

Single P-channel MOSFET

ELM57401SA-S

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

■ General description

ELM57401SA-S uses advanced trench technology to provide excellent $R_{ds(on)}$, low gate charge and operation with gate voltages as low as 2.5V.

■ Features

- $V_{ds} = -30V$
- $I_d = -2.8A$
- $R_{ds(on)} = 115m\Omega$ ($V_{gs} = -10V$)
- $R_{ds(on)} = 150m\Omega$ ($V_{gs} = -4.5V$)
- $R_{ds(on)} = 185m\Omega$ ($V_{gs} = -2.5V$)

■ Maximum absolute ratings

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

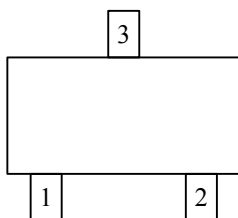
| Parameter | Symbol | Limit | Unit |
|--|-----------|--------------------|------------|
| Drain-source voltage | V_{ds} | -30 | V |
| Gate-source voltage | V_{gs} | ± 12 | V |
| Continuous drain current ($T_j = 150^\circ C$) | I_d | $T_a = 25^\circ C$ | -2.8 |
| | | $T_a = 70^\circ C$ | -2.1 |
| Pulsed drain current | I_{dm} | -8 | A |
| Power dissipation | P_d | $T_c = 25^\circ C$ | 0.35 |
| | | $T_c = 70^\circ C$ | 0.22 |
| 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 | $^\circ C/W$ |

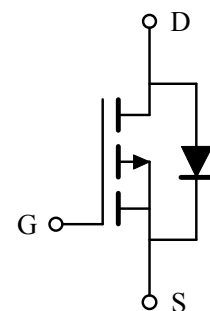
■ Pin configuration

SC-70(TOP VIEW)



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

■ Circuit



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■ Electrical characteristics

Ta=25°C. Unless otherwise noted.

