

Complementary MOSFET

ELM34609AA-N

General Description

ELM34609AA-N uses advanced trench technology to provide excellent $R_{ds(on)}$ and low gate charge.

Features

- | | |
|---|--|
| N-channel | P-channel |
| • $V_{ds}=30V$ | $V_{ds}=-30V$ |
| • $I_d=4A$ | $I_d=-3A$ |
| • $R_{ds(on)} < 65m\Omega (V_{gs}=10V)$ | $R_{ds(on)} < 150m\Omega (V_{gs}=-10V)$ |
| • $R_{ds(on)} < 120m\Omega (V_{gs}=4.5V)$ | $R_{ds(on)} < 250m\Omega (V_{gs}=-4.5V)$ |

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	4	-3	A	
	$T_a=70^{\circ}C$		3	-2		
Pulsed drain current		I_{dm}	10	-10	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	$^{\circ}C$	

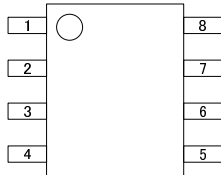
Thermal Characteristics

Parameter		Symbol	Device	Typ.	Max.	Unit	Note
Maximum junction-to-ambient		$R\theta_{ja}$	N-ch		110	$^{\circ}C/W$	
Maximum junction-to-ambient		$R\theta_{ja}$	P-ch		110	$^{\circ}C/W$	

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

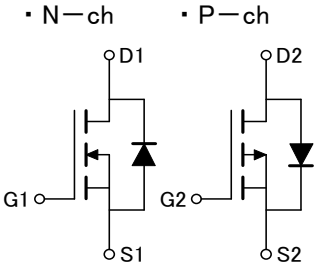
Pin Configuration

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 _{ds} =24V, V _{gs} =0V			1	μA	
		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	0.9	1.5	2.5	V	
On state drain current	I _{d(on)}	V _{gs} =10V, V _{ds} =5V	10			A	1
Static drain-source on-resistance	R _{ds(on)}	V _{gs} =10V, I _d =4A		48	65	mΩ	1
		V _{gs} =4.5V, I _d =3A		72	120		
Forward transconductance	G _{fs}	V _{ds} =10V, I _d =3A		6		S	1
Diode forward voltage	V _{sd}	I _f =0.9A, V _{gs} =0V			1.2	V	1
DYNAMIC PARAMETERS							
Input capacitance	C _{iss}	V _{gs} =0V, V _{ds} =10V, f=1MHz		265		pF	
Output capacitance	C _{oss}			65		pF	
Reverse transfer capacitance	C _{rss}			40		pF	
SWITCHING PARAMETERS							
Total gate charge	Q _g	V _{gs} =10V, V _{ds} =15V, I _d =3A		5.0	7.5	nC	2
Gate-source charge	Q _{gs}			0.8		nC	2
Gate-drain charge	Q _{gd}			1.0		nC	2
Turn-on delay time	t _{d(on)}	V _{gs} =10V, V _{ds} =15V, I _d ≈ 1A R _L =15 Ω, R _{gen} =6 Ω		7	11	ns	2
Turn-on rise time	t _r			12	18	ns	2
Turn-off delay time	t _{d(off)}			12	18	ns	2
Turn-off fall time	t _f			7	11	ns	2
Body-diode reverse recovery time	t _{rr}	I _f =0.9A, dI/dt=100A/μs		40	80	ns	

