



# WILLAS



## SE3415

### SOT-23 Plastic-Encapsulate MOSFETS

P-Channel 20-V(D-S) MOSFET

#### FEATURE

Excellent  $R_{DS(ON)}$ , low gate charge, low gate voltages

#### APPLICATIONS

Load switch and in PWM applicatopns

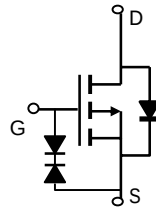
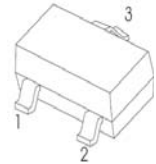
#### Pb-Free package is available

RoHS product for packing code suffix "G"

Halogen free product for packing code suffix "H"

#### SOT-23

1. GATE
2. SOURCE
3. DRAIN



MARKING: R15

Maximum ratings ( $T_a=25^{\circ}\text{C}$  unless otherwise noted)

| Parameter                                         | Symbol          | Value      | Unit                 |
|---------------------------------------------------|-----------------|------------|----------------------|
| Drain-Source Voltage                              | $V_{DS}$        | -20        | V                    |
| Gate-Source Voltage                               | $V_{GS}$        | $\pm 8$    |                      |
| Continuous Drain Current ( $t \leq 10\text{s}$ )  | $I_D$           | -4.0       | A                    |
| Maximum Power Dissipation ( $t \leq 10\text{s}$ ) | $P_D$           | 0.35       | W                    |
| Thermal Resistance from Junction to Ambient       | $R_{\theta JA}$ | 357        | $^{\circ}\text{C/W}$ |
| Operating Junction Temperature                    | $T_J$           | 150        | $^{\circ}\text{C}$   |
| Storage Temperature                               | $T_{STG}$       | -55 ~ +150 | $^{\circ}\text{C}$   |

