Single N-channel MOSFET

ELM4N6002FDA-N

■General description

ELM4N6002FDA-N uses advanced trench technology to provide excellent Rds(on), low gate charge and low gate threshold voltage.

■Features

- Vds=60V
- Id=17A (Vgs=10V)
- Rds(on) = 75mΩ (Vgs=10V)
- Rds(on) = 90mΩ (Vgs=4.5V)

■Maximum absolute ratings

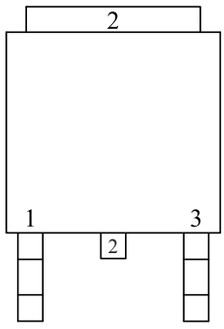
Parameter		Symbol	Limit	Unit	Note
Drain-source voltage		Vds	60	V	
Gate-source voltage		Vgs	±20	V	
Continuous drain current (Vgs=10V)	Tc=25°C	Id	17	A	1
	Tc=100°C		12		
Pulsed drain current		Idm	50	A	2
Single pulsed avalanche energy		Eas	11	mJ	3
Avalanche current		Ias	15	A	
Power dissipation	Tc=25°C	Pd	42	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	-	62	°C/W	1
Thermal resistance junction-to-case	Rθjc	-	3	°C/W	1

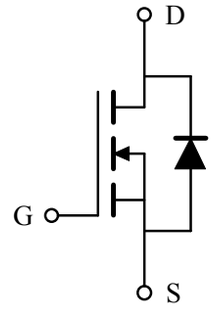
■Pin configuration

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	Id=250μA, Vgs=0V	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=5A	-	-	75	mΩ	2
		Vgs=4.5V, Id=5A	-	-	90		
Forward transconductance	Gfs	Vds=5V, Id=5A	-	7	-	S	
Diode forward voltage	Vsd	Vgs=0V, Is=1A	-	-	1.2	V	2
Max. body-diode continuous current	Is	Vgs=Vds=0V, Force current	-	-	17	A	1, 5
Pulsed body-diode current	Ism		-	-	50	A	2, 5
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vds=15V, Vgs=0V, f=1MHz	-	695	-	pF	
Output capacitance	Coss		-	148	-	pF	
Reverse transfer capacitance	Crss		-	7	-	pF	
SWITCHING PARAMETERS							
Total gate charge (10V)	Qg	Vds=12V, Vgs=10V, Id=5A	-	5.5	-	nC	
Gate-source charge	Qgs		-	1.8	-	nC	
Gate-drain charge	Qgd		-	2.4	-	nC	
Turn-on delay time	td(on)	Vds=12V, Vgs=10V, Id=5A Rgen=3.3Ω	-	6	-	ns	
Turn-on rise time	tr		-	10	-	ns	
Turn-off delay time	td(off)		-	15	-	ns	
Turn-off fall time	tf		-	7	-	ns	

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 Vdd=25V, Vgs=10V, L=0.1mH, Ias=15A.
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

