# Single P-Channel, -20V, -4.0A, Power MOSFET

## Features

- ✧ Trench Technology
- ✧ Supper high density cell design
- ✧ Excellent ON resistance
- ✧ Extremely Low Threshold Voltage
- ✧ Small package SOT-23

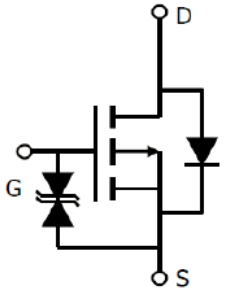
| $V_{DS}$ (V) | Typical $R_{DS(on)}$ (mΩ) |
|---|---|
| -20 | 38 @ $V_{GS}$=-4.5V |
| | 46 @ $V_{GS}$=-2.5V |

## Applications

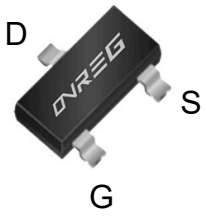
- ✧ PWM applications
- ✧ Load/Power Switching for portable device

## Mechanical Data

- ✧ UL Flame Rating : UL94V-0
- ✧ RoHS/WEEE Complain



Circuit Diagram



SOT-23

**Absolute Maximum Rating at $T_A$ = 25℃, unless otherwise specified**

| Parameter | | Symbol | Rating | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | -20 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±8 | |
| Continuous Drain Current | $T_A$=25°C | $I_D$ | -4.0 | A |
| | $T_A$=70°C | | -3.5 | A |
| Maximum Power Dissipation（$T_C$=25°C） | | $P_D$ | 1.7 | W |
| Pulsed Drain Current（t = 300 μs） | | $I_{DM}$ | -12 | A |
| Operating Junction Temperature | | $T_J$ | -55 to 150 | °C |
| Lead Temperature | | $T_L$ | 260 | °C |
| Storage Temperature Range | | $T_{stg}$ | -55 to 150 | °C |

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## Electronics Characteristics (Ta=25°C, unless otherwise noted)

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **OFF Characteristics** | | | | | | |
| Drain-source breakdown voltage | $BV_{DSS}$ | $V_{GS}$=0V, $I_D$=-250μA | -20 | - | - | V |
| Zero gate voltage drain current | $I_{DSS}$ | $V_{DS}$=-20V, $V_{GS}$=0V | - | - | -1 | μA |
| Gate-body leakage | $I_{GSS}$ | $V_{DS}$=0V, $V_{GS}$=±8V | - | - | ±10 | μA |
| **ON Characteristics** | | | | | | |
| Gate threshold voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$, $I_D$=-250μA | -0.4 | -0.59 | -0.9 | V |
| Drain-source on-state resistance | $R_{DS(ON)}$ | $V_{GS}$=-4.5V, $I_D$=-4A | - | 38 | 45 | mΩ |
| | | $V_{GS}$=-2.5V, $I_D$=-4A | - | 46 | 55 | |
| Forward transconductance | gfs | $V_{DS}$=-5V, $I_D$=-4A | 8 | - | - | S |
| **Dynamic Characteristics** | | | | | | |
| Input capacitance | $C_{ISS}$ | $V_{DS}$=-10V ,$V_{GS}$=0V f=1.0MHz | - | 751 | - | pF |
| Output capacitance | $C_{OSS}$ | | - | 115 | - | |
| Reverse transfer capacitance | $C_{RSS}$ | | - | 80 | - | |
| **Switching Characteristics** | | | | | | |
| Turn-on delay time | $t_{D(ON)}$ | $V_{DD}$=-10V $I_D$=-2.8A $V_{GEN}$=-4.5V $R_L$=10ohm $R_{GEN}$=-60ohm | - | 13 | - | ns |
| Rise time | tr | | - | 9 | - | |
| Turn-off delay time | $t_{D(OFF)}$ | | - | 19 | - | |
| Fall time | tf | | - | 29 | - | |
| Total gate charge | Qg | $V_{DS}$=-10V,$I_D$=-3A $V_{GS}$=-4.5V | - | 9.3 | - | nC |
| Gate-source charge | Qgs | | - | 1 | - | |
| Gate-drain charge | Qgd | | - | 2.2 | - | |
| **DRAIN-SOURCE DIODE** | | | | | | |
| Diode forward voltage | $V_{SD}$ | $V_{GS}$=0V,Is=-1.25A | - | -0.81 | -1.2 | |

