

Single N-channel MOSFET

ELM4N0076FTA-T

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

■ General description

ELM4N0076FTA-T uses advanced trench technology to provide excellent $R_{ds(on)}$, low gate charge and low gate threshold voltage.

■ Features

- $V_{ds}=100V$
- $I_d=308A$
- $R_{ds(on)} = 2.2m\Omega$ ($V_{gs}=10V$)

■ Maximum absolute ratings

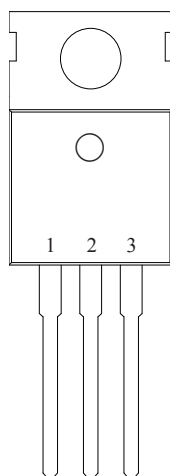
Parameter	Symbol	Limit	Unit	Note	
Drain-source voltage	V_{ds}	100	V		
Gate-source voltage	V_{gs}	± 20	V		
Continuous drain current	I_d	$T_c=25^\circ C$	308	A	1.6
		$T_c=100^\circ C$	218		
Pulsed drain current	I_{dm}	550	A	2	
Single pulse avalanche energy	E_{as}	1012.5	mJ	3	
Avalanche current	I_{as}	45	A		
Power dissipation	P_d	$T_c=25^\circ C$	429	W	4
Storage temperature range		T_{stg}	-55 to 175	$^\circ C$	
Operating junction temperature	T_j	-55 to 175	$^\circ C$		

■ Thermal characteristics

Parameter	Symbol	Typ.	Max.	Unit	Note
Thermal resistance junction-ambient	$R_{\theta ja}$	--	60.00	$^\circ C/W$	1
Thermal resistance junction-case	$R_{\theta jc}$	--	0.35		

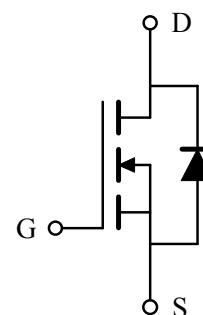
■ Pin configuration

TO-220(TOP VIEW)



Pin No.	Pin name
1	GATE
2	DRAIN
3	SOURCE

■ 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	100	--	--	V	
Static drain-source on-resistance	R _{ds(on)}	V _{gs} =10V, I _d =30A	--	1.8	2.2	mΩ	2
Gate threshold voltage	V _{gs(th)}	V _{gs} =V _{ds} , I _d =250μA	2	--	4	V	
Drain-source leakage current	I _{dss}	V _{ds} =80V, V _{gs} =0V	--	--	1	μA	
		V _{ds} =80V, V _{gs} =0V, T _j =100°C	--	--	100		
Gate-source leakage current	I _{gss}	V _{gs} =±20V, V _{ds} =0V	--	--	±100	nA	
Forward transconductance	G _{fs}	V _{ds} =5V, I _d =20A	--	75	--	S	
Continuous source current	I _s	V _{gs} =V _{ds} =0V, Force current	--	--	80	A	1, 5, 6
Diode forward voltage	V _{sd}	V _{gs} =0V, I _s =1A	--	--	1.1	V	2
DYNAMIC PARAMETERS							
Input capacitance	C _{iss}	V _{ds} =50V, V _{gs} =0V, f=1MHz	--	13362	--	pF	
Output capacitance	C _{oss}		--	1917	--	pF	
Reverse transfer capacitance	C _{rss}		--	387	--	pF	
SWITCHING PARAMETERS							
Total gate charge	Q _g	V _{ds} =50V, V _{gs} =10V, I _d =20A	--	200.0	--	nC	
Gate-source charge	Q _{gs}		--	53.3	--	nC	
Gate-drain charge	Q _{gd}		--	49.0	--	nC	
Turn-on delay time	t _{d(on)}	V _{dd} =50V, V _{gs} =10V R _{gen} =3Ω, I _d =20A	--	47	--	ns	
Turn-on rise time	t _r		--	28	--	ns	
Turn-off delay time	t _{d(off)}		--	79	--	ns	
Turn-off fall time	t _f		--	18	--	ns	
Reverse recovery time	t _{rr}	I _f =20A, di/dt=100A/μs	--	70	--	nS	
Reverse recovery charge	Q _{rr}		--	580	--	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=1.0mH, I_{as}=45A.
4. The power dissipation is limited by 175°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. Bonding wire limitation current is 120A.

