

# Single P-channel MOSFET

## ELM34405AA-N

### ■ General description

ELM34405AA-N uses advanced trench technology to provide excellent  $R_{ds(on)}$ , low gate charge and low gate resistance.

### ■ Features

- $V_{ds} = -40V$
- $I_d = -5.5A$
- $R_{ds(on)} < 55m\Omega$  ( $V_{gs} = -10V$ )
- $R_{ds(on)} < 94m\Omega$  ( $V_{gs} = -4.5V$ )

### ■ Maximum absolute ratings

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

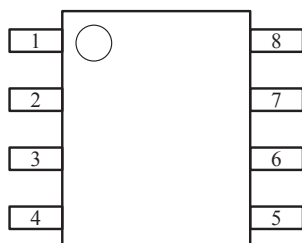
Parameter	Symbol	Limit	Unit	Note
Drain-source voltage	$V_{ds}$	-40	V	
Gate-source voltage	$V_{gs}$	$\pm 20$	V	
Continuous drain current	$I_d$	$T_a = 25^\circ C$	-5.5	A
		$T_a = 70^\circ C$	-4.5	
Pulsed drain current	$I_{dm}$	-20	A	3
Power dissipation	$P_d$	$T_c = 25^\circ C$	2.5	W
		$T_c = 70^\circ C$	1.3	
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-ambient	$R_{\theta ja}$		50	$^\circ C/W$	

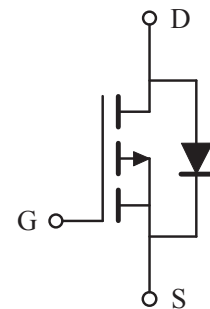
### ■ Pin configuration

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	Note
<b>STATIC PARAMETERS</b>							
Drain-source breakdown voltage	BV <sub>dss</sub>	I <sub>d</sub> =-250μA, V <sub>gs</sub> =0V	-40			V	
Zero gate voltage drain current	I <sub>dss</sub>	V <sub>ds</sub> =-32V, V <sub>gs</sub> =0V			-1	μA	
		V <sub>ds</sub> =-30V, V <sub>gs</sub> =0V, Ta=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> =-250μA	-1.0	-1.5	-2.5	V	
On state drain current	I <sub>d(on)</sub>	V <sub>gs</sub> =-10V, V <sub>ds</sub> =-5V	-20			A	1
Static drain-source on-resistance	R <sub>ds(on)</sub>	V <sub>gs</sub> =-10V, I <sub>d</sub> =-5.5A		38	55	mΩ	1
		V <sub>gs</sub> =-4.5V, I <sub>d</sub> =-4.5A		65	94		
Forward transconductance	G <sub>fs</sub>	V <sub>ds</sub> =-10V, I <sub>d</sub> =-5.5A		11		S	1
Diode forward voltage	V <sub>sd</sub>	I <sub>s</sub> =I <sub>f</sub> , V <sub>gs</sub> =0V			-1	V	1
Max. body-diode continuous current	I <sub>s</sub>				-1.3	A	
Pulsed body-diode current	I <sub>sm</sub>				-2.6	A	3
<b>DYNAMIC PARAMETERS</b>							
Input capacitance	C <sub>iss</sub>			690		pF	
Output capacitance	C <sub>oss</sub>	V <sub>gs</sub> =0V, V <sub>ds</sub> =-10V, f=1MHz		310		pF	
Reverse transfer capacitance	C <sub>rss</sub>			75		pF	
<b>SWITCHING PARAMETERS</b>							
Total gate charge	Q <sub>g</sub>	V <sub>gs</sub> =-10V, V <sub>ds</sub> =-20V I <sub>d</sub> =-5.5A		14.0		nC	2
Gate-source charge	Q <sub>gs</sub>			2.2		nC	2
Gate-drain charge	Q <sub>gd</sub>			1.9		nC	2
Turn-on delay time	t <sub>d(on)</sub>	V <sub>gs</sub> =-10V, V <sub>ds</sub> =-20V I <sub>d</sub> =-1A, R <sub>gen</sub> =6Ω		6.7	13.4	ns	2
Turn-on rise time	t <sub>r</sub>			9.7	19.4	ns	2
Turn-off delay time	t <sub>d(off)</sub>			19.8	35.6	ns	2
Turn-off fall time	t <sub>f</sub>			12.3	22.2	ns	2
Body diode reverse recovery time	t <sub>rr</sub>	I <sub>f</sub> =-5A, dI <sub>f</sub> /dt=100A/μs		15.5		ns	
Body diode reverse recovery charge	Q <sub>rr</sub>	I <sub>f</sub> =-5A, dI <sub>f</sub> /dt=100A/μs		7.9		nC	

