

Dual P-channel MOSFET

ELM54801AA-N

■ General description

ELM54801AA-N uses advanced trench technology to provide excellent $R_{ds(on)}$ and low gate charge.

■ Features

- $V_{ds} = -30V$
- $I_d = -5A$ ($V_{gs} = -10V$)
- $R_{ds(on)} < 48m\Omega$ ($V_{gs} = -10V$)
- $R_{ds(on)} < 57m\Omega$ ($V_{gs} = -4.5V$)
- $R_{ds(on)} < 80m\Omega$ ($V_{gs} = -2.5V$)

■ Maximum absolute ratings

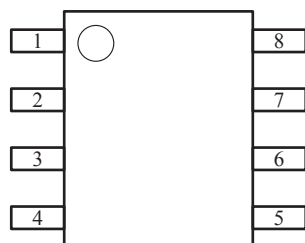
Parameter	Symbol	Limit	Unit	Note	
Drain-source voltage	V_{ds}	-30	V		
Gate-source voltage	V_{gs}	± 12	V		
Continuous drain current	I_d	$T_a = 25^\circ C$	-5	A	
		$T_a = 70^\circ C$	-4		
Pulsed drain current	I_{dm}	-28	A	3	
Avalanche current	I_{as}, I_{ar}	17	A	3	
Avalanche energy	$L = 0.1mH$	Eas, Ear	14	mJ	3
Power dissipation	P_d	$T_a = 25^\circ C$	2.0	W	
		$T_a = 70^\circ C$	1.3		
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	$t \leq 10s$	$R_{\theta ja}$	48.0	62.5	$^\circ C/W$	1
Maximum junction-to-ambient	Steady-state		74.0	90.0	$^\circ C/W$	1, 4
Maximum junction-to-lead	Steady-state	$R_{\theta jl}$	32.0	40.0	$^\circ C/W$	

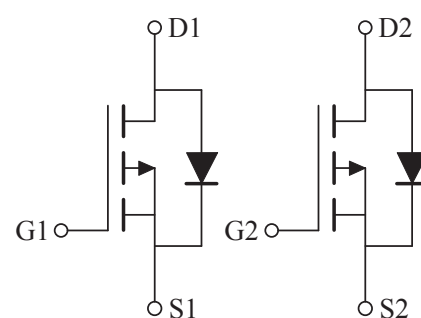
■ Pin configuration

SOP-8(TOP VIEW)



Pin No.	Pin name
1	SOURCE2
2	GATE2
3	SOURCE1
4	GATE1
5	DRAIN1
6	DRAIN1
7	DRAIN2
8	DRAIN2

■ Circuit



Dual P-channel MOSFET

ELM54801AA-N

■Electrical characteristics

Ta=25°C

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
STATIC PARAMETERS						
Drain-source breakdown voltage	BVdss	Id=-250μA, Vgs=0V	-30			V
Zero gate voltage drain current	Idss	Vds=-30V, Vgs=0V Tj=55°C			-1	μA
					-5	
Gate-body leakage current	Igss	Vds=0V, Vgs=±12V			±100	nA
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=-250μA	-0.5	-0.9	-1.3	V
On state drain current	Id(on)	Vgs=-4.5V, Vds=-5V	-28			A
Static drain-source on-resistance	Rds(on)	Vgs=-10V, Id=-5A Tj=125°C		40	48	mΩ
				60	72	
				45	57	
		Vgs=-2.5V, Id=-2.5A		60	80	
Forward transconductance	Gfs	Vds=-5V, Id=-5A		18		S
Diode forward voltage	Vsd	Is=-1A, Vgs=0V		-0.7	-1.0	V
Max. body-diode continuous current	Is				-2.5	A
DYNAMIC PARAMETERS						
Input capacitance	Ciss		515	645	780	pF
Output capacitance	Coss	Vgs=0V, Vds=-15V, f=1MHz	55	80	105	pF
Reverse transfer capacitance	Crss		30	55	80	pF
Gate resistance	Rg	Vgs=0V, Vds=0V, f=1MHz	4.0	7.8	12.0	Ω
SWITCHING PARAMETERS						
Total gate charge	Qg	Vgs=-4.5V, Vds=-15V Id=-5A	5.0	7.0	9.0	nC
Gate-source charge	Qgs				1.5	nC
Gate-drain charge	Qgd				2.5	nC
Turn-on delay time	td(on)			6.5		ns
Turn-on rise time	tr	Vgs=-10V, Vds=-15V		3.5		ns
Turn-off delay time	td(off)	RI=3Ω, Rgen=6Ω		41.0		ns
Turn-off fall time	tf			9.0		ns
Body diode reverse recovery time	trr	If=-5A, dl/dt=100A/μs		11	15	ns
Body diode reverse recovery charge	Qrr	If=-5A, dl/dt=100A/μs		3.5	5.0	nC