**SOT-23 Plastic-Encapsulate MOSFETS****Electrical characteristics ( $T_a=25^{\circ}\text{C}$  unless otherwise noted)**

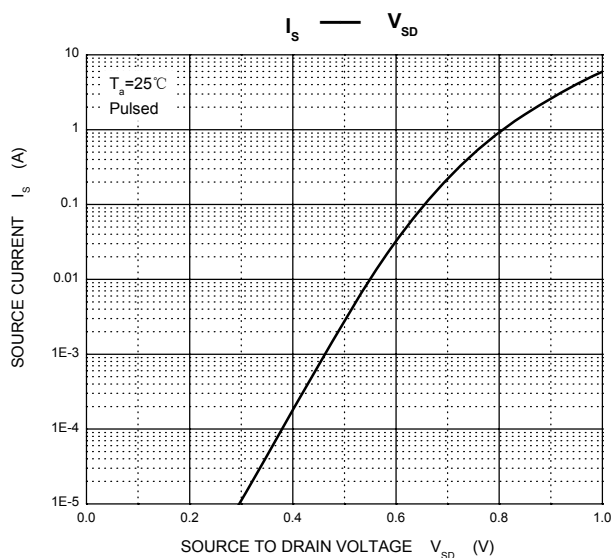
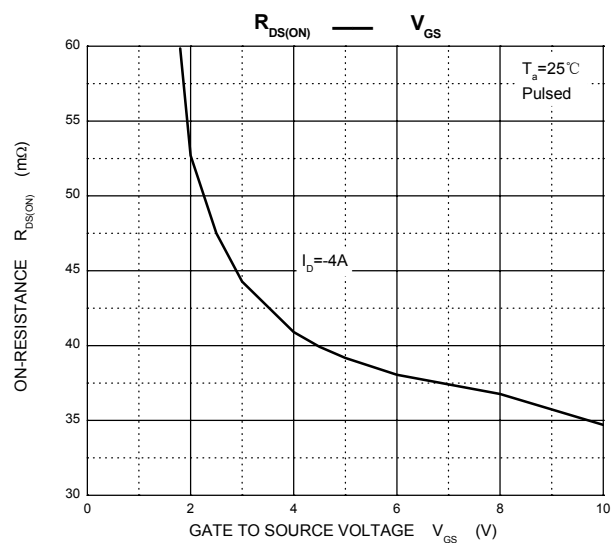
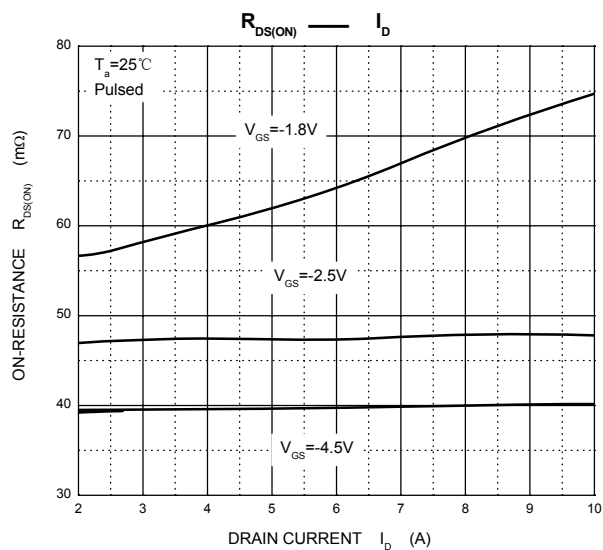
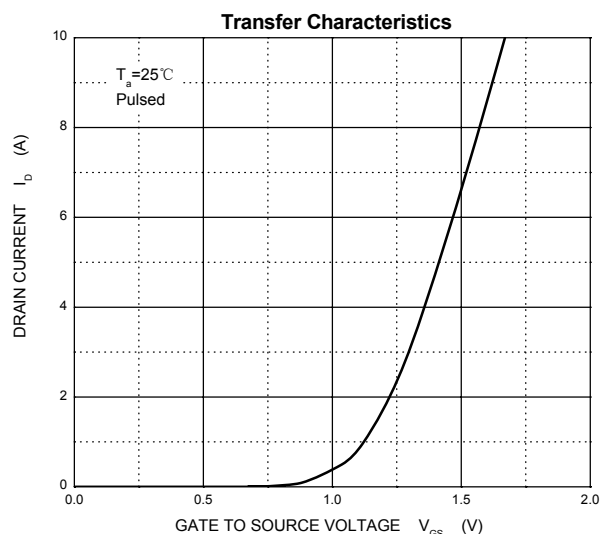
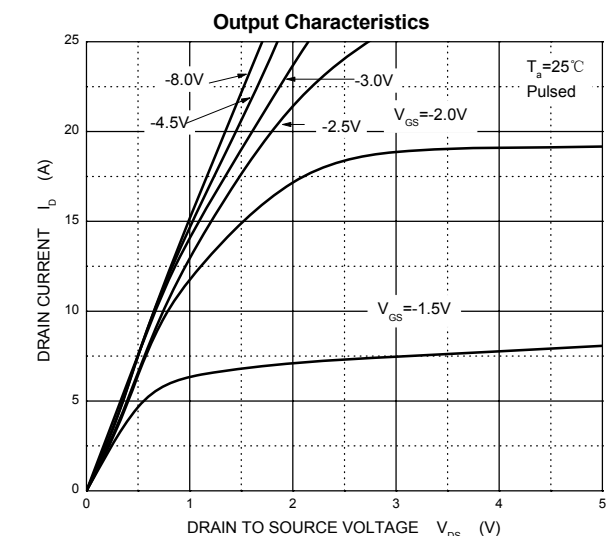
| Parameter                               | Symbol        | Test Condition                                                           | Min  | Typ  | Max      | Units    |
|-----------------------------------------|---------------|--------------------------------------------------------------------------|------|------|----------|----------|
| <b>Static Parameters</b>                |               |                                                                          |      |      |          |          |
| Drain-source breakdown voltage          | $V_{(BR)DSS}$ | $V_{GS} = 0V, I_D = -250\mu A$                                           | -20  |      |          | V        |
| Gate threshold voltage                  | $V_{GS(th)}$  | $V_{DS} = V_{GS}, I_D = -250\mu A$                                       | -0.3 |      | -1       |          |
| Gate-body leakage current               | $I_{GSS}$     | $V_{DS} = 0V, V_{GS} = \pm 8V$                                           |      |      | $\pm 10$ | $\mu A$  |
|                                         |               | $V_{DS} = 0V, V_{GS} = \pm 4.5V$                                         |      |      | $\pm 1$  |          |
| Zero gate voltage drain current         | $I_{DSS}$     | $V_{DS} = -16V, V_{GS} = 0V$                                             |      |      | -1       |          |
| Drain-source on-state resistance(note1) | $R_{DS(on)}$  | $V_{GS} = -4.5V, I_D = -4A$                                              |      |      | 0.050    | $\Omega$ |
|                                         |               | $V_{GS} = -2.5V, I_D = -4A$                                              |      |      | 0.060    |          |
|                                         |               | $V_{GS} = -1.8V, I_D = -2A$                                              |      |      | 0.073    |          |
| Forward transconductance(note2)         | $g_{FS}$      | $V_{DS} = -5V, I_D = -4A$                                                | 8    |      |          | S        |
