Complementary MOSFET

ELM4CA0903FNA-N

■General description

ELM4CA0903FNA-N uses advanced trench technology to provide excellent Rds(on), low gate charge and low gate threshold voltage.

■Features

N-channel
- Vds=100V
- Id=8.0A (Vgs=10V)
- Rds(on) = 100mΩ(Vgs=10V)
- Rds(on) = 125mΩ(Vgs=4.5V)

P-channel
- Vds=-100V
- Id=-6.2A (Vgs=-10V)
- Rds(on) = 220mΩ(Vgs=-10V)
- Rds(on) = 255mΩ(Vgs=-4.5V)

■Maximum absolute ratings

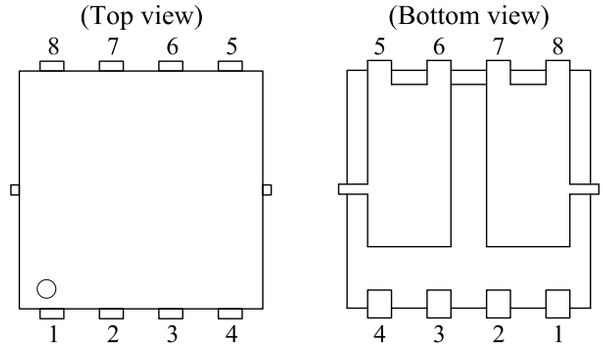
Parameter		Symbol	N-ch (Max.)	P-ch (Max.)	Unit	Note
Drain-source voltage		Vds	100	-100	V	
Gate-source voltage		Vgs	±20	±20	V	
Continuous drain current (Vgs=10)	Tc=25°C	Id	8.0	-6.2	A	1
	Tc=100°C		4.4	-3.9		
	Ta=25°C		2.6	-1.8		
	Ta=100°C		1.6	-1.1		
Pulsed drain current		Idm	25	-25	A	2
Single pulse avalanche energy		EAS	25	49	mJ	3
Avalanche current		Ias	10	-14	A	
Total power dissipation	Tc=25°C	Pd	17.8	17.8	W	4
	Ta=25°C		1.5	1.5		
Storage and junction temperature range		Tstg, Tj	-55 to 150	-55 to 150	°C	

■Thermal Characteristics

Parameter	Symbol	Typ.	Max.	Unit	Note
Thermal resistance junction-ambient	Rθja	--	85	°C/W	1
Thermal resistance junction-case	Rθjc	--	7	°C/W	1

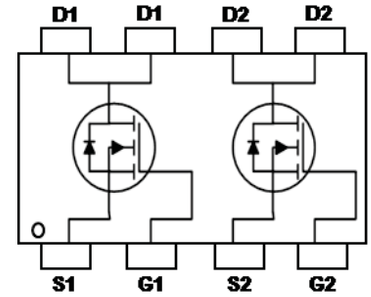
■Pin configuration

PRPAK8-5×6



Pin No.	Pin name	Pin No.	Pin name
1	SOURCE1	5	DRAIN2
2	GATE1	6	DRAIN2
3	SOURCE2	7	DRAIN1
4	GATE2	8	DRAIN1

■Circuit



■Electrical characteristics (N-ch)

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	100	--	--	V	
Static drain-source on-resistance	Rds(on)	Vgs=10V, Id=2.5A	--	80	100	mΩ	2
		Vgs=4.5V, Id=2.0A	--	90	125		
Gate threshold voltage	Vgs(th)	Vgs=Vds, Id=250μA	1.2	--	2.7	V	
Drain-source leakage current	Idss	Vds=80V, Vgs=0V	--	--	1	μA	
		Vds=80V, Vgs=0V, Tj=85°C	--	--	30		
Gate-source leakage current	Igss	Vgs=±20V, Vds=0V	--	--	±100	nA	
Continuous source current	Is	Vgs=Vds=0V, Force current	--	--	12	A	1, 5
Diode forward voltage	Vsd	Vgs=0V, Is=1A	--	--	1.2	V	2
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vds=30V, Vgs=0V, f=1MHz	--	987	--	pF	
Output capacitance	Coss		--	38	--	pF	
Reverse transfer capacitance	Crss		--	26	--	pF	
Gate resistance	Rg	Vds=0V, Vgs=0V, f=1MHz	--	3.5	--	Ω	
SWITCHING PARAMETERS							
Total gate charge	Qg	Vds=50V, Vgs=10V Id=2A	--	15.0	--	nC	
Gate-source charge	Qgs		--	3.2	--	nC	
Gate-drain charge	Qgd		--	2.6	--	nC	
Turn-on delay time	td(on)	Vdd=30V, Vgs=10V Rgen=3.3Ω, Id=1A	--	8	--	ns	
Turn-on rise time	tr		--	12	--	ns	
Turn-off delay time	td(off)		--	20	--	ns	
Turn-off fall time	tf		--	6	--	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=0.5mH, Ias=10A.
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 (N-ch)

