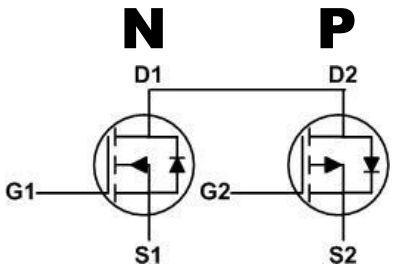
WLU3012

N-Ch and P-Ch Fast Switching MOSFETs

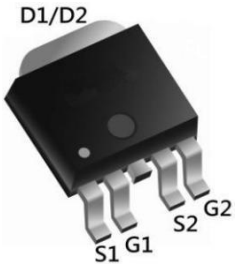
★ 100% EAS Guaranteed
★ Green Device Available
★ Super Low Gate Charge
★ Excellent CdV/dt effect decline
★ Advanced high cell density Trench technology



Description

The WLU3012 is the high performance complementary N-ch and P-ch MOSFETs with high cell density, whichprovide excellent RDSON and gate charge for most of the synchronous buck converter applications .
The WLU3012 meet the RoHS and Green Product requirement 100% EAS guaranteed with full function reliability approved.

TO252-4 Pin Configuration



Product Summary

BVDSS	RDSON	ID
30V	15 mΩ	12A
-30V	35 mΩ	-12A

Absolute Maximum Ratings

Symbol	Parameter	Rating		Units
		N-Ch	P-Ch	
V_{DS}	Drain-Source Voltage	30	-30	V
V_{GS}	Gate-Source Voltage	±20	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	12	- 12	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1]	10	- 8	A
I_{DM}	Pulsed Drain Current[2]	30	-30	A
EAS	Single Pulse Avalanche Energy[3]	24.6	28	mJ
P_D@T_C=25℃	Total Power Dissipation[4]	10.8	10.8	W
P_D@T_A=25℃	Total Power Dissipation[4]	2	2	W
T_{STG}	Storage Temperature Range	-55 to 150	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	-55 to 150	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	---	32	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	6	℃/W

Electrical Characteristics (T_J=25℃ unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=30V, V_{GS} = 0V,	-	-	1.0	μA
I_{GSS}	Gate to Body Leakage Current	V_{DS}=0V, V_{GS} = ±20V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250μA	1.0	1.5	2.5	V
$R_{DS(on)}$	Static Drain-Source on-Resistance note3	V_{GS}=10V, I_D=5A	-	15	20	mΩ
		V_{GS}=4.5V, I_D=3A	-	21	29	
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=15V, V_{GS}=0V, f=1.0MHz	-	490	-	pF
C_{oss}	Output Capacitance		-	79	-	pF
C_{rss}	Reverse Transfer Capacitance		-	61	-	pF
Q_g	Total Gate Charge	V_{DS}=15V, I_D=5.8A, V_{GS}=10V	-	10	-	nC
Q_{gs}	Gate-Source Charge		-	1.7	-	nC
Q_{gd}	Gate-Drain(“Miller”) Charge		-	2.5	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	V_{DS}=15V, I_D=3A, V_{GS}=10V, R_{REN} =3Ω	-	6	-	ns
t_r	Turn-on Rise Time		-	15	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	17	-	ns
t_f	Turn-off Fall Time		-	17	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	12	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	30	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS}=0V, I_S=9A	-	-	1.2	V
trr	Body Diode Reverse Recovery Time	I_F=5A, dI/dt=100A/μs	-	7	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	2	-	nC

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. EAS condition : T_J=25℃,V_{DD}=15V,V_G=10V,L=0.5mH,Rg=25Ω,I_{AS}=6A

