

Single P-channel MOSFET

ELM14425AA-N

<http://www.elm-tech.com>

■ General description

ELM14425AA-N uses advanced trench technology to provide excellent $R_{ds(on)}$, low gate charge and low gate resistance. Internal ESD protection is included.

■ Features

- $V_{ds} = -38V$
- $I_d = -14A$ ($V_{gs} = -20V$)
- $R_{ds(on)} < 10m\Omega$ ($V_{gs} = -20V$)
- $R_{ds(on)} < 11m\Omega$ ($V_{gs} = -10V$)
- ESD Rating : 4000V HBM

■ Maximum absolute ratings

$T_a = 25^\circ C$. Unless otherwise noted.

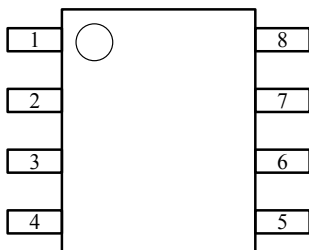
Parameter	Symbol	Limit	Unit	Note	
Drain-source voltage	V_{ds}	-38	V		
Gate-source voltage	V_{gs}	± 25	V		
Continuous drain current	I_d	$T_a = 25^\circ C$	-14	A	1
		$T_a = 70^\circ C$	-11		
Pulsed drain current	I_{dm}	-50	A	2	
Power dissipation	P_d	$T_c = 25^\circ C$	3.1	W	1
		$T_c = 70^\circ C$	2.0		
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	$R_{\theta ja}$	$t \leq 10s$	26	$^\circ C/W$	1
Maximum junction-to-ambient		Steady-state	50	$^\circ C/W$	
Maximum junction-to-lead	$R_{\theta jl}$	14	24	$^\circ C/W$	3

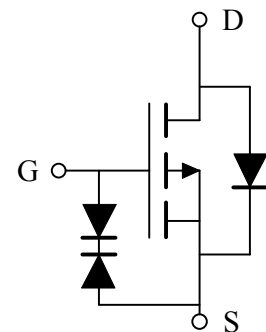
■ Pin configuration

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



Single P-channel MOSFET

ELM14425AA-N

<http://www.elm-tech.com>

■ Electrical characteristics

Ta=25°C. Unless otherwise noted.

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
STATIC PARAMETERS						
Drain-source breakdown voltage	BVdss	Id=-250μA, Vgs=0V	-38			V
Zero gate voltage drain current	Idss	Vds=-30V			-100	nA
		Vgs=0V			-500	
Gate-body leakage current	Igss	Vds=0V, Vgs=±20V			±1	μA
		Vds=0V, Vgs=±25V			±10	μA
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=-250μA	-2.0	-2.5	-3.5	V
On state drain current	Id(on)	Vgs=-10V, Vds=-5V	-50			A
Static drain-source on-resistance	Rds(on)	Vgs=-20V		7.7	10.0	mΩ
		Id=-14A	Ta=125°C	11.0	13.5	
		Vgs=-10V, Id=-14A		8.8	11.0	mΩ
Forward transconductance	Gfs	Vds=-5V, Id=-14A		43		S
Diode forward voltage	Vsd	Is=-1A, Vgs=0V		-0.71	-1.00	V
Max. body-diode continuous current	Is				-4.2	A
DYNAMIC PARAMETERS						
Input capacitance	Ciss			3800		pF
Output capacitance	Coss	Vgs=0V, Vds=-20V, f=1MHz		560		pF
Reverse transfer capacitance	Crss			350		pF
Gate resistance	Rg	Vgs=0V, Vds=0V, f=1MHz		7.5		Ω
SWITCHING PARAMETERS						
Total gate charge	Qg	Vgs=-10V, Vds=-20V Id=-14A		63.0		nC
Gate-source charge	Qgs			14.1		nC
Gate-drain charge	Qgd			16.1		nC
Turn-on delay time	td(on)			12.4		ns
Turn-on rise time	tr	Vgs=-10V, Vds=-20V		9.2		ns
Turn-off delay time	td(off)	RL=1.35Ω, Rgen=3Ω		97.5		ns
Turn-off fall time	tf			45.5		ns
Body diode reverse recovery time	trr	If=-14A, dIf/dt=100A/μs		35		ns
Body diode reverse recovery charge	Qrr	If=-14A, dIf/dt=100A/μs		33		nC

NOTE :

- The value of Rθja 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 ≤ 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 are obtained using 80μs pulses, duty cycle 0.5%max.
- 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.

