

Dual N-channel MOSFET (common drain)

ELM18814BA-S

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

■ General description

ELM18814BA-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

- $V_{ds}=20V$
- $I_d=7.5A$ ($V_{gs}=10V$)
- $R_{ds(on)} < 16m\Omega$ ($V_{gs}=10V$)
- $R_{ds(on)} < 18m\Omega$ ($V_{gs}=4.5V$)
- $R_{ds(on)} < 24m\Omega$ ($V_{gs}=2.5V$)
- $R_{ds(on)} < 34m\Omega$ ($V_{gs}=1.8V$)
- ESD Rating : 2500V HBM

■ Maximum absolute ratings

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

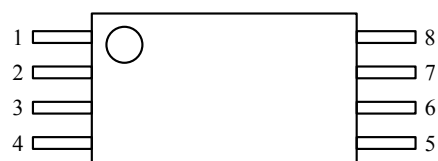
Parameter	Symbol	Limit	Unit	Note	
Drain-source voltage	V_{ds}	20	V		
Gate-source voltage	V_{gs}	± 12	V		
Continuous drain current	I_d	$T_a=25^\circ C$	7.5	A	1
		$T_a=70^\circ C$	6.0		
Pulsed drain current	I_{dm}	30	A	2	
Power dissipation	P_d	$T_c=25^\circ C$	1.50	W	1
		$T_c=70^\circ C$	0.96		
Junction and storage temperature range	T_j, T_{stg}	-55 to 150	$^\circ C$		

■ Thermal characteristics

Parameter	Symbol	Typ.	Max.	Unit	Note
Thermal resistance junction-to-ambient	$R_{\theta ja}$	$t \leq 10s$	64	$^\circ C/W$	1
Thermal resistance junction-to-ambient		Steady-state	89	$^\circ C/W$	
Thermal resistance junction-to-lead	$R_{\theta jl}$	Steady-state	53	$^\circ C/W$	3

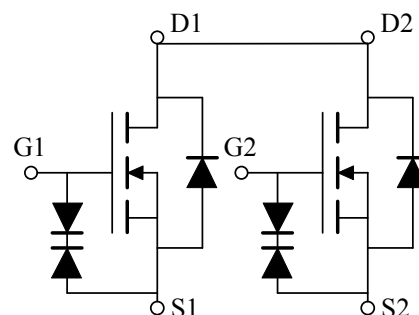
■ Pin configuration

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

Ta=25°C. Unless otherwise noted.

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
STATIC PARAMETERS						
Drain-source breakdown voltage	BV _{dss}	I _d =250μA, V _{gs} =0V	20			V
Zero gate voltage drain current	I _{dss}	V _{ds} =16V, V _{gs} =0V			1	μA
					5	
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 =±250μA	±12			V
Gate threshold voltage	V _{gs(th)}	V _{ds} =V _{gs} , I _d =250μA	0.50	0.71	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, I _d =7.5A		13	16	mΩ
			Ta=125°C		18	
		V _{gs} =4.5V, I _d =7A		15	18	
		V _{gs} =2.5V, I _d =6A		19	24	
		V _{gs} =1.8V, I _d =5A		26	34	
Forward transconductance	G _{fs}	V _{ds} =5V, I _d =7.5A		30		S
Diode forward voltage	V _{sd}	I _s =1A, V _{gs} =0V		0.74	1.00	V
Max. body-diode continuous current	I _s				2.5	A
DYNAMIC PARAMETERS						
Input capacitance	C _{iss}			1390		pF
Output capacitance	C _{oss}	V _{gs} =0V, V _{ds} =10V, f=1MHz		190		pF
Reverse transfer capacitance	C _{rss}			150		pF
Gate resistance	R _g	V _{gs} =0V, V _{ds} =0V, f=1MHz		1.5		Ω
SWITCHING PARAMETERS						
Total gate charge	Q _g			15.4		nC
Gate-source charge	Q _{gs}	V _{gs} =4.5V, V _{ds} =10V, I _d =7.5A		1.4		nC
Gate-drain charge	Q _{gd}			4.0		nC
Turn-on delay time	t _{d(on)}			6.2		ns
Turn-on rise time	t _r	V _{gs} =5V, V _{ds} =10V		11.0		ns
Turn-off delay time	t _{d(off)}	RL=1.3Ω, R _{gen} =3Ω		40.5		ns
Turn-off fall time	t _f			10.0		ns
Body diode reverse recovery time	t _{rr}	I _f =7.5A, dI _f /dt=100A/μs		15.0		ns
Body diode reverse recovery charge	Q _{rr}	I _f =7.5A, dI _f /dt=100A/μs		5.1		nC