3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

Electrical Characteristics (T_J=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}= 0V, I_D= -250μA	-30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}= -30V, V_{GS}= 0V	-	-	-1	μA
Gate-Source Leakage	I_{GSS}	V_{DS}= 0V, V_{GS}= ±20V	-	-	±100	nA
Gate-Source Threshold voltage	$V_{GS(th)}$	V_{DS}= V_{GS}, I_D= -250μA	-1	-1.5	-2.5	V
Drain-Source on-State Resistance[3]	$R_{DS(on)}$	V_{GS}= -10V, I_D= -4.1A	-	35	50	mΩ
		V_{GS}= -4.5V, I_D= -3A	-	49	75	
Dynamic Characteristics[4]						
Input Capacitance	C_{iss}	V_{GS} = 0V , V_{DS} = -15V, f = 1.0MHz	-	530	-	pF
Output Capacitance	C_{oss}		-	70	-	
Reverse Transfer Capacitance	C_{rss}		-	56	-	
Switching Characteristics[4]						
Total Gate Charge	Q_g	V_{GS} = -10V, V_{DS} = -15V, I_D = -4.1A	-	6.8	-	nC
Gate−Source Charge	Q_{gs}		-	1.0	-	
Gate−Drain Charge	Q_{gd}		-	1.4	-	
Turn-on Delay Time	$t_{d(on)}$	V_{GS}= -10V, V_{DS}= -15V , R_L= 15Ω,R_{GEN}= 2.5Ω	-	14	-	ns
Rise Time	t_r		-	61	-	
Turn-off Delay time	$t_{d(off)}$		-	19	-	
Fall Time	t_f		-	10	-	
Source-Drain Body Diode Characteristics						
Diode Forward Voltage[3]	V_{SD}	I_S = -4.1A, V_{GS} = 0V	-	-	-1.2	V
Continuous Source Current	I_S		-	-	-12	A

Notes:

1. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C.
2. The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.
3. Pulse Test: Pulse width≤300μs, duty cycle≤2%.
4. This value is guaranteed by design hence it is not included in the production test.

