

Single N-channel MOSFET

ELM4N6032FAA-N

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

■General description

ELM4N6032FAA-N uses advanced trench technology to provide excellent $R_{ds(on)}$, low gate charge and low gate threshold voltage.

■Features

- $V_{ds}=60V$
- $I_d=13A$ ($V_{gs}=10V$)
- $R_{ds(on)} = 8.5m\Omega$ ($V_{gs}=10V$)
- $R_{ds(on)} = 12.0m\Omega$ ($V_{gs}=4.5V$)

■Maximum absolute ratings

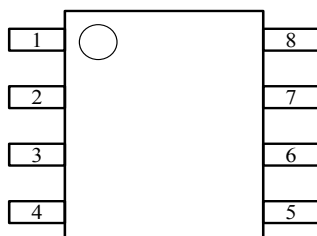
Parameter		Symbol	Limit	Unit	Note
Drain-source voltage		V_{ds}	60	V	
Gate-source voltage		V_{gs}	± 20	V	
Continuous drain current ($V_{gs}=10V$)	$T_a=25^{\circ}C$	I_d	13	A	1
	$T_a=100^{\circ}C$		8		
Pulsed drain current		I_{dm}	60	A	2
Single pulse avalanche energy		EAS	80	mJ	3
Avalanche current		I_{as}	40	A	
Total power dissipation	$T_a=25^{\circ}C$	P_d	2.7	W	4
Storage temperature range		T_{stg}	- 55 to 150	$^{\circ}C$	
Operating junction temperature range		T_j	- 55 to 150	$^{\circ}C$	

■Thermal characteristics

Parameter		Symbol	Typ.	Max.	Unit	Note
Thermal resistance junction-ambient	$t \leq 10s$	$R_{\theta ja}$	-	45	$^{\circ}C/W$	1
	Steady state	$R_{\theta ja}$	-	80		1

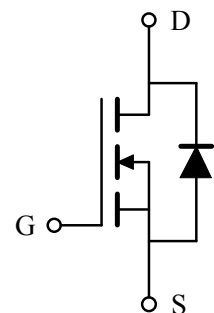
■Pin configuration

SOP-8(TOP VIEW)



Pin No.	Pin name
1	SOURCE
2	SOURCE
3	SOURCE
4	GATE
5	DRAIN
6	DRAIN
7	DRAIN
8	DRAIN

■Circuit



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■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	60	-	-	V	
Static drain-source on-resistance	Rds(on)	Vgs=10V, Id=10A	-	-	8.5	mΩ	2
		Vgs=4.5V, Id=8A	-	-	12.0		
Gate threshold voltage	Vgs(th)	Vgs=Vds, Id=250μA	1.2	-	2.5	V	
Drain-source leakage current	Idss	Vds=48V Vgs=0V	-	-	1	μA	
		Tj=55°C	-	-	5		
Gate-source leakage current	Igss	Vds=0V, Vgs=±20V	-	-	±100	nA	
Forward transconductance	Gfs	Vds=5V, Id=10A	-	50	-	S	
Continuous source current	Is	Vgs=Vds=0V, Force current	-	-	10	A	1, 5
Pulsed source current	Ism		-	-	60	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	-	3307	-	pF	
Output capacitance	Coss		-	201	-	pF	
Reverse transfer capacitance	Crss		-	151	-	pF	
SWITCHING PARAMETERS							
Total gate charge (10V)	Qg	Vds=48V, Vgs=10V Id=10A	-	57.0	-	nC	
Gate-source charge	Qgs		-	8.7	-	nC	
Gate-drain charge	Qgd		-	14.0	-	nC	
Turn-on delay time	td(on)	Vdd=30V, Vgs=10V Rgen=3.3Ω, Id=10A	-	16.2	-	ns	
Turn-on rise time	tr		-	41.2	-	ns	
Turn-off delay time	td(off)		-	56.4	-	ns	
Turn-off fall time	tf		-	16.2	-	ns	
Reverse recovery time	trr	If=10A, di/dt=100A/μs	-	24.0	-	nS	
Reverse recovery charge	Qrr		-	15.0	-	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 ≤ 300us, duty cycle ≤ 2%.
3. The EAS data shows Max. rating . The test condition is Vdd=50V, Vgs=10V, L=0.1mH, Ias=40A.
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.

