

Single N-channel MOSFET

ELM4N0008FDA-N

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

■General description

ELM4N0008FDA-N uses advanced trench technology to provide excellent $R_{ds(on)}$, low gate charge and low gate threshold voltage.

■Features

- $V_{ds}=100V$
- $I_d=5.4A$ ($V_{gs}=10V$)
- $R_{ds(on)} = 310m\Omega$ ($V_{gs}=10V$)
- $R_{ds(on)} = 320m\Omega$ ($V_{gs}=4.5V$)

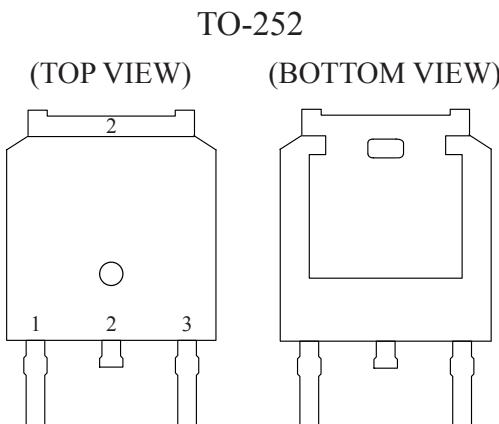
■Maximum absolute ratings

Parameter	Symbol	Limit	Unit	Note
Drain-source voltage	V_{ds}	100	V	
Gate-source voltage	V_{gs}	± 20	V	
Continuous drain current ($V_{gs}=10V$)	I_d	5.4	A	1
		3.4		
		1.7		
		1.3		
Pulsed drain current	I_{dm}	11	A	2
Total power dissipation	P_d	20.8	W	3
		2.0		
Storage temperature range	T_{stg}	-55 to +150	°C	
Operating junction temperature range	T_j	-55 to +150	°C	

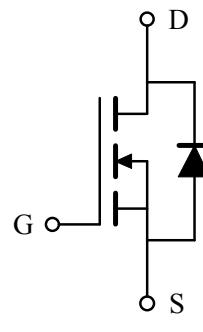
■Thermal characteristics

Parameter	Symbol	Typ.	Max.	Unit	Note
Thermal resistance junction-ambient	$R_{\theta ja}$	-	62	°C/W	1
Thermal resistance junction-case	$R_{\theta jc}$	-	6	°C/W	1

■Pin configuration



■Circuit



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■Electrical characteristics

T_j=25°C. Unless otherwise noted.