NOTE :

1. The value of R_{θja} 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.
2. Repetitive rating, pulse width limited by junction temperature.
3. The R_{θja} is the sum of the thermal impedance from junction to lead R_{θjl} and lead to ambient.
4. The static characteristics in Figures 1 to 6 are obtained using 80μs 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

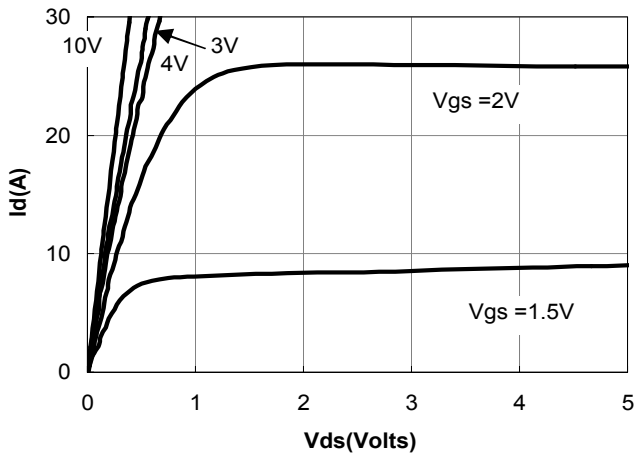


Figure 1: On-Regions CharacteristicCS

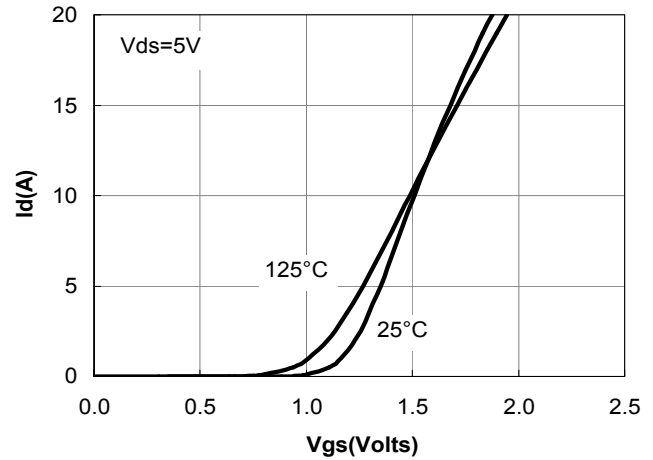


