Single N-channel MOSFET

ELM4N6006FDA-N

■General description

ELM4N6006FDA-N uses advanced trench technology to provide excellent Rds(on), low gate charge and low gate threshold voltage.

■Features

- Vds=60V
- Id=35A (Vgs=10V)
- Rds(on) = 20mΩ (Vgs=10V)
- Rds(on) = 24mΩ (Vgs=4.5V)

■Maximum absolute ratings

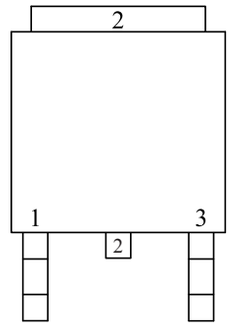
Parameter		Symbol	Limit	Unit	Note
Drain-source voltage		Vds	60	V	
Gate-source voltage		Vgs	±20	V	
Continuous drain current (Vgs=10V)	Tc=25°C	Id	35.0	A	1
	Tc=100°C		22.0		
	Ta=25°C		7.4		
	Ta=70°C		6.0		
Pulsed drain current		Idm	80	A	2
Single pulsed avalanche energy		Eas	39.2	mJ	3
Avalanche current		Ias	28	A	
Power dissipation	Tc=25°C	Pd	45	W	4
	Ta=25°C		2		
Junction and storage temperature range		Tj, Tstg	-55 to +150	°C	

■Thermal characteristics

Parameter	Symbol	Typ.	Max.	Unit	Note
Thermal resistance junction-to-ambient	Rθja	-	62.0	°C/W	1
Thermal resistance junction-to-case	Rθjc	-	2.8		

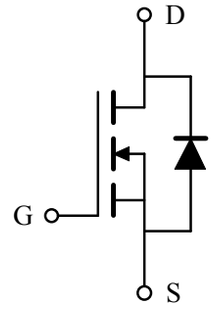
■Pin configuration

TO-252(TOP VIEW)



Pin No.	Pin name
1	GATE
2	DRAIN
3	SOURCE

■Circuit



■Electrical characteristics

Tj=25°C. Unless otherwise noted.

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
STATIC PARAMETERS							
Drain-source breakdown voltage	BVdss	Vgs=0V, Id=250μA	60	-	-	V	
Zero gate voltage drain current	Idss	Vds=48V, Vgs=0V	-	-	1	μA	
		Vds=48V, Vgs=0V, Tj=55°C	-	-	5		
Gate-body leakage current	Igss	Vgs=±20V, Vds=0V	-	-	±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=20A	-	-	20	mΩ	2
		Vgs=4.5V, Id=10A	-	-	24		
Forward transconductance	Gfs	Vds=5V, Id=15A	-	45	-	S	
Diode forward voltage	Vsd	Vgs=0V, Is=1A	-	-	1	V	2
Max. body-diode continuous current	Is	Vgs=Vds=0V, Force current	-	-	35	A	1, 5
Pulsed body-diode current	Ism		-	-	80	A	2, 5
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vds=15V, Vgs=0V, f=1MHz	-	2423	-	pF	
Output capacitance	Coss		-	145	-	pF	
Reverse transfer capacitance	Crss		-	97	-	pF	
Gate resistance	Rg	Vds=0V, Vgs=0V, f=1MHz	-	1.7	-	Ω	
SWITCHING PARAMETERS							
Total gate charge (4.5V)	Qg	Vds=48V, Vgs=4.5V, Id=15A	-	19.3	-	nC	
Gate-source charge	Qgs		-	7.1	-	nC	
Gate-drain charge	Qgd		-	7.6	-	nC	
Turn-on delay time	td(on)	Vds=30V, Vgs=10V, Id=15A Rgen=3.3Ω	-	7.2	-	ns	
Turn-on rise time	tr		-	50.0	-	ns	
Turn-off delay time	td(off)		-	36.4	-	ns	
Turn-off fall time	tf		-	7.6	-	ns	
Reverse recovery time	trr	If=15A, di/dt=100A/μs	-	16.3	-	ns	
Reverse recovery charge	Qrr		-	11.0	-	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 Vds=25V, Vgs=10V, L=0.1mH, Ias=28A.
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 characteristics

