

# Dual N-channel MOSFET (common drain)

## ELM582050A-S

<http://www.elm-tech.com>

### ■General description

ELM582050A-S uses advanced trench technology to provide excellent  $R_{ds(on)}$ , low gate charge and operation with gate voltages as low as 1.8V.

### ■Features

- $V_{ds}=20V$
- $I_d=5A$
- $R_{ds(on)} = 29m\Omega$  ( $V_{gs}=4.5V$ )
- $R_{ds(on)} = 37m\Omega$  ( $V_{gs}=2.5V$ )
- $R_{ds(on)} = 50m\Omega$  ( $V_{gs}=1.8V$ )

### ■Maximum absolute ratings

$T_a=25^\circ C$ . Unless otherwise noted.

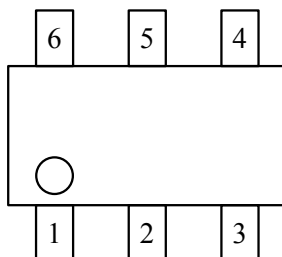
| Parameter                                     |                  | Symbol    | Limit       | Unit       |
|-----------------------------------------------|------------------|-----------|-------------|------------|
| Drain-source voltage                          |                  | $V_{ds}$  | 20          | V          |
| Gate-source voltage                           |                  | $V_{gs}$  | $\pm 12$    | V          |
| Continuous drain current( $T_j=150^\circ C$ ) | $T_a=25^\circ C$ | $I_d$     | 5.0         | A          |
|                                               | $T_a=70^\circ C$ |           | 3.2         |            |
| Pulsed drain current                          |                  | $I_{dm}$  | 20          | A          |
| Power dissipation                             | $T_c=25^\circ C$ | $P_d$     | 2.0         | W          |
|                                               | $T_c=70^\circ C$ |           | 1.3         |            |
| Operating junction temperature                |                  | $T_j$     | 150         | $^\circ C$ |
| Storage temperature range                     |                  | $T_{stg}$ | - 55 to 150 | $^\circ C$ |

### ■Thermal characteristics

| Parameter                              | Symbol         | Typ. | Max. | Unit         |
|----------------------------------------|----------------|------|------|--------------|
| Thermal resistance junction-to-ambient | $R\theta_{ja}$ |      | 120  | $^\circ C/W$ |

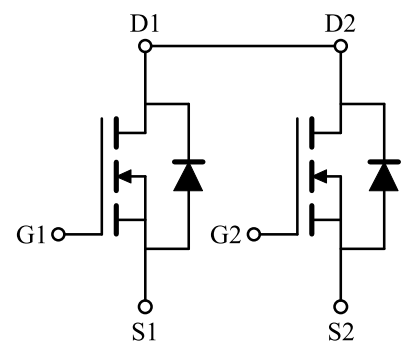
### ■Pin configuration

SOT-26(TOP VIEW)



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

### ■Circuit



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## ■Electrical characteristics

Ta=25°C. Unless otherwise noted.

