

Dual N-channel MOSFET

ELM4DNB6254FNA-N

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

■General description

ELM4DNB6254FNA-N uses advanced trench technology to provide excellent $R_{ds(on)}$ and low gate charge.

■Features

- $V_{ds}=60V$
- $I_d=29A$
- $R_{ds(on)} = 15m\Omega$ ($V_{gs}=10V$)
- $R_{ds(on)} = 21m\Omega$ ($V_{gs}=4.5V$)

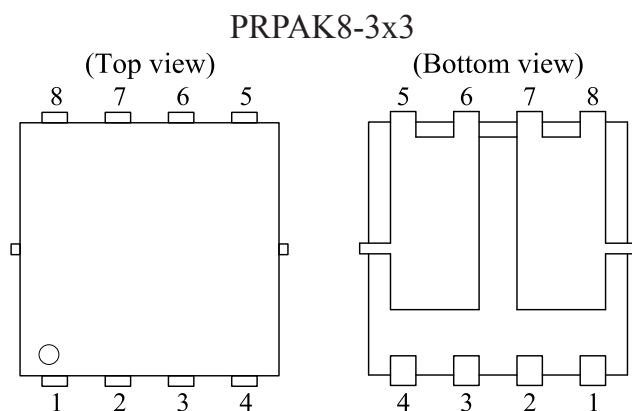
■Maximum absolute ratings

Parameter		Symbol	Limit	Unit	Note
Drain-source voltage		V_{ds}	60	V	
Gate-source voltage		V_{gs}	± 20	V	
Continuous drain current ($V_{gs}=10V$)	$T_c=25^\circ C$	I_d	29	A	1
	$T_c=100^\circ C$		23		
Pulsed drain current		I_{dm}	58	A	2
Single pulse avalanche energy		EAS	45	mJ	3
Avalanche current		Aas	30	A	
Total power dissipation	$T_c=25^\circ C$	P_d	20.8	W	4
Storage temperature range		T_{stg}	-55 to 150	$^\circ C$	
Operating junction temperature range		T_j	-55 to 150	$^\circ C$	

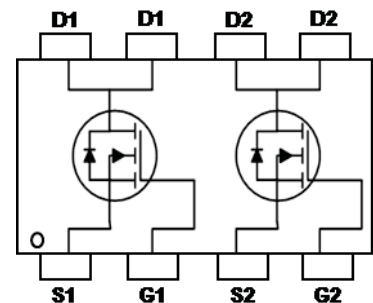
■Thermal characteristics

Parameter	Symbol	Typ.	Max.	Unit	Note
Thermal resistance junction-ambient	$R_{\theta ja}$	-	62.5	$^\circ C/W$	1
Thermal resistance junction-case	$R_{\theta jc}$	-	6.0	$^\circ C/W$	1

■Pin configuration



■Circuit



Pin No.	Pin name	Pin No.	Pin name
1	SOURCE1	5	DRAIN2
2	GATE1	6	DRAIN2
3	SOURCE2	7	DRAIN1
4	GATE2	8	DRAIN1

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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 =10A	-	10.5	15.0	mΩ	2
		V _{gs} =4.5V, I _d =10A	-	15.7	21.0		
Gate threshold voltage	V _{gs(th)}	V _{gs} =V _{ds} , I _d =250μA	1.2	2.0	2.3	V	
Drain-source leakage current	I _{dss}	V _{ds} =48V V _{gs} =0V	-	-	1	μA	
		T _j =55°C	-	-	5		
Gate-source leakage current	I _{gss}	V _{gs} =±20V, V _{ds} =0V	-	-	±100	nA	
Continuous source current	I _s	V _{gs} =V _{ds} =0V, Force current	-	-	29	A	1, 5
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	-	760	-	pF	
Output capacitance	C _{oss}		-	272	-	pF	
Reverse transfer capacitance	C _{rss}		-	26	-	pF	
Gate resistance	R _g	V _{ds} =0V, V _{gs} =0V, f=1MHz	-	1	-	Ω	
SWITCHING PARAMETERS							
Total gate charge (V _{gs} =10V)	Q _g	V _{ds} =30V, V _{gs} =10V I _d =10A	-	15.8	-	nC	
Total gate charge (V _{gs} =4.5V)	Q _g		-	8.7	-	nC	
Gate-source charge	Q _{gs}		-	3.1	-	nC	
Gate-drain charge	Q _{gd}		-	4.4	-	nC	
Turn-on delay time	t _{d(on)}	V _{dd} =30V, V _{gs} =10V R _{gen} =3.3Ω, I _d =10A	-	5.8	-	ns	
Turn-on rise time	t _r		-	3.5	-	ns	
Turn-off delay time	t _{d(off)}		-	26.0	-	ns	
Turn-off fall time	t _f		-	3.2	-	ns	

NOTE :

1. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
2. Single pulse width limited by junction temperature T_j(Max)=150°C.
3. The EAS data shows Max. rating . The test condition is V_{dd}=25V, V_{gs}=10V, L=0.1mH, I_{as}=30A .
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.

