

Single P-channel MOSFET

ELM14407AA-N

General description

ELM14407AA-N uses advanced trench technology to provide excellent $R_{ds(on)}$, low gate charge and low gate resistance.

Features

- $V_{ds} = -30V$
- $I_d = -12A$ ($V_{gs} = -20V$)
- $R_{ds(on)} < 13m\Omega$ ($V_{gs} = -20V$)
- $R_{ds(on)} < 14m\Omega$ ($V_{gs} = -10V$)

Maximum absolute ratings

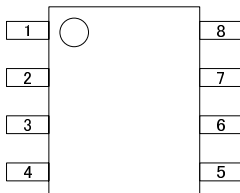
Parameter		Symbol	Limit	Unit	Note
Drain-source voltage		V_{ds}	-30	V	
Gate-source voltage		V_{gs}	± 25	V	
Continuous drain current	$T_a = 25^\circ C$	I_d	-12	A	1
	$T_a = 70^\circ C$		-10		
Pulsed drain current		I_{dm}	-60	A	2
Power dissipation	$T_a = 25^\circ C$	P_d	3.0	W	1
	$T_a = 70^\circ C$		2.1		
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	$t \leq 10s$	$R\theta_{ja}$	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

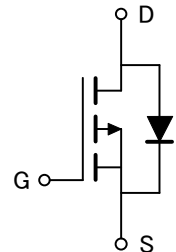
Pin configuration

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			-1	μ A
		Tj=55°C			-5	
Gate-body leakage current	Igss	Vds=0V, Vgs= $\pm$ 25V			$\pm$ 100	nA
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=-250 μ A	-1.7	-2.5	-3.0	V
On state drain current	Id(on)	Vgs=-10V, Vds=-5V	-60			A
Static drain-source on-resistance	Rds(on)	Vgs=-10V Id=-10A		11	14	m Ω
		Tj=125°C		15	19	
		Vgs=-20V, Id=-10A		10	13	m Ω
		Vgs=-4.5V, Id=-10A		24		m Ω
Forward transconductance	Gfs	Vds=-5V, Id=-10A		26		S
Diode forward voltage	Vsd	Is=-1A, Vgs=0V		-0.72	-1.00	V
Max. body-diode continuous current	Is				-4.2	A
DYNAMIC PARAMETERS						
Input capacitance	Ciss	Vgs=0V, Vds=-15V, f=1MHz		2076	2500	pF
Output capacitance	Coss			503		pF
Reverse transfer capacitance	Crss			302		pF
Gate resistance	Rg	Vgs=0V, Vds=0V, f=1MHz		2	3	Ω
SWITCHING PARAMETERS						
Total gate charge	Qg	Vgs=-10V, Vds=-15V Id=-12A		37.2	45.0	nC
Gate-source charge	Qgs			7.0		nC
Gate-drain charge	Qgd			10.4		nC
Turn-on delay time	td(on)	Vgs=-10V, Vds=-15V Rl=1.25 Ω , Rgen=3 Ω		12.4		ns
Turn-on rise time	tr			8.2		ns
Turn-off delay time	td(off)			25.6		ns
Turn-off fall time	tf			12.0		ns
Body diode reverse recovery time	trr	If=-12A, dI/dt=100A/ μ s		33	40	ns
Body diode reverse recovery charge	Qrr	If=-12A, dI/dt=100A/ μ s		23		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

