

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

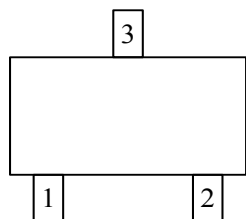
Parameter	Symbol	Limit	Unit	Note
Drain-source voltage	V_{ds}	100	V	
Gate-source voltage	V_{gs}	± 20	V	
Continuous drain current ($V_{gs}=10V$)	I_d	$T_a=25^\circ C$	2.1	A
		$T_a=70^\circ C$	1.7	
Pulsed drain current	I_{dm}	8.4	A	2
Total power dissipation	P_d	$T_a=25^\circ C$	1.00	W
		$T_a=70^\circ C$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

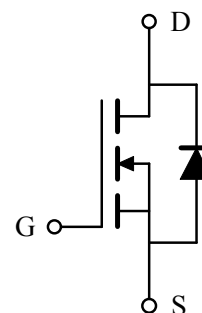
■ Pin configuration

SOT-23(TOP VIEW)



Pin No.	Pin name
1	GATE
2	SOURCE
3	DRAIN

■ Circuit



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■ Electrical characteristics

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	
Static drain-source on-resistance	R _{ds(on)}	V _{gs} =10V, I _d =2A	--	93	120	mΩ	2
		V _{gs} =4.5V, I _d =1A	--	128	150		
Gate threshold voltage	V _{gs(th)}	V _{gs} =V _{ds} , I _d =250μA	1.2	2.0	2.3	V	
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	
Continuous source current	I _s	V _{gs} =V _{ds} =0V, Force current	--	--	2.1	A	1, 4
Diode forward voltage	V _{sd}	V _{gs} =0V, I _s =1A	--	--	1.2	V	2
DYNAMIC PARAMETERS							
Input capacitance	C _{iss}	V _{ds} =50V, V _{gs} =0V, f=1MHz	--	180.0	--	pF	
Output capacitance	C _{oss}		--	32.0	--	pF	
Reverse transfer capacitance	C _{rss}		--	2.5	--	pF	
Gate resistance	R _g	V _{ds} =0V, V _{gs} =0V, f=1MHz	--	3.5	--	Ω	
SWITCHING PARAMETERS							
Total gate charge	Q _g	V _{ds} =50V, V _{gs} =10V, I _d =2A	--	3.49	--	nC	
Gate-source charge	Q _{gs}		--	0.66	--	nC	
Gate-drain charge	Q _{gd}		--	0.92	--	nC	
Turn-on delay time	t _{d(on)}	V _{dd} =50V, V _{gs} =10V R _{gen} =3Ω, I _d =1A	--	4.8	--	ns	
Turn-on rise time	t _r		--	19.0	--	ns	
Turn-off delay time	t _{d(off)}		--	17.0	--	ns	
Turn-off fall time	t _f		--	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 I_d and I_{dm}, in real applications, should be limited by total power dissipation.

