# ER 3420A

## 20V N-Channel MOSFET

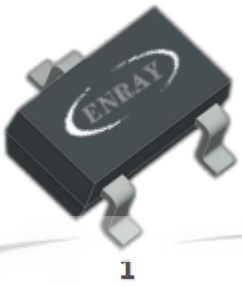
## Features

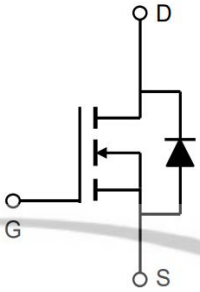
The E R 3420A uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.

## Product Summary

| | |
|---|---|
| $V_{DS}$ | 20V |
| $I_D$ | 6A |
| $R_{DS(ON)}$ (at $V_{GS}$=10V) | < 24mΩ |
| $R_{DS(ON)}$ (at $V_{GS}$ =4.5V) | < 27mΩ |
| $R_{DS(ON)}$ (at $V_{GS}$ =4.5V) | < 42mΩ |

1.GATE
2.SOURCE
3.DRAIN




## Order Information

| Product | Package | Marking | Packing |
|---|---|---|---|
| ER3420A | SOT-23-3L | ANOK | 3000PCS/Reel |

## Maximum Ratings(Ta=25℃ unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 20 | V |
| Gate-Source Voltage | $V_{GS}$ | ±12 | |
| Continuous Drain Current | $I_D$ | 6 | A |
| Pulsed Drain Current ① | $I_{DM}$ | 30 | |
| Continuous Source-Drain Current(Diode Conduction) | $I_S$ | 2 | |
| Power Dissipation ② | $P_D$ | 1.4 | W |
| Thermal Resistance from Junction to Ambient (t≤5s) | $R_{\theta JA}$ | 125 | ℃/W |
| Operating Junction | $T_J$ | 150 | ℃ |
| Storage Temperature | $T_{STG}$ | -55~+150 | ℃ |

| Electrical Characteristics(TJ=25°C unless otherwise noted) | | | | | | |
|---|---|---|---|---|---|---|
| **Parameter** | **Symbol** | **Test Condition** | **Min** | **Typ** | **Max** | **Unit** |
| **Static Parameters ③** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | VGS = 0V, ID = 250μA | 20 | | | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | VDS =VGS, ID = 250μA | 0.4 | | 1.1 | V |
| Gate-Body leakage Current | $I_{GSS}$ | VDS =0V, VGS = ±12V | | | ±100 | nA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | VDS = 30V, VGS =0V | | | 1 | μA |
| Static Drain-Source On-Resistance | $R_{DS(on)}$ | VGS = 10V, ID = 6A | | 18 | 24 | mΩ |
| | | VGS = 4.5V, ID = 5A | | 20 | 27 | mΩ |
| | | VGS = 2.5V, ID = 4A | | 25 | 42 | mΩ |
| Forward Transconductance | gFs | VDS = 4.5V, ID = 6A | | 25 | | S |
| Diode Forward Voltage | $V_{SD}$ | IS=1A,VGS=0V | | 0.72 | 1.1 | V |
| **Dynamic Parameters ④** | | | | | | |
| Total Gate Charge | $Q_g$ | VDS = 10V,VGS = 10V, ID =6A | | 12.5 | 12 | nC |
| Gate Source Charge | $Q_{gs}$ | | | 1.1 | | nC |
| Gate Drain Charge | $Q_{gd}$ | | | 2 | | nC |
| Input Capacitance | $C_{iss}$ | VDS = 10V,VGS =0V, f=1MHz | | 525 | | pF |
| Output Capacitance | $C_{oss}$ | | | 95 | | pF |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 75 | | pF |
| Gate Resistance | $R_g$ | f=1MHz | | 1.7 | | Ω |
| **Switching Parameters ④** | | | | | | |
| Turn-On DelayTime | td(on) | VDD= 10V RL=1.7Ω, ID = 3A, VGEN= 10V,Rg=3Ω | | 3 | | ns |
| Turn-On Rise Time | tr | | | 7.5 | | ns |
| Turn-Off DelayTime | td(off) | | | 20 | | ns |
| Turn-Off Fall Time | tf | | | 6 | | ns |

**Note :**

1. Repetitive Rating : Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t < 5 sec.
3. Pulse Test : Pulse Width≤300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production testing.