NOTE :

1. 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 application depends on the user's specific board design.
2. The power dissipation Pd is based on Tj(Max)=150°C, using 10s junction-to-ambient thermal resistance.
3. Repetitive rating, pulse width limited by junction temperature Tj(Max)=150°C. Ratings are based on low frequency and duty cycles to keep initial Tj=25°C.
4. The Rθja is the sum of the thermal impedance from junction to lead Rθjl and lead to ambient.
5. The static characteristics in Figures 1 to 6 are obtained using <300μs pulses, duty cycle 0.5% max.
6. These curves are based on the junction-to-ambient thermal impedance which is measured with the device mounted on 1in2 FR-4 board with 2oz.Copper, assuming a maximum junction temperature of Tj(Max)=150°C. The SOA curve provides a single pulse rating.

Dual P-channel MOSFET

ELM54801AA-N

■ Typical electrical and thermal characteristics

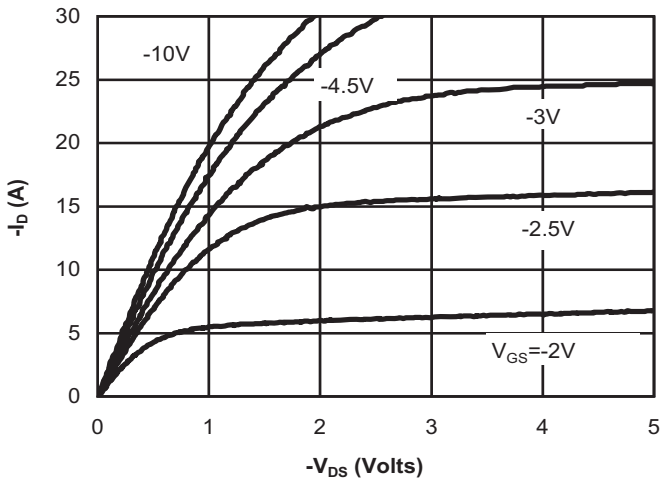


Fig 1: On-Region Characteristics (Note E)

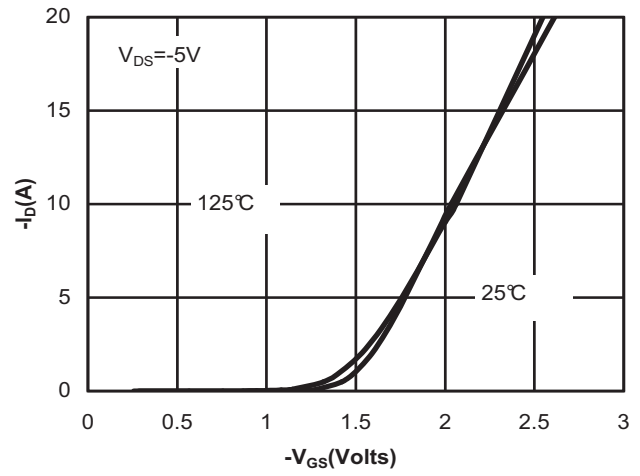


Figure 2: Transfer Characteristics (Note E)

