

Single N-channel MOSFET

ELM55004SA-S

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

■ General description

ELM55004SA-S uses advanced trench technology to provide excellent $R_{ds(on)}$, low gate charge and low gate threshold voltage.

■ Features

- $V_{ds}=40V$
- $I_d=15A$
- $R_{ds(on)} = 5.5m\Omega$ ($V_{gs}=10V$)
- $R_{ds(on)} = 6.5m\Omega$ ($V_{gs}=4.5V$)

■ Maximum absolute ratings

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

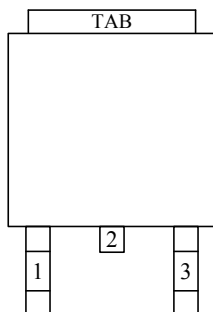
Parameter	Symbol	Limit	Unit	
Drain-source voltage	V_{ds}	40	V	
Gate-source voltage	V_{gs}	± 20	V	
Continuous drain current($T_j=150^\circ C$)	I_d	$T_a=25^\circ C$	15	A
		$T_a=70^\circ C$	12	
Pulsed drain current	I_{dm}	40	A	
Single pulse avalanche current	I_{as}	25	A	
Avalanche energy	E_{as}	35	mJ	
Power dissipation	P_d	$T_c=25^\circ C$	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	$^\circ C/W$

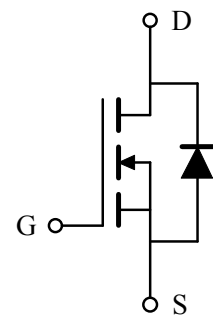
■ Pin configuration

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.

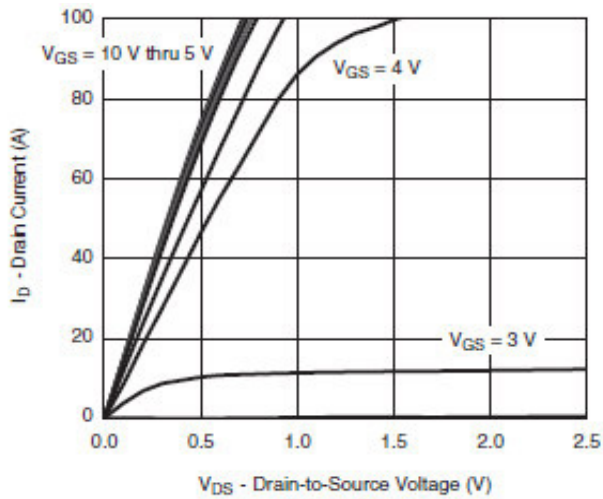
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
STATIC PARAMETERS						
Drain-source breakdown voltage	BVdss	Id=250μA, Vgs=0V	40			V
Zero gate voltage drain current	Idss	Vds=32V, Vgs=0V Ta=85°C			1	μA
					10	
Gate-body leakage current	Igss	Vds=0V, Vgs=±20V			±100	nA
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=250μA	1.0		2.0	V
On state drain current	Id(on)	Vgs=10V, Vds≥5V	50			A
Static drain-source on-resistance	Rds(on)	Vgs=10V, Id=20A		3.5	5.5	mΩ
		Vgs=4.5V, Id=15A		4.5	6.5	
Forward transconductance	Gfs	Vds=15V, Id=15A		75		S
Diode forward voltage	Vsd	Is=10A, Vgs=0V		0.85	1.30	V
Max. body-diode continuous current	Is				2.6	A
DYNAMIC PARAMETERS						
Input capacitance	Ciss	Vgs=0V, Vds=20V, f=1MHz		2500		pF
Output capacitance	Coss			280		pF
Reverse transfer capacitance	Crss			120		pF
SWITCHING PARAMETERS						
Total gate charge	Qg	Vgs=4.5V, Vds=20V Id≐20A		18	30	nC
Gate-source charge	Qgs			7		nC
Gate-drain charge	Qgd			5		nC
Turn-on delay time	td(on)	Vgs=10V, Vds=20V RL=1Ω, Id≐20A Rgen=1Ω		10	20	ns
Turn-on rise time	tr			6	15	ns
Turn-off delay time	td(off)			40	65	ns
Turn-off fall time	tf			6	15	ns

