Single P-channel MOSFET

ELM4P3105FAA-N

■General description

ELM4P3105FAA-N uses advanced trench technology to provide excellent Rds(on), low gate charge and low gate threshold voltage.

■Features

- Vds=-30V
- Id=-11.5A (Vgs=-10V)
- Rds(on) = 15mΩ (Vgs=-10V)
- Rds(on) = 25mΩ (Vgs=-4.5V)

■Maximum absolute ratings

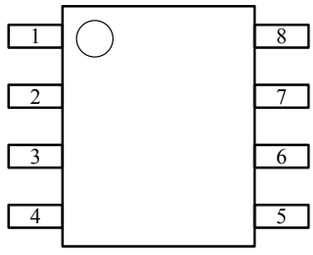
Parameter		Symbol	Limit	Unit	Note
Drain-source voltage		Vds	-30	V	
Gate-source voltage		Vgs	±20	V	
Continuous drain current (Vgs=-10V)	Ta=25°C	Id	-11.5	A	1
	Ta=70°C		-9.0		
Pulsed drain current		Idm	-46	A	2
Single pulsed avalanche energy		Eas	125	mJ	3
Avalanche current		Ias	-50	A	
Total power dissipation	Ta=25°C	Pd	1.5	W	4
Storage temperature range		Tstg	-55 to +150	°C	
Operating junction temperature range		Tj	-55 to +150	°C	

■Thermal characteristics

Parameter		Symbol	Typ.	Max.	Unit	Note
Thermal resistance junction-ambient		Rθja	-	75	°C/W	1
Thermal resistance junction-ambient	t ≤ 10s		-	40		
Thermal resistance junction-case		Rθjc	-	24	°C/W	1

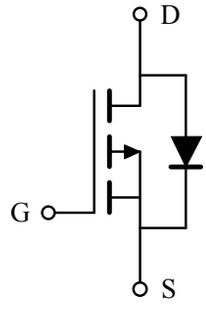
■Pin configuration

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



■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	-30	-	-	V	
BVdss Temperature coefficient	$\frac{\Delta BVdss}{\Delta Tj}$	Reference to 25°C, Id=-1mA	-	-0.023	-	V/°C	
Static drain-source on-resistance	Rds(on)	Vgs=-10V, Id=-10A	-	-	15	mΩ	2
		Vgs=-4.5V, Id=-10A	-	-	25		
Gate threshold voltage	Vgs(th)	Vgs=Vds, Id=-250μA	-1.0	-	-2.5	V	
Vgs(th) Temperature coefficient	ΔVgs(th)		-	-4.6	-	mV/°C	
Drain-source leakage current	Idss	Vds=-24V, Vgs=0V	-	-	-1	μA	
		Vds=-24V, Vgs=0V, Tj=55°C	-	-	-5		
Gate-source leakage current	Igss	Vgs=±20V, Vds=0V	-	-	±100	nA	
Forward transconductance	Gfs	Vds=-5V, Id=-10A	-	24	-	S	
Continuous source current	Is	Vgs=Vds=0V, Force Current	-	-	-11.5	A	1, 5
Pulsed source current	Ism		-	-	-46.0	A	2, 5
Diode forward voltage	Vsd	Vgs=0V, Is=-1A	-	-	-1	V	2
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vds=-15V, Vgs=0V, f=1MHz	-	2215	-	pF	
Output capacitance	Coss		-	310	-	pF	
Reverse transfer capacitance	Crss		-	237	-	pF	
Gate resistance	Rg	Vds=0V, Vgs=0V, f=1MHz	-	9	-	Ω	
SWITCHING PARAMETERS							
Total gate charge (-4.5V)	Qg	Vds=-15V, Vgs=-4.5V Id=-10A	-	20.0	-	nC	
Gate-source charge	Qgs		-	5.1	-	nC	
Gate-drain charge	Qgd		-	7.3	-	nC	
Turn-on delay time	td(on)	Vds=-15V, Vgs=-10V Rgen=3.3Ω, Id=-1A	-	33.8	-	ns	
Turn-on rise time	tr		-	35.8	-	ns	
Turn-off delay time	td(off)		-	72.8	-	ns	
Turn-off fall time	tf		-	10.6	-	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=-50A.
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.

