# Single N-channel MOSFET

## ELM54190SA-N



## ■General description

ELM54190SA-N uses advanced trench technology to provide excellent Rds(on), low gate charge and low gate threshold voltage.

## ■Features

- Vds=100V
- Id=18A
- Rds(on) = 9.2mΩ (Vgs=10V)
- Rds(on) = 13.0mΩ (Vgs=4.5V)

## ■Maximum absolute ratings

Ta=25°C. Unless otherwise noted.

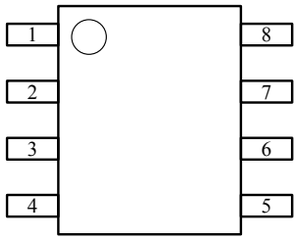
| Parameter | | Symbol | Limit | Unit |
|---|---|---|---|---|
| Drain-source voltage | | Vds | 100 | V |
| Gate-source voltage | | Vgs | ±20 | V |
| Continuous drain current(Tj=150°C) | Ta=25°C | Id | 18 | A |
| | Ta=70°C | | 14 | |
| Pulsed drain current | | Idm | 70 | A |
| Power dissipation | Tc=25°C | Pd | 6.0 | W |
| | Tc=70°C | | 3.8 | |
| Operating junction temperature | | Tj | 150 | °C |
| Storage temperature range | | Tstg | - 55 to 150 | °C |

## ■Thermal characteristics

| Parameter | Symbol | Typ. | Max. | Unit |
|---|---|---|---|---|
| Thermal resistance junction-to-ambient | Rθja | | 62.5 | °C/W |

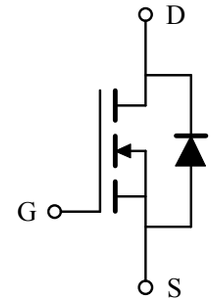
## ■Pin configuration

SOP-8(TOP VIEW)




| Pin No. | Pin name |
|---|---|
| 1 | SOURCE |
| 2 | SOURCE |
| 3 | SOURCE |
| 4 | GATE |
| 5 | DRAIN |
| 6 | DRAIN |
| 7 | DRAIN |
| 8 | DRAIN |

## ■Circuit

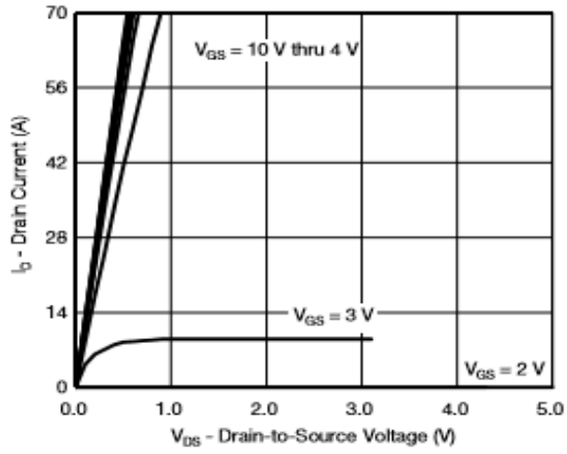


## ■Electrical characteristics

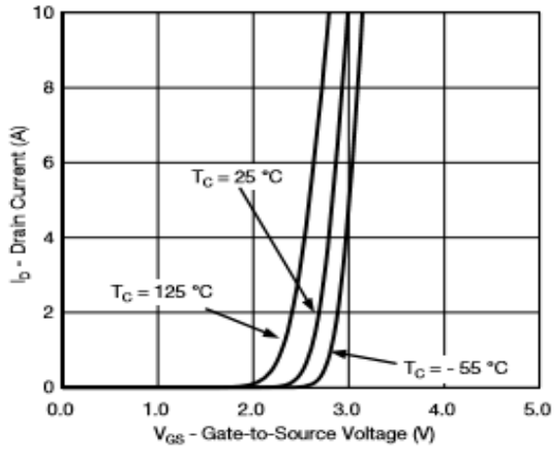
Ta=25°C. Unless otherwise noted.

