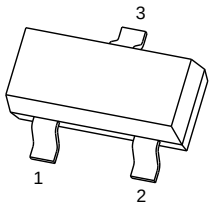
# 20V P-Channel MOSFET

## Product Summary

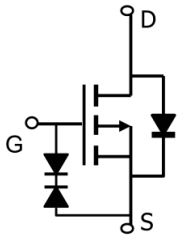
| $V_{(BR)DSS}$ | $R_{DS(on)TYP}$ | $I_D$ |
|---|---|---|
| -20V | 33mΩ@-4.5V | -4A |
| | 45mΩ@-2.5V | |
| | 63mΩ@-1.8V | |

**SOT-23**




1. GATE
2. SOURCE
3. DRAIN

Schematic diagram



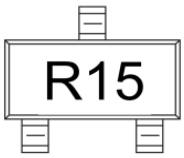

## Feature

- Excellent RDS(ON), low gate charge,low gate voltages
- TrenchFET power MOSFET
- ESD protected gate
- AEC-Q101 qualified (Automotive grade with suffix "Q".)
- Exsemi technology

## Application

- Load switch and in PWM applicatopns

**MARKING:**




## ABSOLUTE MAXIMUM RATINGS ($T_a$=25℃ unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | -20 | V |
| Gate-Source Voltage | $V_{GS}$ | ±8 | V |
| Continuous Drain Current(t≤10s) | $I_D$ | -4.0 | A |
| Maximum Power Dissipation(t≤10s) | $P_D$ | 0.35 | W |
| Thermal Resistance from Junction to Ambient | $R_{\theta JA}$ | 357 | ℃/W |
| Junction Temperature | $T_J$ | 150 | ℃ |
| Operating Temperature | $T_{OPR}$ | -45~ +125 | ℃ |
| Storage Temperature | $T_{STG}$ | -55~ +150 | ℃ |

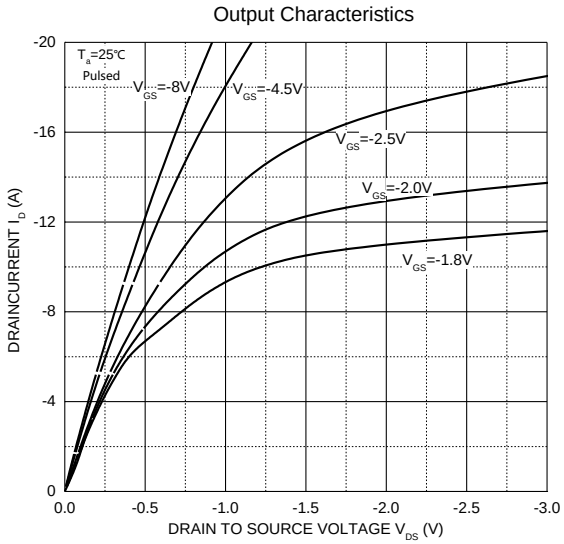
## MOSFET ELECTRICAL CHARACTERISTICS($T_a$=25℃ unless otherwise noted)

