Complementary MOSFET

ELM34609AA-N

■General Description

ELM34609AA-N uses advanced trench technology to provide excellent Rds(on) and low gate charge.

■Features

N-channel	P-channel
• Vds=30V	Vds=-30V
• Id=4A	Id=-3A
• Rds(on) < 65mΩ(Vgs=10V)	Rds(on) < 150mΩ(Vgs=-10V)
• Rds(on) < 120mΩ(Vgs=4.5V)	Rds(on) < 250mΩ(Vgs=-4.5V)

■Maximum Absolute Ratings

Parameter		Symbol	N-ch (Max.)	P-ch (Max.)	Unit	Note
Drain-source voltage		Vds	30	-30	V	
Gate-source voltage		Vgs	±20	±20	V	
Continuous drain current	Ta=25℃	Id	4	-3	A	
	Ta=70℃		3	-2		
Pulsed drain current		Idm	10	-10	A	1
Power dissipation	Ta=25℃	Pd	2.0	2.0	W	
	Ta=70℃		1.3	1.3		
Junction and storage temperature range		Tj,Tstg	-55 to 150	-55 to 150	℃	

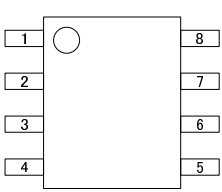
■Thermal Characteristics

Parameter		Symbol	Device	Typ.	Max.	Unit	Note
Maximum junction-to-ambient		Rθja	N-ch		110	℃/W	
Maximum junction-to-ambient		Rθja	P-ch		110	℃/W	

1. Pulse width limited by maximum junction temperature.
2. Duty cycle ≤ 1%.

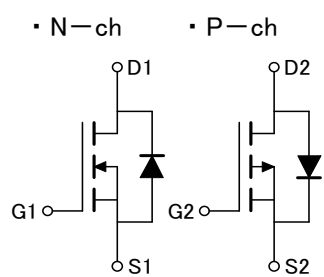
■Pin Configuration

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



■Electrical Characteristics (N-ch)

Ta=25℃

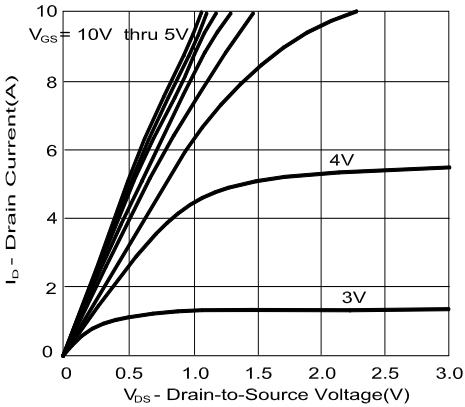
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	Note
STATIC PARAMETERS							
Drain-source breakdown voltage	BVdss	Id=250μA, Vgs=0V	30			V	
Zero gate voltage drain current	Idss	Vds=24V, Vgs=0V			1	μA	
		Vds=20V, Vgs=0V, Tj=55℃			10		
Gate-body leakage current	Igss	Vds=0V, Vgs=±20V			±100	nA	
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=250μA	0.9	1.5	2.5	V	
On state drain current	Id(on)	Vgs=10V, Vds=5V	10			A	1
Static drain-source on-resistance	Rds(on)	Vgs=10V, Id=4A		48	65	mΩ	1
		Vgs=4.5V, Id=3A		72	120		
Forward transconductance	Gfs	Vds=10V, Id=3A		6		S	1
Diode forward voltage	Vsd	If=0.9A, Vgs=0V			1.2	V	1
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vgs=0V, Vds=10V, f=1MHz		265		pF	
Output capacitance	Coss			65		pF	
Reverse transfer capacitance	Crss			40		pF	
SWITCHING PARAMETERS							
Total gate charge	Qg	Vgs=10V, Vds=15V, Id=3A		5.0	7.5	nC	2
Gate-source charge	Qgs			0.8		nC	2
Gate-drain charge	Qgd			1.0		nC	2
Turn-on delay time	td(on)	Vgs=10V, Vds=15V, Id ≅ 1A Rl=15Ω, Rgen=6Ω		7	11	ns	2
Turn-on rise time	tr			12	18	ns	2
Turn-off delay time	td(off)			12	18	ns	2
Turn-off fall time	tf			7	11	ns	2
Body-diode reverse recovery time	trr	If=0.9A, dI/dt=100A/μs		40	80	ns	