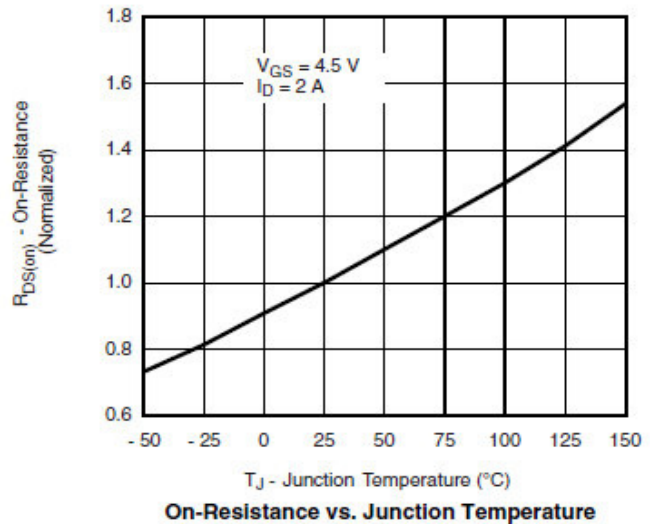
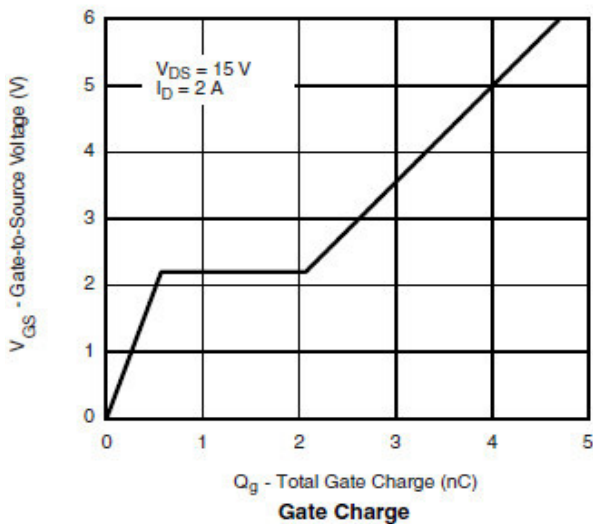
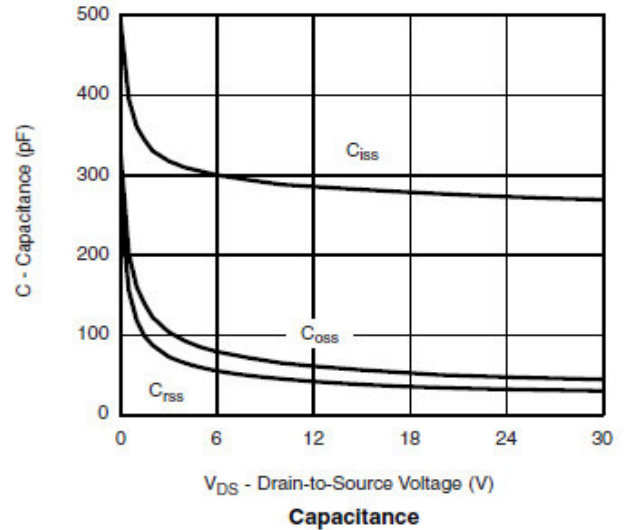
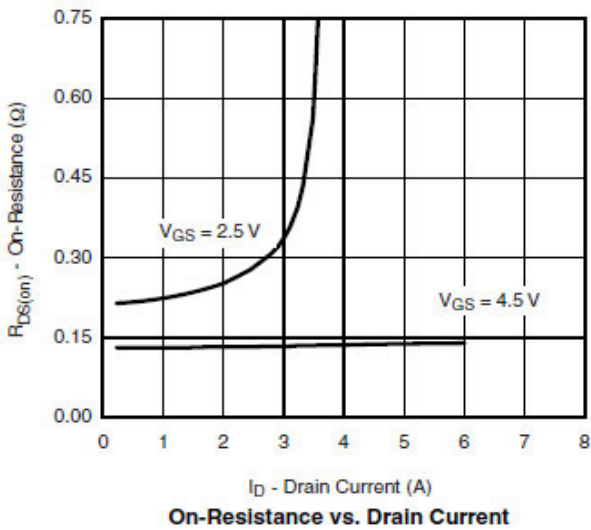
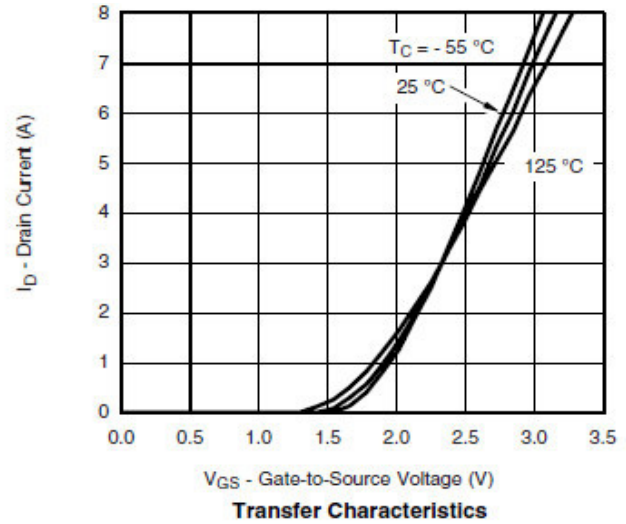
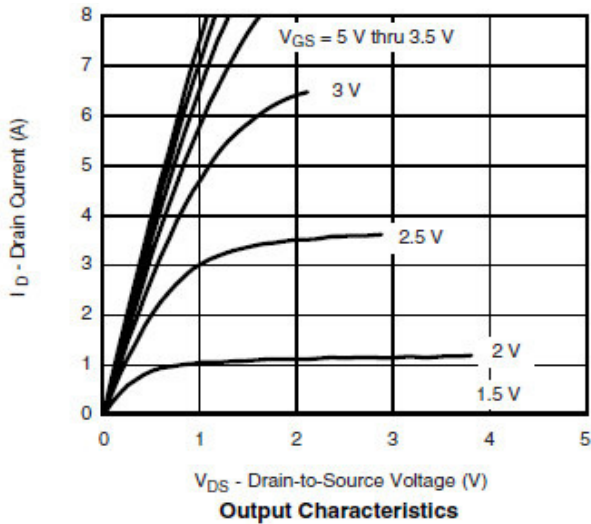
| Parameter | Symbol | Condition | Min. | Typ. | Max. | Unit |
|------------------------------------|---------|---|------|------|------|------|
| STATIC PARAMETERS | | | | | | |
| Drain-source breakdown voltage | BVdss | Vgs=0V, Id=-250μA | -30 | | | V |
| Zero gate voltage drain current | Idss | Vds=-24V, Vgs=0V | | | -1 | μA |
| | | Vds=-24V, Vgs=0V, Ta=85°C | | | -30 | |
| Gate-body leakage current | Igss | Vds=0V, Vgs=±12V | | | ±100 | nA |
| Gate threshold voltage | Vgs(th) | Vds=Vgs, Id=-250μA | -0.6 | | -1.1 | V |
| On state drain current | Id(on) | Vgs=-10V, Vds≥-5V | -10 | | | A |
| Static drain-source on-resistance | Rds(on) | Vgs=-10V, Id=-2.8A | | 105 | 115 | mΩ |
