Single N-channel MOSFET

ELM4N6016FAA-N

■General description

ELM4N6016FAA-N uses advanced trench technology to provide excellent Rds(on), low gate charge and low gate threshold voltage.

■Features

- Vds=60V
- Id=8A (Vgs=10V)
- Rds(on) = 12mΩ (Vgs=10V)
- Rds(on) = 15mΩ (Vgs=4.5V)

■Maximum absolute ratings

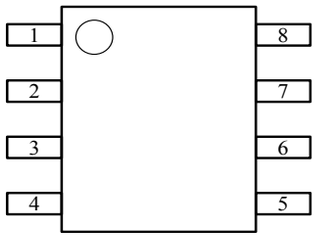
Parameter		Symbol	Limit	Unit	Note
Drain-source voltage		Vds	60	V	
Gate-source voltage		Vgs	±20	V	
Continuous drain current (Vgs=10V)	Ta=25°C	Id	8.0	A	1
	Ta=70°C		6.4		
Pulsed drain current		Idm	32	A	2
Single pulse avalanche energy		EAS	72	mJ	3
Avalanche current		Ias	38	A	
Power dissipation	Ta=25°C	Pd	1.5	W	4
Storage temperature range		Tstg	- 55 to 150	°C	
Operating junction temperature range		Tj	- 55 to 150	°C	

■Thermal characteristics

Parameter	Symbol	Typ.	Max.	Unit	Note
Thermal resistance junction-to-ambient	Rθja	-	85	°C/W	1
Thermal resistance junction-to-case	Rθjc	-	24		1

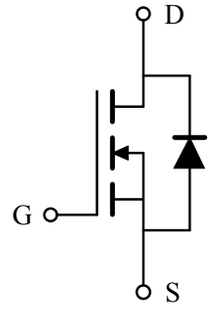
■Pin configuration

SOP-8(TOP VIEW)



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

■Circuit



■Electrical characteristics

Tj=25°C. Unless otherwise noted.

Parameter	Symbol	Condition		Min.	Typ.	Max.	Unit	Note
STATIC PARAMETERS								
Drain-source breakdown voltage	BVdss	Id=250μA, Vgs=0V		60	-	-	V	
Drain-source leakage current	Idss	Vds=48V, Vgs=0V		-	-	1	μA	
			Tj=55°C	-	-	5		
Gate-body leakage current	Igss	Vds=0V, Vgs=±20V		-	-	±100	nA	
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=250μA		1.2	-	2.5	V	
Static drain-source on-resistance	Rds(on)	Vgs=10V, Id=8A		-	10.2	12.0	mΩ	2
		Vgs=4.5V, Id=6A		-	13.0	15.0		
Forward transconductance	Gfs	Vds=5V, Id=8A		-	45	-	S	
Diode forward voltage	Vsd	Is=1A, Vgs=0V		-	-	1.2	V	2
Diode continuous source current	Is	Vgs=Vds=0V, Force current		-	-	8	A	1, 5
Pulsed source current	Ism			-	-	32	A	2, 5
DYNAMIC PARAMETERS								
Input capacitance	Ciss	Vgs=0V, Vds=15V, f=1MHz		-	3240	-	pF	
Output capacitance	Coss			-	210	-	pF	
Reverse transfer capacitance	Crss			-	146	-	pF	
Gate resistance	Rg	Vgs=0V, Vds=0V, f=1MHz		-	1.5	-	Ω	
SWITCHING PARAMETERS								
Total gate charge (4.5V)	Qg	Vgs=4.5V, Vds=48V, Id=8A		-	30.0	-	nC	
Gate-source charge	Qgs			-	10.7	-	nC	
Gate-drain charge	Qgd			-	9.4	-	nC	
Turn-on delay time	td(on)	Vgs=10V, Vds=30V, Id=8A, Rgen=3.3Ω		-	10.6	-	ns	
Turn-on rise time	tr			-	9.0	-	ns	
Turn-off delay time	td(off)			-	65.6	-	ns	
Turn-off fall time	tf			-	4.8	-	ns	
Reverse recovery time	trr	If=8A, di/dt=100A/μs		-	18.0	-	ns	
Reverse recovery charge	Qrr			-	15.6	-	nC	

Note :

1. The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.
2. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
3. The EAS data shows Max. rating . The test condition is Vdd=25V, Vgs=10V, L=0.1mH, Ias=38A.
4. The power dissipation is limited by 150°C junction temperature.
5. The data is theoretically the same as Id and Idm, in real applications, should be limited by total power dissipation.