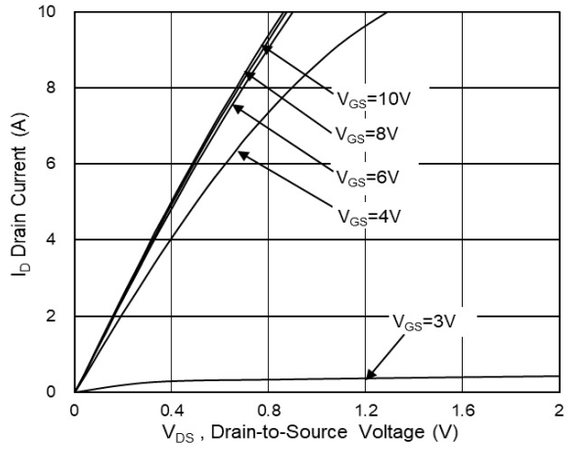


Fig.1 Typical Output Characteristics

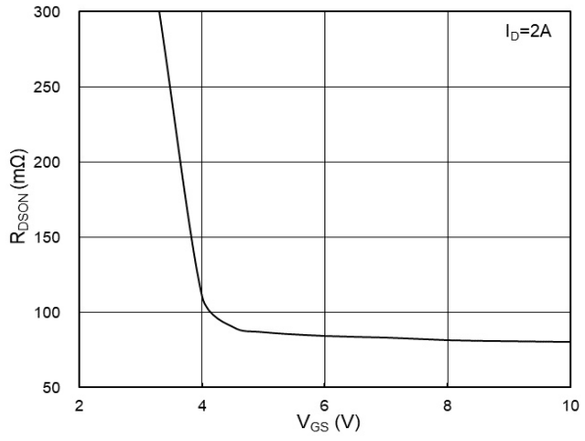


Fig.2 On-Resistance vs G-S Voltage

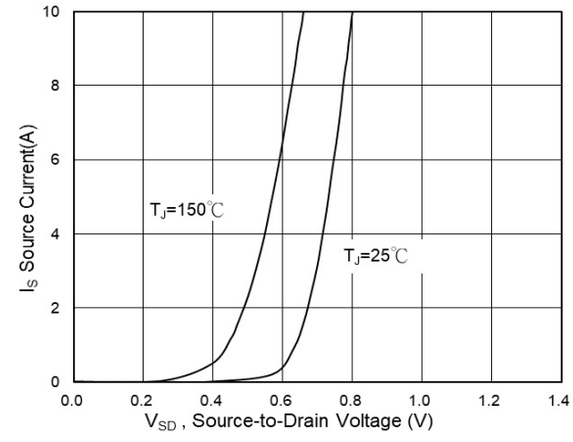


Fig.3 Source Drain Forward Characteristics

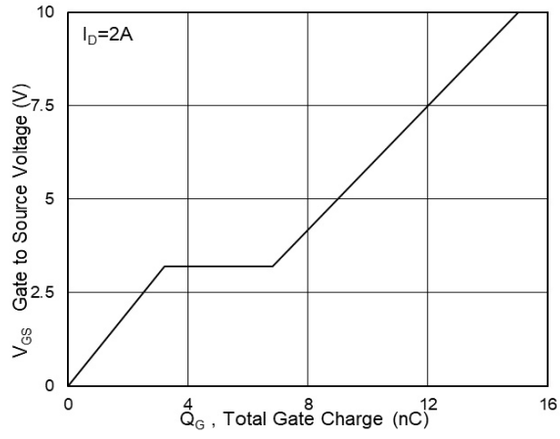


Fig.4 Gate-Charge Characteristics

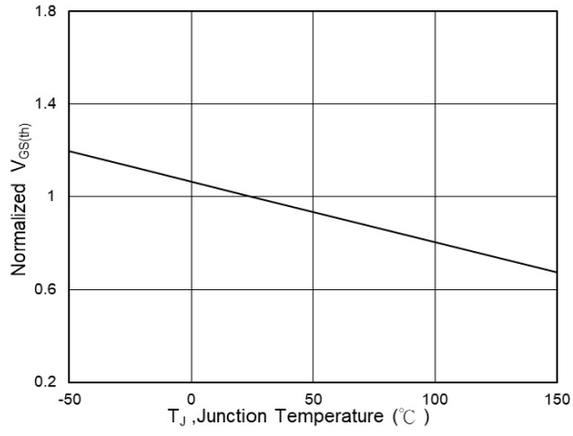


Fig.5 Normalized $V_{GS(th)}$ vs T_J

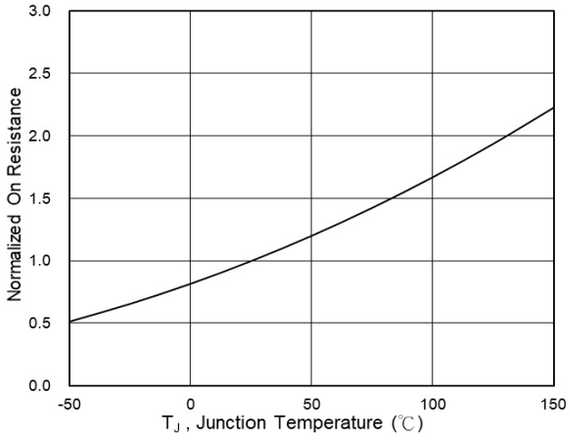