NOTE :

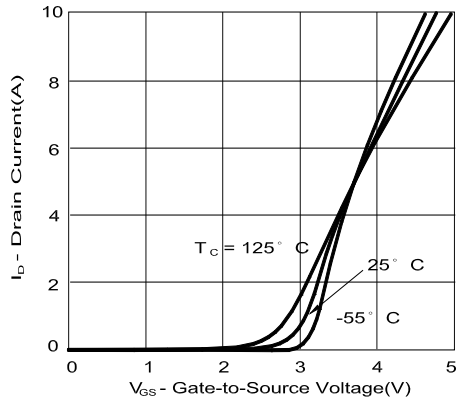
1. Pulse test : Pulse width ≤ 300μsec, duty cycle ≤ 2%.
2. Independent of operating temperature.
3. Pulse width limited by maximum junction temperature.

■Typical Electrical and Thermal Characteristics (N-ch)

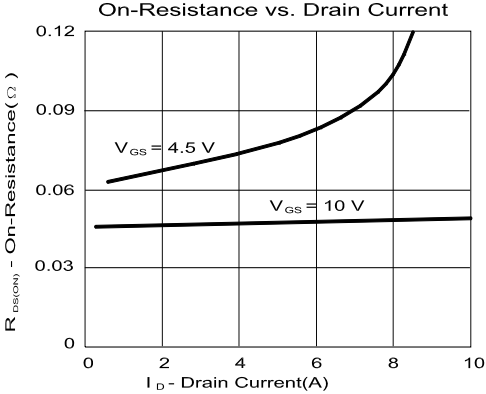
Output Characteristics



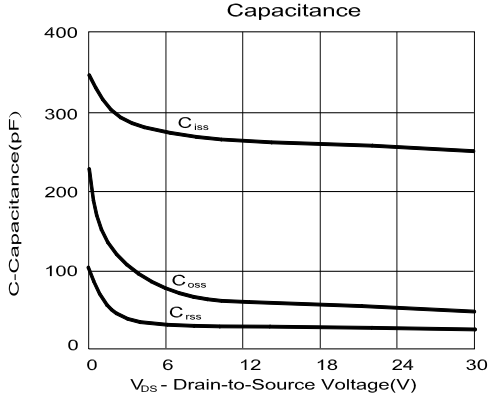
Transfer Characteristics



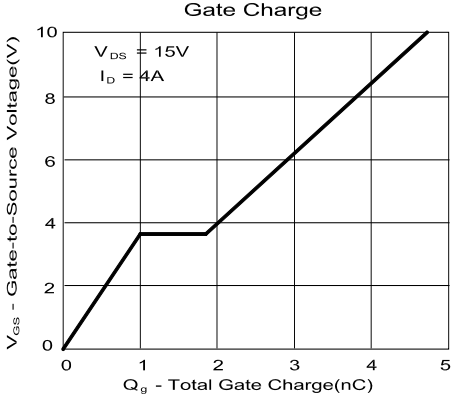
On-Resistance vs. Drain Current



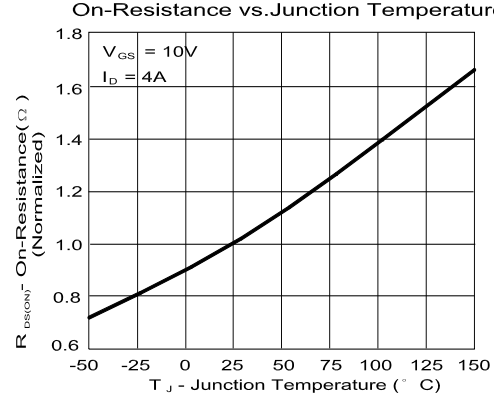
Capacitance



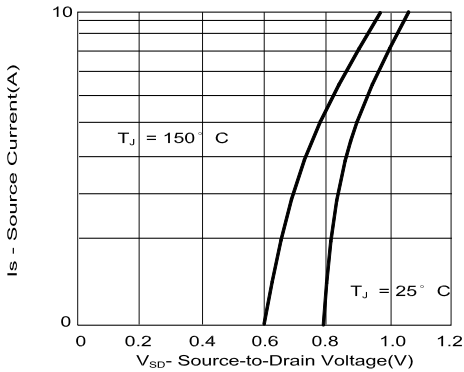