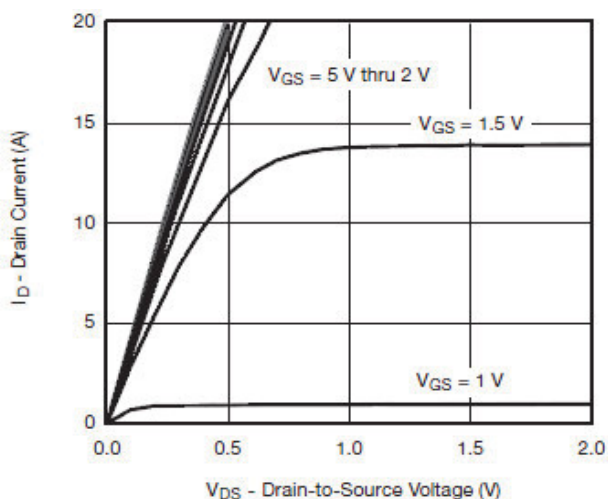
| Parameter                          | Symbol  | Condition                                          | Min. | Typ. | Max. | Unit |
|------------------------------------|---------|----------------------------------------------------|------|------|------|------|
| STATIC PARAMETERS                  |         |                                                    |      |      |      |      |
| Drain-source breakdown voltage     | BVdss   | Id=250μA, Vgs=0V                                   | 20   |      |      | V    |
| Zero gate voltage drain current    | Idss    | Vds=16V, Vgs=0V                                    |      |      | 1    | μA   |
|                                    |         | Ta=85°C                                            |      |      | 10   |      |
| Gate-source leakage current        | Igss    | Vds=0V, Vgs=±12V                                   |      |      | ±100 | nA   |
| Gate threshold voltage             | Vgs(th) | Vds=Vgs, Id=250μA                                  | 0.4  |      | 0.8  | V    |
| On state drain current             | Id(on)  | Vgs=4.5V, Vds≥5V                                   | 6    |      |      | A    |
|                                    |         | Vgs=2.5V, Vds≥5V                                   | 4    |      |      |      |
| Static drain-source on-resistance  | Rds(on) | Vgs=4.5V, Id=5.0A                                  |      | 25   | 29   | mΩ   |
|                                    |         | Vgs=2.5V, Id=3.2A                                  |      | 30   | 37   |      |
|                                    |         | Vgs=1.8V, Id=2.4A                                  |      | 45   | 50   |      |
| Forward transconductance           | Gfs     | Vds=5V, Id=3.6A                                    |      | 10   |      | S    |
| Diode forward voltage              | Vsd     | Is=1.6A, Vgs=0V                                    |      | 0.85 | 1.20 | V    |
| Max. body-diode continuous current | Is      |                                                    |      |      | 1.6  | A    |
| DYNAMIC PARAMETERS                 |         |                                                    |      |      |      |      |
| Input capacitance                  | Ciss    | Vgs=0V, Vds=10V, f=1MHz                            |      | 850  |      | pF   |
| Output capacitance                 | Coss    |                                                    |      | 120  |      | pF   |
| Reverse transfer capacitance       | Crss    |                                                    |      | 60   |      | pF   |
| SWITCHING PARAMETERS               |         |                                                    |      |      |      |      |
| Total gate charge                  | Qg      | Vgs=4.5V, Vds=10V, Id≐4.0A                         |      | 8.2  | 14.0 | nC   |
| Gate-source charge                 | Qgs     |                                                    |      | 1.2  |      | nC   |
| Gate-drain charge                  | Qgd     |                                                    |      | 1.0  |      | nC   |
| Turn-on delay time                 | td(on)  | Vgs=4.5V, Vds=10V<br>RL=2.2Ω, Id≐4.0A<br>Rgen=1.0Ω |      | 10   | 16   | ns   |
| Turn-on rise time                  | tr      |                                                    |      | 16   | 25   | ns   |
| Turn-off delay time                | td(off) |                                                    |      | 31   | 45   | ns   |
| Turn-off fall time                 | tf      |                                                    |      | 10   | 16   | ns   |

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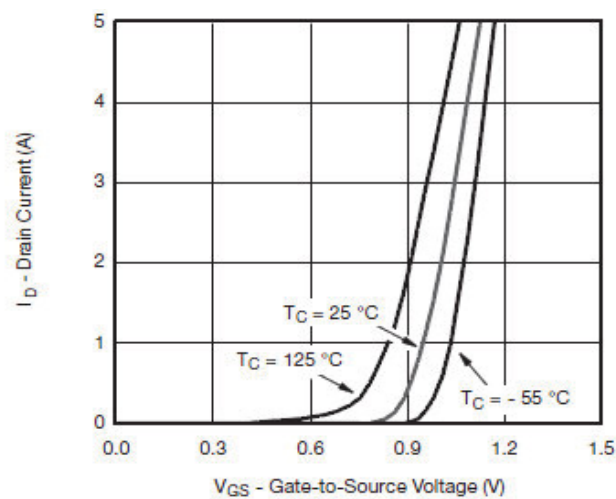
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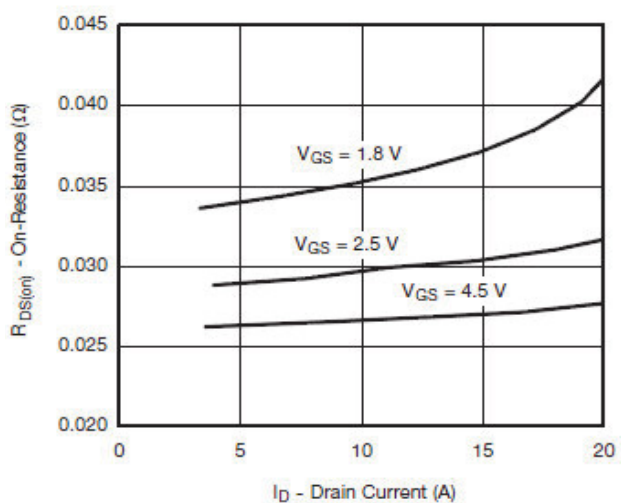
## ■ Typical electrical and thermal characteristics



