

Single N-channel MOSFET

ELM4N0048FTA-T

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

■General description

ELM4N0048FTA-T uses advanced trench technology to provide excellent $R_{ds(on)}$, low gate charge and low gate threshold voltage.

■Features

- $V_{ds}=100V$
- $I_d=48A$
- $R_{ds(on)} = 8.0m\Omega$ ($V_{gs}=10V$)
- $R_{ds(on)} = 10.5m\Omega$ ($V_{gs}=4.5V$)

■Maximum absolute ratings

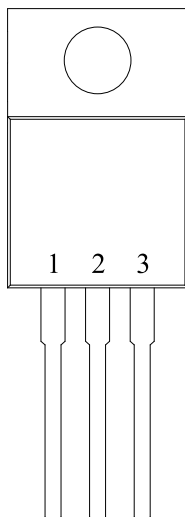
Parameter		Symbol	Limit	Unit	Note
Drain-source voltage		V_{ds}	100	V	
Gate-source voltage		V_{gs}	± 20	V	
Continuous drain current	$T_c=25^{\circ}C$	I_d	48	A	1
	$T_c=70^{\circ}C$		38		
Pulsed drain current		I_{dm}	144	A	2
Single pulse avalanche energy		E_{as}	61	mJ	3
Avalanche current		I_{as}	35	A	
Total power dissipation	$T_c=25^{\circ}C$	P_d	108	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	$^{\circ}C/W$	1
Thermal resistance junction-case	$R_{\theta jc}$	--	4		

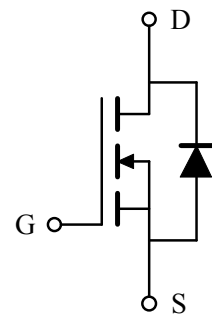
■Pin configuration

TO-220F(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	BVdss	Vgs=0V, Id=250μA	100	--	--	V	
Static drain-source on-resistance	Rds(on)	Vgs=10V, Id=13.5A	--	6.6	8.0	mΩ	2
		Vgs=4.5V, Id=11.5A	--	8.7	10.5		
Gate threshold voltage	Vgs(th)	Vgs=Vds, Id=250μA	1.2	--	2.3	V	
Drain-source leakage current	Idss	Vds=80V, Vgs=0V	--	--	1	μA	
		Vds=80V, Vgs=0V, Tj=55°C	--	--	5		
Gate-source leakage current	Igss	Vgs=±20V, Vds=0V	--	--	±100	nA	
Forward transconductance	Gfs	Vds=5V, Id=20A	--	85	--	S	
Continuous source current	Is	Vgs=Vds=0V, Force current	--	--	48	A	1, 5
Diode forward voltage	Vsd	Vgs=0V, Is=1A	--	--	1.1	V	2
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vds=50V, Vgs=0V, f=1MHz	--	3320	--	pF	
Output capacitance	Coss		--	605	--	pF	
Reverse transfer capacitance	Crss		--	20	--	pF	
SWITCHING PARAMETERS							
Total gate charge (10V)	Qg	Vds=50V, Vgs=10V Id=13.5A	--	45.0	--	nC	
Total gate charge (4.5V)			--	19.3	--		
Gate-source charge	Qgs		--	9.5	--	nC	
Gate-drain charge	Qgd		--	4.8	--	nC	
Turn-on delay time	td(on)	Vdd=50V, Vgs=10V Rgen=3Ω, Id=13.5A	--	10.0	--	ns	
Turn-on rise time	tr		--	6.5	--	ns	
Turn-off delay time	td(off)		--	45.0	--	ns	
Turn-off fall time	tf		--	7.5	--	ns	
Reverse recovery time	trr	If=13.5A, di/dt=100A/μs	--	33	--	nS	
Reverse recovery charge	Qrr		--	150	--	nC	

NOTE :

