

Single N-channel MOSFET

ELM54116WSA-N

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

■ General description

ELM54116WSA-N uses advanced trench technology to provide excellent $R_{ds(on)}$, low gate charge and low gate threshold voltage.

■ Features

- $V_{ds}=20V$
- $I_d=15A$
- $R_{ds(on)} = 8.5m\Omega$ ($V_{gs}=4.5V$)
- $R_{ds(on)} = 11.0m\Omega$ ($V_{gs}=2.5V$)

■ Maximum absolute ratings

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

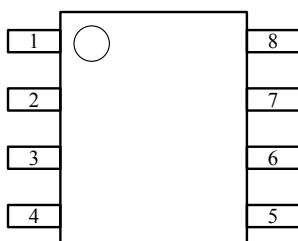
Parameter	Symbol	Limit	Unit
Drain-source voltage	V_{ds}	20	V
Gate-source voltage	V_{gs}	± 12	V
Continuous drain current($T_j=150^\circ C$)	I_d	$T_a=25^\circ C$	15
		$T_a=70^\circ C$	12
Pulsed drain current	I_{dm}	50	A
Power dissipation	P_d	$T_c=25^\circ C$	5.0
		$T_c=70^\circ C$	3.2
Operating junction 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	$^\circ C/W$

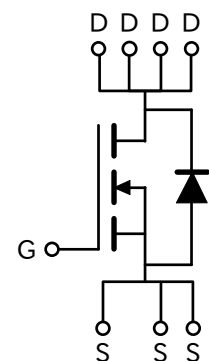
■ Pin configuration

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



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■Electrical characteristics

Ta=25°C. Unless otherwise noted.

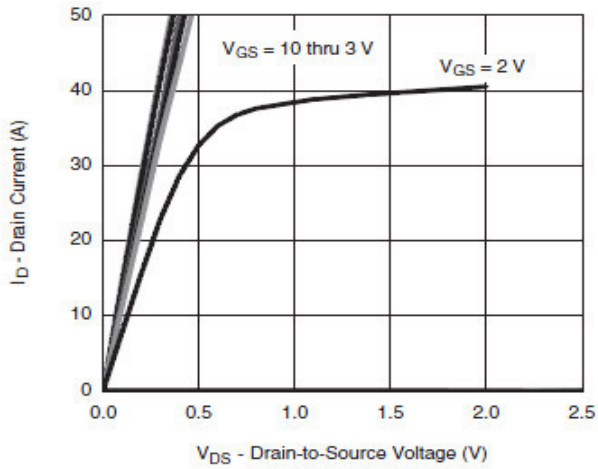
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
STATIC PARAMETERS						
Drain-source breakdown voltage	BVdss	Id=250μA, Vgs=0V	20			V
Zero gate voltage drain current	Idss	Vds=16V, Vgs=0V			1	μA
		Vds=16V, Vgs=0V, Ta=85°C			10	
Gate-body leakage current	Igss	Vds=0V, Vgs=±20V			±100	nA
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=250μA	0.5		1.0	V
On state drain current	Id(on)	Vgs=10V, Vds≥5V	30			A
Static drain-source on-resistance	Rds(on)	Vgs=4.5V, Id=15A		7.2	8.5	mΩ
		Vgs=2.5V, Id=12A		8.5	11.0	
Forward transconductance	Gfs	Vds=15V, Id=10A		68		S
Diode forward voltage	Vsd	Is=3.2A, Vgs=0V		0.7	1.3	V
Max. body-diode continuous current	Is				4.5	A
DYNAMIC PARAMETERS						
Input capacitance	Ciss	Vgs=0V, Vds=15V, f=1MHz		1900		pF
Output capacitance	Coss			325		pF
Reverse transfer capacitance	Crss			145		pF
SWITCHING PARAMETERS						
Total gate charge	Qg	Vds=15V, Vgs=4.5V Id≐10A		18.0	30.0	nC
Gate-source charge	Qgs			3.8		nC
Gate-drain charge	Qgd			3.5		nC
Turn-on delay time	td(on)	Vgs=10V, Vds=15V RL=1.5Ω, Id≐10A Rgen=1.0Ω		8	16	ns
Turn-on rise time	tr			10	20	ns
Turn-off delay time	td(off)			30	60	ns
Turn-off fall time	tf			9	18	ns

