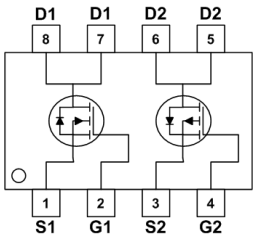
● General Description

The N-ch and P-ch MOSFET LH4612 has the low $R_{DS(on)}$,low gate charge,fast switching and excellent avalanche characteristics.This device is suitable for fast charge and lighting.



VDS =30V

RDS(ON)=10mΩ

ID =30A

VDS =-30V

RDS(ON)=13mΩ

ID =-20A

■ RoHS COMPLIANT

DFN5*6

● Features

■Low $R_{DS(ON)}$ to minimize conductive loss

■Low Gate Charge for fast switching

■Low Thermal resistance

●Application

■Lighting

■POL Application

■Wireless Charging

●Ordering Information:

Part number	LH4612
Package	DFN5*6
Basic ordering unit (pcs)	5000
Normal Package Material Ordering Code	LH4612N-DFN5*6-TAP
Halogen Free Ordering Code	LH4612N-DFN5*6-TAP-HF

●Absolute Maximum Ratings (T_C =25℃)

Parameter	Symbol	Rating		Unit
		N-Channel	P-Channel	
Drain-Source Voltage	V_{DS}	30	-30	V
Gate-Source Voltage	V_{GS}	±20	±20	V
Continuous Drain Current(TC=25℃)[1]	I_D@TC=25℃	30	-20	A
Pulsed Drain Current[2]	I_{DM}	35	-35	A
Total Power Dissipation(TC=25℃)[4]	P_D@T_A=25℃	0.65	2.0	W
Avalanche Current	I_{AS}	12	-12	A
Operating Junction Temperature	T_J	-55 to 150	-55 to 150	℃
Storage Temperature	T_{STG}	-55 to 150	-55 to 150	℃
Single Pulse Avalanche Energy[3]	E_{AS}	20	19	mJ

●Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	-	-	5	°C/W
Thermal resistance, junction - ambient	R_{thJA}	-	-	62.5	°C/W
Soldering temperature, wavesoldering for 10s	T_{sold}	-	-	265	°C

●Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} =0V,I_D =250uA	30	-	-	V
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} =V_{DS}, I_D =250uA	1.0	-	2.5	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=±30V,V_{GS}=0V,T_J=25℃	-	-	±1.0	uA
Gate- Source Leakage Current	I_{GSS}	V_{GS}=±20V ,V_{DS} =0V	-	-	±100	nA
Static Drain-source On Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=15A	-	10	13	mΩ
		V_{GS}=4.5V, I_D=10A	-	14	18	mΩ
Forward Transconductance	g_{FS}		-	10	-	s

●Electronic Characteristics(TJ = 25℃)

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	Ciss	V_{DS} =25V, V_{GS}=0V f = 1MHz	-	730	-	pF
Output capacitance	Coss		-	90	-	
Reverse transfer capacitance	Crss		-	29	-	
Total gate charge	Qg	V_{DS}=15V ID = 10A V_{GS} = 4.5V	-	8.9	-	nC
Gate - Source charge	Qgs		-	4.4	-	
Gate - Drain charge	Qgd		-	3.2	-	
Turn-on Delay Time	Td(on)	V_{DS}=25V ID = 6A V_{GS} = 10V	-	13	-	nS
Turn-off Delay Time	Td(off)		-	30	-	
Rise Time	Tr		-	9.0	-	
Fall Time	Tf		-	7.0	-	
Gate Resistance	Rg	V_{DS} =0V, V_{GS}=0V f = 1MHz	-	0.9	-	Ω

● Diode Characteristics

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Continuous Source Current[1,5]	Is	V_G=V_D=0V Force Current	-	-	30	A
Pulsed Source Current[2,5]	I_{SM}		-	-	35	A
Diode Forward Voltage[2]	V_{SD}	V_{GS}=0V,Is=1A,Tj=25°C	-	-	1.2	V

