

Single P-channel MOSFET

ELM33407CA-S

■ General description

ELM33407CA-S uses advanced trench technology to provide excellent $R_{ds(on)}$, low gate charge and low gate resistance.

■ Features

- $V_{ds} = -20V$
- $I_d = -3A$
- $R_{ds(on)} < 150m\Omega$ ($V_{gs} = -4.5V$)
- $R_{ds(on)} < 250m\Omega$ ($V_{gs} = -2.5V$)

■ Maximum absolute ratings

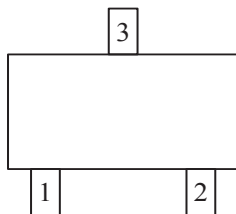
| Parameter | Symbol | Limit | Unit | Note | |
|--|----------------|--------------------|------------|------|--|
| Drain-source voltage | V_{ds} | -20 | V | | |
| Gate-source voltage | V_{gs} | ± 12 | V | | |
| Continuous drain current | I_d | $T_a = 25^\circ C$ | -3.0 | A | |
| | | $T_a = 70^\circ C$ | -1.4 | | |
| Pulsed drain current | I_{dm} | -10 | A | 3 | |
| Power dissipation | P_d | $T_a = 25^\circ C$ | 1.25 | W | |
| | | $T_a = 70^\circ C$ | 0.80 | | |
| 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-ambient | Steady-state | $R_{\theta ja}$ | | 166 | $^\circ C/W$ | |

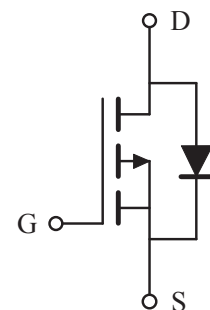
■ Pin configuration

SOT-23(TOP VIEW)



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

■ Circuit



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■Electrical characteristics

Ta=25°C

| Parameter | Symbol | Condition | Min. | Typ. | Max. | Unit | Note |
|------------------------------------|---------|--|------|------|-------|------|------|
| STATIC PARAMETERS | | | | | | | |
| Drain-source breakdown voltage | BVdss | Vgs=0V, Id=-250μA | -20 | | | V | |
| Zero gate voltage drain current | Idss | Vds=-16V, Vgs=0V | | | -1 | μA | |
| | | Vds=-16V, Vgs=0V, Tj=125°C | | | -10 | | |
| Gate-body leakage current | Igss | Vds=0V, Vgs=±12V | | | ±100 | nA | |
| Gate threshold voltage | Vgs(th) | Vds=Vgs, Id=-250μA | -0.5 | -0.9 | -1.2 | V | |
| On state drain current | Id(on) | Vgs=-4.5V, Vds=-5V | -6 | | | A | 1 |
| Static drain-source on-resistance | Rds(on) | Vgs=-4.5V, Id=-2A | | 100 | 150 | mΩ | 1 |
| | | Vgs=-2.5V, Id=-1A | | 180 | 250 | mΩ | |
| Forward transconductance | Gfs | Vds=-5V, Id=-2A | | 16 | | S | 1 |
| Diode forward voltage | Vsd | Is=-1A, Vgs=0V | | | -1.2 | V | 1 |
| Max. body-diode continuous current | Is | | | | -1.6 | A | |
| Pulsed body-diode current | Ism | | | | -3 | A | 3 |
| DYNAMIC PARAMETERS | | | | | | | |
| Input capacitance | Ciss | Vgs=0V, Vds=-6V, f=1MHz | | 410 | | pF | |
| Output capacitance | Coss | | | 220 | | pF | |
| Reverse transfer capacitance | Crss | | | 85 | | pF | |
| SWITCHING PARAMETERS | | | | | | | |
| Total gate charge | Qg | Vgs=-4.5V, Vds=-10V Id=-2A | | 5.80 | 10.00 | nC | 2 |
| Gate-source charge | Qgs | | | 0.85 | | nC | 2 |
| Gate-drain charge | Qgd | | | 1.70 | | nC | 2 |
| Turn-on delay time | td(on) | Vgs=-4.5V, Vds=-10V Id≈-1A, Rgen=6Ω | | 13 | | ns | 2 |
| Turn-on rise time | tr | | | 36 | | ns | 2 |
| Turn-off delay time | td(off) | | | 42 | | ns | 2 |
| Turn-off fall time | tf | | | 34 | | ns | 2 |

