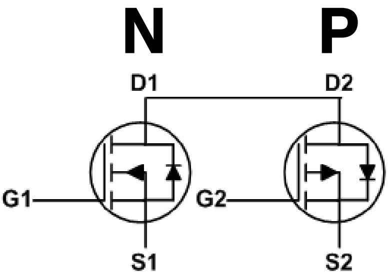
WLU4030

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

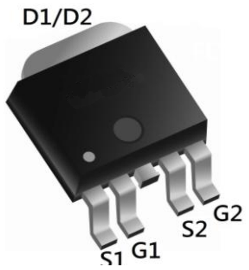


Description

The WLU4030 is the high performance complementary N-ch and P-ch MOSFETs with high cell density, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The WLU4030 meet the RoHS and Green Product requirement 100% EAS guaranteed with full function reliability approved.

TO252-4L Pin Configuration



Product Summary

BVDSS	RDSON	ID
40V	13.5mΩ	30A
-40V	25mΩ	-30A

Absolute Maximum Ratings

Symbol	Parameter	Rating		Units
		N-Ch	P-Ch	
V_{DS}	Drain-Source Voltage	40	-40	V
V_{GS}	Gate-Source Voltage	±20	±20	V
I_D@T_C=25°C	Continuous Drain Current, V_{GS} @ 10V[1]	30	-30	A
I_D@T_C=100°C	Continuous Drain Current, V_{GS} @ 10V[1]	18	-16	A
I_{DM}	Pulsed Drain Current[2]	60	-60	A
EAS	Single Pulse Avalanche Energy[3]	28	40.9	mJ
I_{AS}	Avalanche Current	27	-27	A
P_D@T_C=25°C	Total Power Dissipation[4]	25	35	W
T_{STG}	Storage Temperature Range	-55 to 150	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	-55 to 150	°C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	---	62	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	3.6	°C/W

N-Channel Electrical Characteristics (T_J=25℃ unless otherwise specified)

Electrical Characteristics (T_C=25℃unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	40	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BVDSS Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	0.032	---	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=15A	---	13.5	18	mΩ
		V_{GS}=4.5V , I_D=10A	---	18.4	24	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.2	1.6	2.5	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-4.8	---	mV/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=32V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=32V , V_{GS}=0V , T_J=55℃	---	---	5	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=5V , I_D=15A	---	34	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	2.1	---	Ω
Q_g	Total Gate Charge (4.5V)	V_{DS}=32V , V_{GS}=4.5V , I_D=15A	---	10	---	nC
Q_{gs}	Gate-Source Charge		---	2.55	---	
Q_{gd}	Gate-Drain Charge		---	4.8	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=20V , V_{GS}=10V , R_G=3.3□ I_D=15A	---	2.8	---	ns
T_r	Rise Time		---	12.8	---	
$T_{d(off)}$	Turn-Off Delay Time		---	21.2	---	
T_f	Fall Time		---	6.4	---	
C_{iss}	Input Capacitance	V_{DS}=15V , V_{GS}=0V , f=1MHz	---	1013	---	pF
C_{oss}	Output Capacitance		---	107	---	
C_{rss}	Reverse Transfer Capacitance		---	76	---	
I_S	Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	---	---	40	A
I_{SM}	Pulsed Source Current[2,5]		---	---	85	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1.2	V
t_{rr}	Reverse Recovery Time	I_F=15A , dI/dt=100A/μs , T_J=25℃	---	10	---	nS
Q_{rr}	Reverse Recovery Charge		---	3.1	---	nC

Note :

1.The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.