Note :
1.The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper,t<10sec.
2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
3.The EAS data shows Max. rating . The test condition is V_{DD}=25V,V_{GS}=10V,L=0.1mH,I_{AS}=10A
4.The power dissipation is limited by 150℃ junction temperature
5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

●P-Ch Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	-	-	5	°C/W
Thermal resistance, junction - ambient	R_{thJA}	-	-	62.5	°C/W
Soldering temperature, wavesoldering for 10s	T_{sold}	-	-	265	°C

●P-Ch Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} =0V,I_D =-250uA	-30	-	-	V
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} =V_{DS}, I_D =-250uA	-1.0	-	-2.5	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=±30V,V_{GS}=0V,T_J=25℃	-	-	±1.0	uA
Gate- Source Leakage Current	I_{GSS}	V_{GS}=±20V ,V_{DS} =0V	-	-	±100	nA
Static Drain-source On Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-9A	-	13	17	mΩ
		V_{GS}=-4.5V, I_D=-6A	-	20	25	mΩ
Forward Transconductance	g_{FS}		-	10	-	s

●P-Ch Electronic Characteristics(TJ = 25℃)

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	Ciss	V_{DS} =-15V, V_{GS}=0V f = 1MHz	-	887	-	pF
Output capacitance	Coss		-	164	-	
Reverse transfer capacitance	Crss		-	133	-	
Total gate charge	Qg	V_{DS}=-15V ID = -10A V_{GS} =- 4.5V	-	32	-	nC
Gate - Source charge	Qgs		-	5.4	-	
Gate - Drain charge	Qgd		-	5.2	-	
Turn-on Delay Time	Td(on)	V_{DS}=-25V ID = -6A V_{GS} = -10V	-	33	-	nS
Turn-off Delay Time	Td(off)		-	108	-	
Rise Time	Tr		-	18	-	
Fall Time	Tf		-	24.4	-	
Gate Resistance	Rg	VDS =0V, VGS=0V f = 1MHz	-	0.9	-	Ω

● P-Ch Diode Characteristics

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Continuous Source Current[1,5]	Is	V_G=V_D=0V Force Current	-	-	-30	A
Pulsed Source Current[2,5]	I_{SM}		-	-	-35	A
Diode Forward Voltage[2]	V_{SD}	V_{GS}=0V,Is=-1A,Tj=25°C	-	-	-1.2	V

Note :
1.The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper,t<10sec.
2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
3.The EAS data shows Max. rating . The test condition is V_{DD}=25V,V_{GS}=10V,L=0.1mH,I_{AS}=10A
4.The power dissipation is limited by 150℃ junction temperature
5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

