

Single N-channel MOSFET

ELM4N0008FCA-S

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

■General description

ELM4N0008FCA-S uses advanced trench technology to provide excellent $R_{ds(on)}$, low gate charge and low gate threshold voltage.

■Features

- $V_{ds}=100V$
- $I_d=1.2A$ ($V_{gs}=10V$)
- $R_{ds(on)} = 310m\Omega$ ($V_{gs}=10V$)
- $R_{ds(on)} = 320m\Omega$ ($V_{gs}=4.5V$)

■Maximum absolute ratings

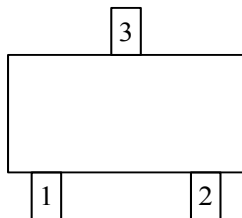
Parameter		Symbol	Limit	Unit	Note
Drain-source voltage		V_{ds}	100	V	
Gate-source voltage		V_{gs}	± 20	V	
Continuous drain current ($V_{gs}=10V$)	$T_a=25^{\circ}C$	I_d	1.2	A	1
	$T_a=70^{\circ}C$		1.0		
Pulsed drain current		I_{dm}	5	A	2
Total power dissipation	$T_a=25^{\circ}C$	P_d	1	W	3
Storage temperature 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	$R_{\theta ja}$	-	125	$^{\circ}C/W$	1
Thermal resistance junction-case	$R_{\theta jc}$	-	80	$^{\circ}C/W$	1

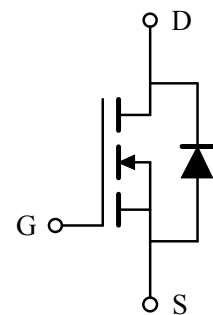
■Pin configuration

SOT-23(TOP VIEW)



Pin No.	Pin name
1	GATE
2	SOURCE
3	DRAIN

■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	BV _{dss}	V _{gs} =0V, I _d =250μA	100	-	-	V	
BV _{dss} temperature coefficient	$\frac{\Delta BV_{dss}}{\Delta T_j}$	Reference to 25°C, I _d =1mA	-	0.067	-	V/°C	
Static drain-source on-resistance	R _{ds(on)}	V _{gs} =10V, I _d =1.0A	-	260	310	mΩ	2
		V _{gs} =4.5V, I _d =0.5A	-	270	320		
Gate threshold voltage	V _{gs(th)}	V _{ds} =V _{gs} , I _d =250μA	1.0	1.5	2.5	V	
V _{gs(th)} temperature coefficient	ΔV _{gs(th)}		-	-4.2	-	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 _{fs}	V _{ds} =5V, I _d =1A	-	2.4	-	S	
Continuous source current	I _s	V _{gs} =V _{ds} =0V, Force current	-	-	1.2	A	1, 4
Pulsed source current	I _{sm}		-	-	5	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	711.0	pF	
Output capacitance	C _{oss}		-	29.0	41.0	pF	
Reverse transfer capacitance	C _{rss}		-	16.4	23.0	pF	
Gate resistance	R _g	V _{ds} =0V, V _{gs} =0V, f=1MHz	-	2.8	5.6	Ω	
SWITCHING PARAMETERS							
Total gate charge (10V)	Q _g	V _{ds} =80V, V _{gs} =10V, I _d =1A	-	9.7	13.6	nC	
Gate-source charge	Q _{gs}		-	1.6	2.2	nC	
Gate-drain charge	Q _{gd}		-	1.7	2.4	nC	
Turn-on delay time	t _{d(on)}	V _{dd} =50V, V _{gs} =10V R _{gen} =3.3Ω, I _d =1A	-	1.6	3.2	ns	
Turn-on rise time	t _r		-	19.0	34.0	ns	
Turn-off delay time	t _{d(off)}		-	13.6	27.0	ns	
Turn-off fall time	t _f	I _f =1A, di/dt=100A/μs	-	19.0	38.0	ns	
Reverse recovery time	t _{rr}		-	14.0	-	nS	
Reverse recovery charge	Q _{rr}		-	9.3	-	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