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
STATIC PARAMETERS							
Drain-source breakdown voltage	BVdss	V _{gs} =0V, I _d =250μA	100	-	-	V	
BVdss Temperature coefficient	$\frac{\Delta BV_{dss}}{\Delta T_j}$	Reference to 25°C, I _d =1mA	-	0.0672	-	V/°C	
Static drain-source on-resistance	R _{ds(on)}	V _{gs} =10V, I _d =5A	-	-	310	mΩ	2
		V _{gs} =4.5V, I _d =3A	-	-	320		
Gate threshold voltage	V _{gs(th)}	V _{gs} =V _{ds} , I _d =250μA	1.0	-	2.5	V	
V _{gs(th)} Temperature coefficient	ΔV _{gs(th)}		-	4.12	-	mV/°C	
Drain-source leakage current	I _{dss}	V _{ds} =80V, V _{gs} =0V	-	-	1	μA	
		V _{ds} =80V, V _{gs} =0V, T _j =55°C	-	-	5		
Gate-source leakage current	I _{gss}	V _{gs} =±20V, V _{ds} =0V	-	-	±100	nA	
Forward transconductance	G _f s	V _{ds} =5V, I _d =3A	-	5.4	-	S	
Continuous source current	I _s	V _{gs} =V _{ds} =0V, Force current	-	-	5.4	A	1, 4
Pulsed source current	I _{sm}		-	-	11.0	A	2, 4
Diode forward voltage	V _{sd}	V _{gs} =0V, I _s =1A	-	-	1.2	V	2
DYNAMIC PARAMETERS							
Input capacitance	C _{iss}	V _{ds} =15V, V _{gs} =0V, f=1MHz	-	508.0	-	pF	
Output capacitance	C _{oss}		-	29.0	-	pF	
Reverse transfer capacitance	C _{rss}		-	16.4	-	pF	
Gate resistance	R _g	V _{ds} =0V, V _{gs} =0V, f=1MHz	-	2.5	-	Ω	
SWITCHING PARAMETERS							
Total gate charge (10V)	Q _g	V _{ds} =80V, V _{gs} =10V, I _d =5A	-	9.60	-	nC	
Gate-source charge	Q _{gs}		-	1.83	-	nC	
Gate-drain charge	Q _{gd}		-	1.85	-	nC	
Turn-on delay time	t _{d(on)}	V _{ds} =50V, V _{gs} =10V R _{gen} =3.3Ω, I _d =5A	-	1.4	-	ns	
Turn-on rise time	t _r		-	30.6	-	ns	
Turn-off delay time	t _{d(off)}		-	11.2	-	ns	
Turn-off fall time	t _f		-	6.0	-	ns	
Reverse recovery time	t _{rr}	I _f =5A, di/dt=100A/μs	-	20	-	nS	
Reverse recovery charge	Q _{rr}		-	19	-	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 power dissipation is limited by 150°C junction temperature.
4. The data is theoretically the same as I_d and I_{dm}, in real applications, should be limited by total power dissipation.