Single P-channel MOSFET

ELM14425AA-N

<http://www.elm-tech.com>

■ Typical electrical and thermal characteristics

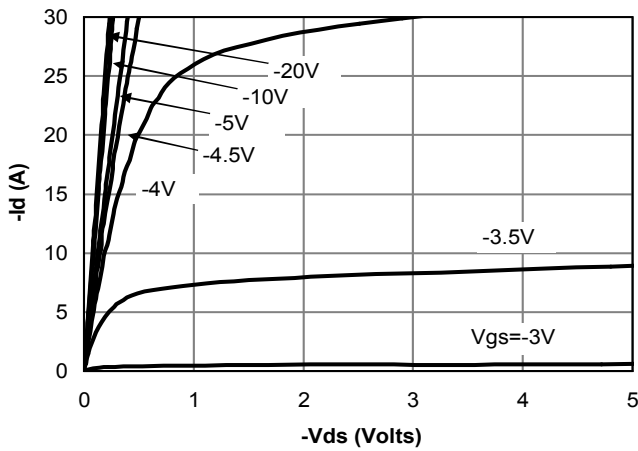


Figure 1: On-Region Characteristics

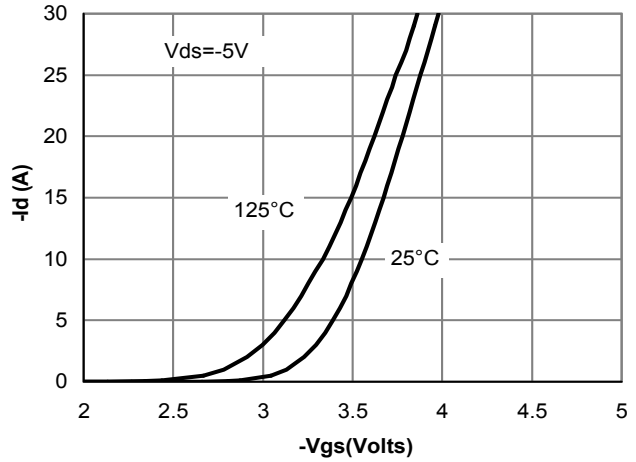


Figure 2: Transfer Characteristics

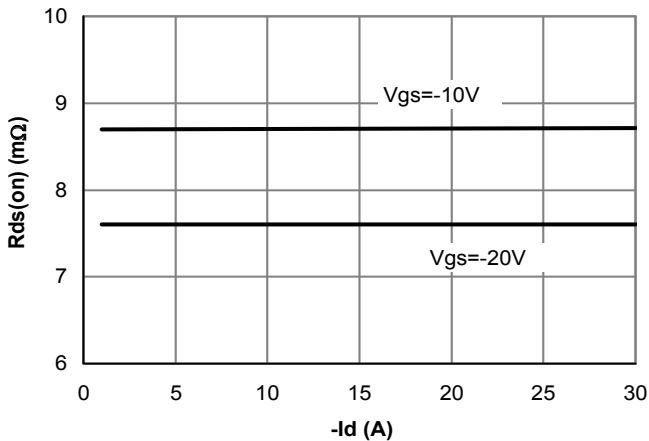


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

