

Single N-channel MOSFET

ELM4NA6074FNA-N

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

■ General description

ELM4NA6074FNA-N uses advanced trench technology to provide excellent $R_{ds(on)}$, low gate charge and low gate resistance.

■ Features

- $V_{ds}=60V$
- $I_d=100A$
- $R_{ds(on)} = 2.1m\Omega$ ($V_{gs}=10V$)
- $R_{ds(on)} = 3.2m\Omega$ ($V_{gs}=4.5V$)

■ Maximum absolute ratings

Parameter	Symbol	Limit	Unit	Note	
Drain-source voltage	V_{ds}	60	V		
Gate-source voltage	V_{gs}	± 20	V		
Continuous drain current	I_d	$T_c=25^\circ C$	100	A	1, 6
		$T_c=100^\circ C$	66		
Pulsed drain current	I_{dm}	400	A	2	
Single pulse avalanche energy	E_{as}	306	mJ	3	
Avalanche current	I_{as}	35	A		
Total power dissipation	P_d	83	W	4	
Storage temperature range	T_{stg}	- 55 to 150	$^\circ C$		
Operating junction temperature	T_j	- 55 to 150	$^\circ C$		

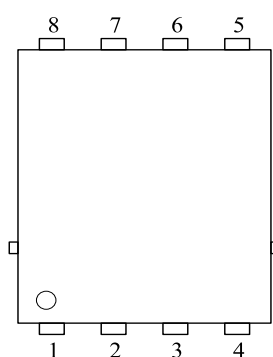
■ Thermal characteristics

Parameter	Symbol	Typ.	Max.	Unit	Note
Thermal resistance junction-ambient	$R_{\theta ja}$	--	55.0	$^\circ C/W$	1
Thermal resistance junction-case	$R_{\theta jc}$	--	1.1		1

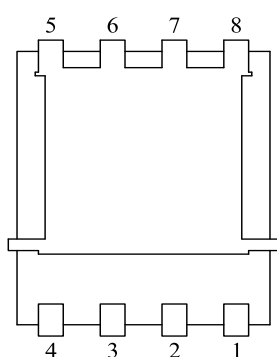
■ Pin configuration

PRPAK8-5×6

(TOP VIEW)

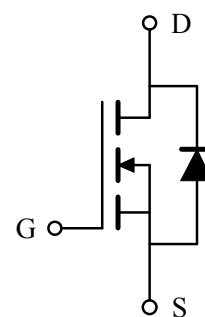


(BOTTOM VIEW)



