

Single P-channel MOSFET

ELM4P4103FAA-N

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

■General description

ELM4P4103FAA-N uses advanced trench technology to provide excellent $R_{ds(on)}$, low gate charge and low gate threshold voltage.

■Features

- $V_{ds} = -40V$
- $I_d = -5.6A$ ($V_{gs} = -10V$)
- $R_{ds(on)} = 32m\Omega$ ($V_{gs} = -10V$)
- $R_{ds(on)} = 46m\Omega$ ($V_{gs} = -4.5V$)

■Maximum absolute ratings

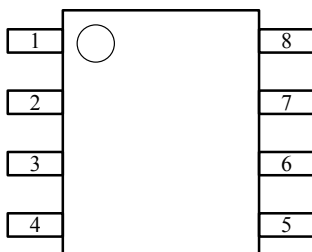
Parameter		Symbol	Limit	Unit	Note
Drain-source voltage		V_{ds}	-40	V	
Gate-source voltage		V_{gs}	± 20	V	
Continuous drain current ($V_{gs} = -10V$)	$T_a = 25^\circ C$	I_d	-5.6	A	1
	$T_a = 70^\circ C$		-4.5		
Pulsed drain current		I_{dm}	-23	A	2
Single pulse avalanche energy		E_{as}	41	mJ	3
Avalanche current		I_{as}	-28.6	A	
Total power dissipation	$T_a = 25^\circ C$	P_d	1.5	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	$R_{\theta ja}$	-	85	$^\circ C/W$	1
Thermal resistance junction - case	$R_{\theta jc}$	-	25		

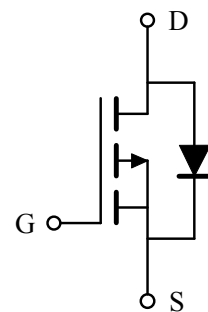
■Pin configuration

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	-40	-	-	V	
BVdss Temperature coefficient	$\frac{\Delta BV_{dss}}{\Delta T_j}$	Reference to 25°C, Id=-1mA	-	-0.02	-	V/°C	
Static drain-source on-resistance	Rds(on)	Vgs=-10V, Id=-5A	-	-	32	mΩ	2
		Vgs=-4.5V, Id=-4A	-	-	46		
Gate threshold voltage	Vgs(th)	Vgs=Vds, Id=-250μA	-1.2	-	-2.5	V	
Vgs(th) Temperature coefficient	ΔVgs(th)		-	-3.72	-	mV/°C	
Drain-source leakage current	Idss	Vds=-32V, Vgs=0V	-	-	-1	μA	
		Vds=-32V, Vgs=0V, Tj=55°C	-	-	-5		
Gate-source leakage current	Igss	Vgs=±20V, Vds=0V	-	-	±100	nA	
Forward transconductance	Gfs	Vds=-5V, Id=-8A	-	10.7	-	S	
Continuous source current	Is	Vgs=Vds=0V, Force Current	-	-	-5.6	A	1, 5
Pulsed source current	Ism		-	-	-23.0	A	2, 5
Diode forward voltage	Vsd	Vgs=0V, Is=-1A	-	-	-1.2	V	2
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vds=-15V, Vgs=0V, f=1MHz	-	1415	-	pF	
Output capacitance	Coss		-	134	-	pF	
Reverse transfer capacitance	Crss		-	102	-	pF	
SWITCHING PARAMETERS							
Total gate charge (-4.5V)	Qg	Vds=-15V, Vgs=-4.5V Id=-1A	-	11.5	-	nC	
Gate-source charge	Qgs		-	3.5	-	nC	
Gate-drain charge	Qgd		-	3.3	-	nC	
Turn-on delay time	td(on)	Vds=-15V, Vgs=-10V Rgen=3.3Ω, Id=-1A	-	22.0	-	ns	
Turn-on rise time	tr		-	15.7	-	ns	
Turn-off delay time	td(off)		-	59.0	-	ns	
Turn-off fall time	tf		-	5.5	-	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 Eas data shows Max. rating . The test condition is Vdd=-25V, Vgs=-10V, L=0.1mH, Ias=-28.6A.
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