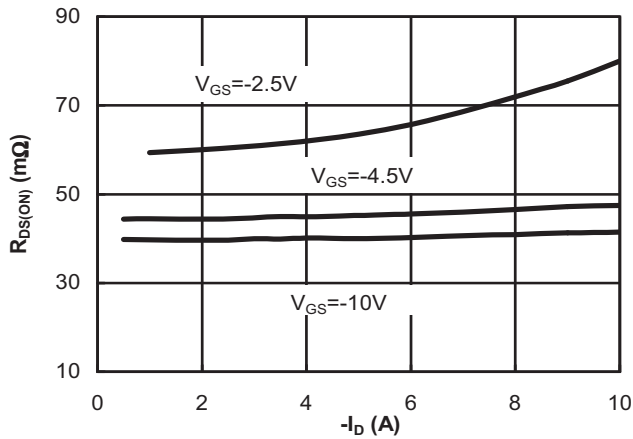


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

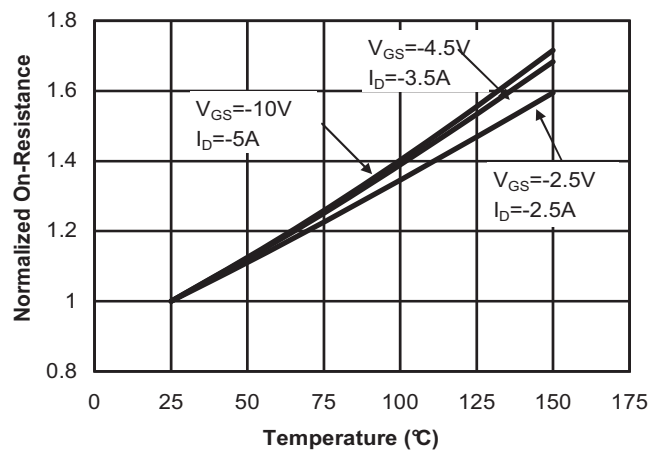


Figure 4: On-Resistance vs. Junction Temperature (Note E)

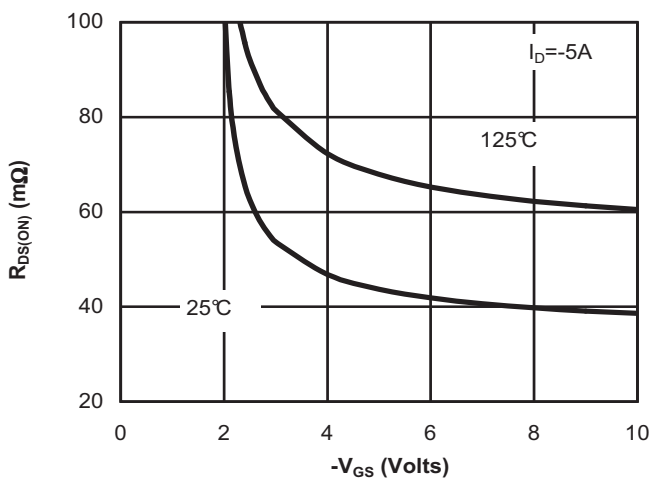


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

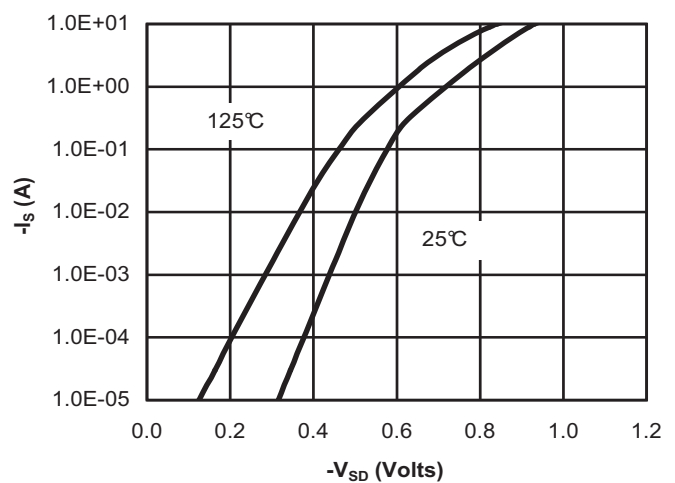


Figure 6: Body-Diode Characteristics (Note E)