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■ Typical characteristics

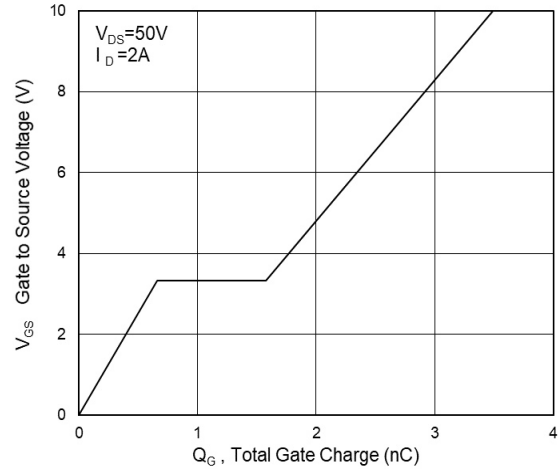
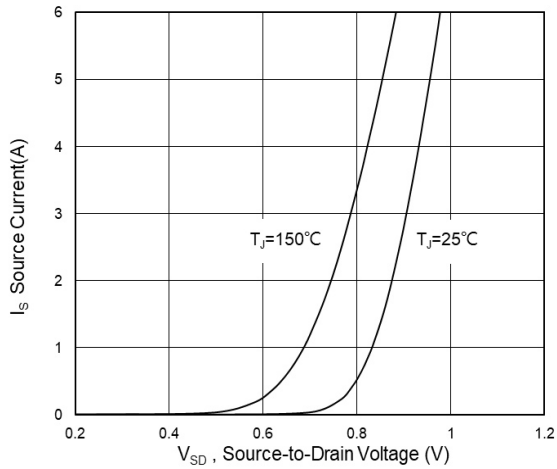
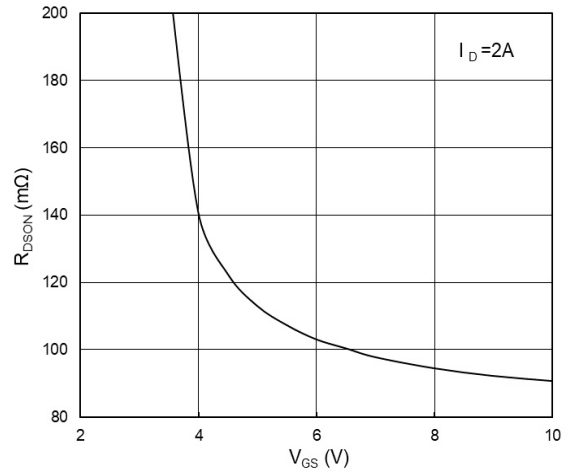
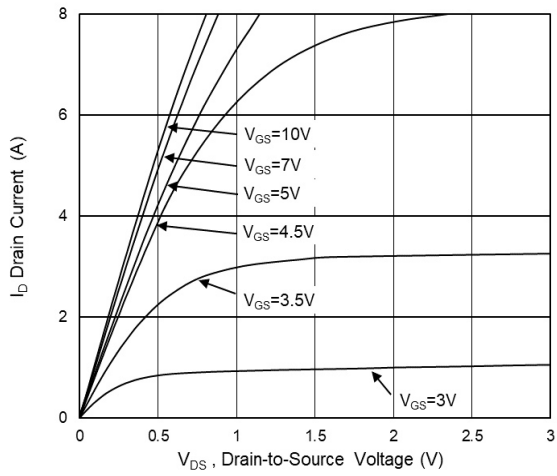


Fig.3 Source Drain Forward Characteristics

Fig.4 Gate-Charge Characteristics

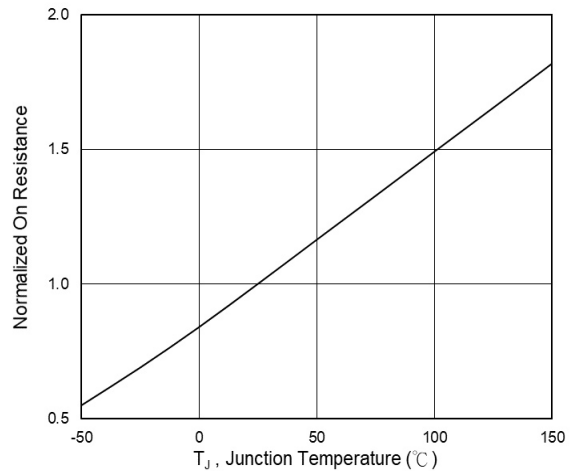
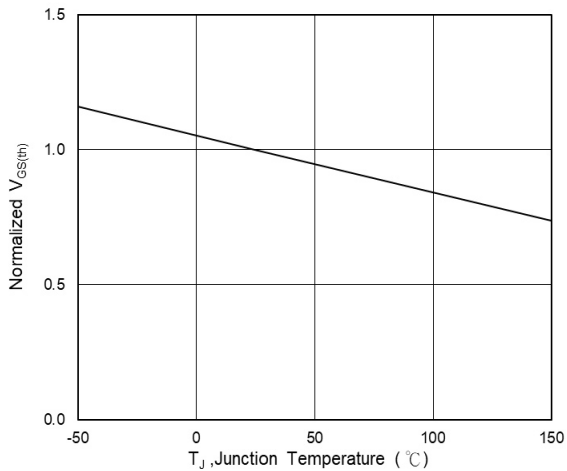


