

# Single N-channel MOSFET

ELM34414AA-N

## General description

ELM34414AA-N uses advanced trench technology to provide excellent  $R_{ds(on)}$ , low gate charge and low gate resistance.

## Features

- $V_{ds}=30V$
- $I_d=15A$
- $R_{ds(on)} < 8m\Omega$  ( $V_{gs}=10V$ )
- $R_{ds(on)} < 12m\Omega$  ( $V_{gs}=4.5V$ )

## Maximum absolute ratings

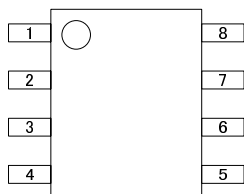
Parameter	Symbol	Limit	Unit	Note
Drain-source voltage	$V_{ds}$	30	V	
Gate-source voltage	$V_{gs}$	$\pm 20$	V	
Continuous drain current	$I_d$	$T_a=25^\circ C$	15	A
		$T_a=90^\circ C$	12	
Pulsed drain current	$I_{dm}$	50	A	3
Power dissipation	$P_d$	$T_a=25^\circ C$	2.5	W
		$T_a=90^\circ C$	2.0	
Junction 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	Steady-state	$R\theta_{ja}$		50	$^\circ C/W$	

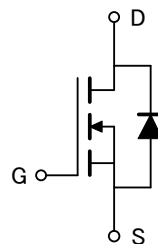
## Pin configuration

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

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> =55°C			10		
Gate-body leakage current	I <sub>gss</sub>	V <sub>ds</sub> =0V, V <sub>gs</sub> =±20V			±100	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	
Static drain-source on-resistance	R <sub>ds(on)</sub>	V <sub>gs</sub> =10V, I <sub>d</sub> =15A		6.8	8.0	mΩ	1
		V <sub>gs</sub> =4.5V, I <sub>d</sub> =12A		8.8	12.0	mΩ	
Forward transconductance	G <sub>fs</sub>	V <sub>ds</sub> =15V, I <sub>d</sub> =15A		60		S	1
Diode forward voltage	V <sub>sd</sub>	I <sub>f</sub> =3A, V <sub>gs</sub> =0V			1.1	V	1
Max. body-diode continuous current	I <sub>s</sub>				3	A	
Pulsed body-diode current	I <sub>sm</sub>				6	A	3
<b>DYNAMIC PARAMETERS</b>							
Input capacitance	C <sub>iss</sub>	V <sub>gs</sub> =0V, V <sub>ds</sub> =15V, f=1MHz		1900		pF	
Output capacitance	C <sub>oss</sub>			530		pF	
Reverse transfer capacitance	C <sub>rss</sub>			120		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> =15A		18.0	28.0	nC	2
Gate-source charge	Q <sub>gs</sub>			4.2		nC	2
Gate-drain charge	Q <sub>gd</sub>			5.4		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		10		ns	2
Turn-on rise time	t <sub>r</sub>			24		ns	2
Turn-off delay time	t <sub>d(off)</sub>		RI=15 Ω, Rgen=6 Ω		48		ns
Turn-off fall time	t <sub>f</sub>			12		ns	2
Body diode reverse recovery time	t <sub>rr</sub>	I <sub>f</sub> =3A, dI/dt=100A/μs		50	80	ns	

NOTE :

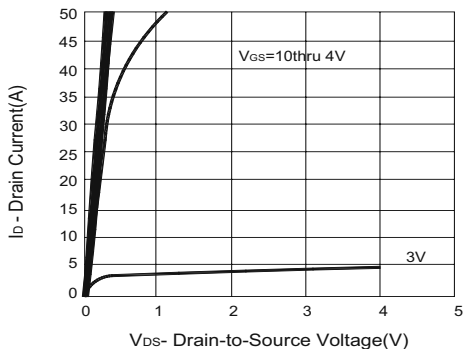
1. Pulsed width ≤ 300 μsec and Duty cycle ≤ 2%;
2. Independent of operating temperature;
3. Pulsed width limited by maximum junction temperature.
4. Duty cycle ≤ 1%.

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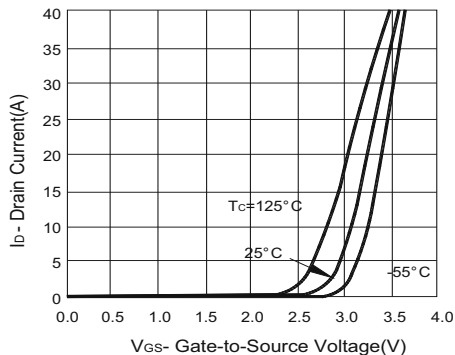
## ELM34414AA-N