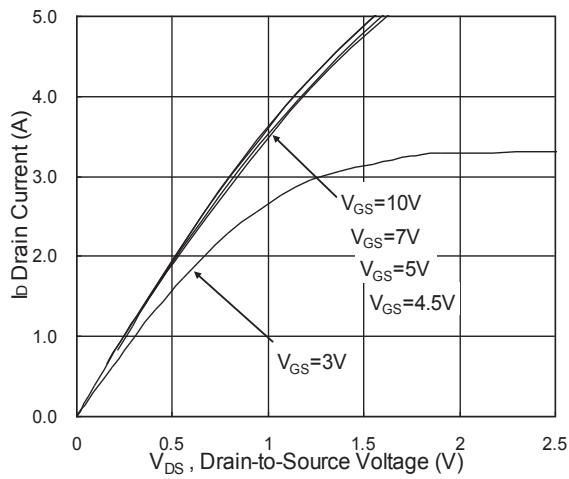


Fig.1 Typical Output Characteristics

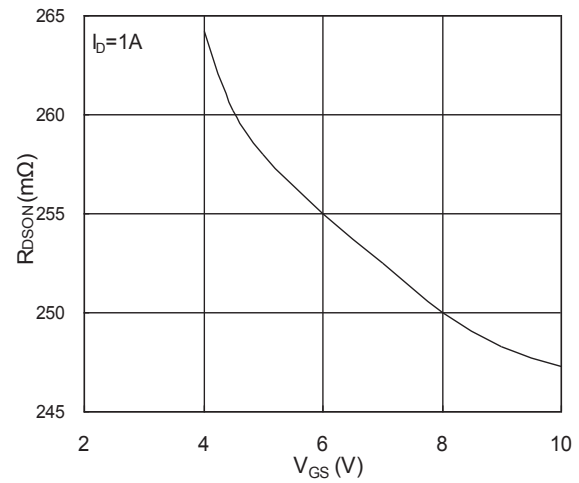


Fig.2 On-Resistance vs. Gate-Source

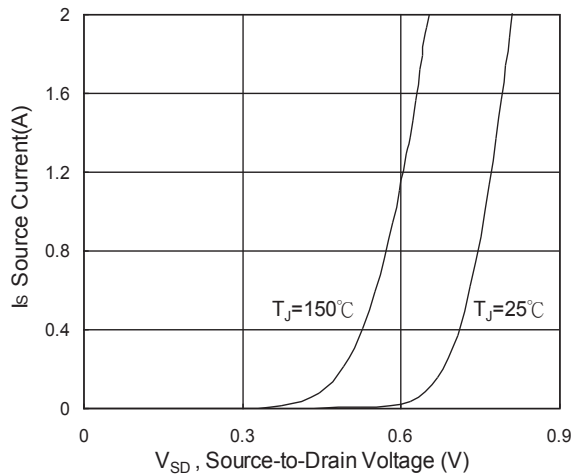


Fig.3 Forward Characteristics of Reverse

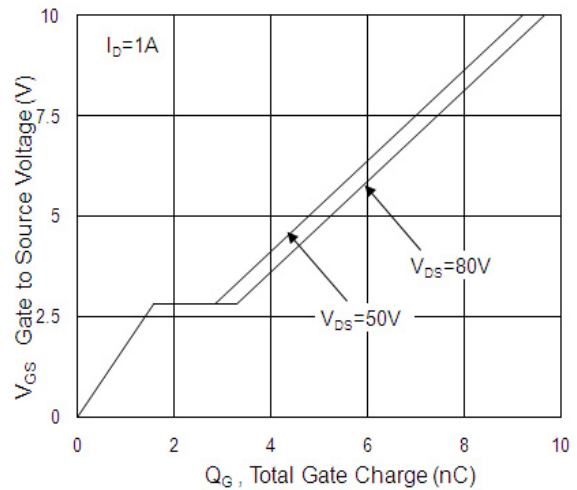


Fig.4 Gate-Charge Characteristics

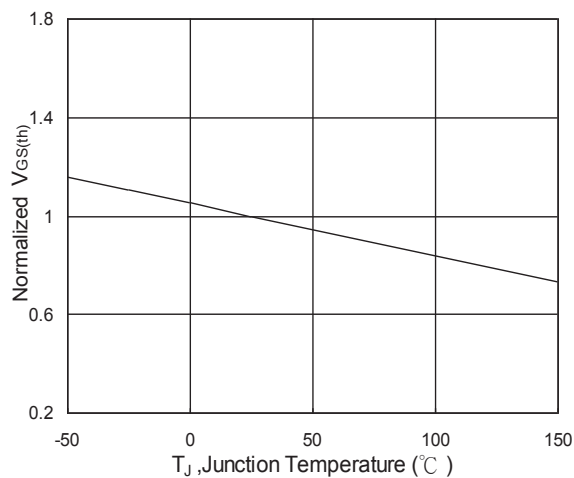


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

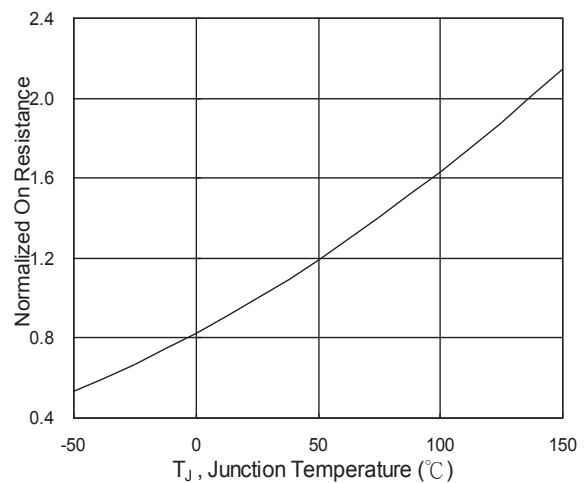


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

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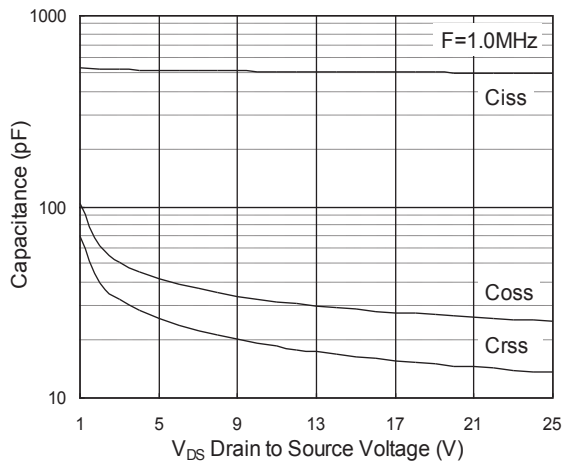