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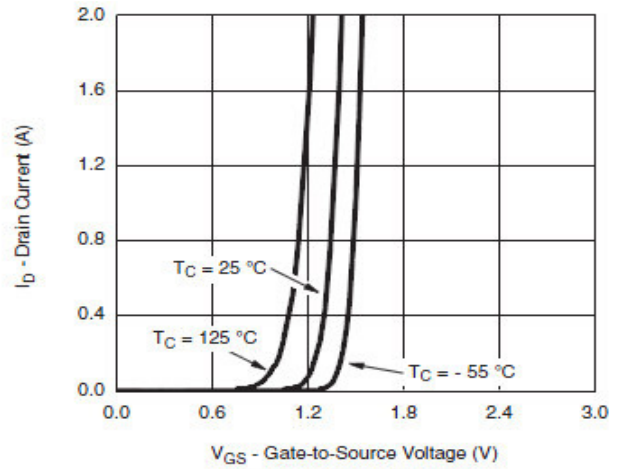
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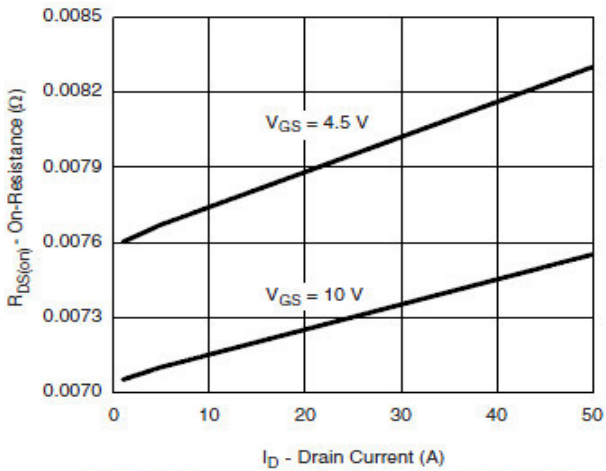
■ Typical electrical and thermal characteristics



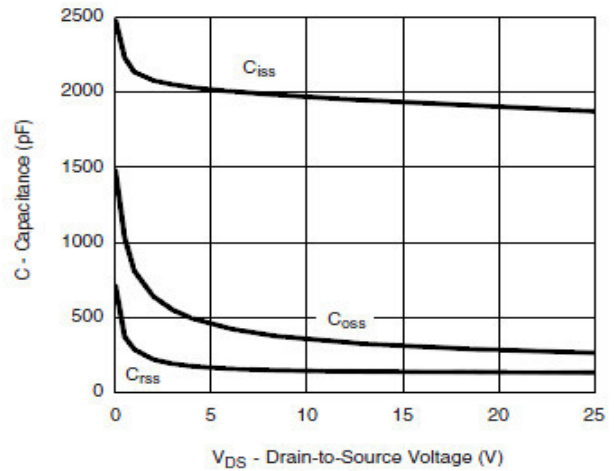
Output Characteristics



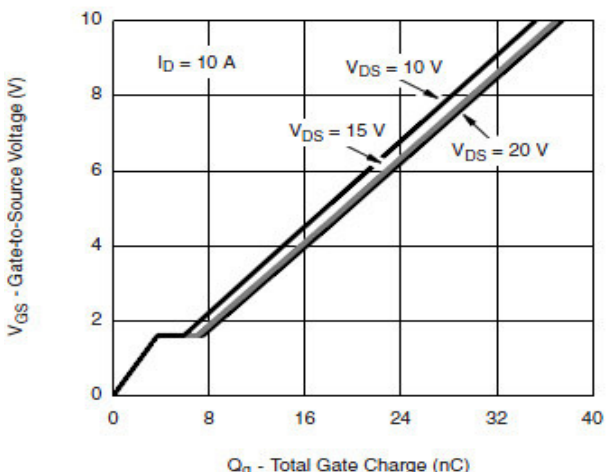
Transfer Characteristics



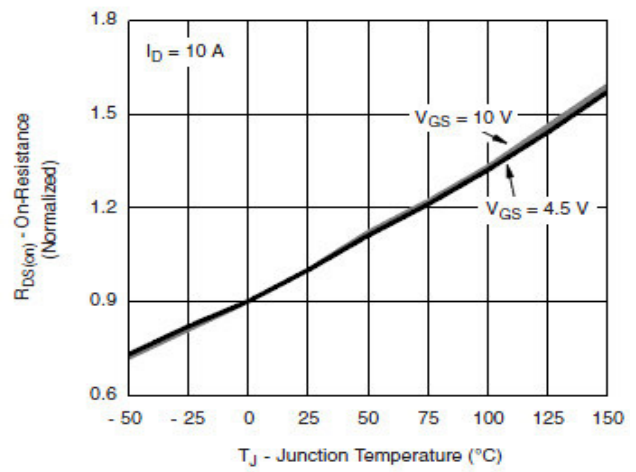
On-Resistance vs. Drain Current and Gate Voltage