### Typical electrical and thermal characteristics

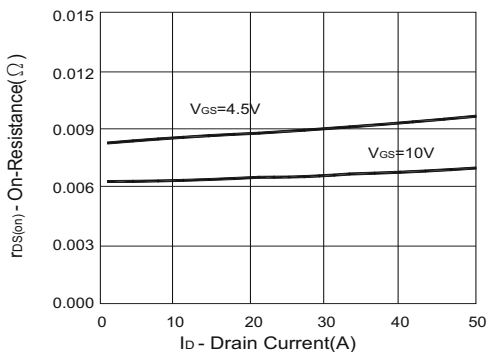
#### Output Characteristics



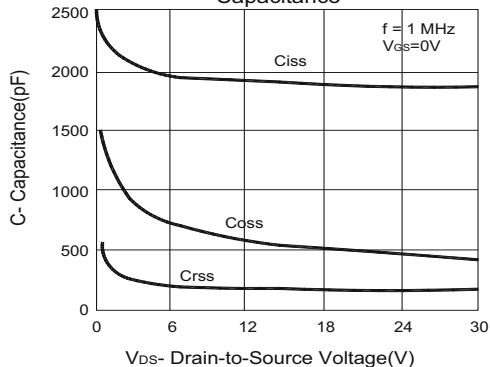
#### Transfer Characteristics



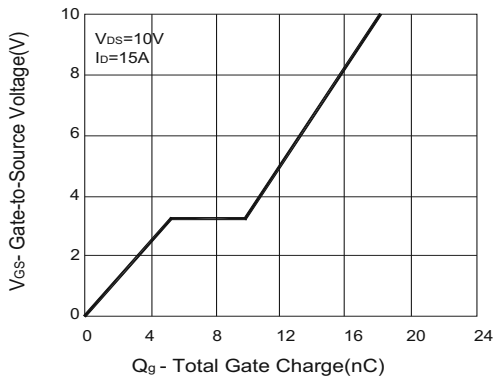
#### On-Resistance vs. Drain Current



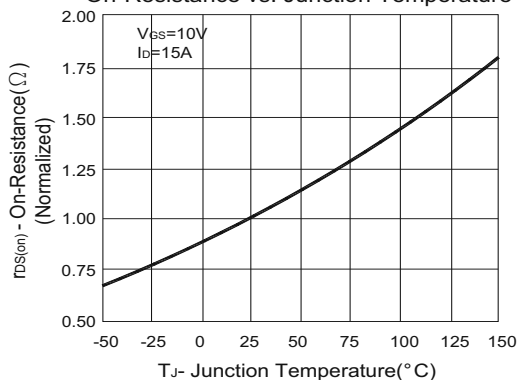
#### Capacitance



#### Gate Charge



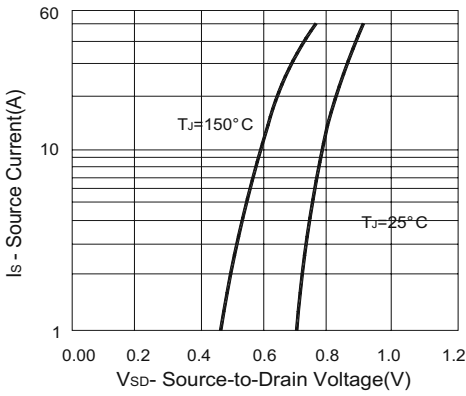
#### On-Resistance vs. Junction Temperature



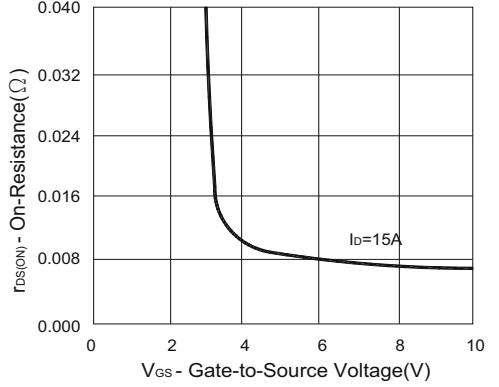
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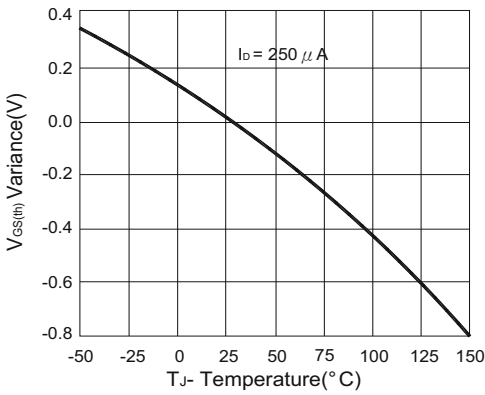
Source-Drain Diode Forward Voltage



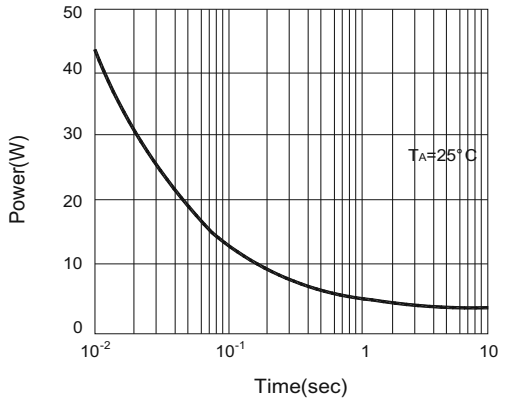
On-Resistance vs. Gate-to-Source Voltage



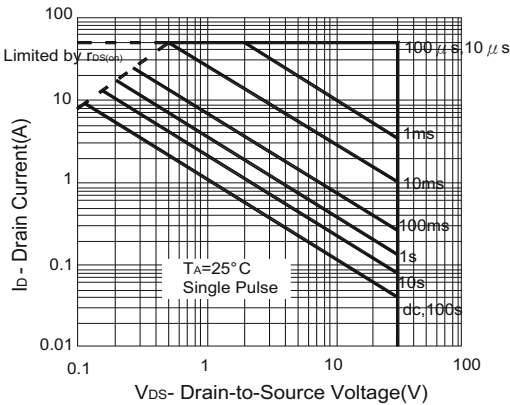
Threshold Voltage



Single Pulse Power



Safe Operating Area, Junction-to Ambient



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