

# Dual N-channel MOSFET with schottky diode

## ELM14902AA-N

### ■ General description

ELM14902AA-N uses advanced trench technology to provide excellent  $R_{ds(on)}$  and low gate charge.

### ■ Features

- $V_{ds}=30V$
  - $I_d=6.9A$  ( $V_{gs}=10V$ )
  - $R_{ds(on)} < 27m\Omega$  ( $V_{gs}=10V$ )
  - $R_{ds(on)} < 32m\Omega$  ( $V_{gs}=4.5V$ )
  - $R_{ds(on)} < 50m\Omega$  ( $V_{gs}=2.5V$ )
- Schottky diode
- $V_{ds(V)}=30V$
  - $I_f=3A$
  - $V_f = 0.5V@1A$

### ■ Maximum absolute ratings

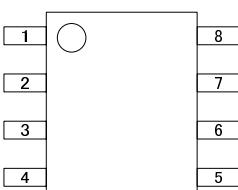
Parameter	Symbol	MOSFET	Schottky	Unit	Note
Drain-source voltage	$V_{ds}$	30		V	
Gate-source voltage	$V_{gs}$	$\pm 12$		V	
Continuous drain current	$I_d$	6.9		A	1
		5.8			
Pulsed drain current	$I_{dm}$	40		A	2
Schottky reverse voltage	$V_{ka}$		30	V	
Continuous forward current	$I_f$		3	A	1
			2		
Pulsed forward current	$I_{fm}$		40	A	2
Power dissipation	$P_d$	2.00	2.00	W	
		1.44	1.44		
Junction and storage temperature range	$T_j, T_{stg}$	-55 to 150	-55 to 150	°C	

### ■ Thermal characteristics

Parameter (MOSFET)	Symbol	Typ.	Max.	Unit	Note
Maximum junction-to-ambient	$R_{\theta ja}$	48.0	62.5	°C/W	1
Maximum junction-to-ambient		74.0	110.0	°C/W	
Maximum junction-to-lead	$R_{\theta jl}$	35.0	40.0	°C/W	3
Parameter (Schottky)	Symbol	Typ.	Max.	Unit	Note
Maximum junction-to-ambient	$R_{\theta ja}$	47.5	62.5	°C/W	1
Maximum junction-to-ambient		71.0	110.0	°C/W	
Maximum junction-to-lead	$R_{\theta jl}$	32.0	40.0	°C/W	3

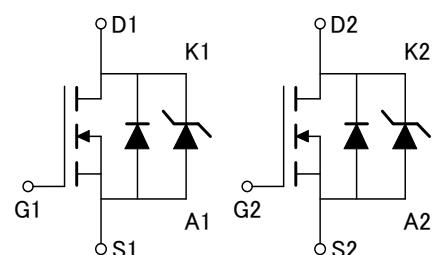
### ■ Pin configuration

SOP-8 (TOP VIEW)



Pin No.	Pin name
1	SOURCE2/ANODE2
2	GATE2
3	SOURCE1/ANODE1
4	GATE1
5	DRAIN1/CATHODE1
6	DRAIN1/CATHODE1
7	DRAIN2/CATHODE2
8	DRAIN2/CATHODE2

### ■ Circuit



**Dual N-channel MOSFET with schottky diode**  
**ELM14902AA-N**

**■ Electrical characteristics**

Ta=25°C

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
<b>STATIC PARAMETERS</b>						
Drain-source breakdown voltage	BVdss	Id=250 μA, Vgs=0V	30			V
Zero gate voltage drain current	Idss	Vds=24V			1	μ A
		Vgs=0V	Tj=55°C		5	
Gate-body leakage current	Igss	Vds=0V, Vgs=±12V			100	nA
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=250 μ A	0.7	1.0	1.4	V
On state drain current	Id(on)	Vgs=4.5V, Vds=5V	25			A
Static drain-source on-resistance	Rds(on)	Vgs=10V			22.6	27.0
		Id=6.9A	Tj=125°C		33.0	40.0
		Vgs=4.5V, Id=6A			27.0	32.0
		Vgs=2.5V, Id=5A			42.0	50.0
Forward transconductance	Gfs	Vds=5V, Id=5A	12	16		S
Diode forward voltage	Vsd	Is=1A			0.71	1.00
Max. body-diode continuous current	Is				3	A
<b>DYNAMIC PARAMETERS</b>						
Input capacitance	Ciss	Vgs=0V, Vds=15V, f=1MHz			846	pF
Output capacitance	Coss				96	pF
Reverse transfer capacitance	Crss				67	pF
Gate resistance	Rg	Vgs=0V, Vds=0V, f=1MHz			1.24	3.60
<b>SWITCHING PARAMETERS</b>						
Total gate charge	Qg	Vgs=4.5V, Vds=15V, Id=6.9A			9.60	nC
Gate-source charge	Qgs				1.65	nC
Gate-drain charge	Qgd				3.00	nC
Turn-on delay time	td(on)	Vgs=10V, Vds=15V			3.2	4.8
Turn-on rise time	tr				4.5	6.8
Turn-off delay time	td(off)		RI=2.2 Ω, Rgen=3 Ω		26.3	40.0
Turn-off fall time	tf				4.8	7.0
Body diode reverse recovery time	trr	IF=5A, dl/dt=100A/μ s			15.5	20.0
Body diode reverse recovery charge	Qrr	IF=5A, dl/dt=100A/μ s			7.9	nC
<b>SCHOTTKY PARAMETERS</b>						
Forward voltage drop	Vf	IF=1A			0.45	0.50
Max. reverse leakage current	Irm	Vr=30V			0.007	0.050
		Vr=30V	Tj=125°C		3.2	10.0
Junction capacitance	Ct	Vr=15V			12.0	20.0
						mA
						pF