## Thermal Characteristics

| Parameter | Symbol | Typ | Max | Units |
|---|---|---|---|---|
| Maximum Junction-to-Ambient | $R_{\theta JA}$ | 100 | 130 | ℃/W |
| Maximum Junction-to-Lead | $R_{\theta JF}$ | 60 | 75 | ℃/W |

a. Surface mounted on 1" x 1" FR4 board.

b. Maximum under steady state conditions is 175 °C/W.

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## Electronics Characteristics (Ta=25°C, unless otherwise noted)

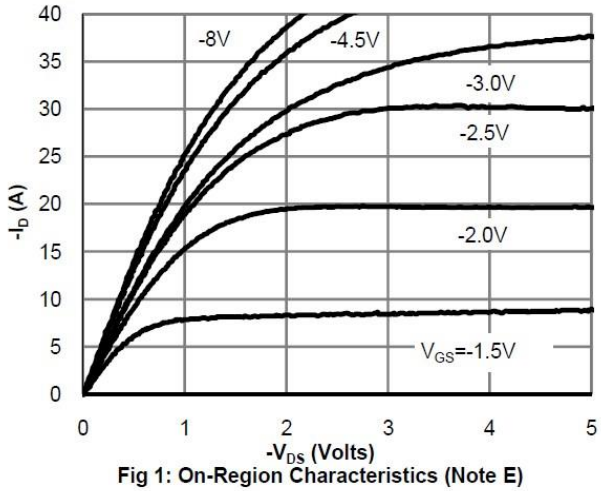


Fig 1: On-Region Characteristics (Note E)

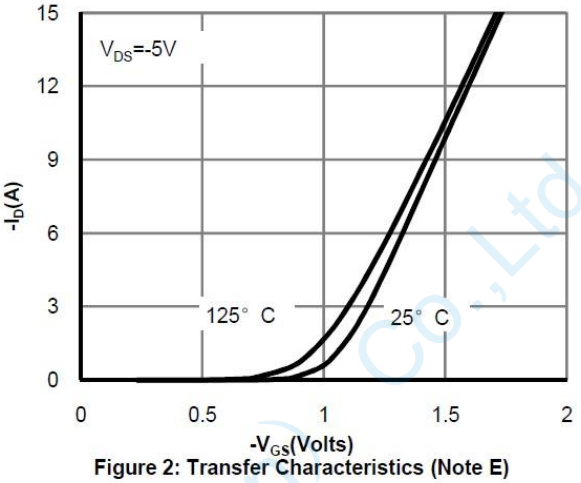


Figure 2: Transfer Characteristics (Note E)