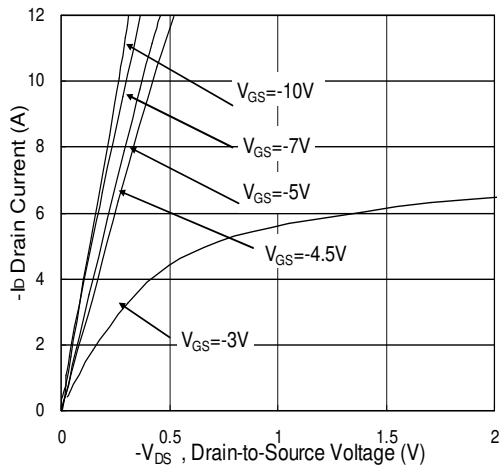


Fig.1 Typical Output Characteristics

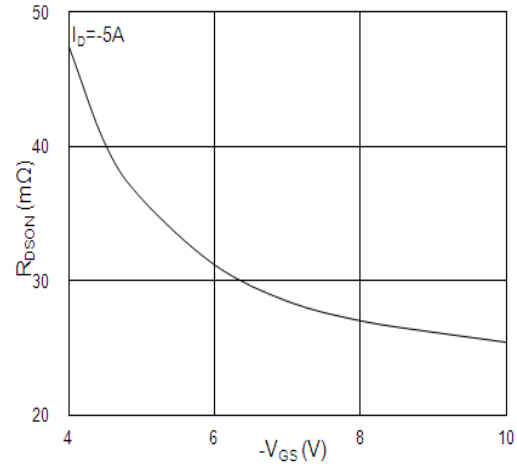


Fig.2 On-Resistance v.s Gate-Source

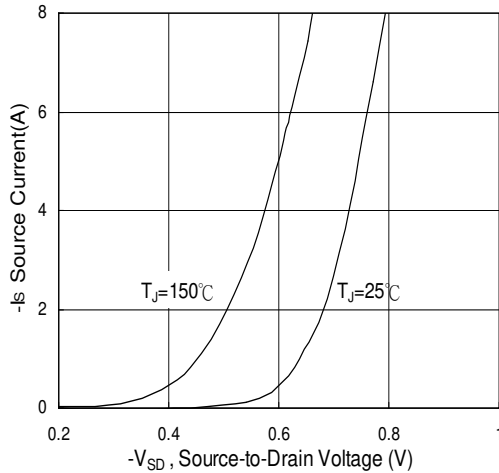


Fig.3 Forward Characteristics Of Reverse

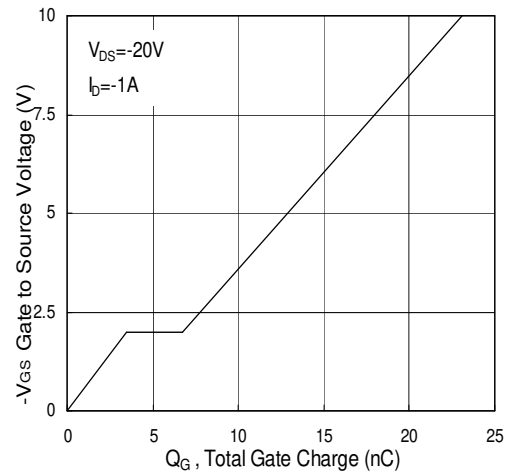


Fig.4 Gate Charge Characteristics

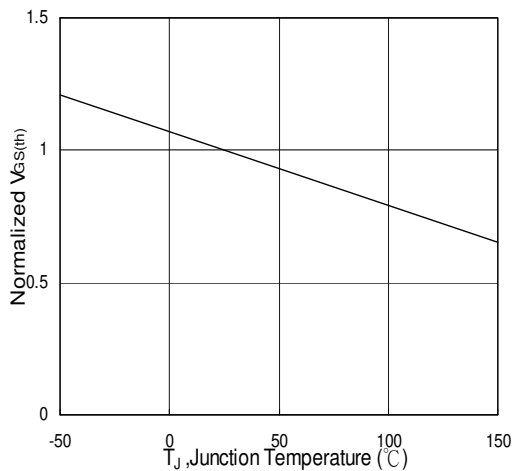


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

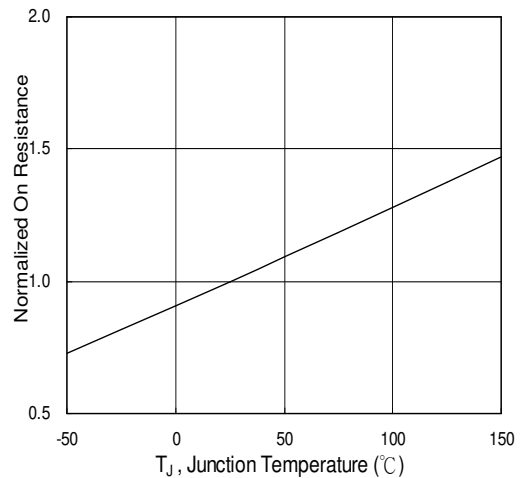


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

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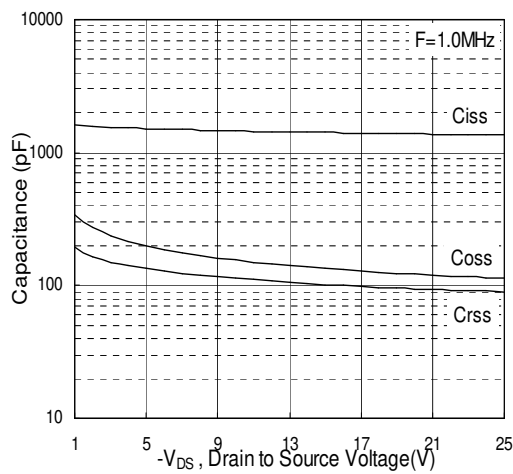