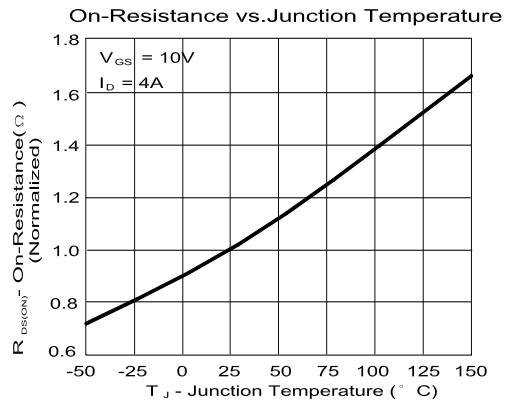
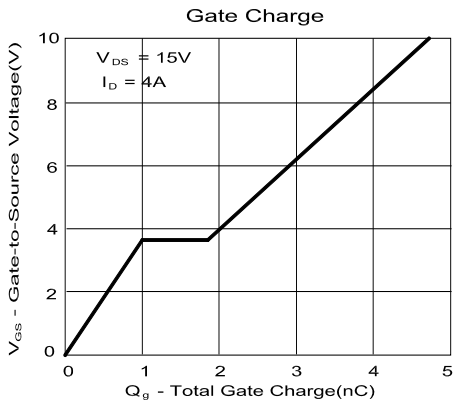
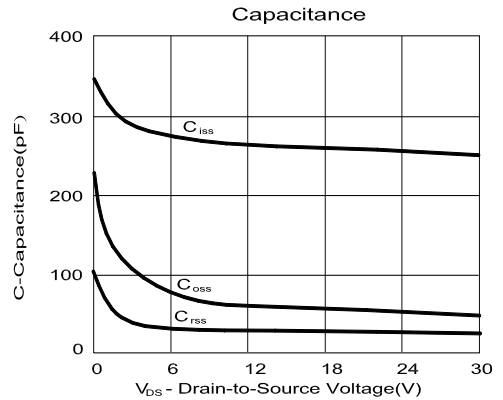
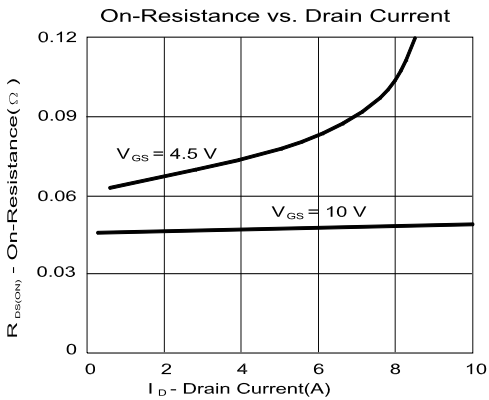
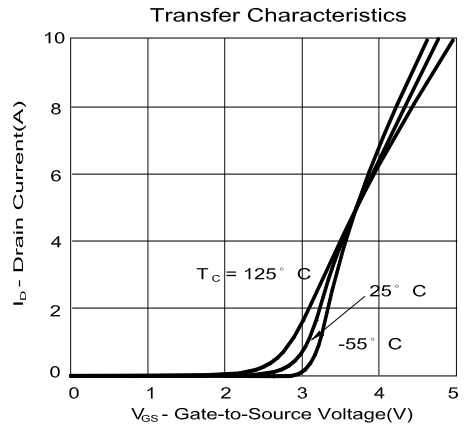
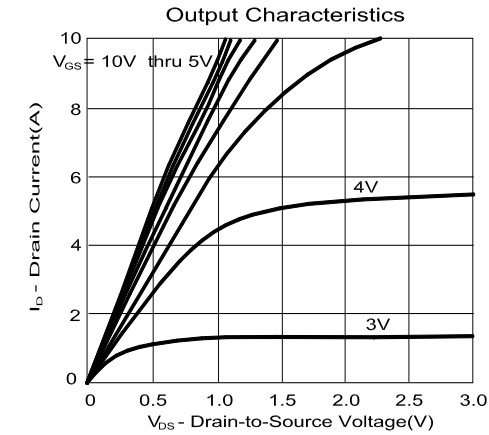
NOTE :

