Single N-channel MOSFET

ELM4N18N20FDA-N

https://www.elm-tech.com

■General description

ELM4N18N20FDA-N uses advanced trench technology to provide excellent Rds(on), low gate charge and low gate threshold voltage.

■Features

- Vds=200V
- Id=18A (Vgs=10V)
- Rds(on) = 170mΩ (Vgs=10V)
- Rds(on) = 180mΩ (Vgs=4.5V)

■Maximum absolute ratings

Parameter		Symbol	Limit	Unit	Note
Drain-source voltage		Vds	200	V	
Gate-source voltage		Vgs	±20	V	
Continuous drain current (Vgs=10V)	Tc=25°C	Id	18.0	A	1
	Tc=100°C		11.7		
Pulsed drain current		Idm	40	A	2
Single pulsed avalanche energy		Eas	15	mJ	3
Avalanche current		Ias	10	A	
Power dissipation	Tc=25°C	Pd	83	W	4
Storage temperature range		Tstg	-55 to 150	°C	
Operating junction temperature range		Tj	-55 to 150	°C	

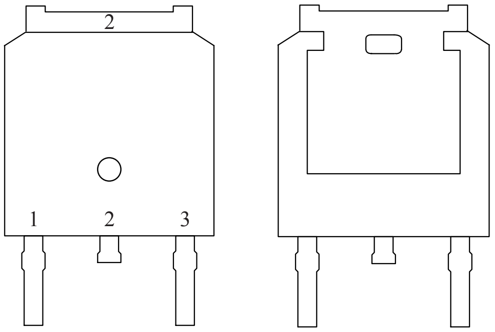
■Thermal characteristics

Parameter	Symbol	Typ.	Max.	Unit	Note
Thermal resistance junction-to-ambient	Rθja	-	60.0	°C/W	1
Thermal resistance junction-to-case	Rθjc	-	1.5	°C/W	1

■Pin configuration

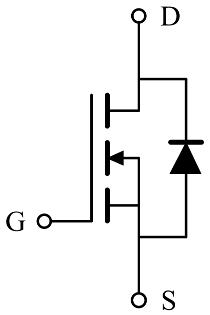
TO-252

(TOP VIEW) (BOTTOM VIEW)



Pin No.	Pin name
1	GATE
2	DRAIN
3	SOURCE

■Circuit



■Electrical characteristics

Tj=25°C. Unless otherwise noted.

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
STATIC PARAMETERS							
Drain-source breakdown voltage	BVdss	Vgs=0V, Id=250μA	200	-	-	V	
Static drain-source on-resistance	Rds(on)	Vgs=10V, Id=9A	-	-	170	mΩ	2
		Vgs=4.5V, Id=9A	-	-	180		
Gate threshold voltage	Vgs(th)	Vgs=Vds, Id=250μA	1.2	-	2.5	V	
Zero gate voltage drain current	Idss	Vds=160V, Vgs=0V	-	-	1	μA	
		Vds=160V, Vgs=0V, Tj=55°C	-	-	5		
Gate-body leakage current	Igss	Vgs=±20V, Vds=0V	-	-	±100	nA	
Forward transconductance	Gfs	Vds=5V, Id=9A	-	22	-	S	
Max. body-diode continuous current	Is	Vgs=Vds=0V, Force current	-	-	18	A	1, 5
Pulsed body-diode current	Ism		-	-	40	A	2, 5
Diode forward voltage	Vsd	Vgs=0V, Is=1A	-	-	1.2	V	2
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vds=25V, Vgs=0V, f=1MHz	-	2047	-	pF	
Output capacitance	Coss		-	109	-	pF	
Reverse transfer capacitance	Crss		-	70	-	pF	
Gate resistance	Rg	Vds=0V, Vgs=0V, f=1MHz	-	2	-	Ω	
SWITCHING PARAMETERS							
Total gate charge (10V)	Qg	Vds=80V, Vgs=10V, Id=9A	-	45.0	-	nC	
Gate-source charge	Qgs		-	9.0	-	nC	
Gate-drain charge	Qgd		-	10.5	-	nC	
Turn-on delay time	td(on)	Vds=50V, Vgs=10V Rgen=3.3Ω, Id=9A	-	13.0	-	ns	
Turn-on rise time	tr		-	8.2	-	ns	
Turn-off delay time	td(off)		-	25.0	-	ns	
Turn-off fall time	tf		-	11.0	-	ns	
Reverse recovery time	trr	If=10A, di/dt=100A/μs	-	37	-	ns	
Reverse recovery charge	Qrr		-	103	-	nC	