| Parameter | Symbol | Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| STATIC PARAMETERS | | | | | | |
| Drain-source breakdown voltage | BVdss | Id=250μA, Vgs=0V | 100 | | | V |
| Zero gate voltage drain current | Idss | Vds=80V, Vgs=0V | | | 1 | μA |
| | | Vds=80V, Vgs=0V, Ta=85°C | | | 10 | |
| Gate-body leakage current | Igss | Vds=0V, Vgs=±20V | | | ±100 | nA |
| Gate threshold voltage | Vgs(th) | Vds=Vgs, Id=250μA | 1.2 | | 2.5 | V |
| On state drain current | Id(on) | Vgs=10V, Vds≥5V | 30 | | | A |
| Static drain-source on-resistance | Rds(on) | Vgs=10V, Id=15A | | 7.6 | 9.2 | mΩ |
| | | Vgs=4.5V, Id=10A | | 11.0 | 13.0 | |
| Forward transconductance | Gfs | Vds=15V, Id=15A | | 54 | | S |
| Diode forward voltage | Vsd | Is=5A, Vgs=0V | | 0.8 | 1.3 | V |
| Max. body-diode continuous current | Is | | | | 5.4 | A |
| DYNAMIC PARAMETERS | | | | | | |
| Input capacitance | Ciss | Vgs=0V, Vds=50V, f=1MHz | | 1950 | | pF |
| Output capacitance | Coss | | | 700 | | pF |
| Reverse transfer capacitance | Crss | | | 65 | | pF |
| SWITCHING PARAMETERS | | | | | | |
| Total gate charge | Qg | Vds=50V, Vgs=4.5V Id≡10A | | 20 | 40 | nC |
| Gate-source charge | Qgs | | | 6 | | nC |
| Gate-drain charge | Qgd | | | 9 | | nC |
| Turn-on delay time | td(on) | Vgs=10V, Vds=50V RL=5Ω, Id≡10A Rgen=1.0Ω | | 12 | 25 | ns |
| Turn-on rise time | tr | | | 10 | 20 | ns |
| Turn-off delay time | td(off) | | | 35 | 70 | ns |
| Turn-off fall time | tf | | | 10 | 20 | ns |

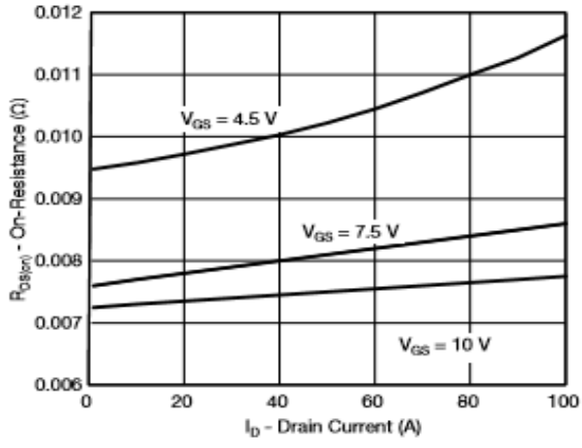
## ■Typical electrical and thermal characteristics