■Typical electrical and thermal characteristics

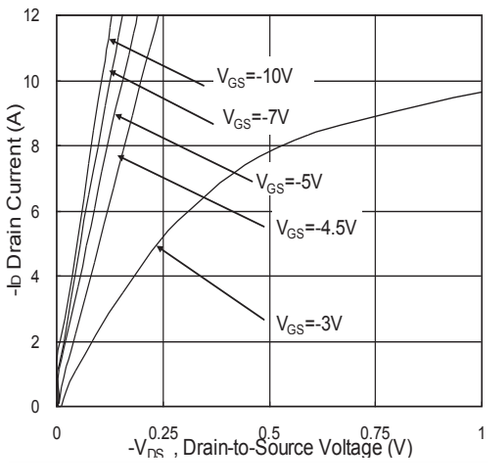


Fig.1 Typical Output Characteristics

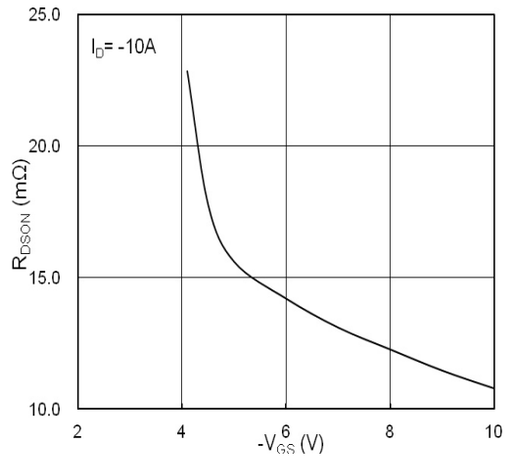


Fig.2 On-Resistance vs. G-S Voltage

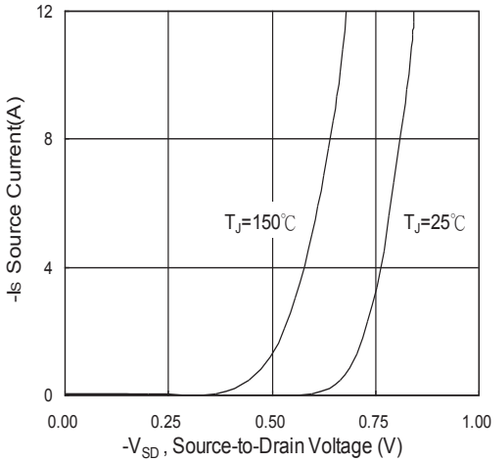


Fig.3 Forward Characteristics of Reverse

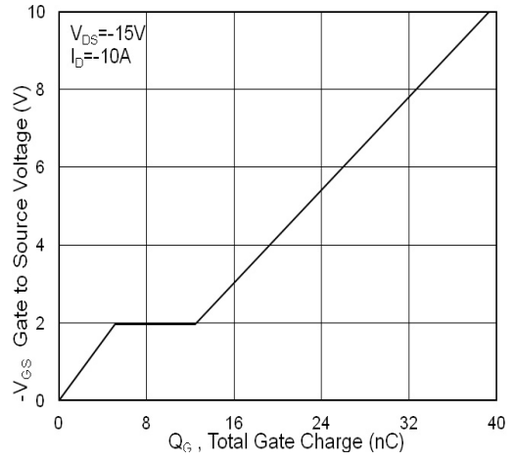


Fig.4 Gate-charge Characteristics