Fig.7 Capacitance

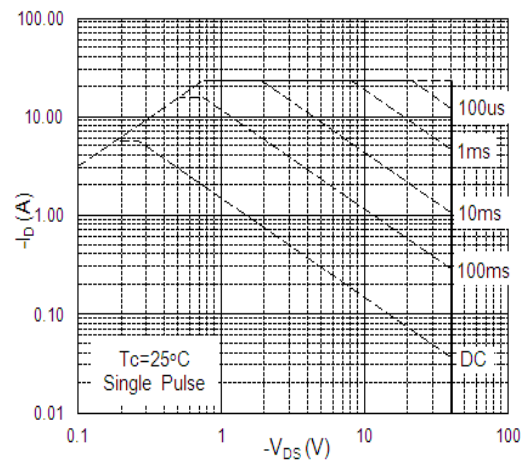


Fig.8 Safe Operating Area

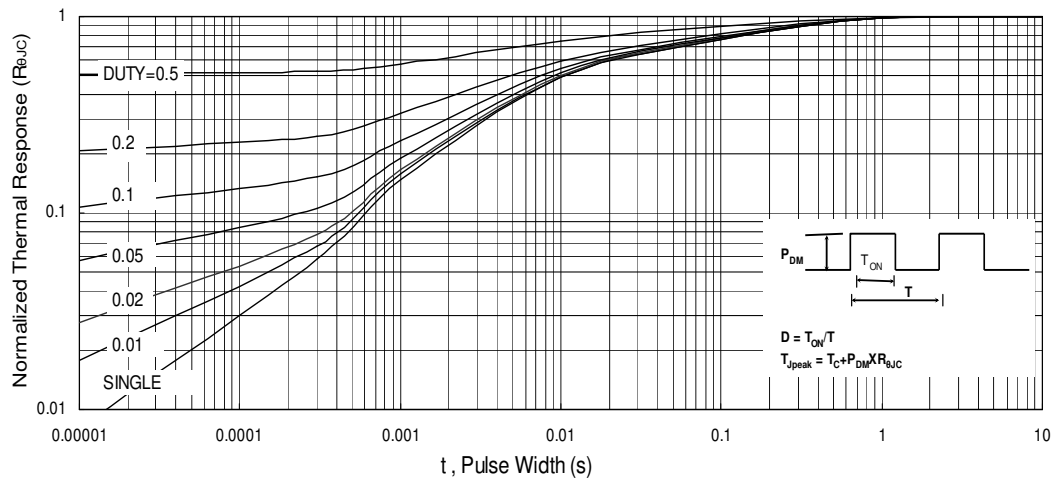


Fig.9 Normalized Maximum Transient Thermal Impedance

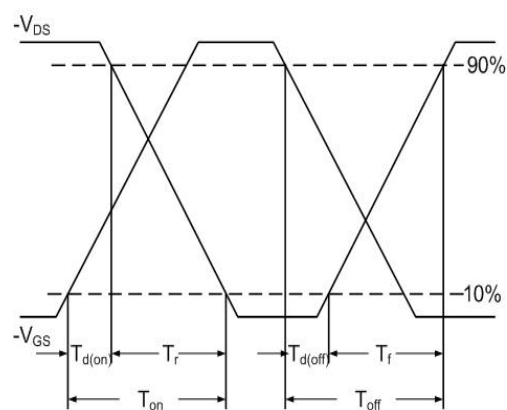


Fig.10 Switching Time Waveform

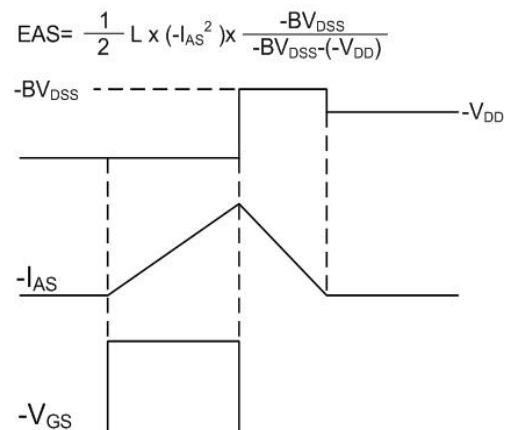


