# Dual N-channel MOSFET

## ELM56800EA-S

## ■General description

ELM56800EA-S uses advanced trench technology to provide excellent Rds(on), low gate charge and low gate resistance.

## ■Features

- Vds=30V
- Id=3.6A
- Rds(on) = 70mΩ (Vgs=10V)
- Rds(on) = 78mΩ (Vgs=4.5V)
- Rds(on) = 95mΩ (Vgs=2.5V)

## ■Maximum absolute ratings

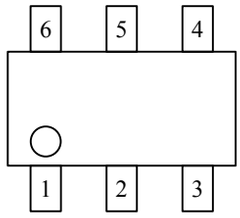
| Parameter | | Symbol | Limit | Unit |
|---|---|---|---|---|
| Drain-source voltage | | Vds | 30 | V |
| Gate-source voltage | | Vgs | ±12 | V |
| Continuous drain current(Tj=150°C) | Ta=25°C | Id | 3.6 | A |
| | Ta=70°C | | 2.2 | |
| Pulsed drain current | | Idm | 20 | A |
| Power dissipation | Ta=25°C | Pd | 2.0 | W |
| | Ta=70°C | | 1.3 | |
| Junction and storage temperature range | | Tj, Tstg | -55 to 150 | °C |

## ■Thermal characteristics

| Parameter | Symbol | Typ. | Max. | Unit | Note |
|---|---|---|---|---|---|
| Maximum junction-to-ambient | Rθja | | 120 | °C/W | |

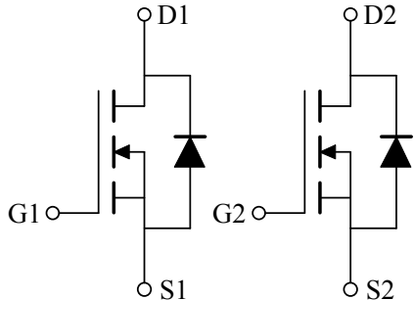
## ■Pin configuration

SOT-26(TOP VIEW)




| Pin No. | Pin name |
|---|---|
| 1 | GATE1 |
| 2 | SOURCE2 |
| 3 | GATE2 |
| 4 | DRAIN2 |
| 5 | SOURCE1 |
| 6 | DRAIN1 |