Fig.6 Normalized R_{DSON} vs T_J

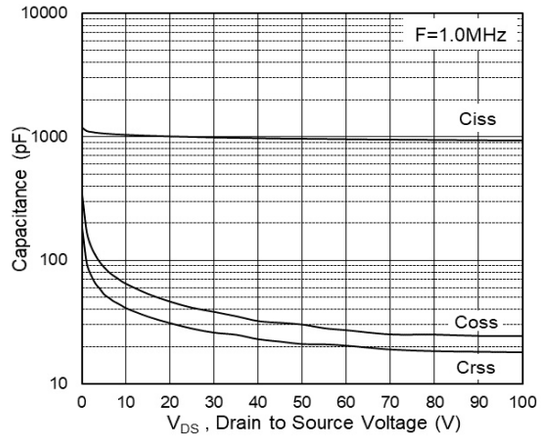


Fig.7 Capacitance

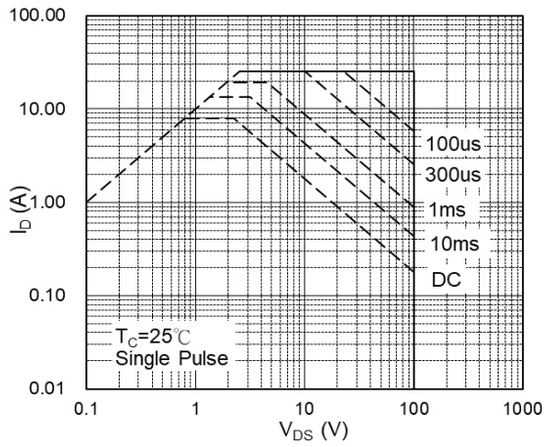


Fig.8 Safe Operating Area

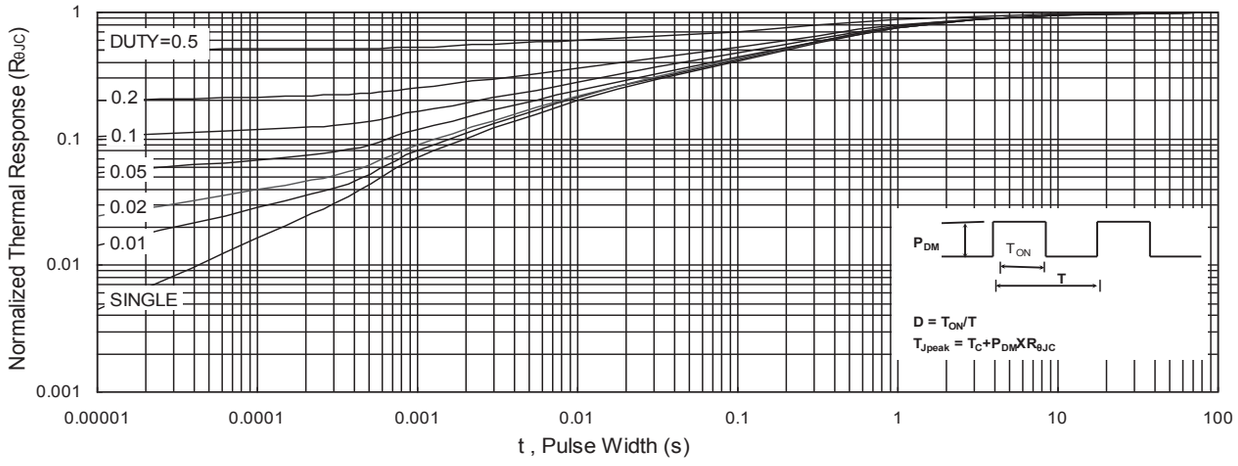


Fig.9 Normalized Maximum Transient Thermal Impedance

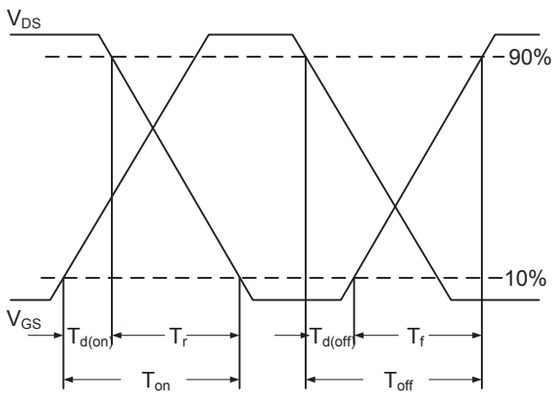


Fig.10 Switching Time Waveform

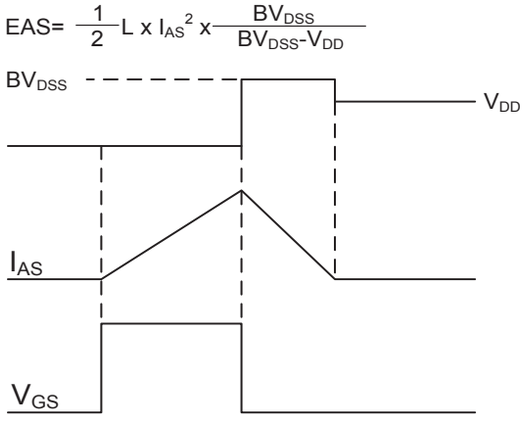


Fig.11 Unclamped Inductive Waveform

■Electrical Characteristics (P-ch)