■Typical electrical and thermal characteristics

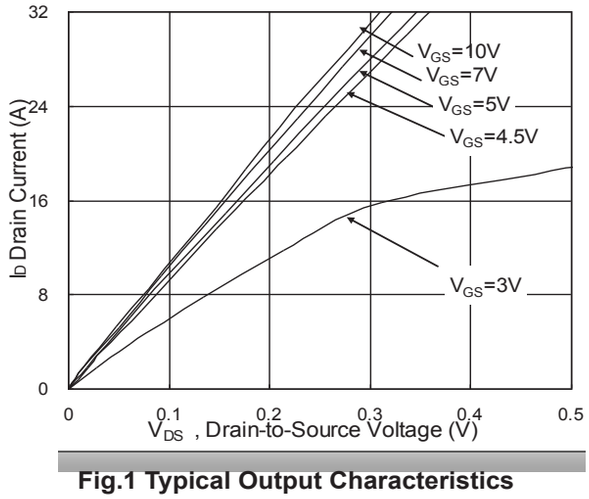


Fig.1 Typical Output Characteristics

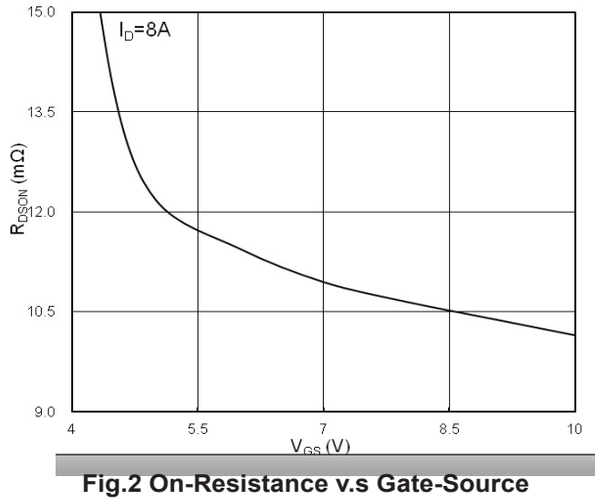


Fig.2 On-Resistance v.s Gate-Source

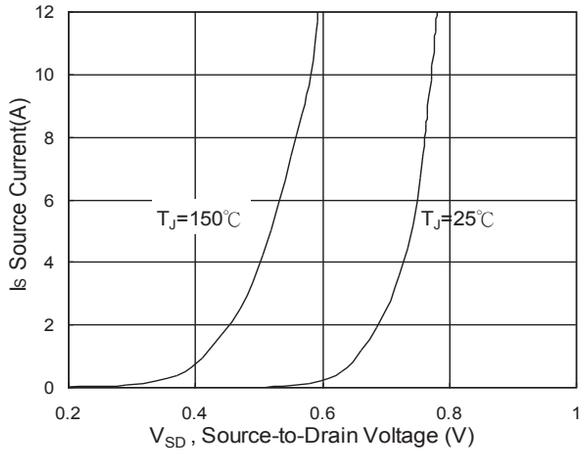


Fig.3 Forward Characteristics of Reverse

