

Single P-channel MOSFET

ELM14405AA-N

General description

ELM14405AA-N uses advanced trench technology to provide excellent $R_{ds(on)}$, low gate charge and low gate resistance.

Features

- $V_{ds} = -30V$
- $I_d = -6A$ ($V_{gs} = -10V$)
- $R_{ds(on)} < 50m\Omega$ ($V_{gs} = -10V$)
- $R_{ds(on)} < 85m\Omega$ ($V_{gs} = -4.5V$)

Maximum absolute ratings

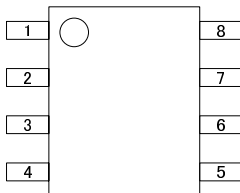
Parameter		Symbol	Limit	Unit	Note
Drain-source voltage		V_{ds}	-30	V	
Gate-source voltage		V_{gs}	± 20	V	
Continuous drain current	$T_a = 25^\circ C$	I_d	-6.0	A	1
	$T_a = 70^\circ C$		-5.1		
Pulsed drain current		I_{dm}	-30	A	2
Power dissipation	$T_a = 25^\circ C$	P_d	3.0	W	1
	$T_a = 70^\circ C$		2.1		
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	$t \leq 10s$	$R\theta_{ja}$	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

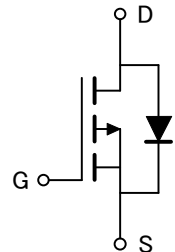
Pin configuration

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	BV _{dss}	I _d =-250 μ A, V _{gs} =0V	-30			V
Zero gate voltage drain current	I _{dss}	V _{ds} =-24V V _{gs} =0V			-1	μ A
		T _j =55°C			-5	
Gate-body leakage current	I _{gss}	V _{ds} =0V, V _{gs} = $\pm$ 20V			$\pm$ 100	nA
Gate threshold voltage	V _{gs(th)}	V _{ds} =V _{gs} , I _d =-250 μ A	-1.0	-1.8	-3.0	V
On state drain current	I _{d(on)}	V _{gs} =-10V, V _{ds} =-5V	-30			A
Static drain-source on-resistance	R _{ds(on)}	V _{gs} =-10V I _d =-6A		40	50	m Ω
		T _j =125°C		55	70	
		V _{gs} =-4.5V, I _d =-4A		65	85	m Ω
Forward transconductance	G _{fs}	V _{ds} =-5V, I _d =-6A	6.0	9.5		S
Diode forward voltage	V _{sd}	I _s =-1A, V _{gs} =0V		-0.78	-1.00	V
Max. body-diode continuous current	I _s				-4.2	A
DYNAMIC PARAMETERS						
Input capacitance	C _{iss}	V _{gs} =0V, V _{ds} =-15V, f=1MHz		700	840	pF
Output capacitance	C _{oss}			112		pF
Reverse transfer capacitance	C _{rss}			78		pF
Gate resistance	R _g	V _{gs} =0V, V _{ds} =0V, f=1MHz		10	15	Ω
SWITCHING PARAMETERS						
Total gate charge (10V)	Q _g	V _{gs} =-10V, V _{ds} =-15V, I _d =-6A		14.7	18.0	nC
Total gate charge (4.5V)	Q _g			7.6		nC
Gate-source charge	Q _{gs}			2.0		nC
Gate-drain charge	Q _{gd}			3.8		nC
Turn-on delay time	t _{d(on)}	V _{gs} =-10V, V _{ds} =-15V R _l =2.5 Ω , R _{gen} =3 Ω		8.6		ns
Turn-on rise time	t _r			5.0		ns
Turn-off delay time	t _{d(off)}			28.2		ns
Turn-off fall time	t _f			13.5		ns
Body diode reverse recovery time	t _{rr}	I _f =-6A, dI/dt=100A/ μ s		24.0	30.0	ns
Body diode reverse recovery charge	Q _{rr}	I _f =-6A, dI/dt=100A/ μ s		14.7		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