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■ Typical electrical and thermal characteristics

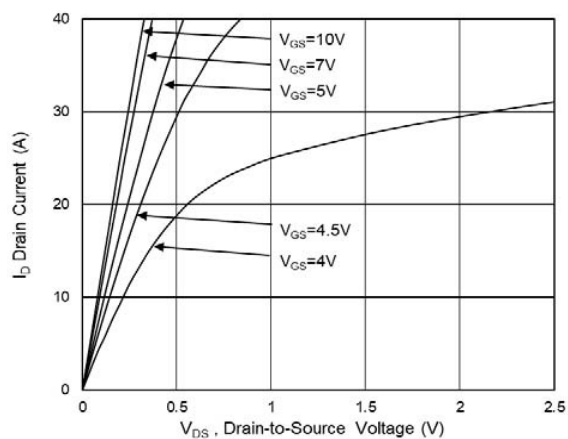


Fig.1 Typical Output Characteristics

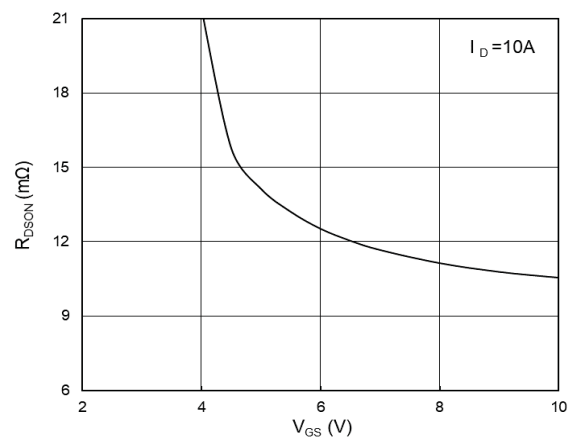


Fig.2 On-Resistance vs G-S Voltage

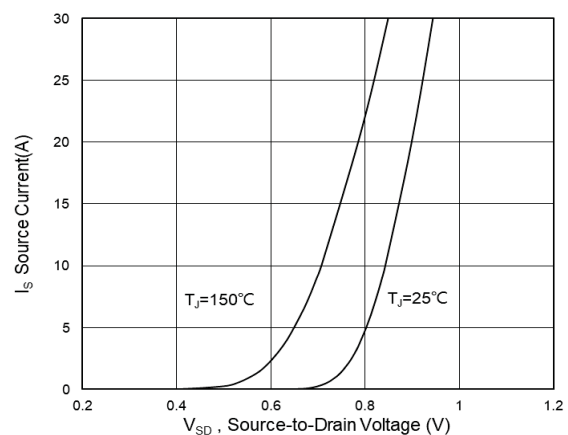


Fig.3 Source Drain Forward Characteristics

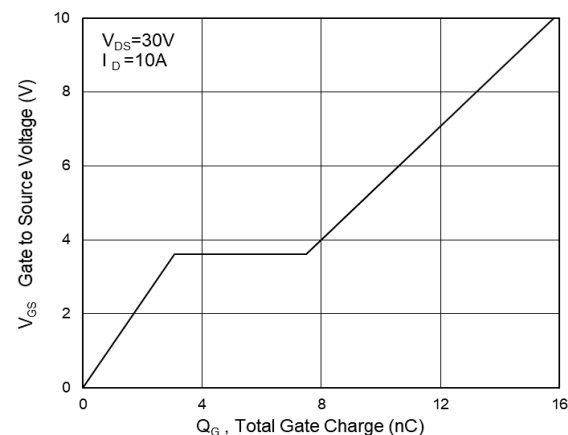


Fig.4 Gate-Charge Characteristics

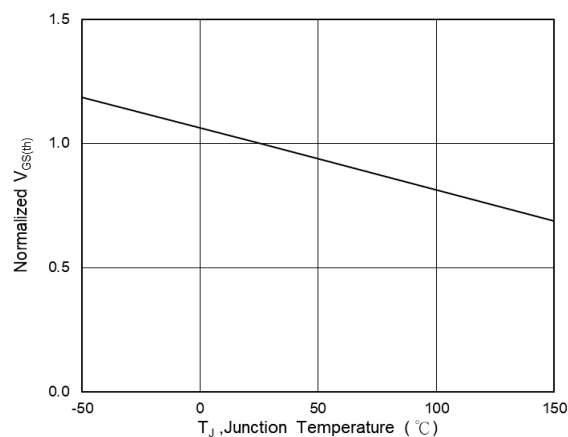


Fig.5 Normalized $V_{GS(th)}$ vs T_J

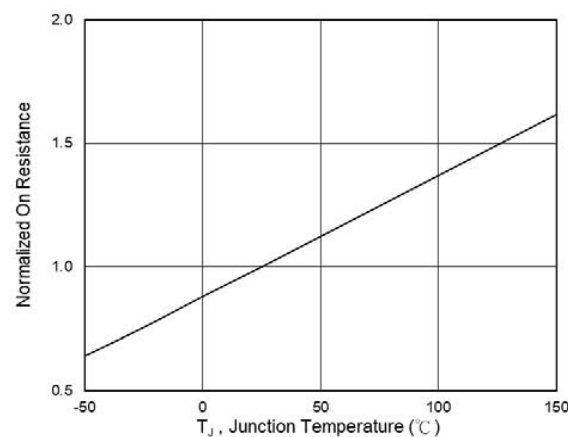


Fig.6 Normalized $R_{DS(on)}$ vs T_J

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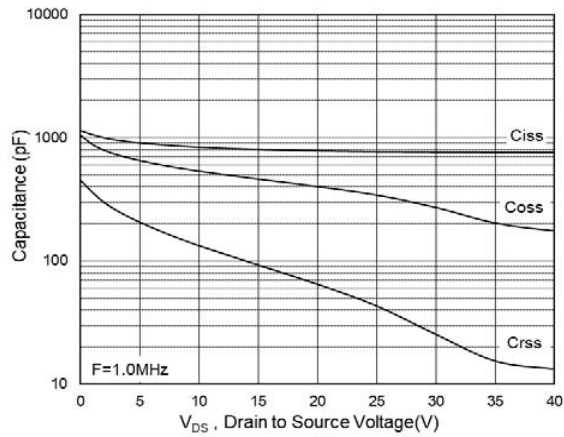