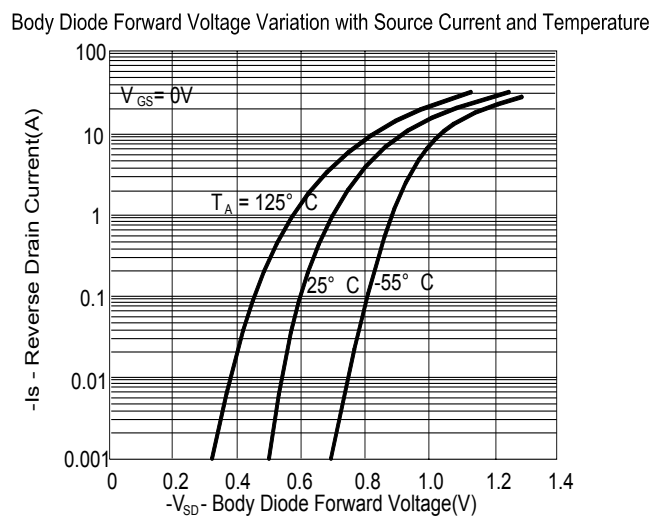
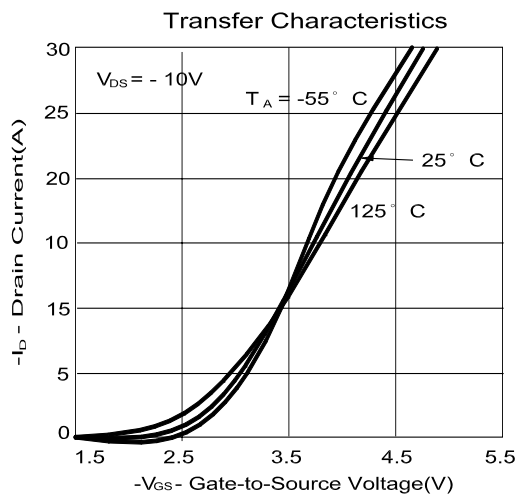
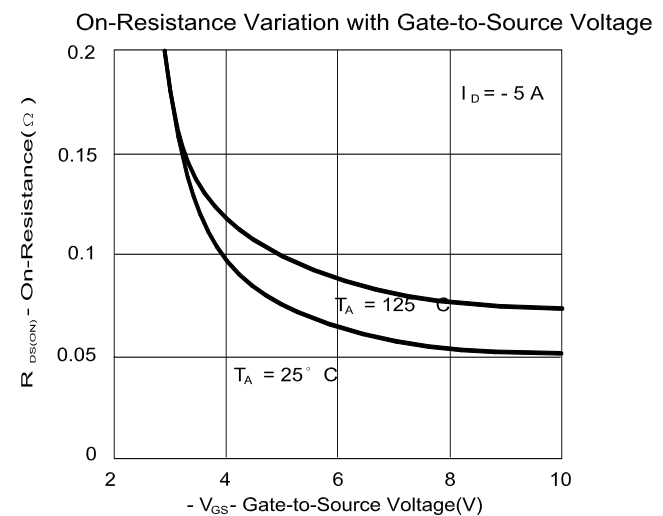
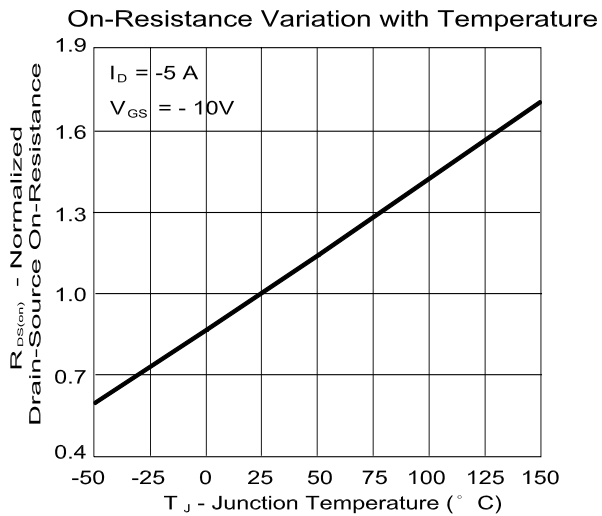
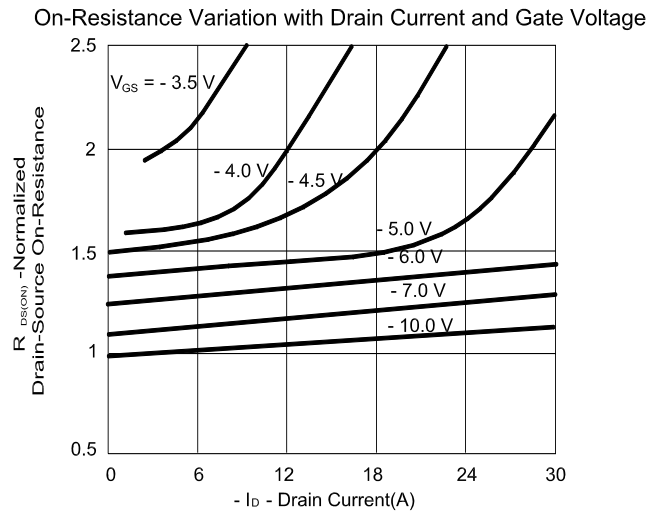
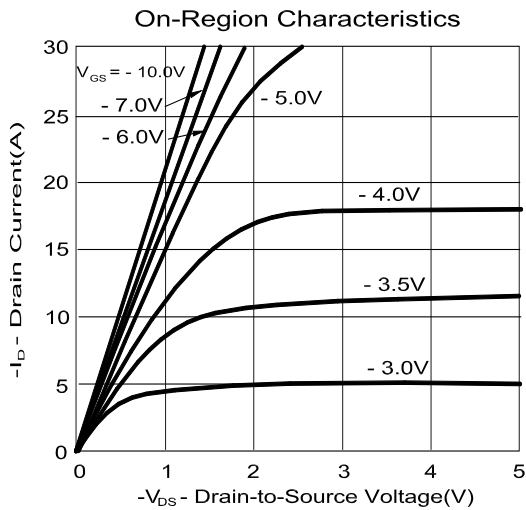
NOTE :

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

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### ■ Typical electrical and thermal characteristics



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