

# Complementary MOSFET

ELM34600AA-N

## General Description

ELM34600AA-N uses advanced trench technology to provide excellent  $R_{ds(on)}$  and low gate charge.

## Features

- N-channel
- $V_{ds}=30V$
- $I_d=7A$
- $R_{ds(on)} < 27.5m\Omega (V_{gs}=10V)$
- $R_{ds(on)} < 40.0m\Omega (V_{gs}=4.5V)$
- P-channel
- $V_{ds}=-30V$
- $I_d=-5A$
- $R_{ds(on)} < 45m\Omega (V_{gs}=-10V)$
- $R_{ds(on)} < 80m\Omega (V_{gs}=-4.5V)$

## Maximum Absolute Ratings

Parameter	Symbol	N-ch (Max.)	P-ch (Max.)	Unit	Note
Drain-source voltage	$V_{ds}$	30	-30	V	
Gate-source voltage	$V_{gs}$	$\pm 20$	$\pm 20$	V	
Continuous drain current	$I_d$	$T_a=25^\circ C$	7	-5	A
		$T_a=70^\circ C$	6	-4	
Pulsed drain current	$I_{dm}$	20	-20	A	1
Power dissipation	$P_d$	$T_a=25^\circ C$	2.0	2.0	W
		$T_a=70^\circ C$	1.3	1.3	
Junction and storage temperature range	$T_j, T_{stg}$	-55 to 150	-55 to 150	$^\circ C$	

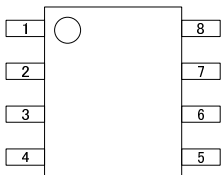
## Thermal Characteristics

Parameter	Symbol	Device	Typ.	Max.	Unit	Note
Maximum junction-to-ambient	$R\theta_{ja}$	N-ch		62.5	$^\circ C/W$	
Maximum junction-to-ambient	$R\theta_{ja}$	P-ch		62.5	$^\circ C/W$	

- Pulse width limited by maximum junction temperature.
- Duty cycle  $\leq 1\%$ .

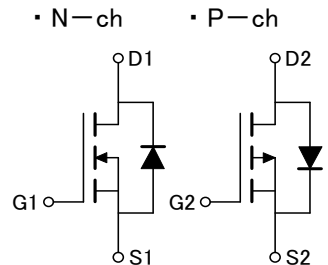
## Pin Configuration

SOP-8 (TOP VIEW)



Pin No.	Pin name
1	SOURCE1
2	GATE1
3	SOURCE2
4	GATE2
5	DRAIN2
6	DRAIN2
7	DRAIN1
8	DRAIN1

## Circuit



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### ■ Electrical Characteristics (N-ch)

T<sub>a</sub>=25°C

Parameter	Symbol	Conditions	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	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> =7A		20.5	27.5	mΩ	1	
		V <sub>gs</sub> =4.5V, I <sub>d</sub> =6A		30.0	40.0			
Forward transconductance	G <sub>fs</sub>	V <sub>ds</sub> =5V, I <sub>d</sub> =7A		16		S	1	
Diode forward voltage	V <sub>sd</sub>	I <sub>f</sub> =1A, V <sub>gs</sub> =0V			1	V	1	
Max.body-diode continuous current	I <sub>s</sub>				1.3	A		
Pulsed current	I <sub>sm</sub>				2.6	A	3	
<b>DYNAMIC PARAMETERS</b>								
Input capacitance	C <sub>iss</sub>	V <sub>gs</sub> =0V, V <sub>ds</sub> =15V, f=1MHz		680		pF		
Output capacitance	C <sub>oss</sub>				105		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> =15V, I <sub>d</sub> =7A		14.0		nC	2	
Gate-source charge	Q <sub>gs</sub>				1.9		nC	2
Gate-drain charge	Q <sub>gd</sub>				3.3		nC	2
Turn-on delay time	t <sub>d(on)</sub>	V <sub>gs</sub> =10V, V <sub>ds</sub> =10V, I <sub>d</sub> ≈ 1A R <sub>gen</sub> =3 Ω		4.6	7.0	ns	2	
Turn-on rise time	t <sub>r</sub>				4.0	6.0	ns	2
Turn-off delay time	t <sub>d(off)</sub>				20.0	30.0	ns	2
Turn-off fall time	t <sub>f</sub>				5.0	8.0	ns	2