N-Channel Typical Characteristics

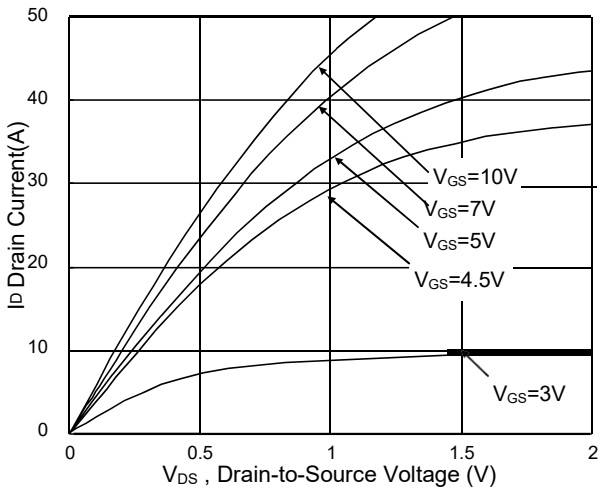


Fig.1 Typical Output Characteristics

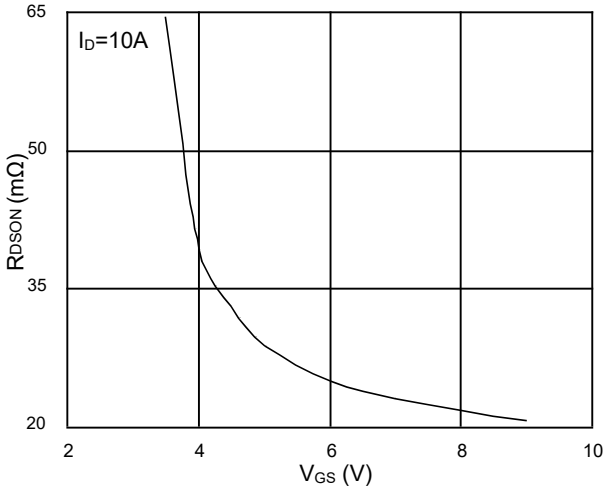


Fig.2 On-Resistance vs. Gate-Source

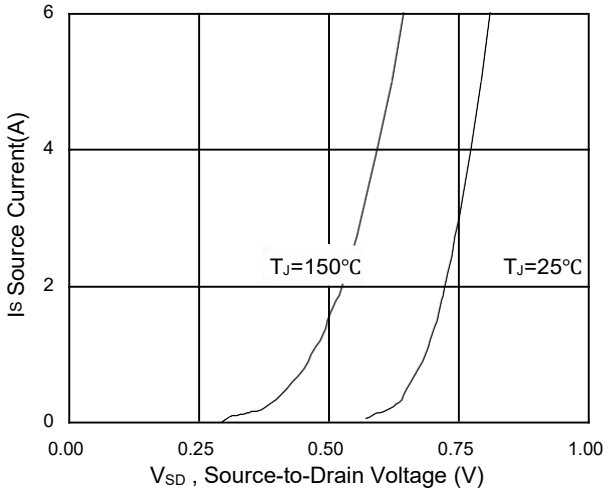


Fig.3 Forward Characteristics Of Reverse