● N-Channel Typical Characteristics

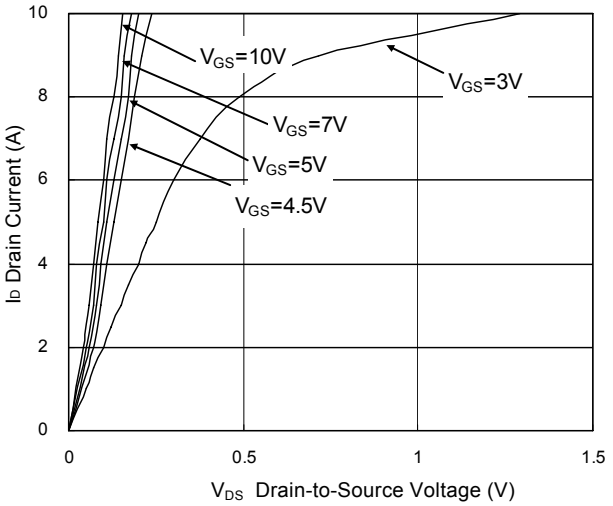


Fig.1 Typical Output Characteristics

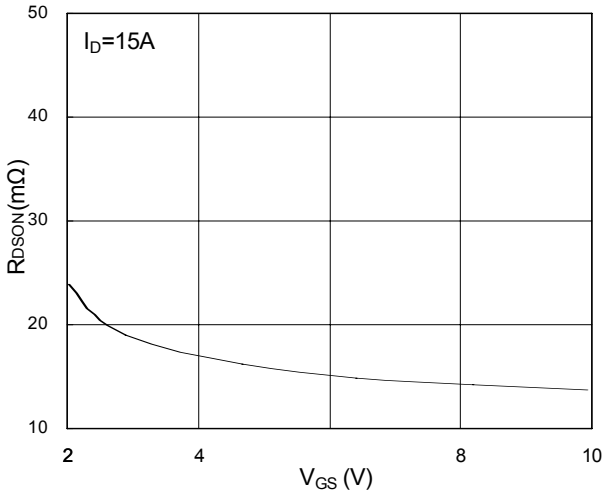


Fig.2 On-Resistance vs. G-S Voltage

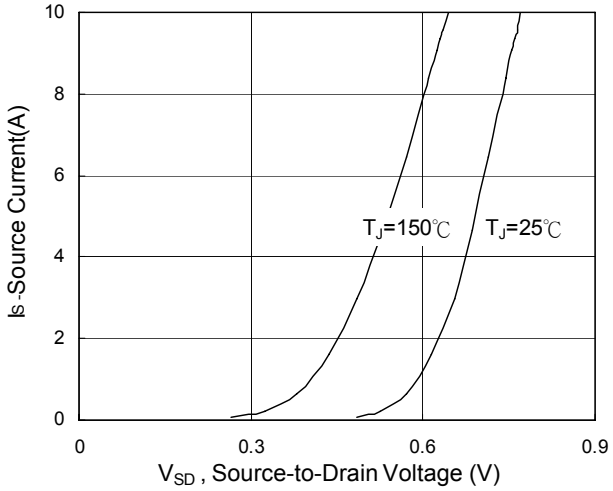


Fig.3 Forward Characteristics of Reverse

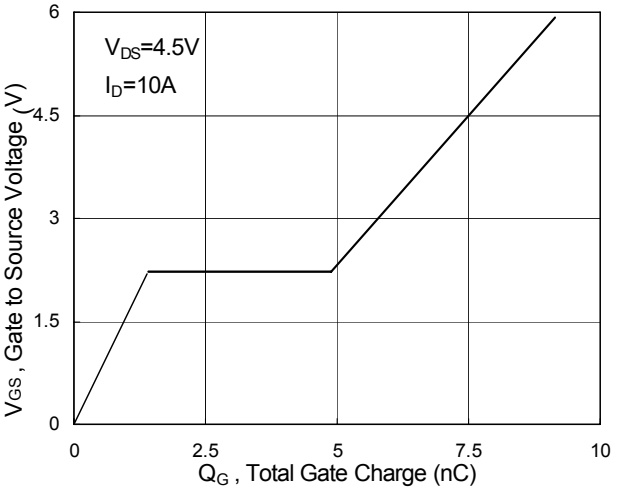
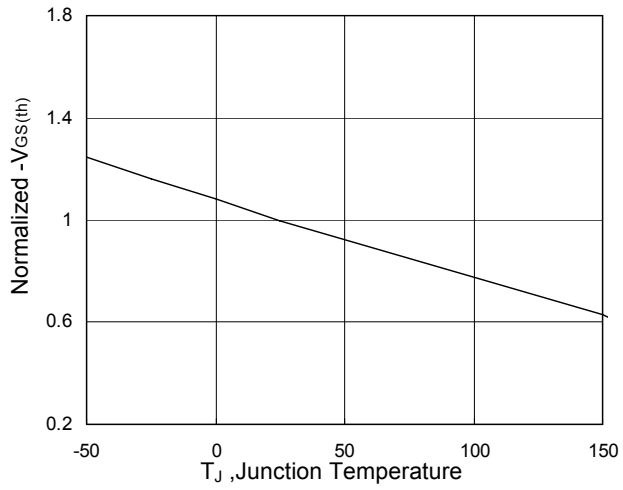