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■ Typical electrical and thermal characteristics

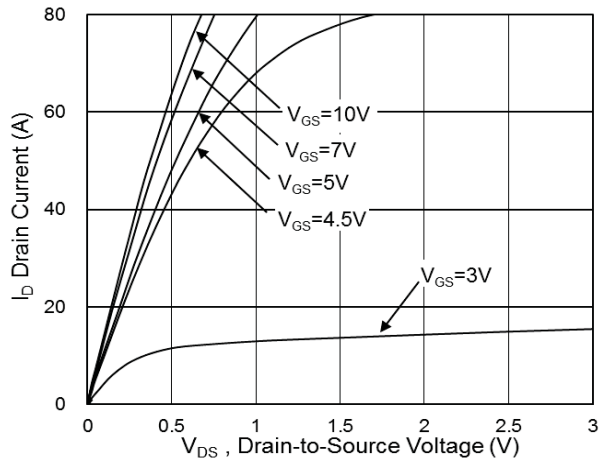


Fig.1 Typical Output Characteristics

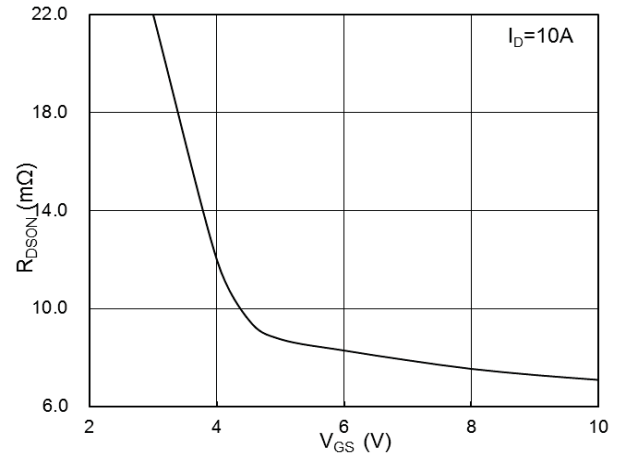


Fig.2 On-Resistance v.s Gate-Source Voltage

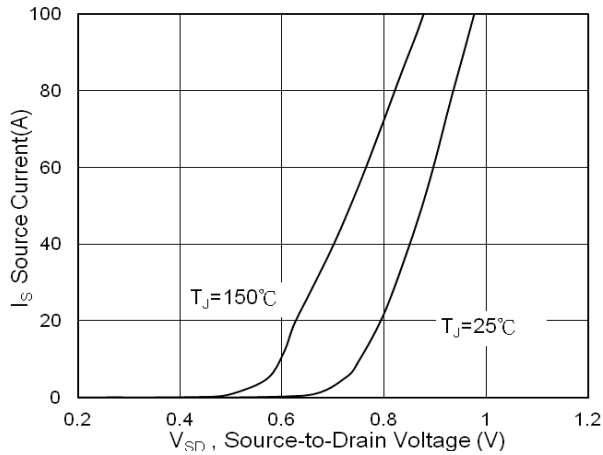


Fig.3 Forward Characteristics of Reverse