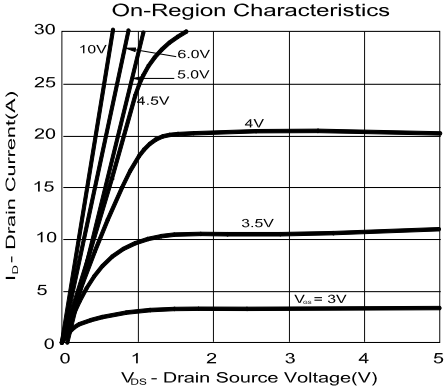
#### NOTE :

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

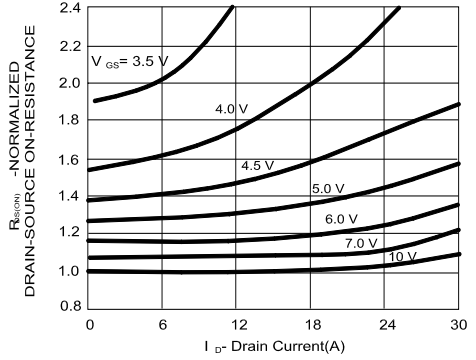
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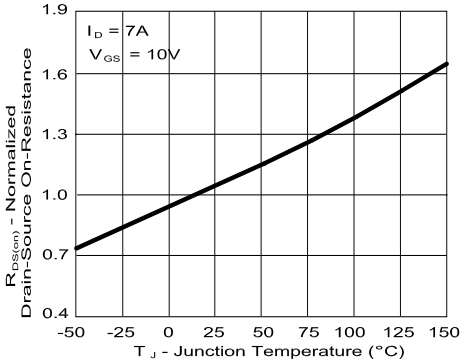
### Typical Electrical and Thermal Characteristics (N-ch)



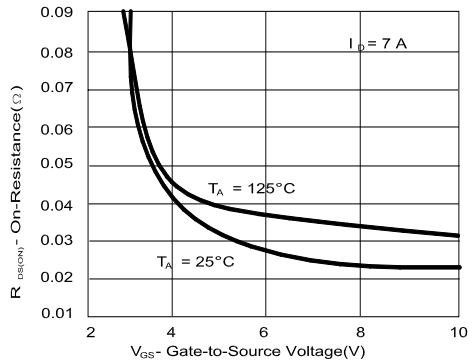
On-Resistance Variation with Drain Current and Gate Voltage



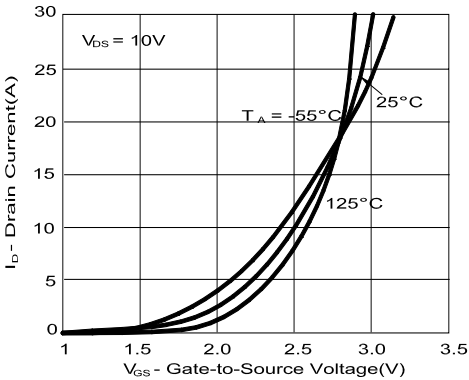
On-Resistance Variation with Temperature



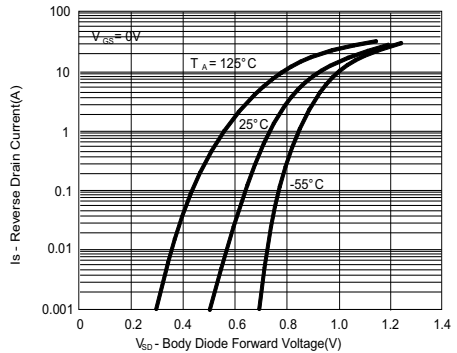
On-Resistance Variation with Gate-to-Source Voltage



