Single P-channel MOSFET

ELM4PB3103FNA-N

■General description

ELM4PB3103FNA-N uses advanced trench technology to provide excellent Rds(on), low gate charge and low gate threshold voltage.

■Features

- Vds=-30V
- Id=-32A (Vgs=-10V)
- Rds(on)=20mΩ (Vgs=-10V)
- Rds(on)=32mΩ (Vgs=-4.5V)

■Maximum absolute ratings

Parameter		Symbol	Limit		Unit	Note
			10s	Steady state		
Drain-source voltage		Vds	-30		V	
Gate-source voltage		Vgs	±25		V	
Continuous drain current (Vgs=-10V)	Tc=25°C	Id	-32		A	1
	Tc=100°C		-20			
	Ta=25°C		-12.2	-7.7		
	Ta=70°C		-9.8	-6.2		
Pulsed drain current		Idm	-65		A	2
Single pulse avalanche energy		Eas	72.2		mJ	3
Avalanche current		Ias	-38		A	
Power dissipation	Tc=25°C	Pd	29.00		W	4
	Ta=25°C		4.20	1.67		
Junction and storage temperature range		Tj, Tstg	-55 to +150		°C	

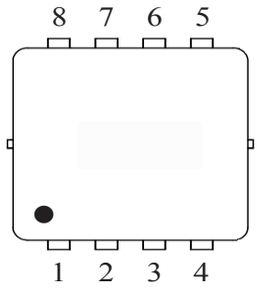
■Thermal characteristics

Parameter	Symbol	Typ.	Max.	Unit	Note
Thermal resistance junction-to-ambient	Rθja	-	75	°C/W	1
Thermal resistance junction-to-ambient (t ≤ 10s)		-	30		
Thermal Resistance Junction-Case	Rθjc	-	4.32	°C/W	1

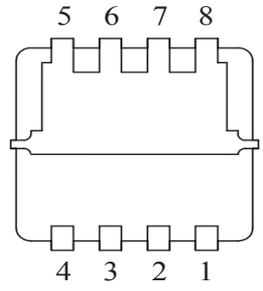
■Pin configuration

PRPAK8-3×3

(TOP VIEW)

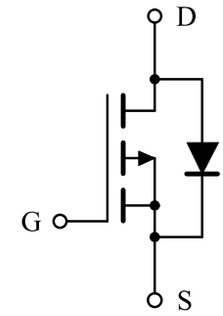


(BOTTOM VIEW)



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	
Zero gate voltage drain current	Idss	Vds=-24V, Vgs=0V	-	-	-1	μA	
		Vds=-24V, Vgs=0V, Tj=55°C	-	-	-5		
Gate-body leakage current	Igss	Vds=0V, Vgs=±25V	-	-	±100	nA	
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=-250μA	-1.0	-	-2.5	V	
Static drain-source on-resistance	Rds(on)	Vgs=-10V, Id=-15A	-	-	20	mΩ	2
		Vgs=-4.5V, Id=-10A	-	-	32		
Forward transconductance	Gfs	Vds=-5V, Id=-15A	-	19	-	S	
Diode forward voltage	Vsd	Is=-1A, Vgs=0V	-	-	-1.2	V	2
Max. body-diode continuous current	Is	Vgs=Vds=0V, Force current	-	-	-32	A	1, 5
Pulsed source current	Ism		-	-	-65	A	2, 5
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vgs=0V, Vds=-15V, f=1MHz	-	1345	-	pF	
Output capacitance	Coss		-	194	-	pF	
Reverse transfer capacitance	Crss		-	158	-	pF	
Gate resistance	Rg	Vds=0V, Vgs=0V, f=1MHz	-	13	-	Ω	
SWITCHING PARAMETERS							
Total gate charge (-4.5)	Qg	Vgs=-4.5V, Vds=-15V Id=-15A	-	12.5	-	nC	
Gate-source charge	Qgs		-	5.4	-	nC	
Gate-drain charge	Qgd		-	5.0	-	nC	
Turn-on delay time	td(on)	Vgs=-10V, Vds=-15V Id=-15A, Rgen=3.3Ω	-	4.4	-	ns	
Turn-on rise time	tr		-	11.2	-	ns	
Turn-off delay time	td(off)		-	34.0	-	ns	
Turn-off fall time	tf		-	18.0	-	ns	
Reverse recovery time	trr	If=-15A , dI/dt=100A/μs	-	12.4	-	ns	
Reverse recovery charge	Qrr		-	5.0	-	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 Eas data shows Max. rating . The test condition is Vdd=-25V, Vgs=-10V, L=0.1mH, Ias=-38A.
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

