Single P-channel MOSFET

ELM4P6115FDA-N

■General description

ELM4P6115FDA-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)=25mΩ (Vgs=-10V)
- Rds(on)=33mΩ (Vgs=-4.5V)

■Maximum absolute ratings

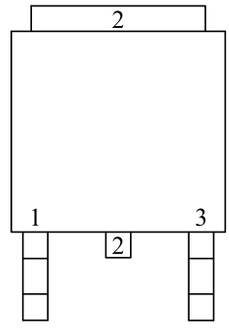
Parameter		Symbol	Limit	Unit	Note
Drain-source voltage		Vds	-60	V	
Gate-source voltage		Vgs	±20	V	
Continuous drain current (Vgs=-10V)	Tc=25°C	Id	-35	A	1
	Tc=100°C		-27		
Pulsed drain current		Idm	-70	A	2
Single pulse avalanche energy		Eas	113	mJ	3
Avalanche current		Ias	47.6	A	
Power dissipation	Tc=25°C	Pd	52.1	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	-	62.0	°C/W	1
Thermal resistance junction-to-case	Rθjc	-	2.4	°C/W	1

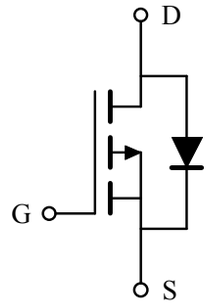
■Pin configuration

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	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	Vds=0V, Vgs=±20V	-	-	±100	nA	
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=-250μA	-1.0	-	-2.5	V	
Static drain-source on-resistance	Rds(on)	Vgs=-10V, Id=-18A	-	-	25	mΩ	2
		Vgs=-4.5V, Id=-12A	-	-	33		
Forward transconductance	Gfs	Vds=-10V, Id=-18A	-	23	-	S	
Diode forward voltage	Vsd	Is=-1A, Vgs=0V	-	-	-1	V	2
Continuous source current	Is	Vgs=Vds=0V, Force current	-	-	-35	A	1, 5
Pulsed source current	Ism		-	-	-70	A	2, 5
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vgs=0V, Vds=-15V, f=1MHz	-	3635	-	pF	
Output capacitance	Coss		-	224	-	pF	
Reverse transfer capacitance	Crss		-	141	-	pF	
Gate resistance	Rg	Vds=0V, Vgs=0V, f=1MHz	-	7	-	Ω	
SWITCHING PARAMETERS							
Total gate charge (-4.5)	Qg	Vgs=-4.5V, Vds=-20V Id=-12A	-	25.0	-	nC	
Gate-source charge	Qgs		-	6.7	-	nC	
Gate-drain charge	Qgd		-	5.5	-	nC	
Turn-on delay time	td(on)	Vgs=-10V, Vds=-15V Id=-1A, Rgen=3.3Ω	-	38.0	-	ns	
Turn-on rise time	tr		-	23.6	-	ns	
Turn-off delay time	td(off)		-	100.0	-	ns	
Turn-off fall time	tf		-	6.8	-	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=-47.6A.
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