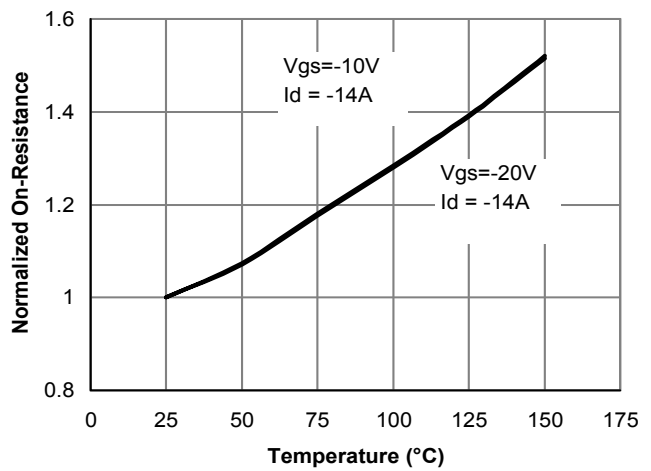


Figure 4: On-Resistance vs. Junction Temperature

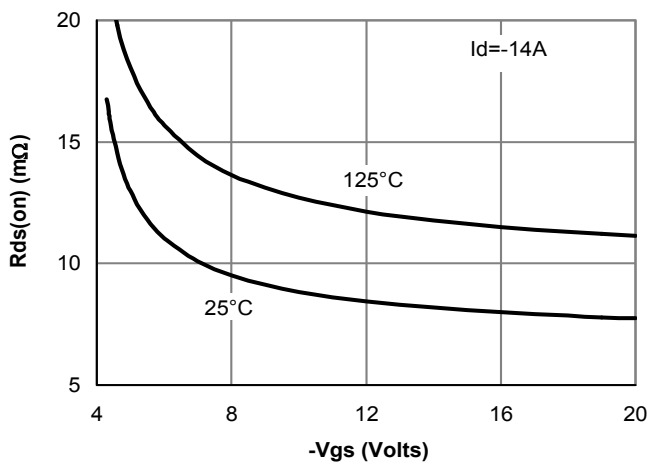


Figure 5: On-Resistance vs. Gate-Source Voltage

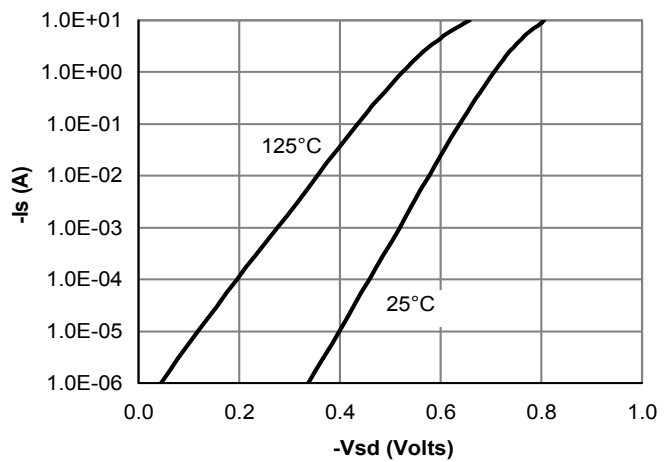


Figure 6: Body-Diode Characteristics

Single P-channel MOSFET

ELM14425AA-N

<http://www.elm-tech.com>

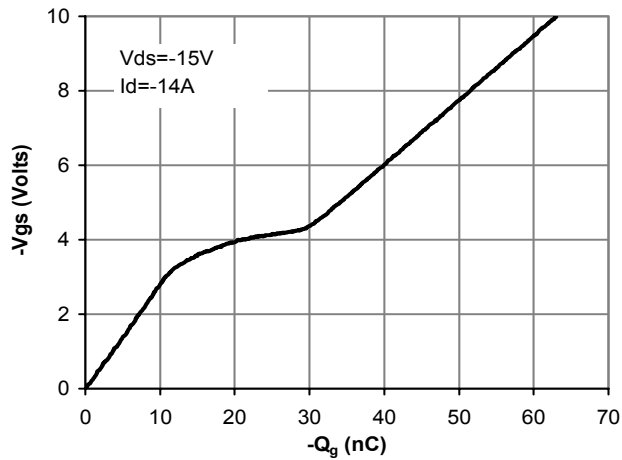


Figure 7: Gate-Charge Characteristics

