

Single N-channel MOSFET

ELM59972SA-S

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

■ General description

ELM59972SA-S uses advanced trench technology to provide excellent $R_{ds(on)}$, low gate charge and low gate threshold voltage.

■ Features

- $V_{ds}=60V$
- $I_d=35A$
- $R_{ds(on)} = 15m\Omega$ ($V_{gs}=10V$)
- $R_{ds(on)} = 18m\Omega$ ($V_{gs}=4.5V$)

■ Maximum absolute ratings

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

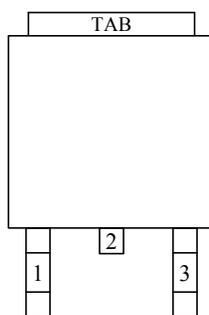
Parameter	Symbol	Limit	Unit	
Drain-source voltage	V_{ds}	60	V	
Gate-source voltage	V_{gs}	± 20	V	
Continuous drain current($T_j=150^\circ C$)	Id	$T_a=25^\circ C$	35	A
		$T_a=70^\circ C$	20	
Pulsed drain current	I_{dm}	75	A	
Power dissipation	Pd	$T_c=25^\circ C$	40	W
		$T_c=70^\circ C$	15	
Operating junction 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	$R_{\theta ja}$		62.5	$^\circ C/W$

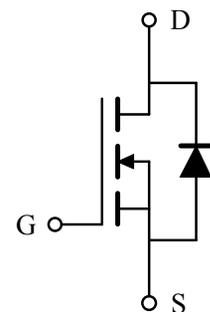
■ Pin configuration

TO-252-3(TOP VIEW)



Pin No.	Pin name
1	GATE
2	DRAIN
3	SOURCE

■ Circuit



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■ Electrical characteristics

Ta=25°C. Unless otherwise noted.