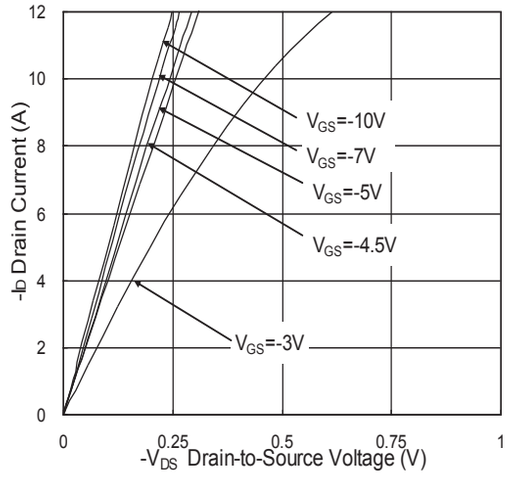


Fig.1 Typical Output Characteristics

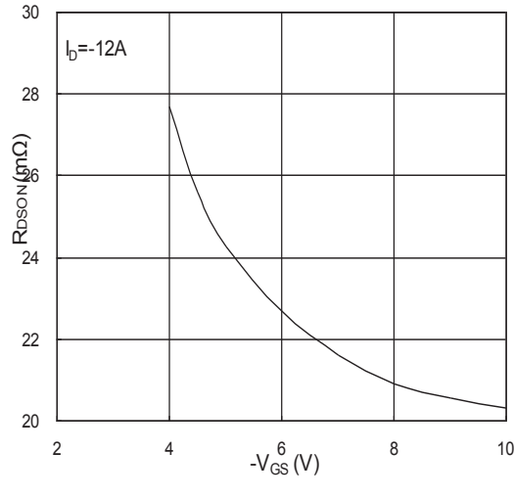


Fig.2 On-Resistance v.s Gate-Source

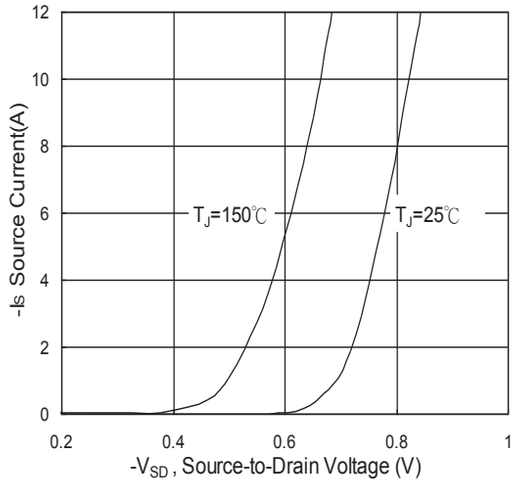


Fig.3 Forward Characteristics Of Reverse

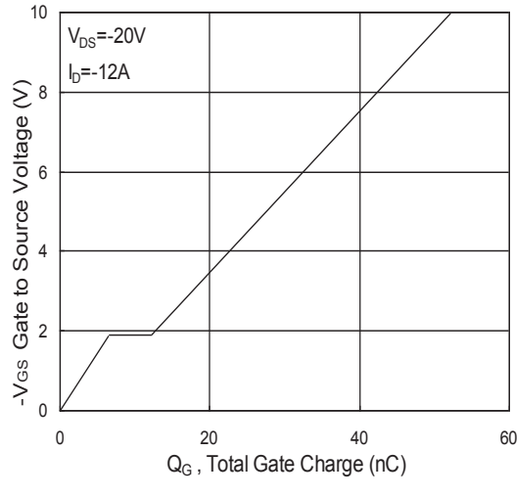


Fig.4 Gate-Charge Characteristics

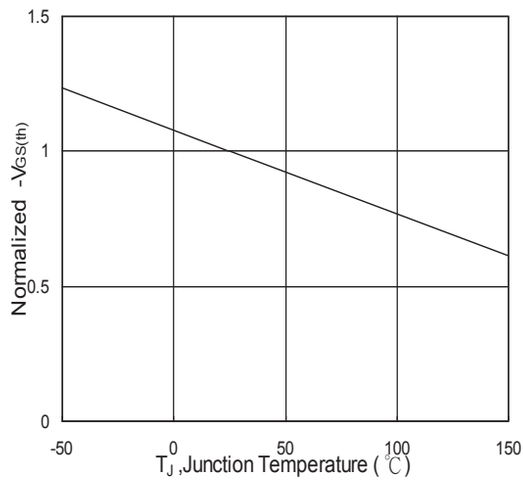


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

