

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

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}	± 20	± 20	V	
Continuous drain current	$T_a=25^{\circ}C$	I_d	7	-5	A	
	$T_a=70^{\circ}C$		6	-4		
Pulsed drain current		I_{dm}	20	-20	A	1
Power dissipation	$T_a=25^{\circ}C$	P_d	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	$^{\circ}C$	

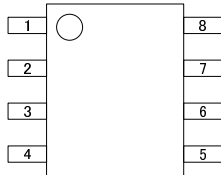
Thermal Characteristics

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	$^{\circ}C/W$	

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

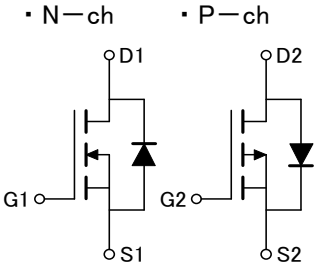
Pin Configuration

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_a=25°C

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	Note
STATIC PARAMETERS							
Drain-source breakdown voltage	BV _{dss}	I _d =250 μA, V _{gs} =0V	30			V	
Zero gate voltage drain current	I _{dss}	V _d =24V, V _{gs} =0V			1	μA	
		V _d =20V, V _{gs} =0V, T _j =55°C			10		
Gate-body leakage current	I _{gss}	V _d =0V, V _{gs} =±20V			±100	nA	
Gate threshold voltage	V _{gs(th)}	V _d =V _{gs} , I _d =250 μA	1.0	1.5	2.5	V	
On state drain current	I _{d(on)}	V _{gs} =10V, V _d =5V	20			A	1
Static drain-source on-resistance	R _{ds(on)}	V _{gs} =10V, I _d =7A		20.5	27.5	mΩ	1
		V _{gs} =4.5V, I _d =6A		30.0	40.0		
Forward transconductance	G _{fs}	V _d =5V, I _d =7A		16		S	1
Diode forward voltage	V _{sd}	I _f =1A, V _{gs} =0V			1	V	1
Max.body-diode continuous current	I _s				1.3	A	
Pulsed current	I _{sm}				2.6	A	3
DYNAMIC PARAMETERS							
Input capacitance	C _{iss}	V _{gs} =0V, V _d =15V, f=1MHz		680		pF	
Output capacitance	C _{oss}			105		pF	
Reverse transfer capacitance	C _{rss}			75		pF	
SWITCHING PARAMETERS							
Total gate charge	Q _g	V _{gs} =10V, V _d =15V, I _d =7A		14.0		nC	2
Gate-source charge	Q _{gs}			1.9		nC	2
Gate-drain charge	Q _{gd}			3.3		nC	2
Turn-on delay time	t _{d(on)}	V _{gs} =10V, V _d =10V, I _d ≅ 1A R _{gen} =3 Ω		4.6	7.0	ns	2
Turn-on rise time	t _r			4.0	6.0	ns	2
Turn-off delay time	t _{d(off)}			20.0	30.0	ns	2
Turn-off fall time	t _f			5.0	8.0	ns	2