Capacitance



Gate Charge

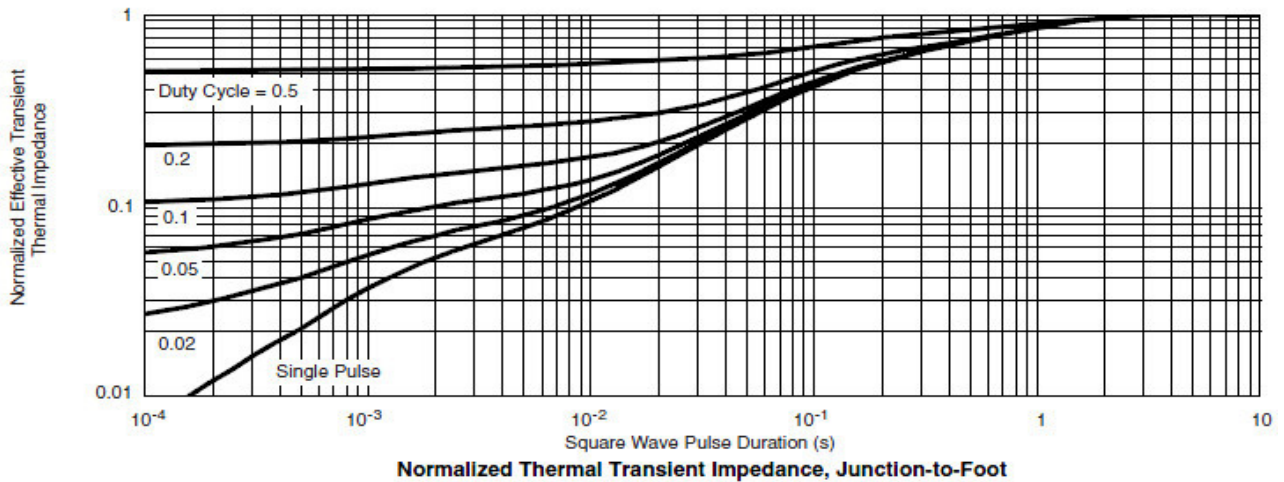
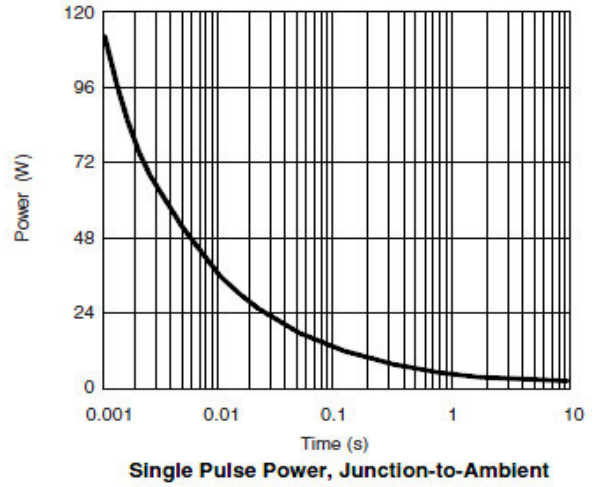
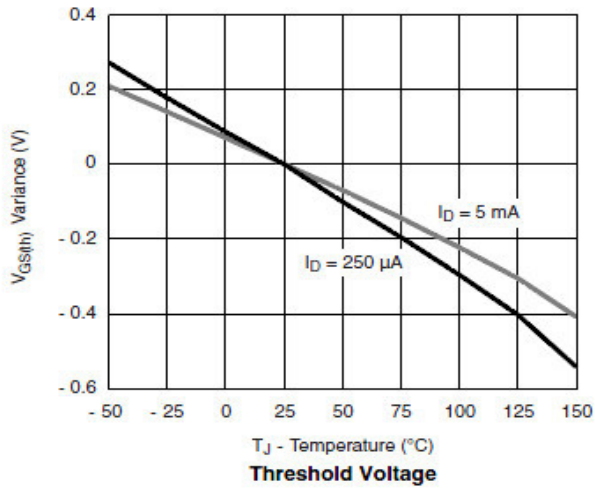
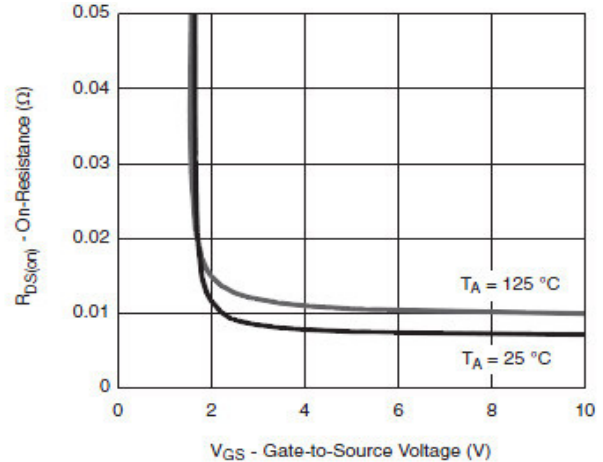
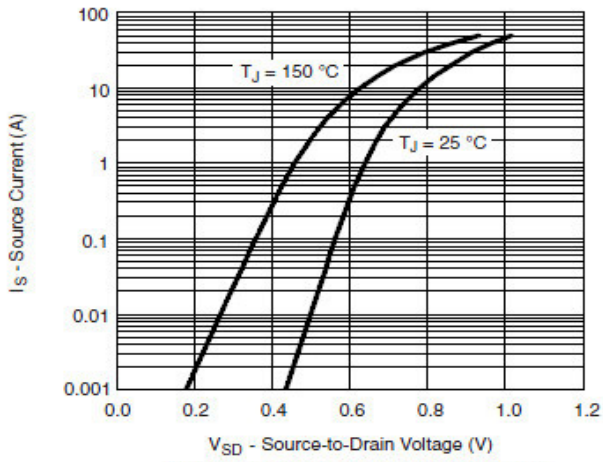


