

Single P-channel MOSFET

ELM14415AA-N

General description

ELM14415AA-N uses advanced trench technology to provide excellent $R_{ds(on)}$, low gate charge and low gate resistance.

Features

- $V_{ds} = -30V$
- $I_d = -8A$ ($V_{gs} = -20V$)
- $R_{ds(on)} < 26m\Omega$ ($V_{gs} = -20V$)
- $R_{ds(on)} < 35m\Omega$ ($V_{gs} = -10V$)

Maximum absolute ratings

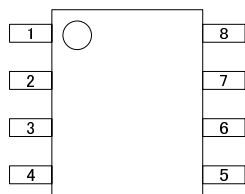
Parameter	Symbol	Limit	Unit	Note	
Drain-source voltage	V_{ds}	-30	V		
Gate-source voltage	V_{gs}	± 25	V		
Continuous drain current	I_d	$T_a = 25^\circ C$	-8.0	A	1
		$T_a = 70^\circ C$	-6.6		
Pulsed drain current	I_{dm}	-40	A	2	
Power dissipation	P_d	$T_a = 25^\circ C$	3.0	W	1
		$T_a = 70^\circ C$	2.1		
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	$t \leq 10s$	$R\theta_{ja}$	24	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

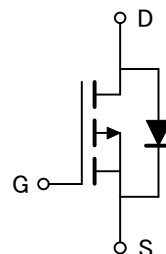
Pin configuration

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

T_a=25°C

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
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
		T _j =55°C			-5	
Gate-body leakage current	I _{gss}	V _{ds} =0V, V _{gs} =±25V			±100	nA
Gate threshold voltage	V _{gs(th)}	V _{ds} =V _{gs} , I _d =-250 μA	-1.7	-2.8	-3.5	V
On state drain current	I _{d(on)}	V _{gs} =-10V, V _{ds} =-5V	-40			A
Static drain-source on-resistance	R _{ds(on)}	V _{gs} =-20V		21.5	26.0	mΩ
		I _d =-8A	T _j =125°C	29.0	35.0	
		V _{gs} =-10V, I _d =-8A		28.5	35.0	mΩ
		V _{gs} =-6V, I _d =-5A		41.0		mΩ
Forward transconductance	G _{fs}	V _{ds} =-5V, I _d =-8A		11.5		S
Diode forward voltage	V _{sd}	I _s =-1A, V _{gs} =0V		-0.76	-1.00	V
Max. body-diode continuous current	I _s				-4.2	A
DYNAMIC PARAMETERS						
Input capacitance	C _{iss}			893	1100	pF
Output capacitance	C _{oss}	V _{gs} =0V, V _{ds} =-15V, f=1MHz		204		pF
Reverse transfer capacitance	C _{rss}			151		pF
Gate resistance	R _g	V _{gs} =0V, V _{ds} =0V, f=1MHz		4	6	Ω
SWITCHING PARAMETERS						
Total gate charge	Q _g	V _{gs} =-10V, V _{ds} =-15V		16.6	21.0	nC
Gate-source charge	Q _{gs}	I _d =-8A		3.2		nC
Gate-drain charge	Q _{gd}			5.2		nC
Turn-on delay time	t _{d(on)}			10.5		ns
Turn-on rise time	t _r	V _{gs} =-10V, V _{ds} =-15V		7.3		ns
Turn-off delay time	t _{d(off)}	R _l =1.8 Ω, R _{gen} =3 Ω		15.1		ns
Turn-off fall time	t _f			8.6		ns
Body diode reverse recovery time	t _{rr}	I _f =-8A, dI/dt=100A/μs		21.0	26.0	ns
Body diode reverse recovery charge	Q _{rr}	I _f =-8A, dI/dt=100A/μs		10.7		nC

NOTE :

1. The value of R_{θja} is measured with the device mounted on 1in² FR-4 board of 2oz. Copper, in still air environment with T_a=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.
2. Repetitive rating, pulse width limited by junction temperature.
3. The R_{θja} is the sum of the thermal impedance from junction to lead R_{θjl} and lead to ambient.
4. The static characteristics in Figures 1 to 6 are obtained using 80μs 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 T_a=25°C. The SOA curve provides a single pulse rating.