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■ Typical characteristics

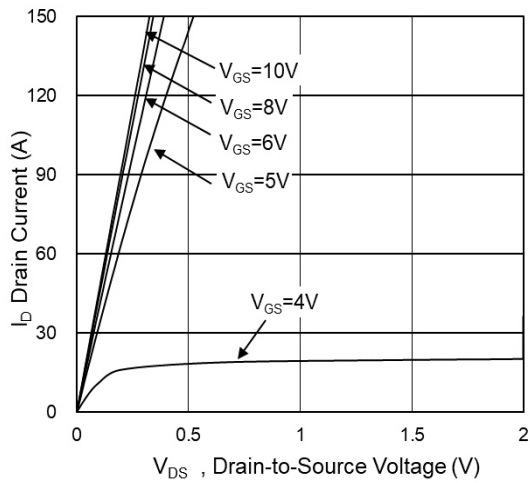


Fig.1 Typical Output Characteristics

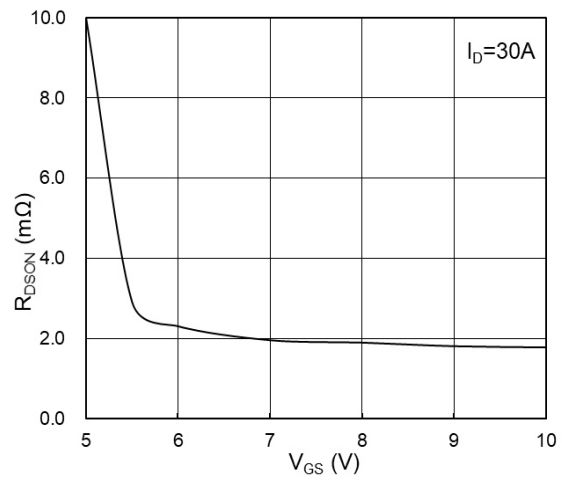


Fig.2 On-Resistance vs G-S Voltage

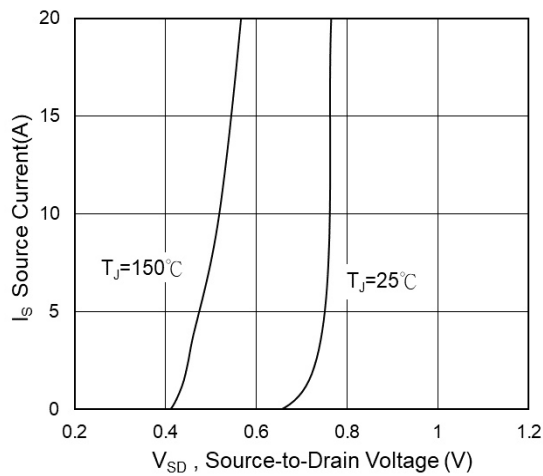


Fig.3 Source-Drain Forward Characteristics

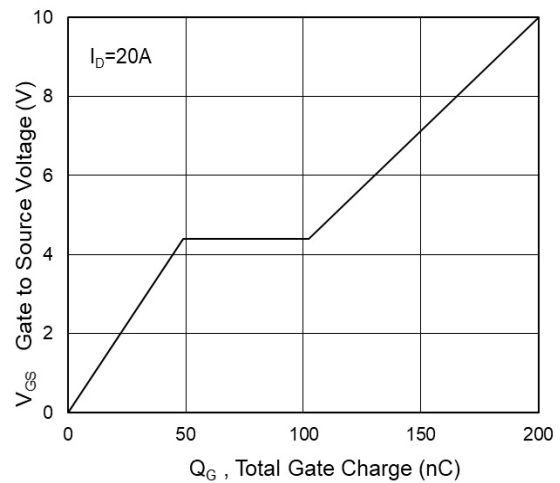


Fig.4 Gate-Charge Characteristics

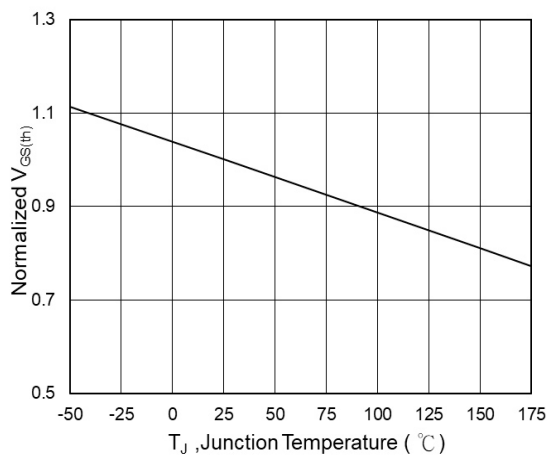


Fig.5 Normalized $V_{GS(th)}$ vs T_J

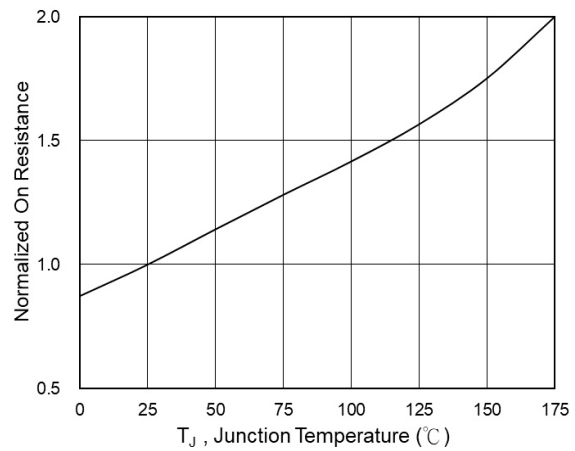


Fig.6 Normalized $R_{DS(on)}$ vs T_J

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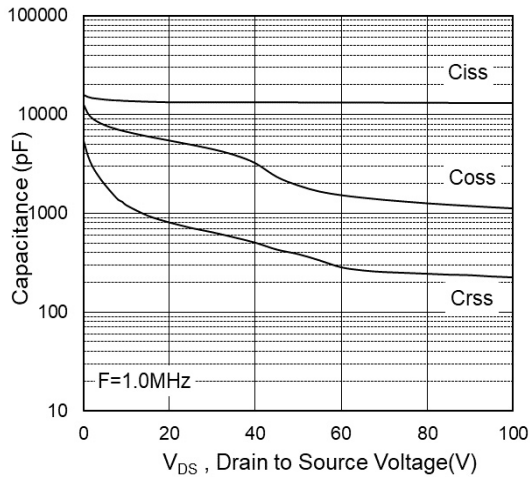