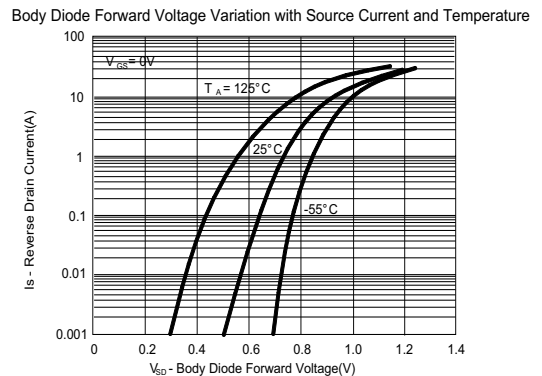
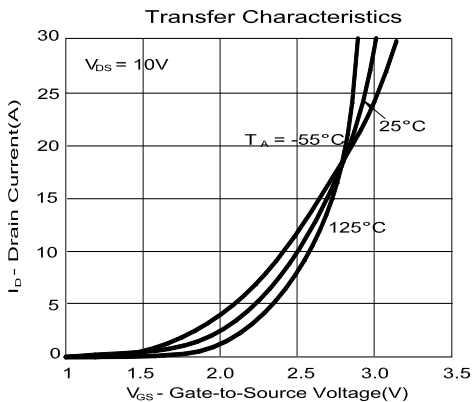
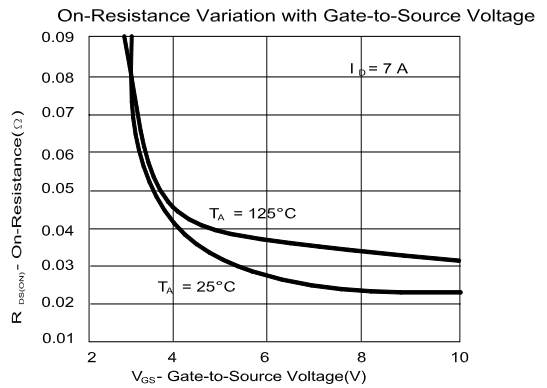
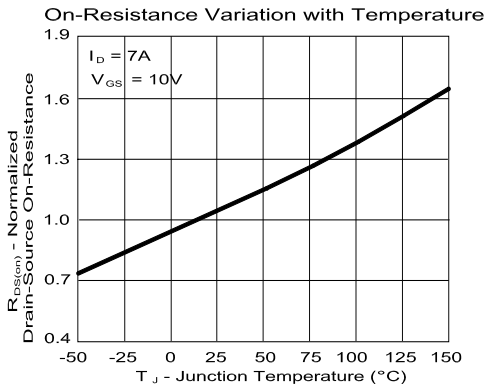
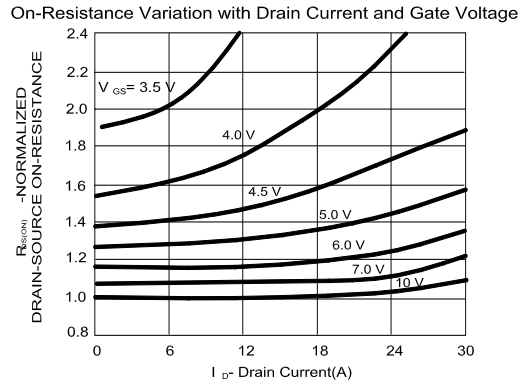
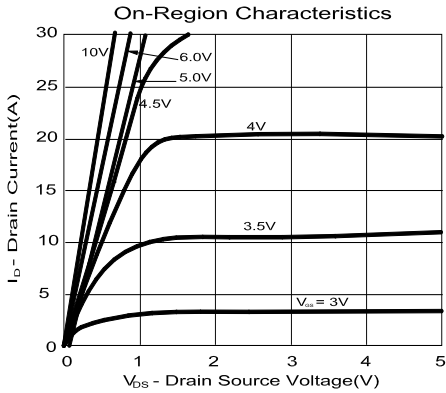
NOTE :

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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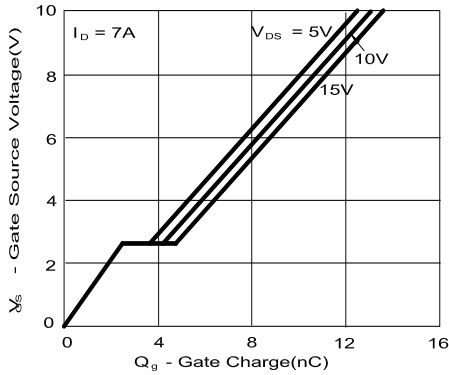
Typical Electrical and Thermal Characteristics (N-ch)



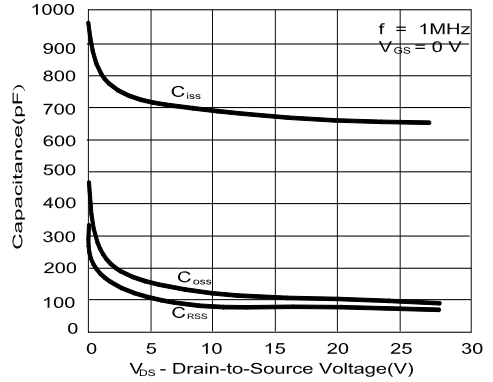
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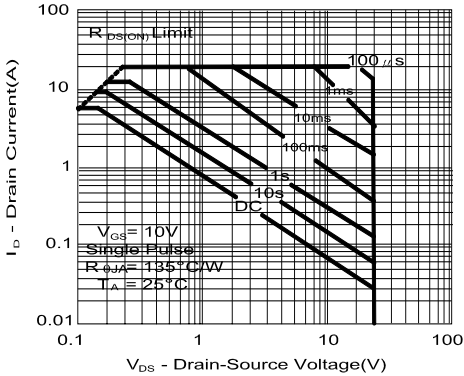
Gate Charge Characteristics