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}=25A

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-Channel Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=-250uA	-40	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C , I_D=-1mA	---	-0.02	---	V/°C
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=-10V , I_D=-8A	---	25	32	mΩ
		V_{GS}=-4.5V , I_D=-4A	---	32	46	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =-250uA	-1.0	---	-2.5	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	3.72	---	V/°C
I_{DSS}	Drain-Source Leakage Current	V_{DS}=-32V , V_{GS}=0V , T_J=25°C	---	---	1	uA
		V_{DS}=-32V , V_{GS}=0V , T_J=55°C	---	---	5	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=-5V , I_D=-8A	---	10.7	---	S
Q_g	Total Gate Charge (-4.5V)	V_{DS}=-15V , V_{GS}=-4.5V , I_D=-1A	---	11.5	---	nC
Q_{gs}	Gate-Source Charge		---	3.5	---	
Q_{gd}	Gate-Drain Charge		---	3.3	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=-15V , V_{GS}=-10V , R_G=3.3Ω, I_D=-1A	---	22	---	ns
T_r	Rise Time		---	15.7	---	
$T_{d(off)}$	Turn-Off Delay Time		---	59	---	
T_f	Fall Time		---	5.5	---	
C_{iss}	Input Capacitance	V_{DS}=-15V , V_{GS}=0V , f=1MHz	---	1415	---	pF
C_{oss}	Output Capacitance		---	134	---	
C_{rss}	Reverse Transfer Capacitance		---	102	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	---	---	-30	A
I_{SM}	Pulsed Source Current[2,5]		---	---	-60	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=-1A , T_J=25°C	---	---	-1.2	V

Note :
1.The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.
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}=-28.6A
4.The power dissipation is limited by 150°C 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