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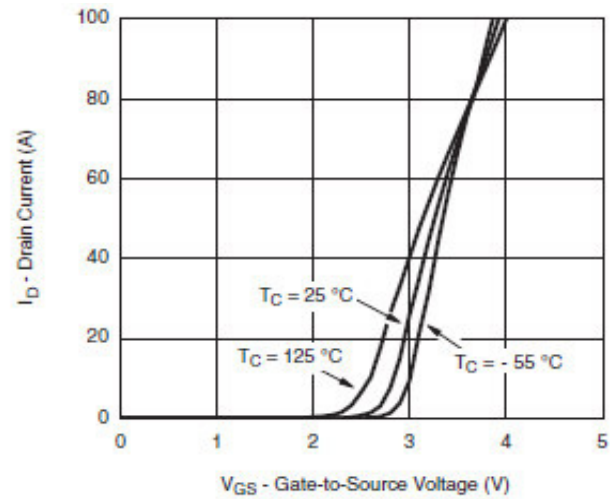
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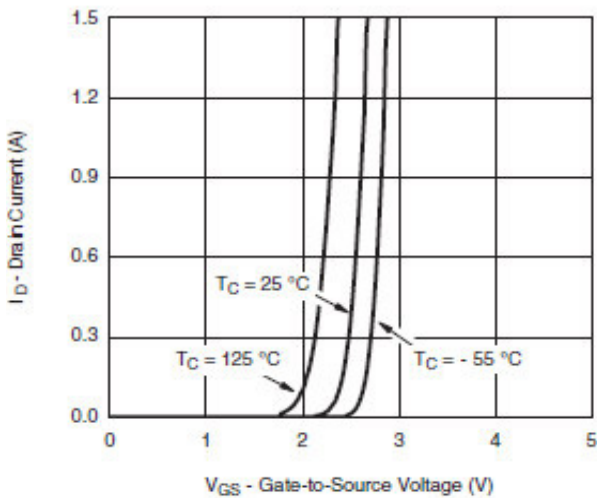
Typical electrical and thermal characteristics