Gate Charge



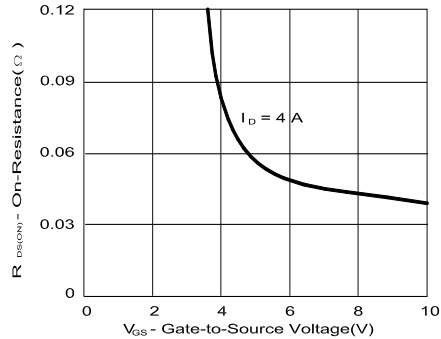
On-Resistance vs.Junction Temperature



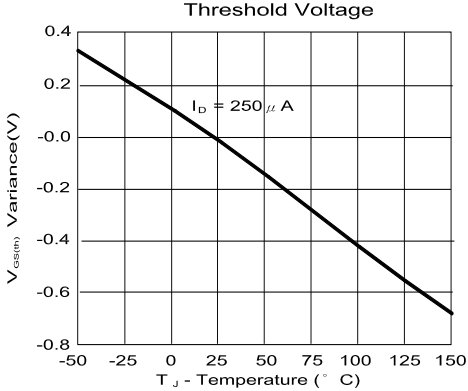
Source-Drain Diode Forward Voltage



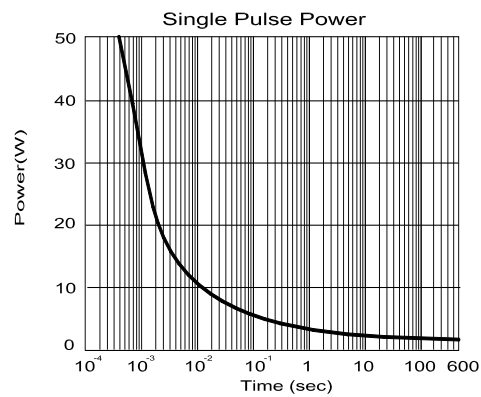
On-Resistance vs. Gate-to-Source Voltage



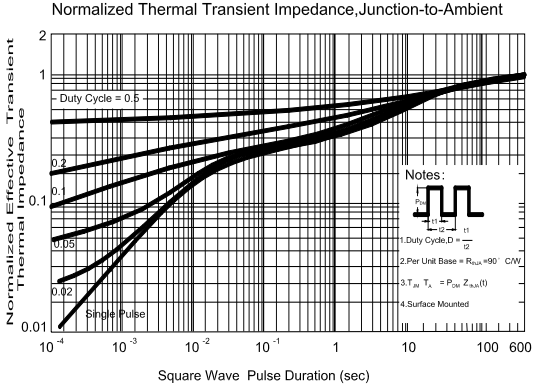
Threshold Voltage



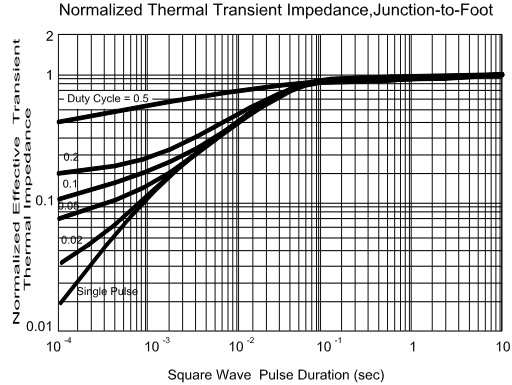
Single Pulse Power



Normalized Thermal Transient Impedance,Junction-to-Ambient



Normalized Thermal Transient Impedance,Junction-to-Foot



■Electrical Characteristics (P-ch)