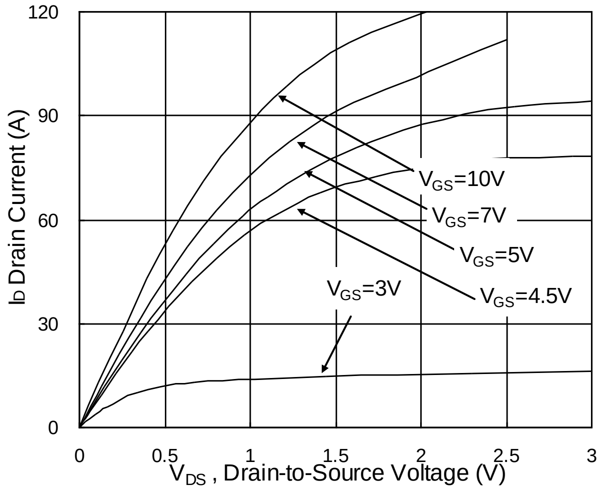


Fig.1 Typical Output Characteristics

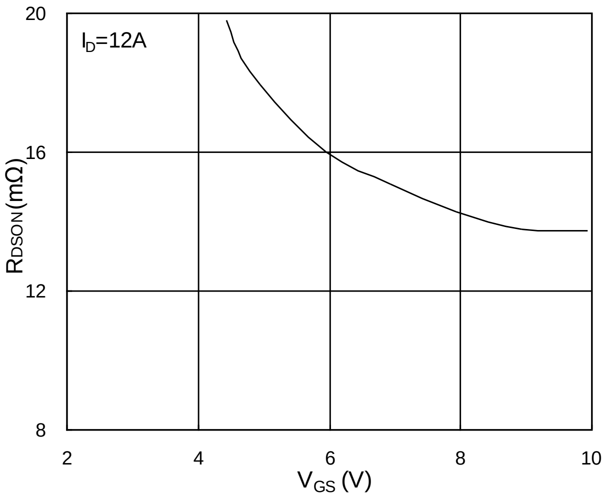


Fig.2 On-Resistance vs. G-S Voltage

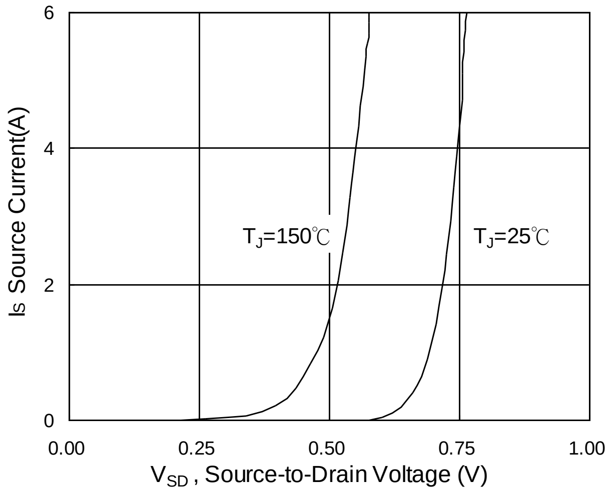


Fig.3 Forward Characteristics of Reverse

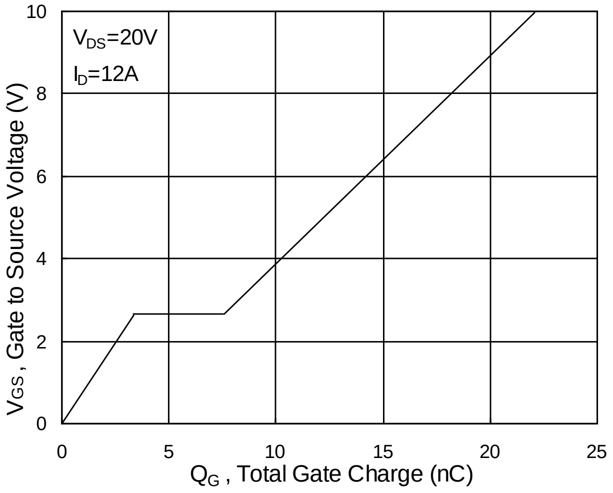


Fig.4 Gate-Charge Characteristics

