

Single N-channel MOSFET

ELM32418LA-S

■ General description

ELM32418LA-S uses advanced trench technology to provide excellent $R_{ds(on)}$, low gate charge and low gate resistance.

■ Features

- $V_{ds}=40V$
- $I_d=20A$
- $R_{ds(on)} < 15m\Omega$ ($V_{gs}=10V$)
- $R_{ds(on)} < 27m\Omega$ ($V_{gs}=7V$)

■ Maximum absolute ratings

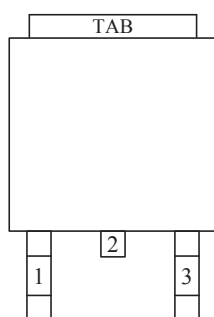
| Parameter | Symbol | Limit | Unit | Note |
|--|----------------|-------------------|------------|------|
| Drain-source voltage | V_{ds} | 40 | V | |
| Gate-source voltage | V_{gs} | ± 20 | V | |
| Continuous drain current | I_d | $T_a=25^\circ C$ | 20 | A |
| | | $T_a=100^\circ C$ | 16 | |
| Pulsed drain current | I_{dm} | 50 | A | 3 |
| Power dissipation | P_d | $T_a=25^\circ C$ | 42 | W |
| | | $T_a=100^\circ C$ | 32 | |
| Junction and storage temperature range | T_j, T_{stg} | -55 to 150 | $^\circ C$ | |

■ Thermal characteristics

| Parameter | | Symbol | Typ. | Max. | Unit | Note |
|-----------------------------|--------------|-----------------|------|------|--------------|------|
| Maximum junction-to-case | Steady-state | $R_{\theta jc}$ | | 3 | $^\circ C/W$ | |
| Maximum junction-to-ambient | Steady-state | $R_{\theta ja}$ | | 75 | $^\circ C/W$ | |

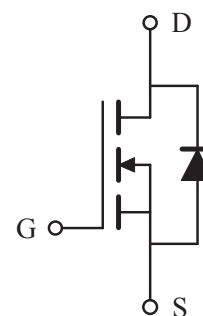
■ Pin configuration

TO-252-3(TOP VIEW)



| Pin No. | Pin name |
|---------|----------|
| 1 | GATE |
| 2 | DRAIN |
| 3 | SOURCE |

■ Circuit



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■Electrical characteristics

Ta=25°C

| Parameter | Symbol | Condition | Min. | Typ. | Max. | Unit | Note |
|------------------------------------|---------------------|--|------|------|------|------|------|
| STATIC PARAMETERS | | | | | | | |
| Drain-source breakdown voltage | BV _{dss} | I _d =250μA, V _{gs} =0V | 40 | | | V | |
| Zero gate voltage drain current | I _{dss} | V _{ds} =32V, V _{gs} =0V | | | 1 | μA | |
| | | V _{ds} =30V, V _{gs} =0V, T _j =125°C | | | 10 | | |
| Gate-body leakage current | I _{gss} | V _{ds} =0V, V _{gs} =±20V | | | ±250 | nA | |
| Gate threshold voltage | V _{gs(th)} | V _{ds} =V _{gs} , I _d =250μA | 1.2 | 2.0 | 3.0 | V | |
| On state drain current | I _{d(on)} | V _{gs} =10V, V _{ds} =10V | 50 | | | A | 1 |
| Static drain-source on-resistance | R _{ds(on)} | V _{gs} =10V, I _d =20A | | 12.5 | 15.0 | mΩ | 1 |
| | | V _{gs} =7V, I _d =10A | | 18.0 | 27.0 | mΩ | |
| Forward transconductance | G _{fs} | V _{ds} =10V, I _d =20A | | 25 | | S | 1 |
| Diode forward voltage | V _{sd} | I _f =I _s , V _{gs} =0V | | | 1.3 | V | 1 |
| Max. body-diode continuous current | I _s | | | | 20 | A | |
| Pulsed body-diode current | I _{sm} | | | | 50 | A | 3 |
| DYNAMIC PARAMETERS | | | | | | | |
| Input capacitance | C _{iss} | V _{gs} =0V, V _{ds} =10V, f=1MHz | | 1145 | 1450 | pF | |
| Output capacitance | C _{oss} | | | 255 | 355 | pF | |
| Reverse transfer capacitance | C _{rss} | | | 95 | 145 | pF | |
| SWITCHING PARAMETERS | | | | | | | |
| Total gate charge | Q _g | V _{gs} =10V, V _{ds} =20V, I _d =10A | | 23.0 | | nC | 2 |
| Gate-source charge | Q _{gs} | | | 3.6 | | nC | 2 |
| Gate-drain charge | Q _{gd} | | | 3.0 | | nC | 2 |
| Turn-on delay time | t _{d(on)} | V _{gs} =10V, V _{ds} =20V, I _d ≈1A R _l =1Ω, R _{gen} =6Ω | | 3.2 | 6.4 | ns | 2 |
| Turn-on rise time | t _r | | | 10.8 | 21.7 | ns | 2 |
| Turn-off delay time | t _{d(off)} | | | 17.1 | 30.8 | ns | 2 |
| Turn-off fall time | t _f | | | 5.3 | 10.7 | ns | 2 |
| Body diode reverse recovery time | t _{rr} | I _f =20A, dI/dt=100A/μs | | 60 | | ns | |
| Body diode reverse recovery charge | Q _{rr} | I _f =20A, dI/dt=100A/μs | | 43 | | nC | |

