

# Single P-channel MOSFET

ELM32405LA-S

## General description

ELM32405LA-S uses advanced trench technology to provide excellent  $R_{ds(on)}$ , low gate charge and low gate resistance.

## Features

- $V_{ds} = -30V$
- $I_d = -12A$
- $R_{ds(on)} < 45m\Omega$  ( $V_{gs} = -10V$ )
- $R_{ds(on)} < 75m\Omega$  ( $V_{gs} = -4.5V$ )

## Maximum absolute ratings

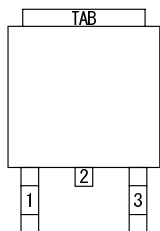
Parameter	Symbol	Limit	Unit	Note	
Drain-source voltage	$V_{ds}$	-30	V		
Gate-source voltage	$V_{gs}$	$\pm 20$	V		
Continuous drain current	$I_d$	$T_a = 25^\circ C$	-12	A	
		$T_a = 70^\circ C$	-10		
Pulsed drain current	$I_{dm}$	-30	A	3	
Power dissipation	$P_d$	$T_a = 25^\circ C$	48	W	
		$T_a = 70^\circ C$	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	Steady-state	$R\theta_{jc}$		3	$^\circ C/W$	
Maximum junction-to-ambient	Steady-state	$R\theta_{ja}$		75	$^\circ C/W$	

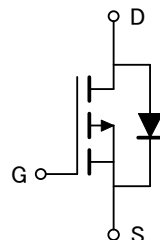
## Pin configuration

TO-252-3 (TOP VIEW)



Pin No.	Pin name
1	GATE
2	DRAIN
3	SOURCE

## Circuit



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## Electrical characteristics

T<sub>a</sub>=25°C

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
<b>STATIC PARAMETERS</b>							
Drain-source breakdown voltage	BV <sub>dss</sub>	I <sub>d</sub> =-250 μA, V <sub>gs</sub> =0V	-30			V	
Zero gate voltage drain current	I <sub>dss</sub>	V <sub>ds</sub> =-24V, V <sub>gs</sub> =0V			-1	μA	
		V <sub>ds</sub> =-20V, V <sub>gs</sub> =0V, T <sub>j</sub> =125°C			-10		
Gate-body leakage current	I <sub>gss</sub>	V <sub>ds</sub> =0V, V <sub>gs</sub> =±20V			±250	nA	
Gate threshold voltage	V <sub>gs(th)</sub>	V <sub>ds</sub> =V <sub>gs</sub> , I <sub>d</sub> =-250 μA	-1.0	-1.5	-3.0	V	
On state drain current	I <sub>d(on)</sub>	V <sub>gs</sub> =-10V, V <sub>ds</sub> =-5V	-30			A	1
Static drain-source on-resistance	R <sub>ds(on)</sub>	V <sub>gs</sub> =-10V, I <sub>d</sub> =-12A		37	45	mΩ	1
		V <sub>gs</sub> =-4.5V, I <sub>d</sub> =-10A		60	75	mΩ	
Forward transconductance	G <sub>fs</sub>	V <sub>ds</sub> =-10V, I <sub>d</sub> =-12A		16		S	1
Diode forward voltage	V <sub>sd</sub>	I <sub>s</sub> =-1A, V <sub>gs</sub> =0V			-1.2	V	1
Max. body-diode continuous current	I <sub>s</sub>				-12	A	
Pulsed body-diode current	I <sub>sm</sub>				-30	A	3
<b>DYNAMIC PARAMETERS</b>							
Input capacitance	C <sub>iss</sub>	V <sub>gs</sub> =0V, V <sub>ds</sub> =-15V, f=1MHz		530		pF	
Output capacitance	C <sub>oss</sub>			135		pF	
Reverse transfer capacitance	C <sub>rss</sub>			70		pF	
<b>SWITCHING PARAMETERS</b>							
Total gate charge	Q <sub>g</sub>	V <sub>gs</sub> =-10V, V <sub>ds</sub> =-15V I <sub>d</sub> =-12A		10.0	14.0	nC	2
Gate-source charge	Q <sub>gs</sub>			2.2		nC	2
Gate-drain charge	Q <sub>gd</sub>			2.0		nC	2
Turn-on delay time	t <sub>d(on)</sub>	V <sub>gs</sub> =-10V, V <sub>ds</sub> =-15V I <sub>d</sub> ≈ -1A, R <sub>l</sub> =1 Ω, R <sub>gen</sub> =6 Ω		5.7		ns	2
Turn-on rise time	t <sub>r</sub>			10.0		ns	2
Turn-off delay time	t <sub>d(off)</sub>			18.0		ns	2
Turn-off fall time	t <sub>f</sub>			5.0		ns	2
Body diode reverse recovery time	t <sub>rr</sub>			15.5		ns	
Body diode reverse recovery charge	Q <sub>rr</sub>	I <sub>f</sub> =-5A, dI/dt=100A/μs		7.9		nC	