Fig.4 Gate-charge Characteristics



(℃) Fig.5 $V_{GS(th)}$ vs. T_J

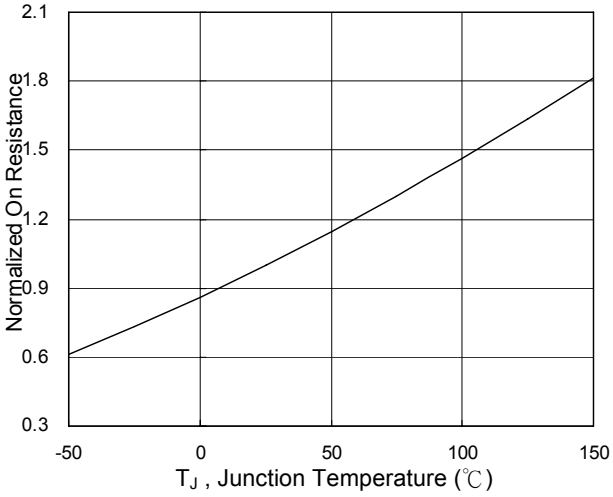


Fig.6 Normalized R_{DSON} vs. T_J

● N-Channel Typical Characteristics(Cont.)

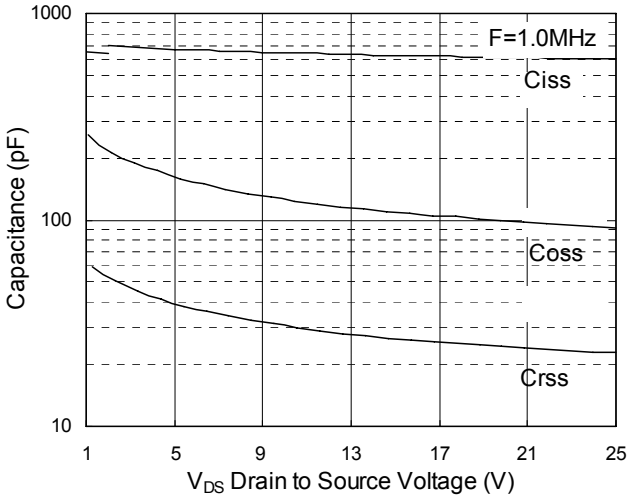


Fig.7 Capacitance

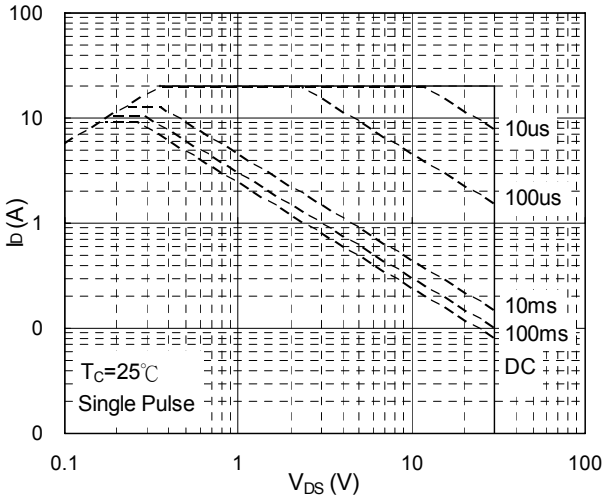


Fig.8 Safe Operating Area

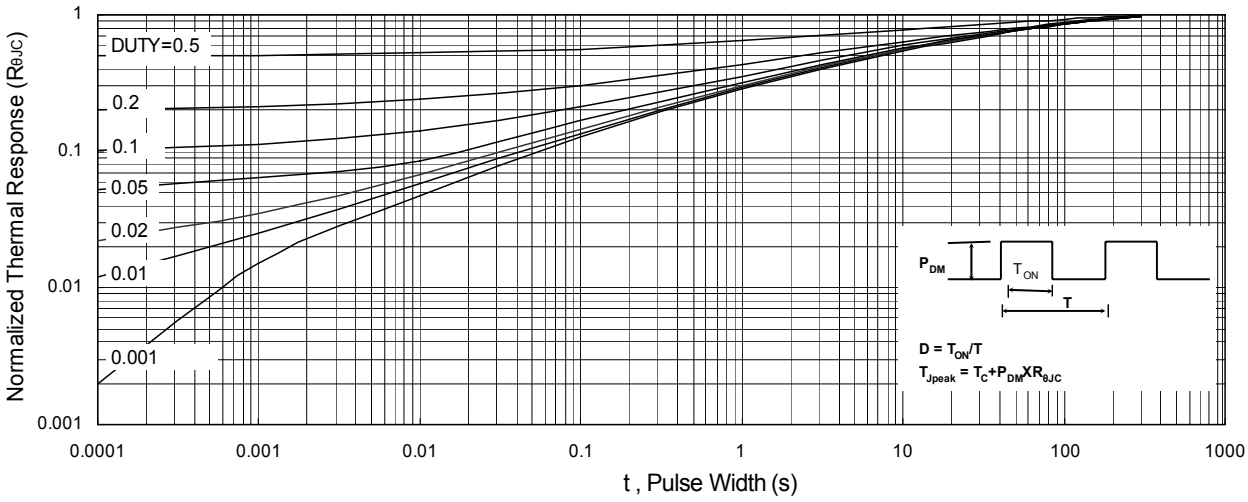