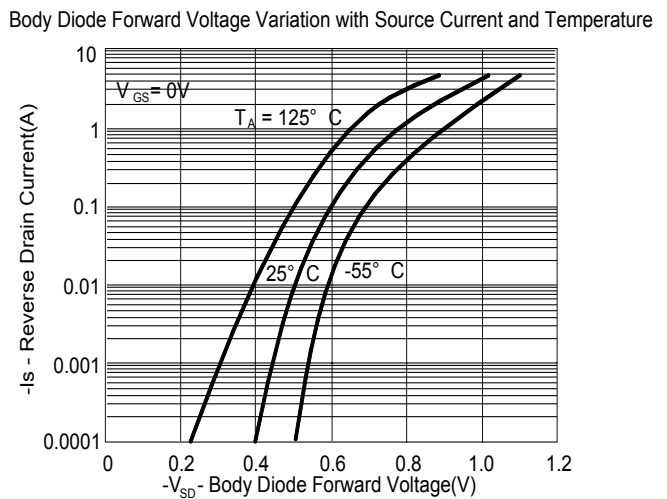
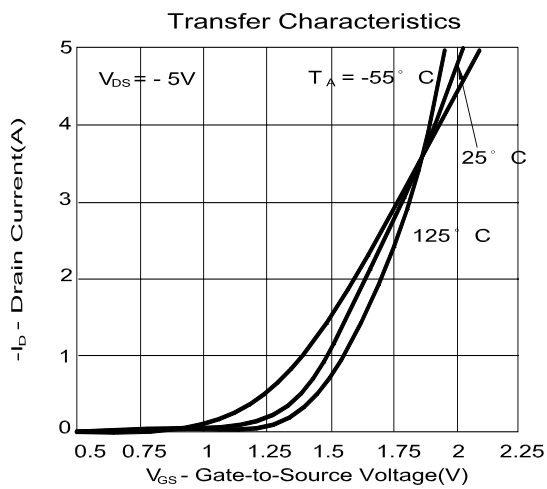
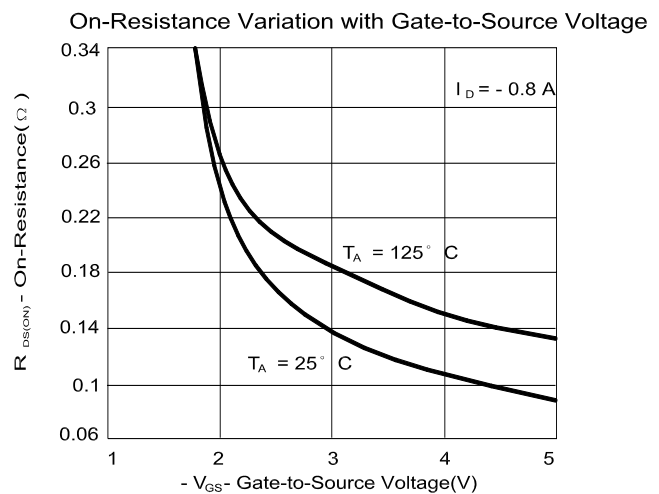
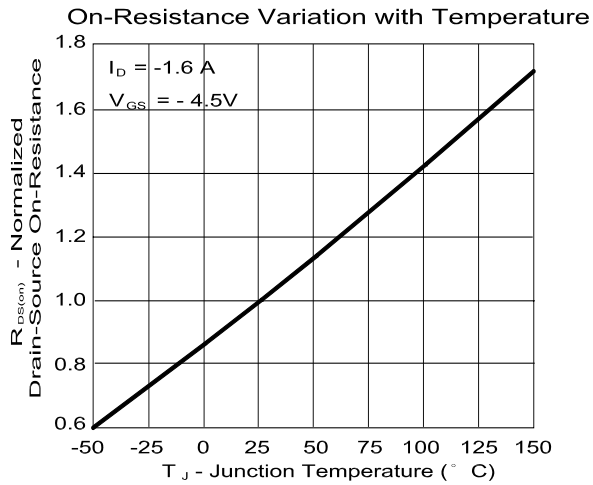
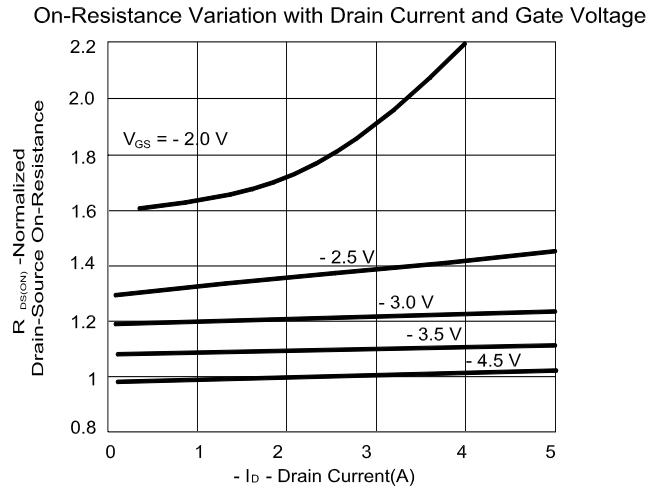
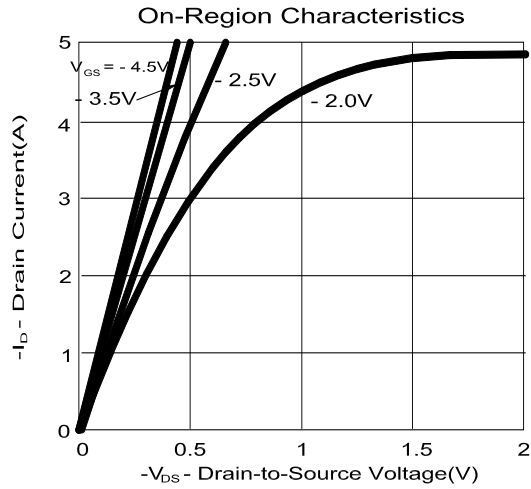
NOTE :

1. 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



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