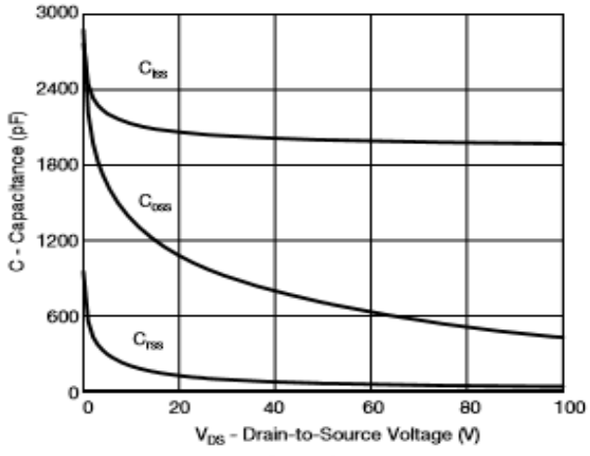

**Output Characteristics**



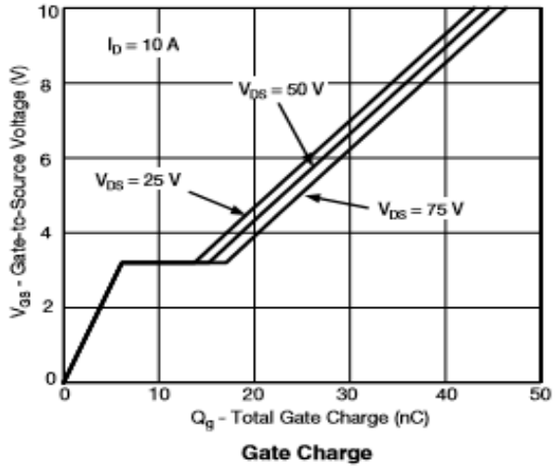

**Transfer Characteristics**



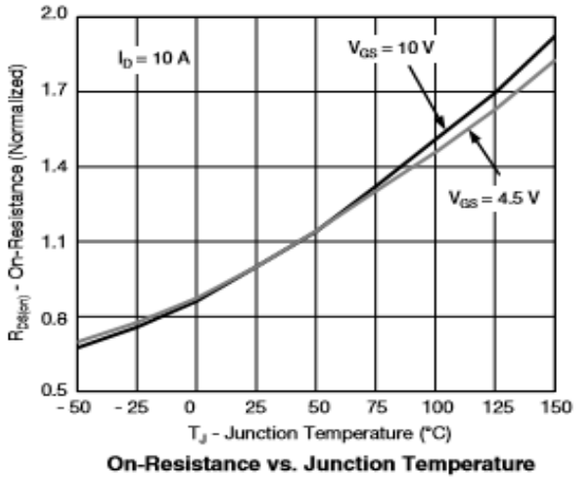

**On-Resistance vs. Drain Current**



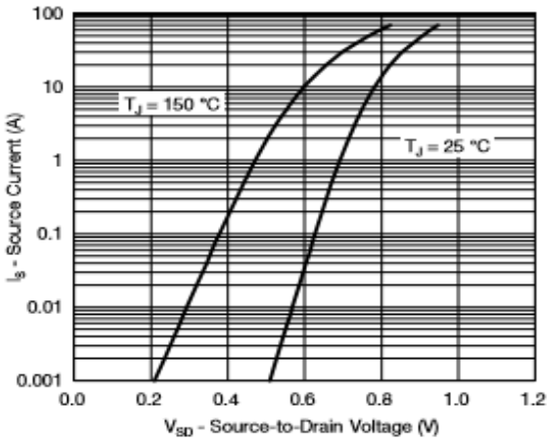

**Capacitance**



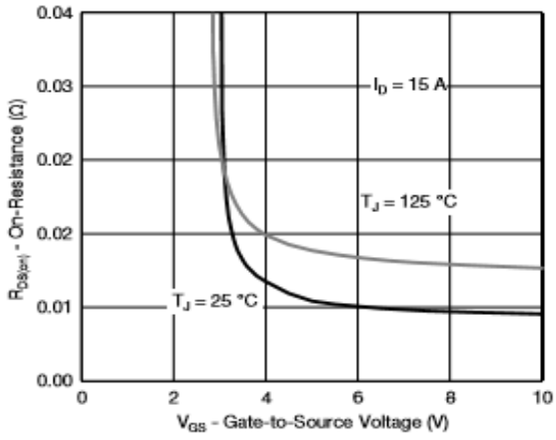

**Gate Charge**



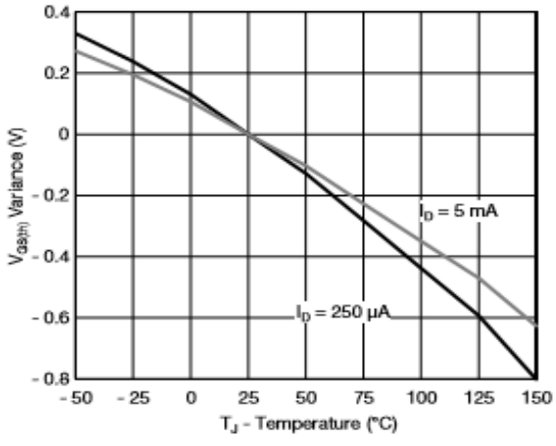

**On-Resistance vs. Junction Temperature**



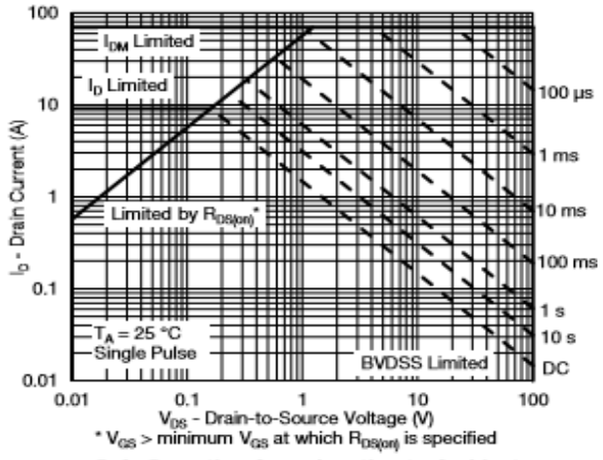