| Body diode voltage(note2)               | $V_{SD}$      | $I_S = -1A, V_{GS} = 0V$                                                 |      |      | -1       | V        |
| <b>Dynamic Parameters (note3)</b>       |               |                                                                          |      |      |          |          |
| Input capacitance                       | $C_{iss}$     | $V_{DS} = -10V, V_{GS} = 0V, f = 1MHz$                                   |      | 1450 |          | pF       |
| Output capacitance                      | $C_{oss}$     |                                                                          |      | 205  |          |          |
| Reverse transfer capacitance            | $C_{rss}$     |                                                                          |      | 160  |          |          |
| Gate resistance                         | $R_g$         | $V_{DS} = 0V, V_{GS} = 0V, f = 1MHz$                                     |      | 6.5  |          | $\Omega$ |
| <b>Switching Parameters</b>             |               |                                                                          |      |      |          |          |
| Total gate charge                       | $Q_g$         | $V_{DS} = -10V, V_{GS} = -4.5V, I_D = -4A$                               |      | 17.2 |          | nC       |
| Gate-Source charge                      | $Q_{gs}$      |                                                                          |      | 1.3  |          |          |
| Gate-drain charge                       | $Q_{gd}$      |                                                                          |      | 4.5  |          |          |
| Turn-on delay time (note3)              | $t_{d(on)}$   | $V_{DS} = -10V, V_{GS} = -4.5V$<br>$R_{GEN} = 3\Omega, R_L = 2.5\Omega,$ |      | 9.5  |          | ns       |
| Turn-on rise time(note3)                | $t_r$         |                                                                          |      | 17   |          |          |
| Turn-off delay time(note3)              | $t_{d(off)}$  |                                                                          |      | 94   |          |          |
| Turn-off fall time(note3)               | $t_f$         |                                                                          |      | 35   |          |          |