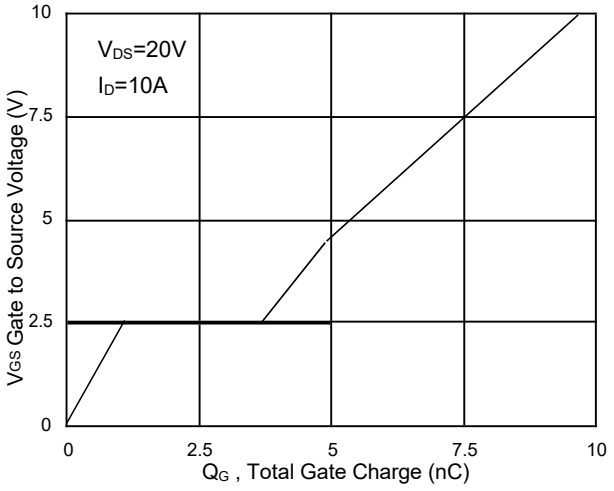


Fig.4 Gate-Charge Characteristics

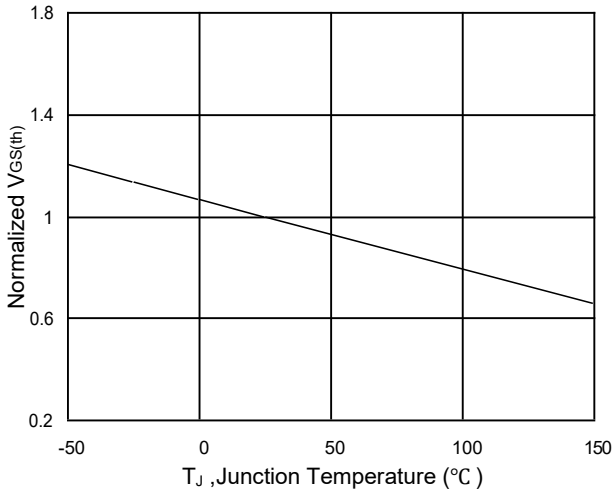


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

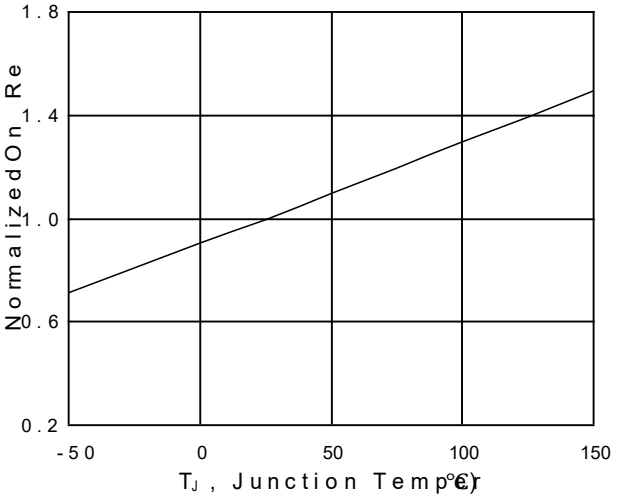


Fig.6 Normalized R_{DSON} vs. T_J