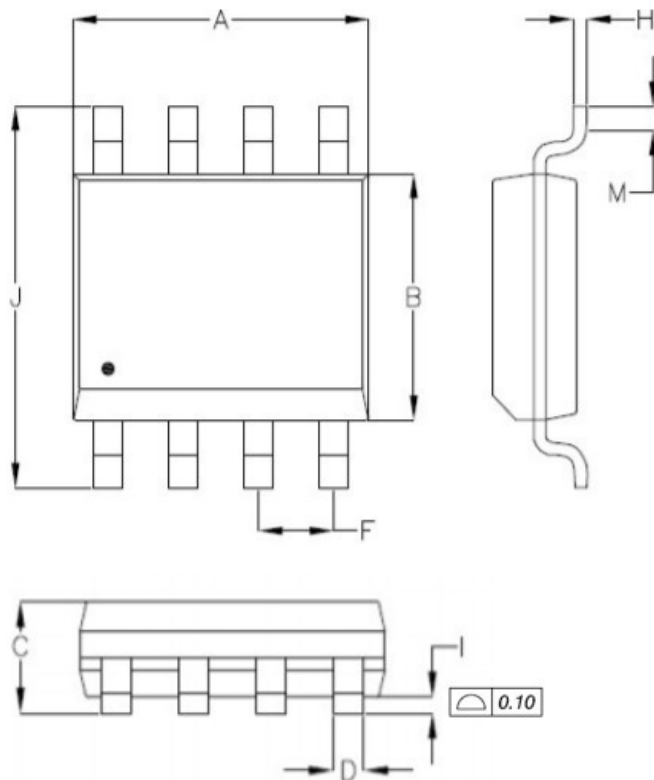
Fig.11 Unclamped Inductive Switching

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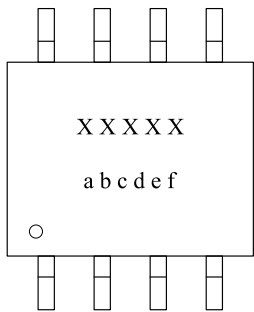
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■SOP-8 dimension (2,500pcs/reel)



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)