Fig.9 Normalized Maximum Transient Thermal Impedance

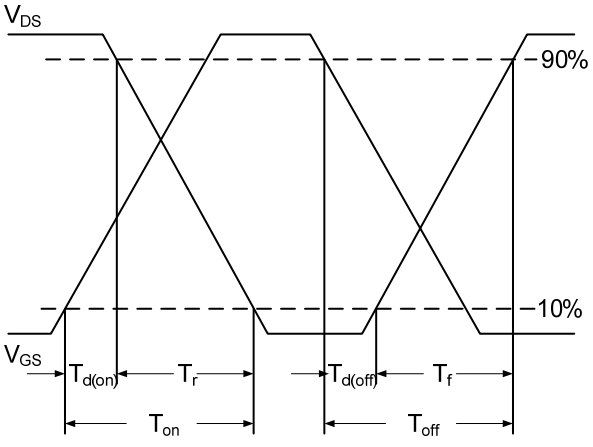


Fig.10 Switching Time Waveform

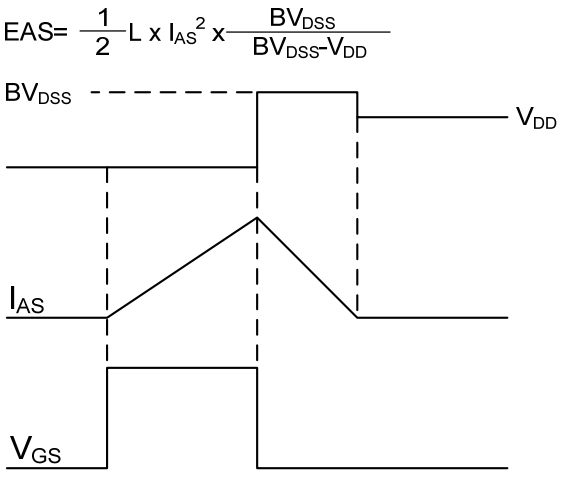


Fig.11 Unclamped Inductive Waveform

● P-Channel Typical Characteristics

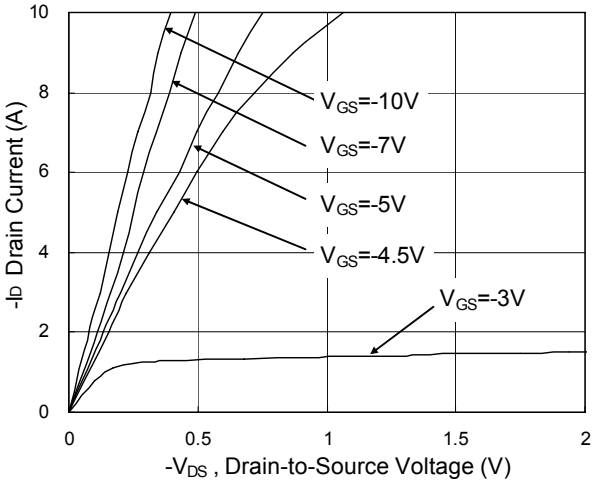


Fig.1 Typical Output Characteristics

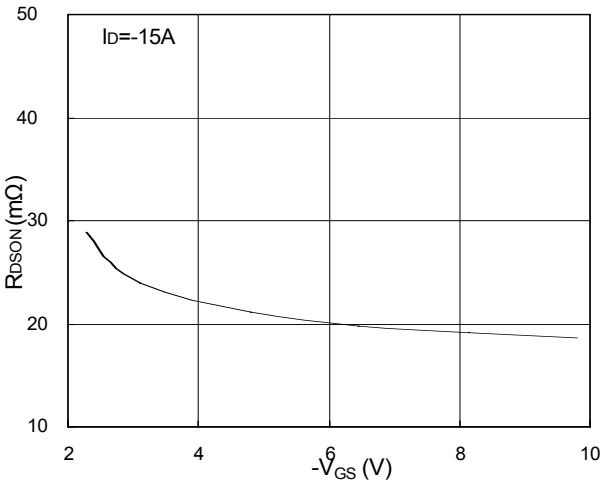


Fig.2 On-Resistance vs. Gate-Source