Figure 2: Transfer Characteristics

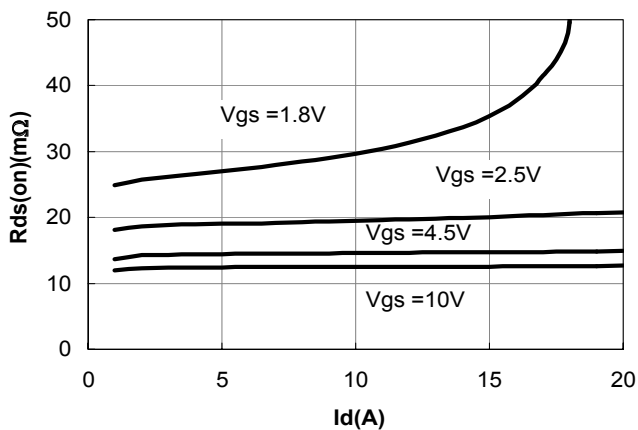


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

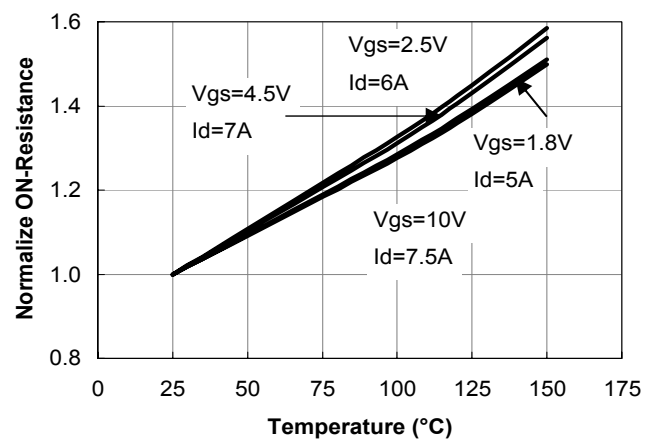


Figure 4: On-Resistance vs. Junction Temperature

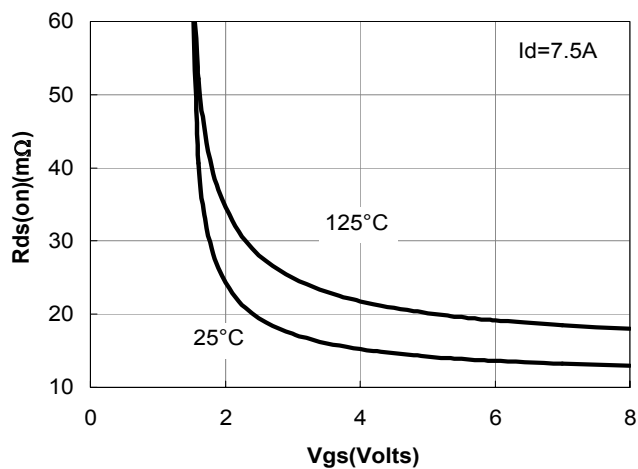


Figure 5: On-Resistance vs. Gate-Source Voltage

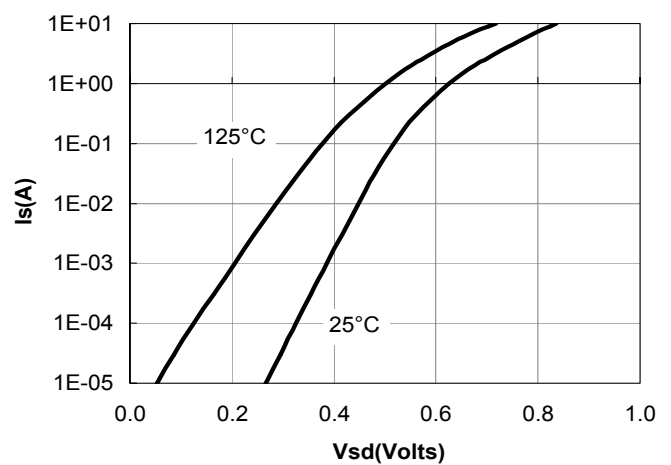


Figure 6: Body-Diode Characteristics

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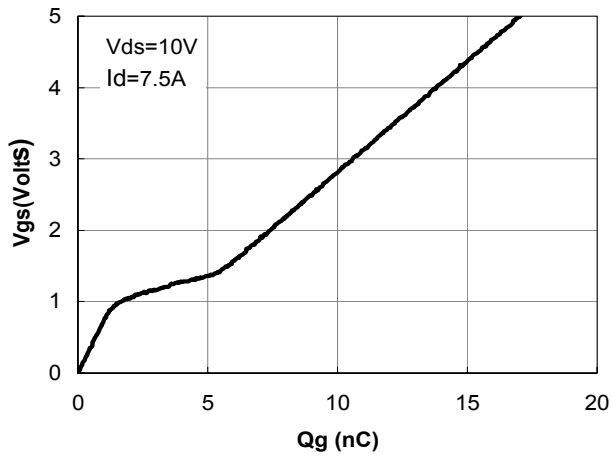