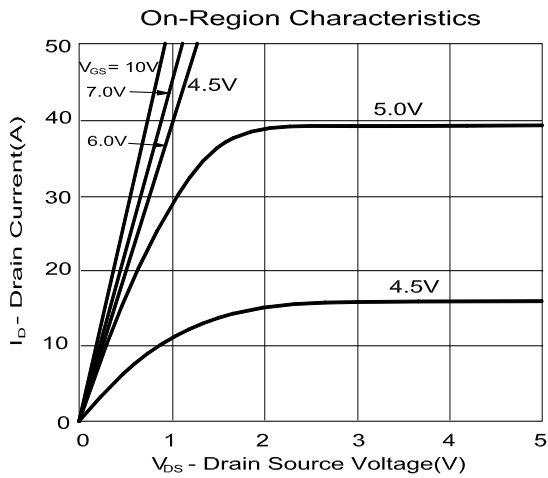
NOTE :

1. Pulse test : Pulsed width ≤ 300μsec and Duty cycle ≤ 2%.
2. Independent of operating temperature.
3. Pulsed width limited by maximum junction temperature.
4. Duty cycle ≤ 1%.

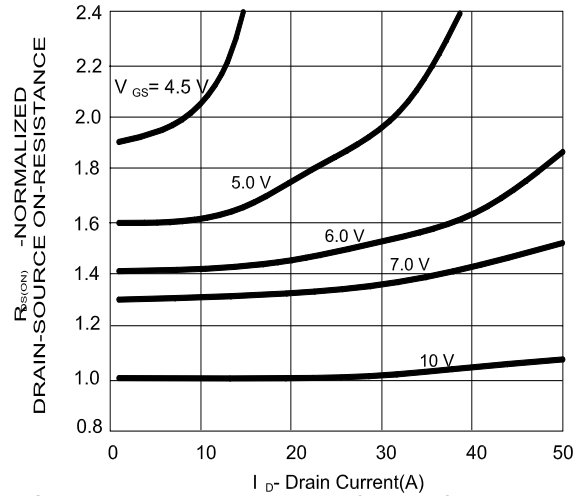
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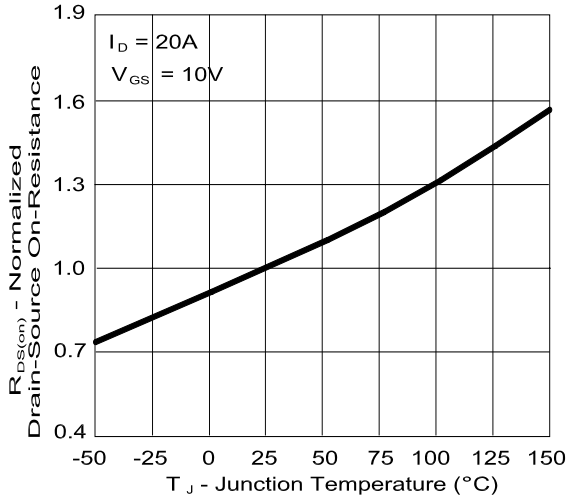
■ Typical electrical and thermal characteristics