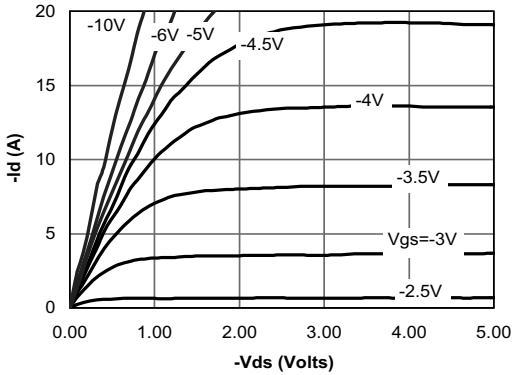


Figure 1: On-Region Characteristics

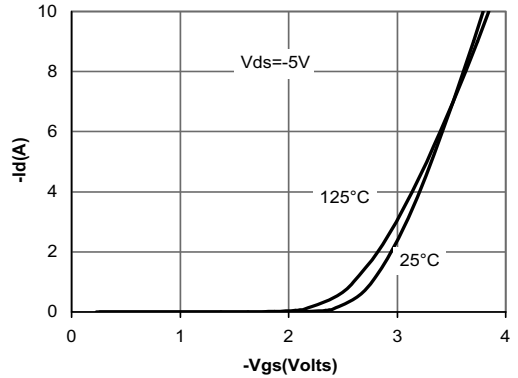


Figure 2: Transfer Characteristics

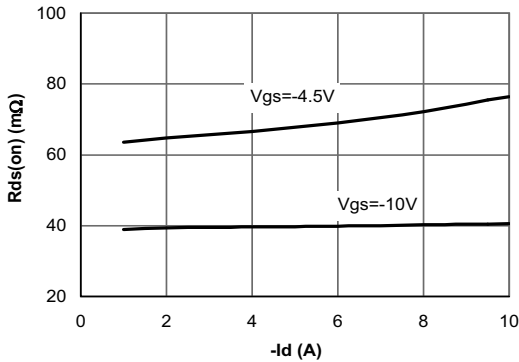


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

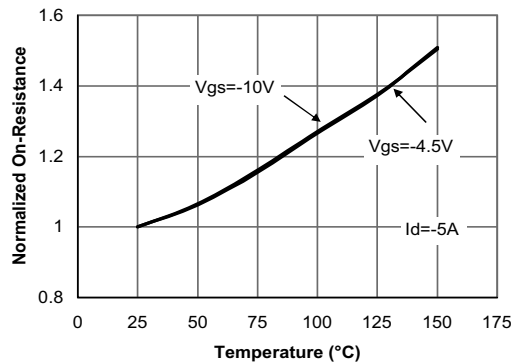


Figure 4: On-Resistance vs. Junction Temperature

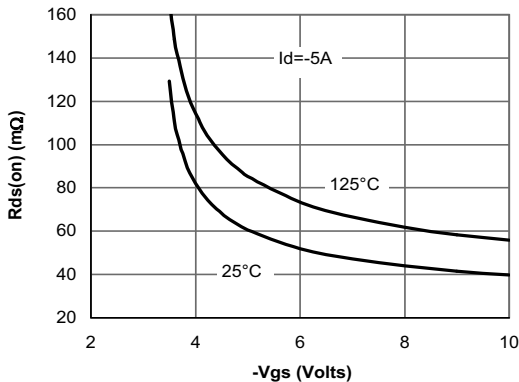


Figure 5: On-Resistance vs. Gate-Source Voltage

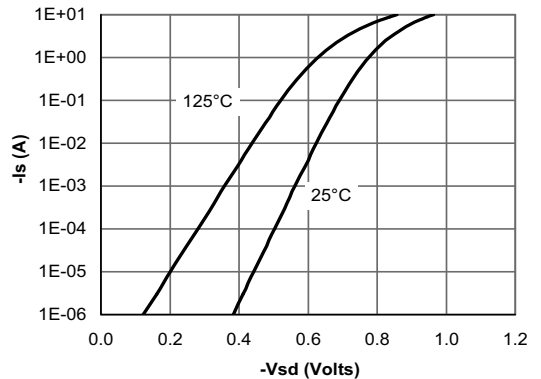


Figure 6: Body-Diode Characteristics

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