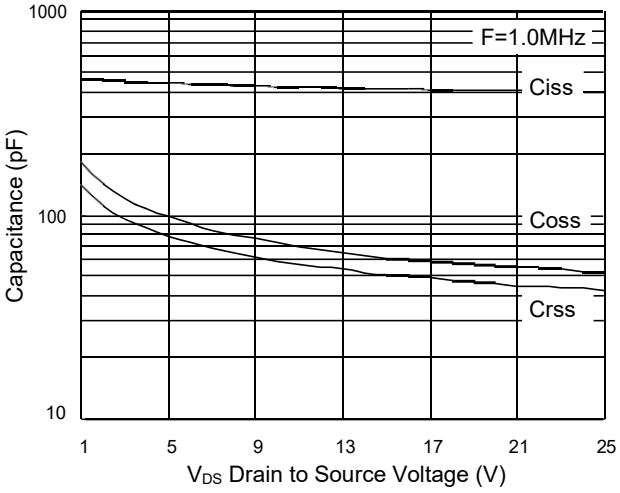


Fig.7 Capacitance

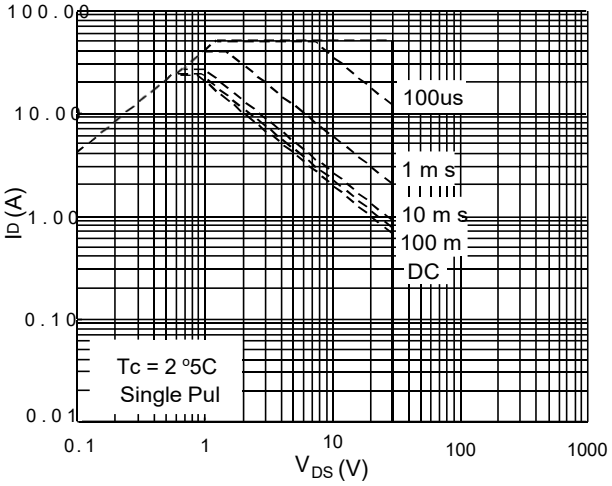


Fig.8 Safe Operating Area

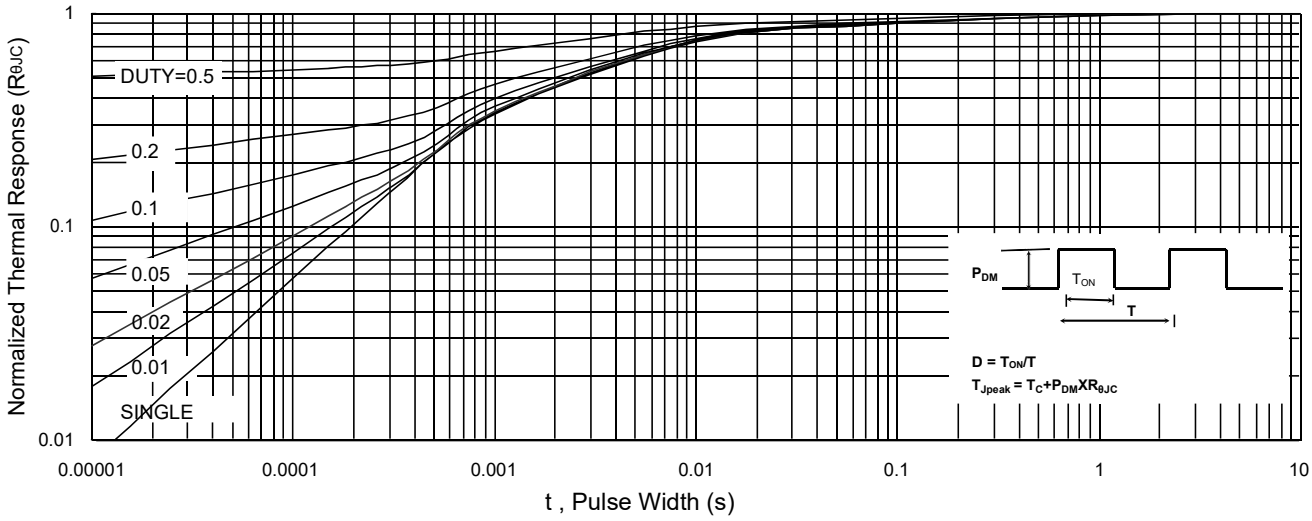
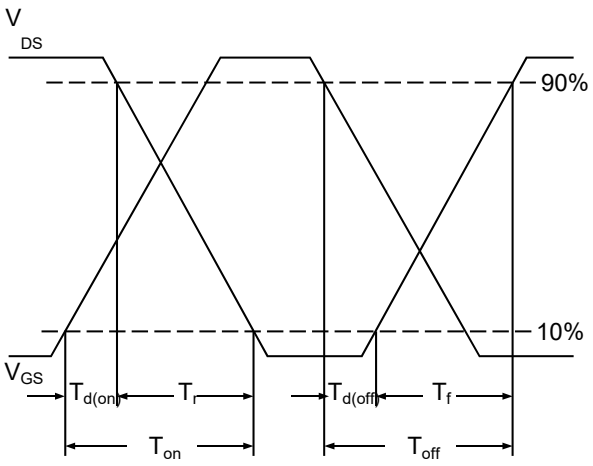
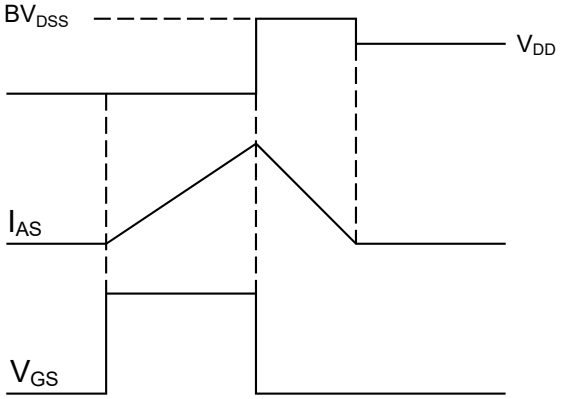