**Source-Drain Diode Forward Voltage**



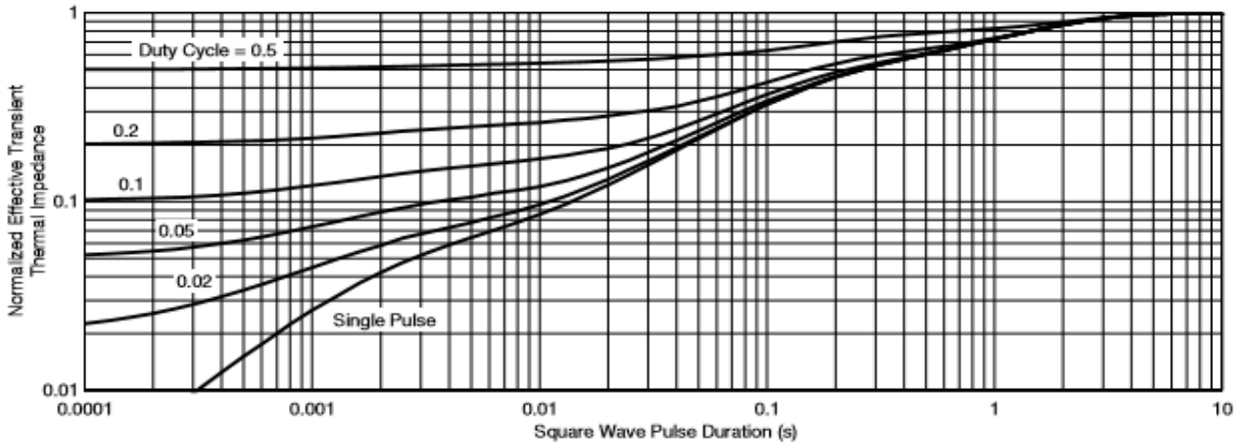

**On-Resistance vs. Gate-to-Source Voltage**




**Threshold Voltage**



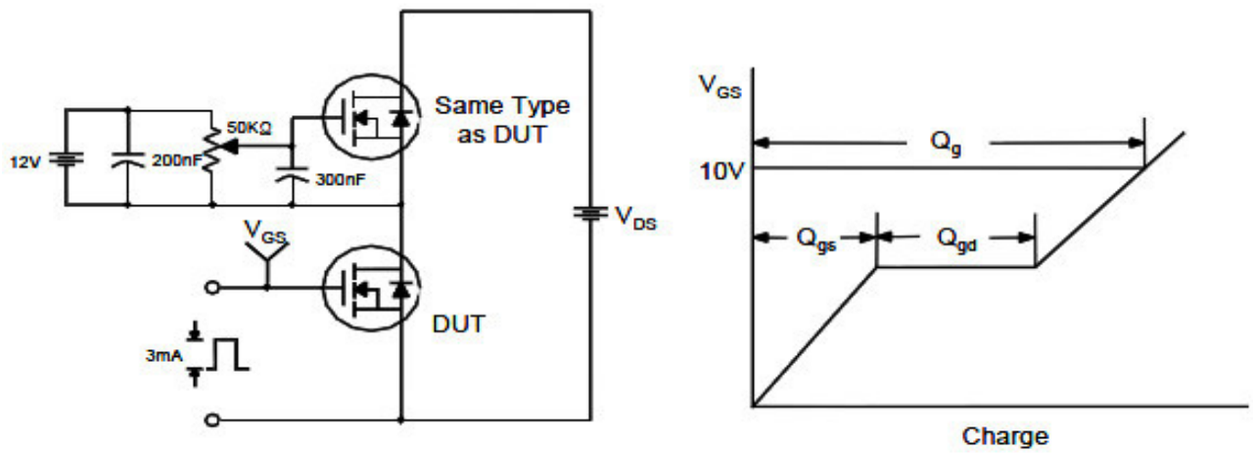

**Safe Operating Area, Junction-to-Ambient**



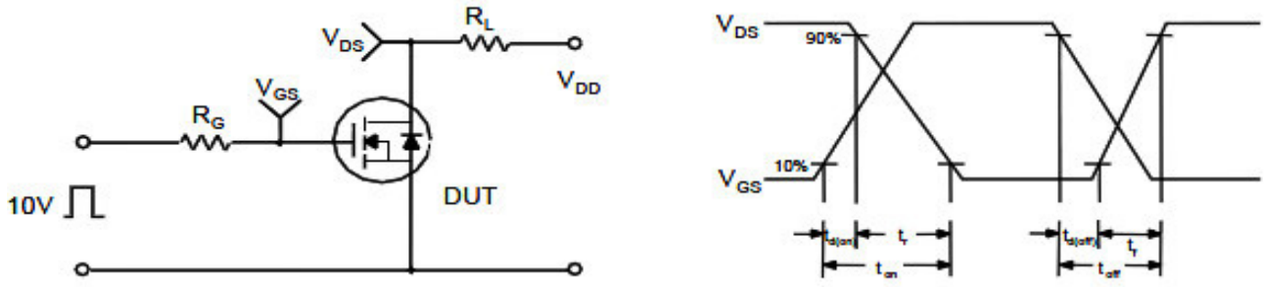

**Normalized Thermal Transient Impedance, Junction-to-Foot**

## ■Test circuit and waveform

Gate Charge Test Circuit & Waveform




Resistive Switching Test Circuit & Waveforms




Unclamped Inductive Switching Test Circuit & Waveforms