

Single N-channel MOSFET

ELM14422AA-N

General description

ELM14422AA-N uses advanced trench technology to provide excellent $R_{ds(on)}$, low gate charge and low gate resistance.

Features

- $V_{ds}=30V$
- $I_d=11A$ ($V_{gs}=10V$)
- $R_{ds(on)} < 15m\Omega$ ($V_{gs}=10V$)
- $R_{ds(on)} < 24m\Omega$ ($V_{gs}=4.5V$)

Maximum absolute ratings

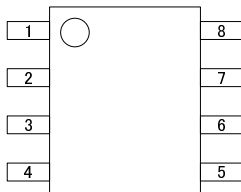
Parameter		Symbol	Limit	Unit	Note
Drain-source voltage		V_{ds}	30	V	
Gate-source voltage		V_{gs}	± 20	V	
Continuous drain current	$T_a=25^{\circ}C$	I_d	11.0	A	1
	$T_a=70^{\circ}C$		9.3		
Pulsed drain current		I_{dm}	50	A	2
Power dissipation	$T_a=25^{\circ}C$	P_d	3.0	W	
	$T_a=70^{\circ}C$		2.1		
Junction 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	$t \leq 10s$	$R\theta_{ja}$	31	40	$^{\circ}C/W$	1
Maximum junction-to-ambient	Steady-state		59	75	$^{\circ}C/W$	
Maximum junction-to-lead	Steady-state	$R\theta_{jl}$	16	24	$^{\circ}C/W$	3

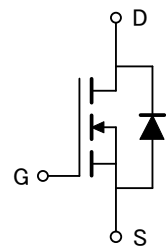
Pin configuration

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 Tj=55°C		0.003	1.000	μ A
Gate-body leakage current	Igss	Vds=0V, Vgs= \pm 20V			100	nA
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=250 μ A	1.0	1.8	3.0	V
On state drain current	Id(on)	Vgs=4.5V, Vds=5V	40			A
Static drain-source on-resistance	Rds(on)	Vgs=10V Id=11A Tj=125°C		12.6	15.0	m Ω
				16.8	21.0	
		Vgs=4.5V, Id=10A		19.6	24.0	m Ω
Forward transconductance	Gfs	Vds=5V, Id=11A		25		S
Diode forward voltage	Vsd	Is=1A, Vgs=0V		0.75	1.00	V
Max. body-diode continuous current	Is				4.3	A
DYNAMIC PARAMETERS						
Input capacitance	Ciss	Vgs=0V, Vds=15V, f=1MHz	800	1040	1250	pF
Output capacitance	Coss		140	180	220	pF
Reverse transfer capacitance	Crss		80	110	140	pF
Gate resistance	Rg	Vgs=0V, Vds=0V, f=1MHz	0.50	0.70	0.85	Ω
SWITCHING PARAMETERS						
Total gate charge (10V)	Qg	Vgs=10V, Vds=15V, Id=11A	15.0	19.8	24.0	nC
Total gate charge (4.5V)	Qg		7.0	9.8	12.0	nC
Gate-source charge	Qgs			2.5		nC
Gate-drain charge	Qgd			3.5		nC
Turn-on delay time	td(on)	Vgs=10V, Vds=15V Rl=1.35 Ω , Rgen=3 Ω		4.5	6.5	ns
Turn-on rise time	tr			3.9	5.5	ns
Turn-off delay time	td(off)			17.4	25.0	ns
Turn-off fall time	tf			3.2	5.0	ns
Body diode reverse recovery time	trr	If=11A, dI/dt=100A/ μ s		17.5	21.0	ns
Body diode reverse recovery charge	Qrr	If=11A, dI/dt=100A/ μ s		9.3	12.0	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