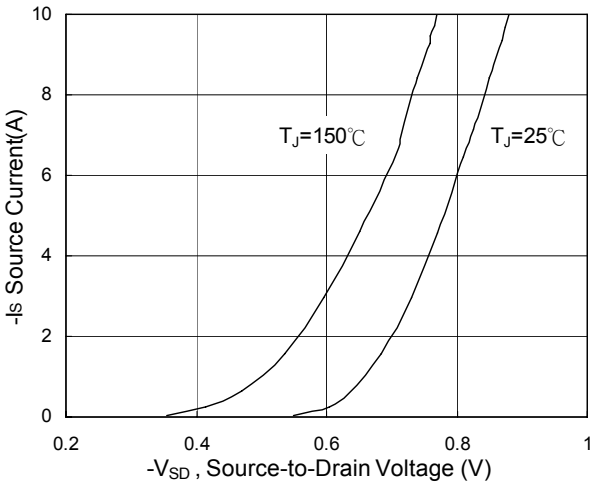


Fig.3 Forward Characteristics of Reverse

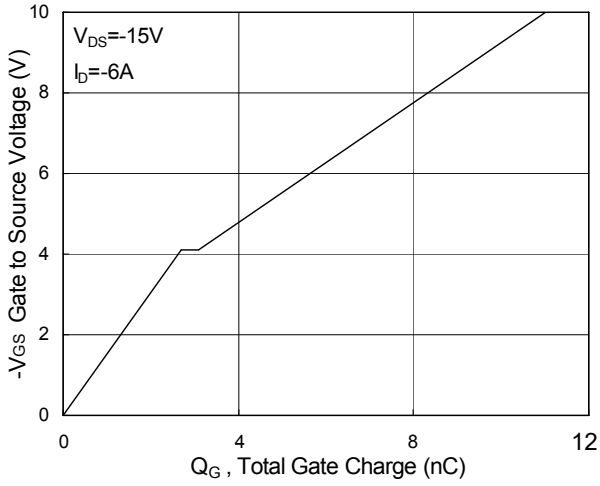


Fig.4 Gate-charge Characteristics

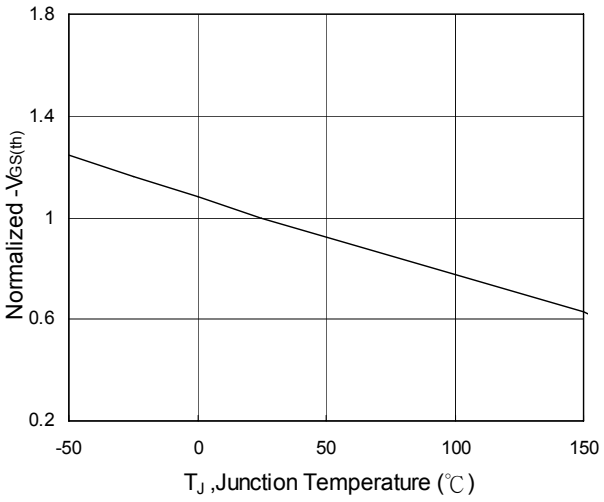


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

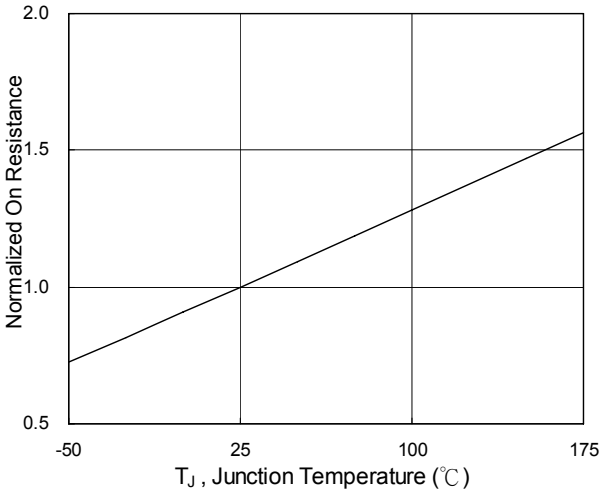


Fig.6 Normalized R_{DSON} vs. T_J

● P-Channel Typical Characteristics(cont.)

