

Single N-channel MOSFET

ELM4N0010FCA-S

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

■General description

ELM4N0010FCA-S uses advanced trench technology to provide excellent $R_{ds(on)}$, low gate charge and low gate threshold voltage.

■Features

- $V_{ds}=100V$
- $I_d=2.1A$ ($V_{gs}=10V$)
- $R_{ds(on)} = 120m\Omega$ ($V_{gs}=10V$)
- $R_{ds(on)} = 150m\Omega$ ($V_{gs}=4.5V$)

■Maximum absolute ratings

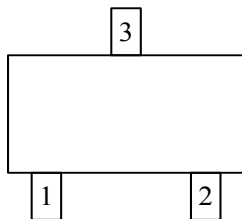
Parameter		Symbol	Limit	Unit	Note
Drain-source voltage		V_{ds}	100	V	
Gate-source voltage		V_{gs}	± 20	V	
Continuous drain current ($V_{gs}=10V$)	$T_a=25^{\circ}C$	I_d	2.1	A	
	$T_a=70^{\circ}C$		1.7		
Pulsed drain current		I_{dm}	8.4	A	2
Total power dissipation	$T_a=25^{\circ}C$	P_d	1.00	W	3
	$T_a=70^{\circ}C$		0.64		
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-ambient ($t \leq 10s$)	$R_{\theta ja}$	-	85	$^{\circ}C/W$	1

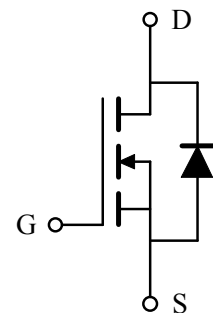
■Pin configuration

SOT-23(TOP VIEW)



Pin No.	Pin name
1	GATE
2	SOURCE
3	DRAIN

■Circuit



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■Electrical characteristics

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	100	-	-	V	
Static drain-source on-resistance	Rds(on)	Vgs=10V, Id=2A	-	93	120	mΩ	2
		Vgs=4.5V, Id=1A	-	128	150		
Gate threshold voltage	Vgs(th)	Vgs=Vds, Id=250μA	1.2	2.0	2.3	V	
Drain-source leakage current	Idss	Vds=80V, Vgs=0V	-	-	1	μA	
		Vds=80V, Vgs=0V, Tj=55°C	-	-	5		
Gate-source leakage current	Igss	Vgs=±20V, Vds=0V	-	-	±100	nA	
Continuous source current	Is	Vgs=Vds=0V, Force current	-	-	2.1	A	1, 4
Diode forward voltage	Vsd	Vgs=0V, Is=1A	-	-	1.2	V	2
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vds=50V, Vgs=0V, f=1MHz	-	180.0	-	pF	
Output capacitance	Coss		-	32.0	-	pF	
Reverse transfer capacitance	Crss		-	2.5	-	pF	
Gate resistance	Rg	Vds=0V, Vgs=0V, f=1MHz	-	3.5	-	Ω	
SWITCHING PARAMETERS							
Total gate charge	Qg	Vds=50V, Vgs=10V, Id=2A	-	3.49	-	nC	
Gate-source charge	Qgs		-	0.66	-	nC	
Gate-drain charge	Qgd		-	0.92	-	nC	
Turn-on delay time	td(on)	Vdd=50V, Vgs=10V Rgen=3Ω, Id=1A	-	4.8	-	ns	
Turn-on rise time	tr		-	19.0	-	ns	
Turn-off delay time	td(off)		-	17.0	-	ns	
Turn-off fall time	tf		-	6.2	-	ns	

NOTE :