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■Typical characteristics

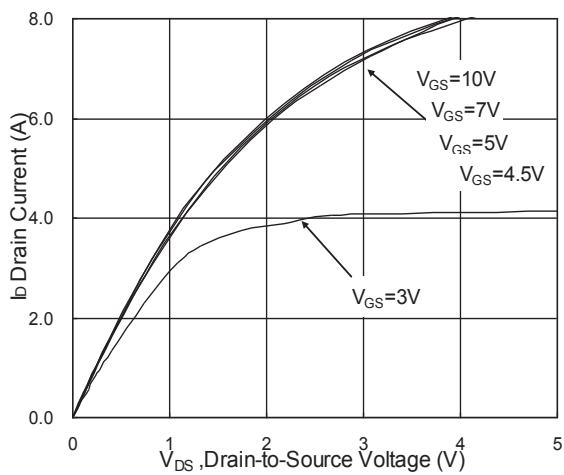


Fig.1 Typical Output Characteristics

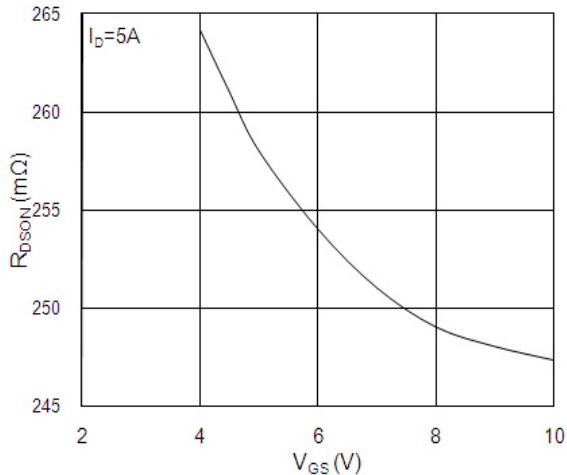


Fig.2 On-Resistance vs. Gate-Source

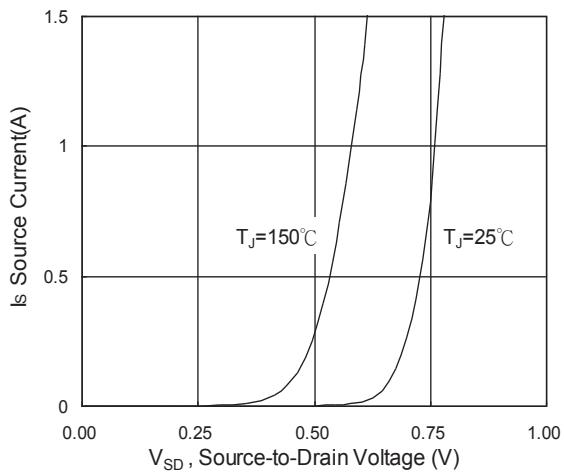


Fig.3 Forward Characteristics Of Reverse

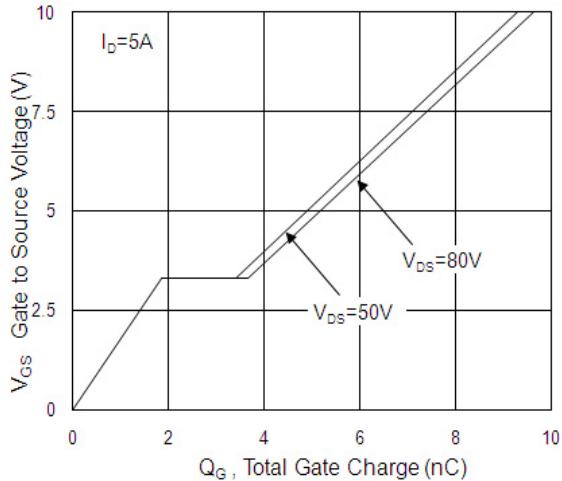


Fig.4 Gate-Charge Characteristics

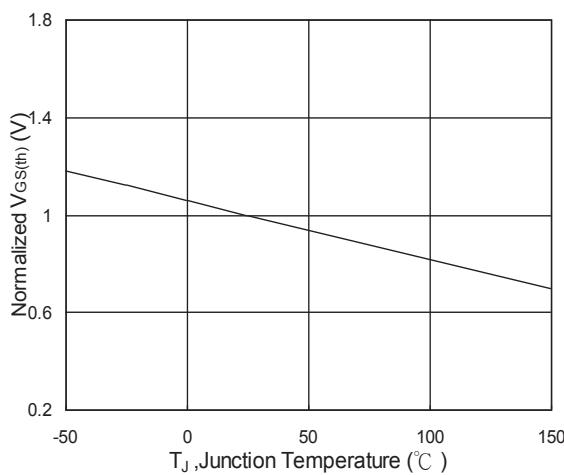


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

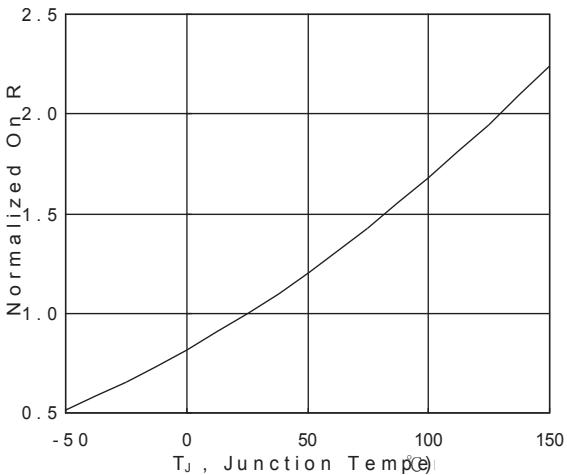


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

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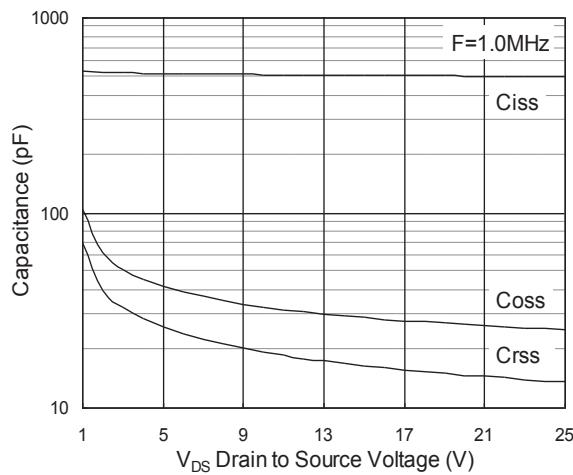