## Typical Electrical and Thermal Characteristics

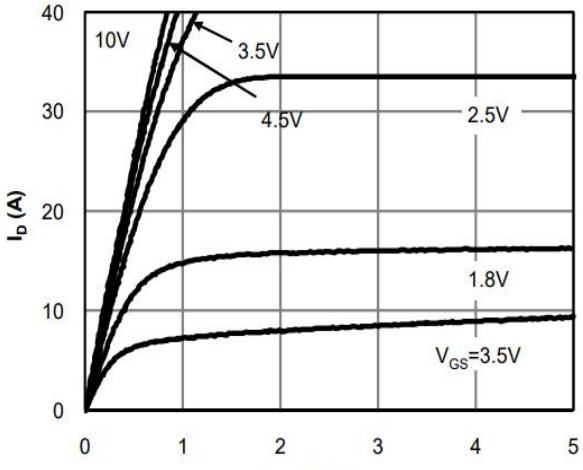



Fig 1: On-Region Characteristics (Note E)

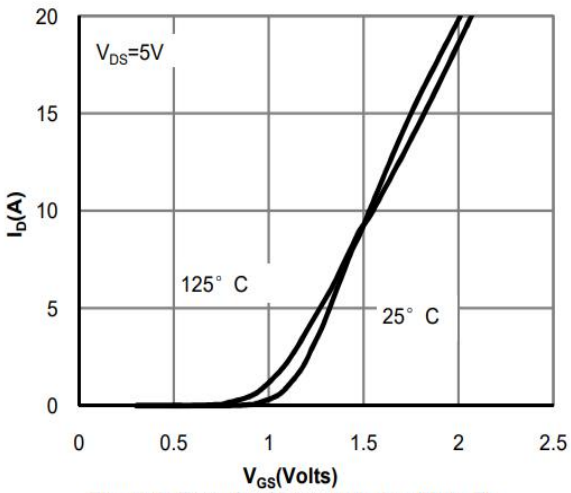



Figure 2: Transfer Characteristics (Note E)

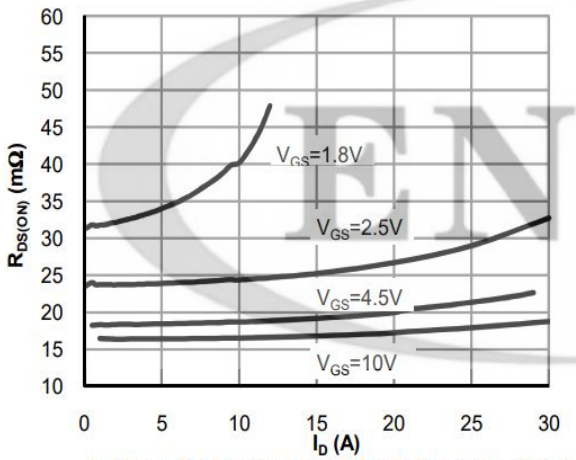



Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

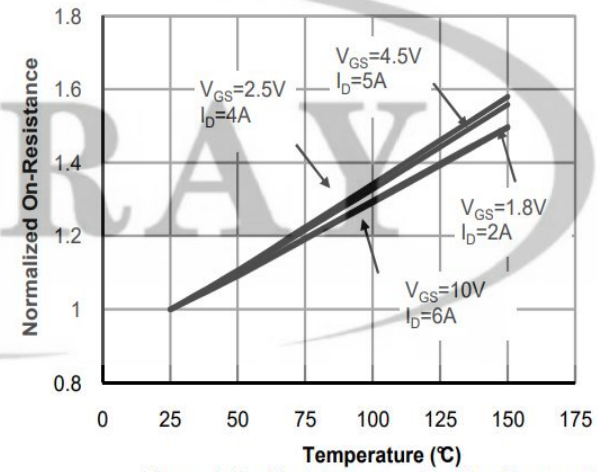



Figure 4: On-Resistance vs. Junction Temperature (Note E)