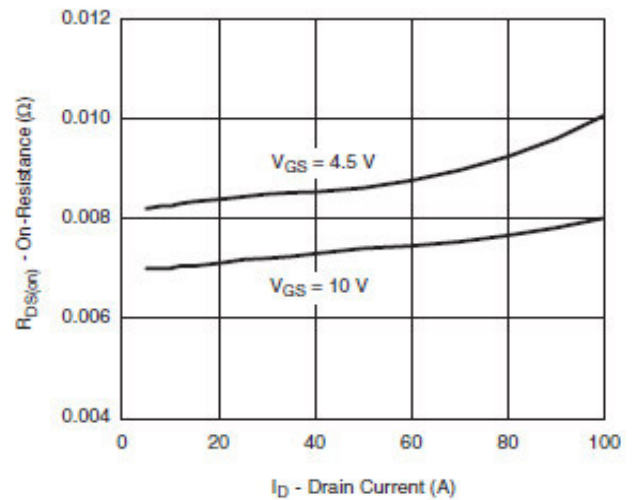
Output Characteristics



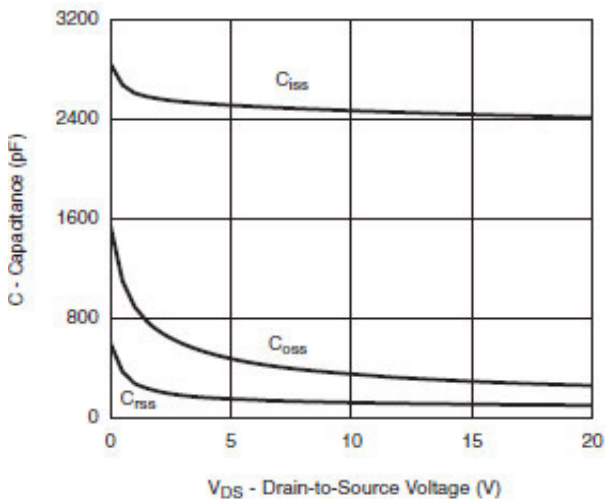
Transfer Characteristics



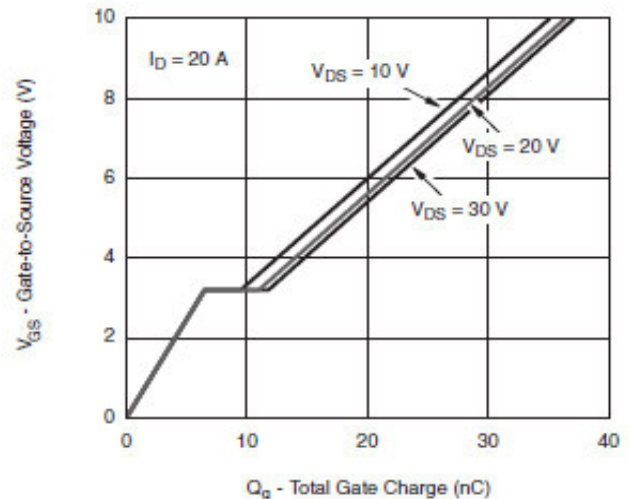
Transfer Characteristics



On-Resistance vs. Drain Current



Capacitance

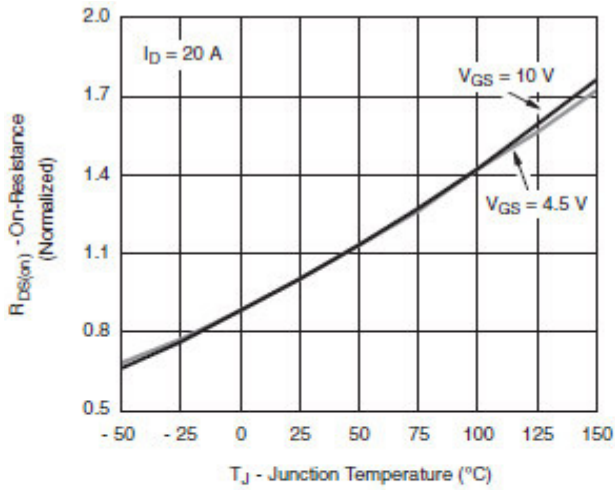


Gate Charge

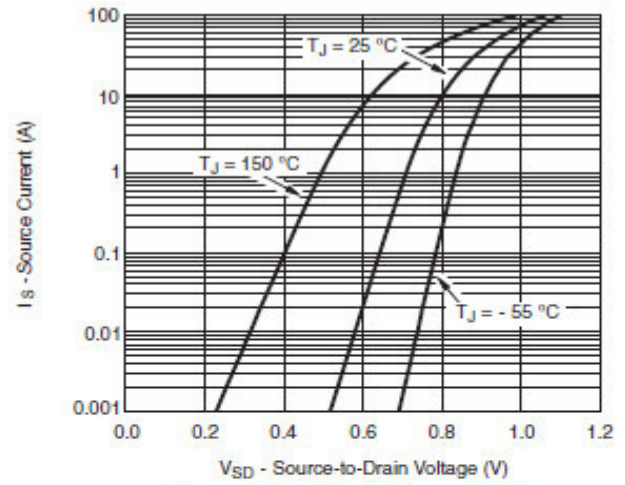