Dual P-channel MOSFET

ELM54801AA-N

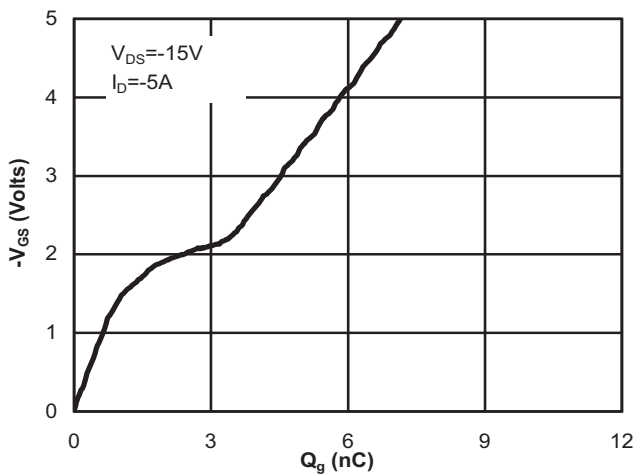


Figure 7: Gate-Charge Characteristics

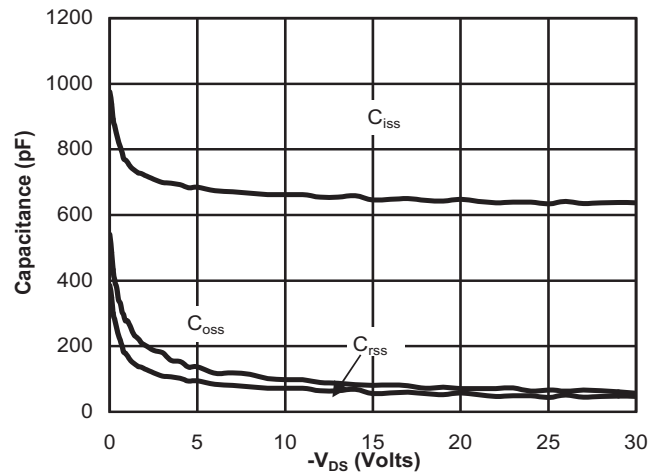


Figure 8: Capacitance Characteristics

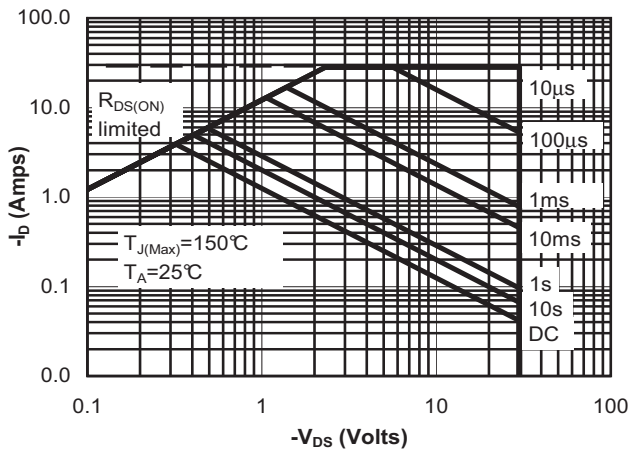


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

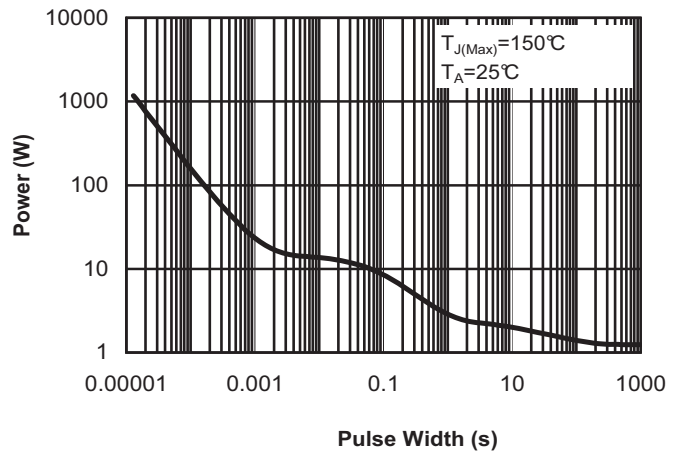


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

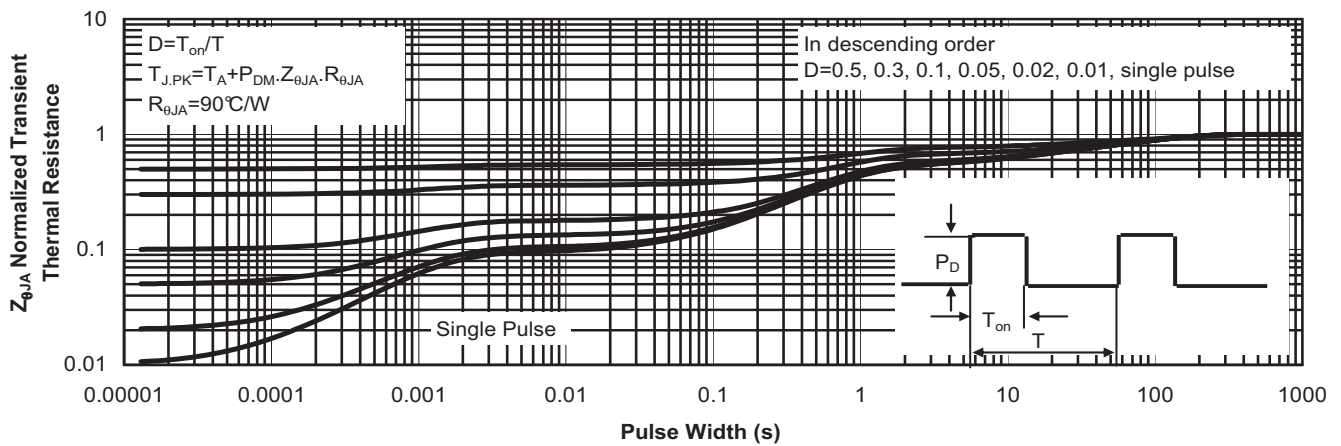