Fig.5 Normalized $V_{GS(th)}$ vs T_J

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

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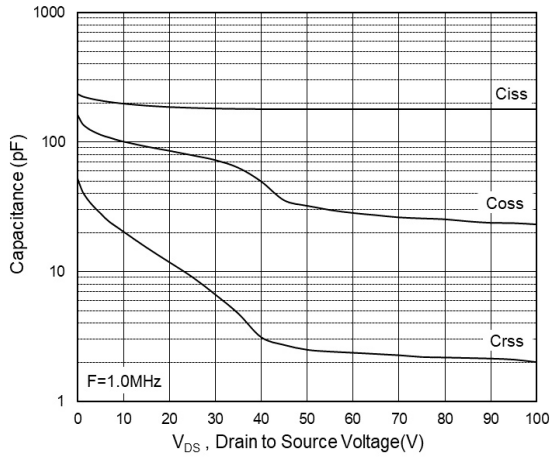


Fig.7 Capacitance

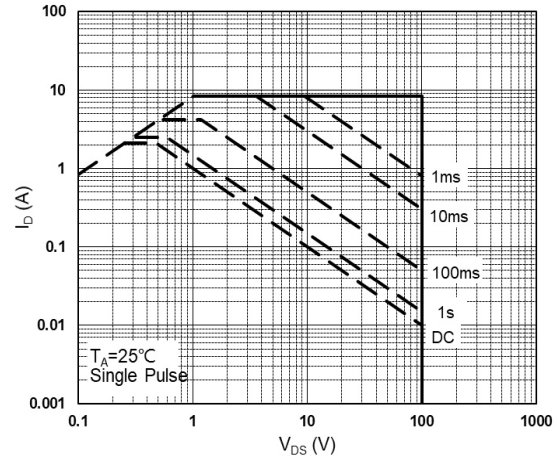


Fig.8 Safe Operating Area

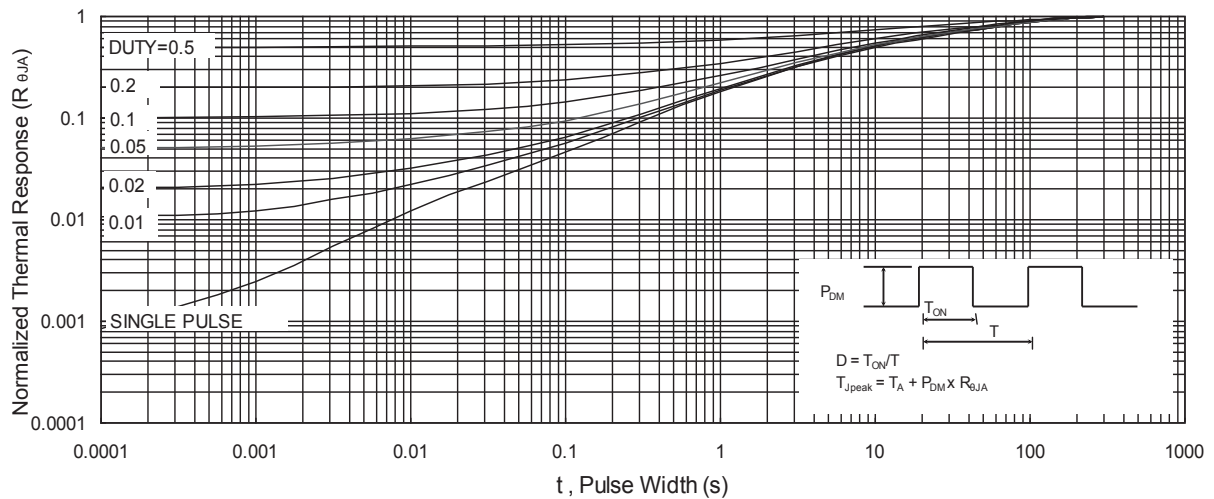


Fig.9 Normalized Maximum Transient Thermal Impedance

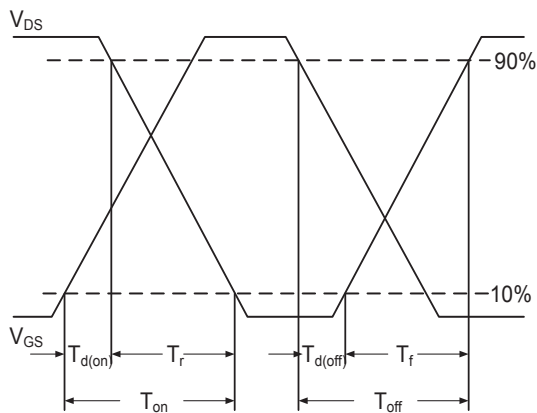


Fig.10 Switching Time Waveform

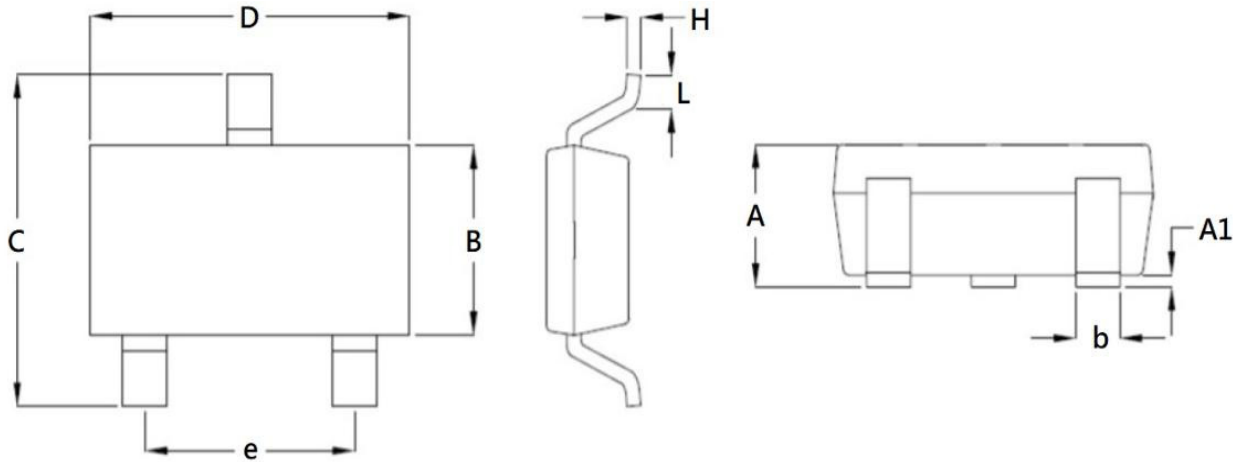
Fig.11 Gate Charge Waveform

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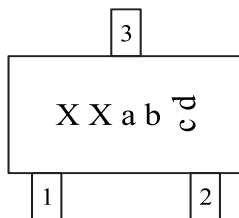
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■SOT-23 dimension (3,000pcs/reel)



Symbols	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	0.85	1.25	0.033	0.049
A1	0.00	0.15	0.000	0.006
B	1.40	1.80	0.055	0.071
b	0.30	0.50	0.012	0.020
C	2.60	3.00	0.102	0.118
D	2.80	3.10	0.110	0.122
e	1.90 BSC		0.075 BSC	
H	0.08	0.20	0.003	0.008
L	0.30	0.60	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)