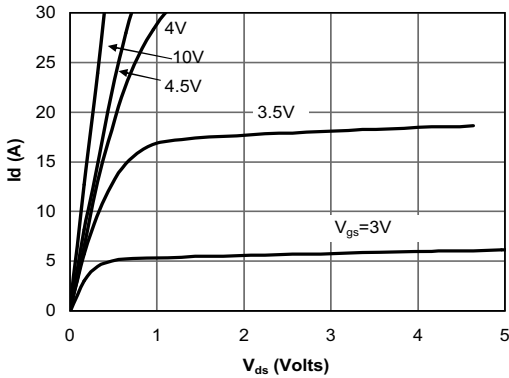


Fig 1: On-Region Characteristics

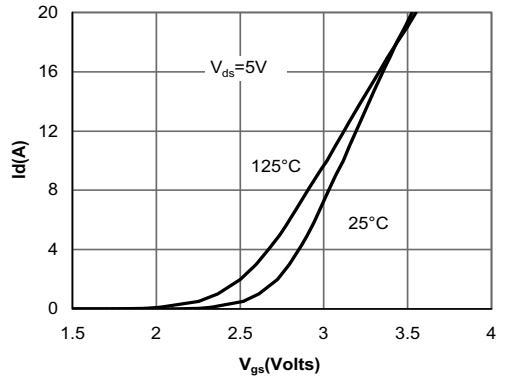


Figure 2: Transfer Characteristics

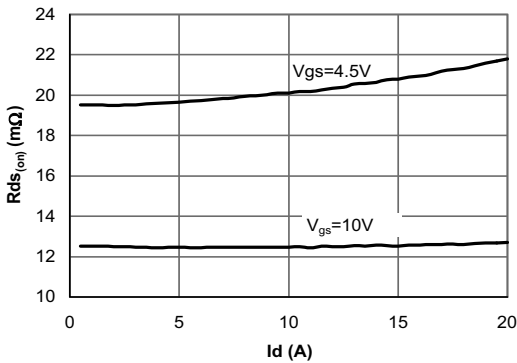


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

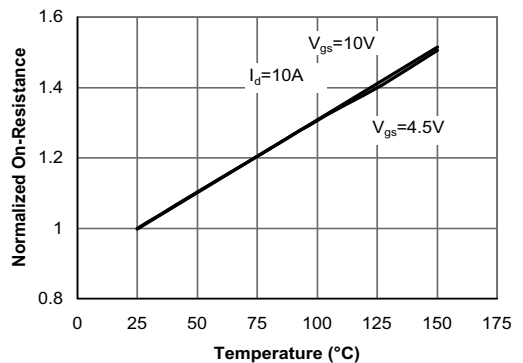


Figure 4: On-Resistance vs. Junction Temperature

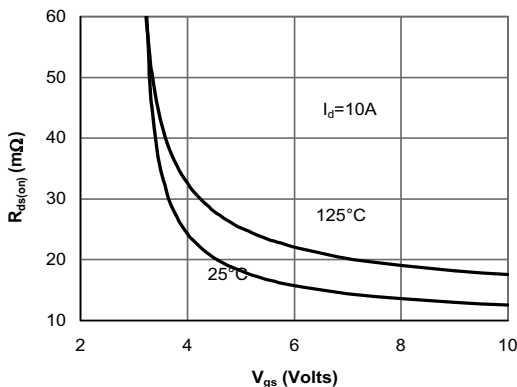


Figure 5: On-Resistance vs. Gate-Source Voltage

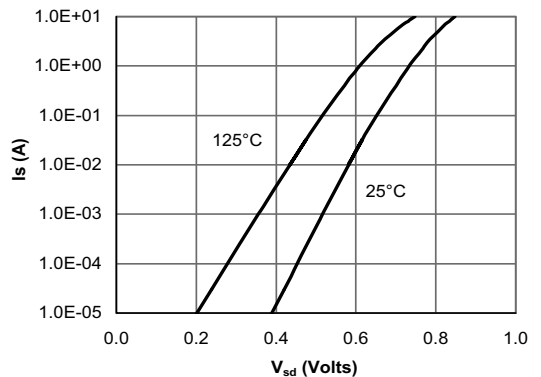


Figure 6: Body-Diode Characteristics