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	-100	--	--	V	
Static drain-source on-resistance	Rds(on)	Vgs=-10V, Id=-2.0A	--	180	220	mΩ	2
		Vgs=-4.5V, Id=-1.6A	--	200	255		
Gate threshold voltage	Vgs(th)	Vgs=Vds, Id=-250μA	-1.2	--	-2.5	V	
Drain-source leakage current	Idss	Vds=-80V, Vgs=0V	--	--	-1	μA	
		Vds=-80V, Vgs=0V, Tj=85°C	--	--	-30		
Gate-source leakage current	Igss	Vgs=±20V, Vds=0V	--	--	±100	nA	
Continuous source current	Is	Vgs=Vds=0V, Force current	--	--	-10	A	1, 5
Diode forward voltage	Vsd	Vgs=0V, Is=-1A	--	--	-1.2	V	2
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vds=-30V, Vgs=0V, f=1MHz	--	1228	--	pF	
Output capacitance	Coss		--	41	--	pF	
Reverse transfer capacitance	Crss		--	29	--	pF	
Gate resistance	Rg	Vds=0V, Vgs=0V, f=1MHz	--	13	--	Ω	
SWITCHING PARAMETERS							
Total gate charge (-10V)	Qg	Vds=-50V, Vgs=-10V Id=-2A	--	19.0	--	nC	
Gate-source charge	Qgs		--	3.4	--	nC	
Gate-drain charge	Qgd		--	2.9	--	nC	
Turn-on delay time	td(on)	Vdd=-30V, Vgs=-10V Rgen=3.3Ω, Id=-1A	--	9	--	ns	
Turn-on rise time	tr		--	6	--	ns	
Turn-off delay time	td(off)		--	39	--	ns	
Turn-off fall time	tf		--	33	--	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=0.5mH, Ias=-14A.
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 (P-ch)