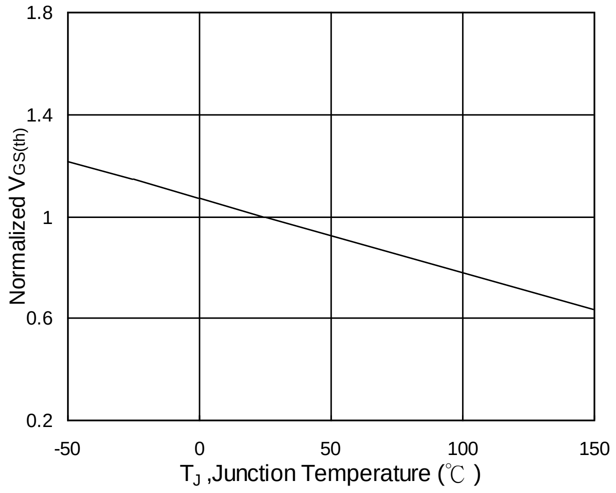


Fig.5 $V_{GS(th)}$ vs. T_J

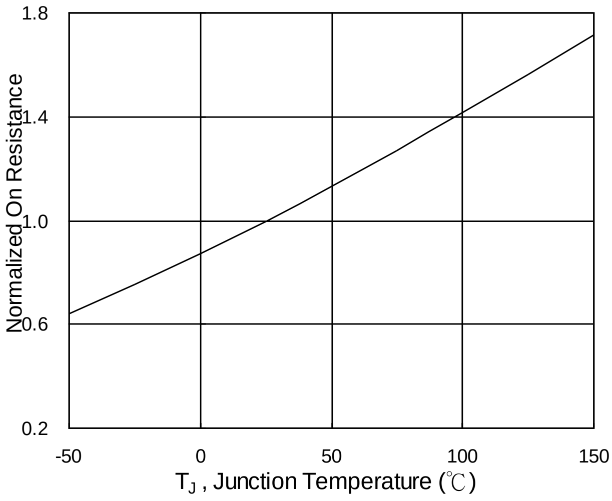


Fig.6 Normalized R_{DSON} vs. T_J

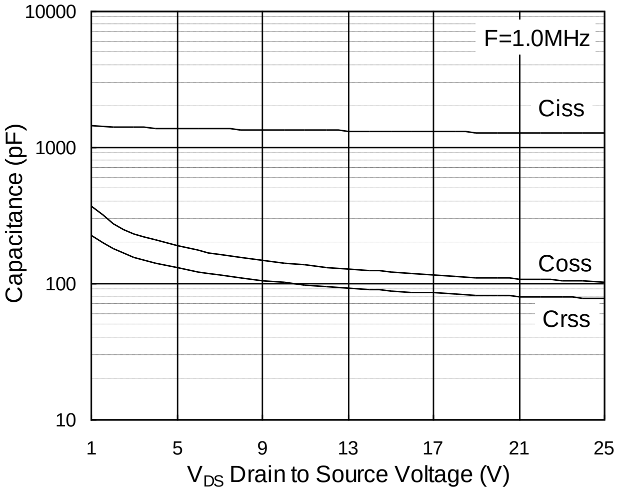


Fig.7 Capacitance

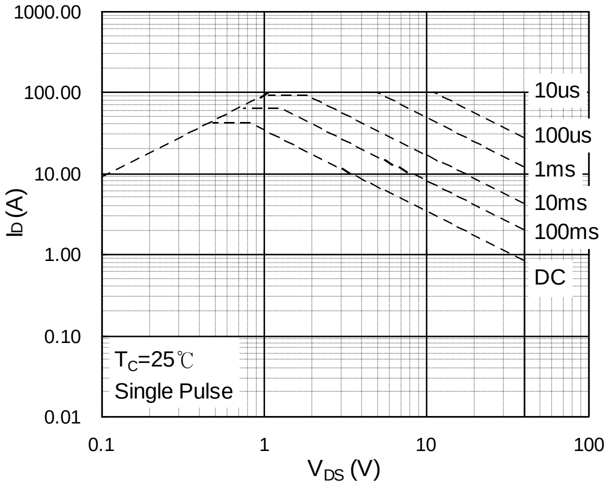


Fig.8 Safe Operating Area

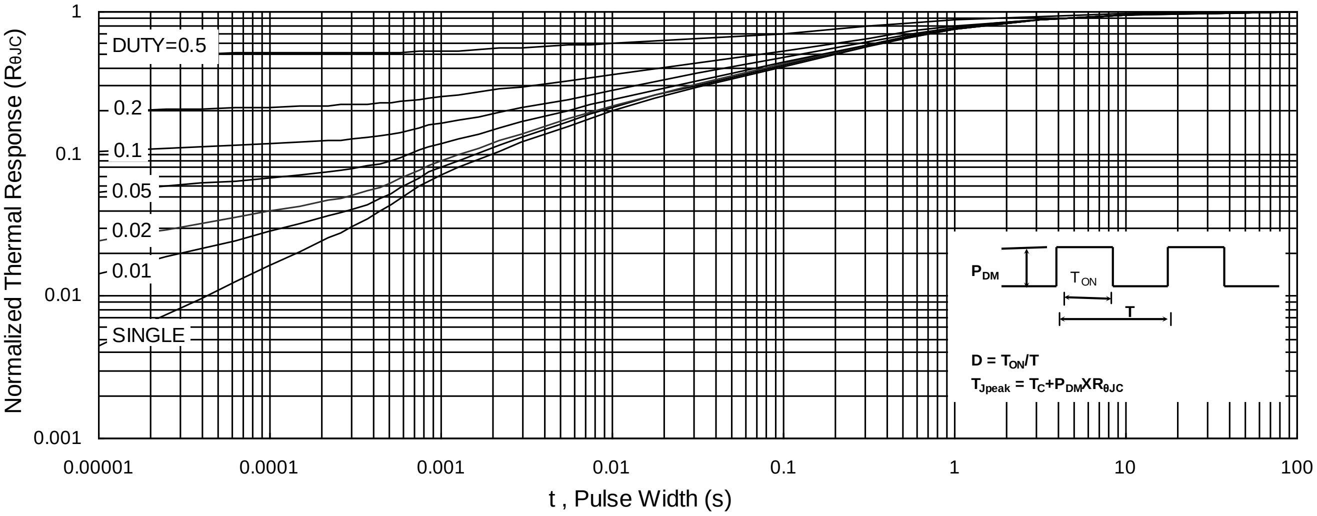
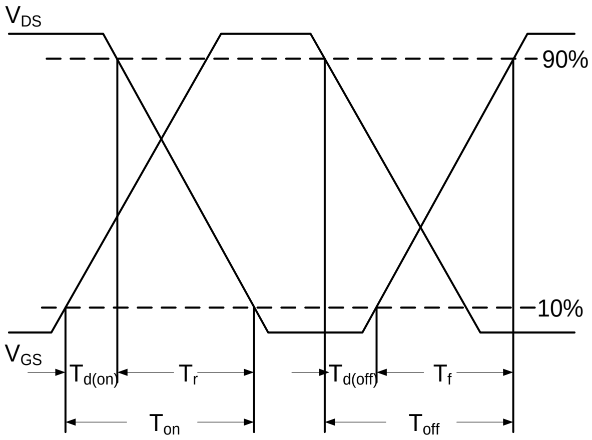