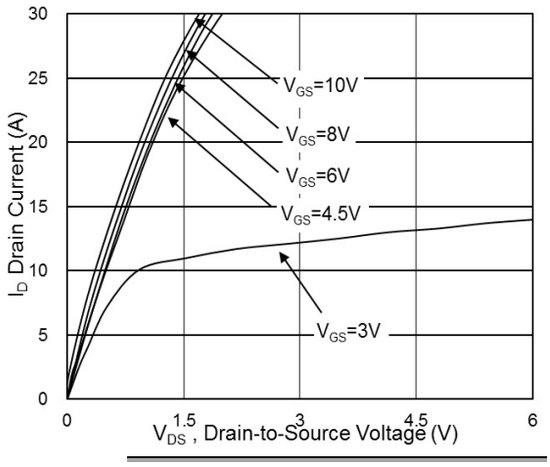


Fig.1 Typical Output Characteristics

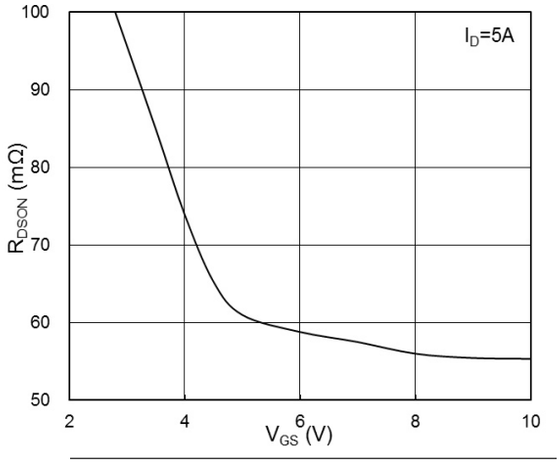


Fig.2 On-Resistance vs. Gate-Source Voltage

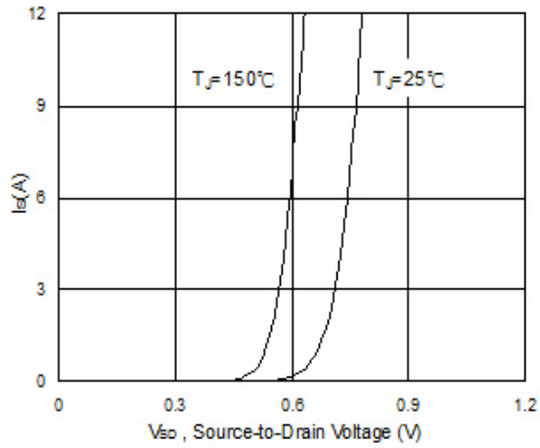


Fig.3 Forward Characteristics of Reverse

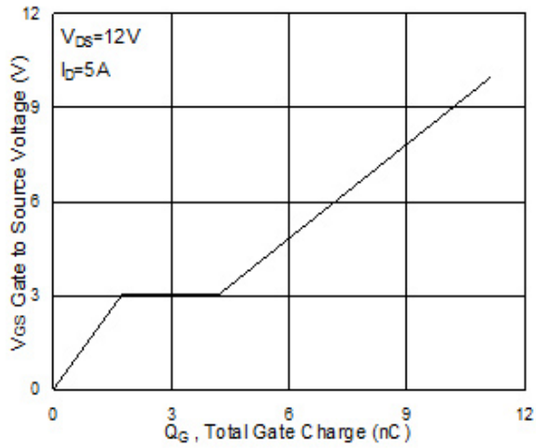
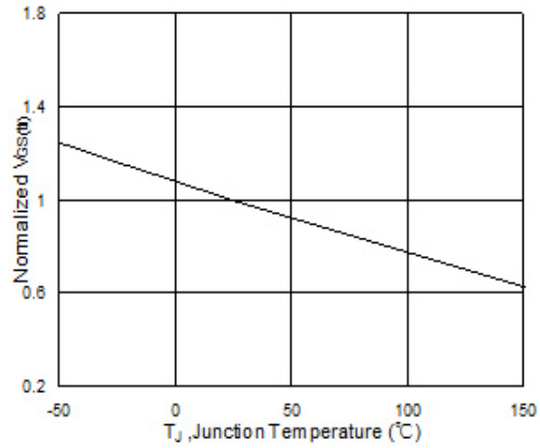
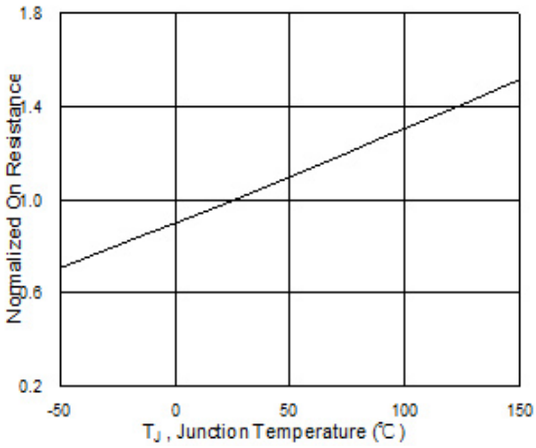