Ta=25℃

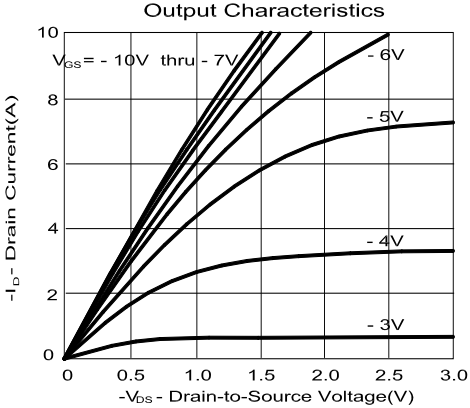
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	Note
STATIC PARAMETERS							
Drain-source breakdown voltage	BVdss	Id=-250μA, Vgs=0V	-30			V	
Zero gate voltage drain current	Idss	Vds=-24V, Vgs=0V			-1	μA	
		Vds=-20V, Vgs=0V, Tj=55℃			-10		
Gate-body leakage current	Igss	Vds=0V, Vgs=±20V			±100	nA	
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=-250μA	-0.9	-1.5	-2.5	V	
On state drain current	Id(on)	Vgs=-10V, Vds=-5V	-10			A	1
Static drain-source on-resistance	Rds(on)	Vgs=-10V, Id=-3A		100	150	mΩ	1
		Vgs=-4.5V, Id=-2A		170	250		
Forward transconductance	Gfs	Vds=-10V, Id=-2A		3		S	1
Diode forward voltage	Vsd	If=-0.9A, Vgs=0V			-1.2	V	1
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vgs=0V, Vds=-10V, f=1MHz		290		pF	
Output capacitance	Coss			65		pF	
Reverse transfer capacitance	Crss			40		pF	
SWITCHING PARAMETERS							
Total gate charge	Qg	Vgs=-10V, Vds=-15V Id=-2A		5.5	6.6	nC	2
Gate-source charge	Qgs			1.2		nC	2
Gate-drain charge	Qgd			0.9		nC	2
Turn-on delay time	td(on)	Vgs=-10V, Vds=-15V Id≅-1A, Rl=15Ω, Rgen=6Ω		8	12	ns	2
Turn-on rise time	tr			11	18	ns	2
Turn-off delay time	td(off)			14	21	ns	2
Turn-off fall time	tf			8	12	ns	2
Body-diode reverse recovery time	trr	If=-0.9A, dI/dt=100A/μs		40	80	ns	

NOTE :

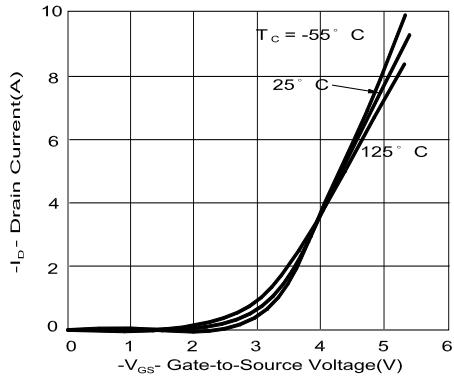
1. Pulse test : Pulse width ≤ 300μsec, duty cycle ≤ 2%.
2. Independent of operating temperature.
3. Pulse width limited by maximum junction temperature.

■Typical Electrical and Thermal Characteristics (P-ch)