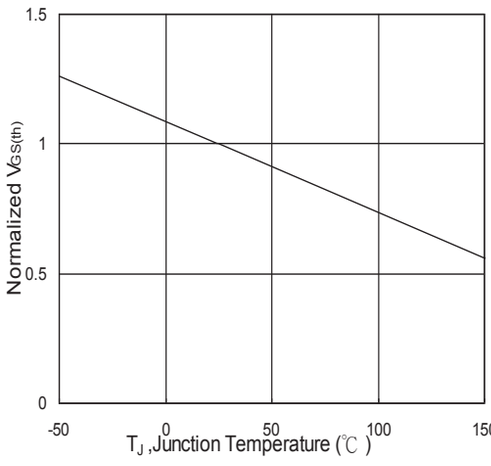


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

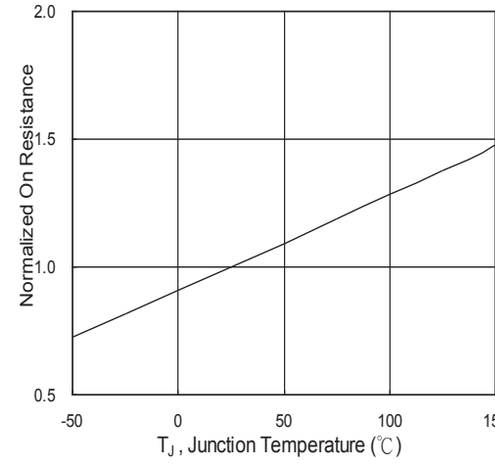


Fig.6 Normalized R_{DSON} vs. T_J

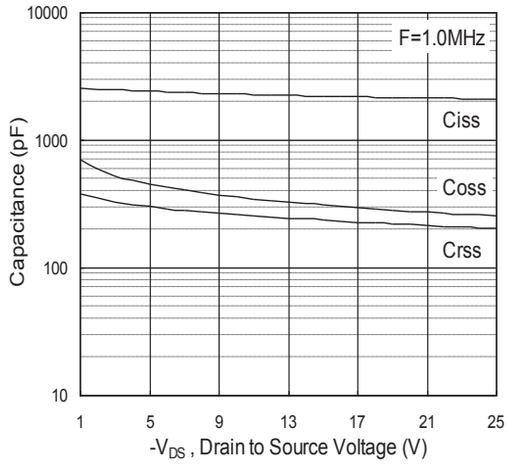


Fig.7 Capacitance

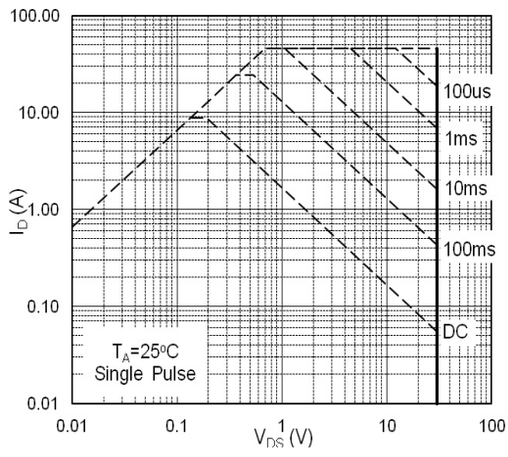


Fig.8 Safe Operating Area

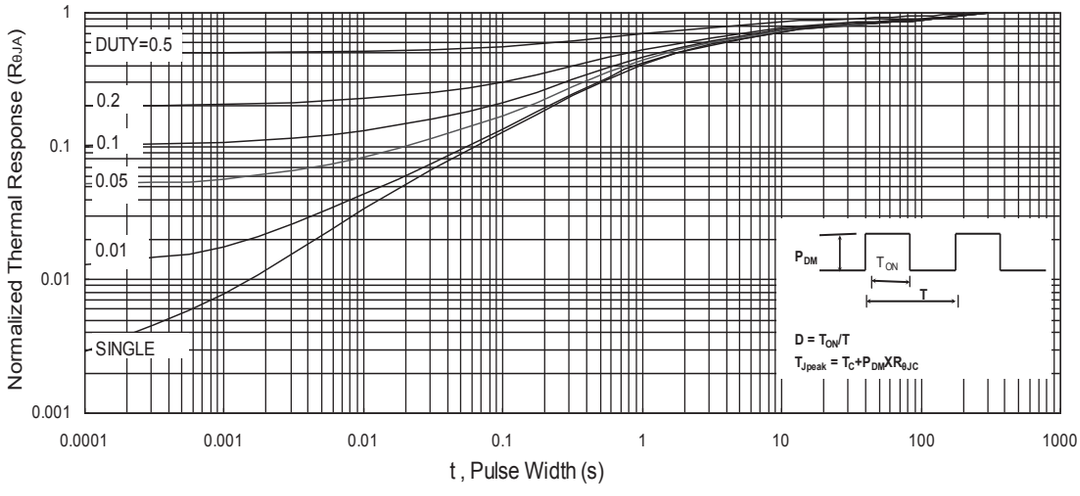