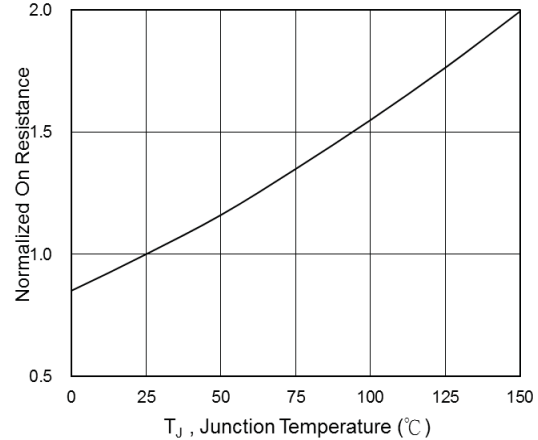
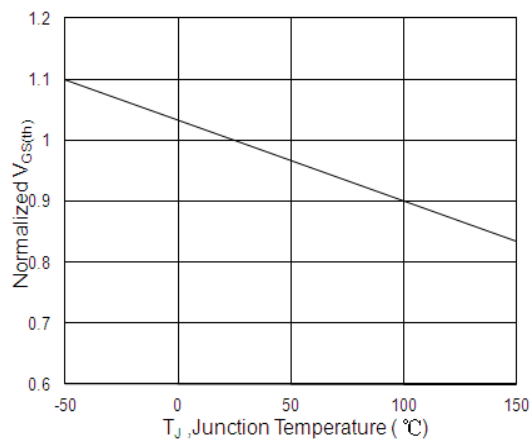
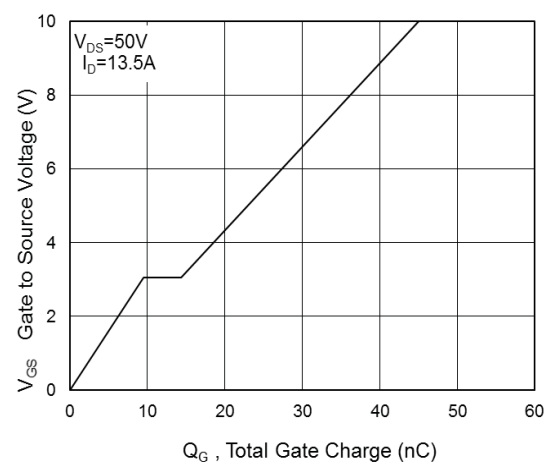
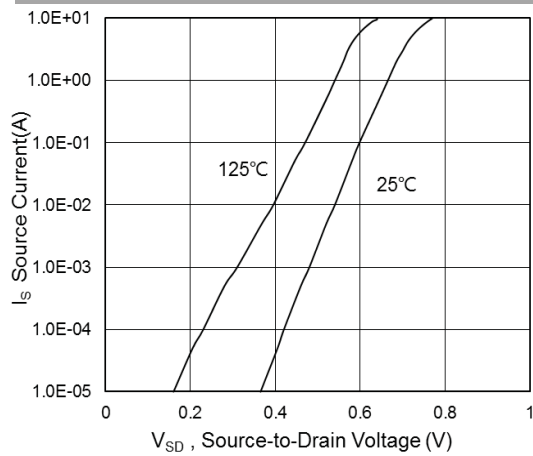
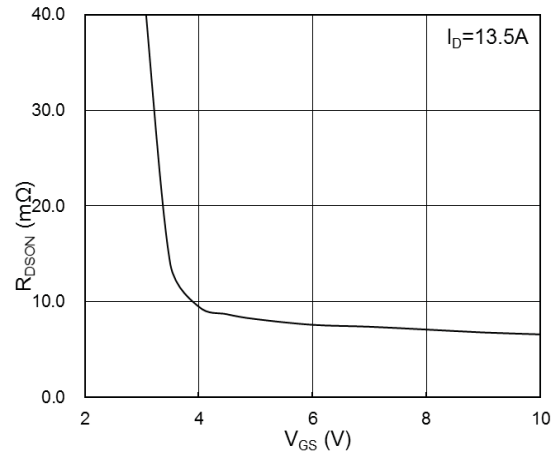
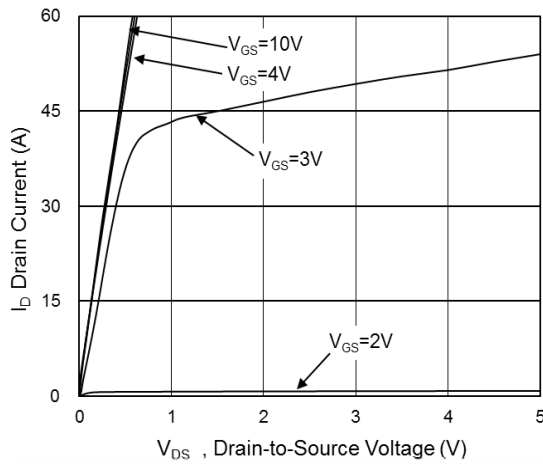
1. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
2. The data tested by pulsed, pulse width ≤ 300μs and duty cycle ≤ 2%.
3. The EAS data shows Max. rating . The test condition is V_{dd}=25V, V_{gs}=10V, L=0.3mH, I_{as}=35A.
4. The power dissipation is limited by 150°C junction temperature.
5. The data is theoretically the same as I_d and I_{dm}, in real applications, should be limited by total power dissipation.

