

Single N-channel MOSFET

ELM14420AA-N

General description

ELM14420AA-N uses advanced trench technology to provide excellent $R_{ds(on)}$, low gate charge and low gate resistance.

Features

- $V_{ds}=30V$
- $I_d=13.7A$ ($V_{gs}=10V$)
- $R_{ds(on)} < 10.5m\Omega$ ($V_{gs}=10V$)
- $R_{ds(on)} < 12m\Omega$ ($V_{gs}=4.5V$)

Maximum absolute ratings

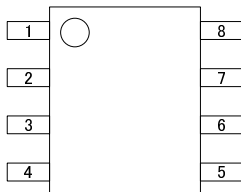
Parameter		Symbol	Limit	Unit	Note
Drain-source voltage		V_{ds}	30	V	
Gate-source voltage		V_{gs}	± 12	V	
Continuous drain current	$T_a=25^{\circ}C$	I_d	13.7	A	1
	$T_a=70^{\circ}C$		9.7		
Pulsed drain current		I_{dm}	60	A	2
Power dissipation	$T_a=25^{\circ}C$	P_d	3.1	W	
	$T_a=70^{\circ}C$		2.0		
Junction and storage temperature range		T_j, T_{stg}	-55 to 150	$^{\circ}C$	

Thermal characteristics

Parameter		Symbol	Typ.	Max.	Unit	Note
Maximum junction-to-ambient	$t \leq 10s$	$R\theta_{ja}$	28	40	$^{\circ}C/W$	1
Maximum junction-to-ambient	Steady-state		54	75	$^{\circ}C/W$	
Maximum junction-to-lead	Steady-state	$R\theta_{jl}$	21	30	$^{\circ}C/W$	3

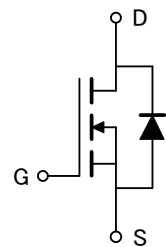
Pin configuration

SOP-8 (TOP VIEW)



Pin No.	Pin name
1	SOURCE
2	SOURCE
3	SOURCE
4	GATE
5	DRAIN
6	DRAIN
7	DRAIN
8	DRAIN

Circuit



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Electrical characteristics

Ta=25°C

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
STATIC PARAMETERS						
Drain-source breakdown voltage	BVdss	Id=250 μ A, Vgs=0V	30			V
Zero gate voltage drain current	Idss	Vds=24V Vgs=0V		0.004	1.000	μ A
		Tj=55°C			5.000	
Gate-body leakage current	Igss	Vds=0V, Vgs= $\pm$ 12V			100	nA
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=250 μ A	0.6	1.1	2.0	V
On state drain current	Id(on)	Vgs=4.5V, Vds=5V	40			A
Static drain-source on-resistance	Rds(on)	Vgs=10V Id=13.7A		8.3	10.5	m Ω
		Tj=125°C		12.5	15.0	
		Vgs=4.5V, Id=12.7A		9.7	12.0	m Ω
Forward transconductance	Gfs	Vds=5V, Id=13.7A	30	37		S
Diode forward voltage	Vsd	Is=1A, Vgs=0V		0.76	1.00	V
Max. body-diode continuous current	Is				5	A
DYNAMIC PARAMETERS						
Input capacitance	Ciss	Vgs=0V, Vds=15V, f=1MHz		3656	4050	pF
Output capacitance	Coss			256		pF
Reverse transfer capacitance	Crss			168		pF
Gate resistance	Rg	Vgs=0V, Vds=0V, f=1MHz		0.86	1.10	Ω
SWITCHING PARAMETERS						
Total gate charge (4.5V)	Qg	Vgs=10V, Vds=15V, Id=13.7A		30.5	36.0	nC
Gate-source charge	Qgs			4.6		nC
Gate-drain charge	Qgd			8.6		nC
Turn-on delay time	td(on)	Vgs=10V, Vds=15V Rl=1.1 Ω , Rgen=0 Ω		5.5	9.0	ns
Turn-on rise time	tr			3.4	7.0	ns
Turn-off delay time	td(off)			49.8	75.0	ns
Turn-off fall time	tf			5.9	11.0	ns
Body diode reverse recovery time	trr	If=13.7A, dl/dt=100A/ μ s		22.5	28.0	ns
Body diode reverse recovery charge	Qrr	If=13.7A, dl/dt=100A/ μ s		12.5	16.0	nC

NOTE :

1. The value of R θ ja is measured with the device mounted on 1in² FR-4 board of 2oz. Copper, in still air environment with Ta=25°C. The value in any given applications depends on the user's specific board design, The current rating is based on the t $\leq$ 10s thermal resistance rating.
2. Repetitive rating, pulse width limited by junction temperature.
3. The R θ ja is the sum of the thermal impedance from junction to lead R θ jl and lead to ambient.
4. The static characteristics in Figures 1 to 6 are obtained using 80 μ s pulses, duty cycle 0.5%max.
5. These tests are performed with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with Ta=25°C. The SOA curve provides a single pulse rating.