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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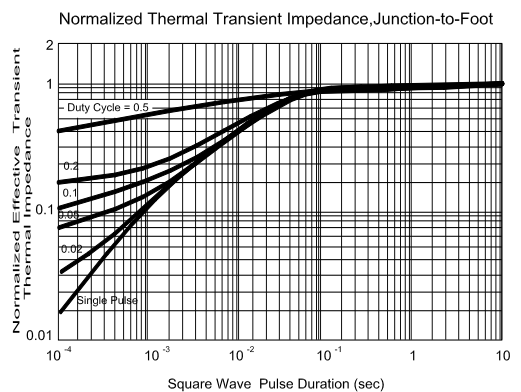
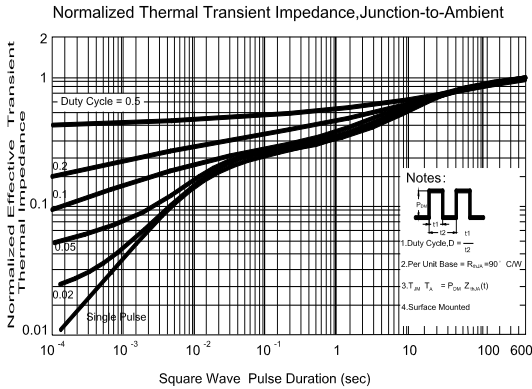
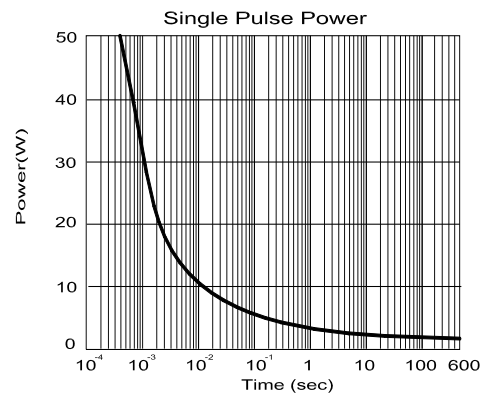
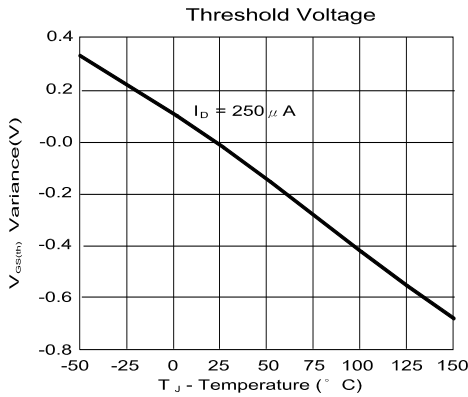
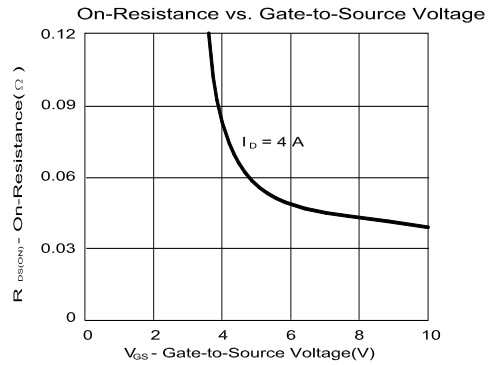
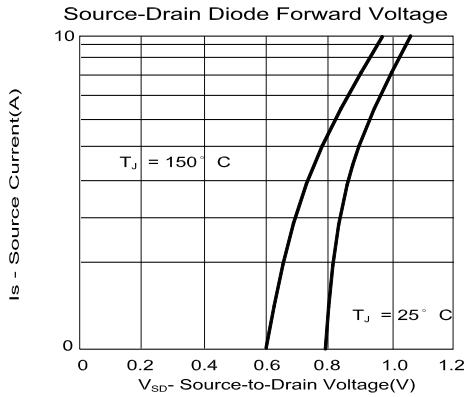
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Typical Electrical and Thermal Characteristics (N-ch)



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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 μ A	-0.9	-1.5	-2.5	V	
On state drain current	I _{d(on)}	V _{gs} =-10V, V _{ds} =-5V	-10			A	1
Static drain-source on-resistance	R _{ds(on)}	V _{gs} =-10V, I _d =-3A		100	150	mΩ	1
		V _{gs} =-4.5V, I _d =-2A		170	250		
Forward transconductance	G _{fs}	V _{ds} =-10V, I _d =-2A		3		S	1
Diode forward voltage	V _{sd}	I _f =-0.9A, V _{gs} =0V			-1.2	V	1
DYNAMIC PARAMETERS							
Input capacitance	C _{iss}	V _{gs} =0V, V _{ds} =-10V, f=1MHz		290		pF	
Output capacitance	C _{oss}			65		pF	
Reverse transfer capacitance	C _{rss}			40		pF	
SWITCHING PARAMETERS							
Total gate charge	Q _g	V _{gs} =-10V, V _{ds} =-15V I _d =-2A		5.5	6.6	nC	2
Gate-source charge	Q _{gs}			1.2		nC	2
Gate-drain charge	Q _{gd}			0.9		nC	2
Turn-on delay time	t _{d(on)}	V _{gs} =-10V, V _{ds} =-15V I _d ≅ -1A, R _l =15 Ω , R _{gen} =6 Ω		8	12	ns	2
Turn-on rise time	t _r			11	18	ns	2
Turn-off delay time	t _{d(off)}			14	21	ns	2
Turn-off fall time	t _f			8	12	ns	2
Body-diode reverse recovery time	t _{rr}	I _f =-0.9A, dI/dt=100A/μ s		40	80	ns	