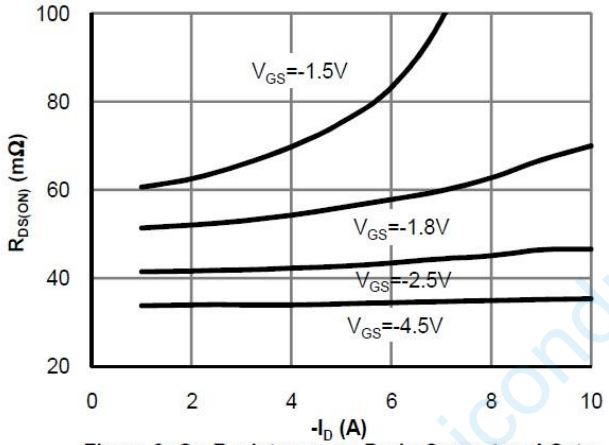


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

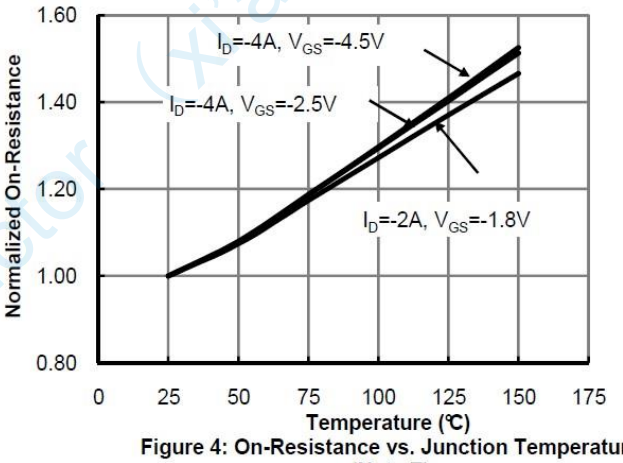


Figure 4: On-Resistance vs. Junction Temperature (Note E)

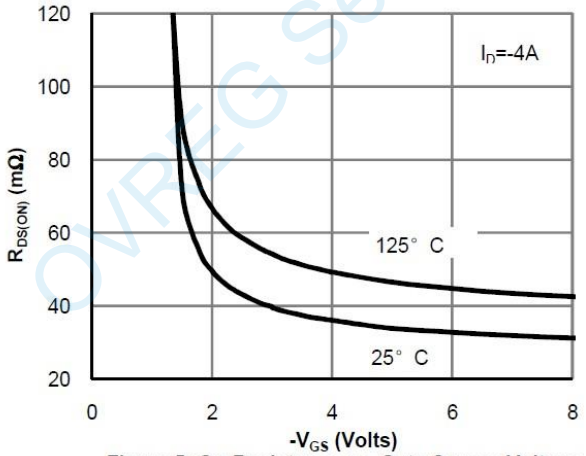


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

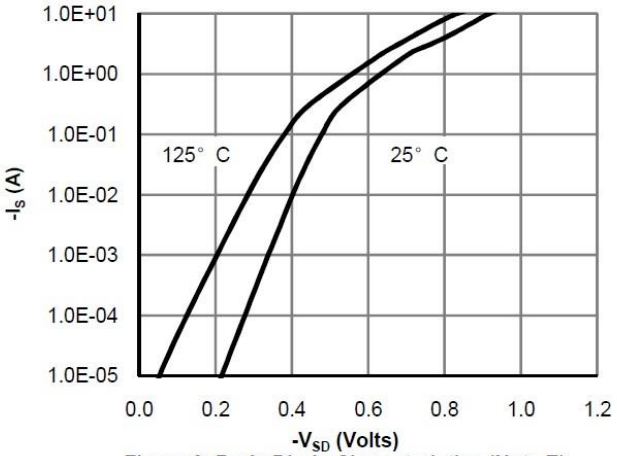


Figure 6: Body-Diode Characteristics (Note E)

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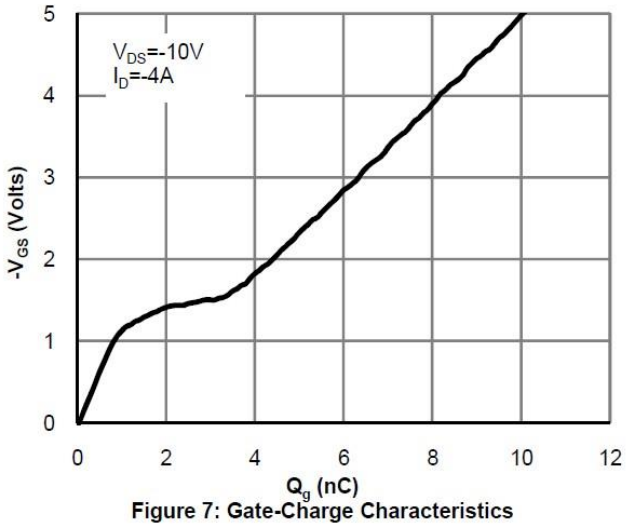


