

Dual N-channel MOSFET (common drain)

ELM18804BA-S

General description

ELM18804BA-S uses advanced trench technology to provide excellent $R_{ds(on)}$, low gate charge and operation with gate voltages as low as 1.8V and internal ESD protection.

Features

- $V_{ds}=20V$
- $I_d=8A$ ($V_{gs}=10V$)
- $R_{ds(on)} < 13m\Omega$ ($V_{gs}=10V$)
- $R_{ds(on)} < 14m\Omega$ ($V_{gs}=4.5V$)
- $R_{ds(on)} < 19m\Omega$ ($V_{gs}=2.5V$)
- $R_{ds(on)} < 27m\Omega$ ($V_{gs}=1.8V$)
- ESD Rating : 2000V HBM

Maximum absolute ratings

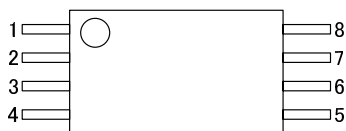
Parameter	Symbol	Limit	Unit	Note
Drain-source voltage	V_{ds}	20	V	
Gate-source voltage	V_{gs}	± 12	V	
Continuous drain current	I_d	8.0	A	1
		6.3		
Pulsed drain current	I_{dm}	30	A	2
Power dissipation	P_d	1.50	W	1
		1.08		
Junction and storage temperature range	T_j, T_{stg}	-55 to 150	$^{\circ}C$	

Thermal characteristics

Parameter	Symbol	Typ.	Max.	Unit	Note
Maximum junction-to-ambient	$R\theta_{ja}$	64	83	$^{\circ}C/W$	1
Maximum junction-to-ambient		Steady-state	89	120	
Maximum junction-to-lead	$R\theta_{jl}$	53	70	$^{\circ}C/W$	3

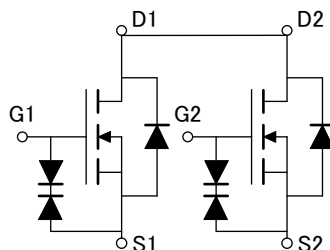
Pin configuration

TSSOP-8 (TOP VIEW)



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

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	20			V
Zero gate voltage drain current	I _{dss}	V _{ds} =16V			10	μA
		V _{gs} =0V	T _j =55°C		25	
Gate-body leakage current	I _{gss}	V _{ds} =0V, V _{gs} =±10V			10	μA
Gate-source breakdown voltage	BV _{gso}	V _{ds} =0V, I _g =±250 μA	±12			V
Gate threshold voltage	V _{gs(th)}	V _{ds} =V _{gs} , I _d =250 μA	0.50	0.75	1.00	V
On state drain current	I _{d(on)}	V _{gs} =4.5V, V _{ds} =5V	30			A
Static drain-source on-resistance	R _{ds(on)}	V _{gs} =10V		10.0	13.0	mΩ
		I _d =8A	T _j =125°C	13.3	16.0	
		V _{gs} =4.5V, I _d =5A		11.5	14.0	mΩ
		V _{gs} =2.5V, I _d =4A		15.4	19.0	mΩ
		V _{gs} =1.8V, I _d =3A		22.2	27.0	mΩ
Forward transconductance	G _{fs}	V _{ds} =5V, I _d =8A		36		S
Diode forward voltage	V _{sd}	I _s =1A, V _{gs} =0V		0.73	1.00	V
Max. body-diode continuous current	I _s				2.4	A
DYNAMIC PARAMETERS						
Input capacitance	C _{iss}	V _{gs} =0V, V _{ds} =10V, f=1MHz		1810		pF
Output capacitance	C _{oss}			232		pF
Reverse transfer capacitance	C _{rss}			200		pF
Gate resistance	R _g	V _{gs} =0V, V _{ds} =0V, f=1MHz		1.6		Ω
SWITCHING PARAMETERS						
Total gate charge	Q _g	V _{gs} =4.5V, V _{ds} =10V, I _d =8A		17.9		nC
Gate-source charge	Q _{gs}			1.5		nC
Gate-drain charge	Q _{gd}			4.7		nC
Turn-on delay time	t _{d(on)}	V _{gs} =10V, V _{ds} =10V R _l =1.2 Ω, R _{gen} =3 Ω		2.5		ns
Turn-on rise time	t _r			7.2		ns
Turn-off delay time	t _{d(off)}			49.0		ns
Turn-off fall time	t _f			10.8		ns
Body diode reverse recovery time	t _{rr}		I _f =8A, dI/dt=100A/μs		20.2	
Body diode reverse recovery charge	Q _{rr}	I _f =8A, dI/dt=100A/μs		8.0		nC

NOTE :

- 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.
- Repetitive rating, pulse width limited by junction temperature.
- The R_{θja} is the sum of the thermal impedance from junction to lead R_{θjl} 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 T_a=25°C. The SOA curve provides a single pulse rating.

