

# Single P-channel MOSFET

## ELM32409LA-S

### ■ General description

ELM32409LA-S uses advanced trench technology to provide excellent  $R_{ds(on)}$ , low gate charge and low gate resistance.

### ■ Features

- $V_{ds} = -40V$
- $I_d = -10A$
- $R_{ds(on)} < 44m\Omega$  ( $V_{gs} = -10V$ )
- $R_{ds(on)} < 68m\Omega$  ( $V_{gs} = -4.5V$ )

### ■ Maximum absolute ratings

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

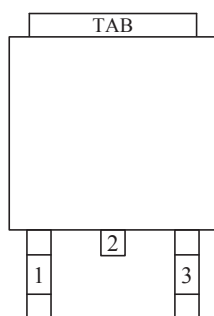
Parameter	Symbol	Limit	Unit	Note	
Drain-source voltage	$V_{ds}$	-40	V		
Gate-source voltage	$V_{gs}$	$\pm 20$	V		
Continuous drain current	$I_d$	$T_a = 25^\circ C$	-10	A	
		$T_a = 70^\circ C$	-8		
Pulsed drain current	$I_{dm}$	-32	A	3	
Power dissipation	$P_d$	$T_c = 25^\circ C$	30	W	
		$T_c = 70^\circ C$	20		
Junction and storage temperature range	$T_j, T_{stg}$	-55 to 150	$^\circ C$		

### ■ Thermal characteristics

Parameter	Symbol	Typ.	Max.	Unit	Note
Maximum junction-to-case	$R\theta_{jc}$		4.1	$^\circ C/W$	
Maximum junction-to-ambient	$R\theta_{ja}$		80.0	$^\circ C/W$	

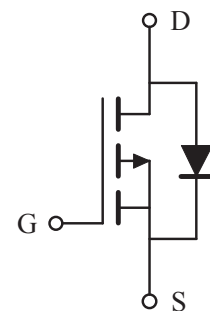
### ■ Pin configuration

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	Note
<b>STATIC PARAMETERS</b>							
Drain-source breakdown voltage	BVdss	Id=-250μA, Vgs=0V	-40			V	
Zero gate voltage drain current	Idss	Vds=-32V, Vgs=0V			-1	μA	
		Vds=-30V, Vgs=0V, Ta=125°C			-10		
Gate-body leakage current	Igss	Vds=0V, Vgs=±20V			±250	nA	
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=-250μA	-1.0	-1.8	-3.0	V	
On state drain current	Id(on)	Vgs=-10V, Vds=-5V	-32			A	1
Static drain-source on-resistance	Rds(on)	Vgs=-10V, Id=-10A		38	44	mΩ	1
		Vgs=-4.5V, Id=-8A		57	68		
Forward transconductance	Gfs	Vds=-10V, Id=-10A		11		S	1
Diode forward voltage	Vsd	Is=If, Vgs=0V			-1	V	1
Max. body-diode continuous current	Is				-10	A	
Pulsed body-diode current	Ism				-30	A	3
<b>DYNAMIC PARAMETERS</b>							
Input capacitance	Ciss	Vgs=0V, Vds=-10V, f=1MHz		660		pF	
Output capacitance	Coss			300		pF	
Reverse transfer capacitance	Crss			70		pF	
<b>SWITCHING PARAMETERS</b>							
Total gate charge	Qg	Vgs=-10V, Vds=-20V Id=-10A		14.0		nC	2
Gate-source charge	Qgs			2.2		nC	2
Gate-drain charge	Qgd			1.9		nC	2
Turn-on delay time	td(on)	Vgs=-10V, Vds=-20V Id=-1A, RL=1Ω, Rgen=6Ω		6.0	12.8	ns	2
Turn-on rise time	tr			9.2	18.6	ns	2
Turn-off delay time	td(off)			19.2	34.8	ns	2
Turn-off fall time	tf			11.8	21.6	ns	2
Body diode reverse recovery time	trr	If=-5A, dIf/dt=100A/μs		15.5		ns	
Body diode reverse recovery charge	Qrr			7.9		nC	