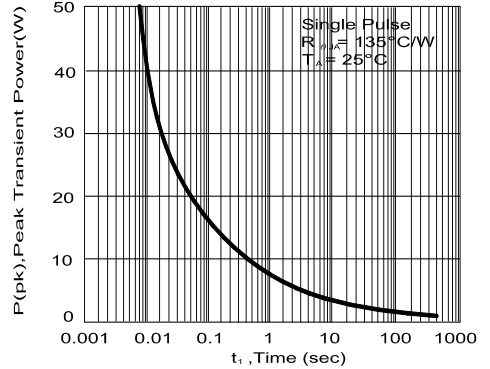
Capacitance Characteristics



Maximum Safe Operating Area



Single Pulse Maximum Power Dissipation



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■ Electrical Characteristics (P-ch)

T_a=25°C

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	Note
STATIC PARAMETERS							
Drain-source breakdown voltage	BV _{dss}	I _d =-250 μA, V _{gs} =0V	-30			V	
Zero gate voltage drain current	I _{dss}	V _{ds} =-24V, V _{gs} =0V			-1	μ A	
		V _{ds} =-20V, V _{gs} =0V, T _j =55°C			-10		
Gate-body leakage current	I _{gss}	V _{ds} =0V, V _{gs} =±20V			±100	nA	
Gate threshold voltage	V _{gs(th)}	V _{ds} =V _{gs} , I _d =-250 μA	-1.0	-1.5	-2.5	V	
On state drain current	I _{d(on)}	V _{gs} =-10V, V _{ds} =-5V	-20			A	1
Static drain-source on-resistance	R _{ds(on)}	V _{gs} =-10V, I _d =-5A		37.5	45.0	m Ω	1
		V _{gs} =-4.5V, I _d =-4A		62.0	80.0		
Forward transconductance	G _{fs}	V _{ds} =-5V, I _d =-5A		13		S	1
Diode forward voltage	V _{sd}	I _f =-1A, V _{gs} =0V			-1	V	1
Max.body-diode continuous current	I _s				-1.3	A	
Pulsed current	I _{sm}				-2.6	A	3
DYNAMIC PARAMETERS							
Input capacitance	C _{iss}	V _{gs} =0V, V _{ds} =-15V, f=1MHz		780		pF	
Output capacitance	C _{oss}			145		pF	
Reverse transfer capacitance	C _{rss}			79		pF	
SWITCHING PARAMETERS							
Total gate charge	Q _g	V _{gs} =-10V, V _{ds} =-15V I _d =-5A		15.1		nC	2
Gate-source charge	Q _{gs}			2.1		nC	2
Gate-drain charge	Q _{gd}			4.0		nC	2
Turn-on delay time	t _{d(on)}	V _{gs} =-10V, V _{ds} =-10V I _d ≈ -1A, R _{gen} =3 Ω		7.7	11.5	ns	2
Turn-on rise time	t _r			5.7	8.5	ns	2
Turn-off delay time	t _{d(off)}			20.0	30.0	ns	2
Turn-off fall time	t _f			9.5	14.0	ns	2

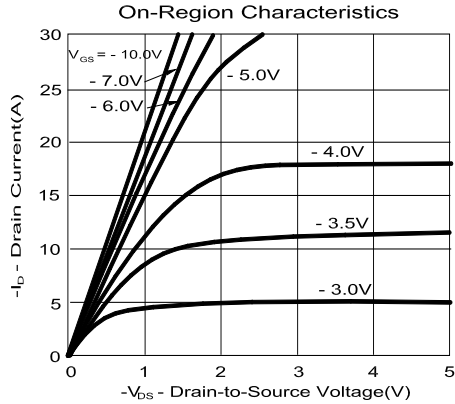
NOTE :

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

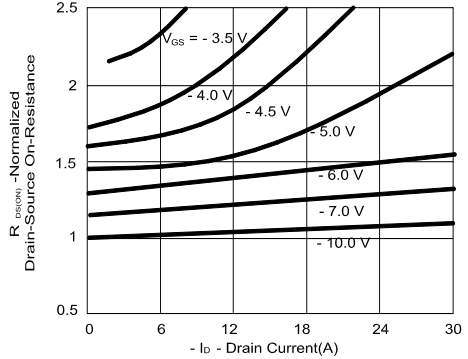
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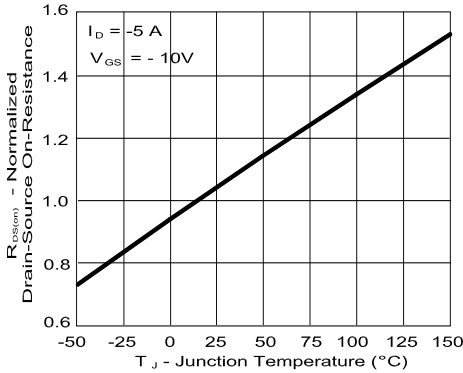
Typical Electrical and Thermal Characteristics (P-ch)