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Typical electrical and thermal characteristics

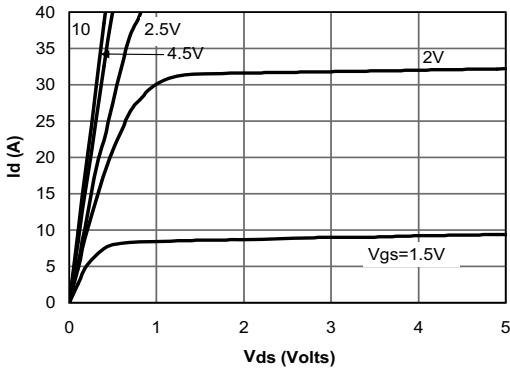


Figure 1: On-Region Characteristics

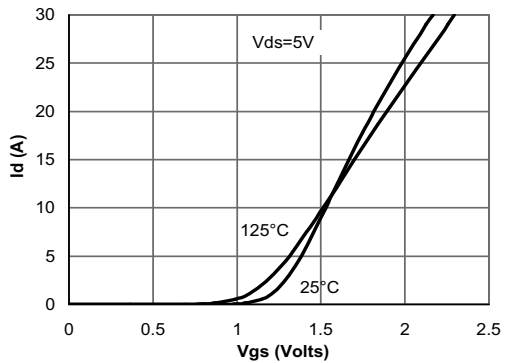


Figure 2: Transfer Characteristics

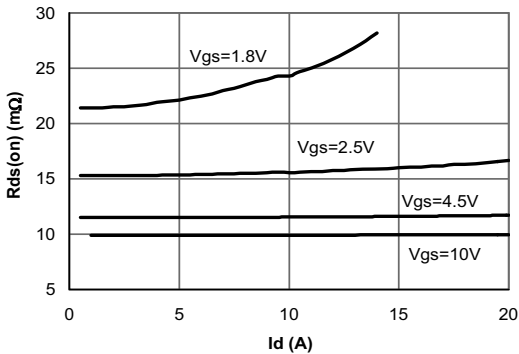


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

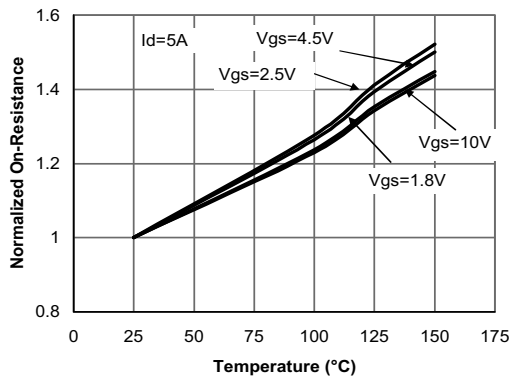


Figure 4: On-Resistance vs. Junction Temperature

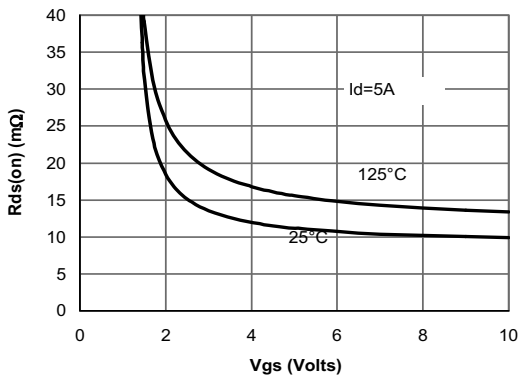


Figure 5: On-Resistance vs. Gate-Source Voltage

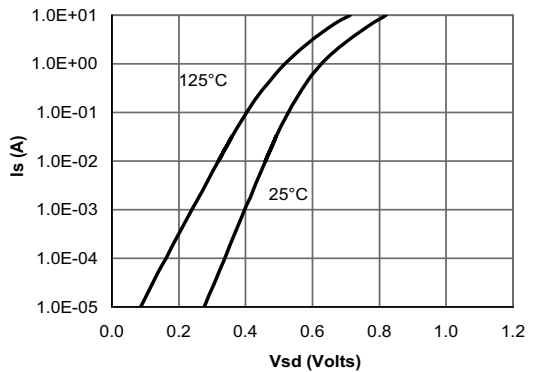