Transfer Characteristics

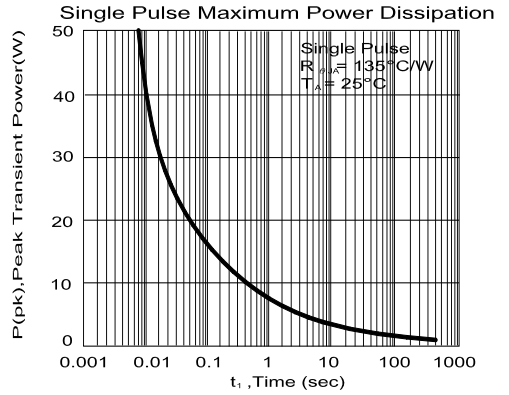
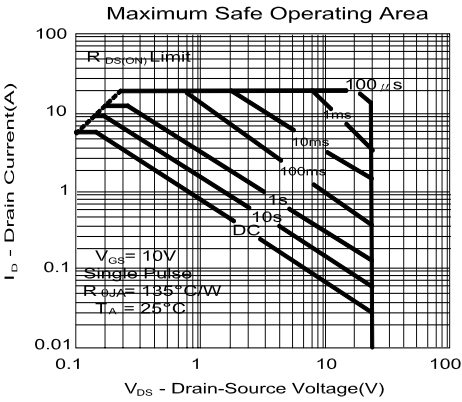
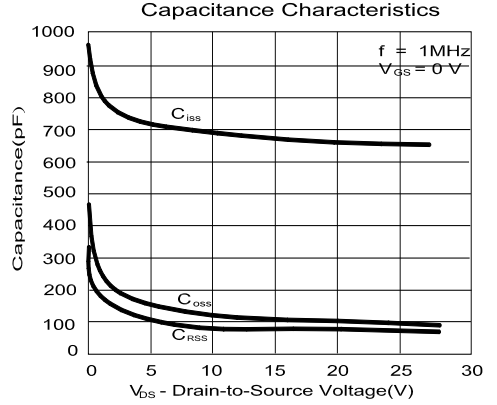
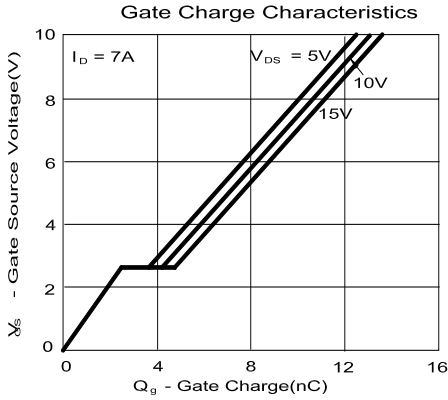


Body Diode Forward Voltage Variation with Source Current and Temperature



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### ■ Electrical Characteristics (P-ch)

T<sub>a</sub>=25°C

Parameter	Symbol	Conditions	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	-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> =0V, 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> =-5A		37.5	45.0	mΩ	1	
		V <sub>gs</sub> =-4.5V, I <sub>d</sub> =-4A		62.0	80.0			
Forward transconductance	G <sub>fs</sub>	V <sub>ds</sub> =-5V, I <sub>d</sub> =-5A		13		S	1	
Diode forward voltage	V <sub>sd</sub>	I <sub>f</sub> =-1A, V <sub>gs</sub> =0V			-1	V	1	
Max.body-diode continuous current	I <sub>s</sub>				-1.3	A		
Pulsed current	I <sub>sm</sub>				-2.6	A	3	
<b>DYNAMIC PARAMETERS</b>								
Input capacitance	C <sub>iss</sub>	V <sub>gs</sub> =0V, V <sub>ds</sub> =-15V, f=1MHz		780		pF		
Output capacitance	C <sub>oss</sub>			145		pF		
Reverse transfer capacitance	C <sub>rss</sub>			79		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> =-5A		15.1		nC	2	
Gate-source charge	Q <sub>gs</sub>			2.1		nC	2	
Gate-drain charge	Q <sub>gd</sub>			4.0		nC	2	
Turn-on delay time	t <sub>d(on)</sub>	V <sub>gs</sub> =-10V, V <sub>ds</sub> =-10V I <sub>d</sub> ≅-1A, R <sub>gen</sub> =3Ω		7.7	11.5	ns	2	
Turn-on rise time	t <sub>r</sub>			5.7	8.5	ns	2	
Turn-off delay time	t <sub>d(off)</sub>			20.0	30.0	ns	2	
Turn-off fall time	t <sub>f</sub>				9.5	14.0	ns	2