## ■Circuit

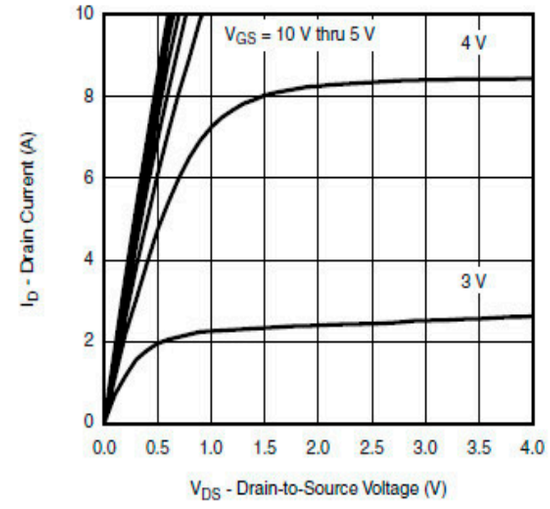


## ■Electrical characteristics

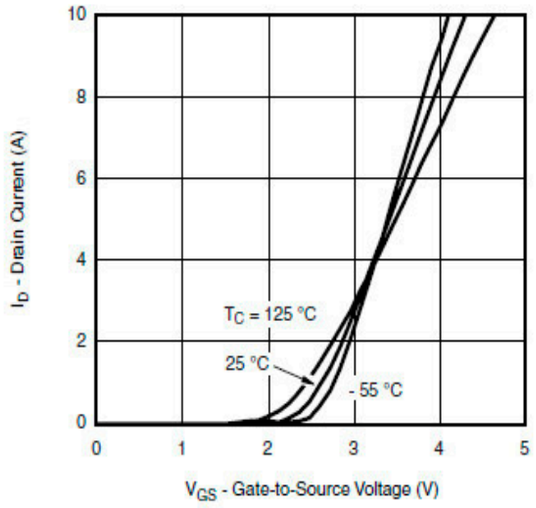
Ta=25°C

| Parameter | Symbol | Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| STATIC PARAMETERS | | | | | | |
| Drain-source breakdown voltage | BVdss | Id=250μA, Vgs=0V | 30 | | | V |
| Zero gate voltage drain current | Idss | Vds=24V, Vgs=0V | | | 1 | μA |
| | | Vds=24V, Vgs=0V, Tj=85°C | | | 30 | |
| Gate-body leakage current | Igss | Vds=0V, Vgs=±12V | | | ±100 | nA |
| Gate threshold voltage | Vgs(th) | Vds=Vgs, Id=250μA | 0.4 | | 1.2 | V |
| On state drain current | Id(on) | Vgs=4.5V, Vds=5V | 30 | | | A |
| Static drain-source on-resistance | Rds(on) | Vgs=10V, Id=3.6A | | 56 | 70 | mΩ |
| | | Vgs=4.5V, Id=3.0A | | 62 | 78 | |
| | | Vgs=2.5V, Id=2.2A | | 78 | 95 | |
| Forward transconductance | Gfs | Vds=10V, Id=1.6A | | 20 | | S |
| Diode forward voltage | Vsd | Is=1.7A, Vgs=0V | | 0.8 | 1.2 | V |
| Max. body-diode continuous current | Is | | | | 1.7 | A |
| DYNAMIC PARAMETERS | | | | | | |
| Input capacitance | Ciss | Vgs=0V, Vds=15V, f=1MHz | | 280 | | pF |
| Output capacitance | Coss | | | 40 | | pF |
| Reverse transfer capacitance | Crss | | | 20 | | pF |
| SWITCHING PARAMETERS | | | | | | |
| Total gate charge | Qg | Vgs=4.5V, Vds=15V, Id=3.6A | | 2.3 | 3.0 | nC |
| Gate-source charge | Qgs | | | 1.0 | | nC |
| Gate-drain charge | Qgd | | | 0.6 | | nC |
| Turn-on delay time | td(on) | Vgs=10V, Vds=15V, Id=1A RL=15Ω, Rgen=6Ω | | 10 | 15 | ns |
| Turn-on rise time | tr | | | 12 | 20 | ns |
| Turn-off delay time | td(off) | | | 15 | 25 | ns |
| Turn-off fall time | tf | | | 10 | 15 | ns |

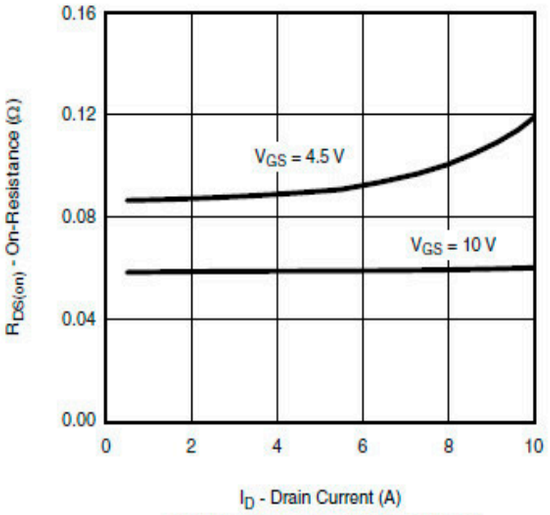
## ■Typical electrical and thermal characteristics