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Typical electrical and thermal characteristics

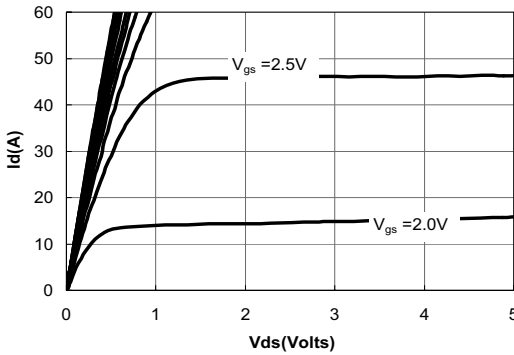


Figure 1: On-Regions Characteristics

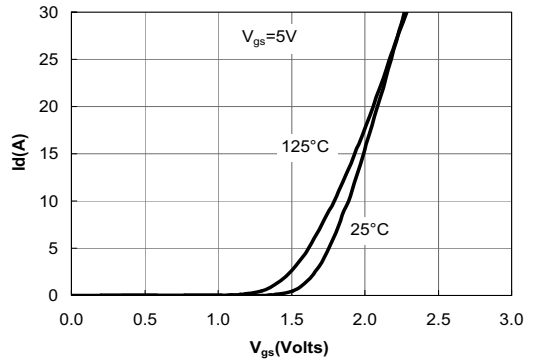


Figure 2: Transfer Characteristics

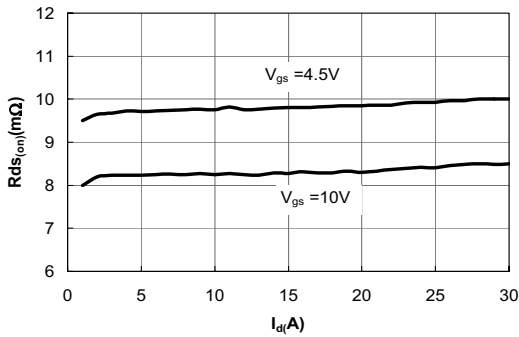


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

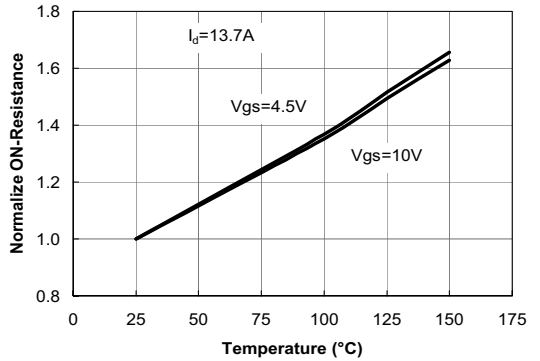


Figure 4: On-Resistance vs. Junction Temperature

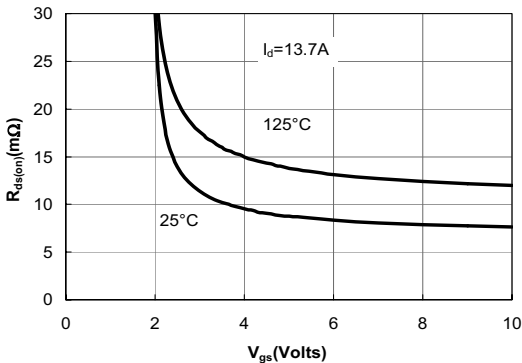


Figure 5: On-Resistance vs. Gate-Source Voltage

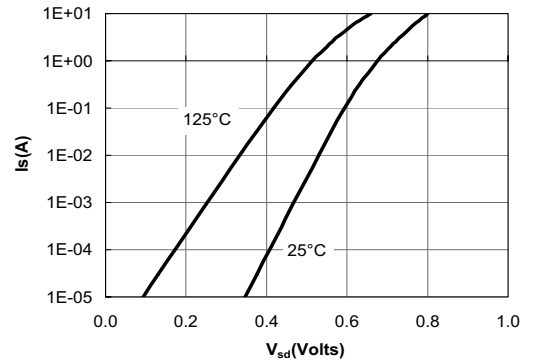


Figure 6: Body-Diode Characteristics

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