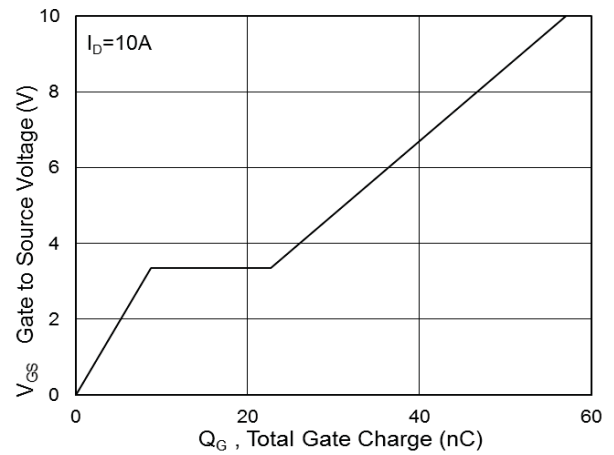


Fig.4 Gate-Charge Characteristics

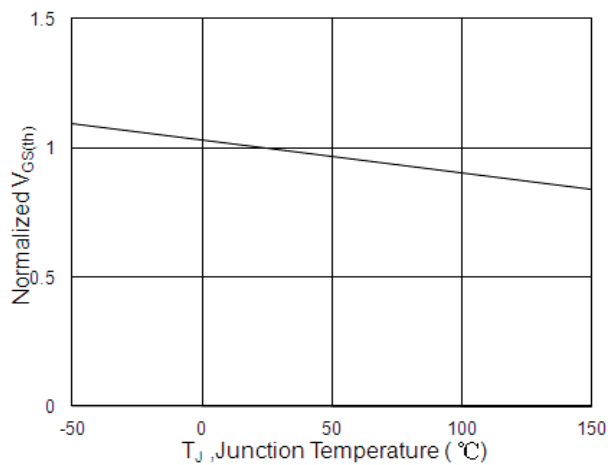


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

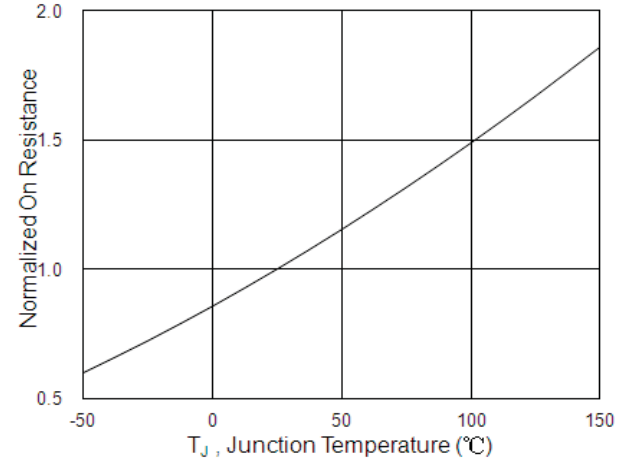


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

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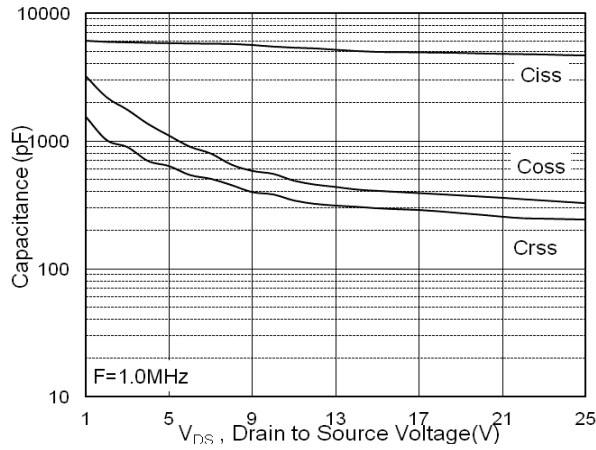