**NOTE :**

- The value of Rθja is measured with the device mounted on 1in<sup>2</sup> 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 ≤ 10s thermal resistance rating.
- Repetitive rating, pulse width limited by junction temperature.
- The Rθja is the sum of the thermal impedance from junction to lead Rθjl and lead to ambient.
- The static characteristics in Figures 1 to 6,12,14 are obtained using 80μs pulses, duty cycle 0.5%max.
- These tests are performed with the device mounted on 1in<sup>2</sup> 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

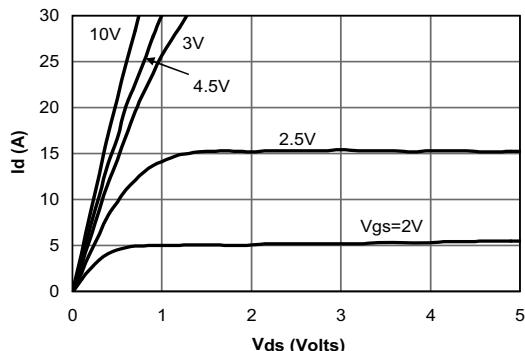


Fig 1: On-Region Characteristics

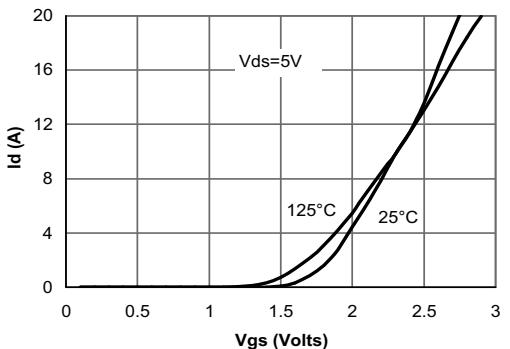


Figure 2: Transfer Characteristics

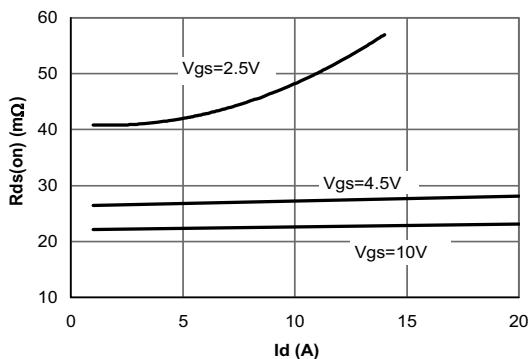


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

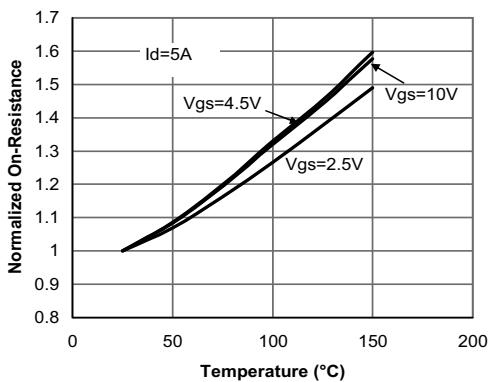


Figure 4: On resistance vs. Junction Temperature