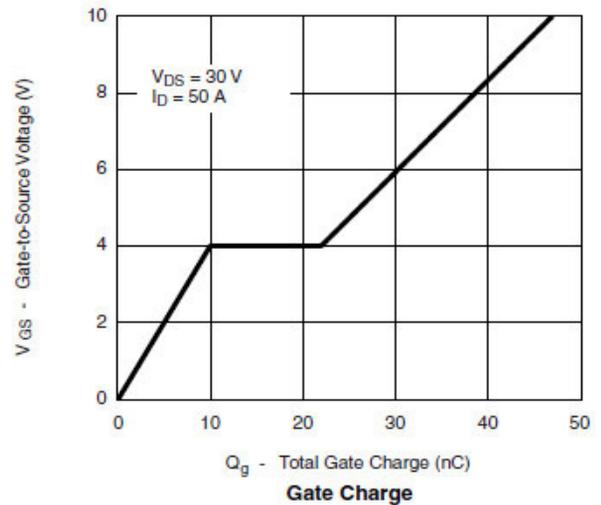
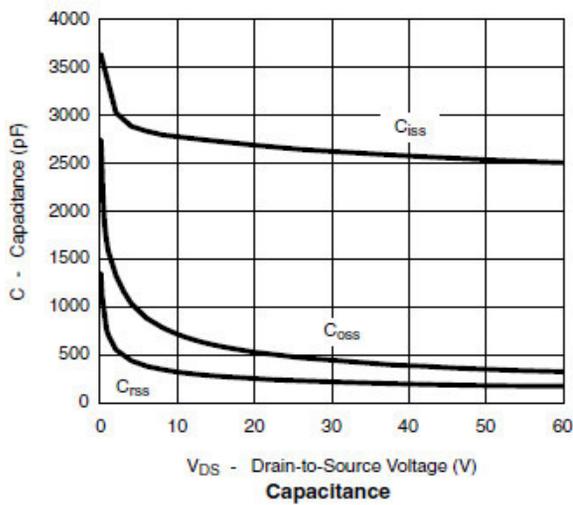
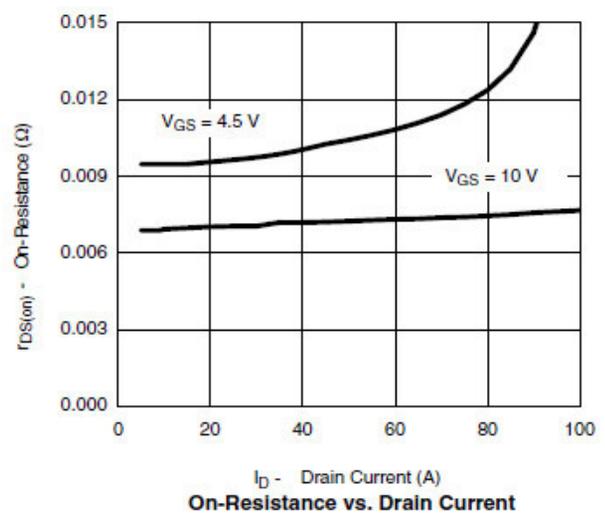
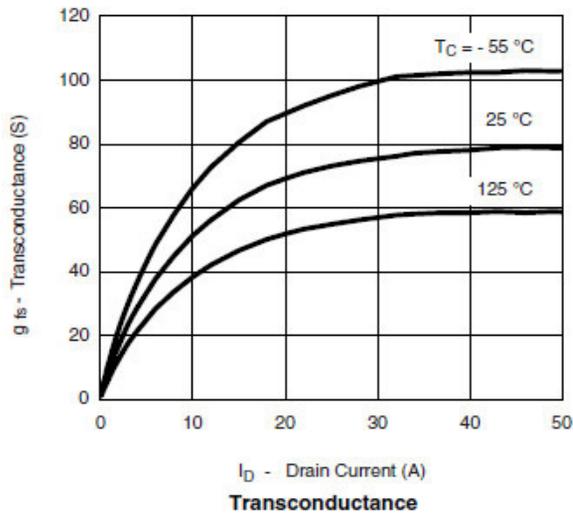
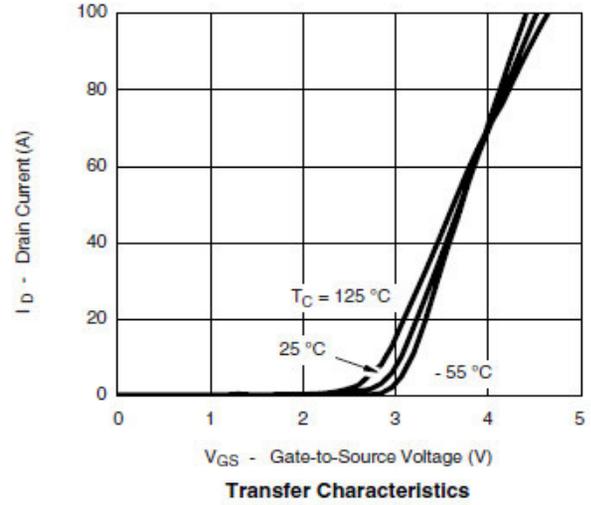
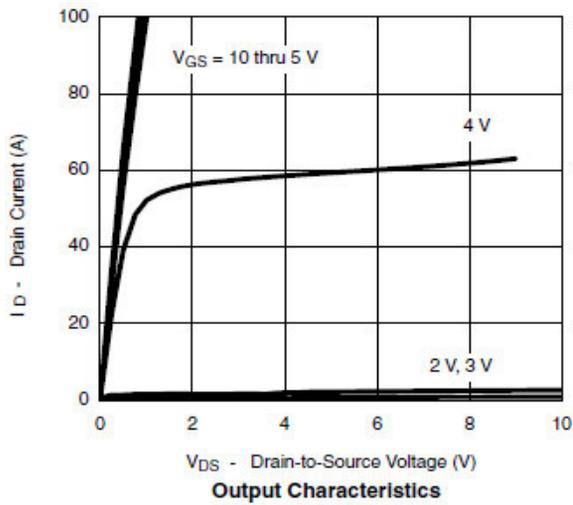
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
STATIC PARAMETERS						
Drain-source breakdown voltage	BVdss	Id=250μA, Vgs=0V	60			V
Zero gate voltage drain current	Idss	Vds=48V, Vgs=0V Ta=85°C			1	μA
					5	
Gate-body leakage current	Igss	Vds=0V, Vgs=±20V			±100	nA
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=250μA	1.0		2.0	V
On state drain current	Id(on)	Vgs=10V, Vds≥5V	35			A
Static drain-source on-resistance	Rds(on)	Vgs=10V, Id=35A		12	15	mΩ
		Vgs=4.5V, Id=25A		13	18	
Forward transconductance	Gfs	Vds=15V, Id=5.3A		24		S
Diode forward voltage	Vsd	Is=2.0A, Vgs=0V		0.85	1.30	V
Max. body-diode continuous current	Is				18	A
DYNAMIC PARAMETERS						
Input capacitance	Ciss	Vgs=0V, Vds=30V, f=1MHz		3200		pF
Output capacitance	Coss			300		pF
Reverse transfer capacitance	Crss			250		pF
SWITCHING PARAMETERS						
Total gate charge	Qg	Vgs=10V, Vds=30V Id≐9.8A		35	65	nC
Gate-source charge	Qgs			7		nC
Gate-drain charge	Qgd			8		nC
Turn-on delay time	td(on)	Vgs=10V, Vds=30V RL=30Ω, Id≐1A Rgen=6Ω		12	20	ns
Turn-on rise time	tr			12	20	ns
Turn-off delay time	td(off)			60	90	ns
Turn-off fall time	tf			20	30	ns