Fig.9 Normalized Maximum Transient Thermal Impedance



$$EAS = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS}-V_{DD}}$$



P-Channel Typical Characteristics

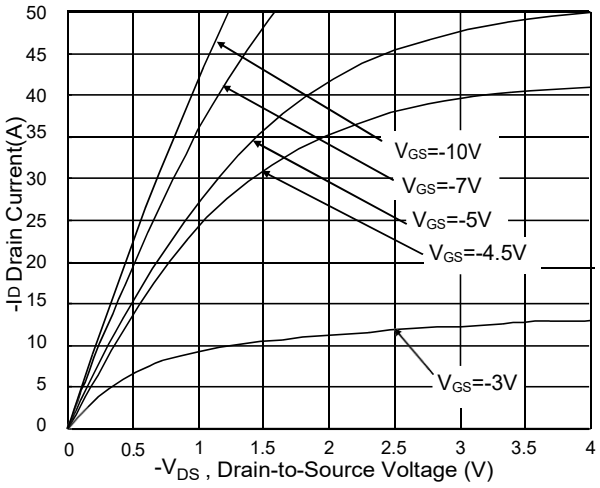


Fig.1 Typical Output Characteristics

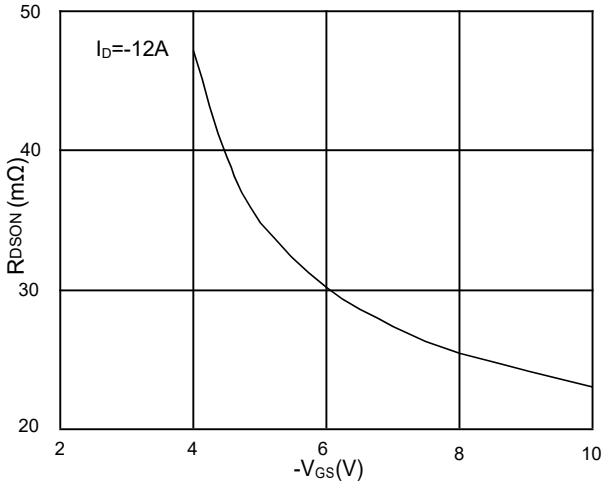
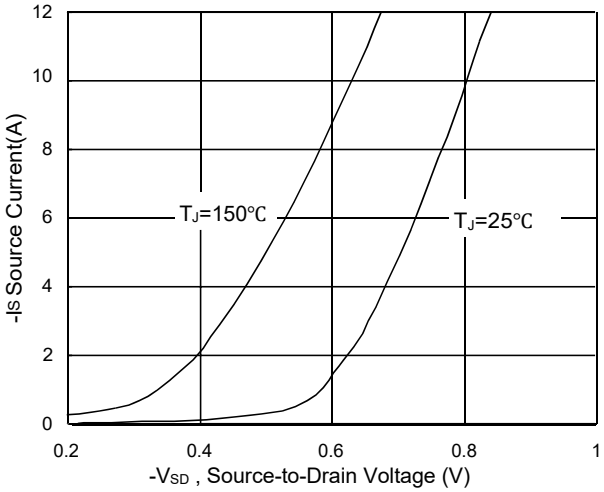


Fig.2 On-Resistance v.s Gate-Source



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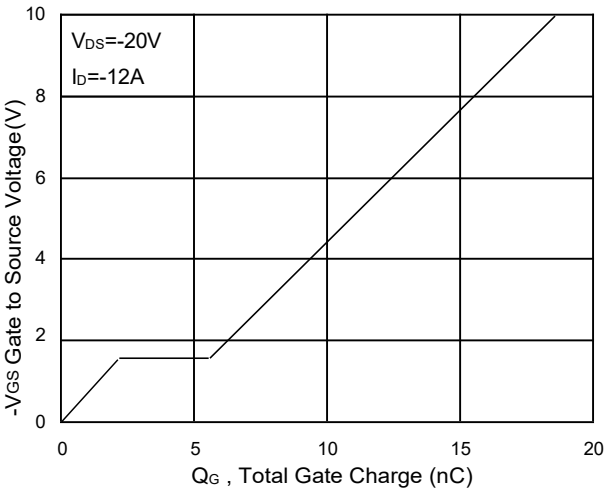


