Single N-channel MOSFET

ELM4NB8008FNA-N

■General description

ELM4NB8008FNA-N uses advanced trench technology to provide excellent Rds(on), low gate charge and low gate threshold voltage.

■Features

- Vds=30V
- Id=50A
- Rds(on)=4.9mΩ (Vgs=10V)
- Rds(on)=5.5mΩ (Vgs=4.5V)
- Rds(on)=7.5mΩ (Vgs=2.5V)

■Maximum absolute ratings

Parameter		Symbol	Limit	Unit	Note
Drain-source voltage		Vds	30	V	
Gate-source voltage		Vgs	±12	V	
Continuous drain current	Tc=25°C	Id	50	A	1
	Tc=100°C		32		
Pulsed drain current		Idm	150	A	2
Single pulse avalanche energy		Eas	125	mJ	3
Avalanche current		Ias	50	A	
Total power dissipation	Tc=25°C	Pd	31	W	4
Storage temperature range		Tstg	-55 to +150	°C	
Operating junction temperature range		Tj	-55 to +150	°C	

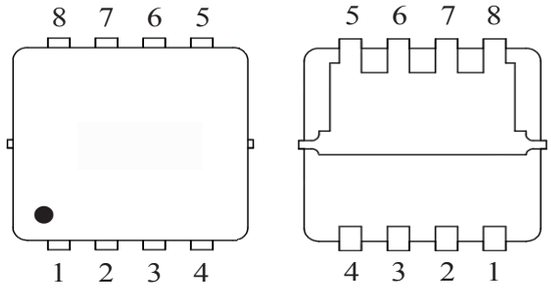
■Thermal characteristics

Parameter	Symbol	Typ.	Max.	Unit	Note
Thermal resistance junction-ambient	Rθja	--	65	°C/W	1
Thermal resistance junction-case	Rθjc	--	4	°C/W	1

■Pin configuration

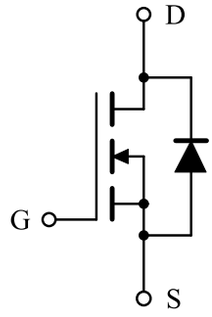
PRPAK8-3×3

(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	
Static drain-source on-resistance	Rds(on)	Vgs=10V, Id=12A	3.3	4.2	4.9	mΩ	2
		Vgs=4.5V, Id=12A	3.7	4.6	5.5		
		Vgs=2.5V, Id=10A	4.5	5.5	7.5		
Gate threshold voltage	Vgs(th)	Vgs=Vds, Id=250μA	0.4	--	1.0	V	
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=±12V, Vds=0V	--	--	±100	nA	
Forward transconductance	Gfs	Vds=5V, Id=12A	--	25	--	S	
Continuous source current	Is	Vgs=Vds=0V, Force current	--	--	50	A	1, 5
Pulsed source current	Ism		--	--	150	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	--	3100	--	pF	
Output capacitance	Coss		--	405	--	pF	
Reverse transfer capacitance	Crss		--	310	--	pF	
Gate resistance	Rg	Vds=0V, Vgs=0V, f=1MHz	--	1.4	--	Ω	
SWITCHING PARAMETERS							
Total gate charge (4.5)	Qg	Vds=20V, Vgs=4.5V Id=12A	--	32.0	--	nC	
Gate-source charge	Qgs		--	6.1	--	nC	
Gate-drain charge	Qgd		--	14.0	--	nC	
Turn-on delay time	td(on)	Vdd=15V, Vgs=10V Rgen=1.5Ω, Id=12A	--	12.0	--	ns	
Turn-on rise time	tr		--	46.0	--	ns	
Turn-off delay time	td(off)		--	33.0	--	ns	
Turn-off fall time	tf		--	7.5	--	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=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

