

Single N-channel MOSFET

ELM4NA6074FNA-N

<http://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		
Power dissipation ($T_c=25^\circ C$)	P_d	83	W	4	
Operating junction temperature	T_j	- 55 to 150	$^\circ C$		
Storage temperature range	T_{stg}	- 55 to 150	$^\circ C$		

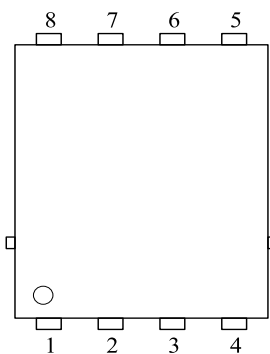
■ Thermal characteristics

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

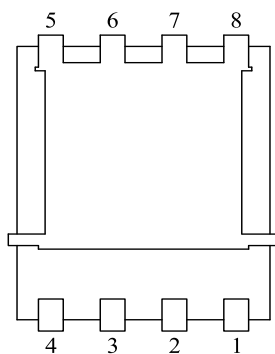
■ Pin configuration

PRPAK8-5×6

(TOP VIEW)

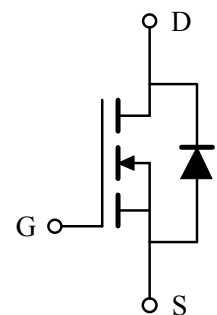


(BOTTOM VIEW)



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	
Zero gate voltage drain current	I _{dss}	V _{ds} =52V V _{gs} =0V	-	-	1	μA	
		T _j =55°C	-	-	5		
Gate-body leakage current	I _{gss}	V _{gs} =±20V, V _{ds} =0V	-	-	±100	nA	
Gate threshold voltage	V _{gs(th)}	V _{gs} =V _{ds} , I _d =250μA	1.2	-	2.3	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		
Forward transconductance	G _{fs}	V _{ds} =5V, I _d =20A	-	60	-	S	
Diode forward voltage	V _{sd}	V _{gs} =0V, I _s =1A	-	-	1.2	V	2
Diode continuous source current	I _s	V _{gs} =V _{ds} =0V, Force current	-	-	100	A	1,5,6
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 _{ds} =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