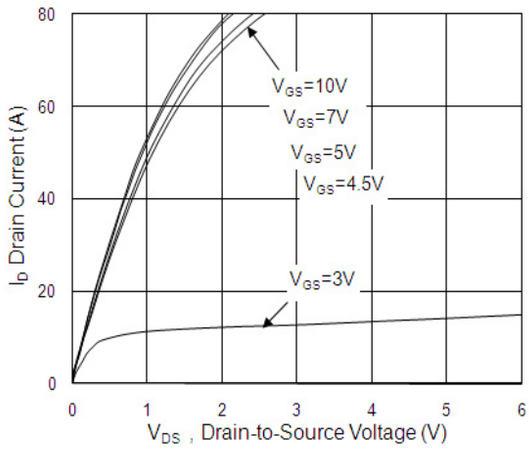


Fig.1 Typical Output Characteristics

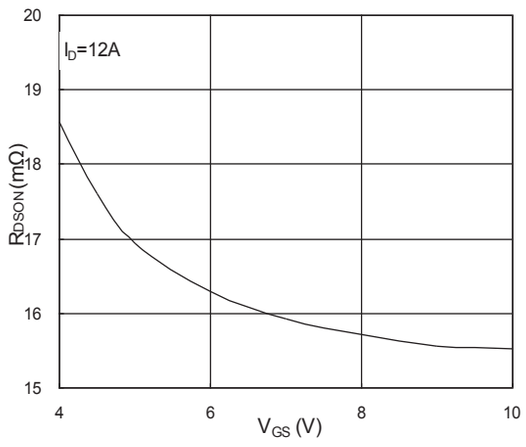


Fig.2 On-Resistance v.s Gate-Source

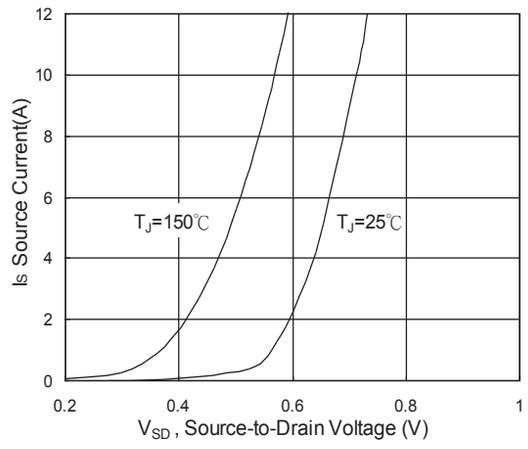


Fig.3 Forward Characteristics of Reverse

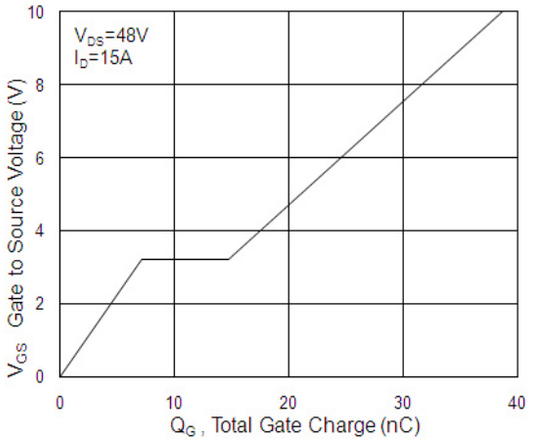


Fig.4 Gate-Charge Characteristics

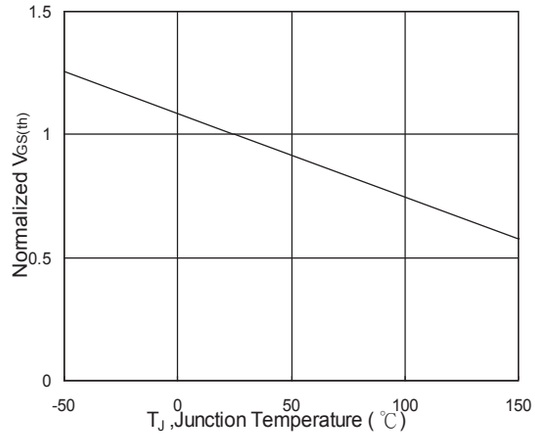


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

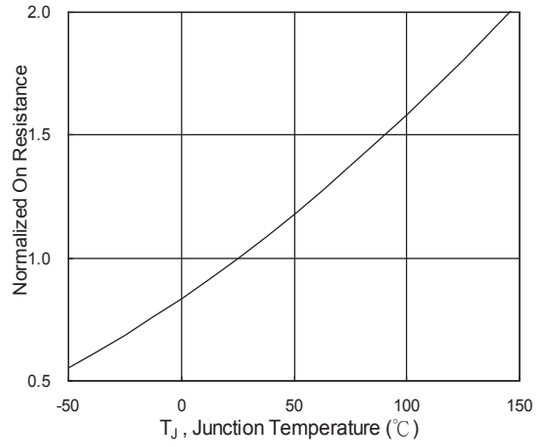


