

Complementary MOSFET

ELM34606AA-N

General Description

ELM34606AA-N uses advanced trench technology to provide excellent $R_{ds(on)}$ and low gate charge.

Features

- | | |
|--|---|
| N-channel | P-channel |
| • $V_{ds}=30V$ | $V_{ds}=-30V$ |
| • $I_d=4A$ | $I_d=-5A$ |
| • $R_{ds(on)} < 60m\Omega$ ($V_{gs}=10V$) | $R_{ds(on)} < 45m\Omega$ ($V_{gs}=-10V$) |
| • $R_{ds(on)} < 95m\Omega$ ($V_{gs}=4.5V$) | $R_{ds(on)} < 80m\Omega$ ($V_{gs}=-4.5V$) |

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	4	-5	A	
	$T_a=70^{\circ}C$		3	-4		
Pulsed drain current		I_{dm}	12	-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	$^{\circ}C$	

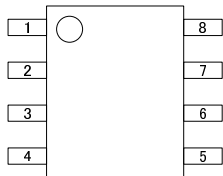
Thermal Characteristics

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 $\leq 1\%$.

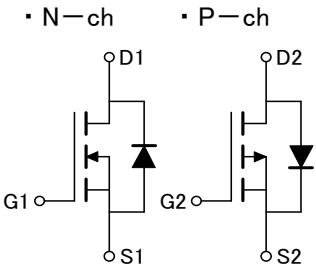
Pin Configuration

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 _{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	1.0	1.5	2.5	V	
On state drain current	I _{d(on)}	V _{gs} =10V, V _{ds} =5V	12			A	1
Static drain-source on-resistance	R _{ds(on)}	V _{gs} =10V, I _d =4A		48	60	mΩ	1
		V _{gs} =4.5V, I _d =3A		72	95		
Forward transconductance	G _{fs}	V _{ds} =5V, I _d =3A		19		S	1
Diode forward voltage	V _{sd}	I _f =1A, V _{gs} =0V			1	V	1
Max.body-diode continuous current	I _s				1.2	A	
Pulsed current	I _{sm}				2.6	A	3
DYNAMIC PARAMETERS							
Input capacitance	C _{iss}	V _{gs} =0V, V _{ds} =10V, f=1MHz		790		pF	
Output capacitance	C _{oss}			175		pF	
Reverse transfer capacitance	C _{rss}			65		pF	
SWITCHING PARAMETERS							
Total gate charge	Q _g	V _{gs} =10V, V _{ds} =15V, I _d =3A		5.0		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} =10V, I _d ≐ 1A 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