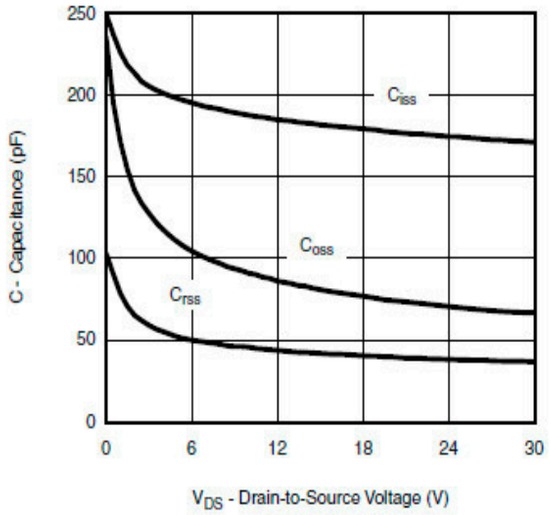

**Output Characteristics**



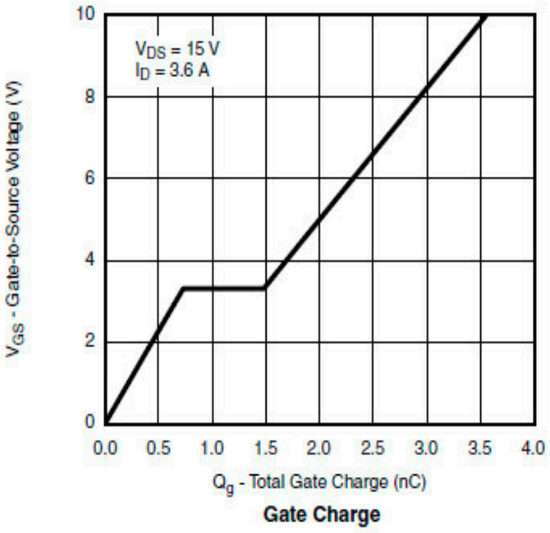

**Transfer Characteristics**



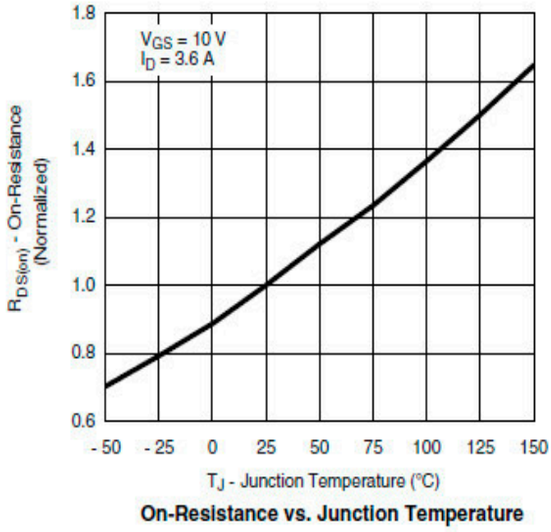

**On-Resistance vs. Drain Current**



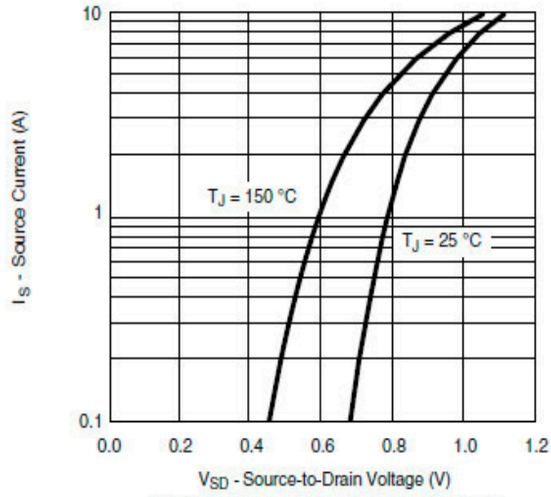

**Capacitance**



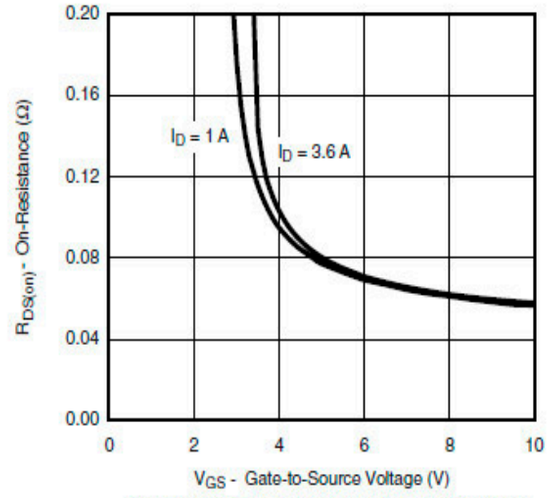