NOTE :

1. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
2. The data tested by pulsed, pulse width ≤ 300μs and duty cycle ≤ 2%.
3. The Eas data shows Max. rating . The test condition is Vdd=25V, Vgs=10V, L=0.3mH, Ias=10A.
4. The power dissipation is limited by 150°C junction temperature.
5. The data is theoretically the same as Id and Idm, in real applications, should be limited by total power dissipation.

■Typical characteristics

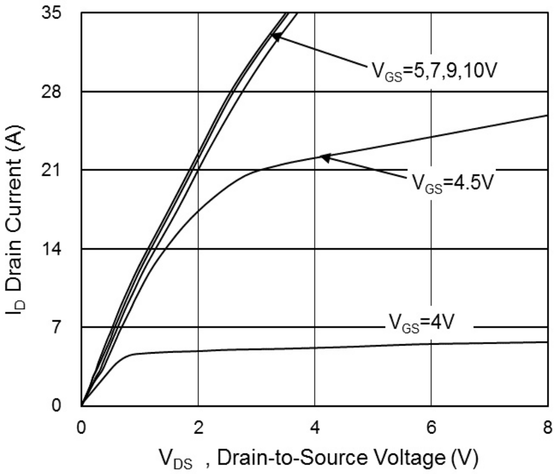


Fig.1 Typical Output Characteristics