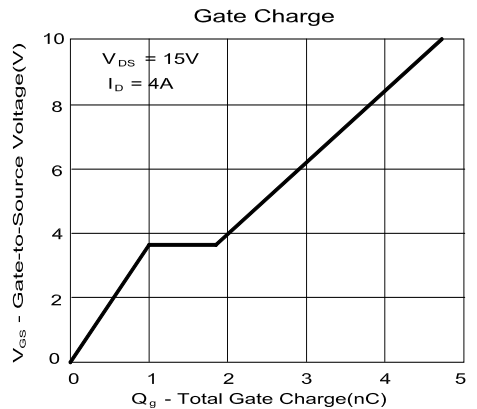
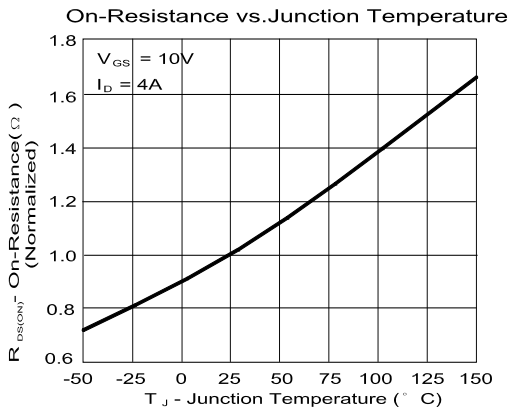
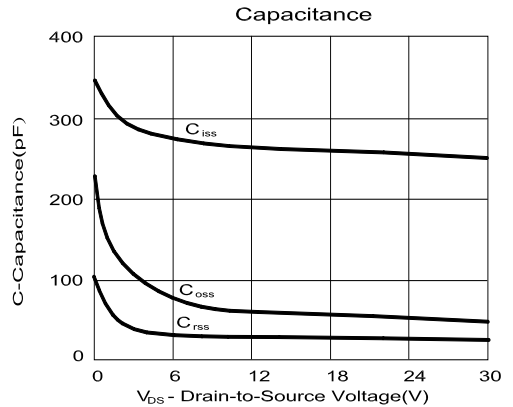
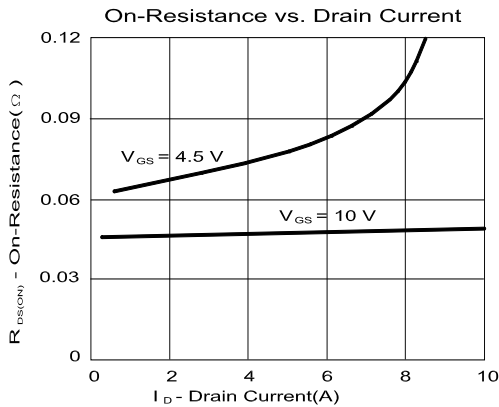
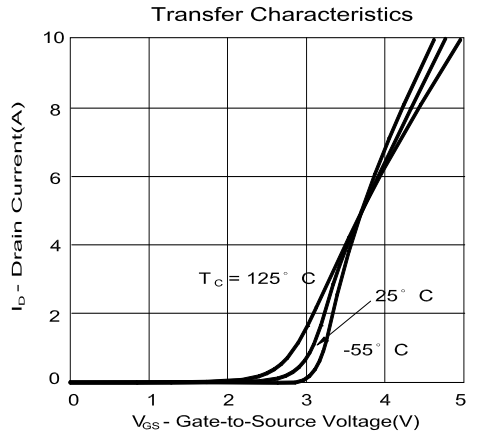
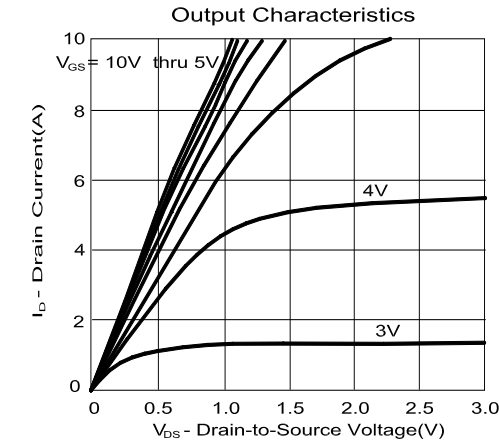
NOTE :

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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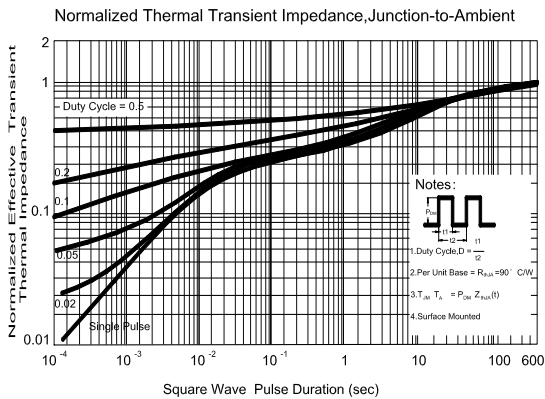
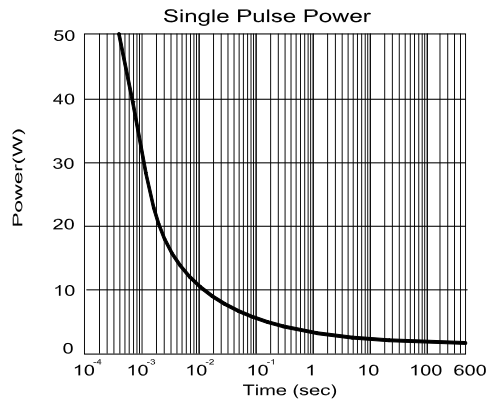
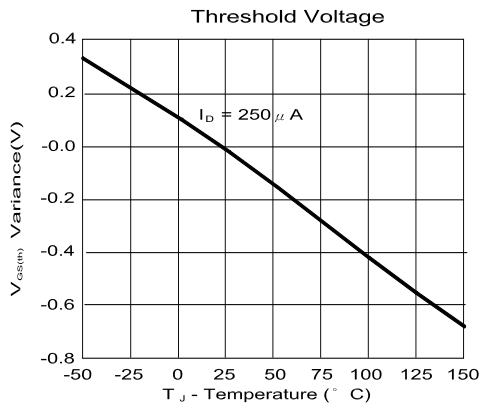
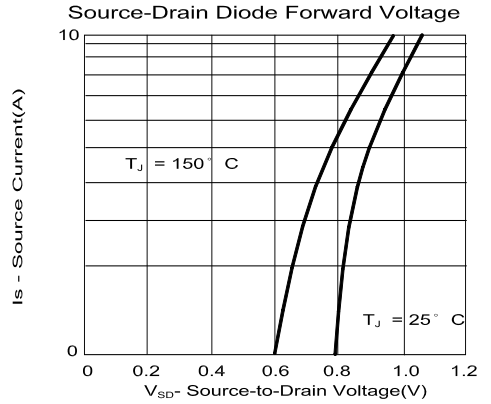
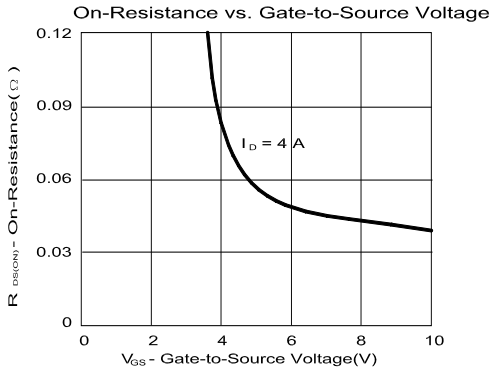
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Typical Electrical and Thermal Characteristics (N-ch)