Fig.7 Capacitance

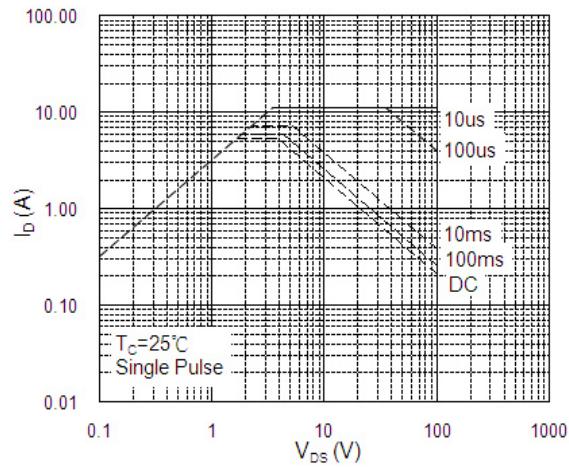


Fig.8 Safe Operating Area

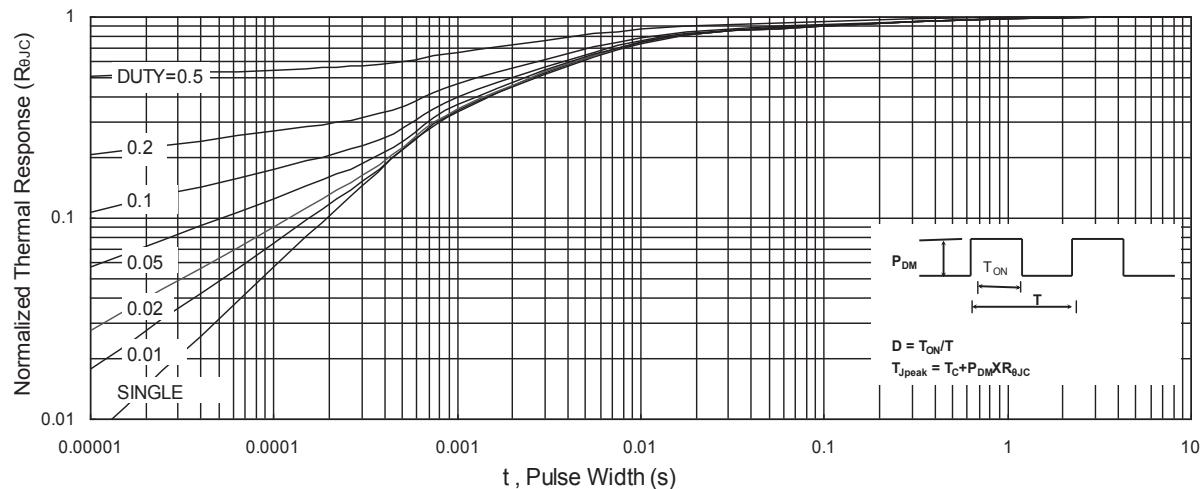


Fig.9 Normalized Maximum Transient Thermal Impedance

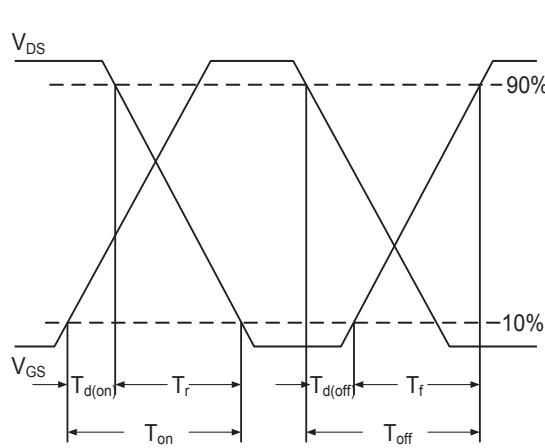


Fig.10 Switching Time Waveform

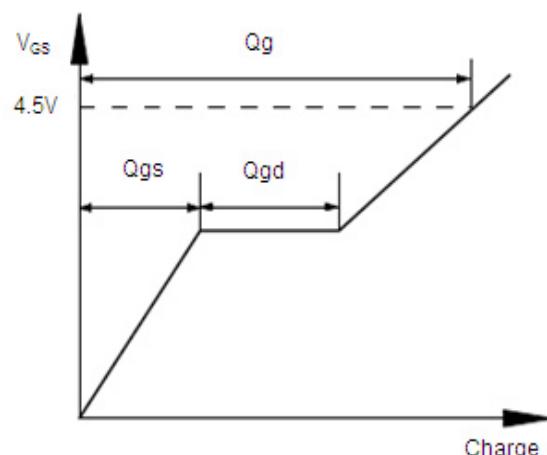


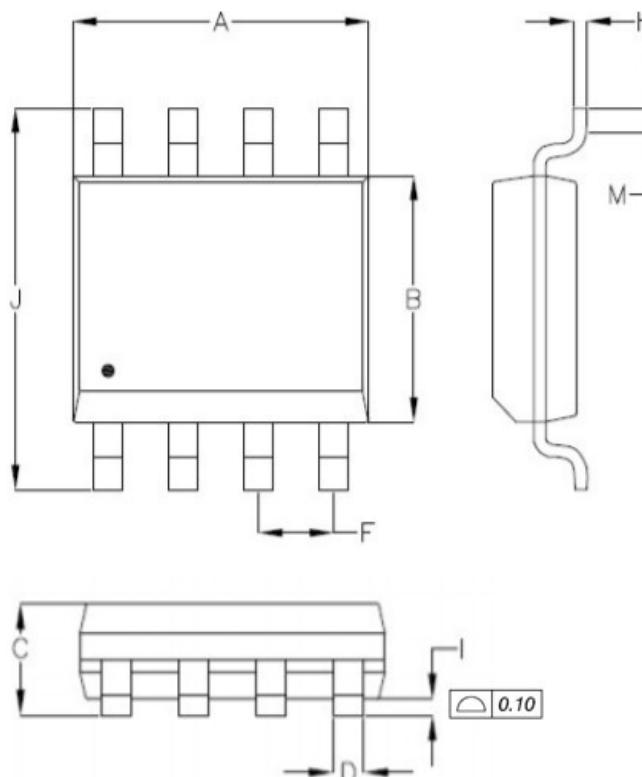
Fig.11 Gate Charge Waveform

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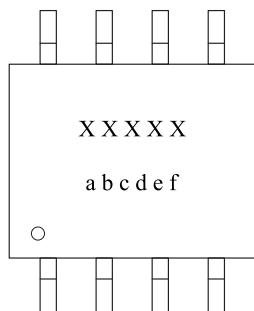
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■SOP-8 dimension (2,500pcs/reel)



Symbols	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.700	5.150	0.185	0.203
B	3.700	4.100	0.146	0.161
C	1.230	1.753	0.048	0.069
D	0.310	0.510	0.012	0.020
F	1.070	1.470	0.042	0.058
H	0.160	0.254	0.006	0.010
I	0.050	0.254	0.002	0.010
J	5.750	6.250	0.226	0.246
M	0.400	1.270	0.016	0.050

■Marking



Symbols	Content
xxxxx	Product code
a	Yearly code: 2019=K, 2020=L, 2021=M, 2022=N...
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)