On-Resistance vs. Junction Temperature

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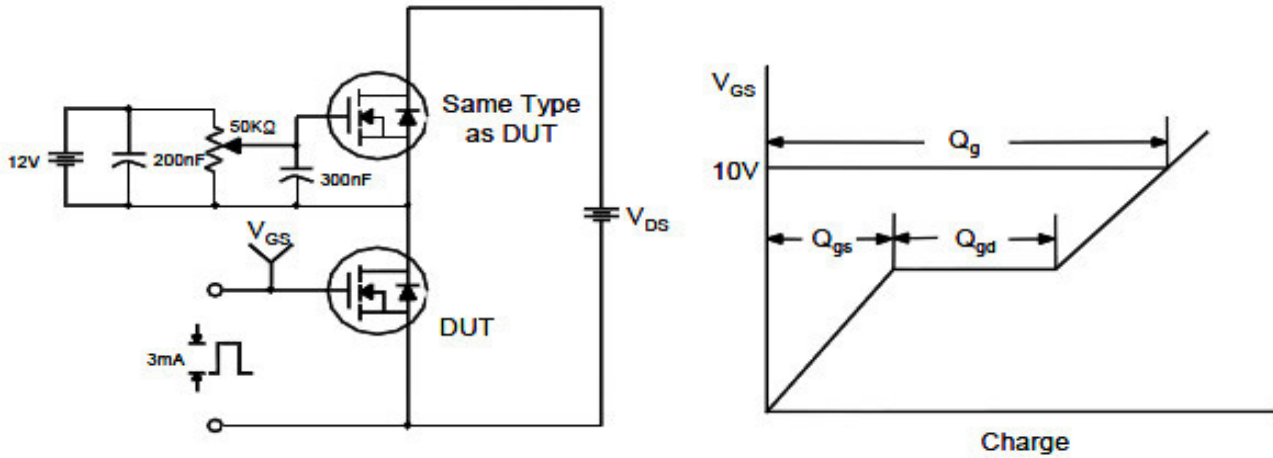
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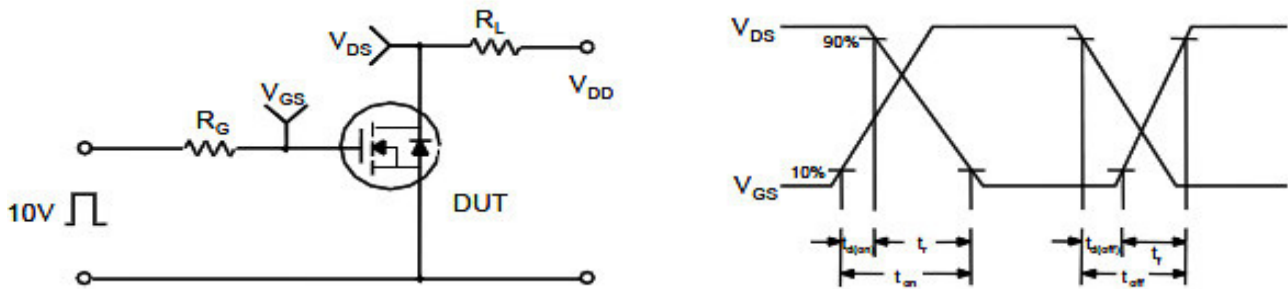
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■ Test circuit and waveform

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms