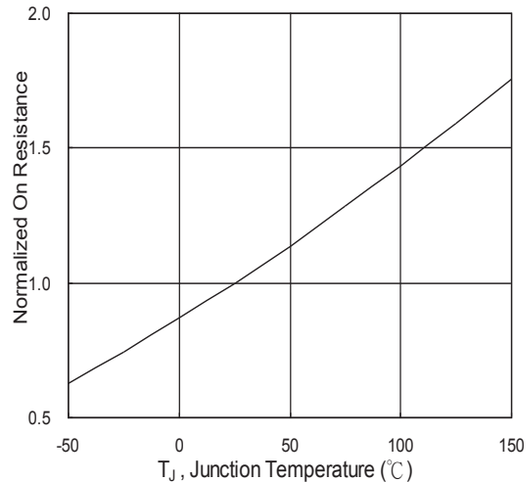


Fig.6 Normalized R_{DSON} v.s T_J

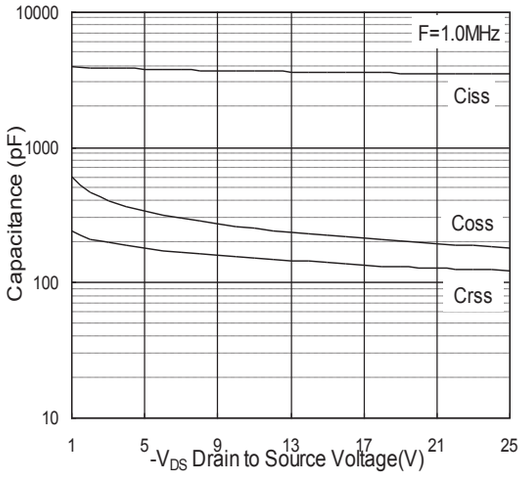


Fig.7 Capacitance

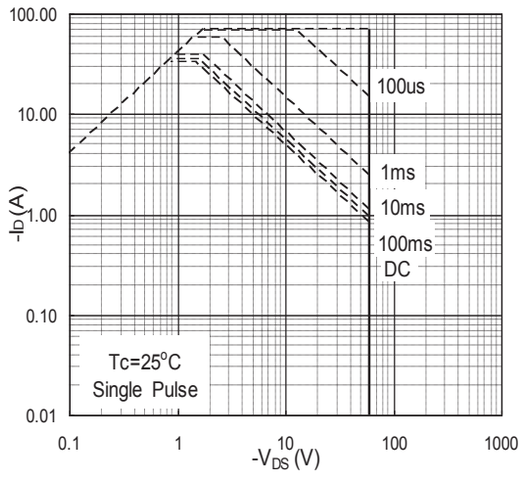


Fig.8 Safe Operating Area

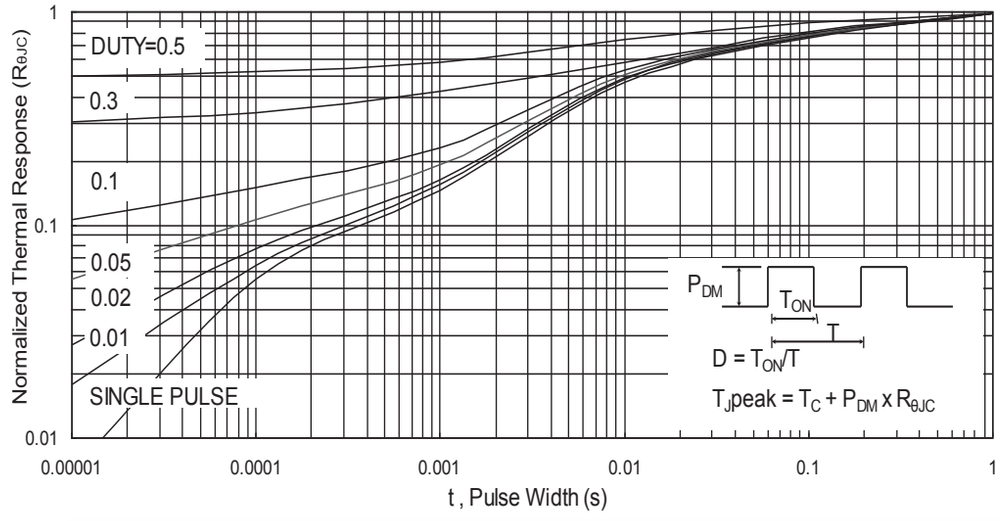


Fig.9 Normalized Maximum Transient Thermal Impedance

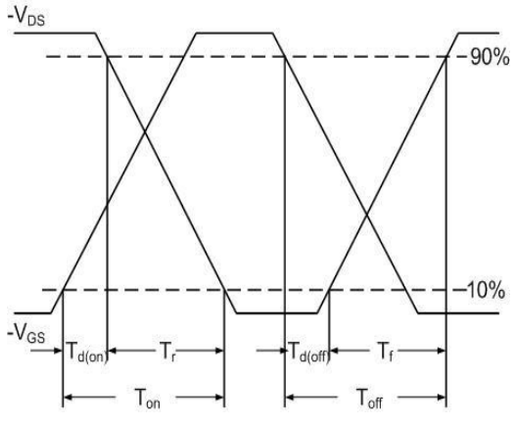


Fig.10 Switching Time Waveform

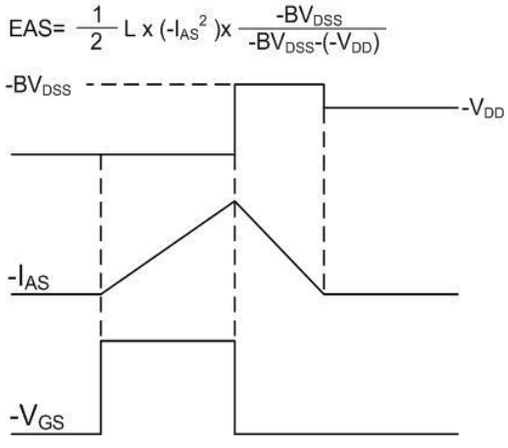


Fig.11 Unclamped Inductive Waveform