Fig.6 Normalized R_{DSON} v.s T_J

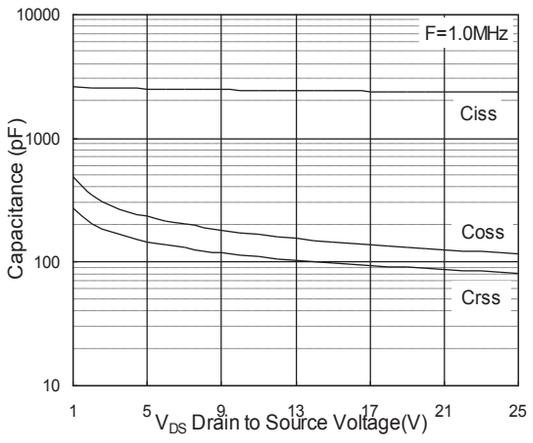


Fig.7 Capacitance

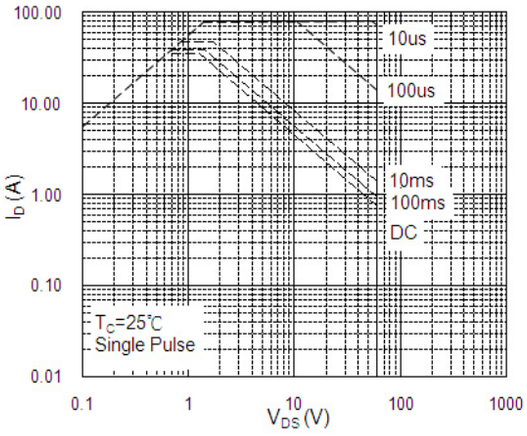


Fig.8 Safe Operating Area

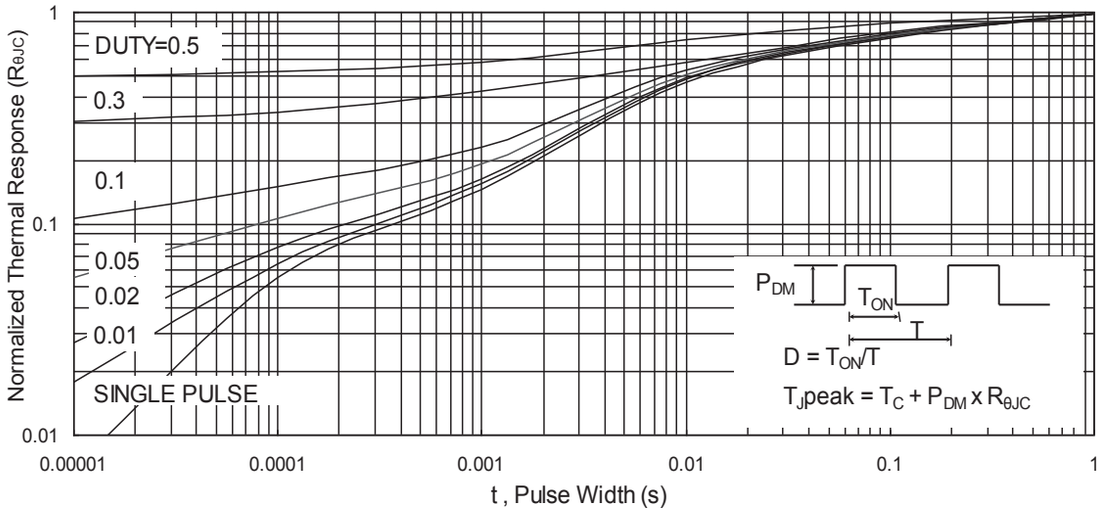


Fig.9 Normalized Maximum Transient Thermal Impedance

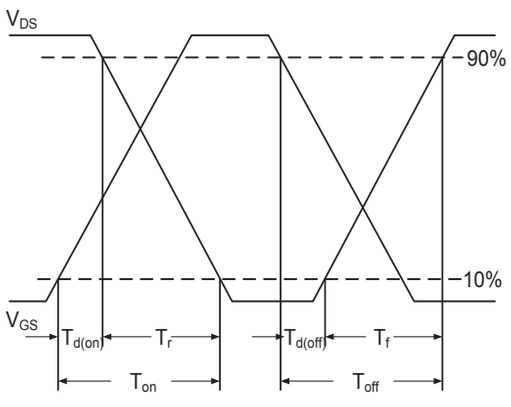


Fig.10 Switching Time Waveform

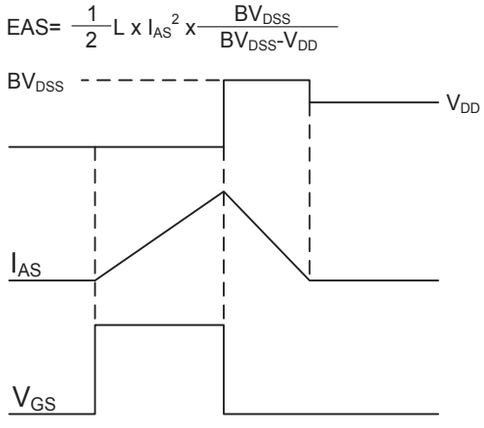


Fig.11 Unclamped Inductive Switching Waveform