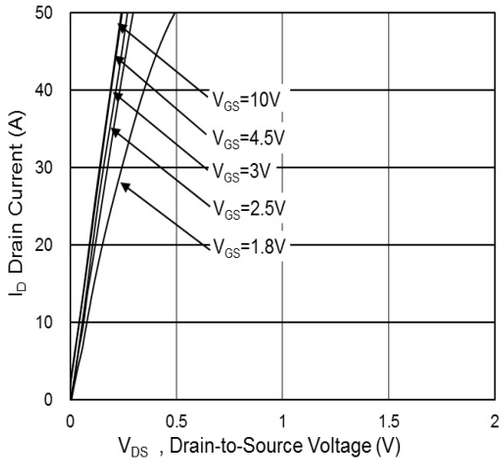


Fig.1 Typical Output Characteristics

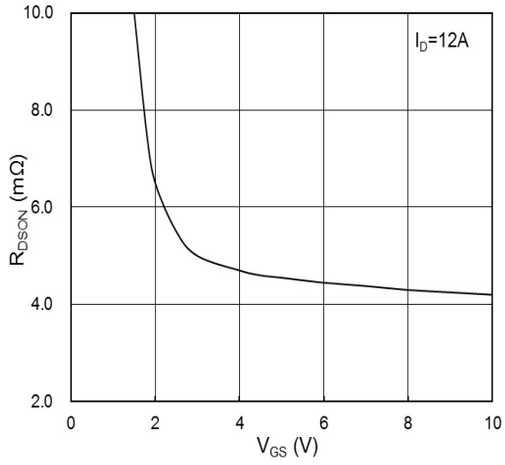


Fig.2 On-Resistance vs G-S Voltage

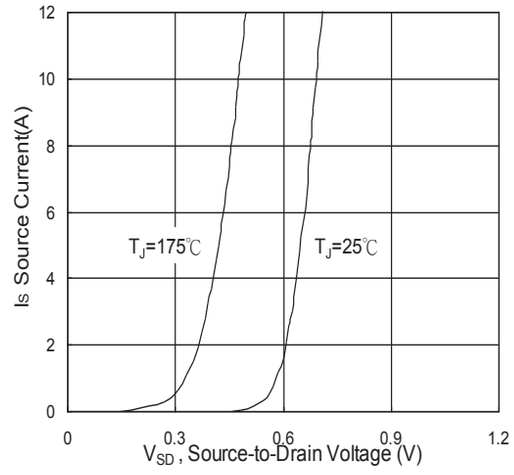


Fig.3 Source Drain Forward Characteristics

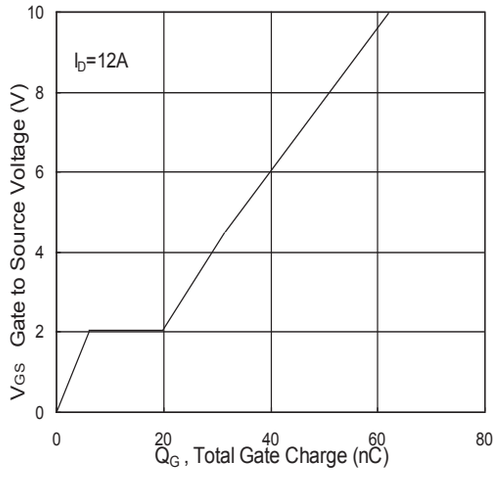


Fig.4 Gate-Charge Characteristics

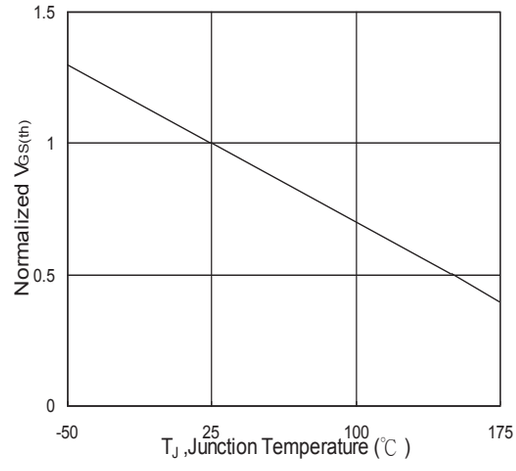


Fig.5 Normalized $V_{GS(th)}$ vs T_J

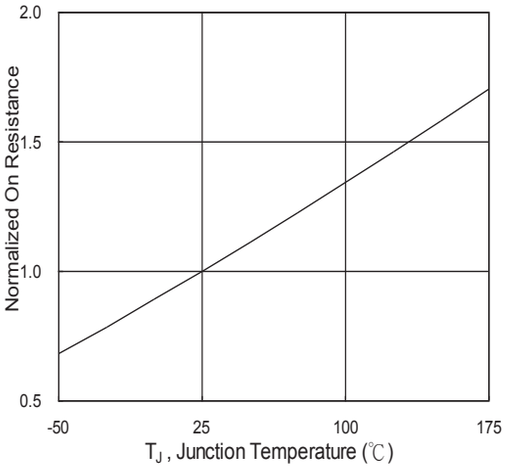


Fig.6 Normalized R_{DSON} vs T_J

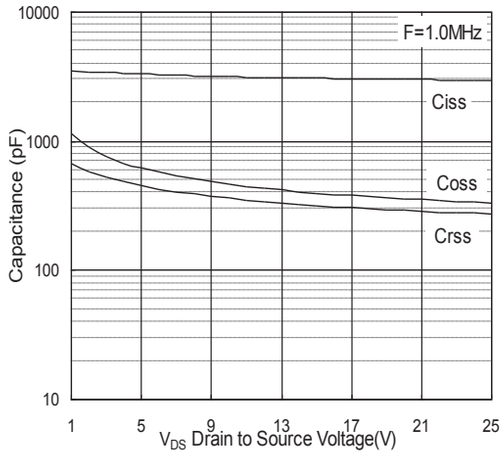