Fig.9 Normalized Maximum Transient Thermal Impedance



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

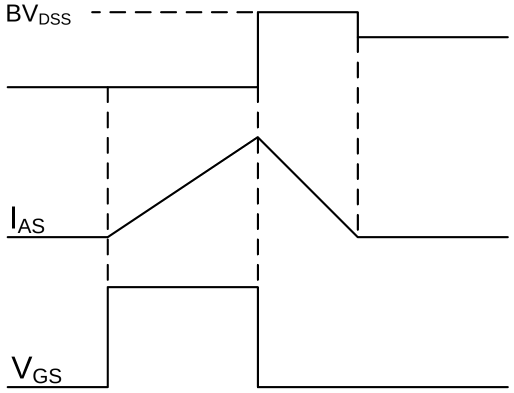


Fig.11 Unclamped Inductive Switching Waveform

P-Channel Typical Characteristics

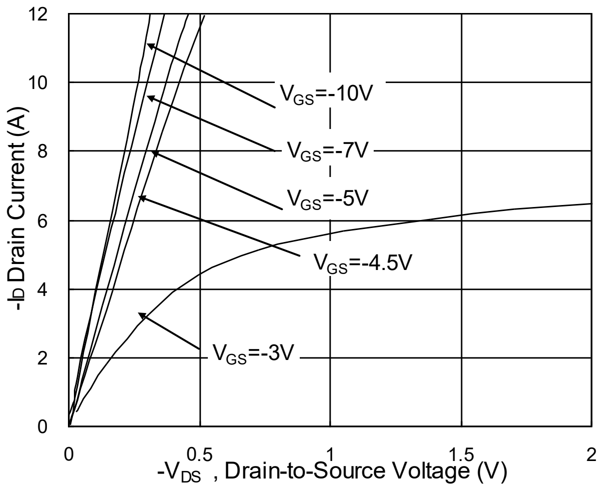


Fig.1 Typical Output Characteristics

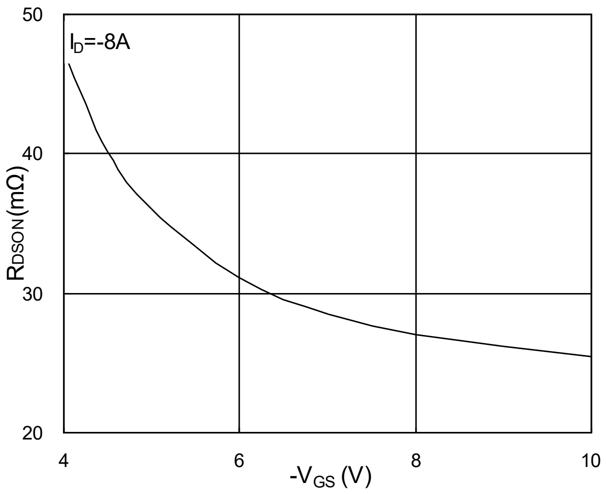