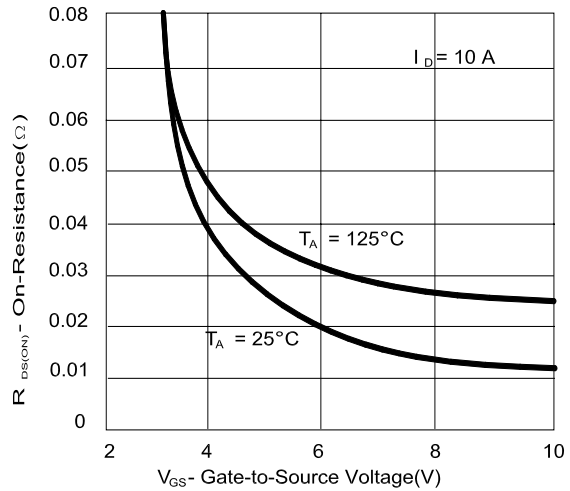
On-Resistance Variation with Drain Current and Gate Voltage



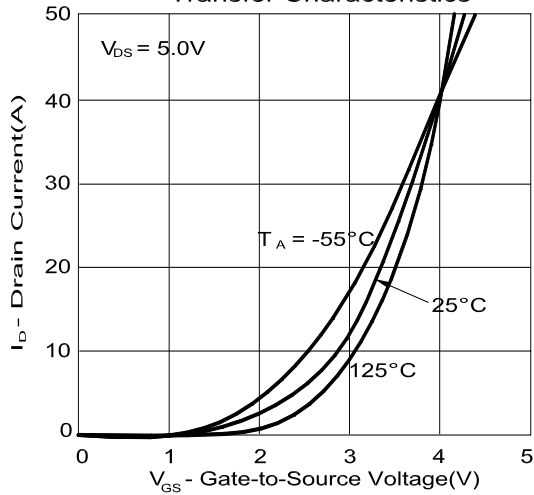
On-Resistance Variation with Temperature



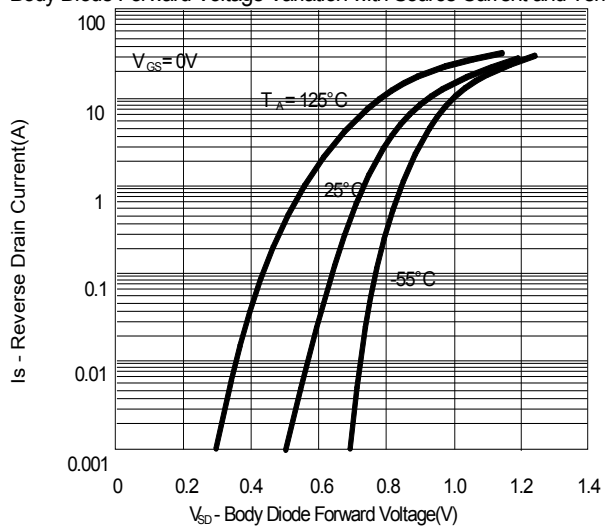
On-Resistance Variation with Gate-to-Source Voltage



Transfer Characteristics



Body Diode Forward Voltage Variation with Source Current and Temperature



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