Fig.4 Gate-Charge Characteristics





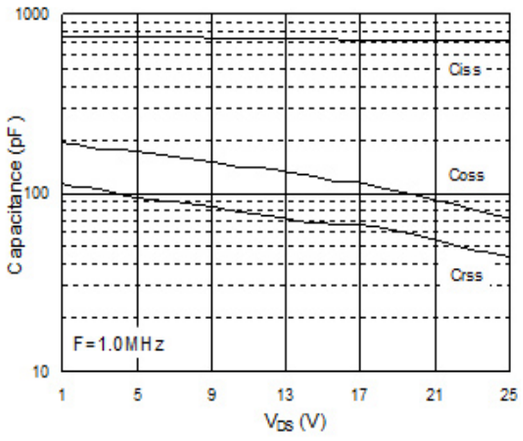


Fig.7 Capacitance

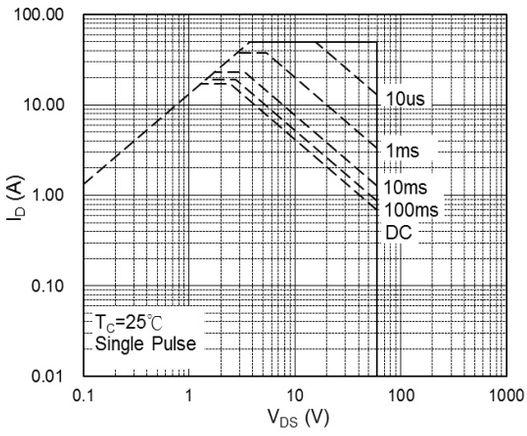


Fig.8 Safe Operating Area

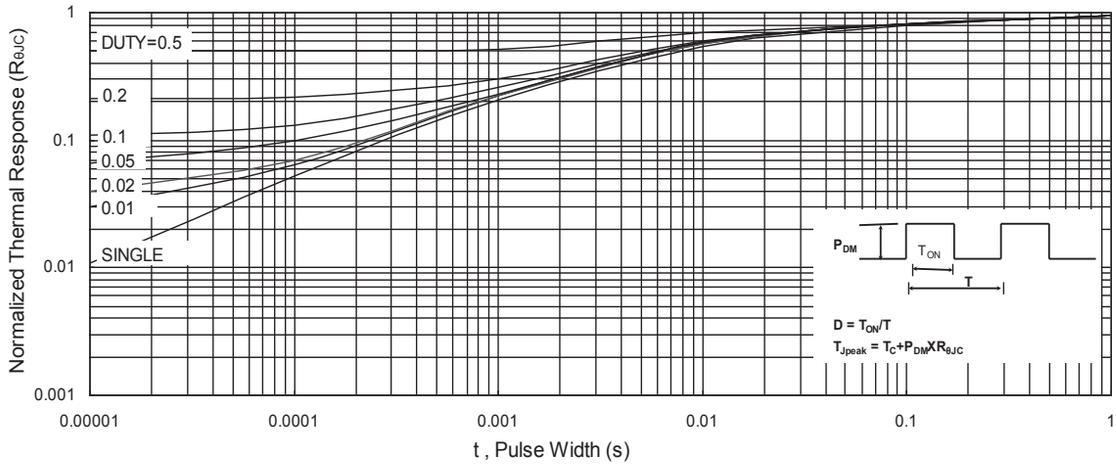


Fig.9 Normalized Maximum Transient Thermal Impedance

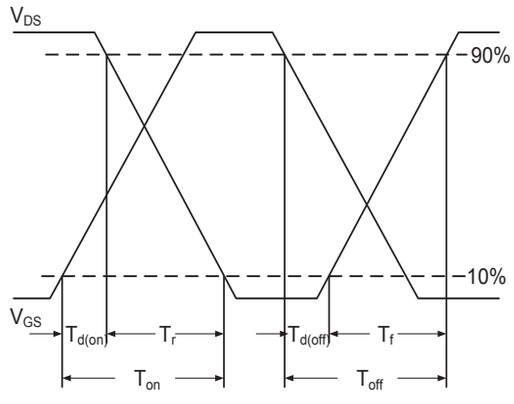


Fig.10 Switching Time Waveform

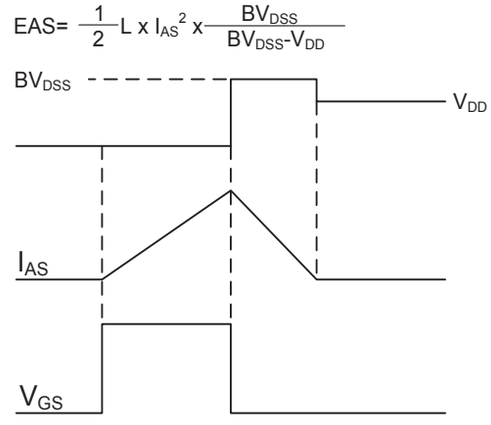


Fig.11 Unclamped Inductive Switching Waveform