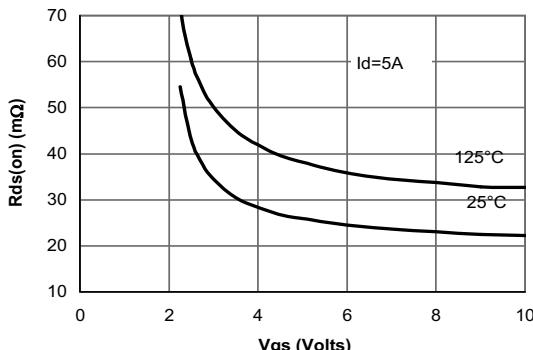


Figure 5: On resistance vs. Gate-Source Voltage

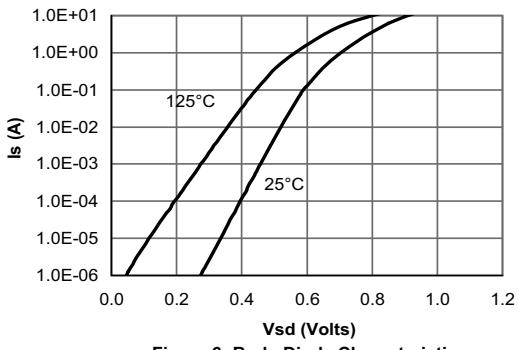


Figure 6: Body-Diode Characteristics

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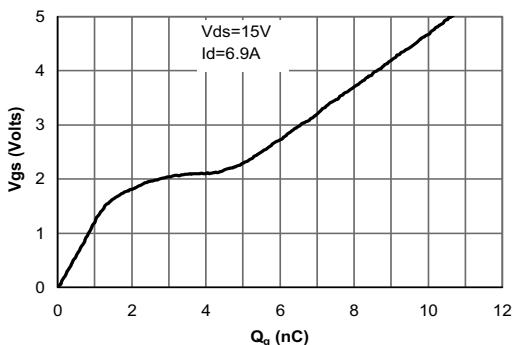


Figure 7: Gate-Charge Characteristics

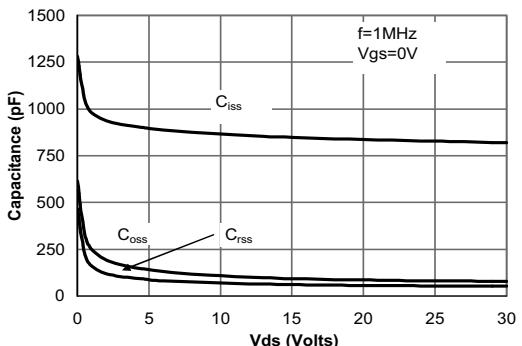


Figure 8: Capacitance Characteristics

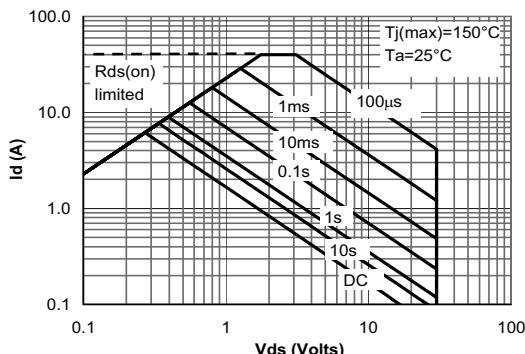


Figure 9: Maximum Forward Biased Safe Operating Area (Note 5)

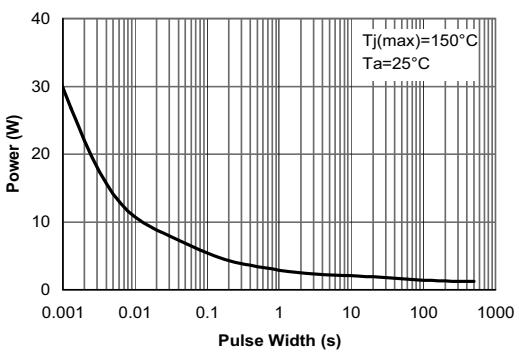


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note 5)

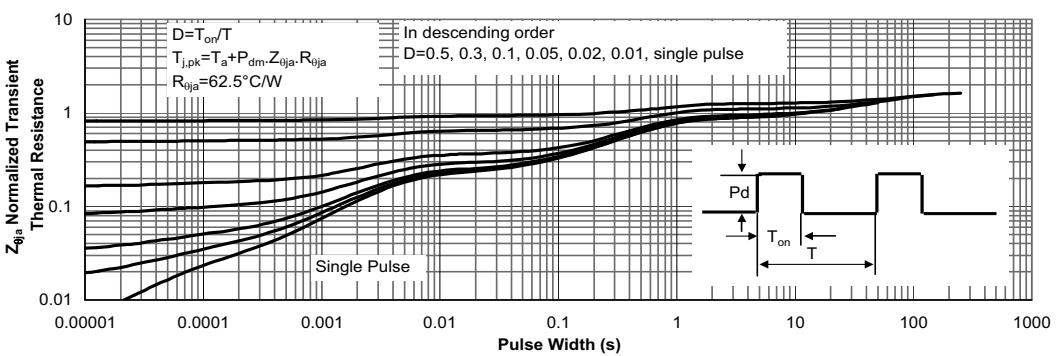


Figure 11: Normalized Maximum Transient Thermal Impedance

# Dual N-channel MOSFET with schottky diode

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### ■ Typical electrical and thermal characteristics (Schottky)

