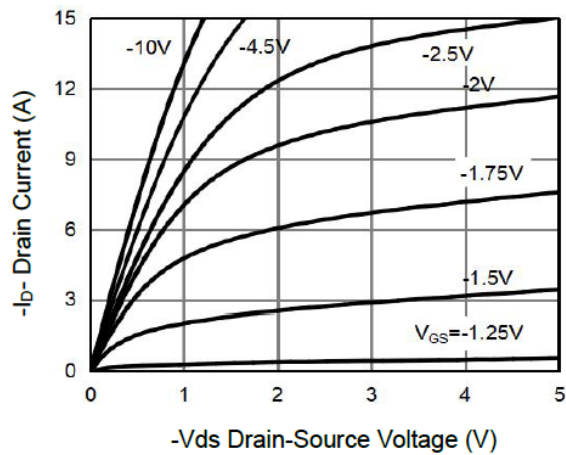


Figure 1. Typ. output characteristics

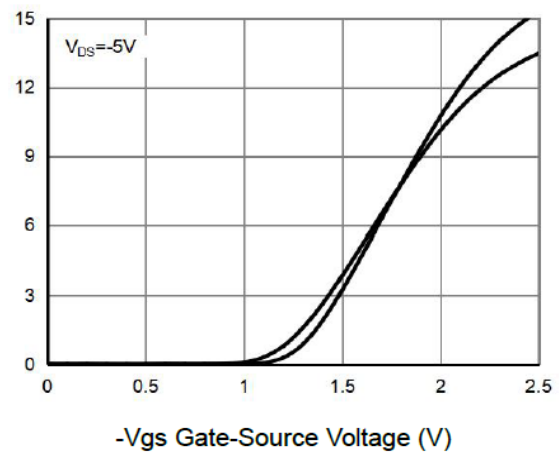


Figure 2. Typ. transfer characteristics

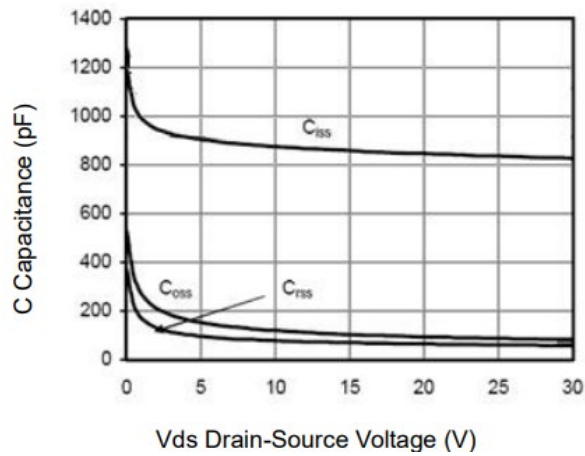


Figure 3. Capacitance

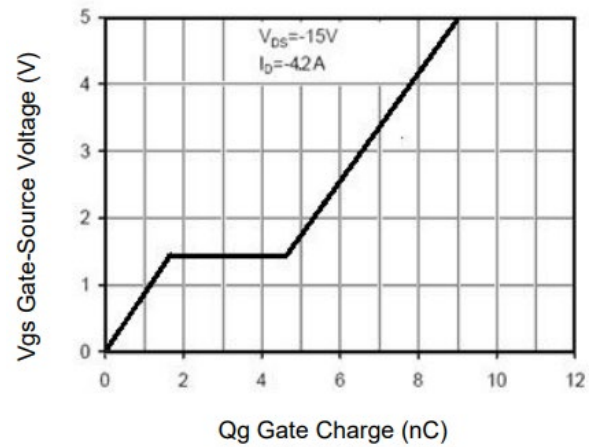


Figure 4. Gate charge

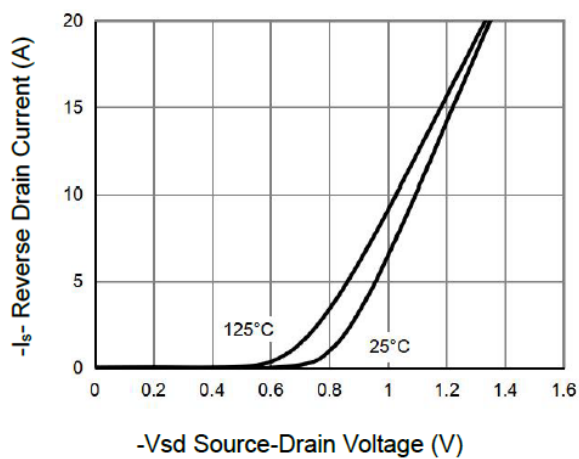


Figure 5. Body-diode characteristics

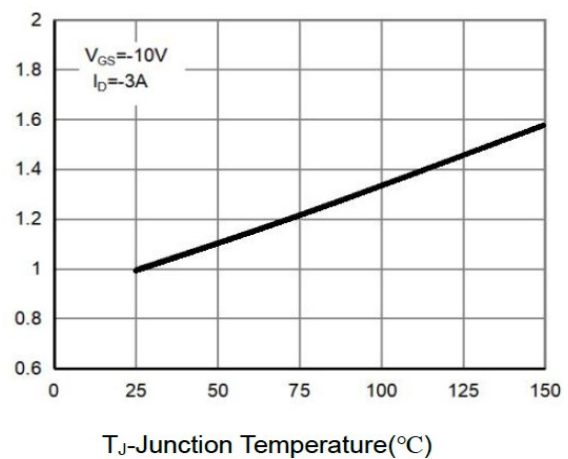
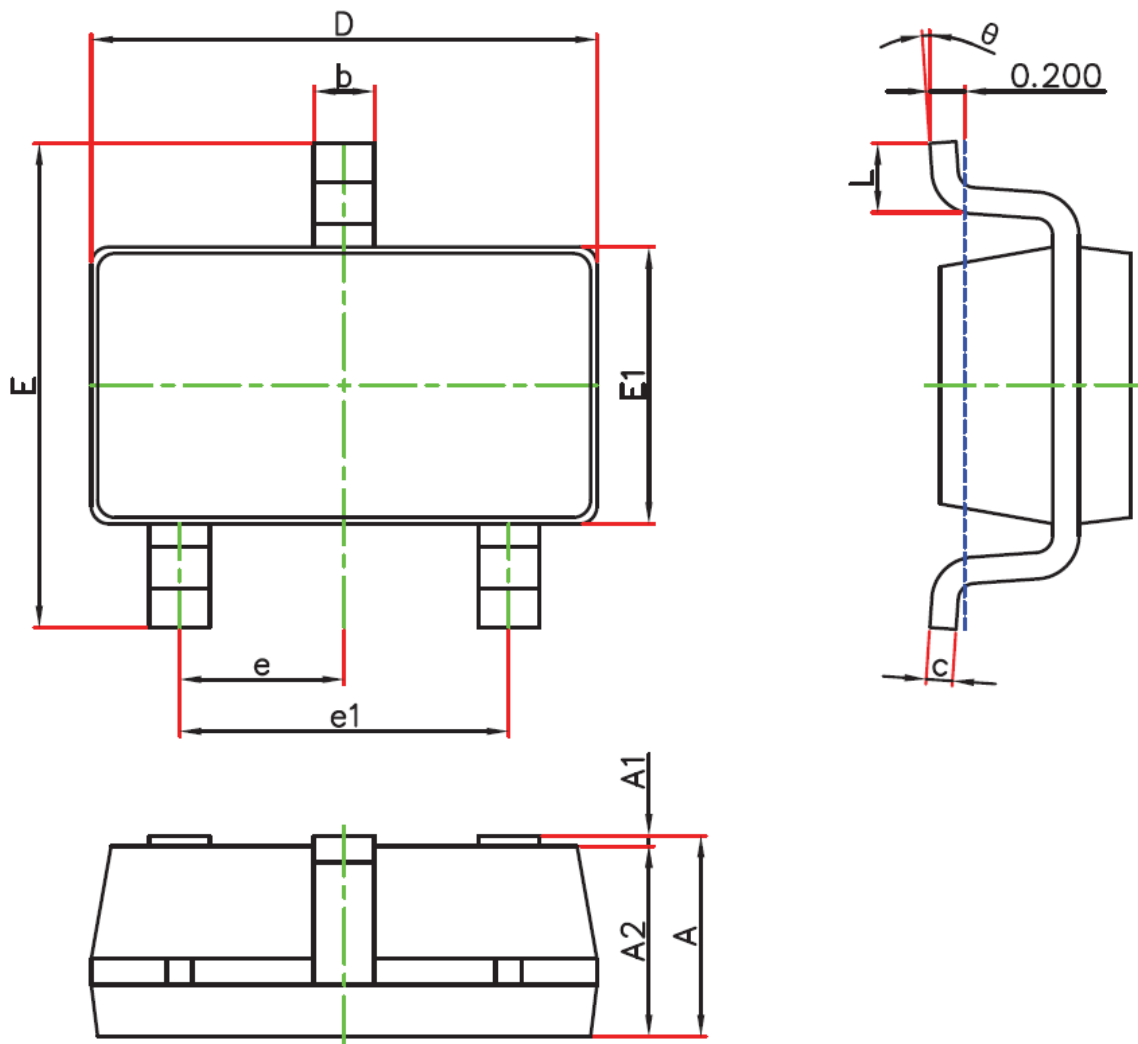


Figure 6.  $R_{DS(on)}$  vs junction temperature

## Package Information



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min.                      | Max.  | Min.                 | Max.  |
| A      | 1.050                     | 1.250 | 0.041                | 0.049 |
| A1     | 0.000                     | 0.100 | 0.000                | 0.004 |
| A2     | 1.050                     | 1.150 | 0.041                | 0.045 |
| b      | 0.300                     | 0.500 | 0.012                | 0.020 |
| c      | 0.100                     | 0.200 | 0.004                | 0.008 |
| D      | 2.820                     | 3.020 | 0.111                | 0.119 |
| E1     | 1.500                     | 1.700 | 0.059                | 0.067 |
| E      | 2.650                     | 2.950 | 0.104                | 0.116 |
| e      | 0.950(BSC)                |       | 0.037(BSC)           |       |
| e1     | 1.800                     | 2.000 | 0.071                | 0.079 |
| L      | 0.300                     | 0.600 | 0.012                | 0.024 |
| θ      | 0°                        | 8°    | 0°                   | 8°    |

Version1 : SOT-23-V package outline dimension

**Ordering Information**

| Package Type | Units/ Reel | Reels/ Inner Box | Units/ Inner Box | Inner Boxes/ Carton Box | Units/ Carton Box |
|--------------|-------------|------------------|------------------|-------------------------|-------------------|
| SOT-23-V     | 3000        | 15               | 45000            | 4                       | 180000            |

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