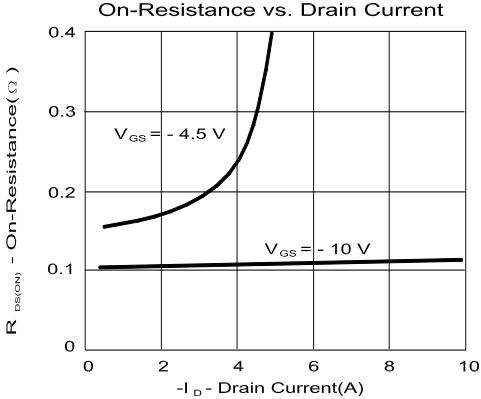
Output Characteristics



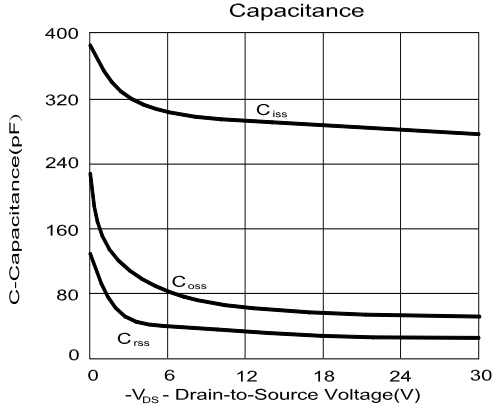
Transfer Characteristics



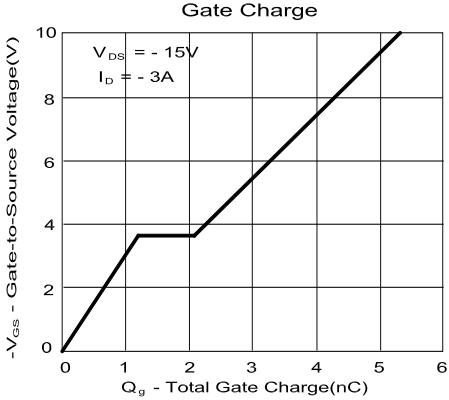
On-Resistance vs. Drain Current



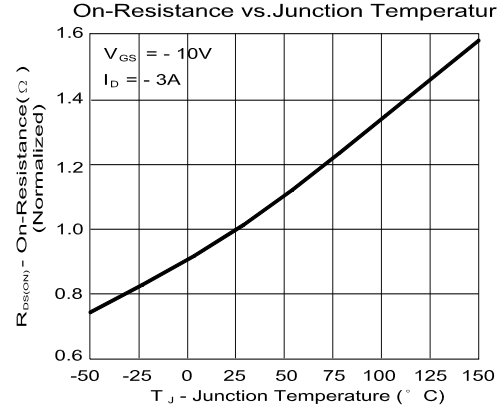
Capacitance



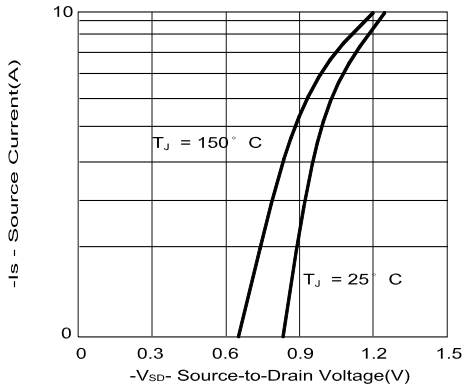
Gate Charge



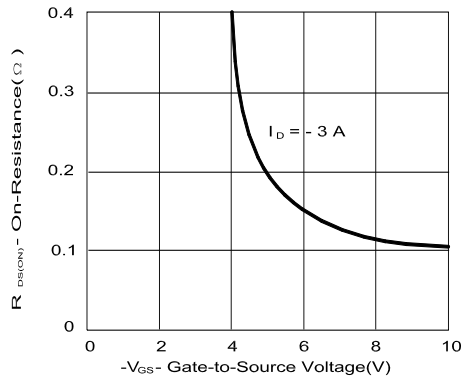
On-Resistance vs.Junction Temperature



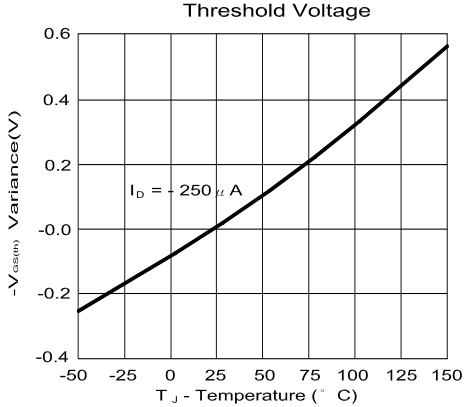
Source-Drain Diode Forward Voltage



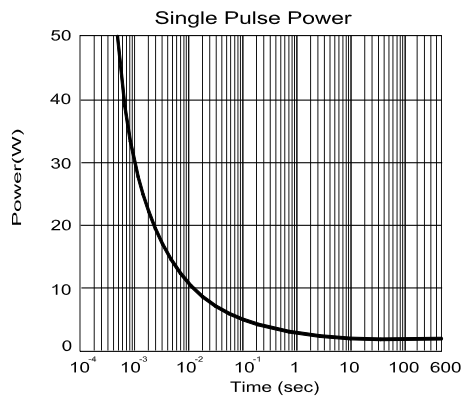
On-Resistance vs. Gate-to-Source Voltage



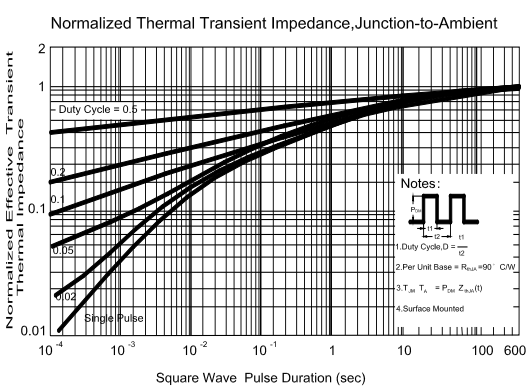
Threshold Voltage



Single Pulse Power



Normalized Thermal Transient Impedance,Junction-to-Ambient



Normalized Thermal Transient Impedance,Junction-to-Foot