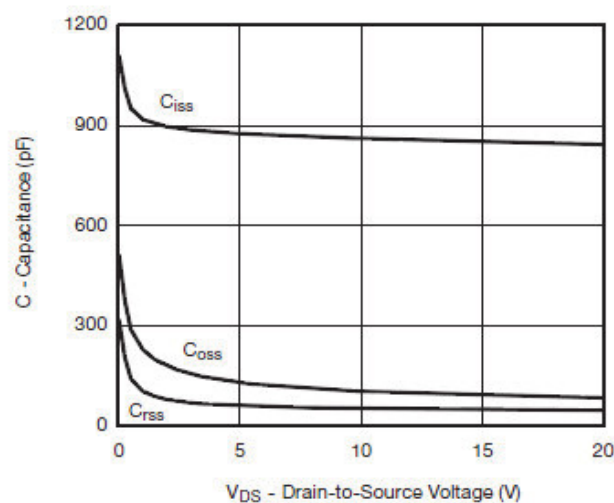
Output Characteristics



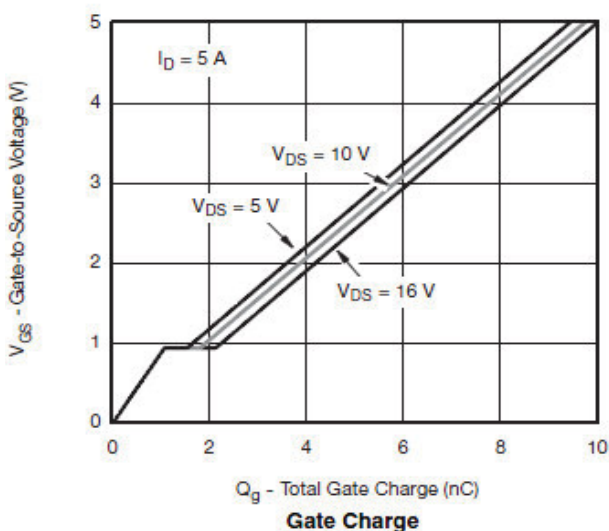
Transfer Characteristics



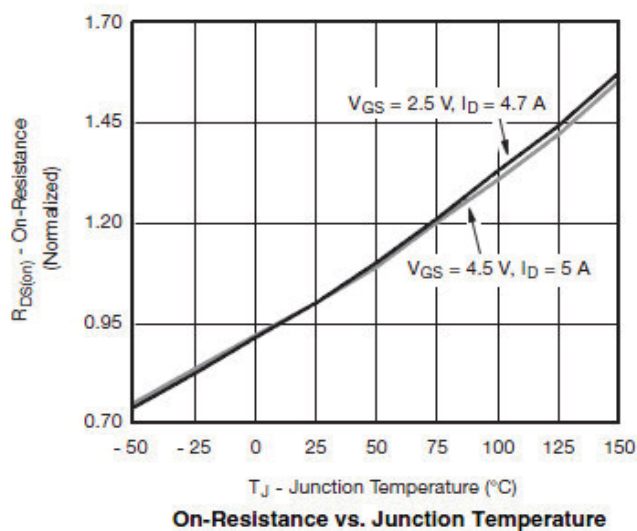
On-Resistance vs. Drain Current and Gate Voltage