**Gate Charge**



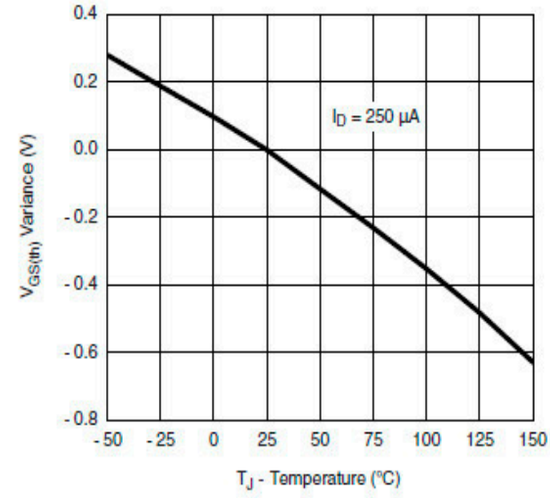

**On-Resistance vs. Junction Temperature**



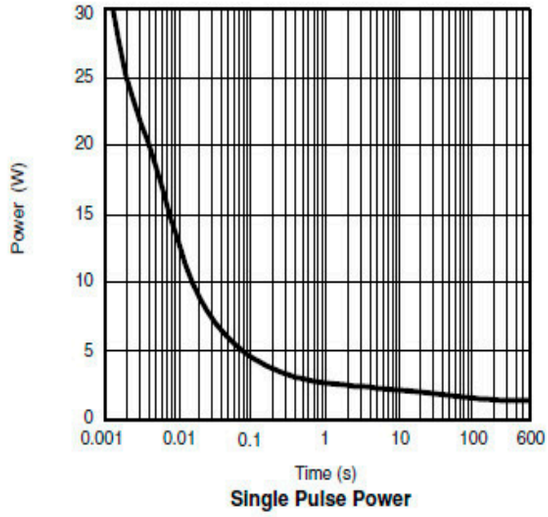

**Source-Drain Diode Forward Voltage**



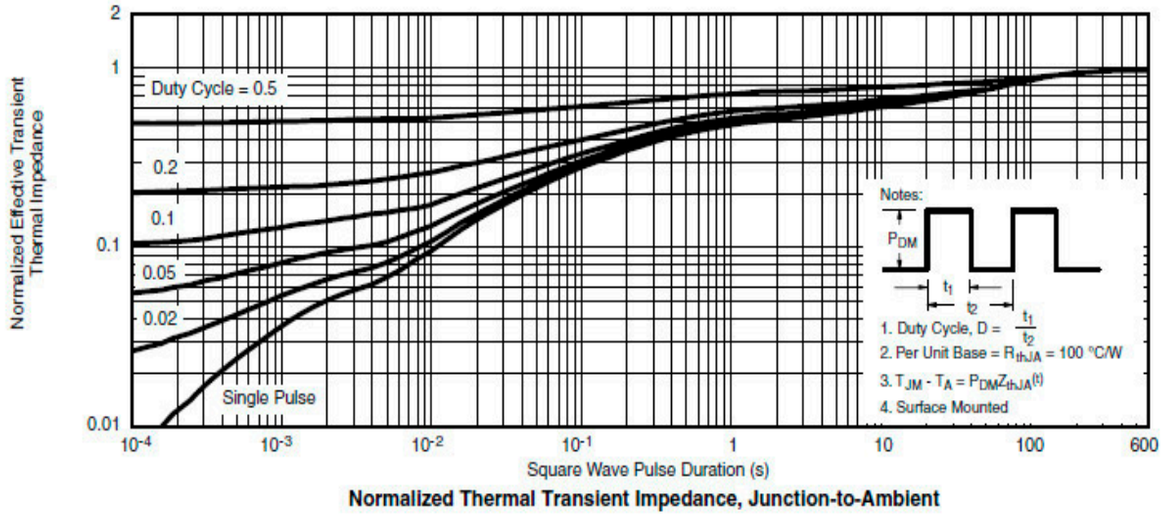

**On-Resistance vs. Gate-to-Source Voltage**




**Threshold Voltage**



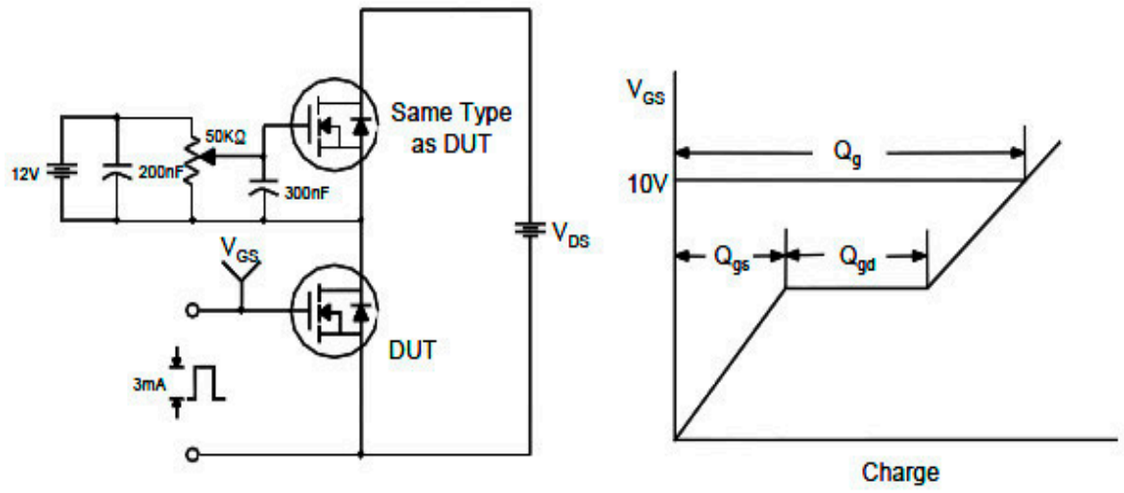