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■ Typical characteristics



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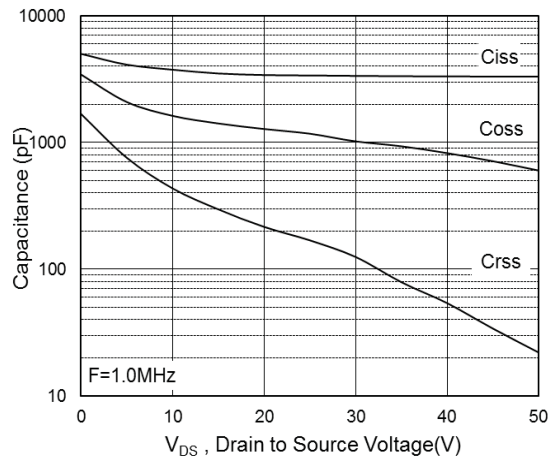


Fig.7 Capacitance

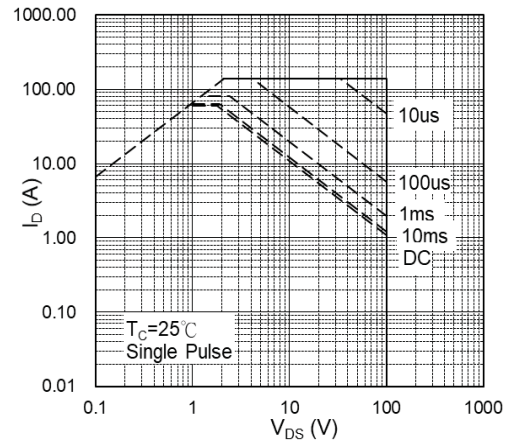


Fig.8 Safe Operating Area

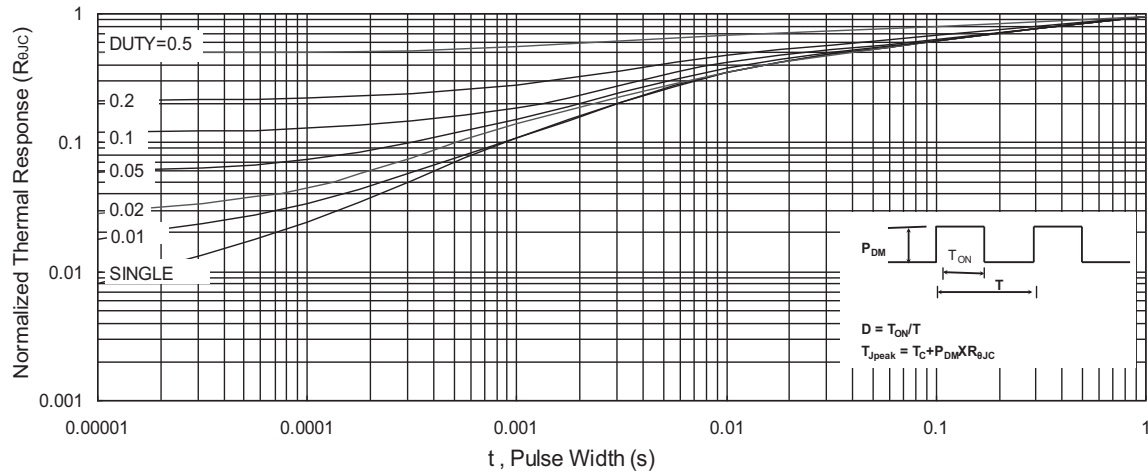


Fig.9 Normalized Maximum Transient Thermal Impedance

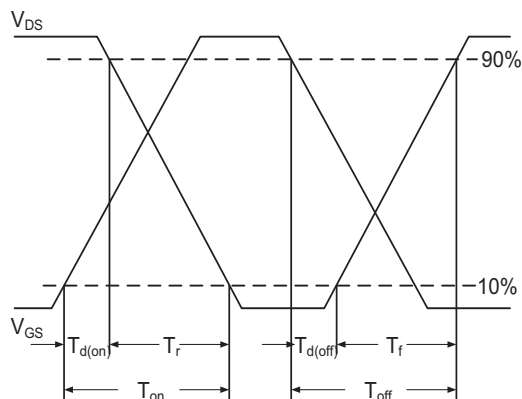


Fig.10 Switching Time Waveform

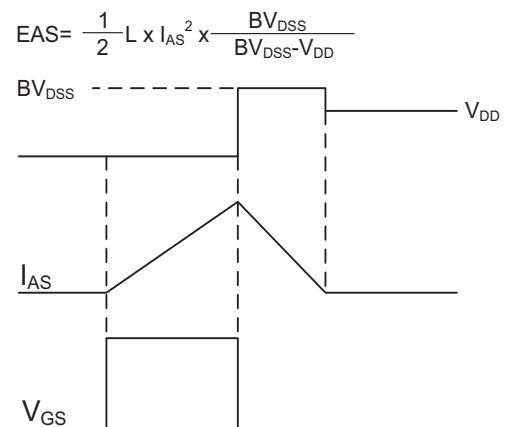


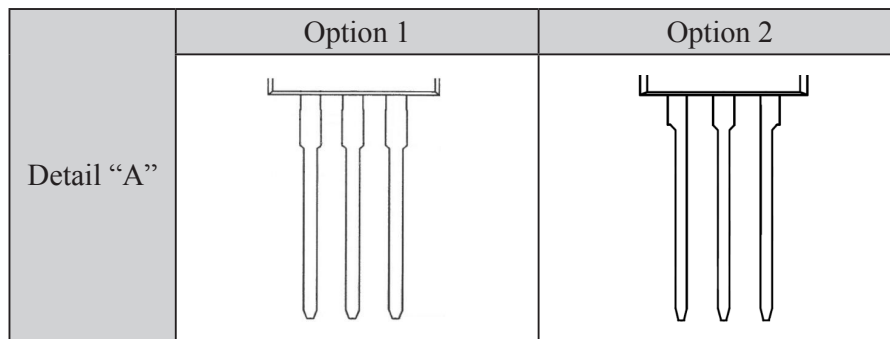
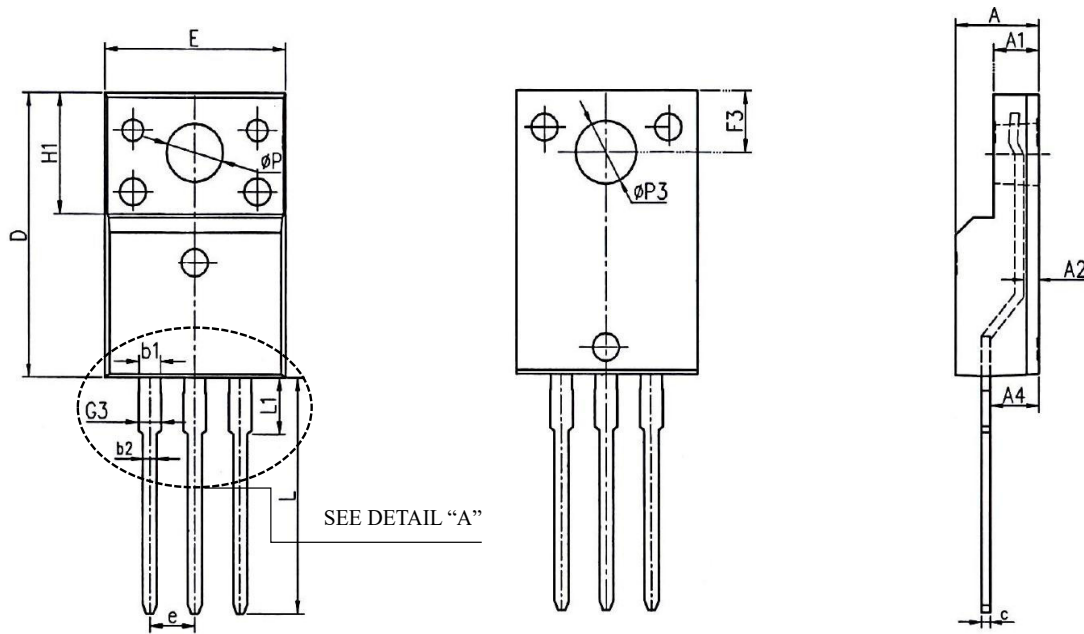
Fig.11 Unclamped Inductive Switching Waveform

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■TO-220F dimension (50pcs/tube)