Pin No.	Pin name
1	SOURCE
2	SOURCE
3	SOURCE
4	GATE
5	DRAIN
6	DRAIN
7	DRAIN
8	DRAIN

■ Circuit



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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	60	--	--	V	
Static drain-source on-resistance	R _{ds(on)}	V _{gs} =10V, I _d =20A	--	1.7	2.1	mΩ	2
		V _{gs} =4.5V, I _d =20A	--	2.3	3.2		
Gate threshold voltage	V _{gs(th)}	V _{gs} =V _{ds} , I _d =250μA	1.2	--	2.3	V	
Drain-source leakage current	I _{dss}	V _{ds} =52V	--	--	1	μA	
		V _{gs} =0V	T _j =55°C	--	5		
Gate-source leakage current	I _{gss}	V _{gs} =±20V, V _{ds} =0V	--	--	±100	nA	
Forward transconductance	G _{fs}	V _{ds} =5V, I _d =20A	--	60	--	S	
Continuous source current	I _s	V _{gs} =V _{ds} =0V, Force current	--	--	100	A	1,5,6
Diode forward voltage	V _{sd}	V _{gs} =0V, I _s =1A	--	--	1.2	V	2
DYNAMIC PARAMETERS							
Input capacitance	C _{iss}	V _{ds} =30V, V _{gs} =0V, f=1MHz	--	5471	--	pF	
Output capacitance	C _{oss}		--	1847	--	pF	
Reverse transfer capacitance	C _{rss}		--	86	--	pF	
Gate resistance	R _g	V _{ds} =0V, V _{gs} =0V, f=1MHz	--	1.6	--	Ω	
SWITCHING PARAMETERS							
Total gate charge (V _{gs} =10V)	Q _g	V _{ds} =30V, V _{gs} =10V I _d =20A	--	102.0	--	nC	
Total gate charge (V _{gs} =4.5V)	Q _g		--	54.1	--	nC	
Gate-source charge	Q _{gs}		--	15.7	--	nC	
Gate-drain charge	Q _{gd}		--	27.9	--	nC	
Turn-on delay time	t _{d(on)}	V _{dd} =30V, V _{gs} =10V R _{gen} =3Ω, I _d =20A	--	15	--	ns	
Turn-on rise time	t _r		--	12	--	ns	
Turn-off delay time	t _{d(off)}		--	60	--	ns	
Turn-off fall time	t _f	I _f =20A, di/dt=100A/μs	--	19	--	ns	
Reverse recovery time	t _{rr}		--	50	--	nS	
Reverse recovery charge	Q _{rr}		--	72	--	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 V_{dd}=50V, V_{gs}=10V, L=0.5mH, I_{as}=35A.
4. The power dissipation is limited by 150°C junction temperature.
5. The data is theoretically the same as I_d and I_{dm}, in real applications, should be limited by total power dissipation.
6. The maximum current rating is package limited.

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■ Typical electrical and thermal characteristics