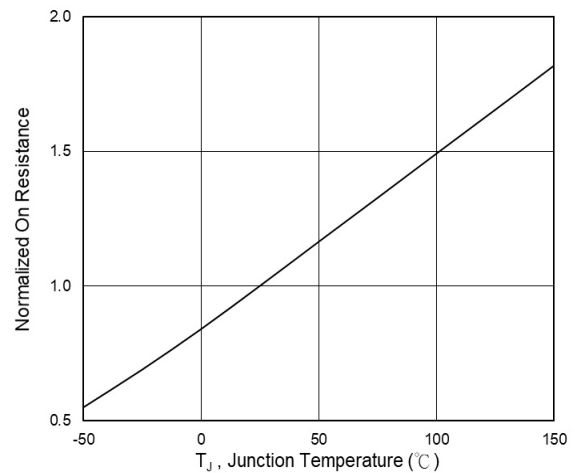
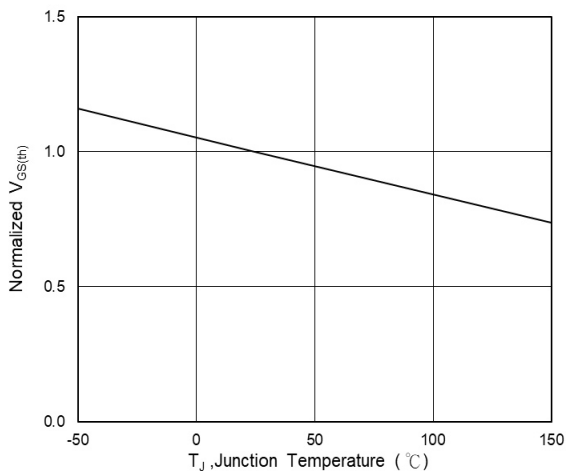
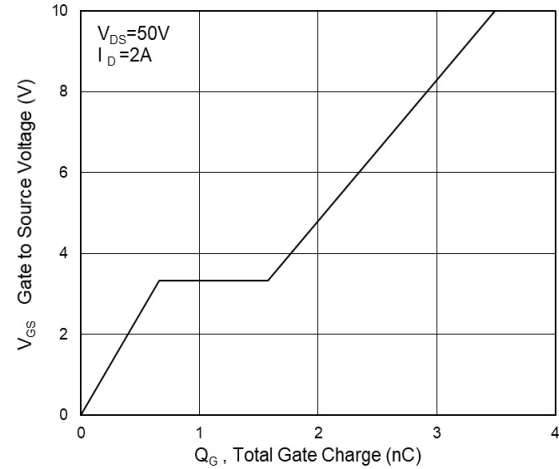
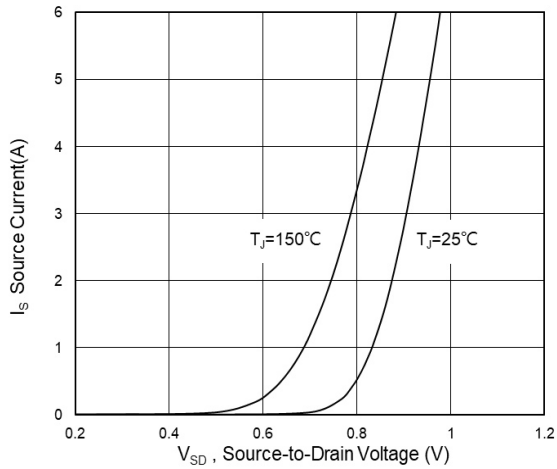
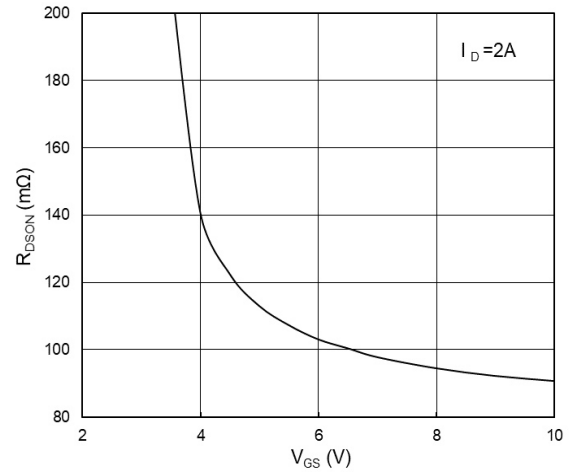
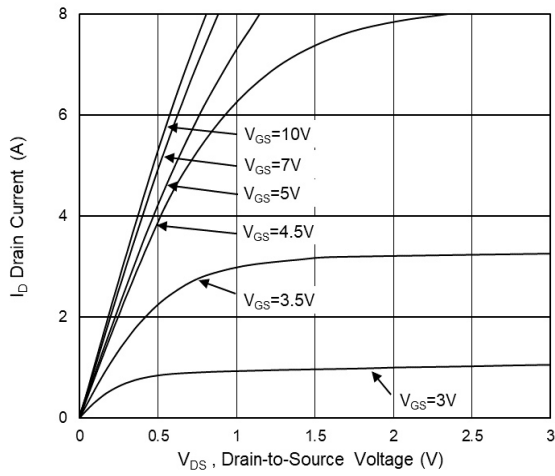
1. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
2. The data tested by pulsed, pulse width ≤ 300μs and duty cycle ≤ 2%.
3. The power dissipation is limited by 150°C junction temperature.
4. The data is theoretically the same as Id and Idm, in real applications, should be limited by total power dissipation.

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■ Typical characteristics



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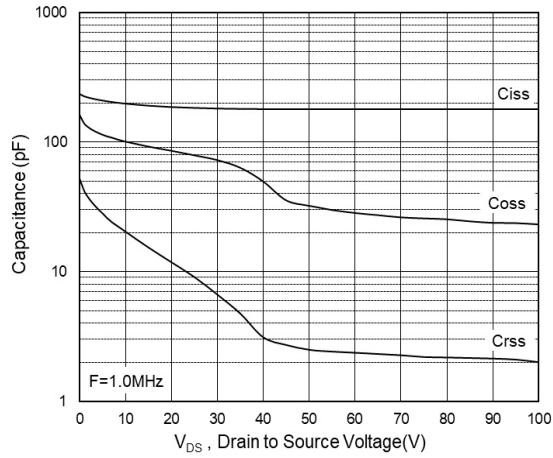