Fig.4 Gate-Charge Characteristics

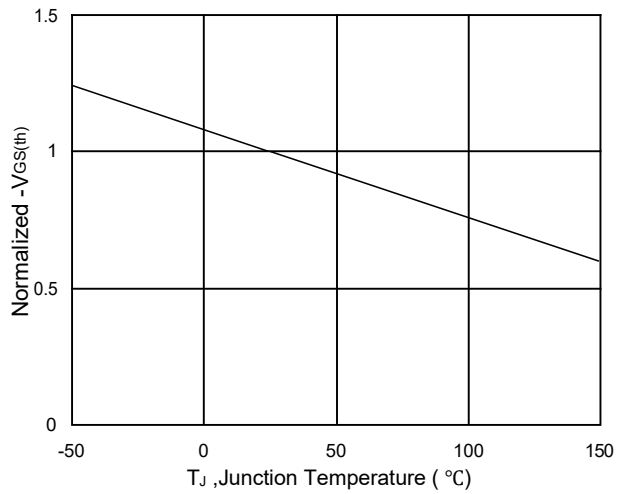


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

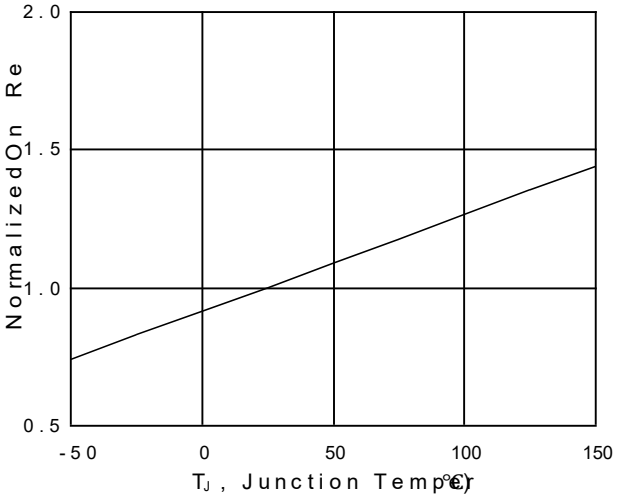


Fig.6 Normalized R_{DSON} v.s T_J

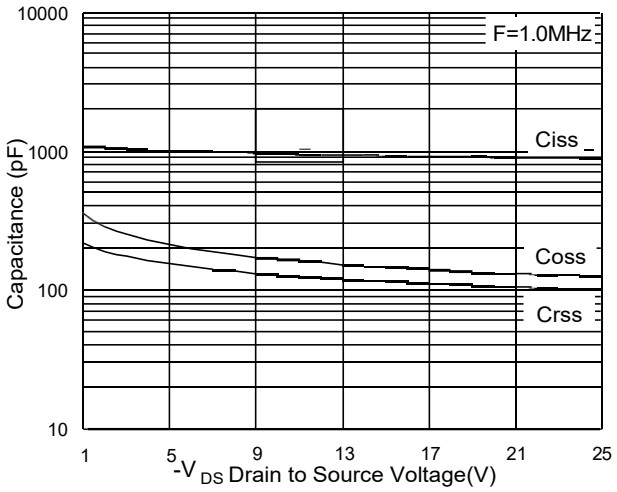


Fig.7 Capacitance

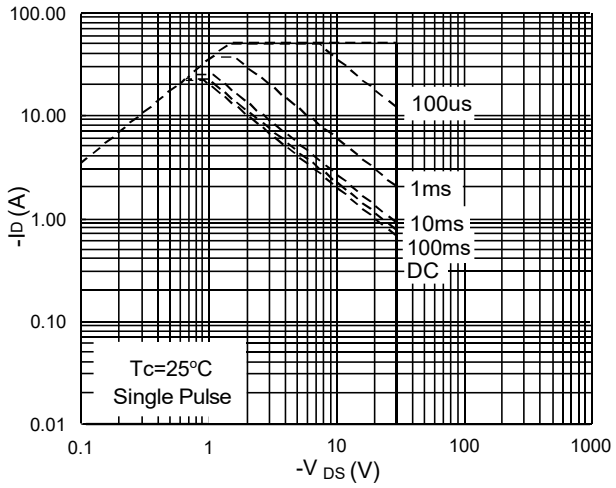
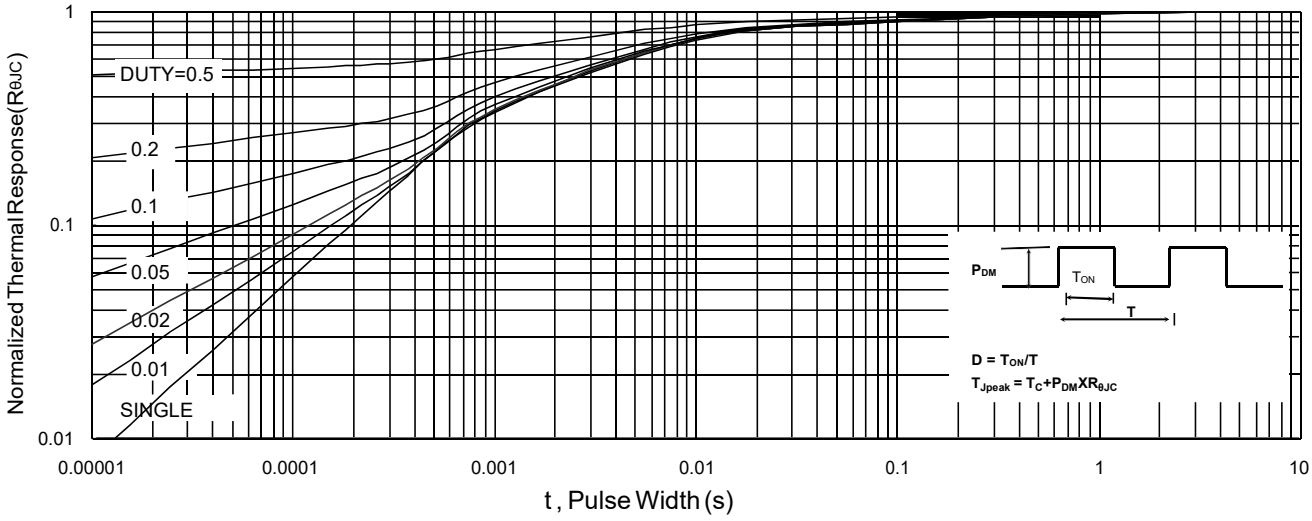


Fig.8 Safe Operating Area



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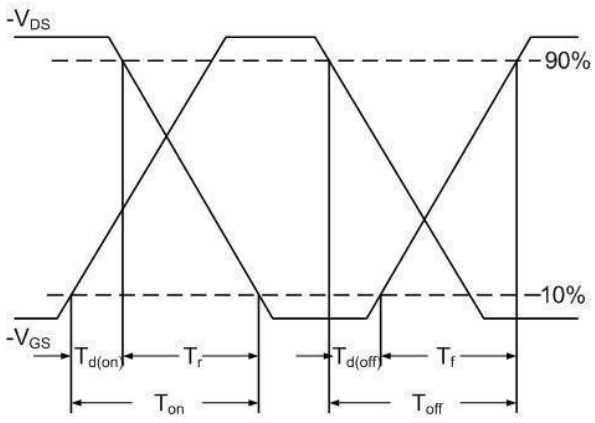