**Notes:**

1. Repetitive rating, pulse width limited by junction temperature.
2. Pulse Test : Pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
3. These parameters have no way to verify.



## Typical Characteristics





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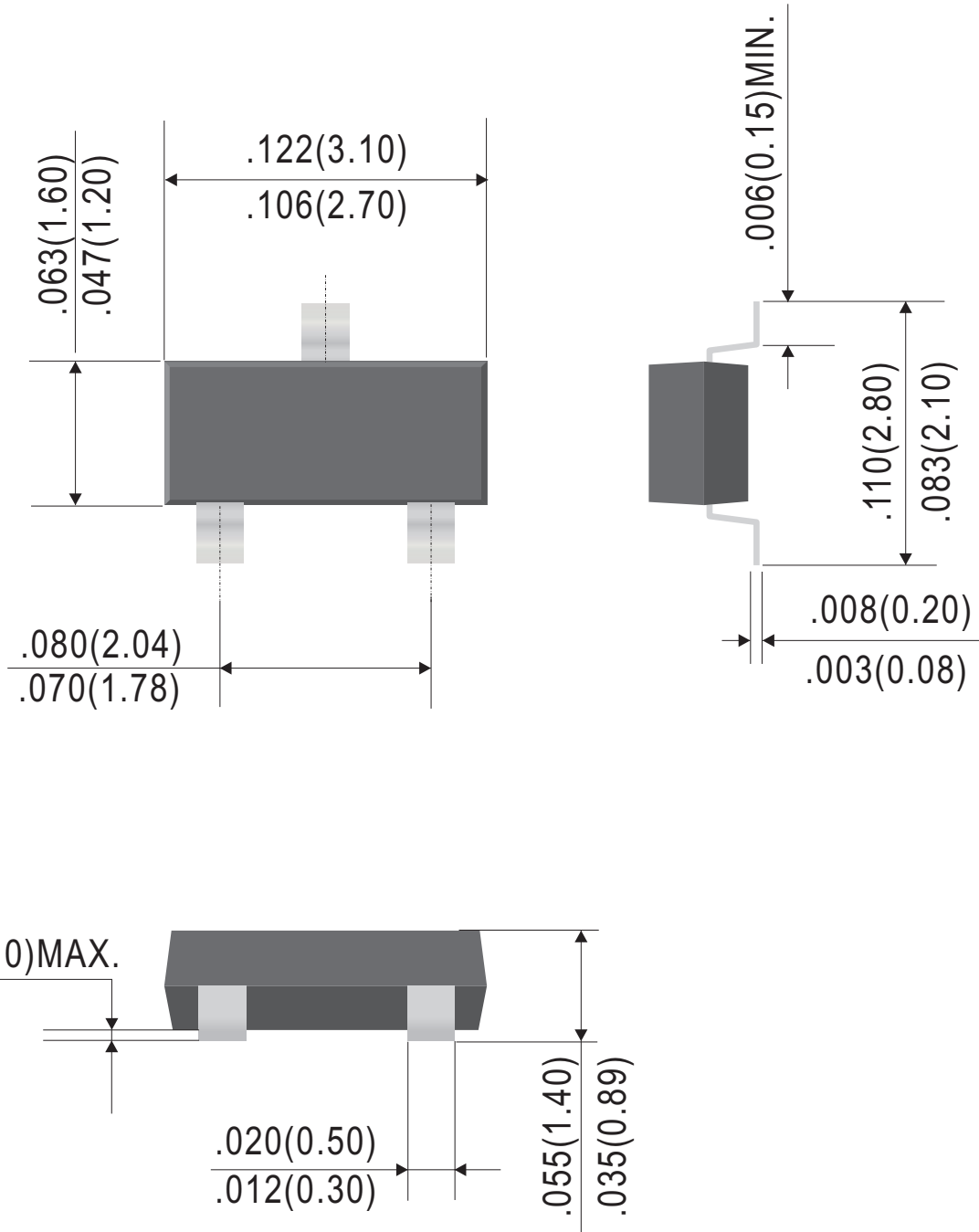


SE3415

## SOT-23 Plastic-Encapsulate MOSFETS

### Outline Drawing

### SOT-23



Dimensions in inches and (millimeters)

Rev.D



## SOT-23 Plastic-Encapsulate MOSFETS

### Ordering Information:

| Device PN                                    | Packing                |
|----------------------------------------------|------------------------|
| SE3415-T <sup>(1)</sup> G <sup>(2)</sup> -WS | Tape&Reel: 3 Kpcs/Reel |

Note: (1) Packing code, Tape & Reel

(2) RoHS product for packing code suffix "G" ; Halogen free product for packing code suffix "H"

### \*\*\*Disclaimer\*\*\*

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