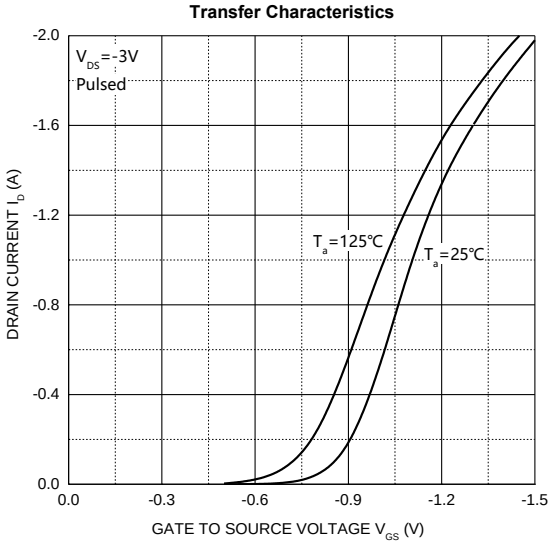
| Parameter | Symbol | Test Condition | Min | Type | Max | Unit |
|---|---|---|---|---|---|---|
| **Static Characteristics** | | | | | | |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | $V_{GS}$ = 0V, $I_D$ =-250μA | -20 | | | V |
| Zero gate voltage drain current | $I_{DSS}$ | $V_{DS}$ =-16V,$V_{GS}$ = 0V | | | -1 | μA |
| Gate-body leakage current | $I_{GSS}$ | $V_{GS}$ =±8V, $V_{DS}$ = 0V | | | ±10 | μA |
| Gate threshold voltage | $V_{GS(th)}$ | $V_{DS}$ =$V_{GS}$, $I_D$ =-250μA | -0.3 | -0.65 | -1.0 | V |
| Drain-source on-resistance(1) | $R_{DS(on)}$ | $V_{GS}$ =-4.5V, $I_D$ =-4A | | 33 | 43 | mΩ |
| | | $V_{GS}$ =-2.5V, $I_D$ =-4A | | 45 | 60 | |
| | | $V_{GS}$ =-1.8V, $I_D$ =-2A | | 63 | 90 | |
| Forward tranconductance(2) | $g_{FS}$ | $V_{DS}$ =-5V, $I_D$ =-4A | 8 | | | S |
| **Dynamic characteristics(3)** | | | | | | |
| 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 | | Ω |
| **Switching Characteristics** | | | | | | |
| Turn-on delay time(3) | $t_{d(on)}$ | $V_{DS}$=-10V, $V_{GS}$=-4.5V<br>$R_{GEN}$ =3Ω, $R_L$=2.5Ω, | | 9.5 | | ns |
| Turn-on rise time(3) | $t_r$ | | | 17 | | |
| Turn-off delay time(3) | $t_{d(off)}$ | | | 94 | | |
| Turn-off fall time(3) | $t_f$ | | | 35 | | |
| 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 | | |
| **Source-Drain Diode characteristics** | | | | | | |
| Diode Forward voltage(2) | $V_{DS}$ | $V_{GS}$ =0V, $I_S$=-1A | | | -1 | V |

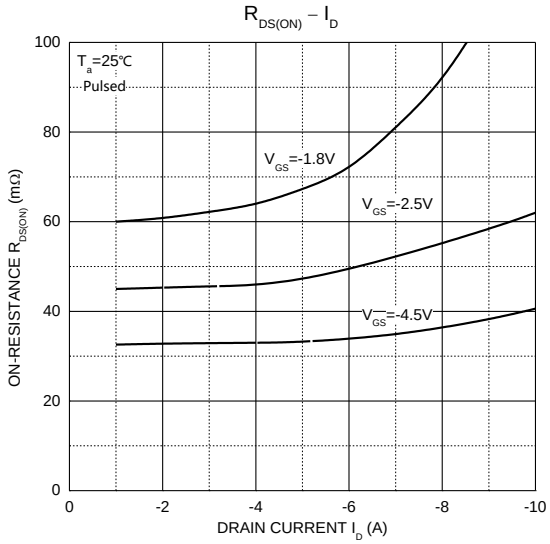
Notes:

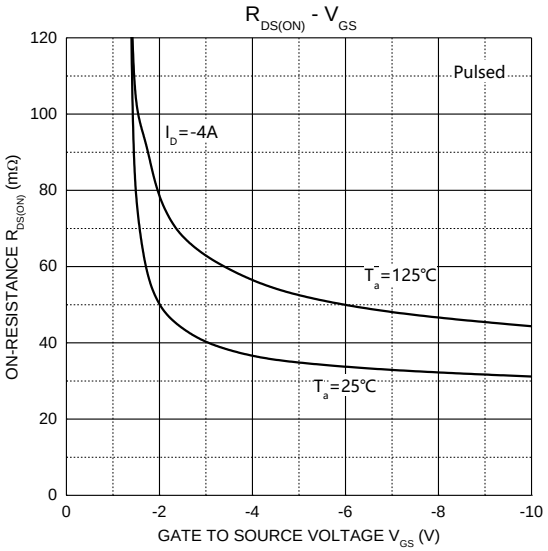
1. Repetitive rating,pulse width limited by junction temperature.
2. Pulse Test : Pulse width≦300μs, duty cycle≦2%.
3. These parameters have no way to verify.