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Typical electrical and thermal characteristics

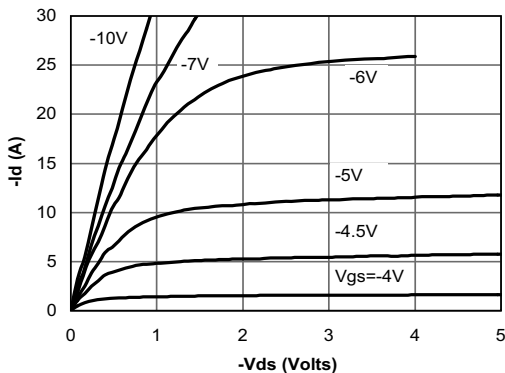


Fig 1: On-Region Characteristics

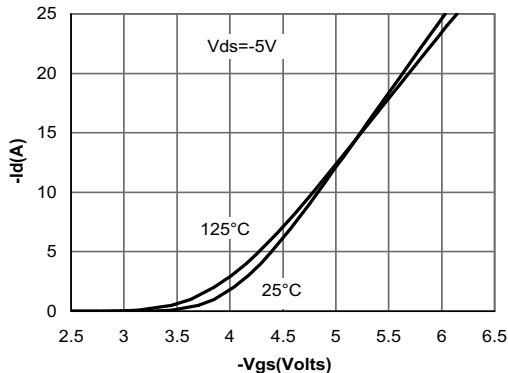


Figure 2: Transfer Characteristics

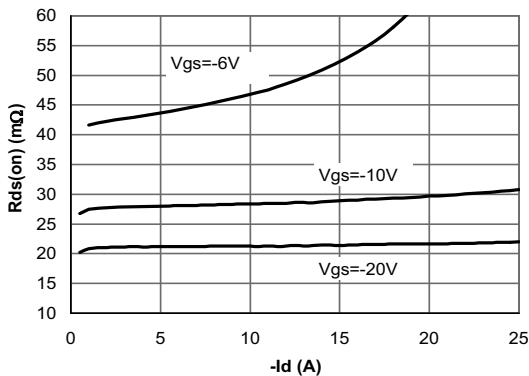


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

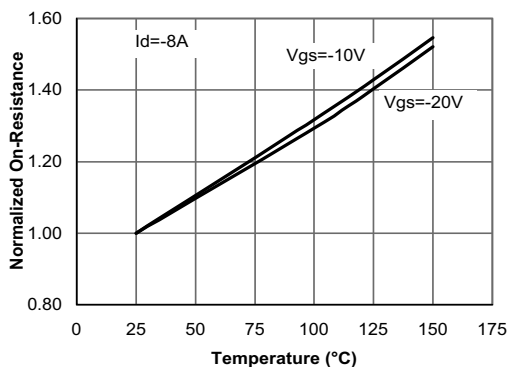


Figure 4: On-Resistance vs. Junction Temperature

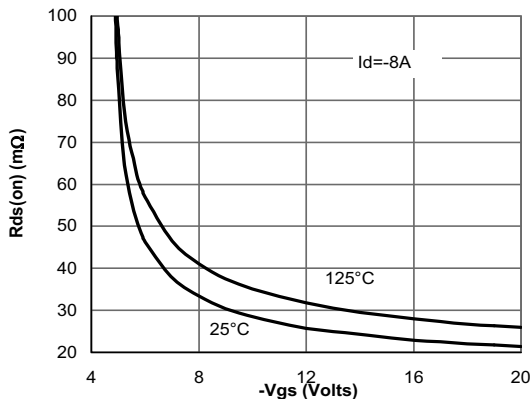


Figure 5: On-Resistance vs. Gate-Source Voltage

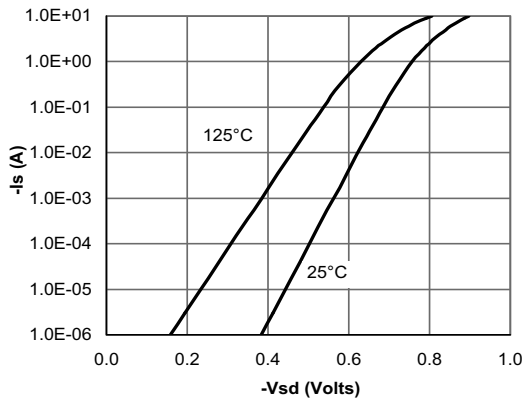


Figure 6: Body-Diode Characteristics

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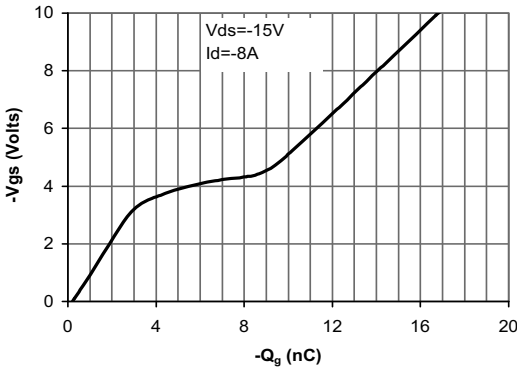


Figure 7: Gate-Charge Characteristics

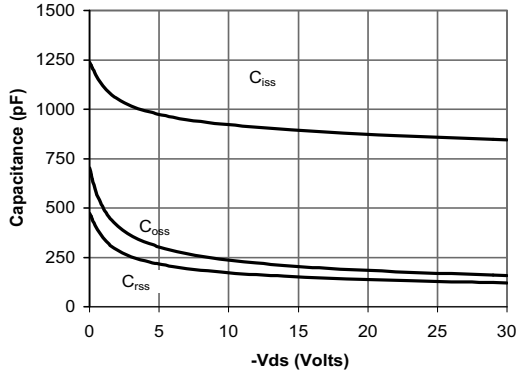


Figure 8: Capacitance Characteristics

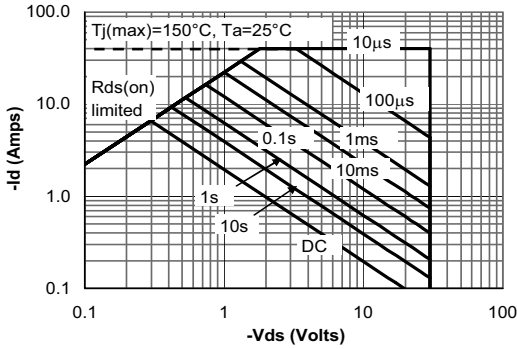


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

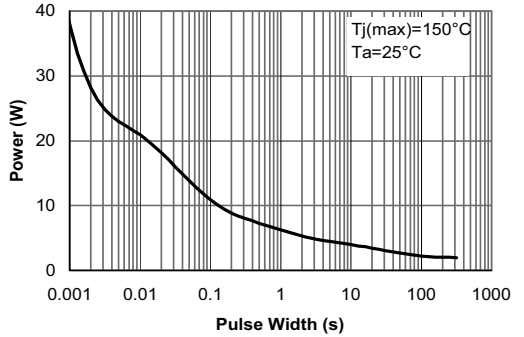


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

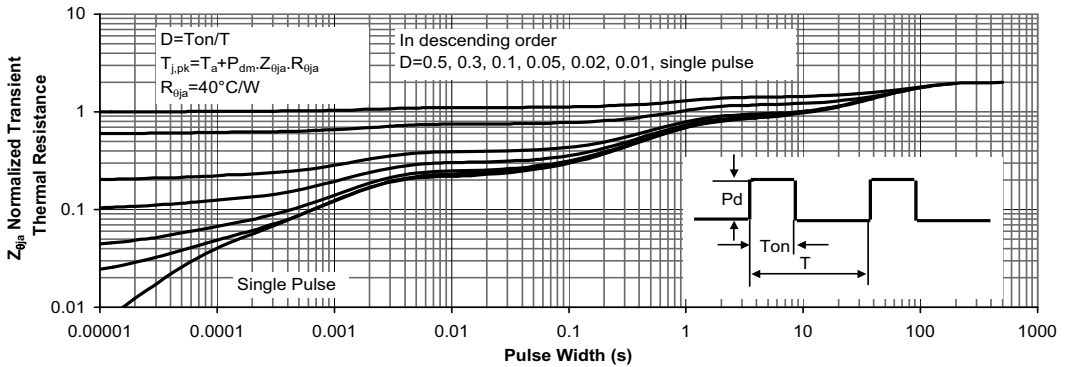


Figure 11: Normalized Maximum Transient Thermal Impedance