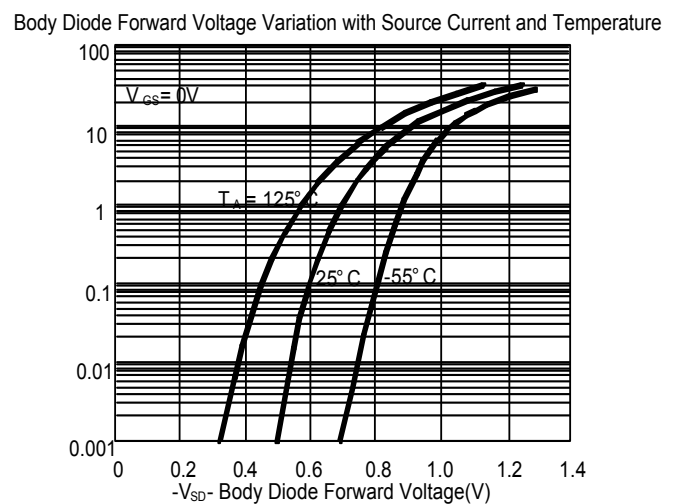
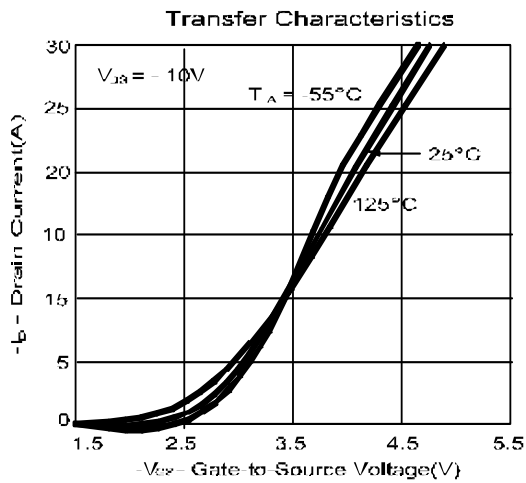
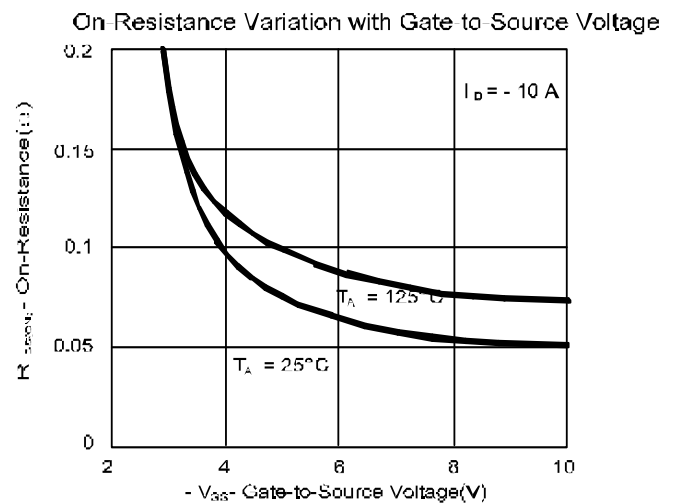
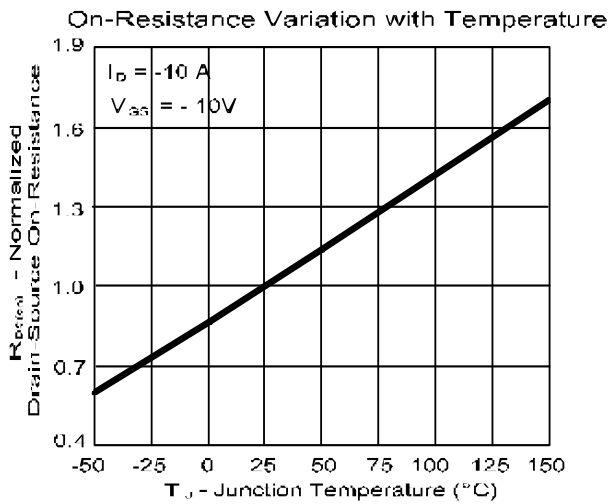
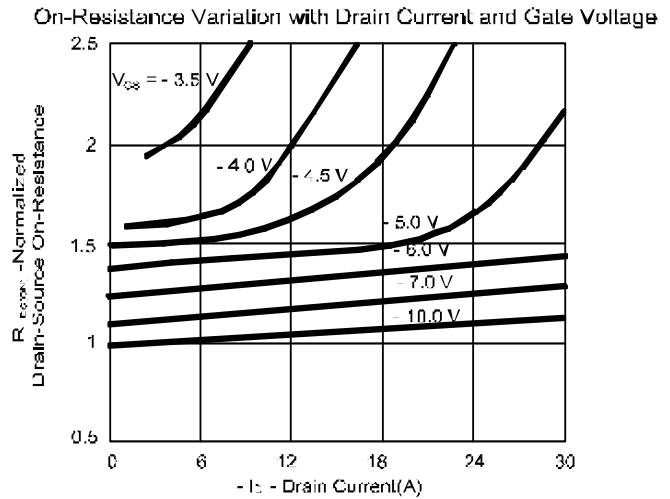
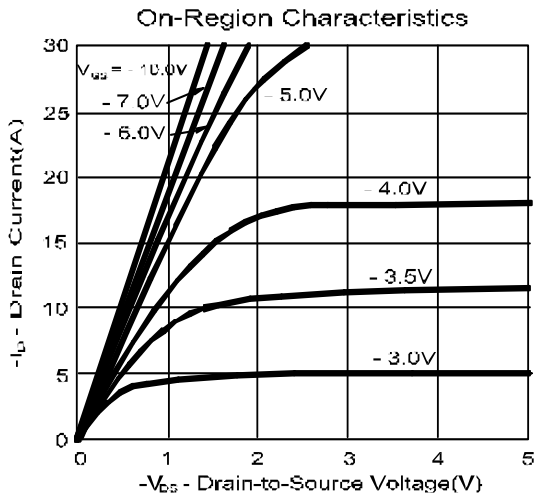
NOTE :

1. Pulse test : Pulsed width  $\leq 300\mu\text{sec}$  and Duty cycle  $\leq 2\%$ .
2. Independent of operating temperature.
3. Pulsed width limited by maximum junction temperature.
4. Duty cycle  $\leq 1\%$ .

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## ■ Typical electrical and thermal characteristics



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