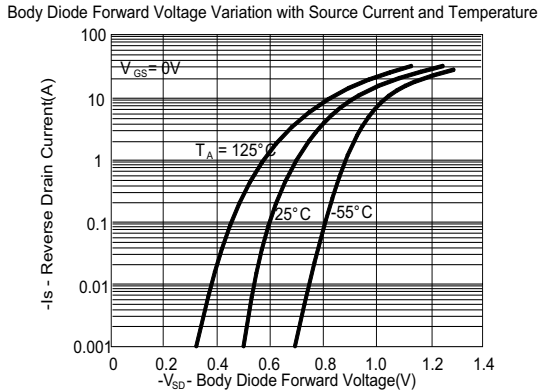
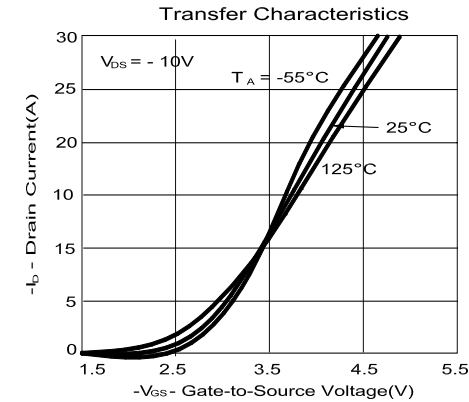
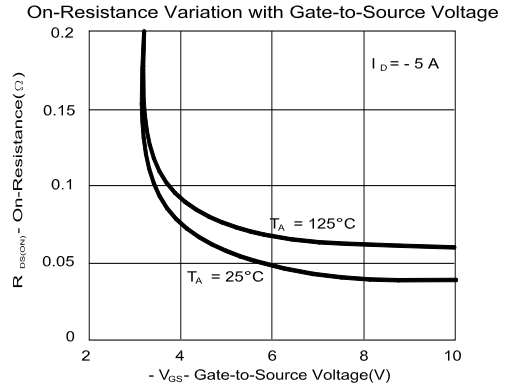
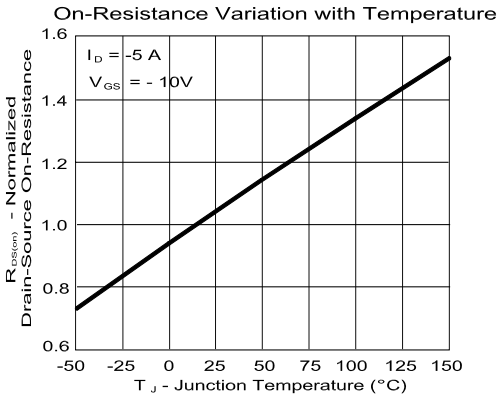
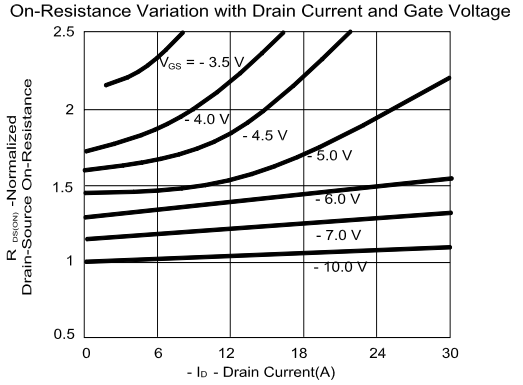
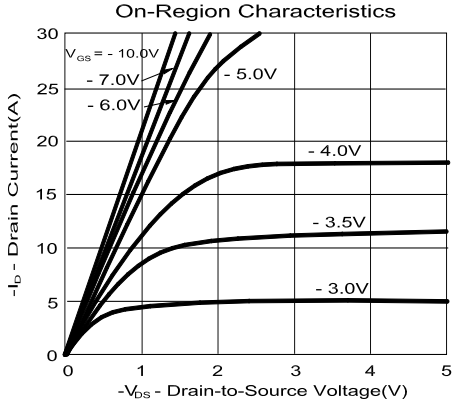
#### NOTE :

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2. Independent of operating temperature.
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### Typical Electrical and Thermal Characteristics (P-ch)



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