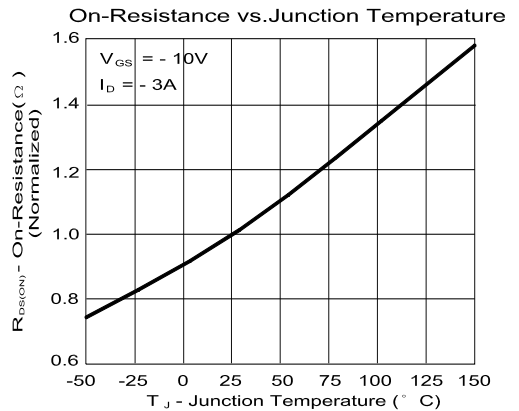
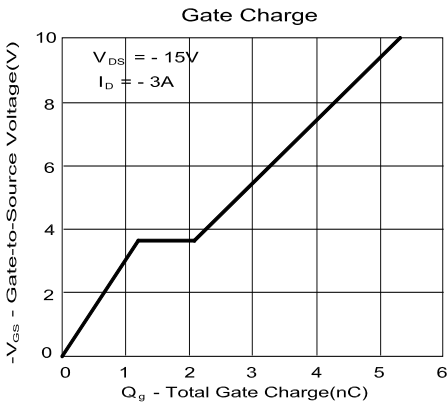
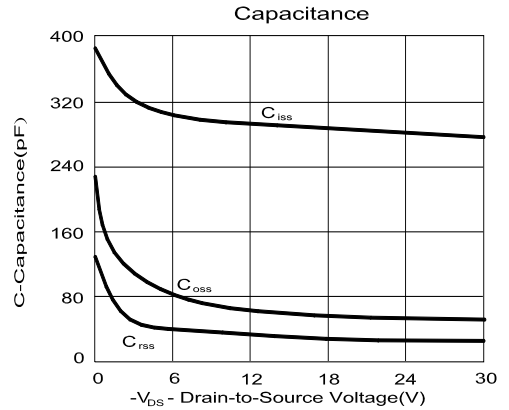
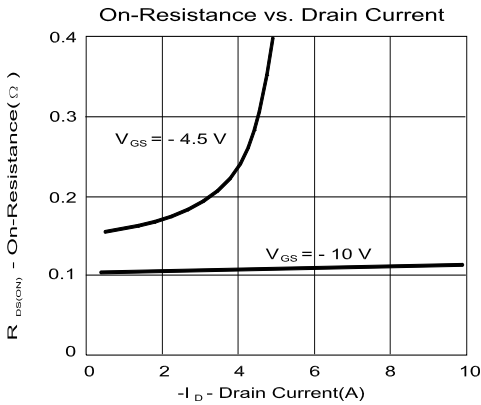
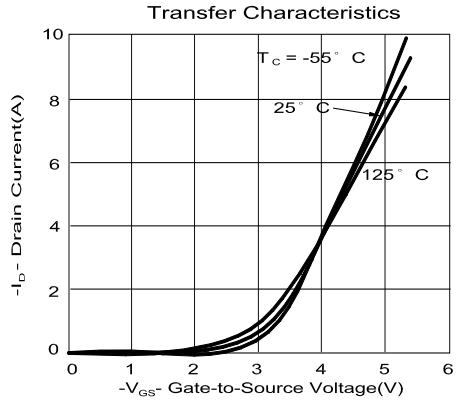
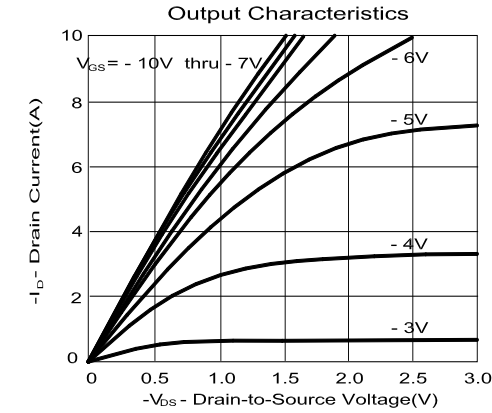
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