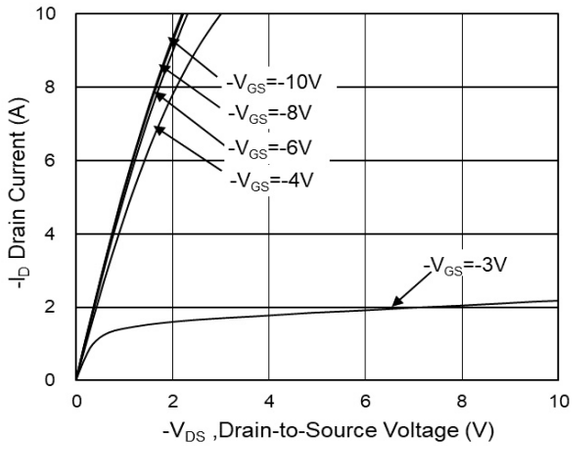


Fig.1 Typical Output Characteristics

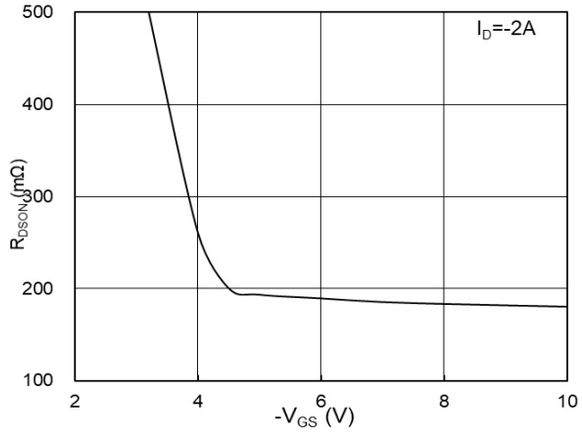


Fig.2 On-Resistance vs G-S Voltage

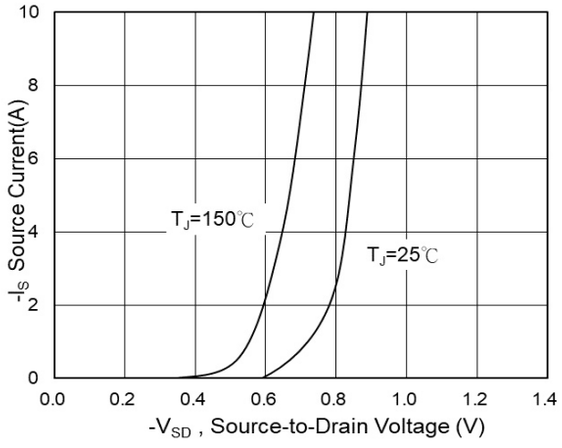


Fig.3 Source Drain Forward Characteristics

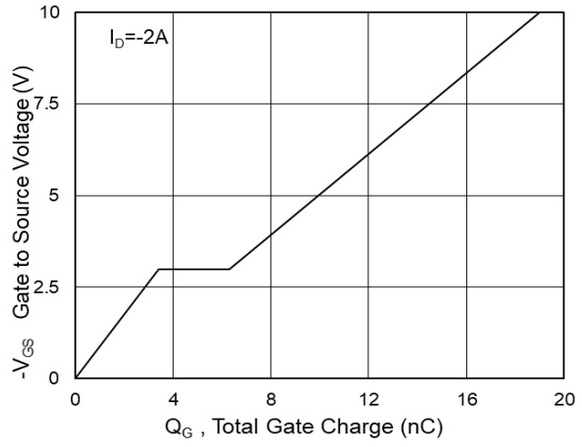