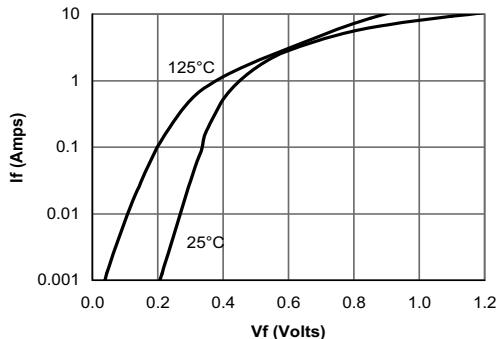


Figure 12: Schottky Forward Characteristics

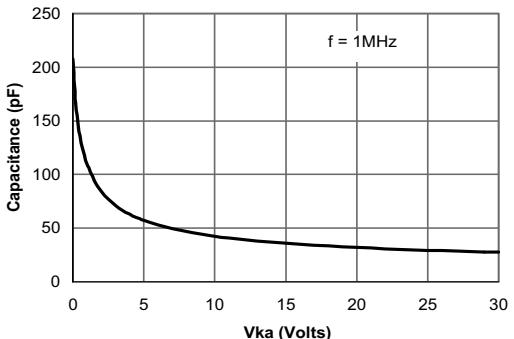


Figure 13: Schottky Capacitance Characteristics

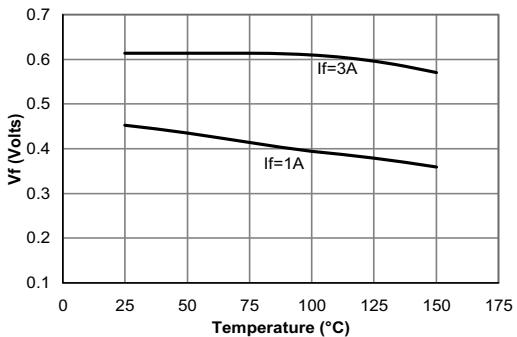


Figure 14: Schottky Forward Drop vs. Junction Temperature

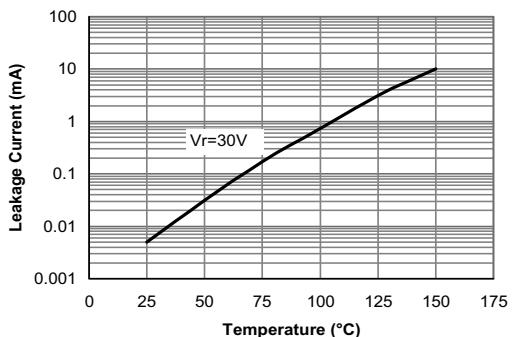


Figure 15: Schottky Leakage current vs. Junction Temperature

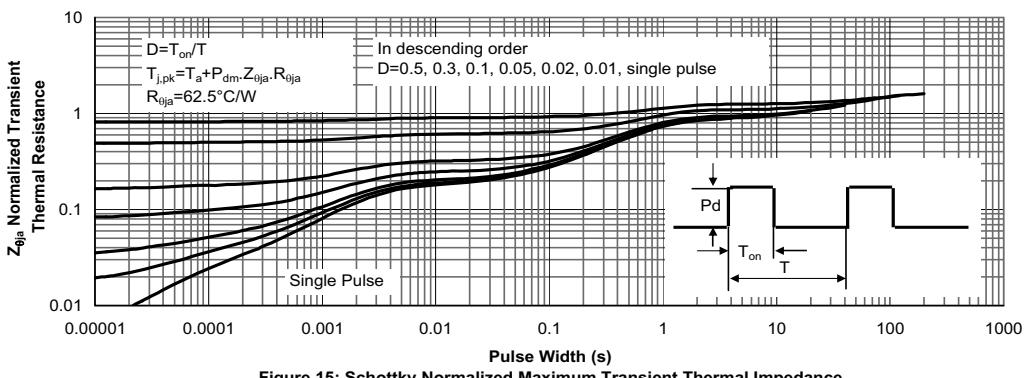


Figure 15: Schottky Normalized Maximum Transient Thermal Impedance