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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	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°C			-10		
Gate-body leakage current	Igss	Vds=0V, Vgs=±20V			±100	nA	
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=-250μA	-1.0	-1.5	-2.5	V	
On state drain current	Id(on)	Vgs=-10V, Vds=-5V	-20			A	1
Static drain-source on-resistance	Rds(on)	Vgs=-10V, Id=-5A		34	45	mΩ	1
		Vgs=-4.5V, Id=-4A		58	80		
Forward transconductance	Gfs	Vds=-5V, Id=-5A		11		S	1
Diode forward voltage	Vsd	If=-1A, Vgs=0V			-1	V	1
Max.body-diode continuous current	Is				-1.3	A	
Pulsed current	Ism				-2.6	A	3
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vgs=0V, Vds=-10V, f=1MHz		690		pF	
Output capacitance	Coss			310		pF	
Reverse transfer capacitance	Crss			75		pF	
SWITCHING PARAMETERS							
Total gate charge	Qg	Vgs=-10V, Vds=-15V Id=-5A		14.0		nC	2
Gate-source charge	Qgs			2.2		nC	2
Gate-drain charge	Qgd			1.9		nC	2
Turn-on delay time	td(on)	Vgs=-10V, Vds=-10V Id≈-1A, Rgen=6Ω		6.7	13.4	ns	2
Turn-on rise time	tr			9.7	19.4	ns	2
Turn-off delay time	td(off)			19.8	35.6	ns	2
Turn-off fall time	tf			12.3	22.2	ns	2