Fig.4 Gate-Charge Characteristics

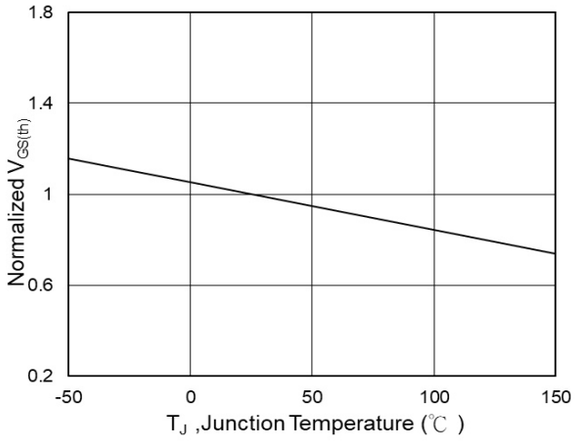


Fig.5 Normalized $V_{GS(th)}$ vs T_J

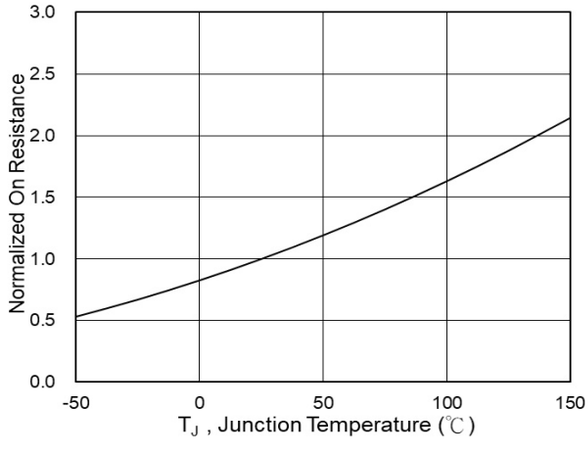


Fig.6 Normalized R_{DSON} vs T_J

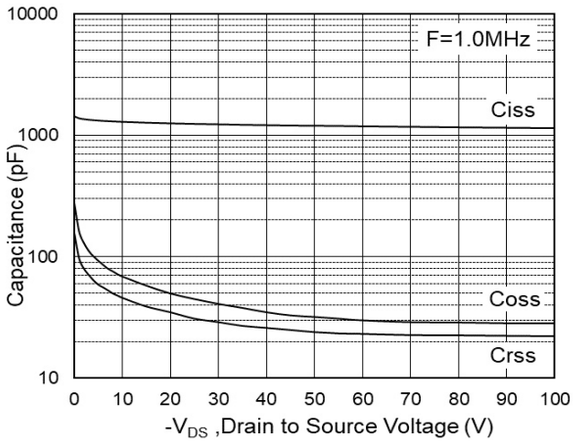


Fig.7 Capacitance

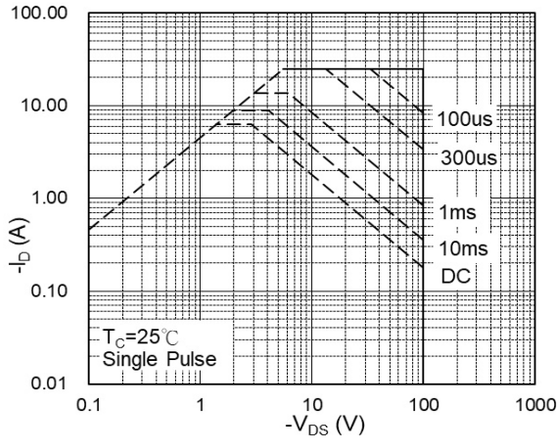