Fig.10 Switching Time Waveform

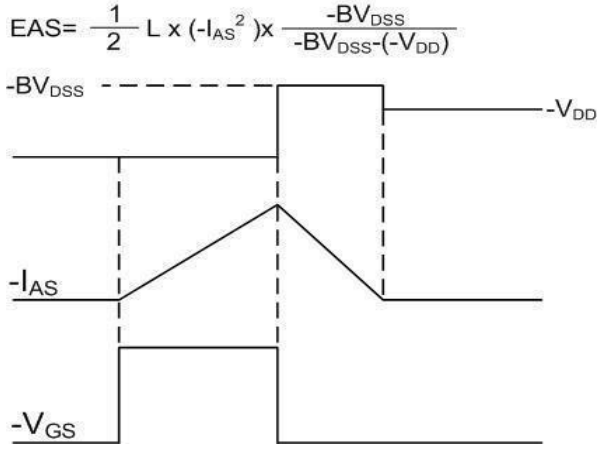
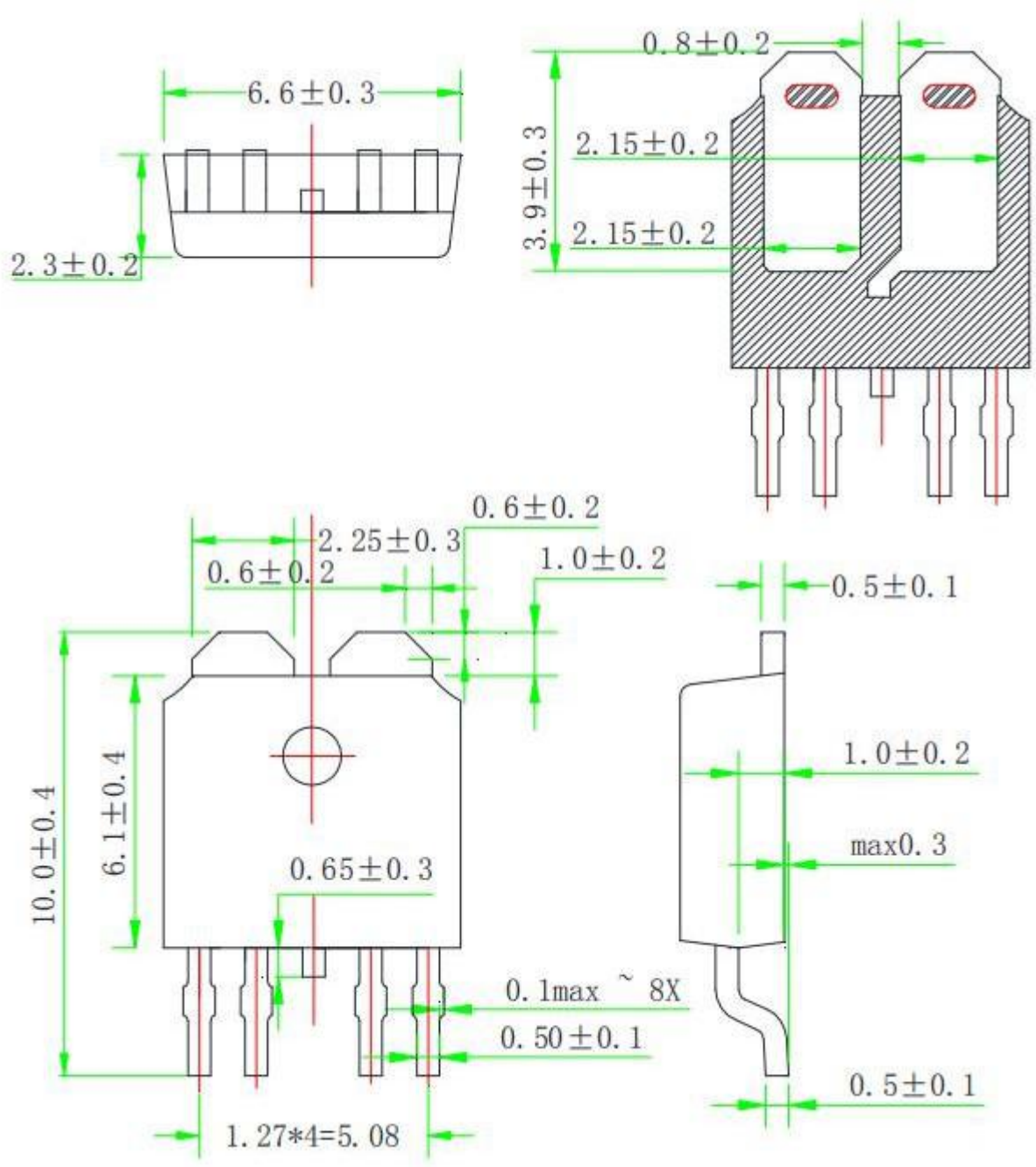


Fig.11 Unclamped Inductive Switching Waveform


6.6±0.3
2.3±0.2
0.8±0.2
3.9±0.3
2.15±0.2
2.15±0.2
0.6±0.2
2.25±0.3
0.6±0.2
1.0±0.2
0.5±0.1
10.0±0.4
6.1±0.4
1.0±0.2
max0.3
0.65±0.3
0.1max ~ 8X
0.50±0.1
0.5±0.1
1.27*4=5.08

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