Figure 6: Body-Diode Characteristics

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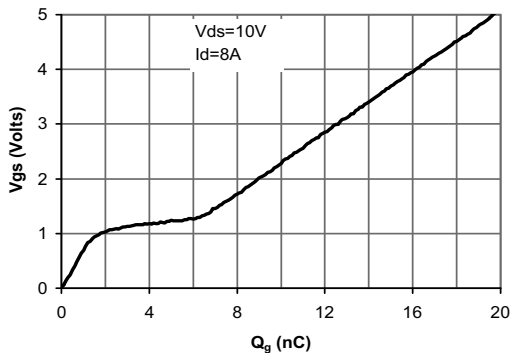


Figure 7: Gate-Charge Characteristics

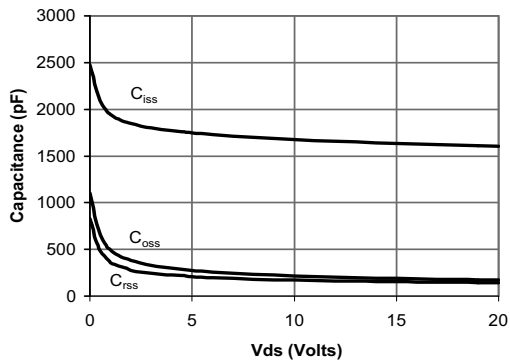


Figure 8: Capacitance Characteristics

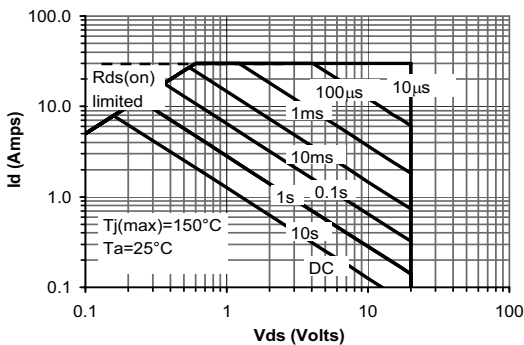


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

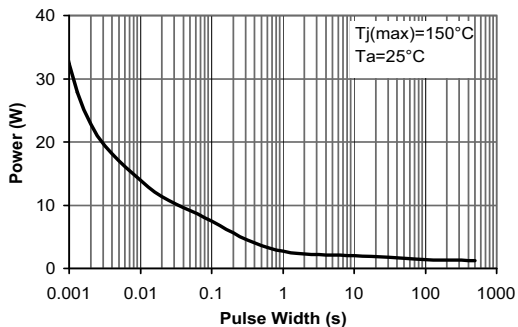


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

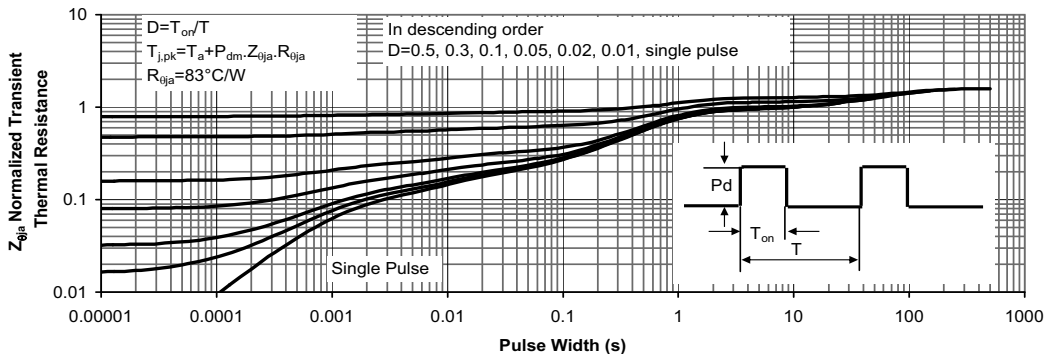


Figure 11: Normalized Maximum Transient Thermal Impedance