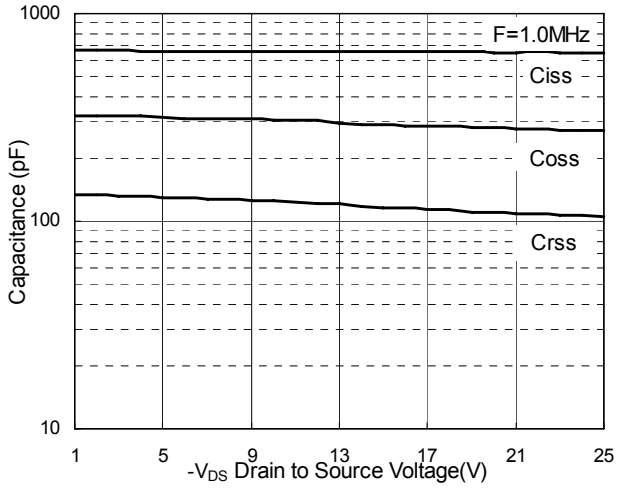


Fig.7 Capacitance

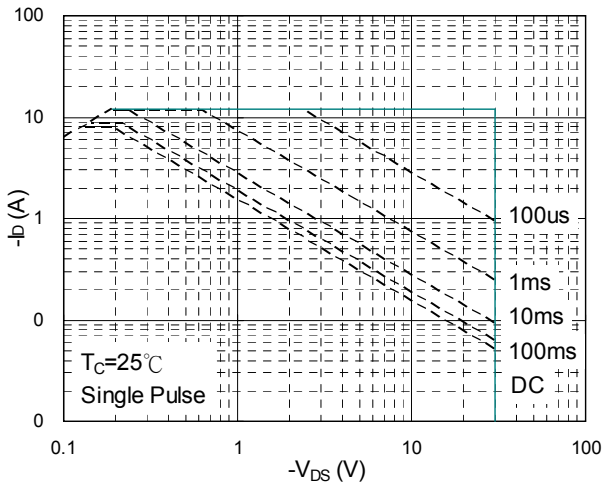


Fig.8 Safe Operating Area

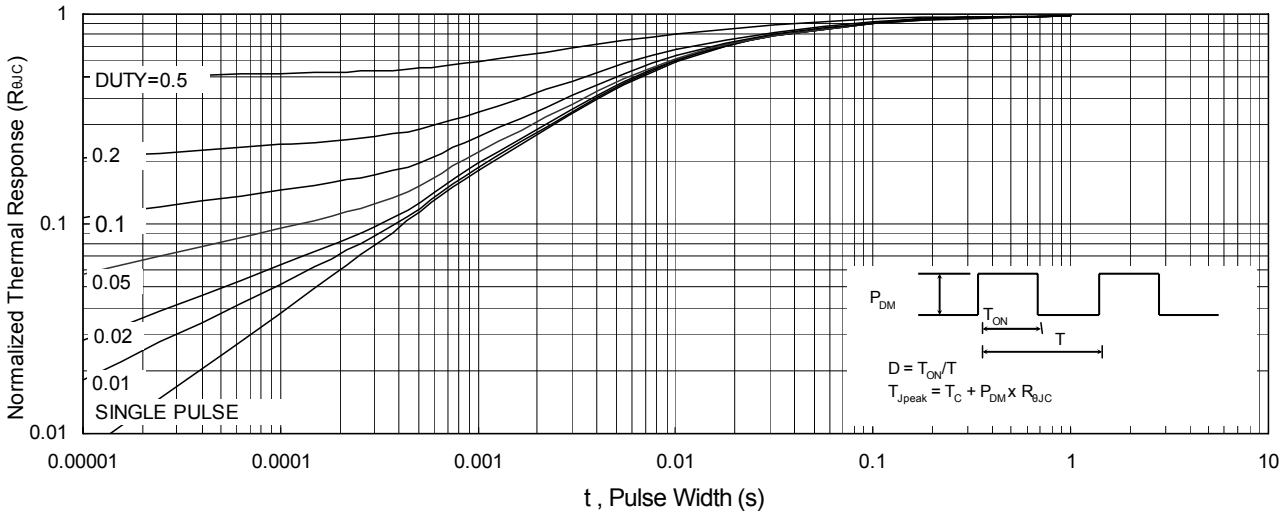


Fig.9 Normalized Maximum Transient Thermal Impedance

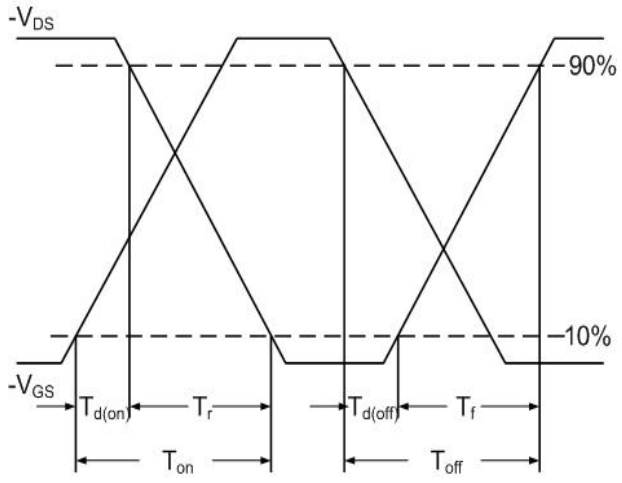


Fig.10 Switching Time Waveform