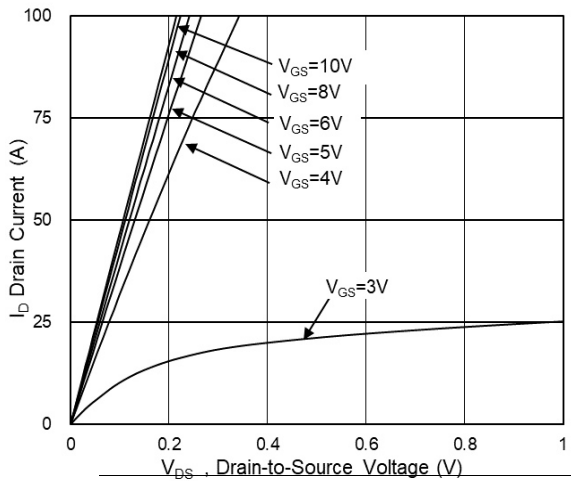


Fig.1 Typical Output Characteristics

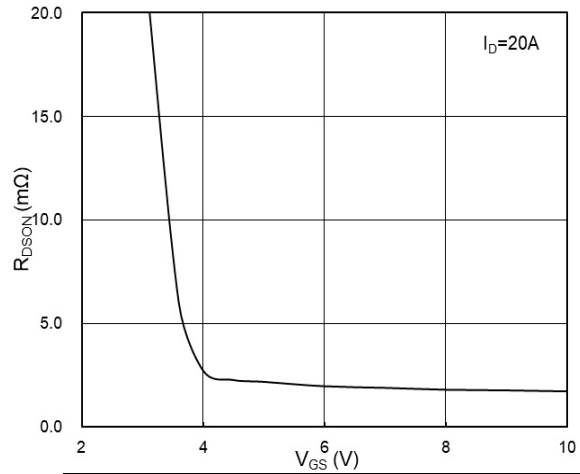


Fig.2 On-Resistance vs G-S Voltage

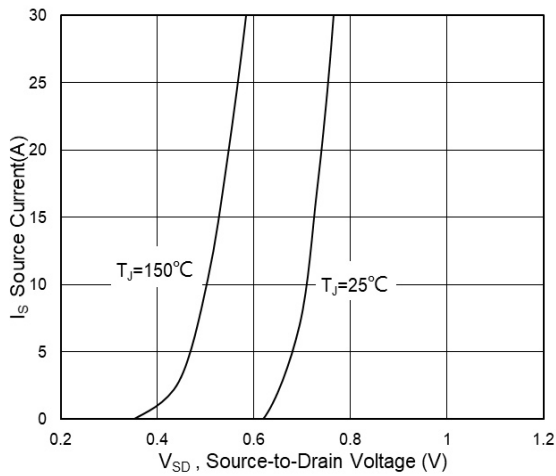


Fig.3 Diode Forward Voltage vs Current

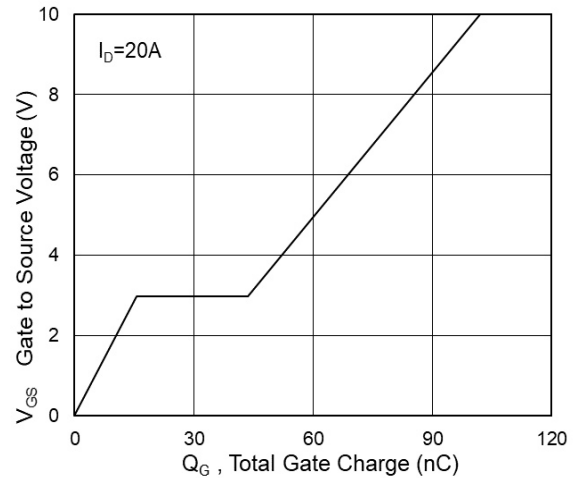


Fig.4 Gate-Charge Characteristics

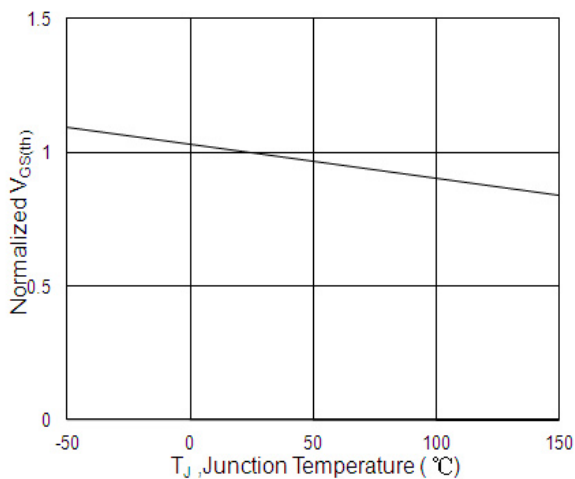


Fig.5 Normalized $V_{GS(th)}$ vs T_J

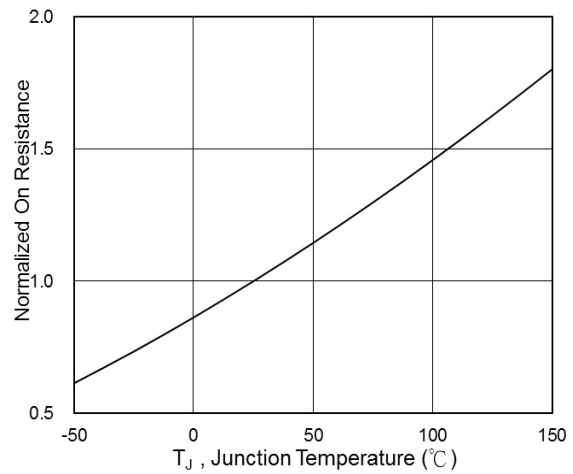


Fig.6 Normalized $R_{DS(on)}$ vs T_J

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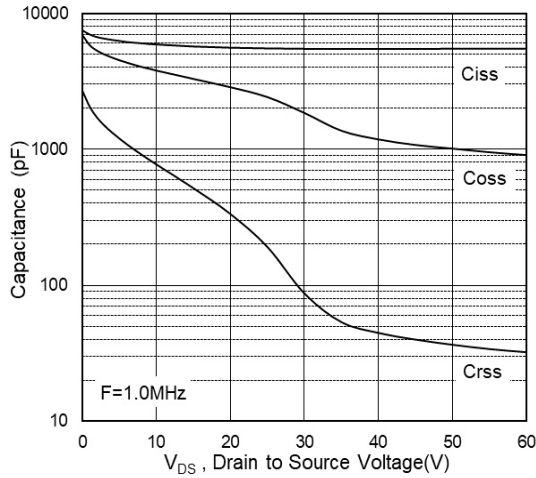