Figure 7: Gate-Charge Characteristics

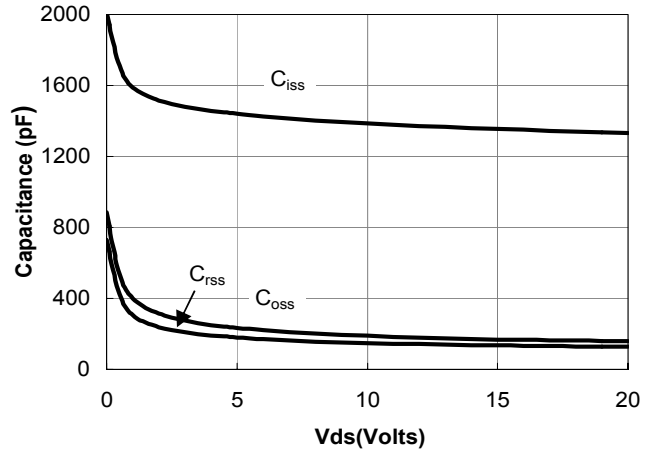


Figure 8: Capacitance Characteristics

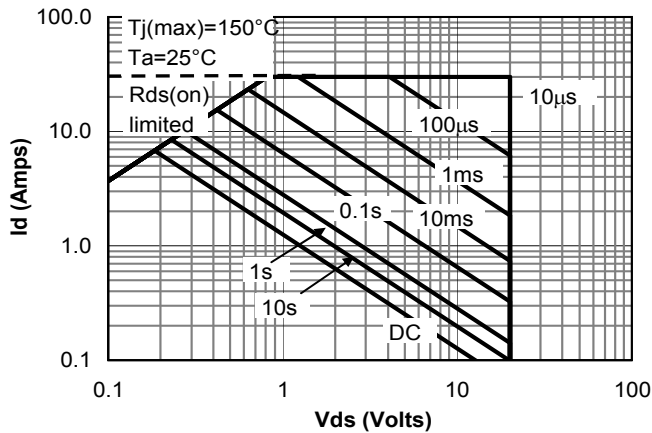


Figure 9: Maximum Forward Biased Safe Operating Area (Note 5)

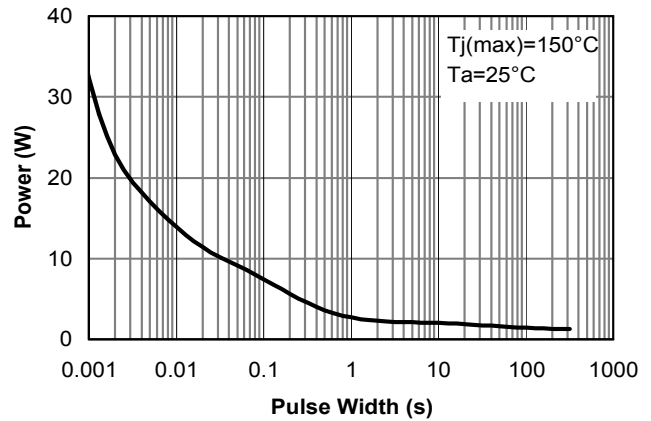


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note 5)

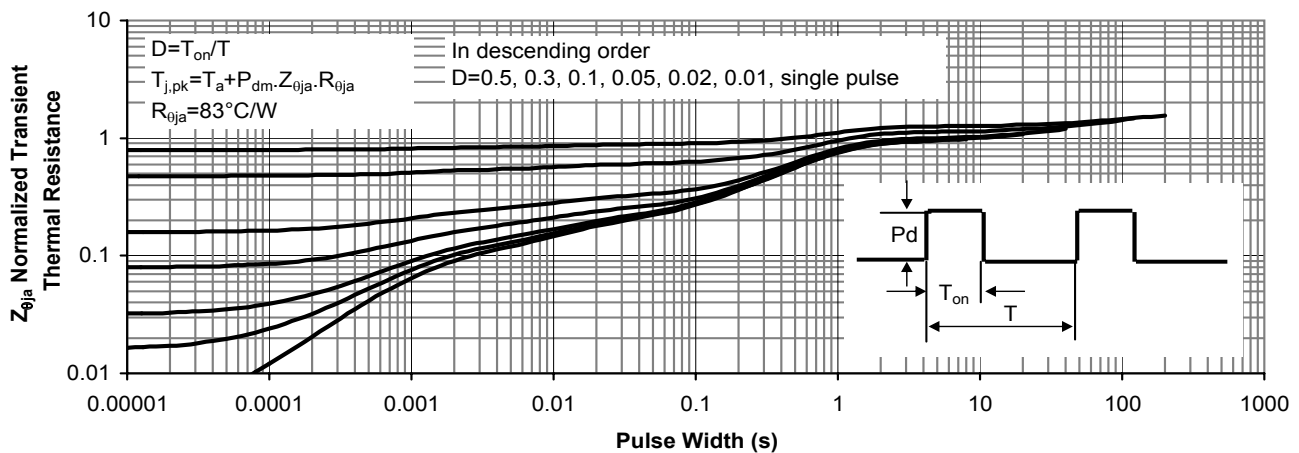


Figure 11: Normalized Maximum Transient Thermal Impedance