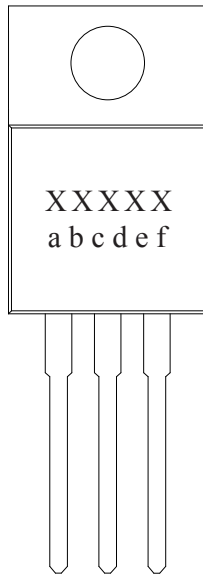
Sym.	Millimeters		Inches		Sym.	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	4.50	4.90	0.177	0.193	ϕP	3.08	3.28	0.121	0.129
A1	2.34	2.74	0.092	0.108	L	12.68	13.28	0.499	0.523
A2	0.65	1.30	0.026	0.051	L1	1.70	3.65	0.067	0.144
A4	2.55	2.95	0.100	0.116	$\phi P3$	3.45 Ref		0.136 Ref	
c	0.40	0.74	0.016	0.029	F3	3.10	3.50	0.122	0.138
D	15.57	16.17	0.613	0.637	G3	1.10	1.50	0.043	0.059
E	9.96	10.40	0.392	0.409	b1	1.05	1.38	0.041	0.054
H1	6.48	6.88	0.255	0.271	b2	0.59	0.92	0.023	0.036
e	2.54 BSC		0.100 BSC						

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■Marking



Symbols	Content
XXXXXX	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)