Fig.9 Normalized Maximum Transient Thermal Impedance

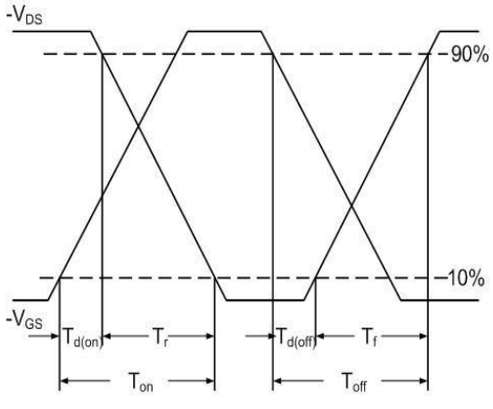


Fig.10 Switching Time Waveform

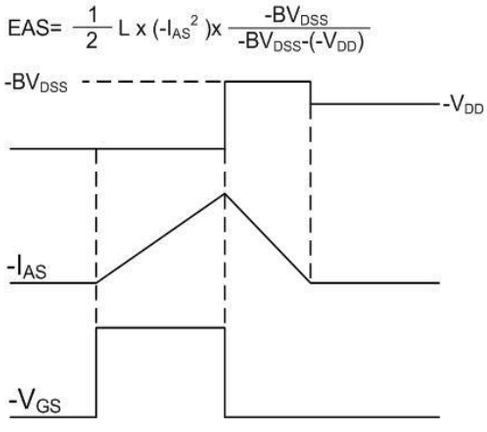
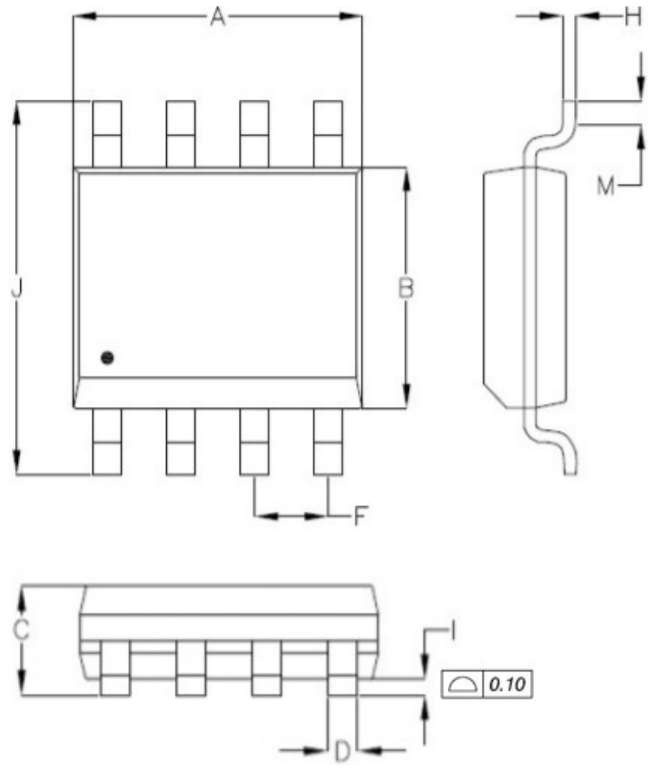


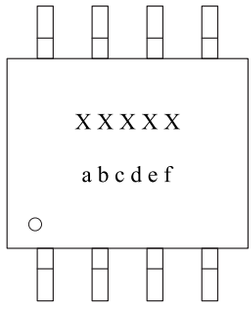
Fig.11 Unclamped Inductive Waveform

■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)