Fig.7 Capacitance

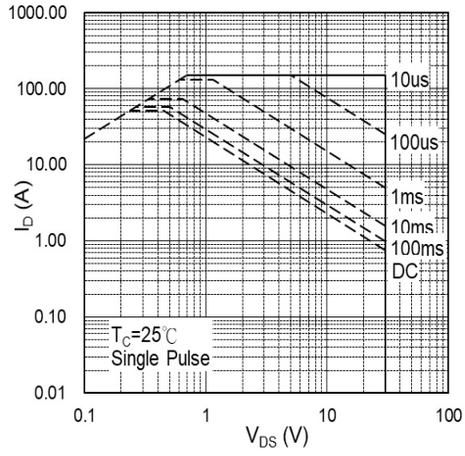


Fig.8 Safe Operating Area

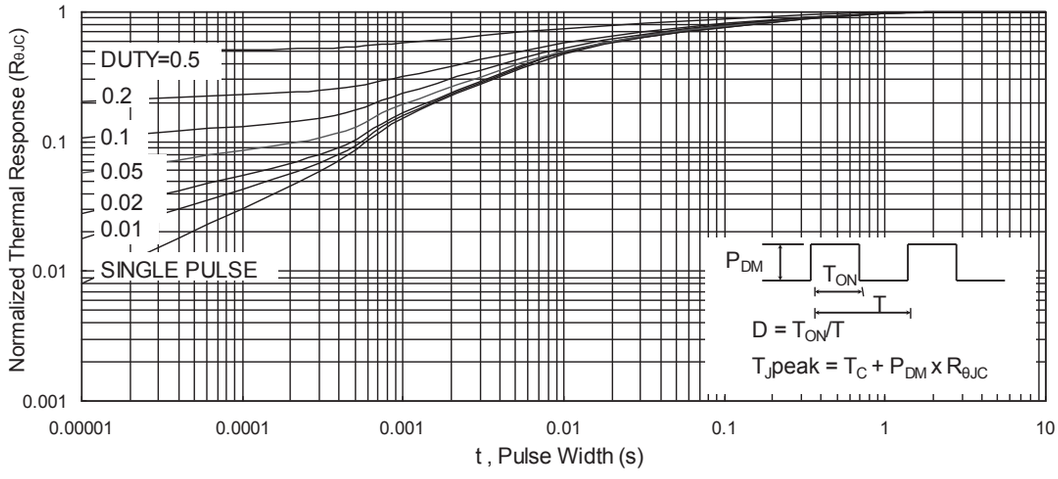


Fig.9 Normalized Maximum Transient Thermal Impedance

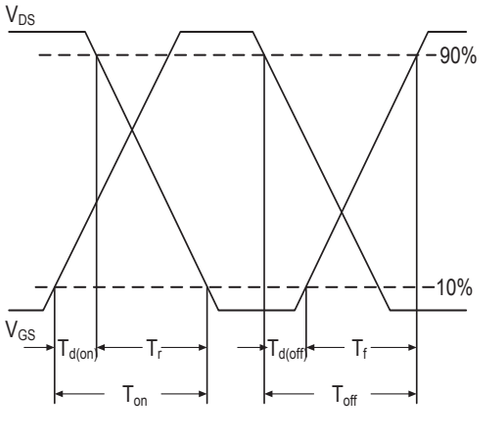


Fig.10 Switching Time Waveform

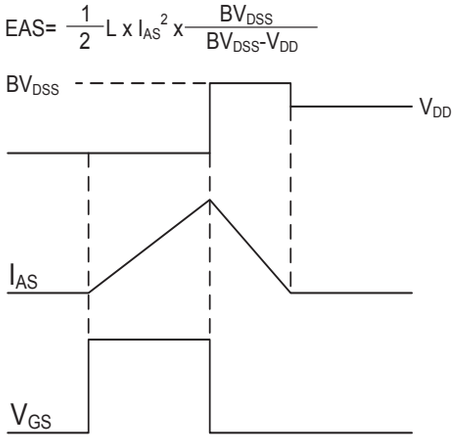
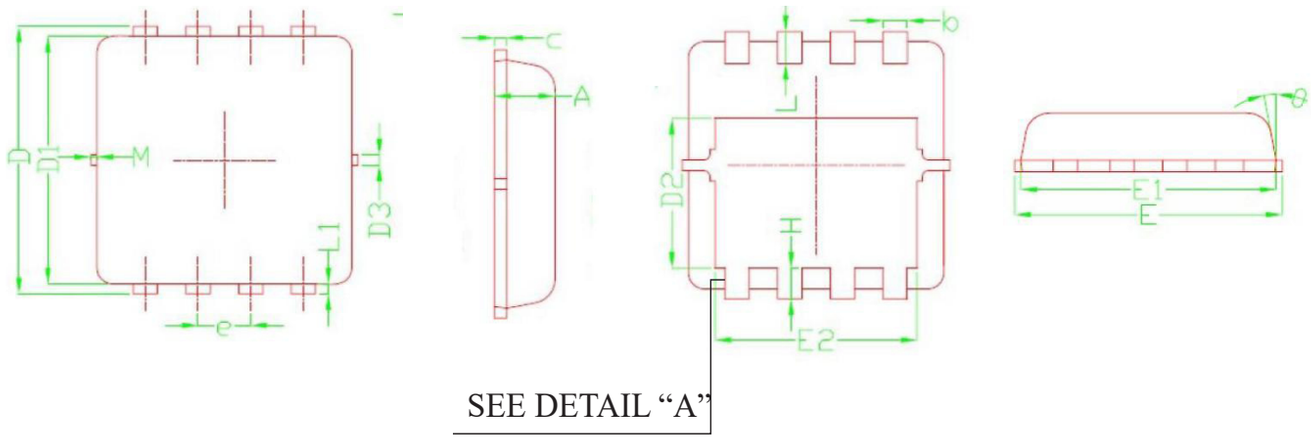
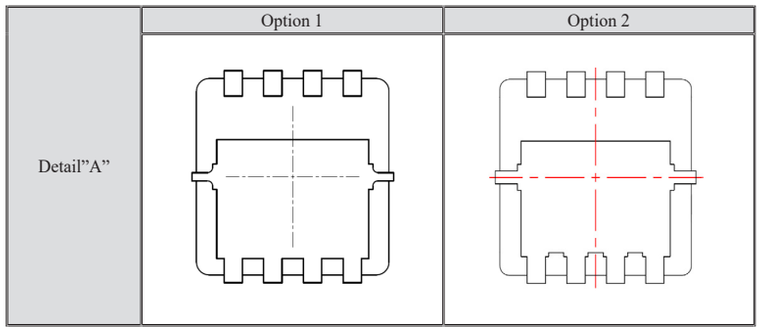


Fig.11 Unclamped Inductive Switching Waveform

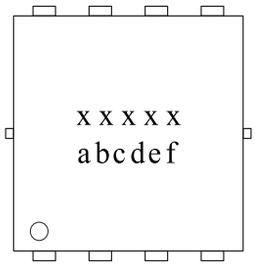
■PRPAK8-3×3 dimension (3,000pcs/reel)





Symbols	Millimeters		Inches		Symbols	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.70	0.90	0.028	0.035	E1	2.90	3.25	0.114	0.128
b	0.20	0.40	0.008	0.016	E2	2.25	2.65	0.089	0.104
c	0.10	0.25	0.004	0.010	e	0.65 BSC		0.026 BSC	
D	3.10	3.45	0.122	0.136	H	0.28	0.65	0.011	0.026
D1	2.90	3.20	0.114	0.126	θ	0°	14°	0°	14°
D2	1.54	1.98	0.061	0.078	L	0.30	0.50	0.012	0.020
D3	0.08	0.30	0.003	0.012	L1	0.06	0.20	0.002	0.008
E	3.00	3.45	0.118	0.136	M	0.00	0.15	0.000	0.006

■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)