Fig.7 Capacitance

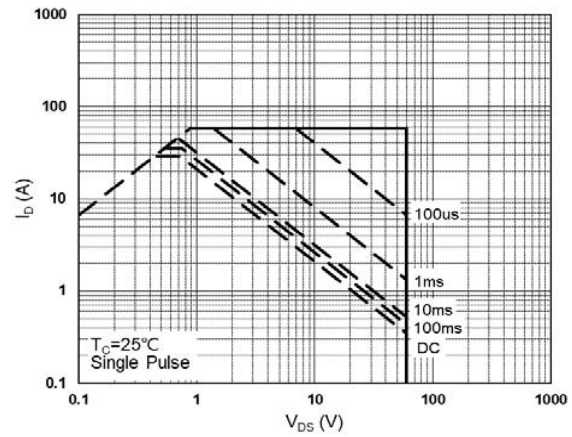


Fig.8 Safe Operating Area

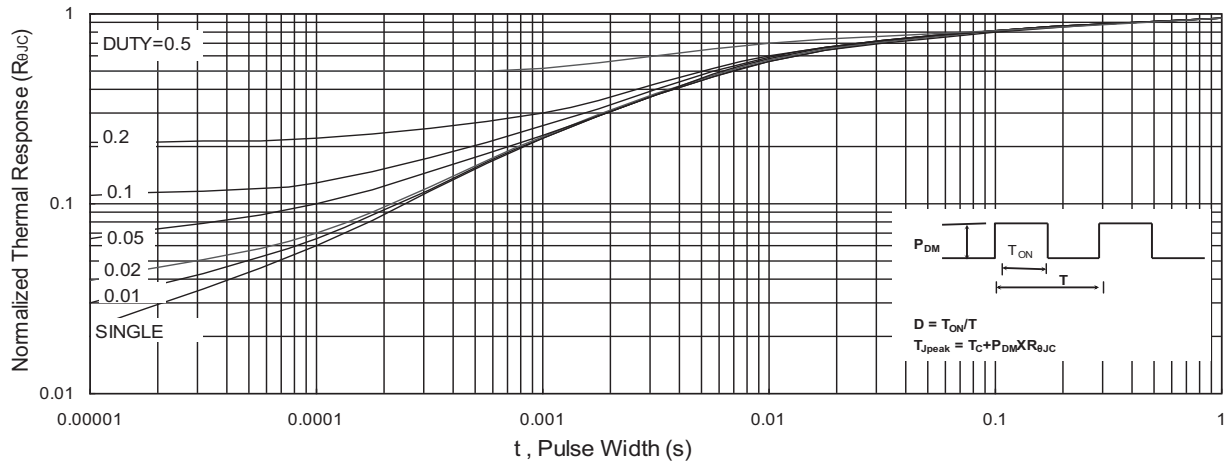


Fig.9 Normalized Maximum Transient Thermal Impedance

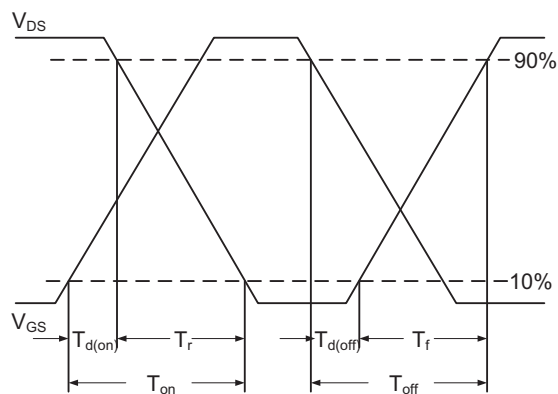


Fig.10 Switching Time Waveform

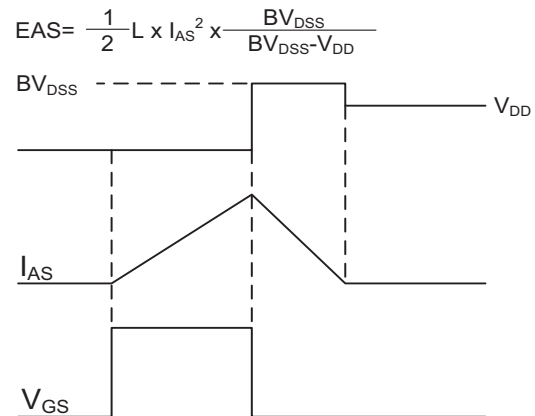