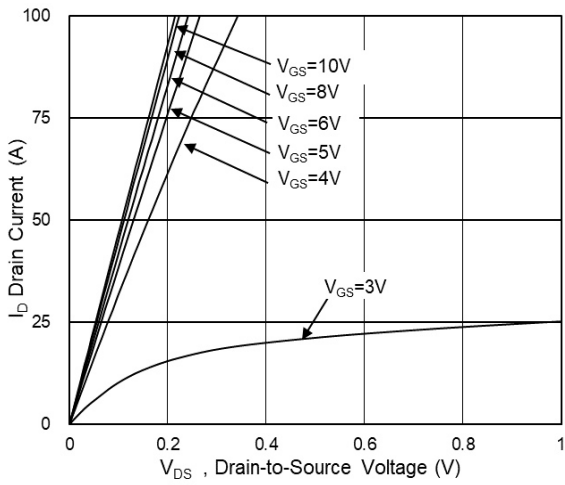


Fig.1 Typical Output Characteristics

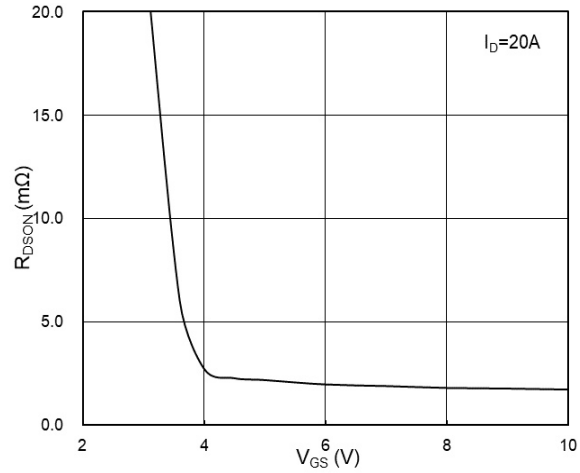


Fig.2 On-Resistance vs G-S Voltage

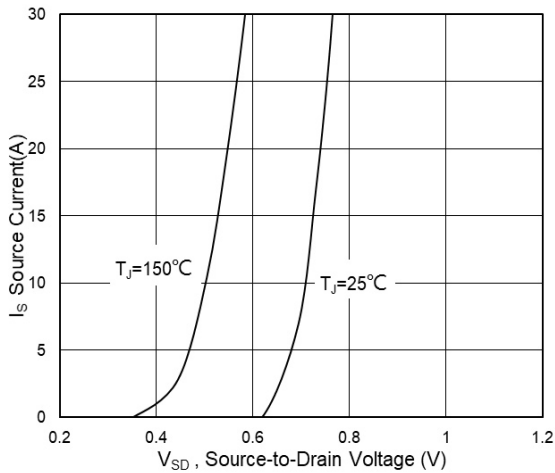


Fig.3 Diode Forward Voltage vs Current

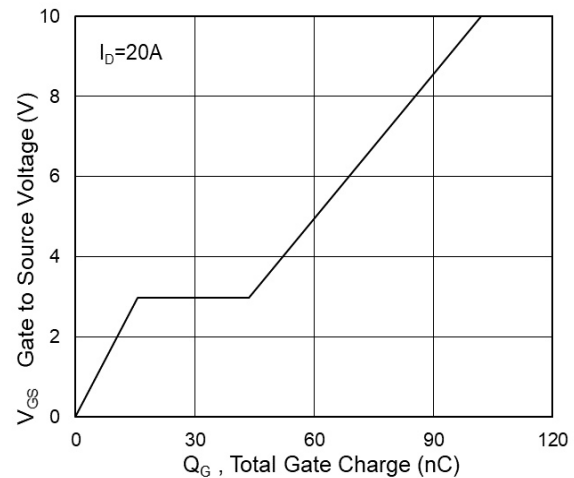


Fig.4 Gate-Charge Characteristics

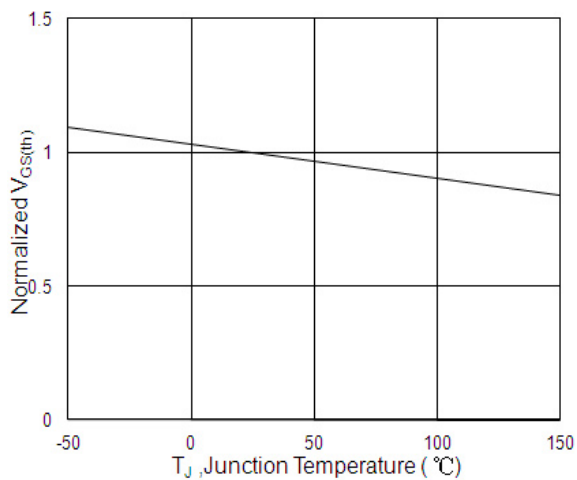


Fig.5 Normalized $V_{GS(th)}$ vs T_J

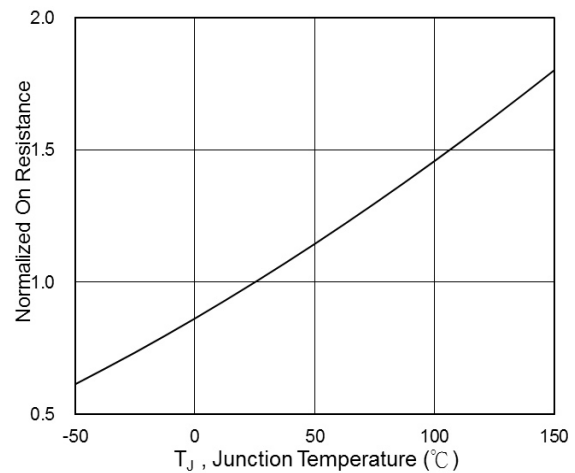


Fig.6 Normalized $R_{DS(on)}$ vs T_J

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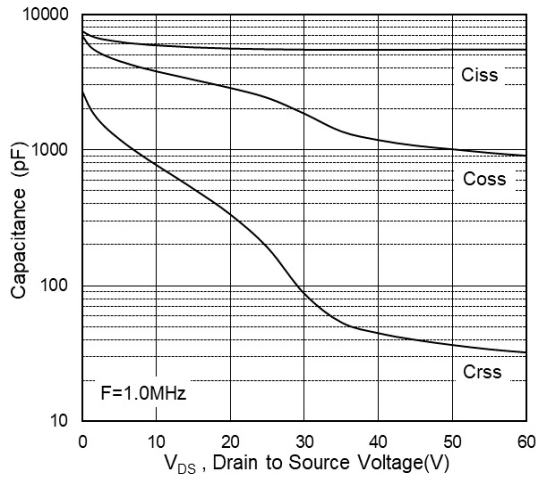