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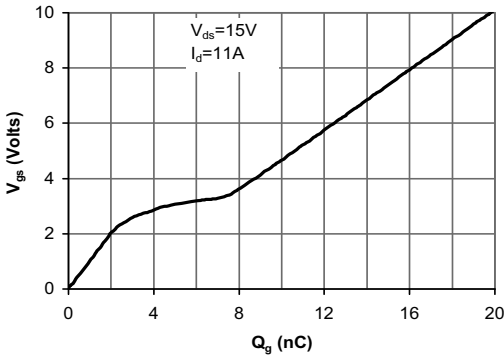


Figure 7: Gate-Charge Characteristics

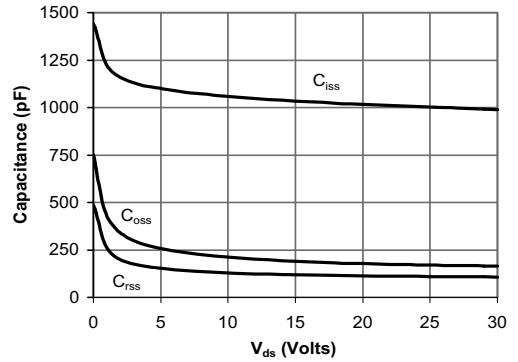


Figure 8: Capacitance Characteristics

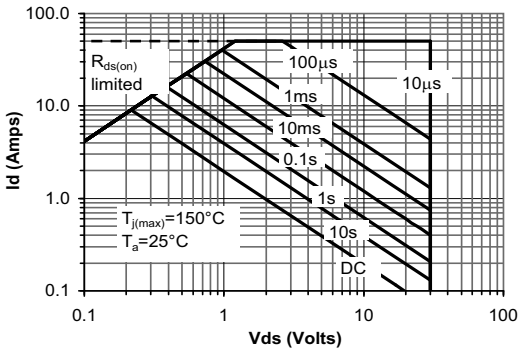


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

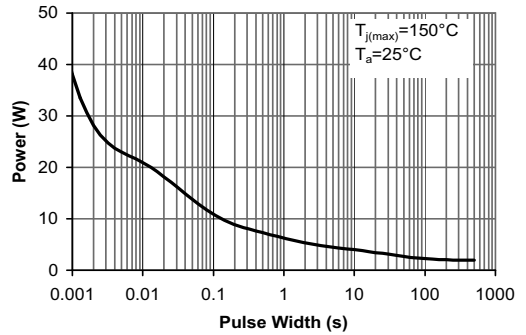


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

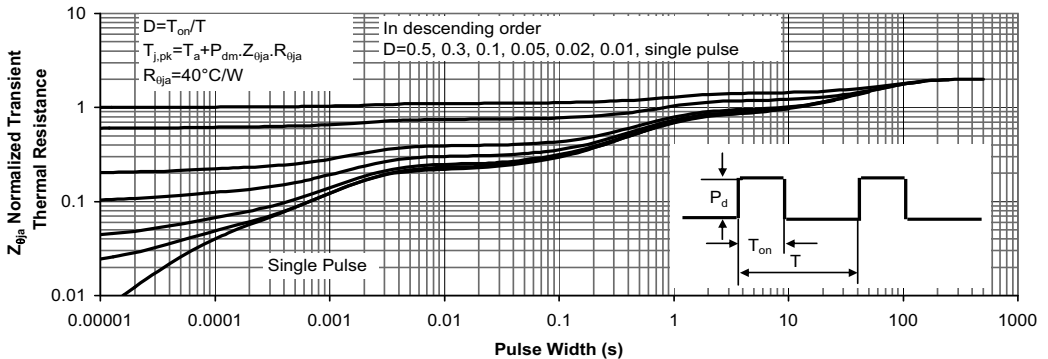


Figure 11: Normalized Maximum Transient Thermal Impedance