Capacitance



Gate Charge

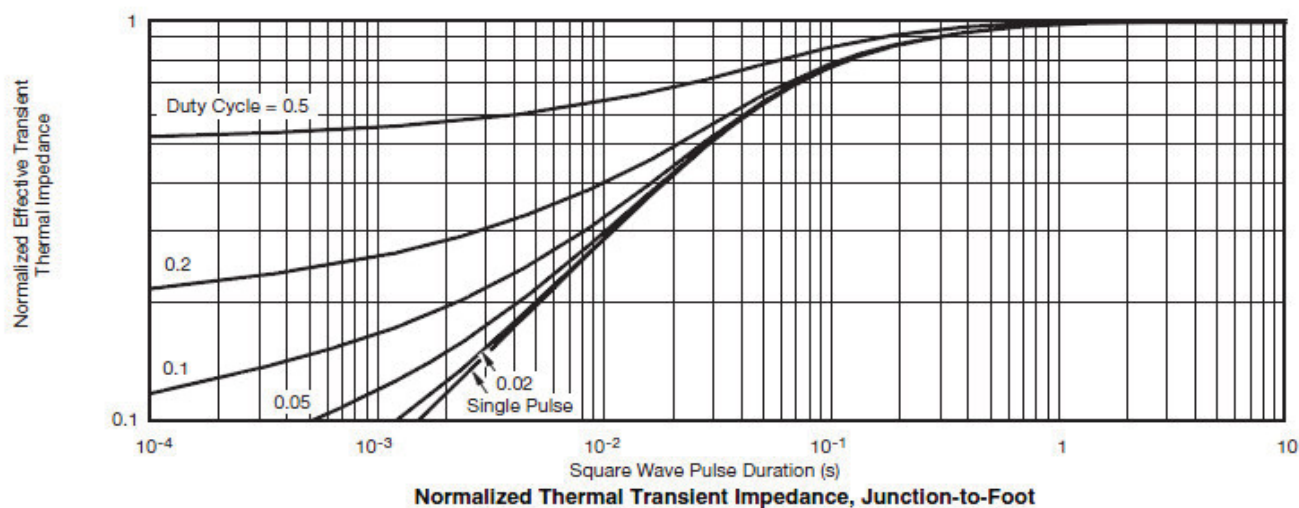
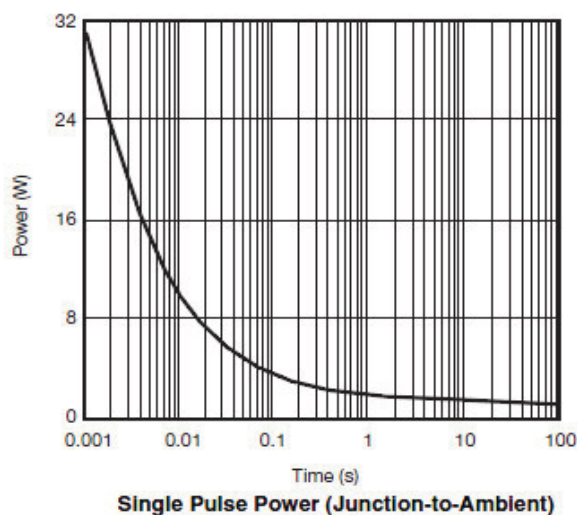
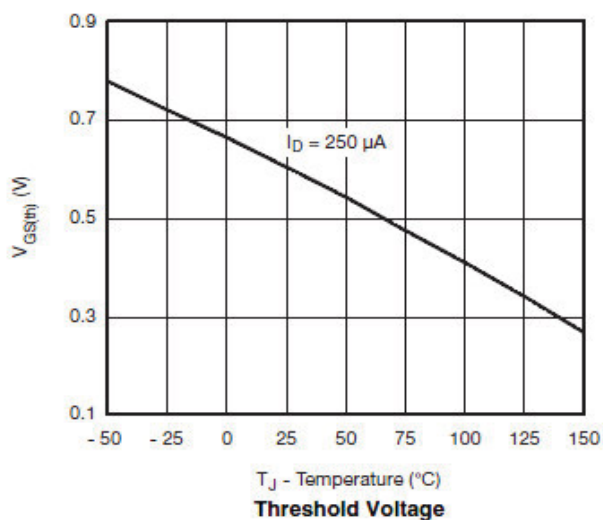
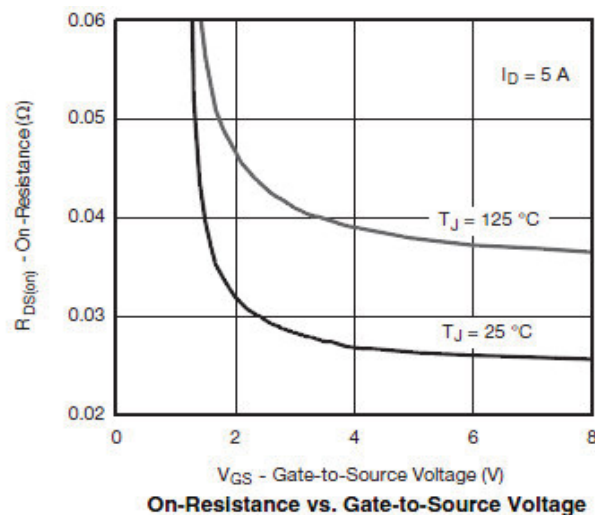
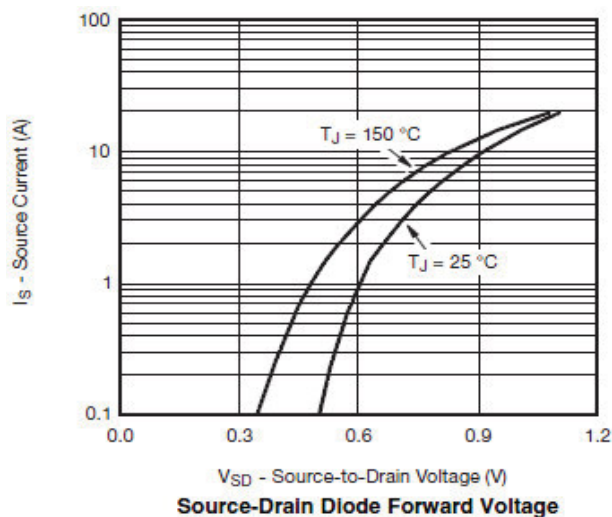