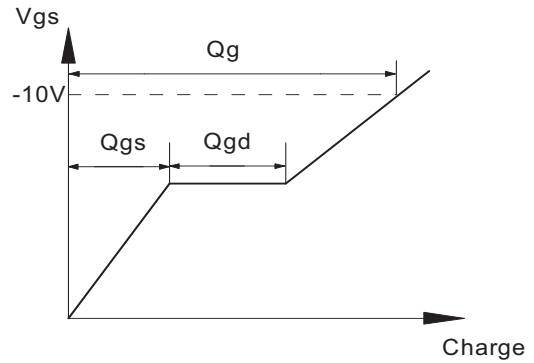
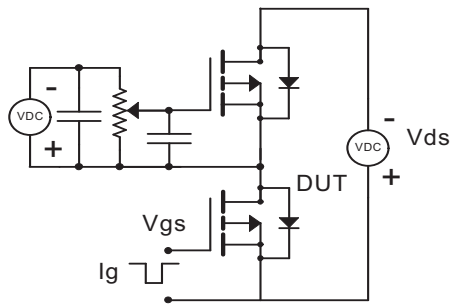
Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

Dual P-channel MOSFET

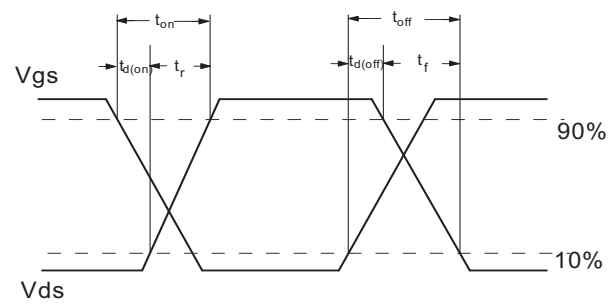
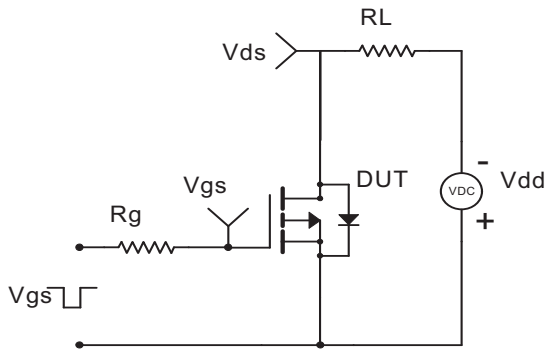
ELM54801AA-N

■ Test circuit & waveform

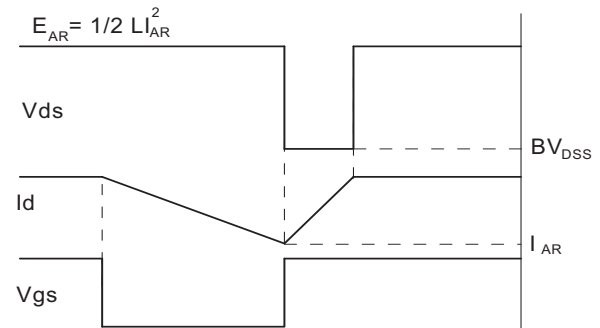
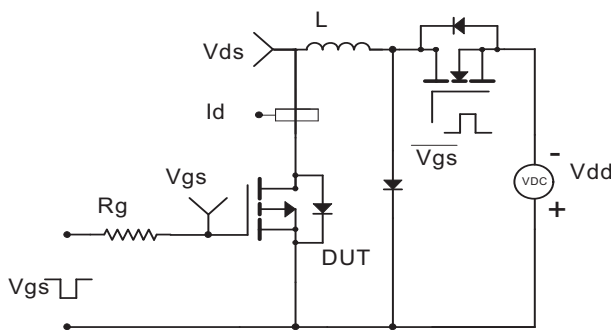
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