Fig.7 Capacitance

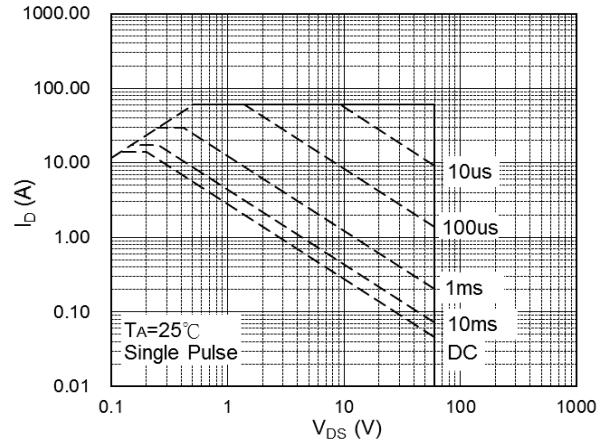


Fig.8 Safe Operating Area

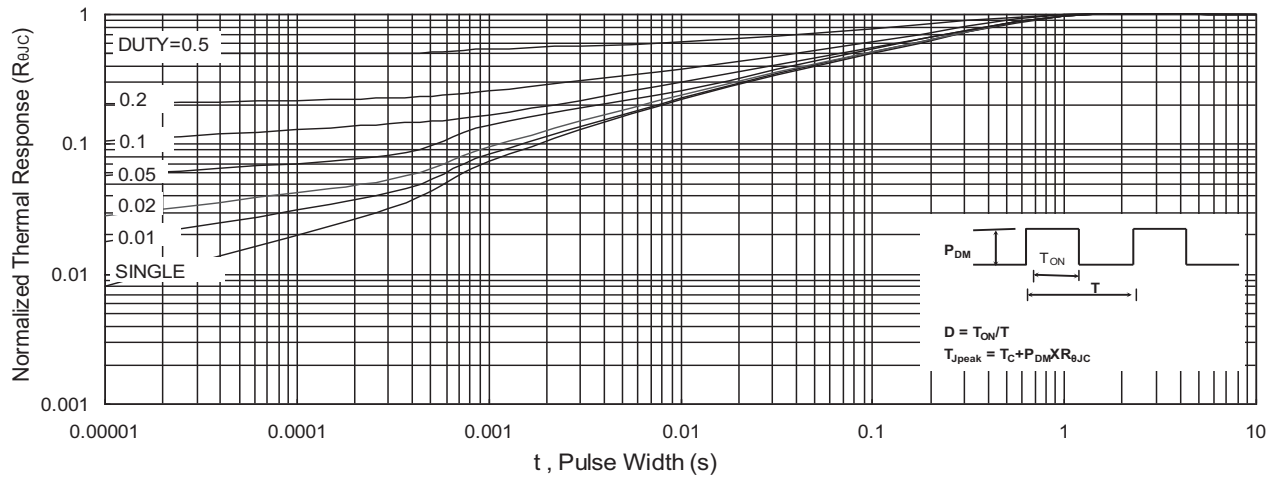


Fig.9 Normalized Maximum Transient Thermal Impedance

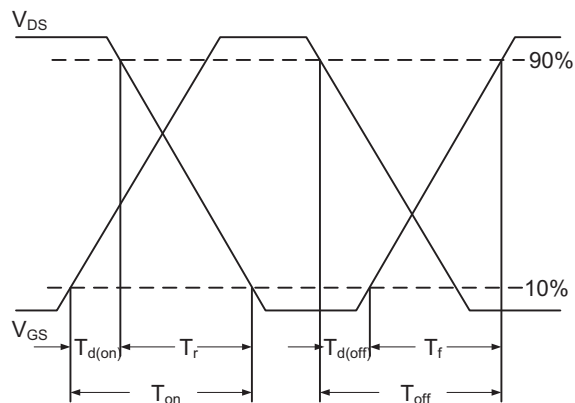


Fig.10 Switching Time Waveform

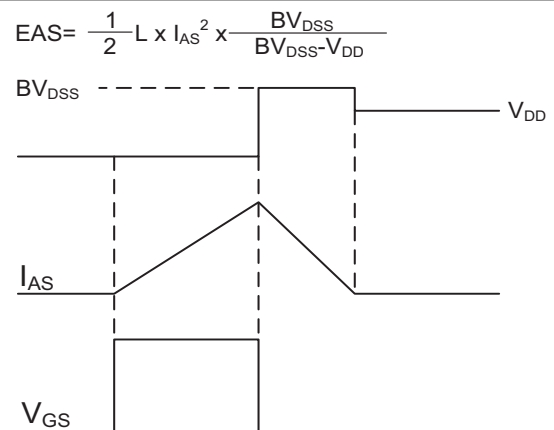


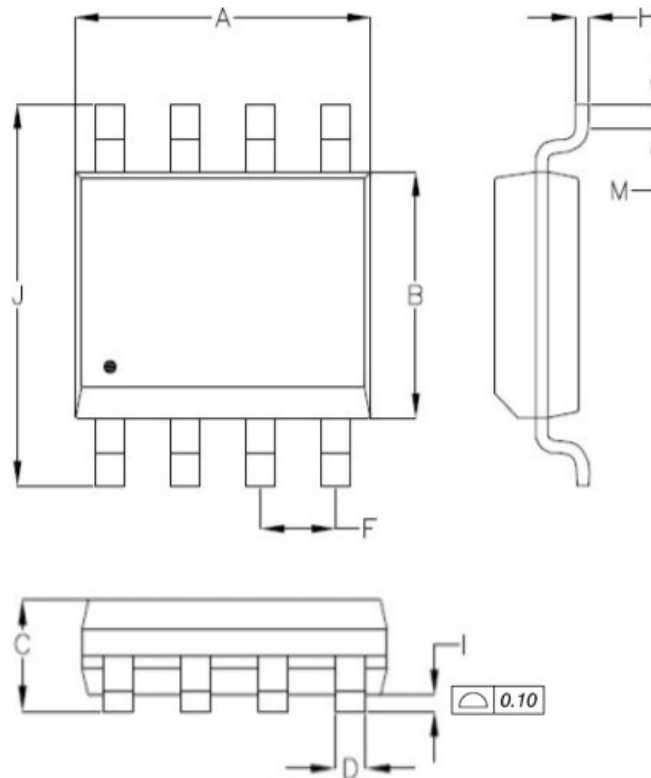
Fig.11 Unclamped Inductive Switching Waveform

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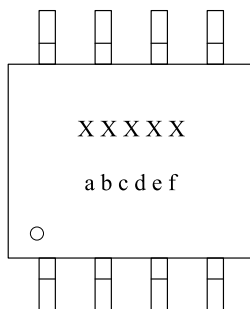
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■SOP-8 dimension (2,500pcs/reel)



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)