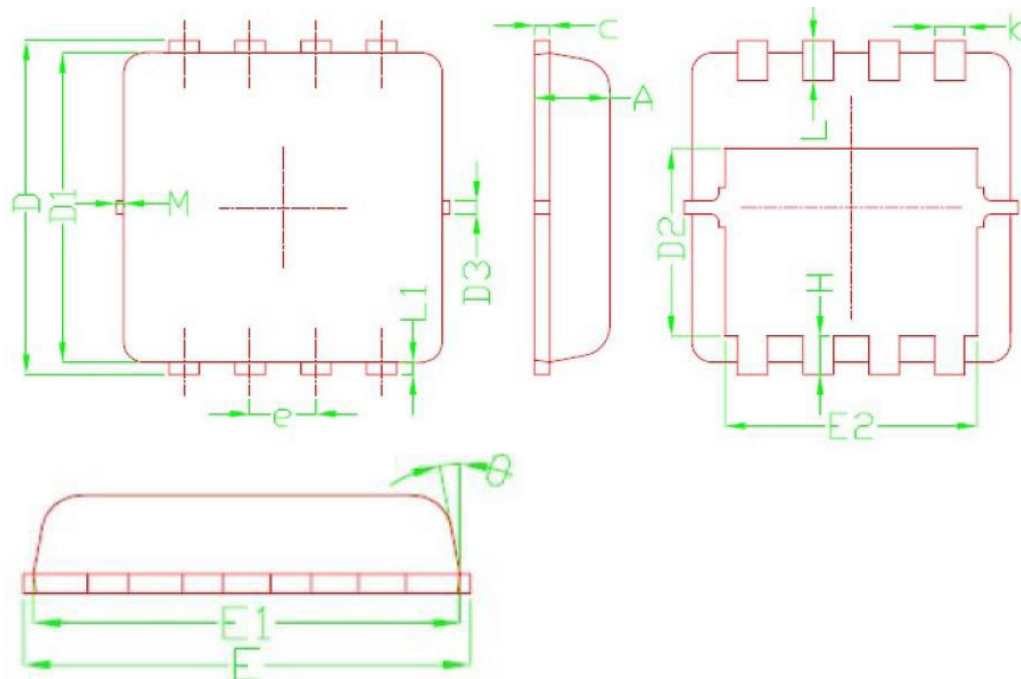
Fig.11 Unclamped Inductive Switching Waveform

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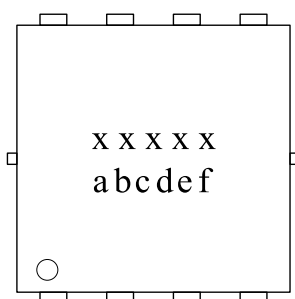
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■PRPAK8-3x3 dimension (3,000pcs/reel)



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)