Fig.7 Capacitance

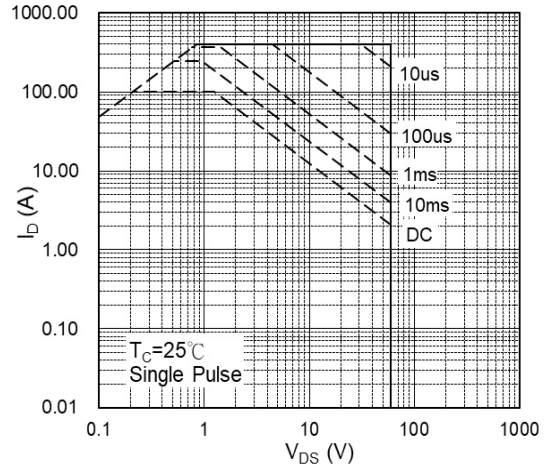


Fig.8 Safe Operating Area

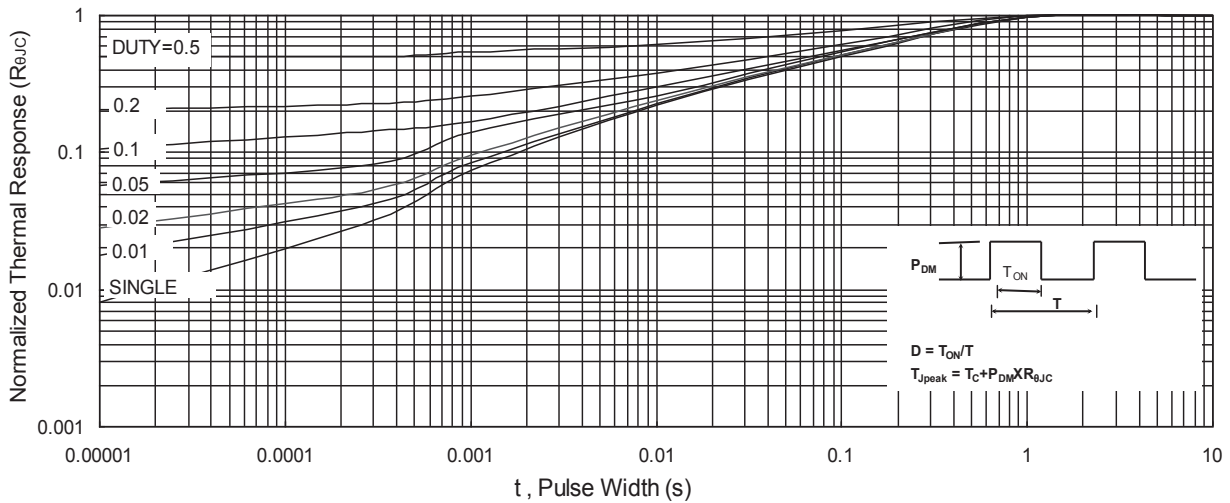


Fig.9 Normalized Maximum Transient Thermal Impedance

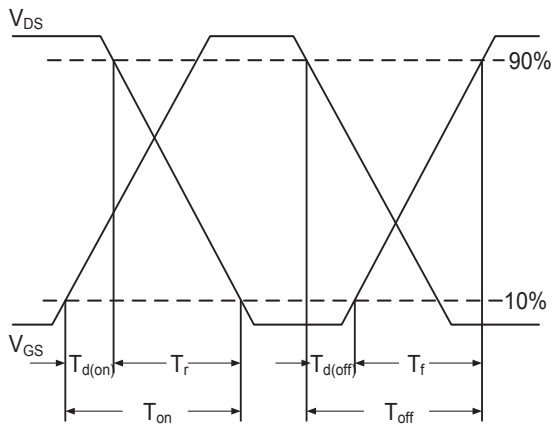


Fig.10 Switching Time Waveform

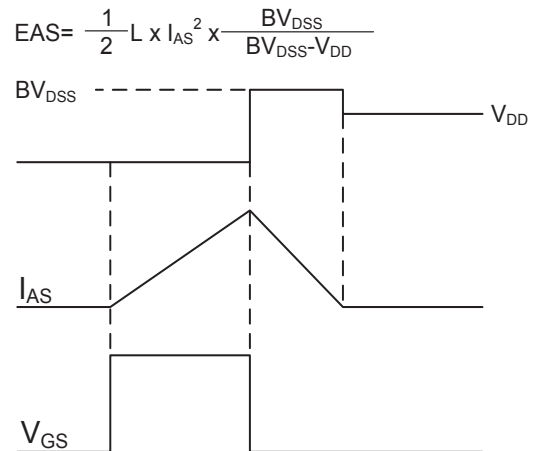


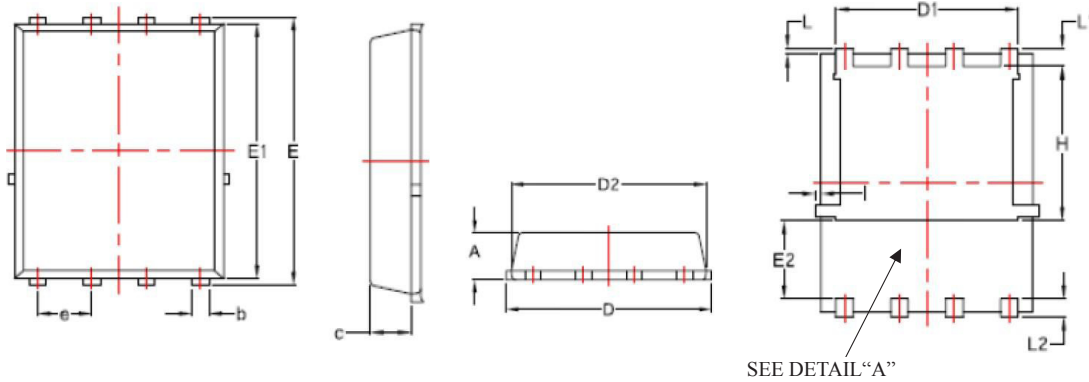
Fig.11 Unclamped Inductive Switching Waveform

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■PRPAK8-5×6 (Single) dimension (3,000pcs/reel)

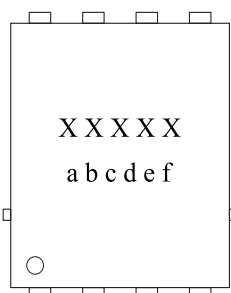


Detail "A"

	Top	Bottom		Top	Bottom
Option 1			Option 3		
Option 2			Option 4		

Symbols	Millimeters		Inches		Symbols	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.85	1.20	0.033	0.047	E2	1.10	--	0.043	--
b	0.30	0.51	0.012	0.020	e	1.27 BSC		0.050 BSC	
c	0.64	1.05	0.025	0.041	L	0.05	0.25	0.002	0.010
D	4.80	5.45	0.189	0.215	L1	0.38	0.68	0.015	0.027
D1	4.11	4.45	0.162	0.175	L2	0.30	0.71	0.012	0.028
D2	4.80	5.30	0.189	0.209	H	3.30	3.92	0.130	0.154
E	5.90	6.35	0.232	0.250	I	0.00	0.18	0.000	0.007
E1	5.45	6.06	0.215	0.239					

■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)