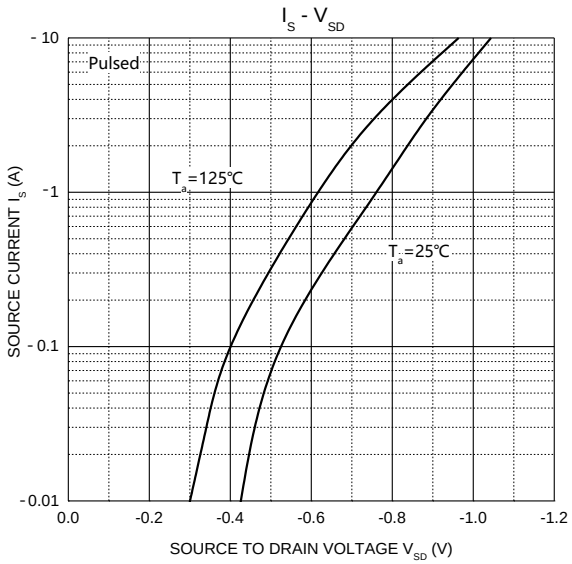
## Typical Electrical and Thermal Characteristics

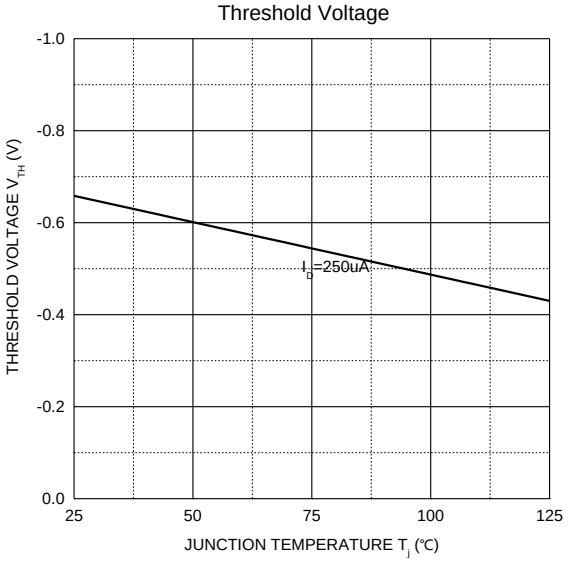


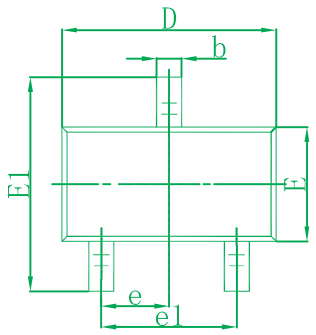



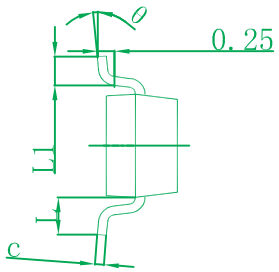



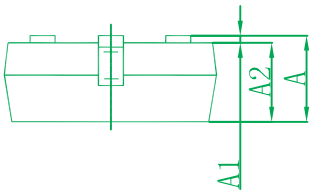



## SOT-23 Package Information

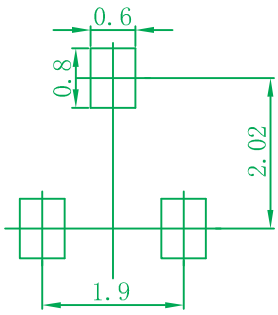



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| A | 0.900 | 1.150 | 0.035 | 0.045 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 0.900 | 1.150 | 0.035 | 0.045 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.080 | 0.150 | 0.003 | 0.006 |
| D | 2.800 | 3.050 | 0.110 | 0.120 |
| E | 1.200 | 1.400 | 0.047 | 0.055 |
| E1 | 2.250 | 2.550 | 0.089 | 0.100 |
| e | 0.950 TYP | | 0.037 TYP | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.550 REF | | 0.022 REF | |
| L1 | 0.360 REF | | 0.014 REF | |
| θ | 0° | 8° | 0° | 8° |

## SOT-23 Suggested Pad Layout




Note:
1.Controlling dimension:in millimeters.
2.General tolerance:±0.05mm.
3.The pad layout is for reference purposes only.

| Device | Package | Shipping |
|---|---|---|
| EP3415 | SOT-23 | 3000/Tape&Reel |