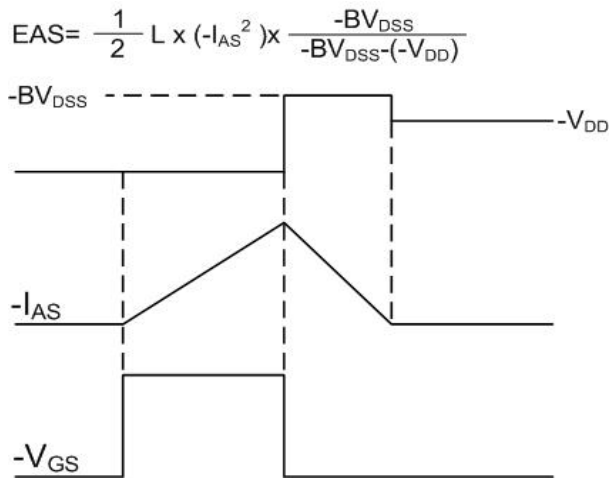


Fig.11 Unclamped Inductive Waveform

●Dimensions（DFN5*6)

Unit：mm

SYMBOL	min	max	SYMBOL	min	max
A	1.00	1.20	E1	5.90	6.40
b	0.30	0.50	e	1.27BSC	
c	0.20	0.30	L	0.05	0.30
D	4.80	5.20	L1	0.40	0.80
D1	3.90	4.30	L2	1.20	2.00
D2	1.50	1.90	H	3.30	3.80
D3	0.40	0.80	I	-	0.18
E	5.50	5.90