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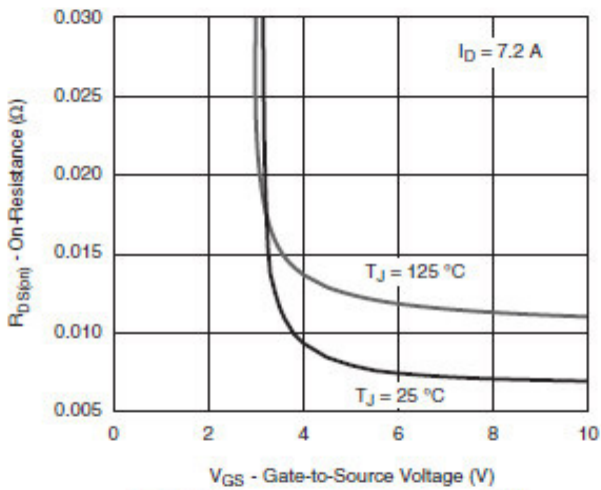
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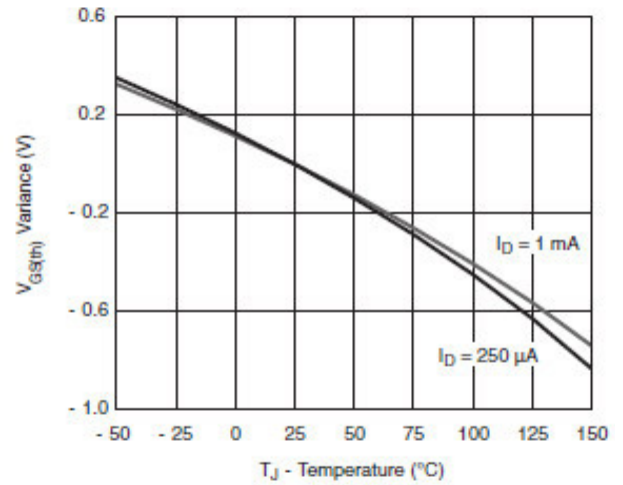
On-Resistance vs. Junction Temperature



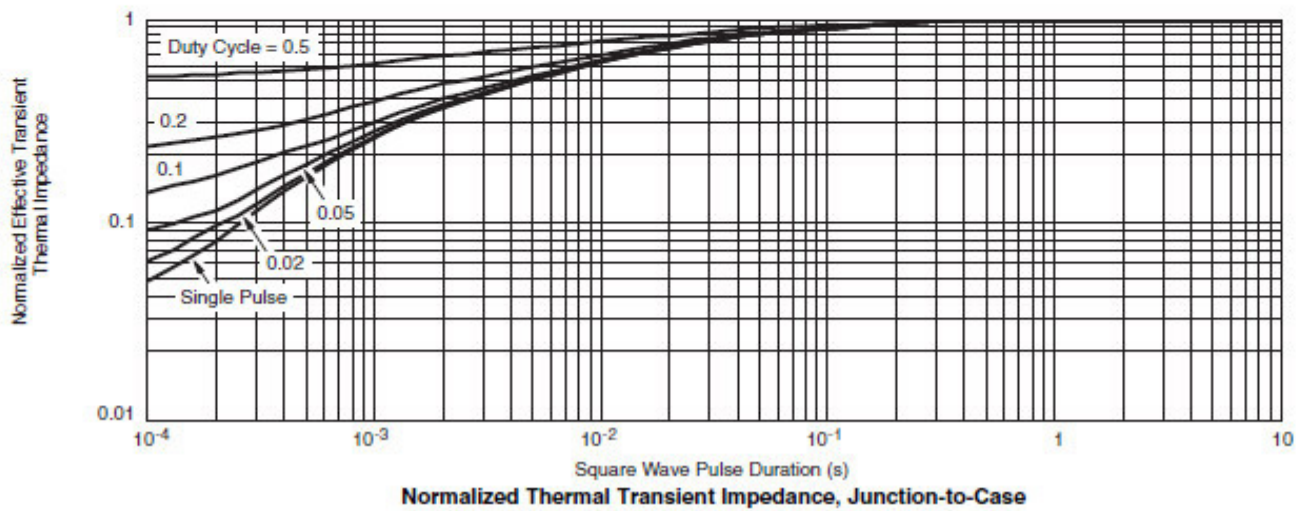
Source-Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Normalized Thermal Transient Impedance, Junction-to-Case