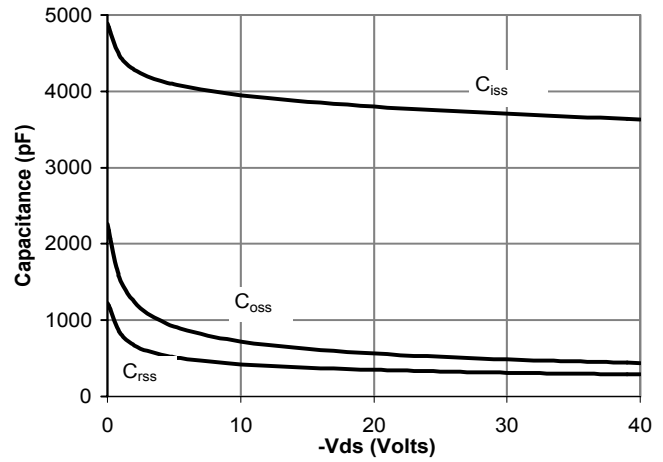


Figure 8: Capacitance Characteristics

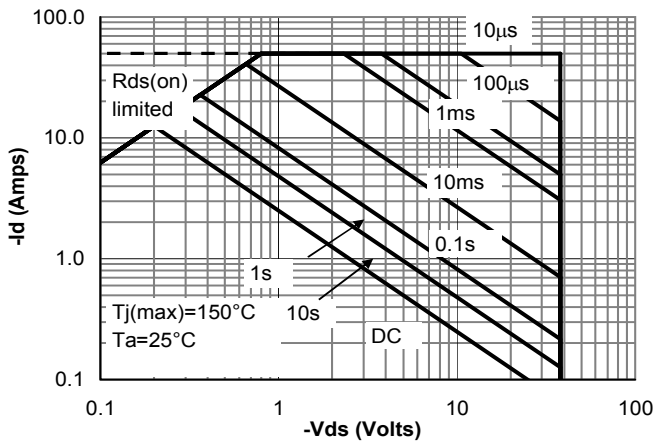


Figure 9: Maximum Forward Biased Safe Operating Area (Note 5)

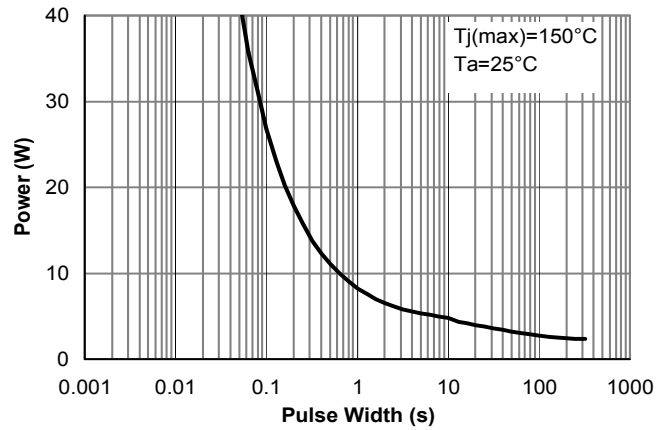


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note 5)

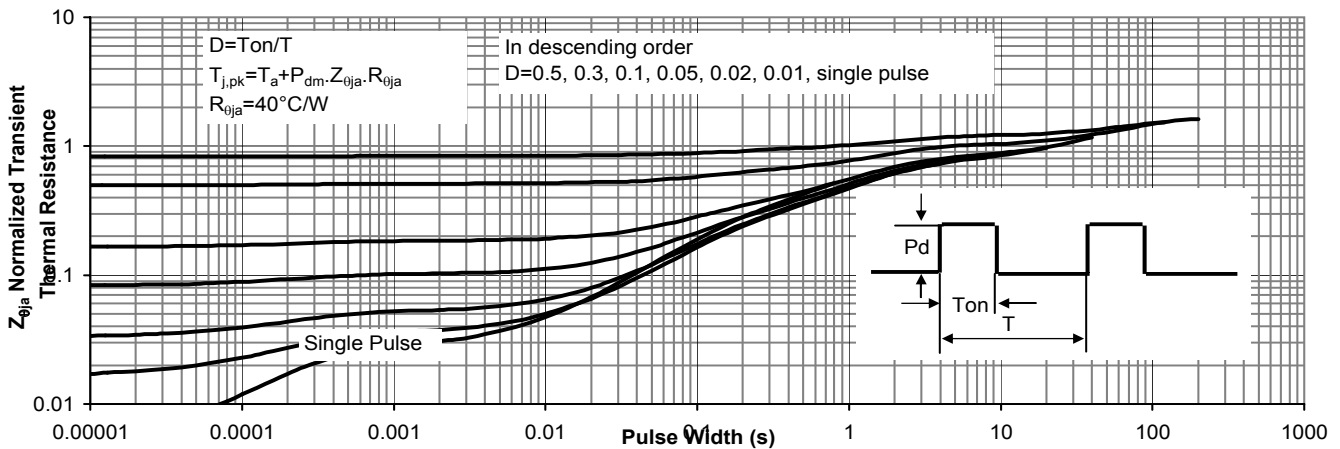


Figure 11: Normalized Maximum Transient Thermal Impedance