Figure 7: Gate-Charge Characteristics

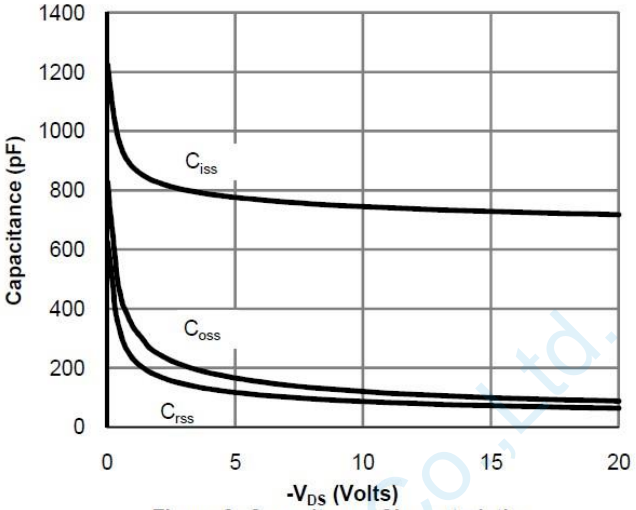


Figure 8: Capacitance Characteristics

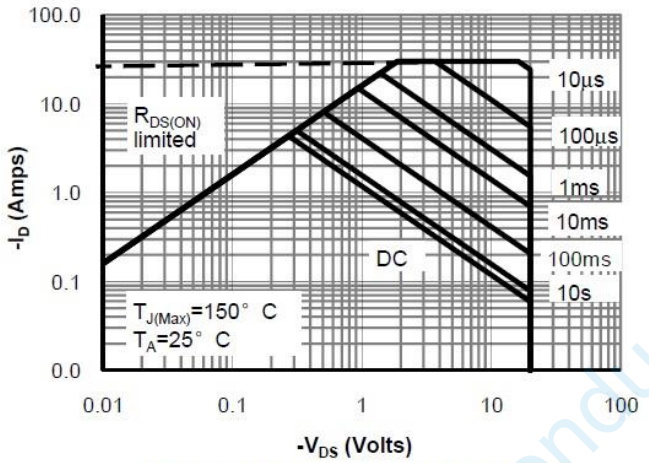


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

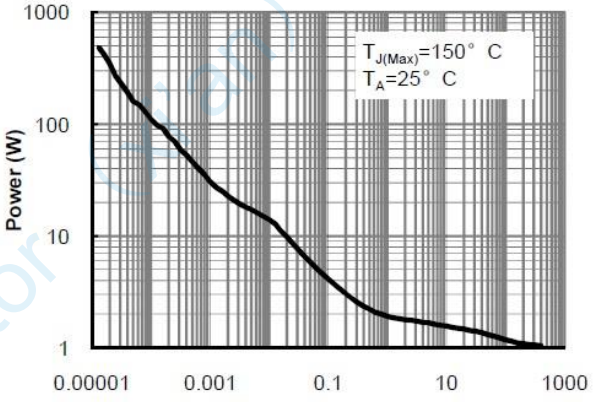


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

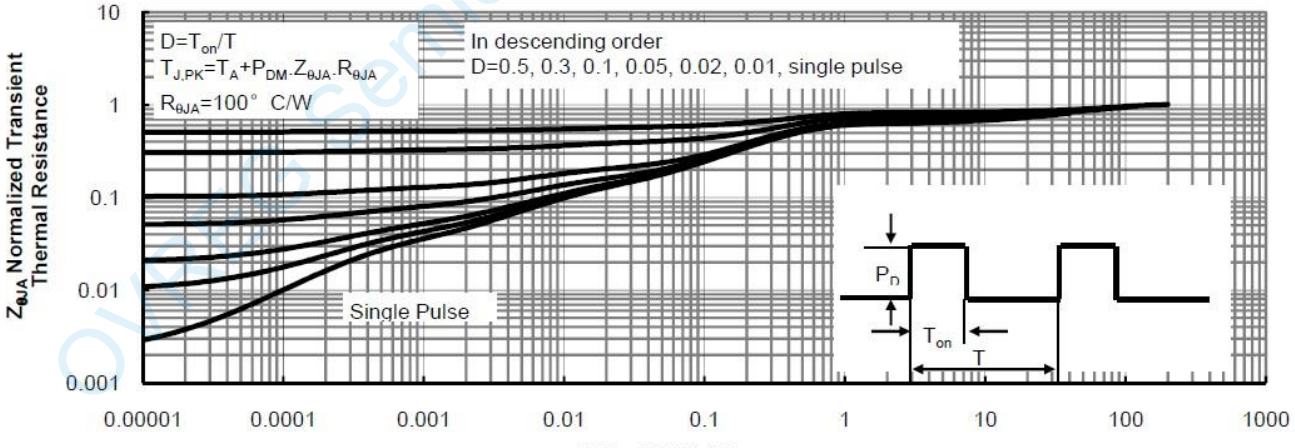


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

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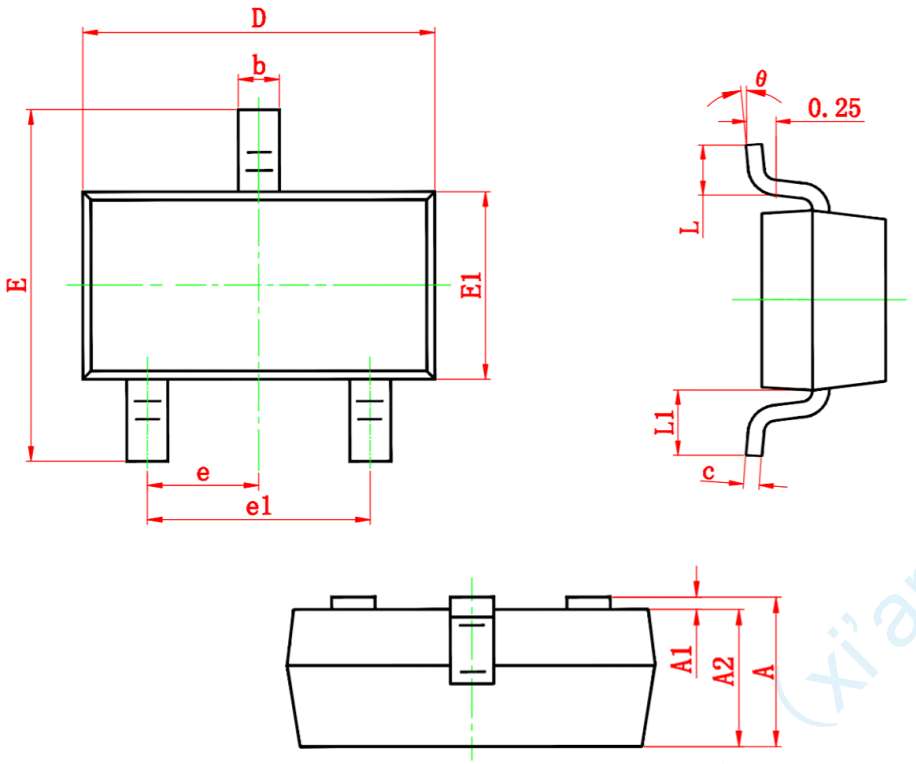
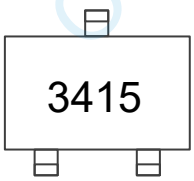
## Package information




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min. | Max. | Min. | Max. |
| A | 0.900 | 1.150 | 0.035 | 0.045 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 0.900 | 1.050 | 0.035 | 0.041 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.080 | 0.150 | 0.003 | 0.006 |
| D | 2.800 | 3.000 | 0.110 | 0.118 |
| E | 2.250 | 2.550 | 0.089 | 0.100 |
| E1 | 1.200 | 1.400 | 0.047 | 0.055 |
| e | 0.950 TYP. | | 0.037 TYP. | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.300 | 0.500 | 0.012 | 0.020 |
| L1 | 0.550 REF. | | 0.022 REF. | |
| θ | 0° | 8° | 0° | 8° |

## Marking




## Ordering Information

| Part number | Material | Reel size | MOQ | MOQ/internal box | MOQ/carton |
|---|---|---|---|---|---|
| OVM20P38T | GREEN | 7 inch | 3k/reel | 10reel= 30k/box | 4boxes=120k/carton |

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