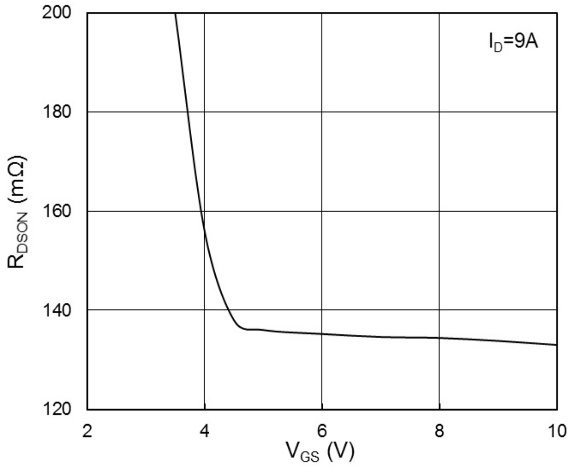


Fig.2 On-Resistance vs. Gate-Source

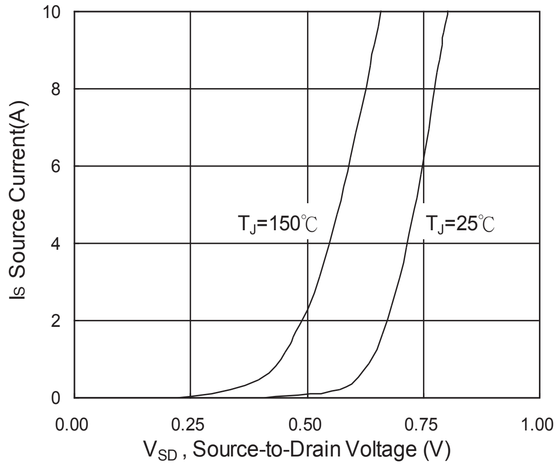


Fig.3 Forward Characteristics Of Reverse

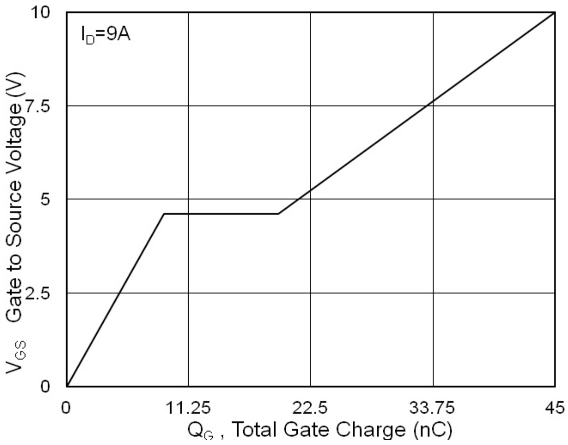


Fig.4 Gate-Charge Characteristics

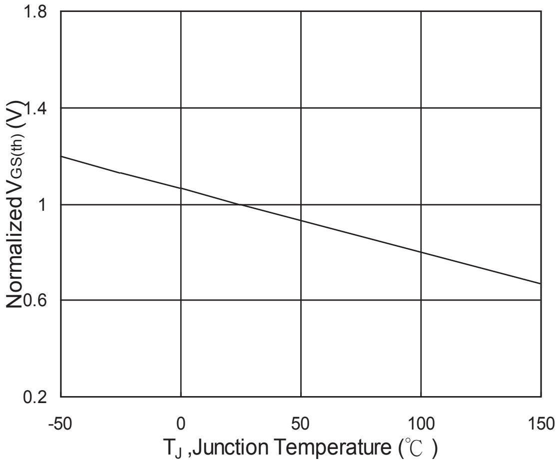


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

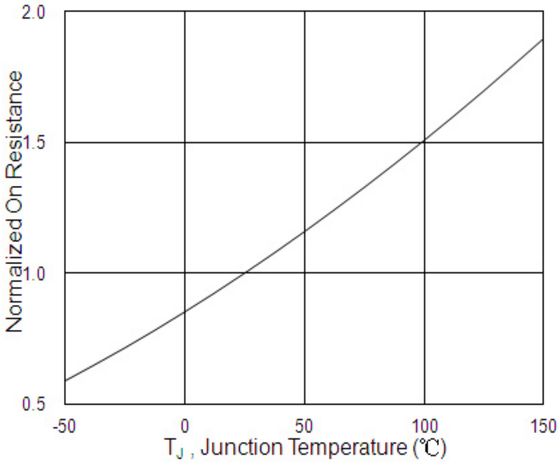


Fig.6 Normalized R_{DSON} vs. T_J

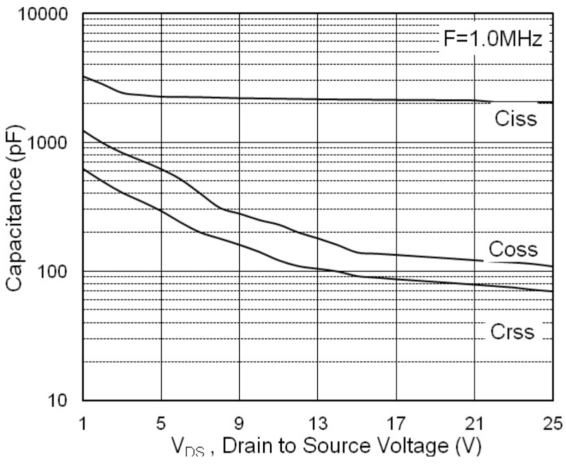


Fig.7 Capacitance

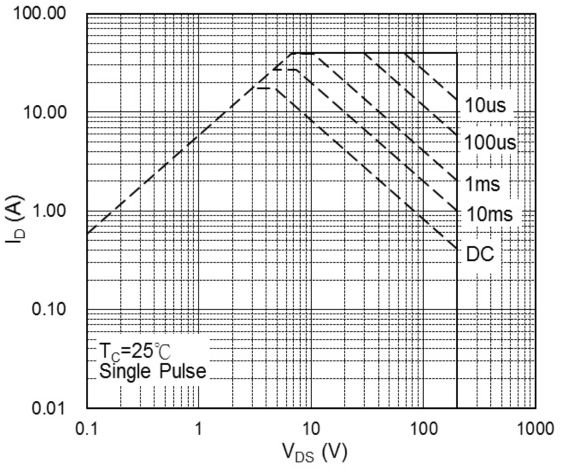


Fig.8 Safe Operating Area