Fig.7 Capacitance

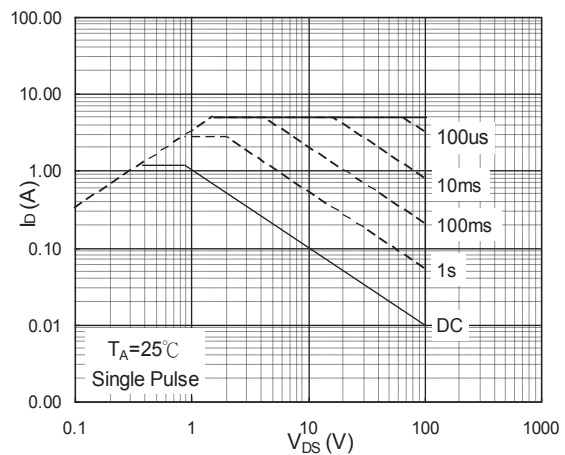


Fig.8 Safe Operating Area

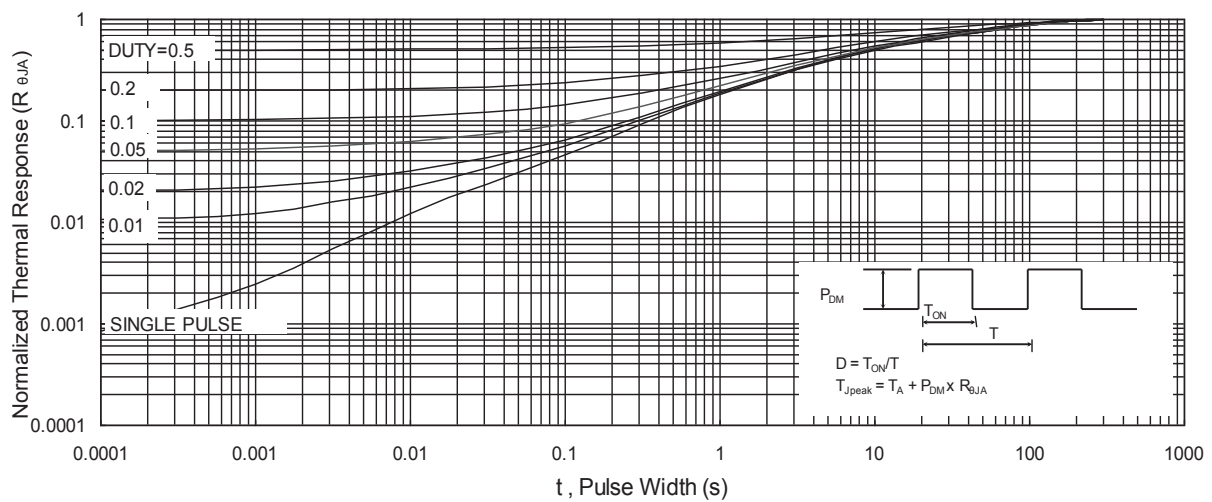


Fig.9 Normalized Maximum Transient Thermal Impedance

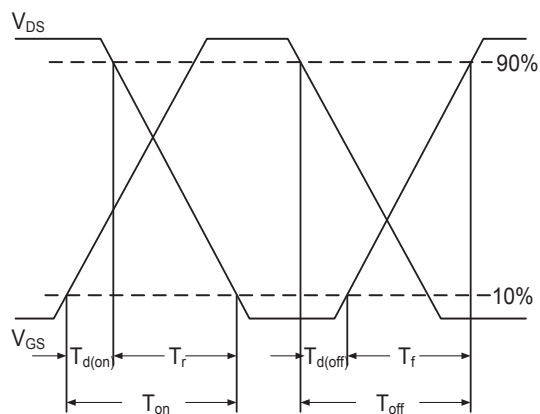


Fig.10 Switching Time Waveform

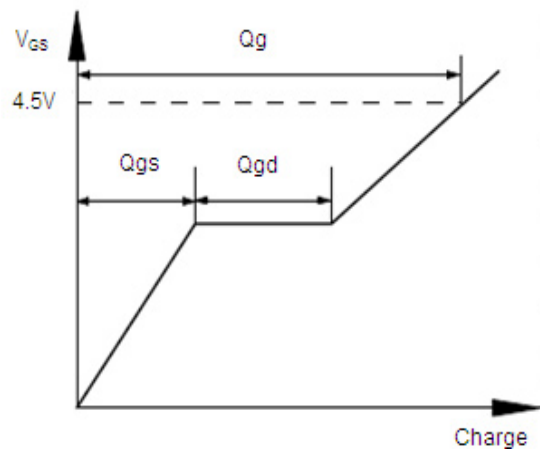


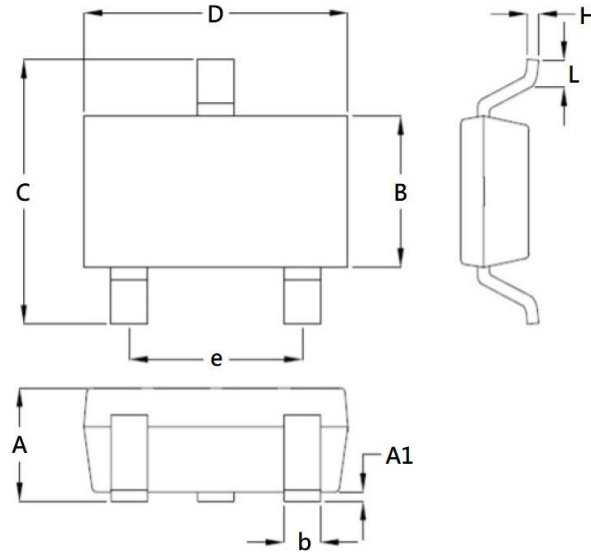
Fig.11 Gate Charge Waveform

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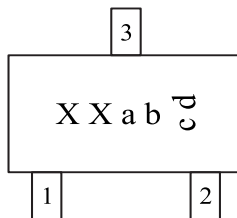
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■SOT-23 dimension (3,000pcs/reel)



Symbols	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	0.850	1.295	0.033	0.051
A1	0.000	0.152	0.000	0.006
B	1.397	1.803	0.055	0.071
b	0.300	0.508	0.012	0.020
C	2.591	3.010	0.102	0.119
D	2.692	3.100	0.106	0.122
e	1.900		0.075	
H	0.080	0.254	0.003	0.010
L	0.300	0.610	0.012	0.024

■Marking



Symbols	Content
xx	XX : Product code
a	Yearly code : 2019=9, 2020=A, 2021=B, 2022=C.....
b	Weekly code : A to Z, a to z (53 weeks in total)
c	Sequence : 1 to 9 or A to Z
d	Assembly code : A to Z (I, O excepted)