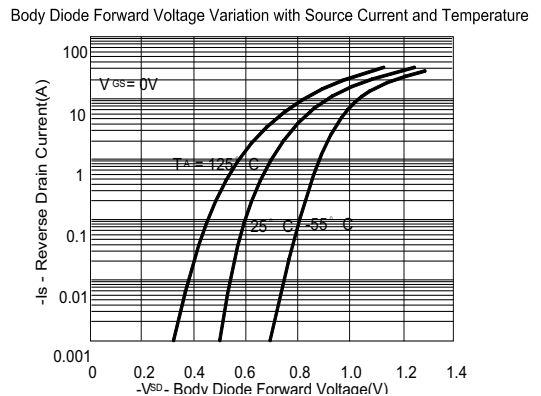
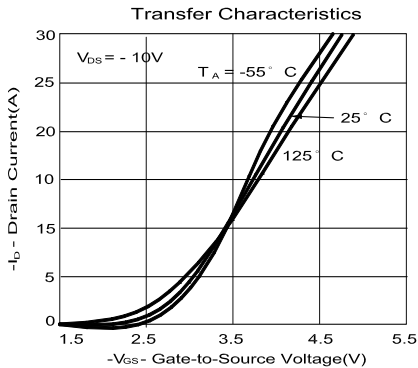
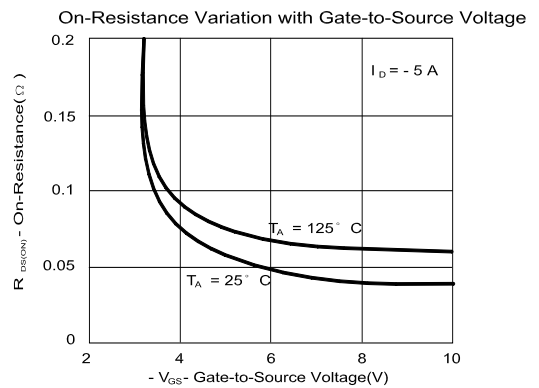
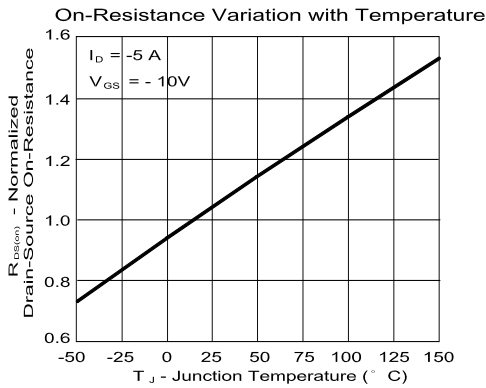
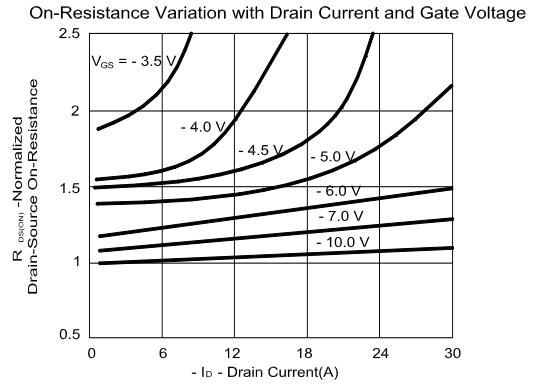
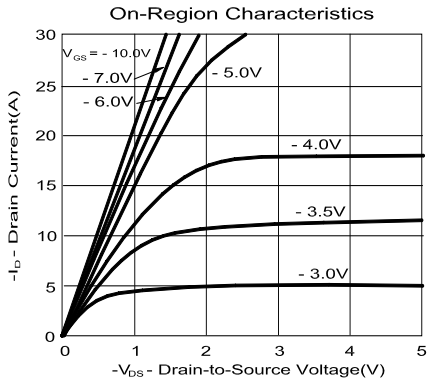
NOTE :

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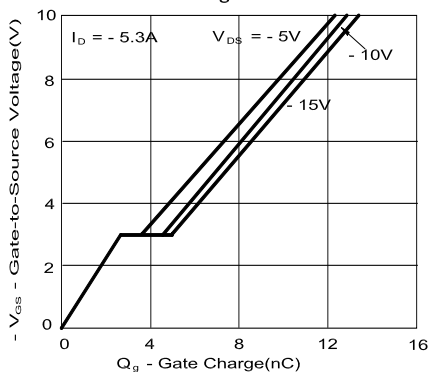
Typical Electrical and Thermal Characteristics (P-ch)



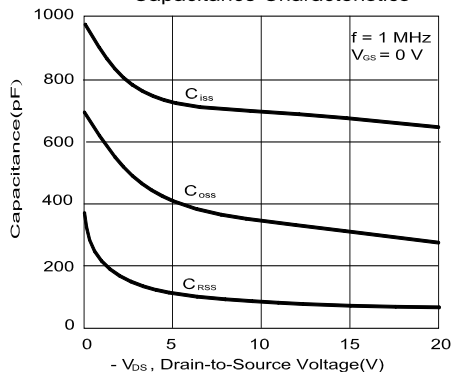
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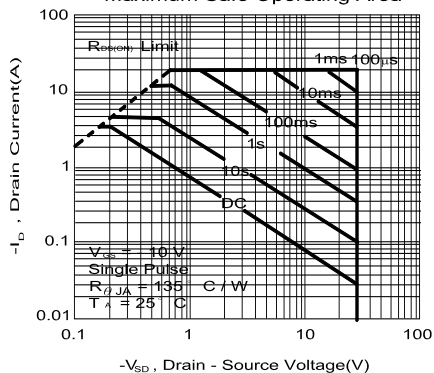
Gate Charge Characteristics



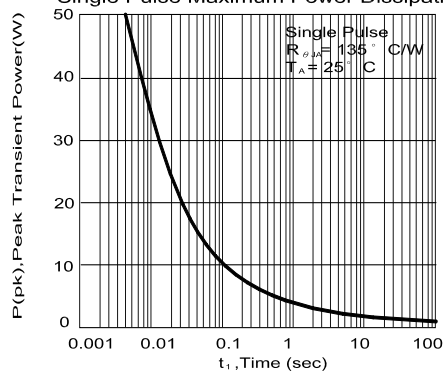
Capacitance Characteristics



Maximum Safe Operating Area



Single Pulse Maximum Power Dissipation



Transient Thermal Response Curve