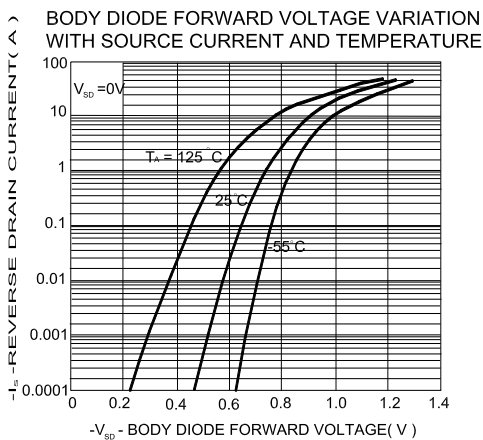
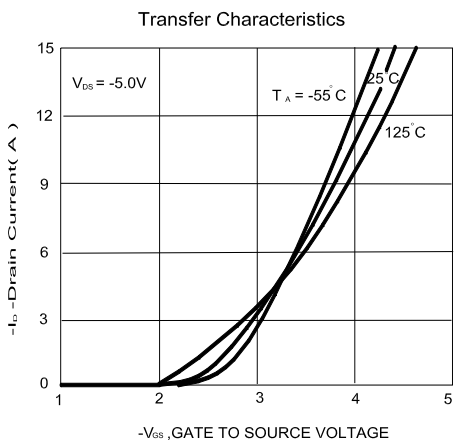
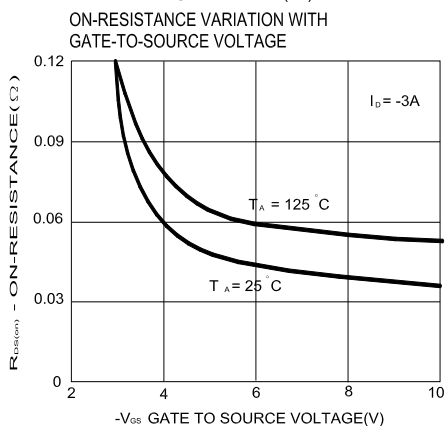
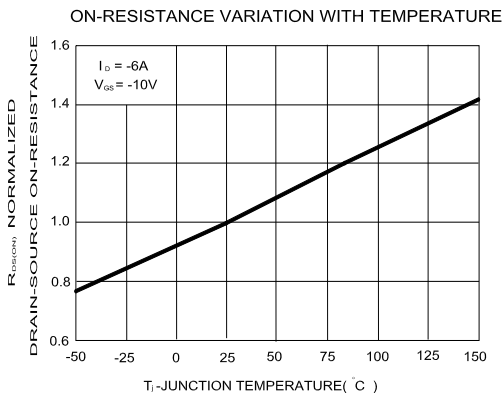
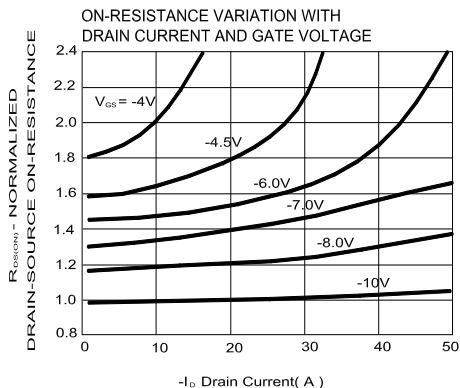
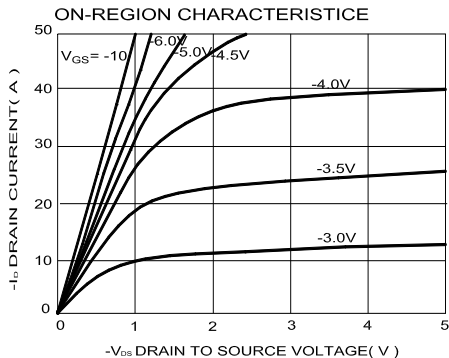
NOTE :

1. Pulse test : Pulsed width ≤ 300 μsec and Duty cycle ≤ 2%.
2. Independent of operating temperature.
3. Pulsed width limited by maximum junction temperature.

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## Typical electrical and thermal characteristics



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