| | | Vgs=-4.5V, Id=-2.5A | | 135 | 150 | |
| | | Vgs=-2.5V, Id=-1.5A | | 160 | 185 | |
| Forward transconductance | Gfs | Vds=-5V, Id=-4.0A | | 10 | | S |
| Diode forward voltage | Vsd | Is=-1.7A, Vgs=0V | | -0.7 | -1.3 | V |
| Max. body-diode continuous current | Is | | | | -1.4 | A |
| DYNAMIC PARAMETERS | | | | | | |
| Input capacitance | Ciss | Vgs=0V, Vds=-15V, f=1MHz | | 230 | | pF |
| Output capacitance | Coss | | | 40 | | pF |
| Reverse transfer capacitance | Crss | | | 25 | | pF |
| SWITCHING PARAMETERS | | | | | | |
| Total gate charge | Qg | Vgs=-4.5V, Vds=-15V Id=-2.0A | | 4.0 | 6.0 | nC |
| Gate-source charge | Qgs | | | 0.6 | | nC |
| Gate-drain charge | Qgd | | | 1.5 | | nC |
| Turn-on delay time | td(on) | Vgs=-10V, Vds=-15V RL=15Ω, Id=-1.0A Rgen=6.0Ω | | 5 | 10 | ns |
| Turn-on rise time | tr | | | 8 | 15 | ns |
| Turn-off delay time | td(off) | | | 15 | 30 | ns |
| Turn-off fall time | tf | | | 15 | 30 | ns |