Fig.7 Capacitance

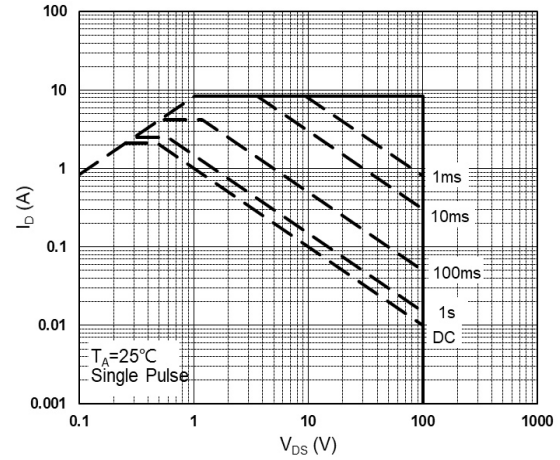


Fig.8 Safe Operating Area

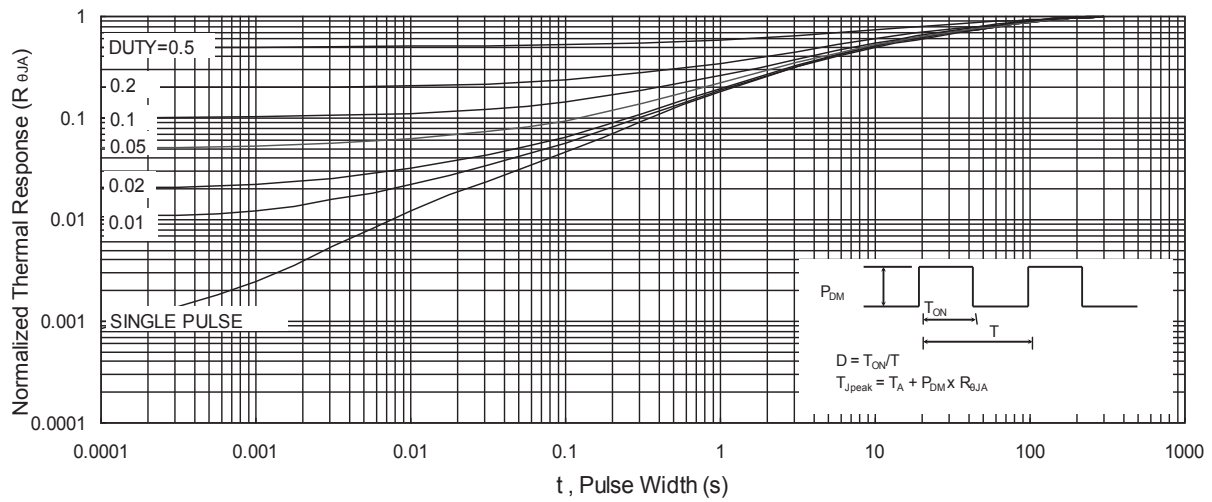


Fig.9 Normalized Maximum Transient Thermal Impedance

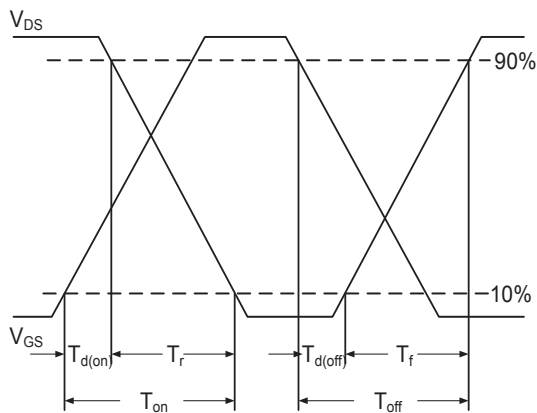


Fig.10 Switching Time Waveform

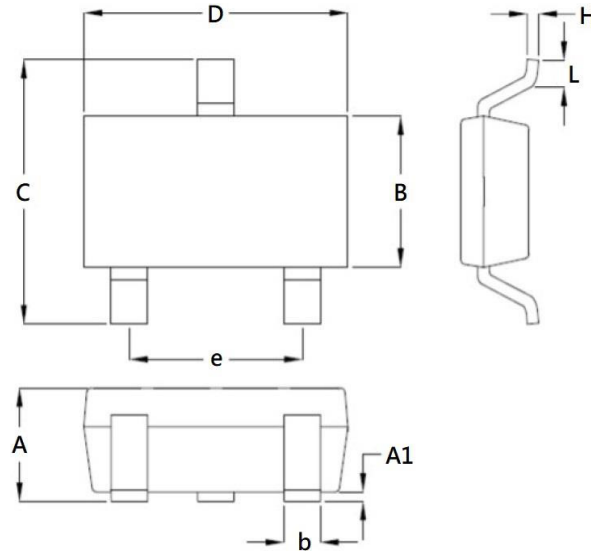
Fig.11 Gate Charge Waveform

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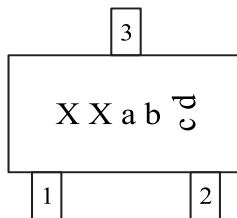
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■SOT-23 dimension (3,000pcs/reel)



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	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)