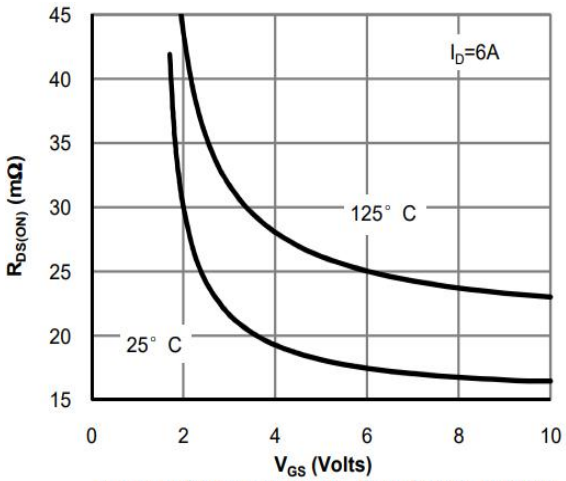



Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

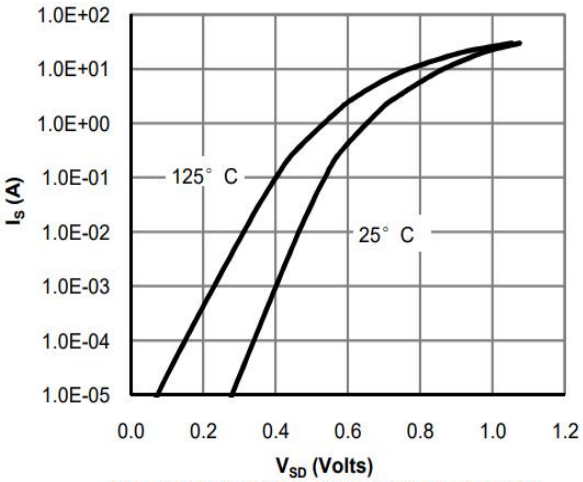



Figure 6: Body-Diode Characteristics (Note E)