Fig.7 Capacitance

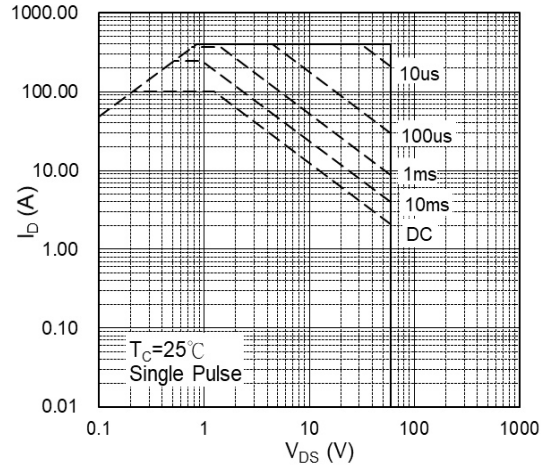


Fig.8 Safe Operating Area

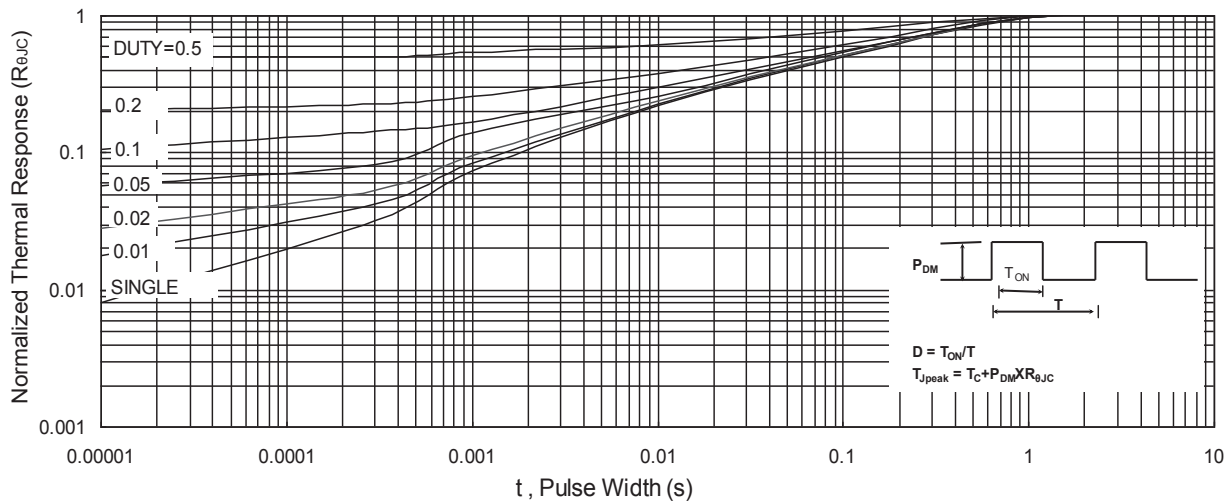


Fig.9 Normalized Maximum Transient Thermal Impedance

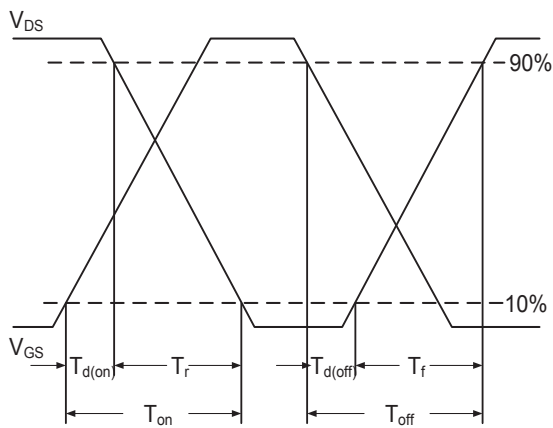


Fig.10 Switching Time Waveform

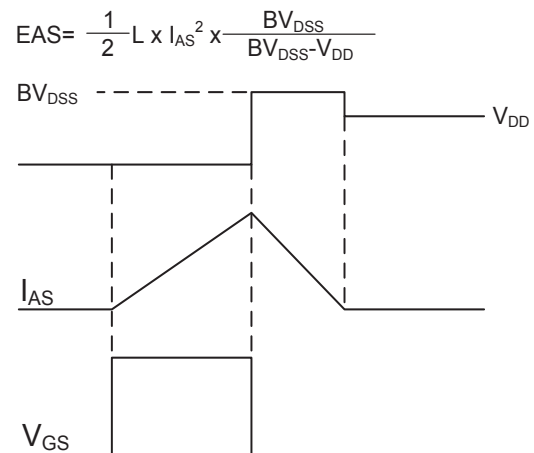


Fig.11 Unclamped Inductive Switching Waveform