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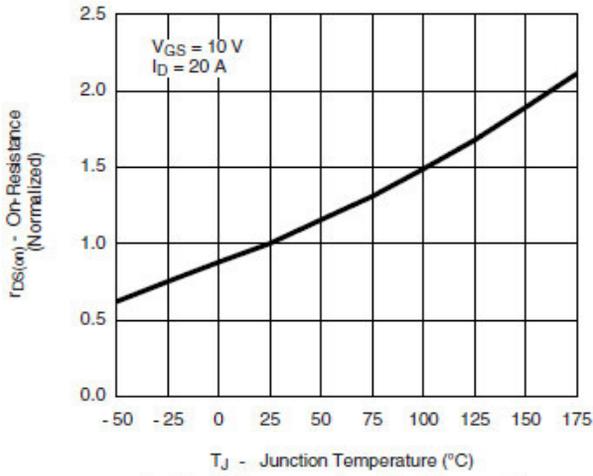
■ Typical electrical and thermal characteristics



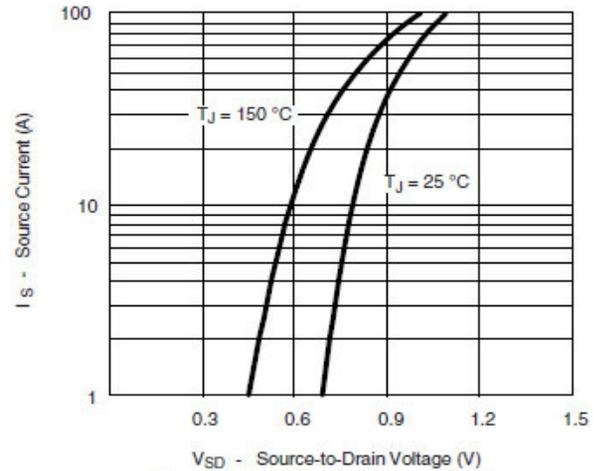
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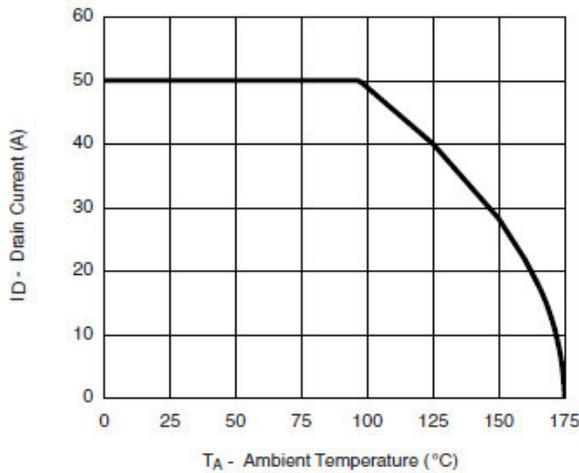
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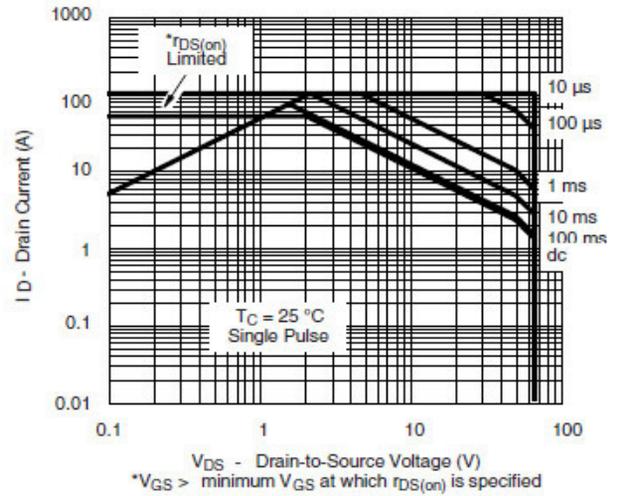
On-Resistance vs. Junction Temperature