## Typical Electrical and Thermal Characteristics

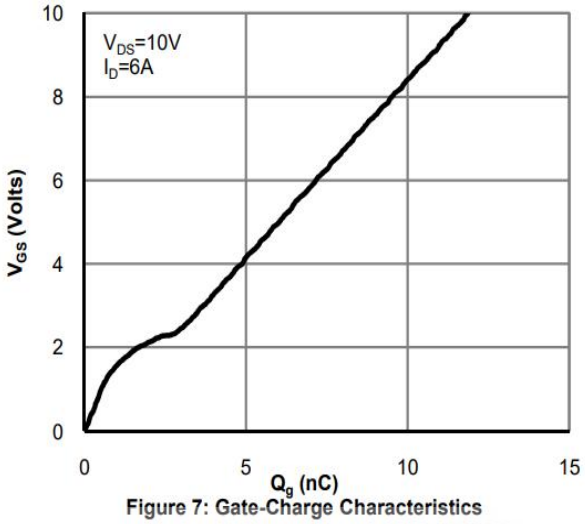



Figure 7: Gate-Charge Characteristics

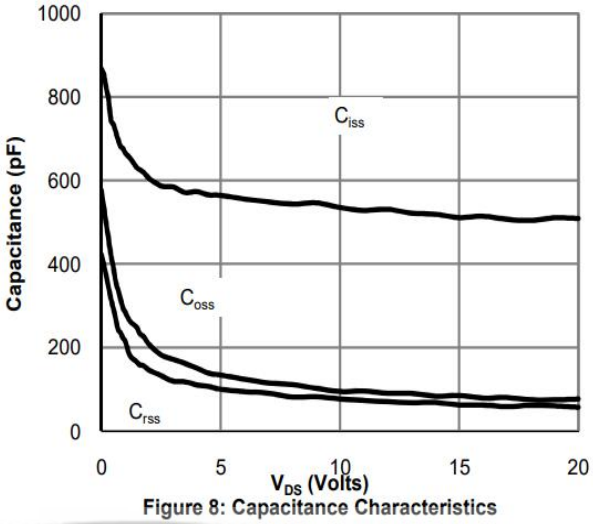



Figure 8: Capacitance Characteristics

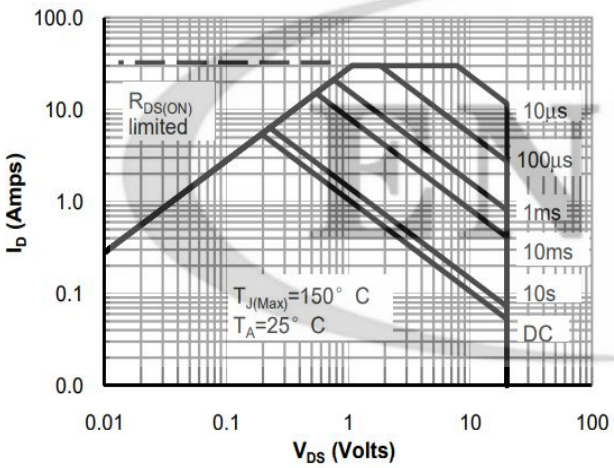



Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

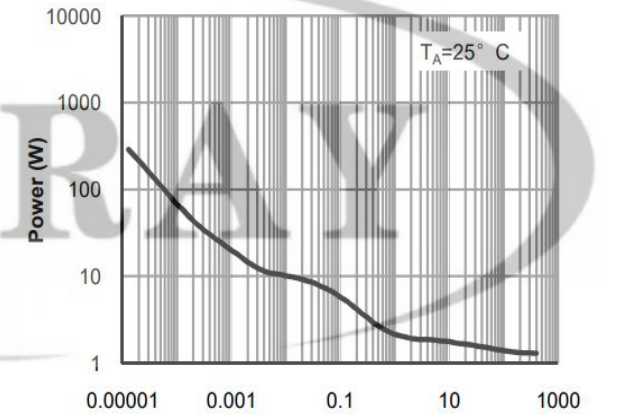



Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

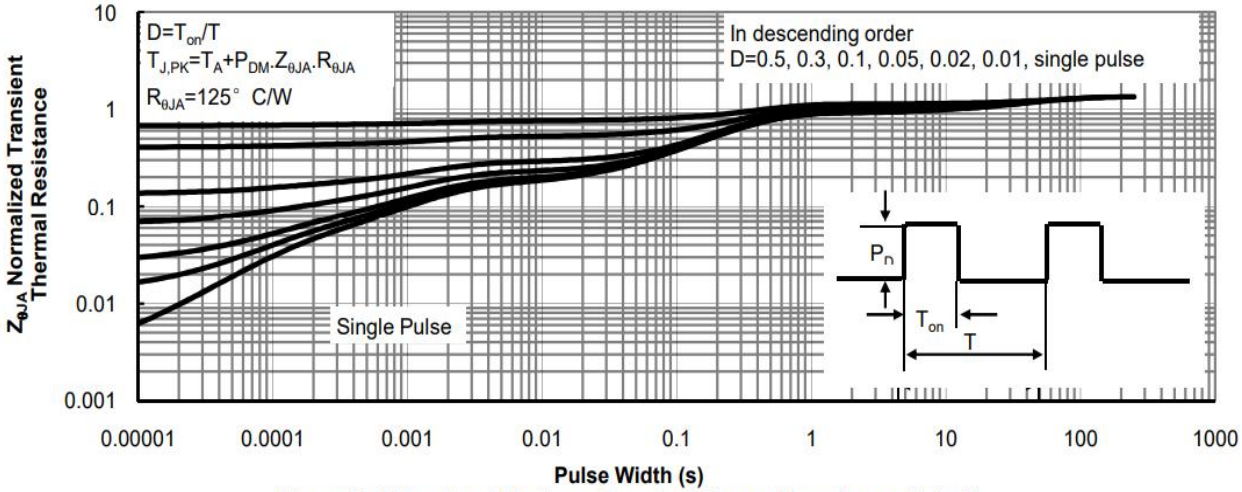
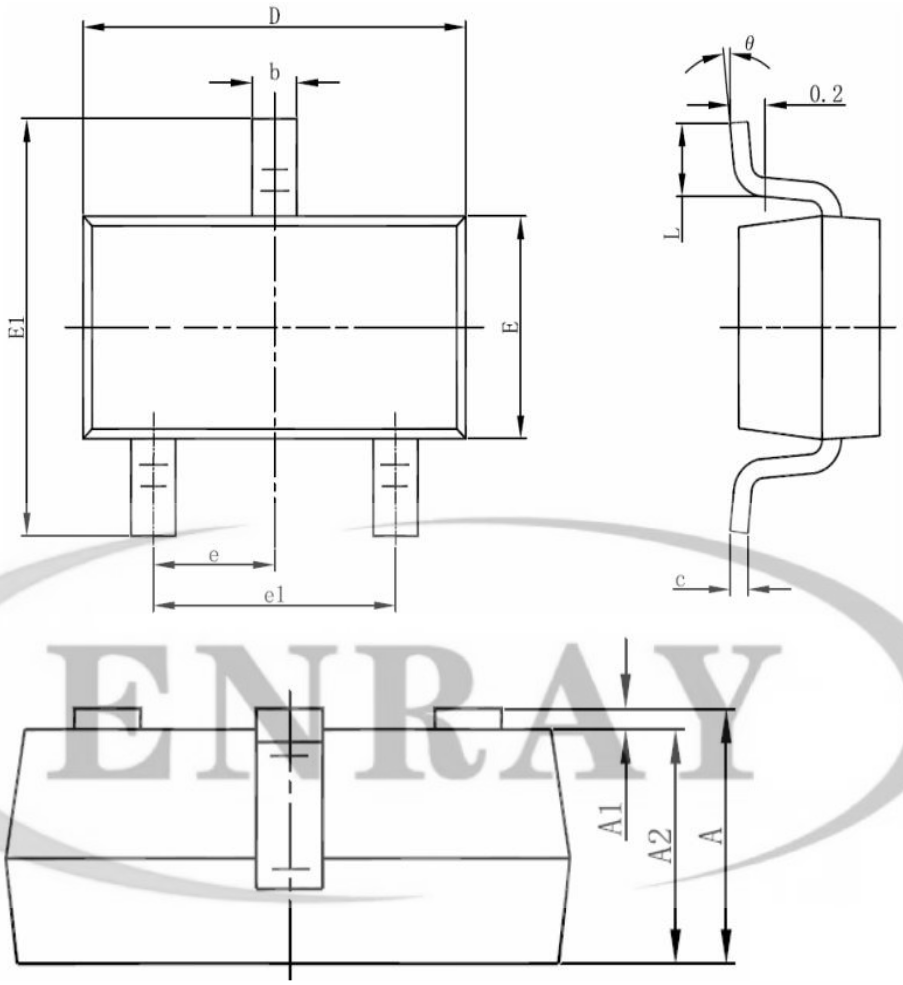



Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

## SOT-23-3L Package Outline Dimesions




| 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 |
| E | 1.500 | 1.700 | 0.059 | 0.067 |
| E1 | 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° |