On-Resistance vs. Junction Temperature

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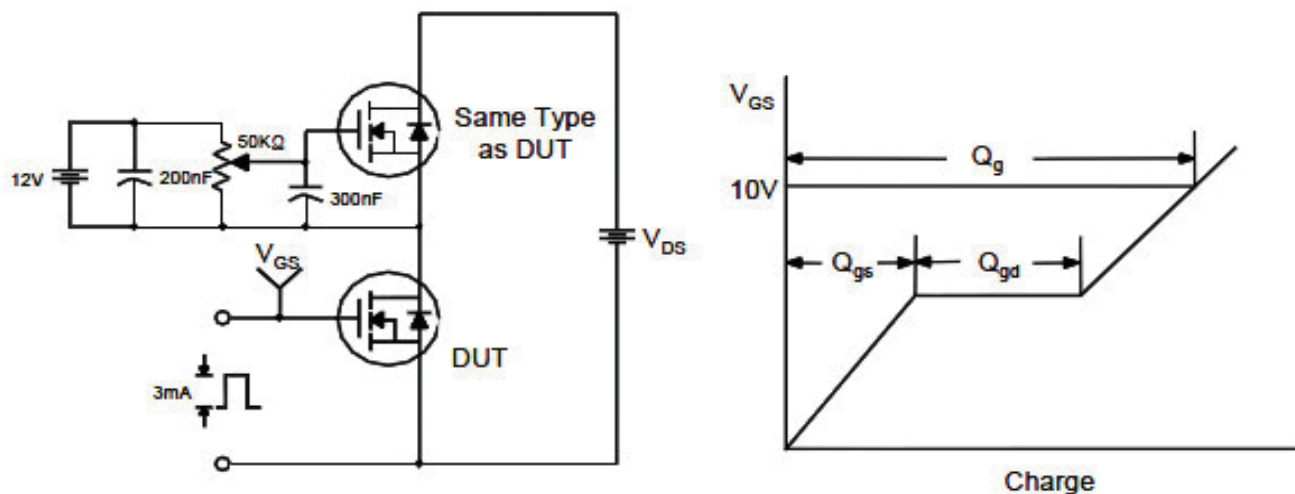
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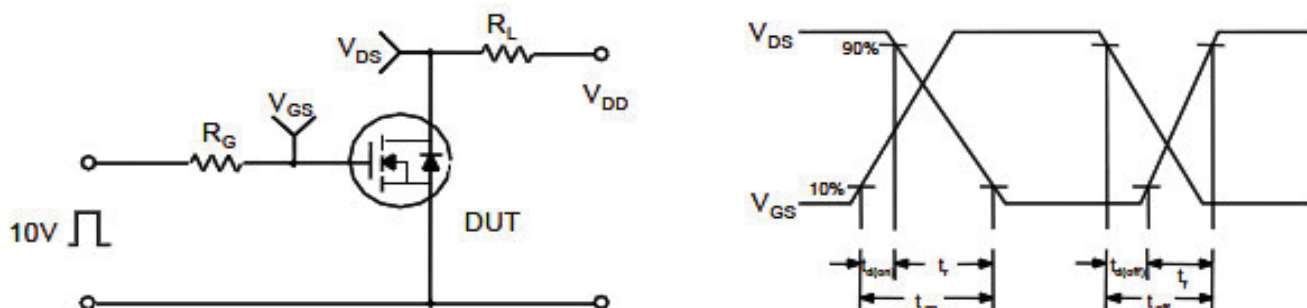
<http://www.elm-tech.com>

## ■ Test circuit and waveform

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms