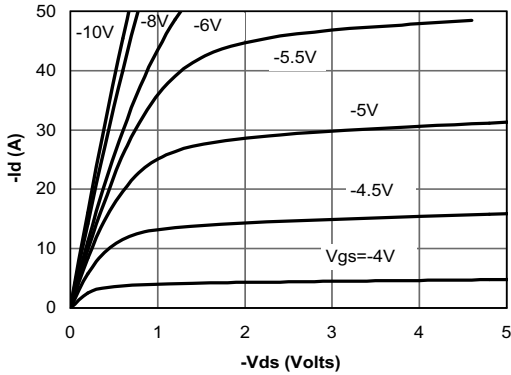


Fig 1: On-Region Characteristics

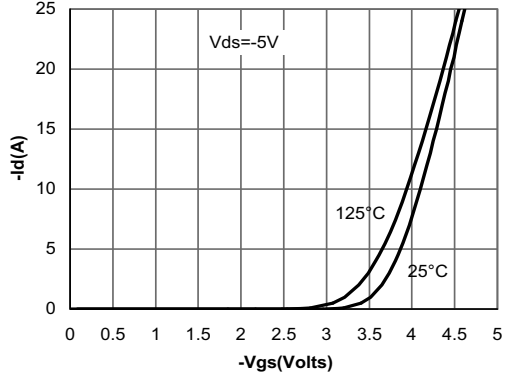


Figure 2: Transfer Characteristics

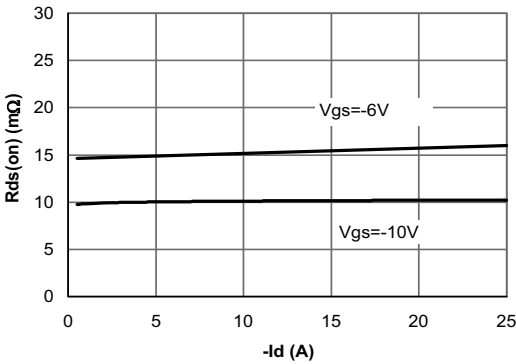


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

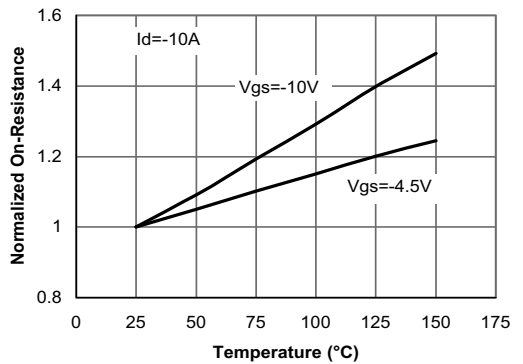


Figure 4: On-Resistance vs. Junction Temperature

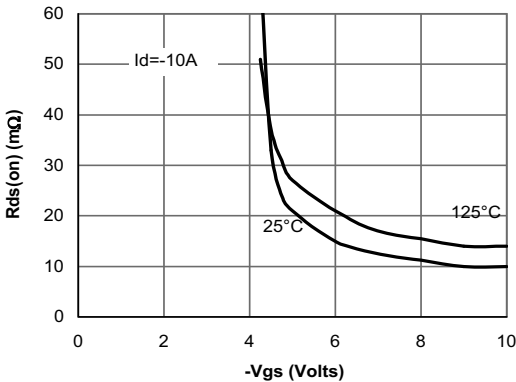


Figure 5: On-Resistance vs. Gate-Source Voltage

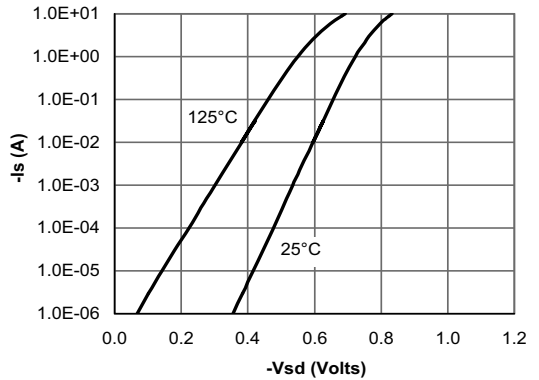


Figure 6: Body-Diode Characteristics

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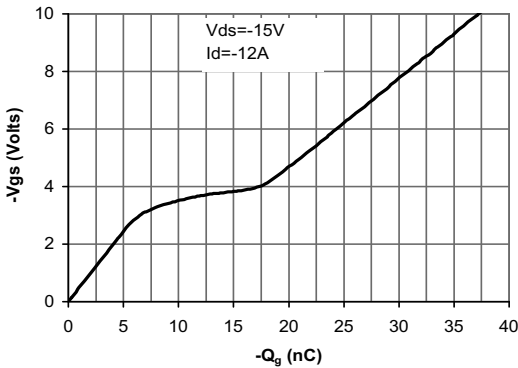


Figure 7: Gate-Charge Characteristics

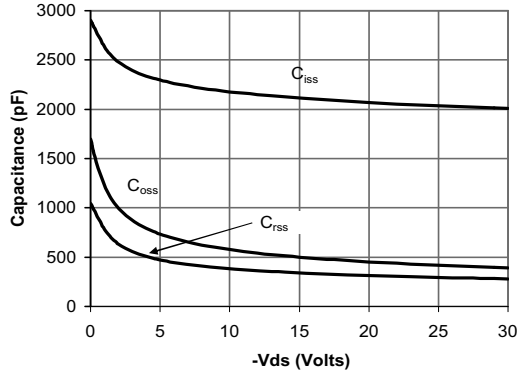


Figure 8: Capacitance Characteristics

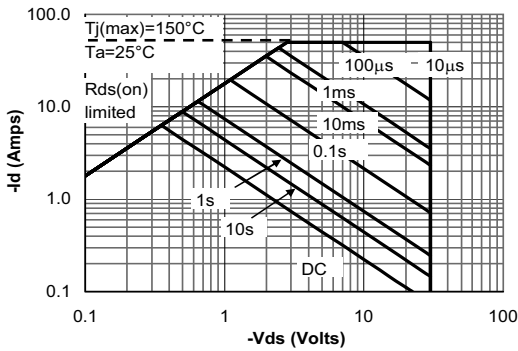


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

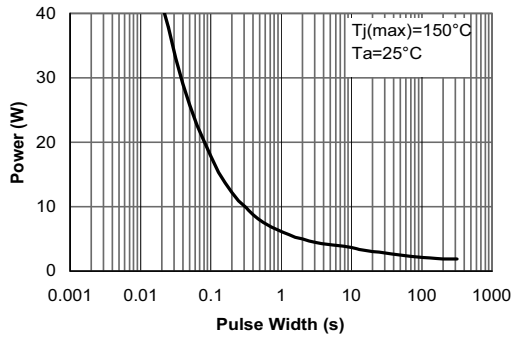


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

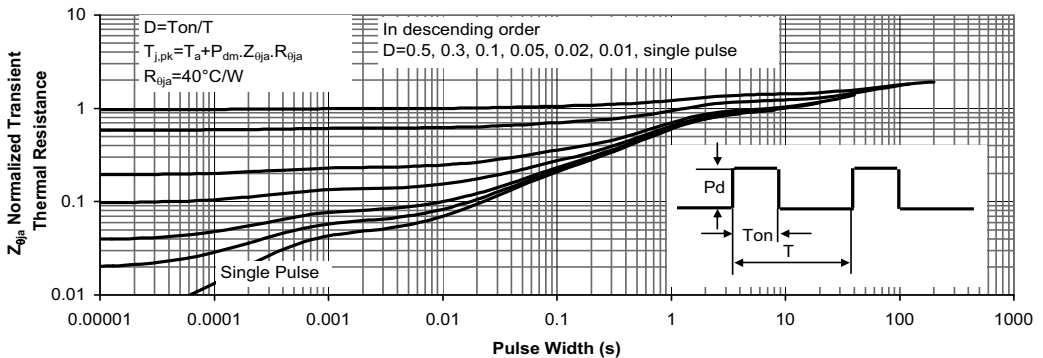


Figure 11: Normalized Maximum Transient Thermal Impedance