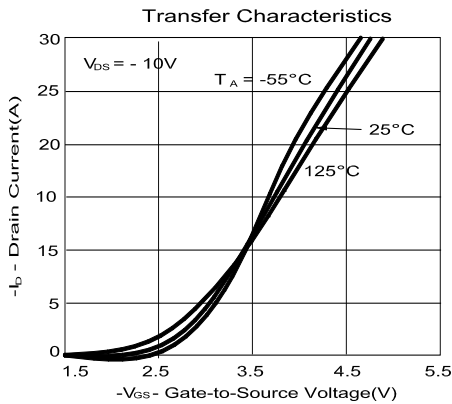
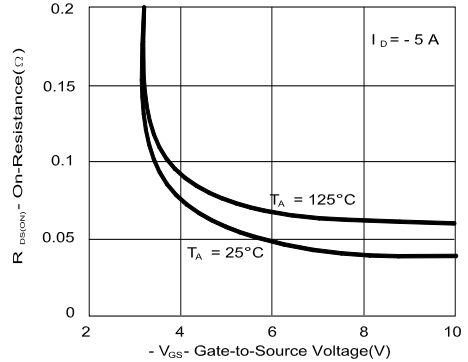
On-Resistance Variation with Drain Current and Gate Voltage



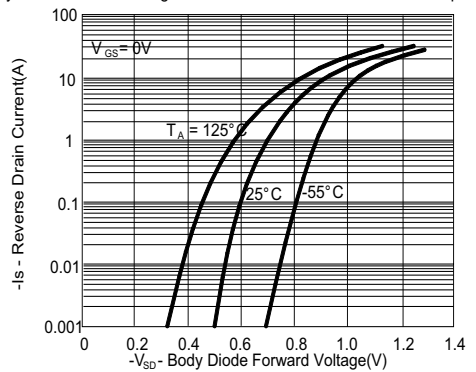
On-Resistance Variation with Temperature



On-Resistance Variation with Gate-to-Source Voltage



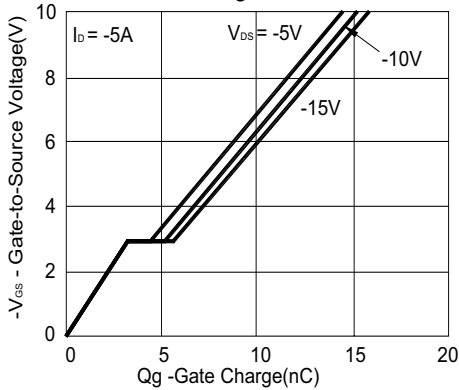
Body Diode Forward Voltage Variation with Source Current and Temperature



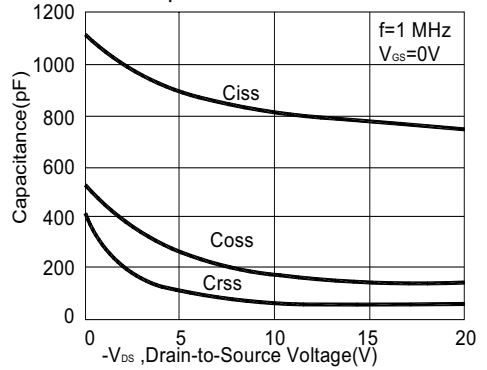
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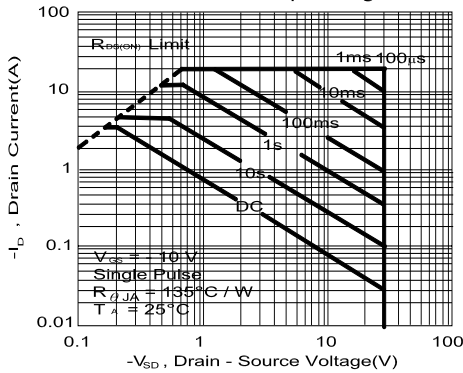
Gate Charge Characteristics



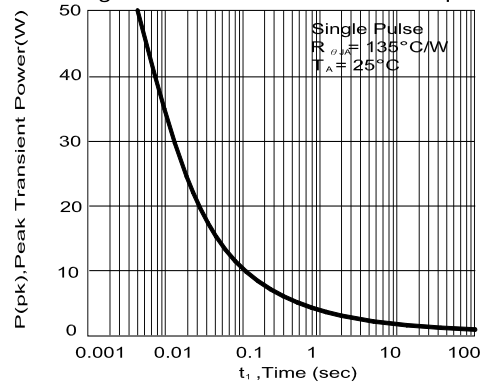
Capacitance Characteristics



Maximum Safe Operating Area



Single Pulse Maximum Power Dissipation



Transient Thermal Response Curve