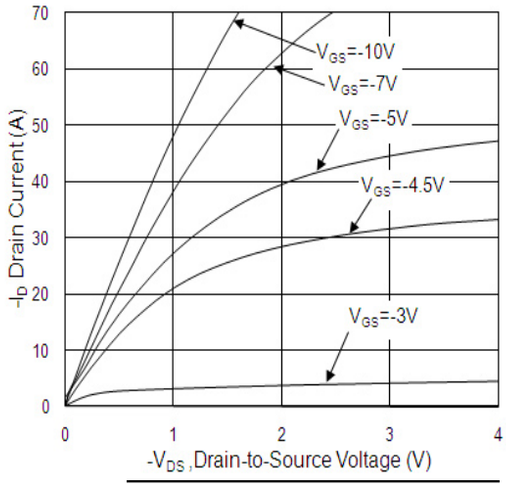


Fig.1 Typical Output Characteristics

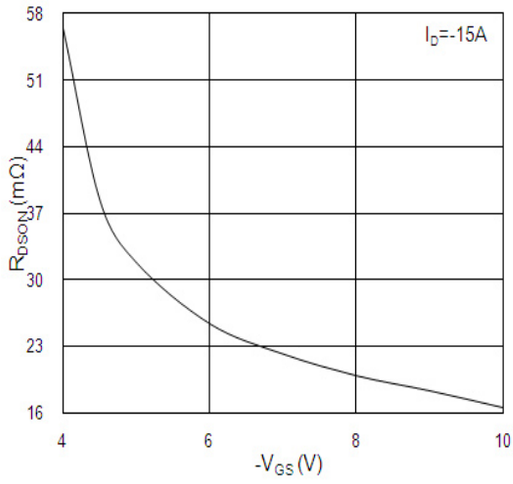


Fig.2 On-Resistance v.s Gate-Source

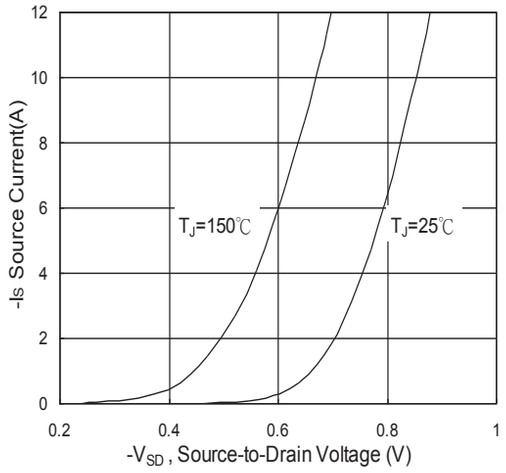


Fig.3 Forward Characteristics of Reverse

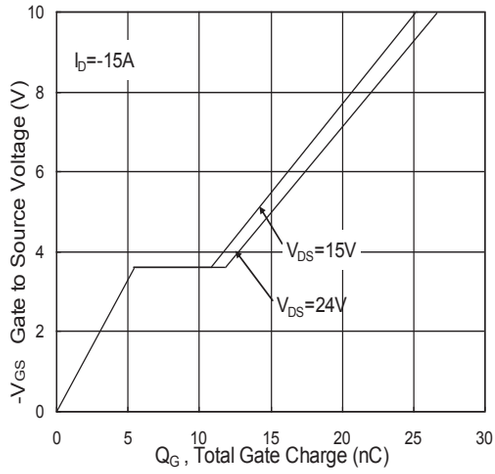


Fig.4 Gate-Charge Characteristics

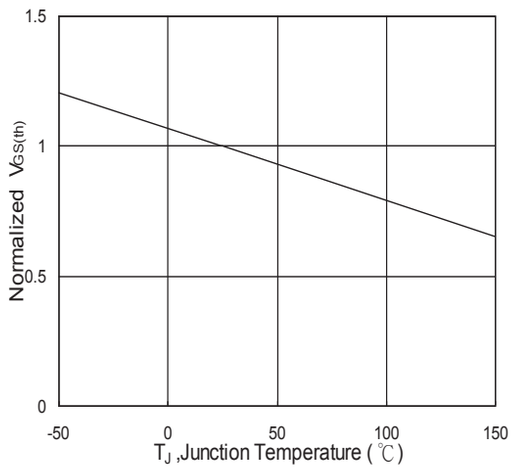


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

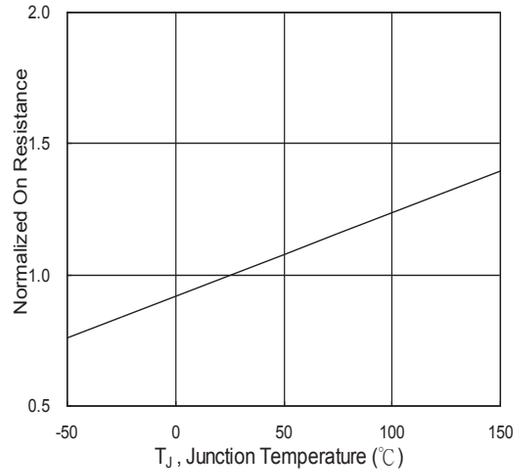