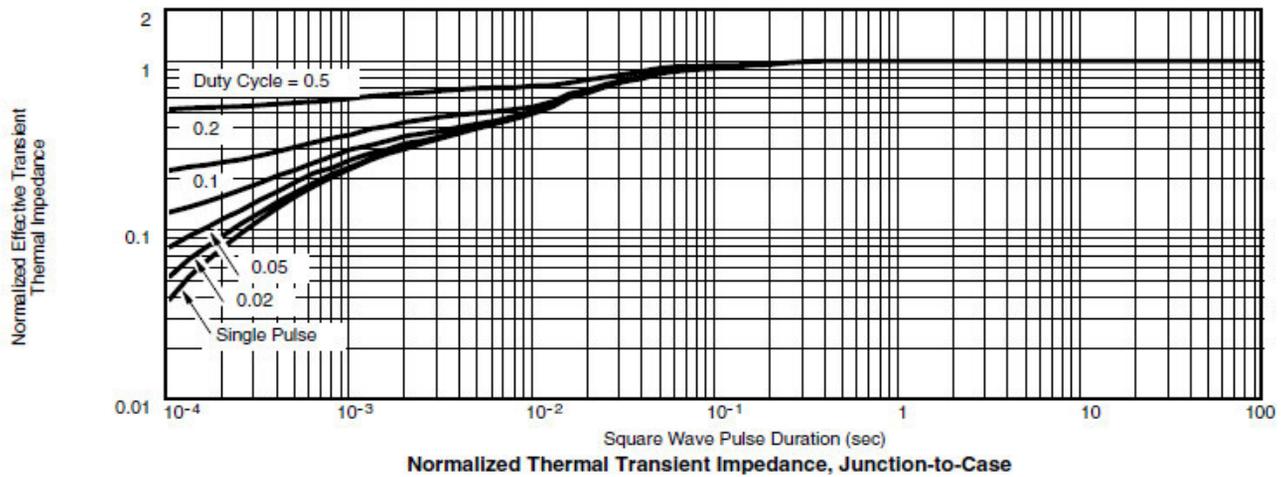
Source-Drain Diode Forward Voltage



Maximum Drain Current vs. Ambient Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

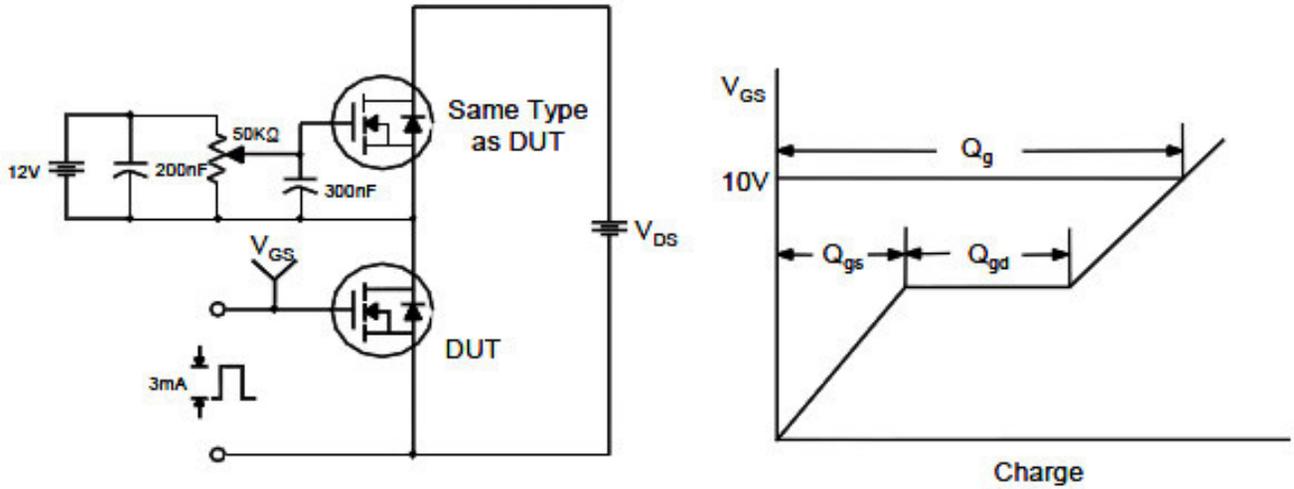
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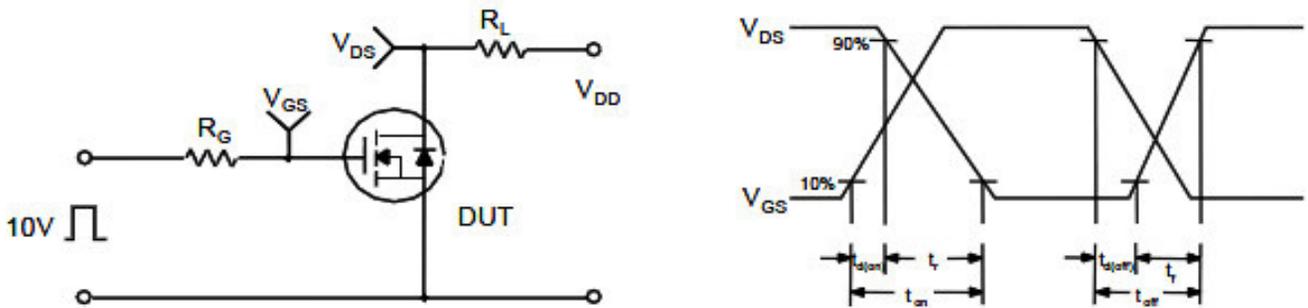
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■ Test circuit and waveform

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms