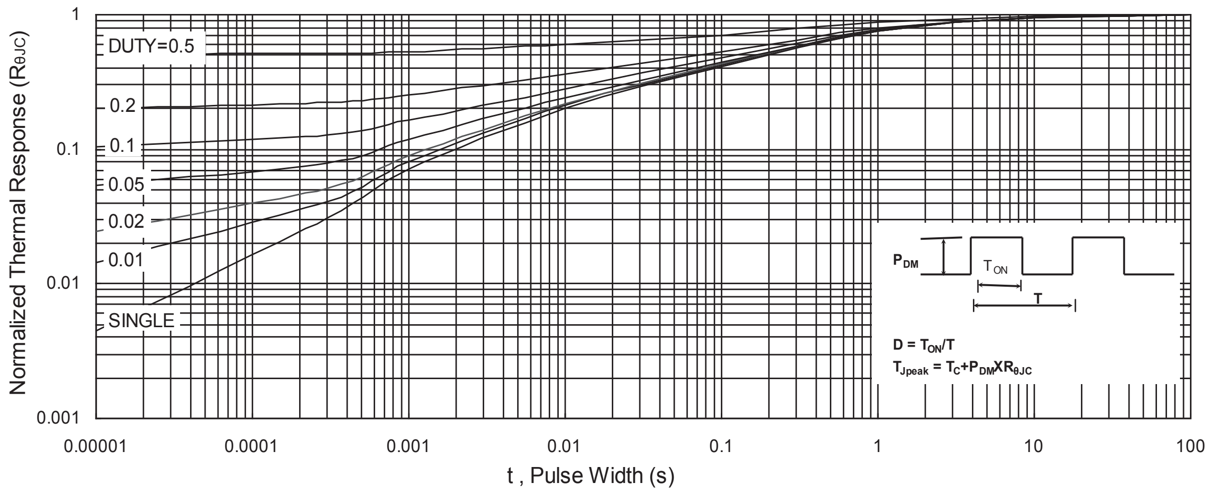


Fig.9 Normalized Maximum Transient Thermal Impedance

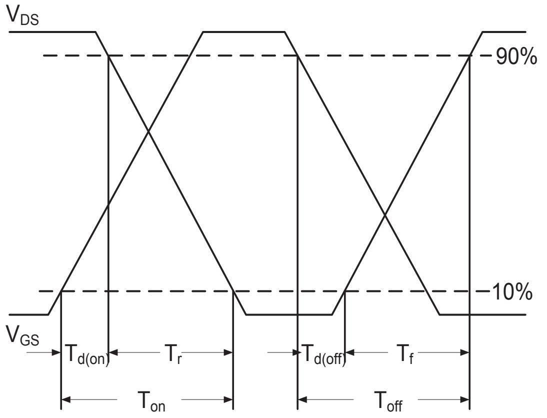


Fig.10 Switching Time Waveform

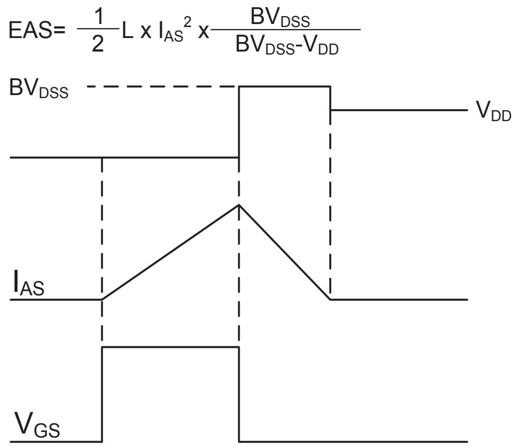
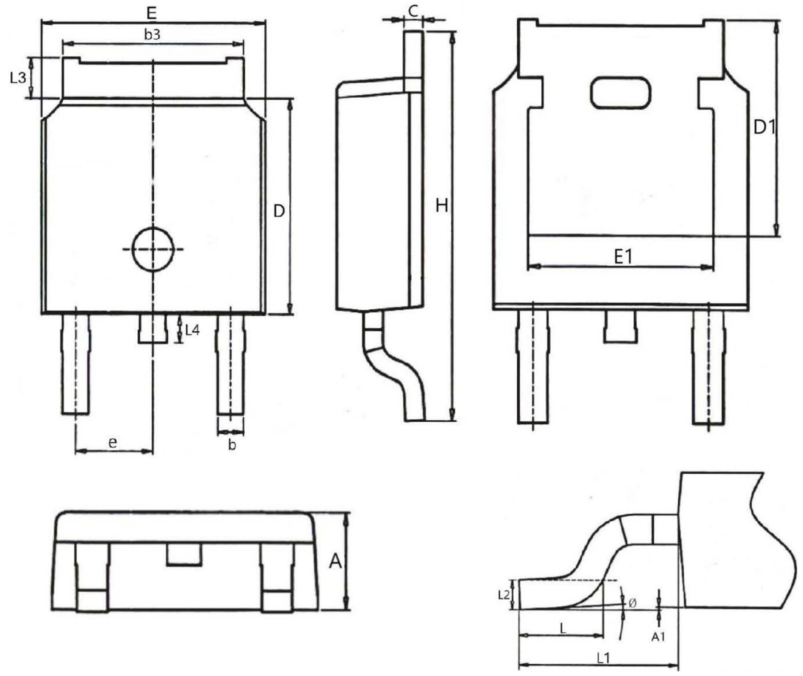


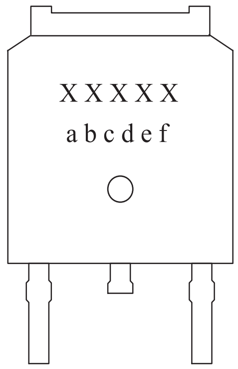
Fig.11 Unclamped Inductive Switching Waveform

■TO-252 dimension (2,500pcs/reel)



Symbols	Millimeters		Inches		Symbols	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	2.18	2.40	0.086	0.095	e	2.286BSC		0.09BSC	
A1	---	0.20	---	0.008	H	9.40	10.50	0.370	0.413
b	0.68	0.90	0.026	0.036	L	1.38	1.78	0.054	0.070
b3	4.95	5.46	0.194	0.215	L1	2.90REF		0.114REF	
c	0.43	0.89	0.017	0.035	L2	0.51BSC		0.020BSC	
D	5.97	6.22	0.235	0.245	L3	0.88	1.28	0.034	0.050
D1	5.300REF		0.209REF		L4	0.50	1.00	0.019	0.039
E	6.35	6.73	0.250	0.265	θ	0°	8°	0°	8°
E1	4.32	---	0.170	---					

■Marking



Symbols	Content
xxxxx	Product code
a	Yearly code: 2019=K, 2020=L, 2021=M...
b, c	Weekly code: 01 to 53
d, e	Sequence: 01 to 99 or 0A to 0Z
f	Assembly code: A to Z (I, O excepted)