Fig.6 Normalized R_{DSON} vs. T_J

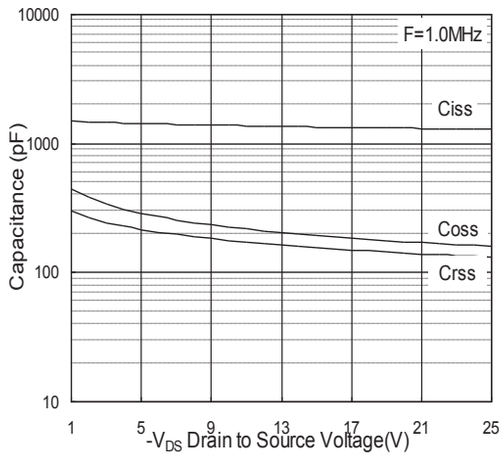


Fig.7 Capacitance

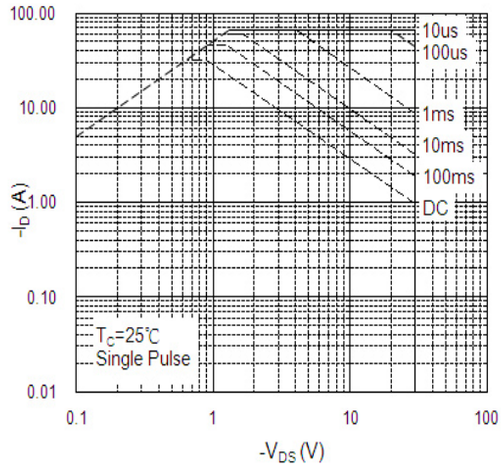


Fig.8 Safe Operating Area

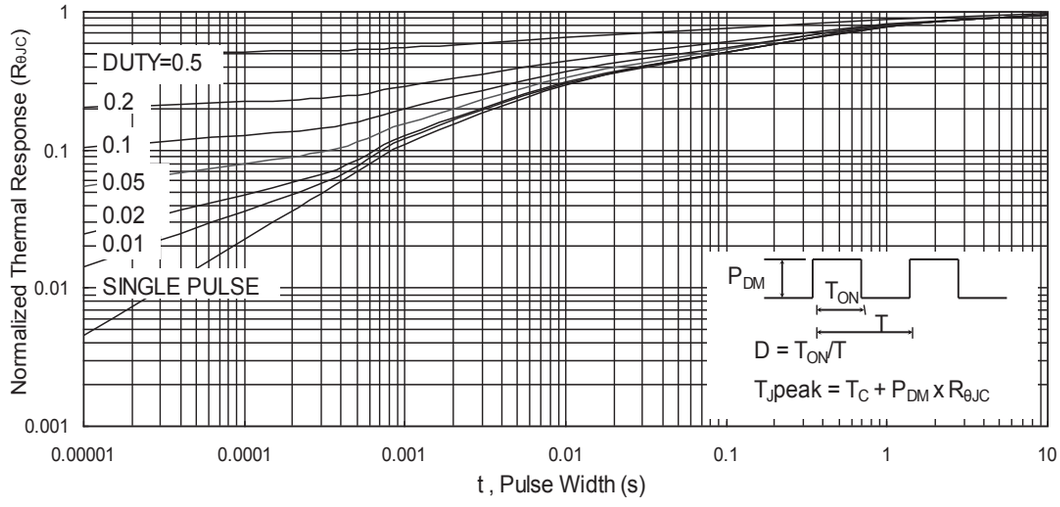


Fig.9 Normalized Maximum Transient Thermal Impedance

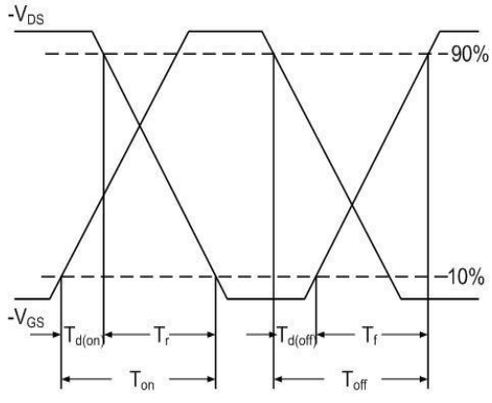


Fig.10 Switching Time Waveform

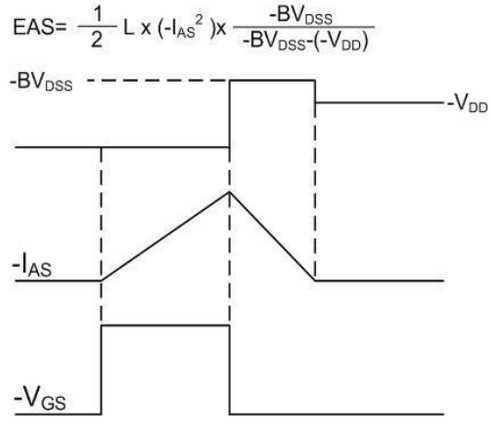
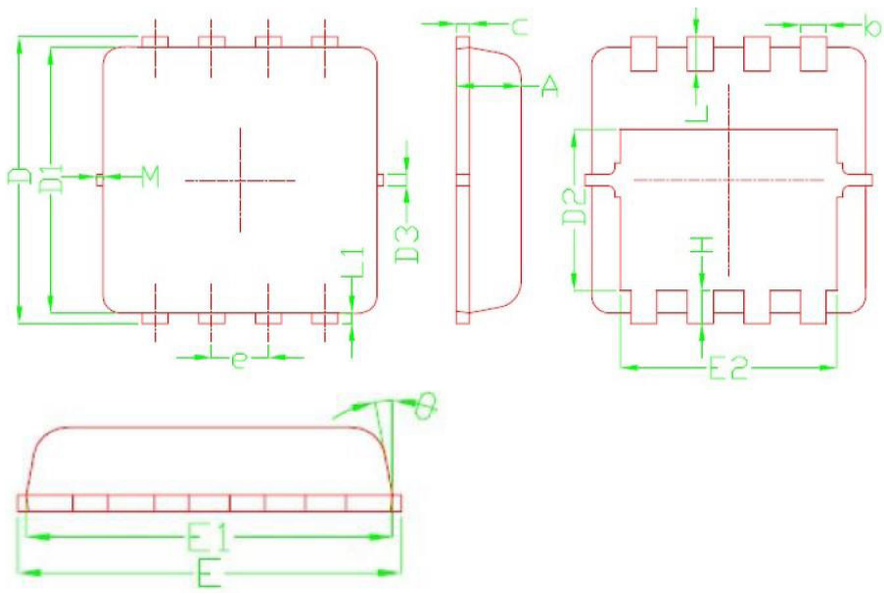


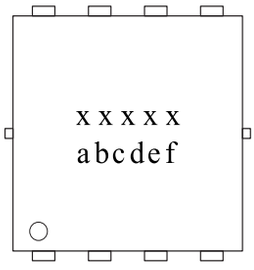
Fig.11 Unclamped Inductive Switching Waveform

■PRPAK8-3×3 dimension (3,000pcs/reel)



Symbols	Millimeters			Symbols	Millimeters		
	Min.	Nom.	Max.		Min.	Nom.	Max.
A	0.70	---	0.85	E1	3.00	---	3.25
b	0.20	---	0.40	E2	2.29	---	2.65
c	0.10	---	0.25	e	0.65 BSC		
D	3.15	---	3.45	H	0.28	---	0.65
D1	2.90	---	3.20	θ	0°	---	14°
D2	1.54	---	1.98	L	0.30	---	0.50
D3	0.10	0.20	0.30	L1	---	0.13	---
E	3.15	---	3.45	M	---	---	0.15

■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)