Fig.8 Safe Operating Area

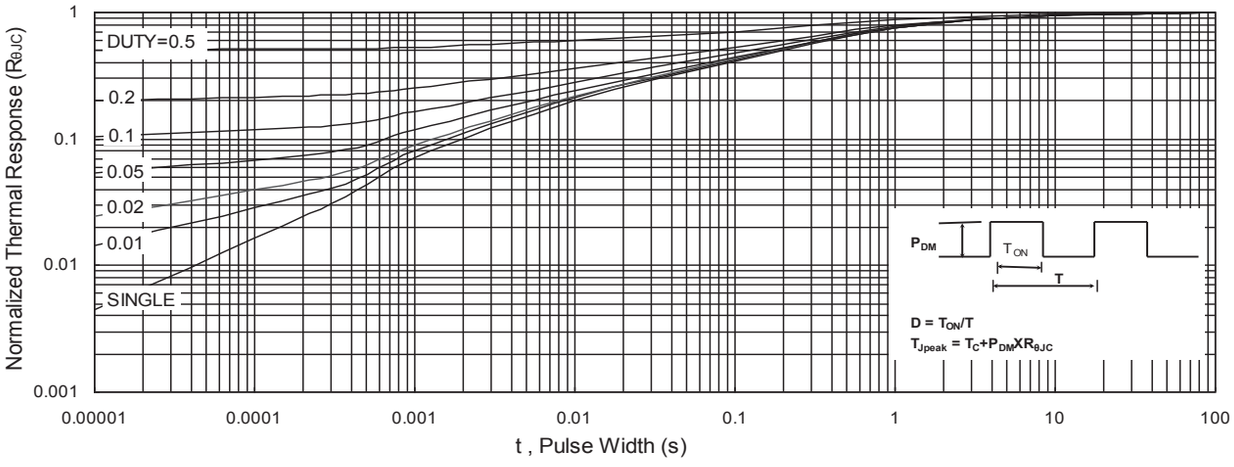


Fig.9 Normalized Maximum Transient Thermal Impedance

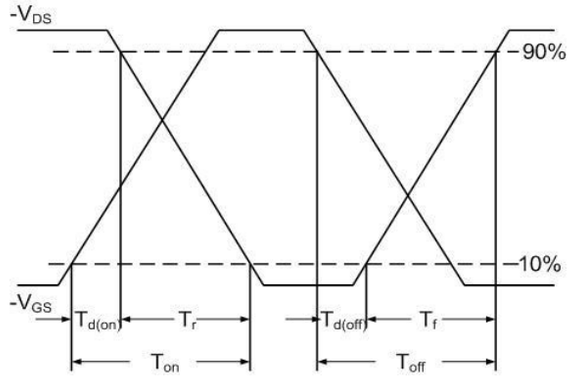


Fig.10 Switching Time Waveform

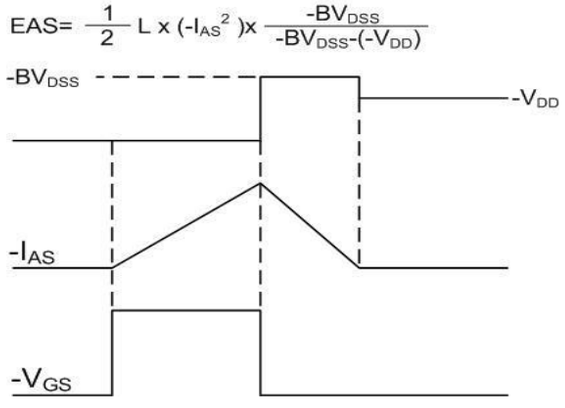


Fig.11 Unclamped Inductive Waveform