**Single Pulse Power**



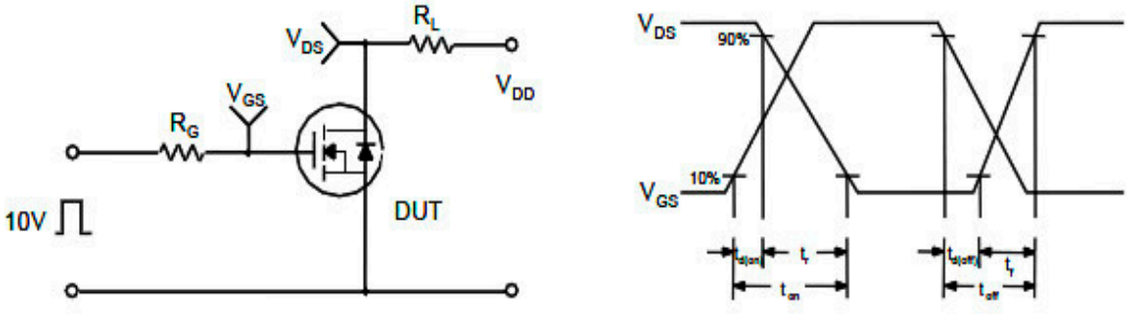

**Normalized Thermal Transient Impedance, Junction-to-Ambient**

## ■Test circuit and waveform

Gate Charge Test Circuit & Waveform




Resistive Switching Test Circuit & Waveforms




Unclamped Inductive Switching Test Circuit & Waveforms