Fig.7 Capacitance

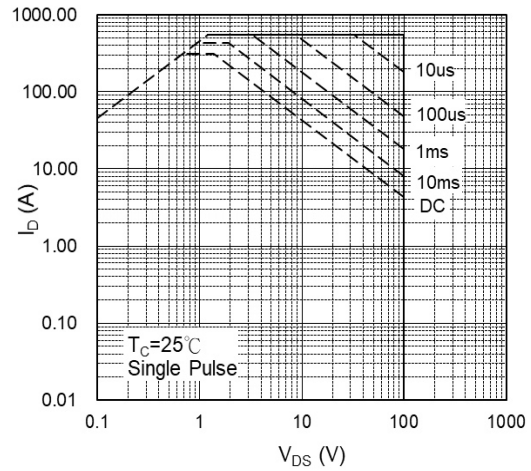


Fig.8 Safe Operating Area

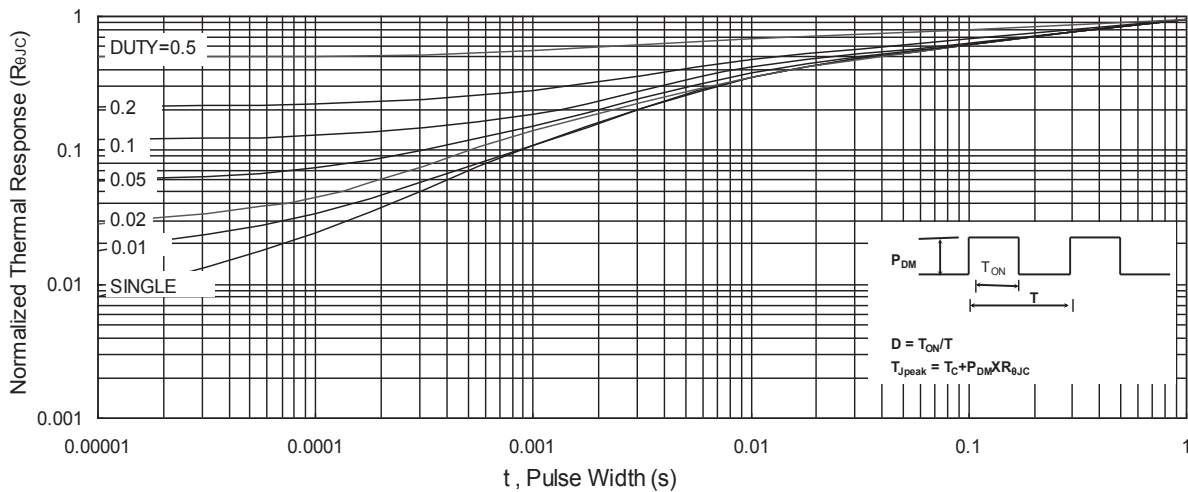


Fig.9 Normalized Maximum Transient Thermal Impedance

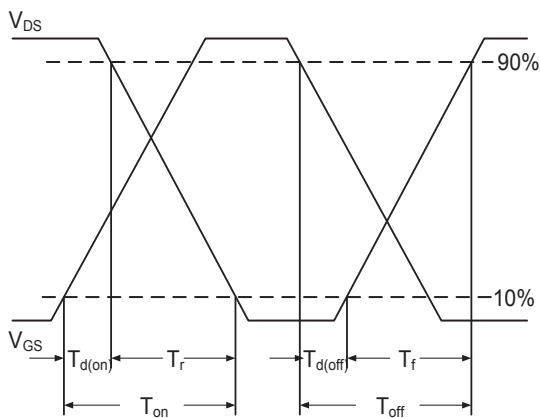


Fig.10 Switching Time Waveform

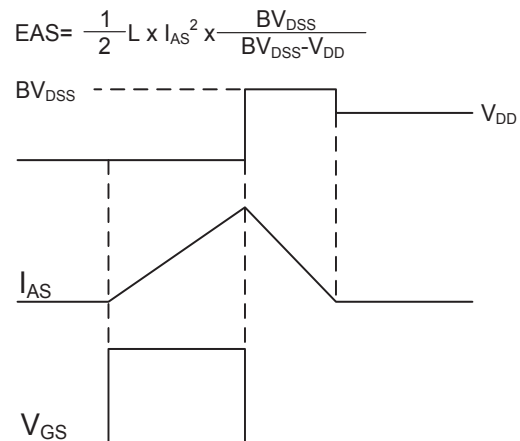


Fig.11 Unclamped Inductive Switching Waveform

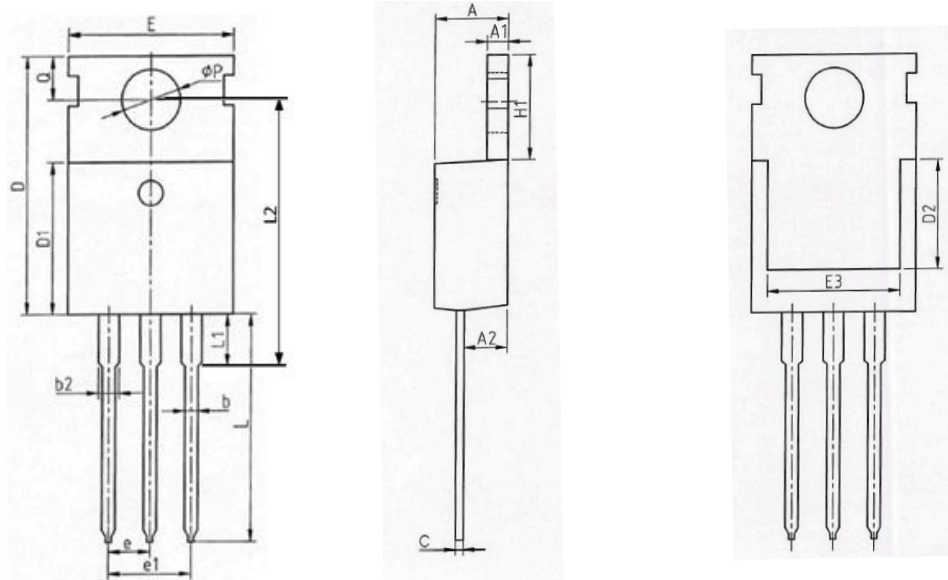
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TO-220 dimension (50pcs/tube)

SEE DETAIL "A"



Detail "A"

	Top	Bottom		Top	Bottom
Option 1			Option 3		
Option 2					

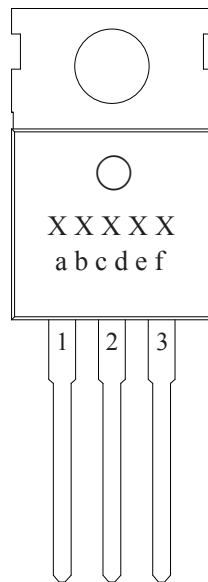
Sym.	Millimeters		Inches		Sym.	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	3.56	4.83	0.140	0.190	E3	6.22	8.89	0.245	0.350
A1	0.51	1.40	0.020	0.055	e	2.54 BSC		0.100 BSC	
A2	2.03	2.92	0.080	0.115	e1	5.08 BSC		0.200 BSC	
b	0.38	1.02	0.015	0.040	H1	5.84	6.86	0.230	0.270
b2	1.14	1.78	0.045	0.070	L	12.27	14.73	0.483	0.580
c	0.36	0.61	0.014	0.024	L1	2.47	4.06	0.097	0.160
D	14.22	16.51	0.560	0.650	L2	0.00	16.70	0.000	0.657
D1	8.38	9.65	0.330	0.380	Q	2.54	3.05	0.100	0.120
D2	5.30	--	0.209	--	ØP	3.40	3.89	0.134	0.153
E	9.65	10.67	0.380	0.420					

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■ Marking



Symbols	Content
xxxxx	Product code
a	Yearly code : 2019=K, 2020=L, 2021=M ...
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)