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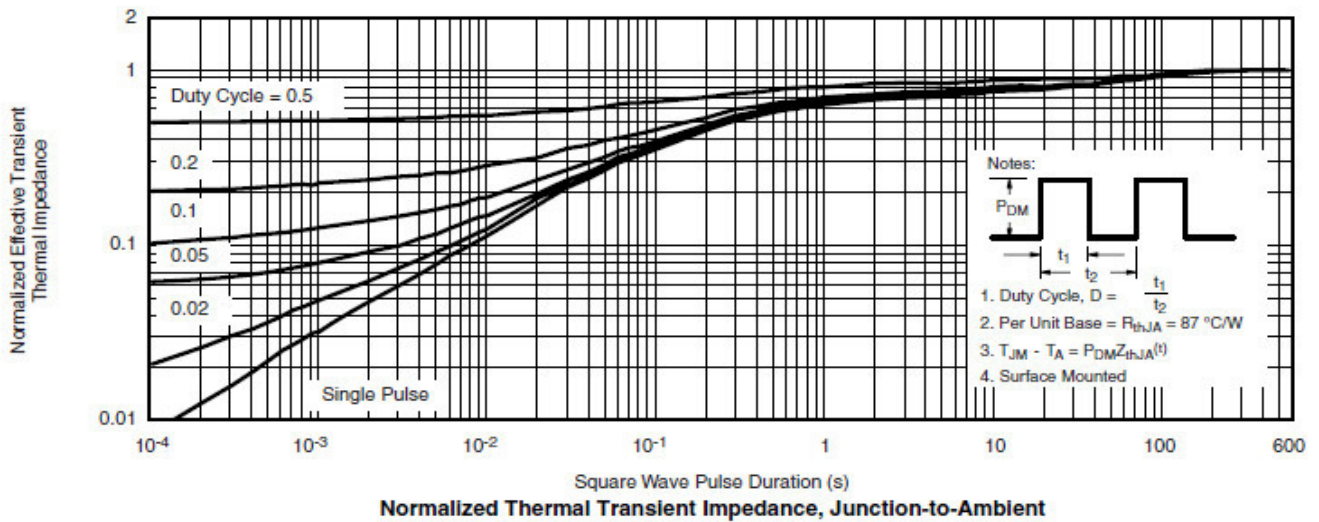
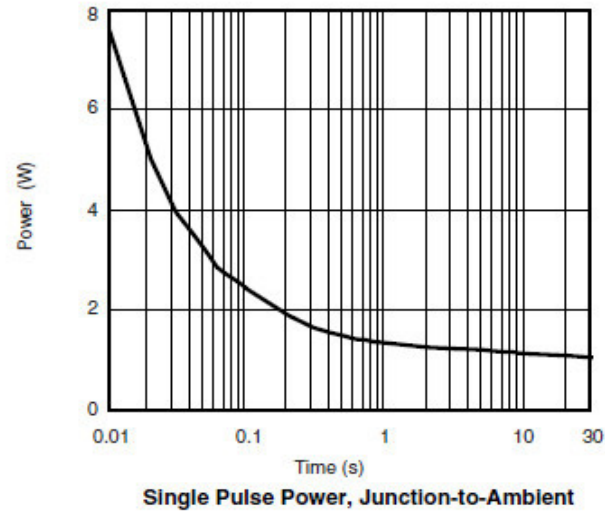
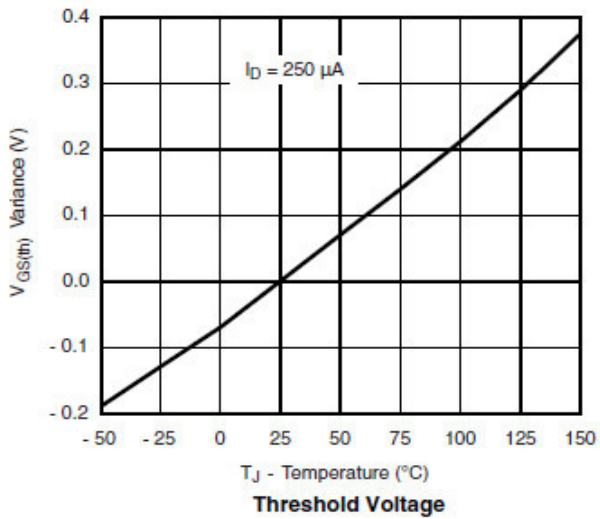
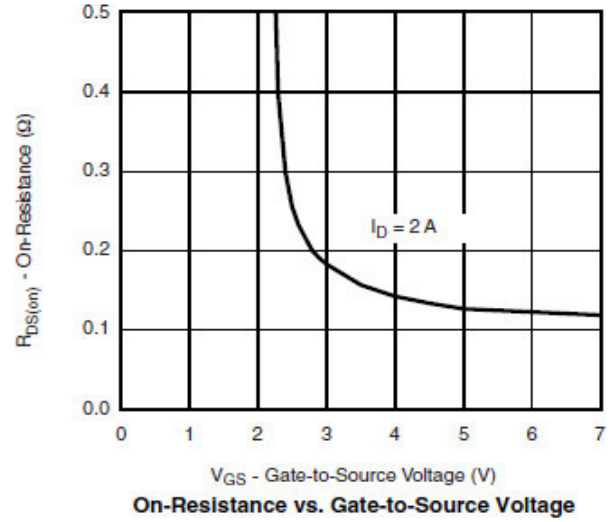
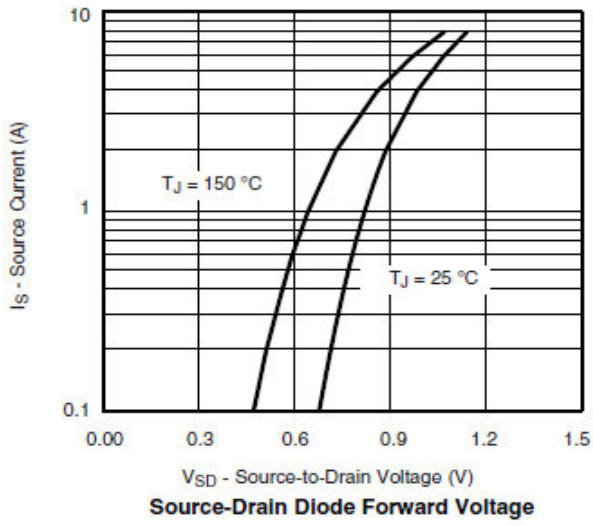
■ Typical electrical and thermal characteristics