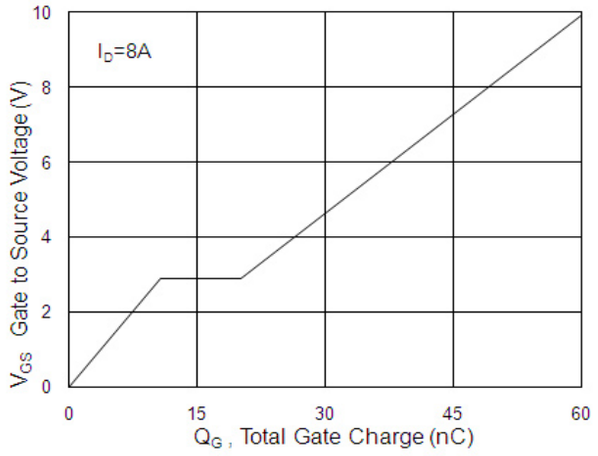


Fig.4 Gate-Charge Characteristics

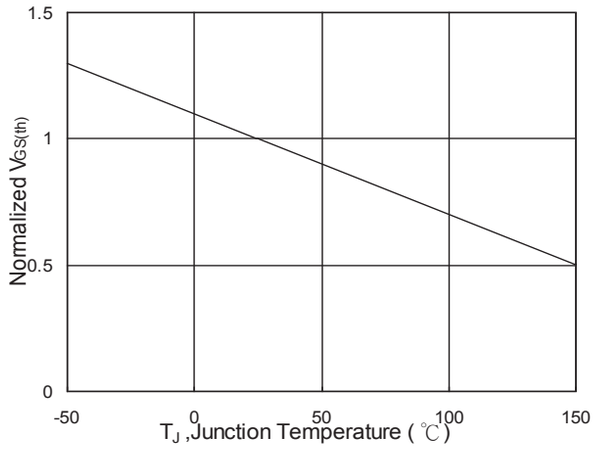


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

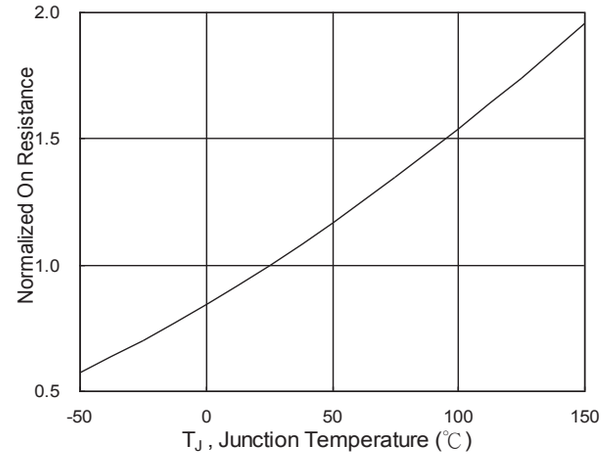


Fig.6 Normalized R_{DSON} vs. T_J

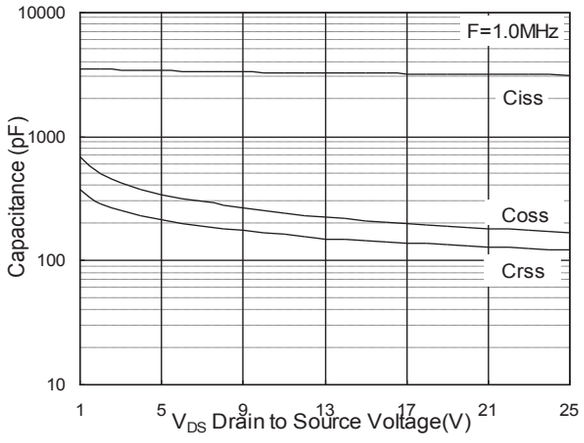


Fig.7 Capacitance