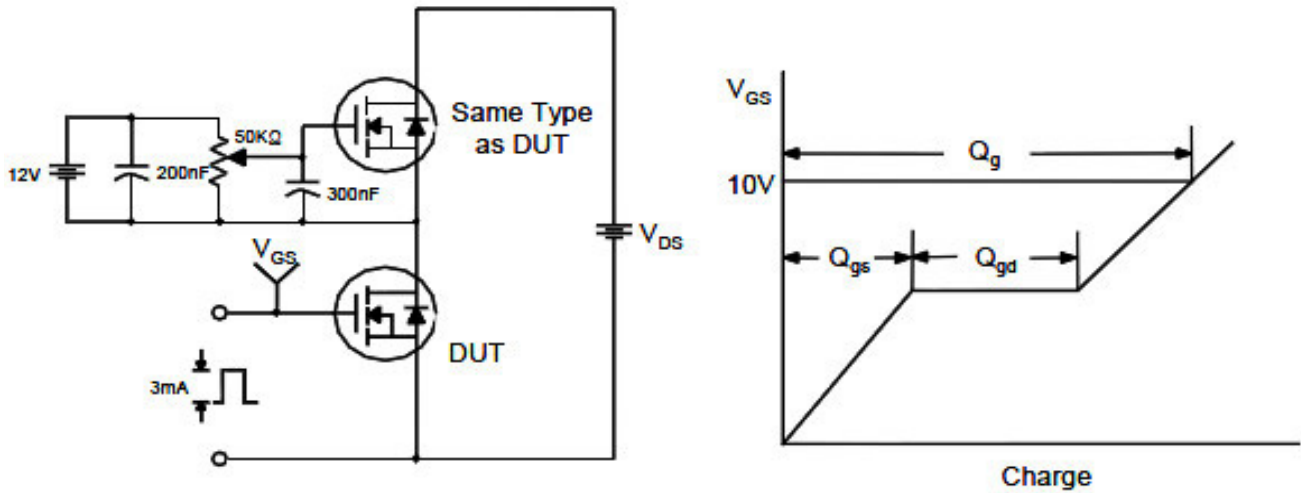
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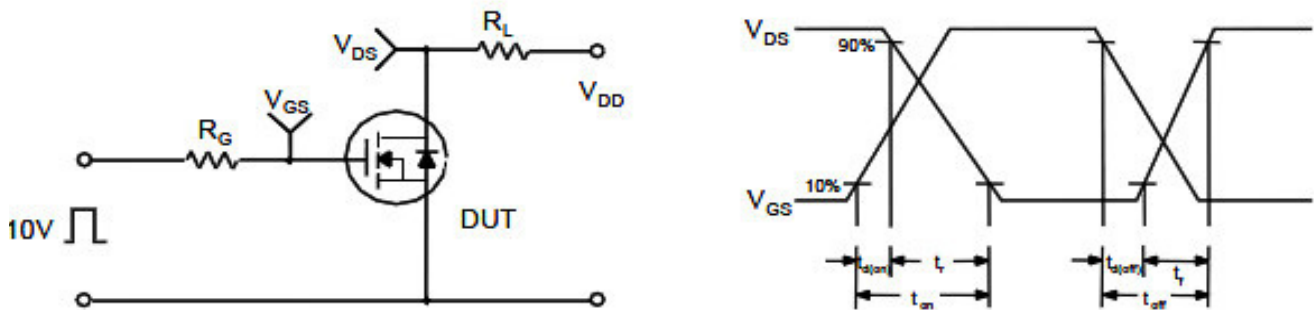
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■ Test circuit and waveform

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms