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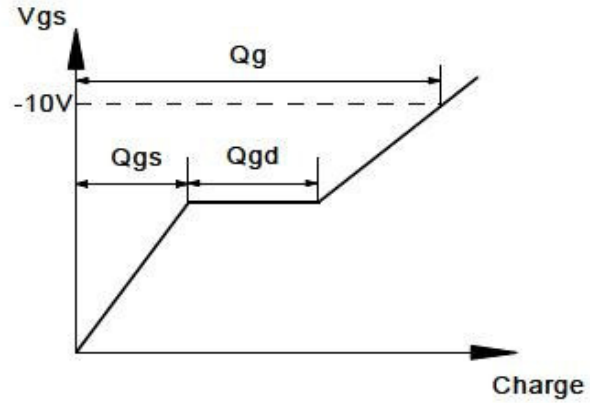
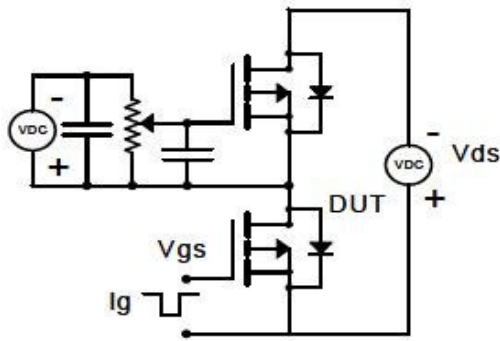
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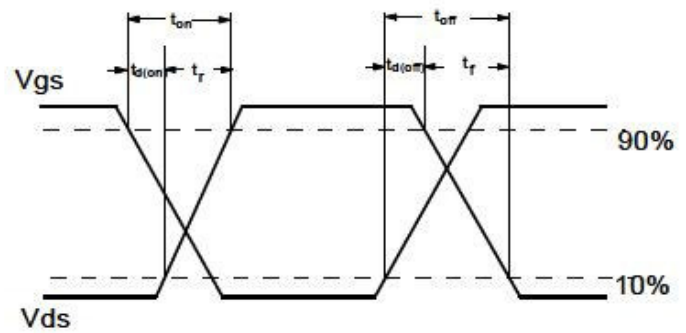
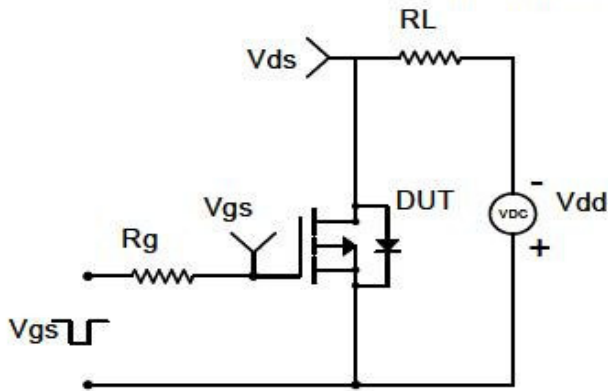
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■ Test circuit and waveform

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