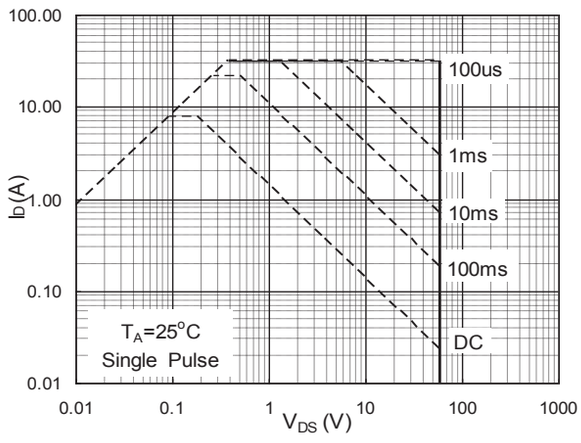


Fig.8 Safe Operating Area

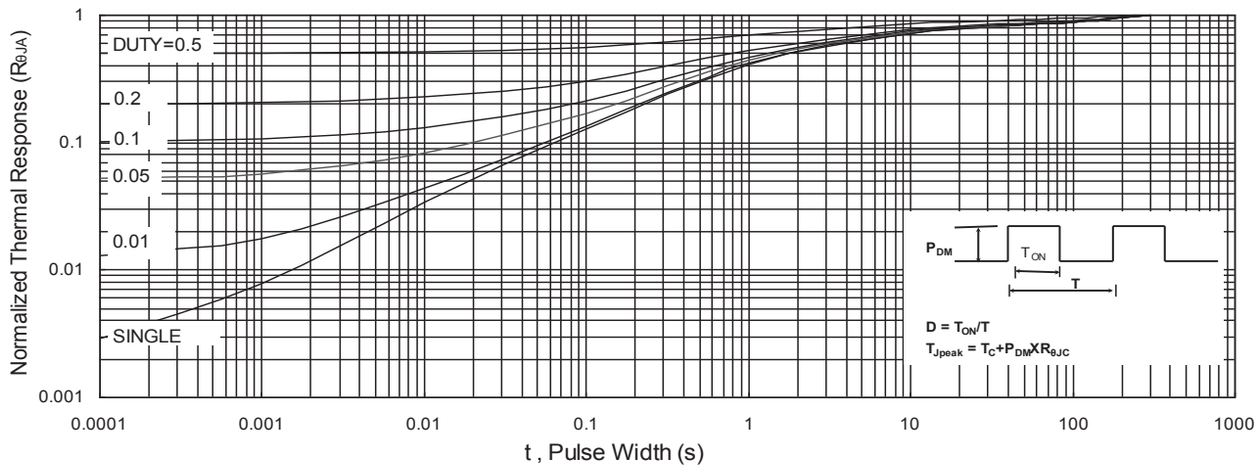


Fig.9 Normalized Maximum Transient Thermal Impedance

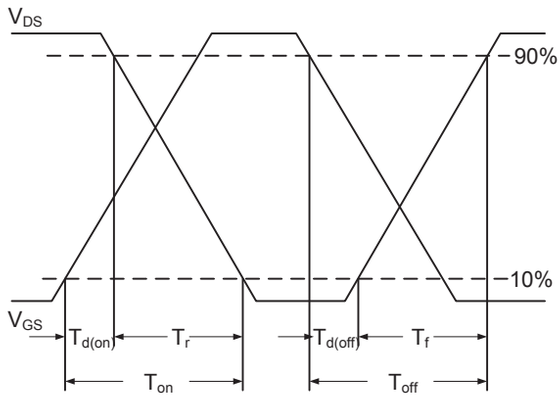


Fig.10 Switching Time Waveform

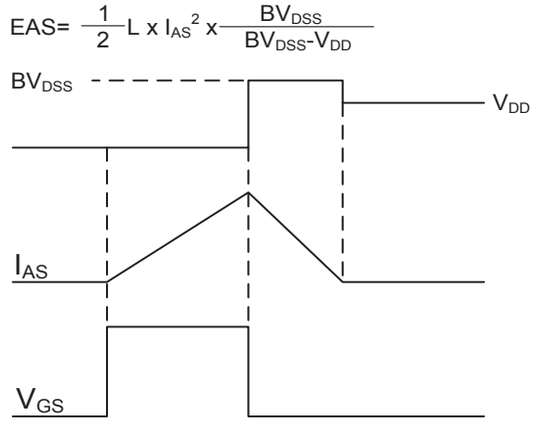


Fig.11 Unclamped Inductive Switching Waveform