Fig.2 On-Resistance v.s Gate-Source

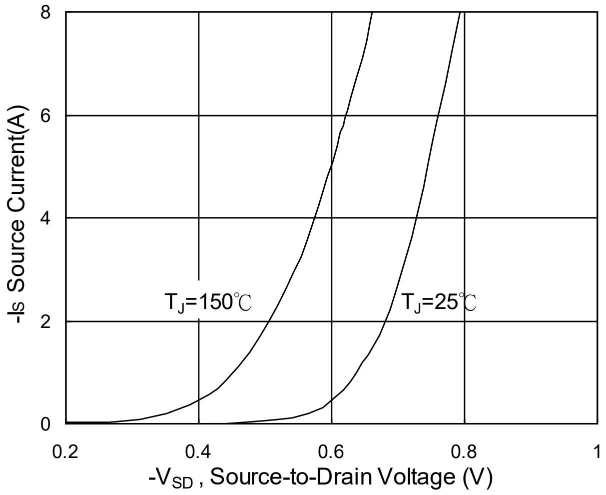


Fig.3 Forward Characteristics Of Reverse

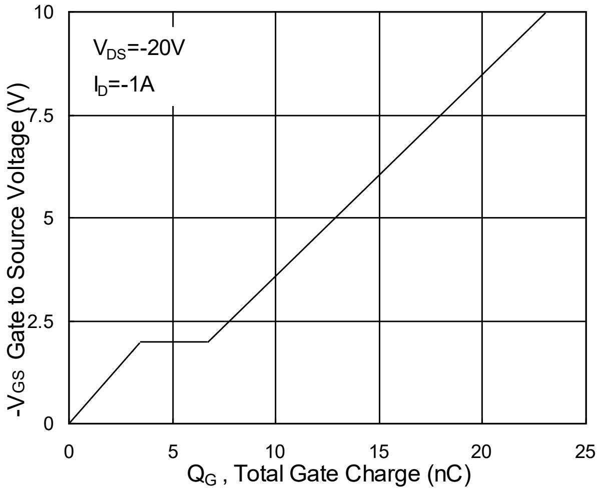


Fig.4 Gate Charge Characteristics

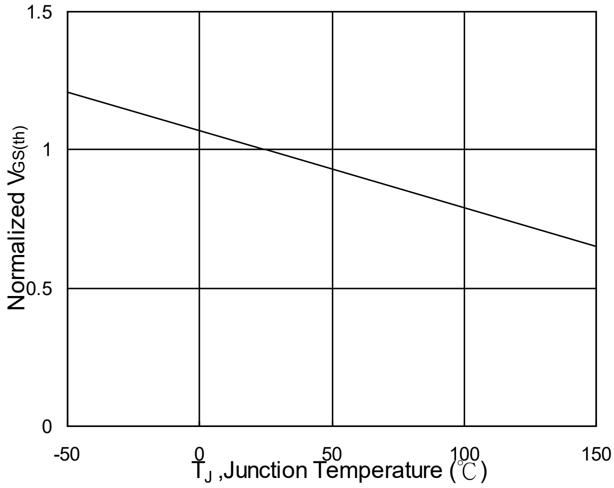


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

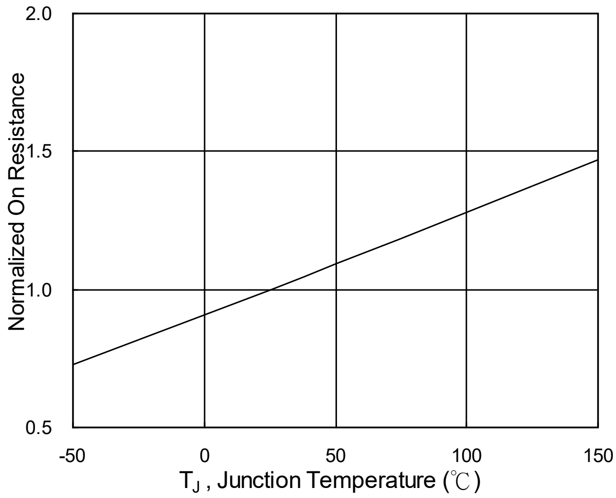


Fig.6 Normalized R_{DSON} v.s T_J

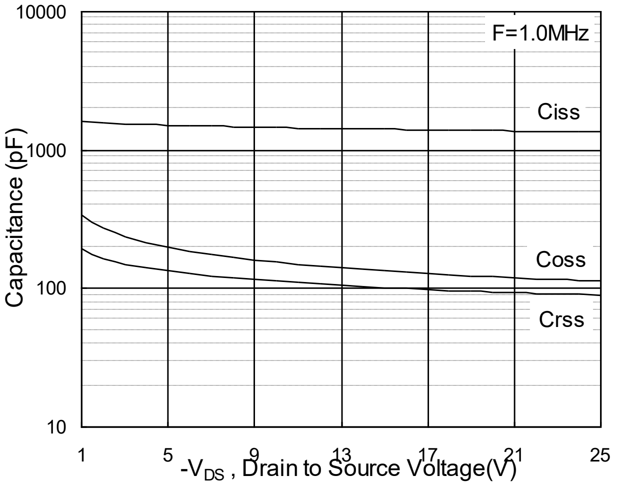


Fig.7 Capacitance

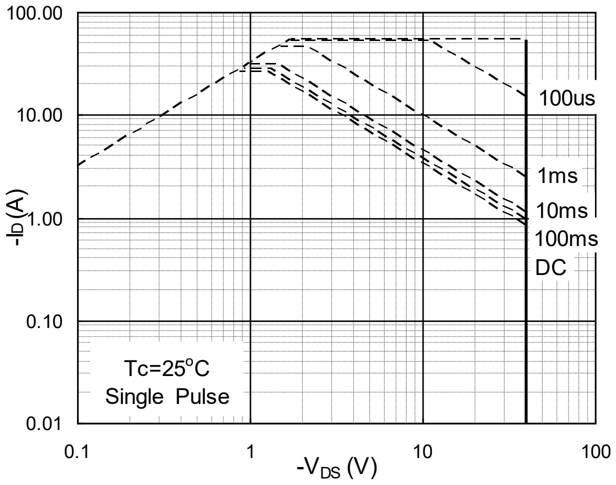


Fig.8 Safe Operating Area

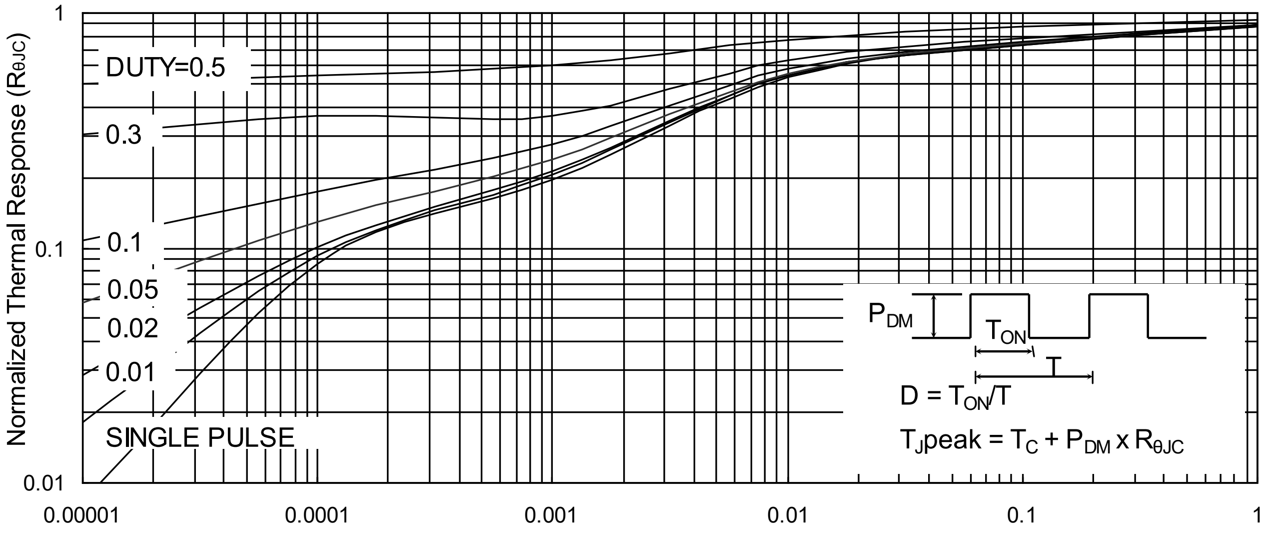
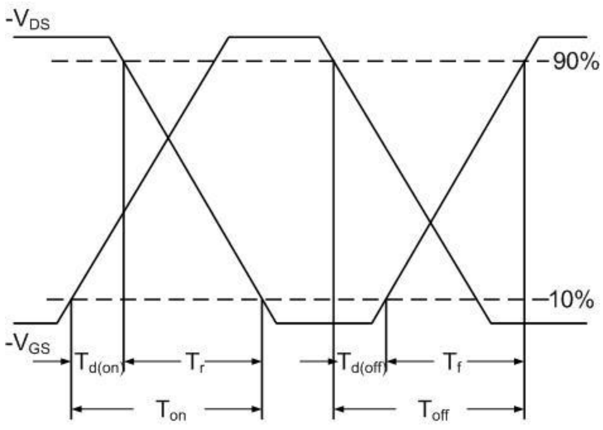


Fig.9 Normalized Maximum Transient Thermal Impedance



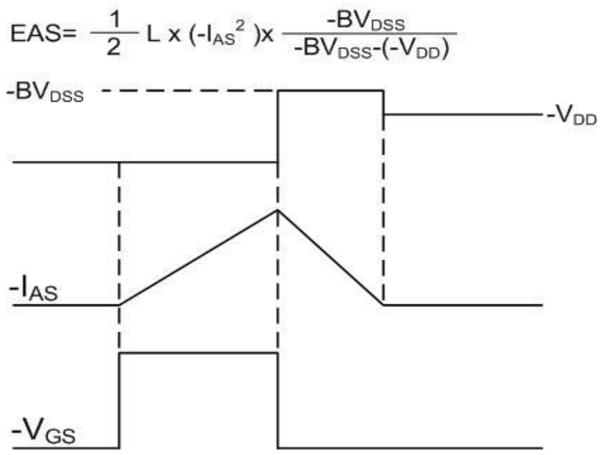
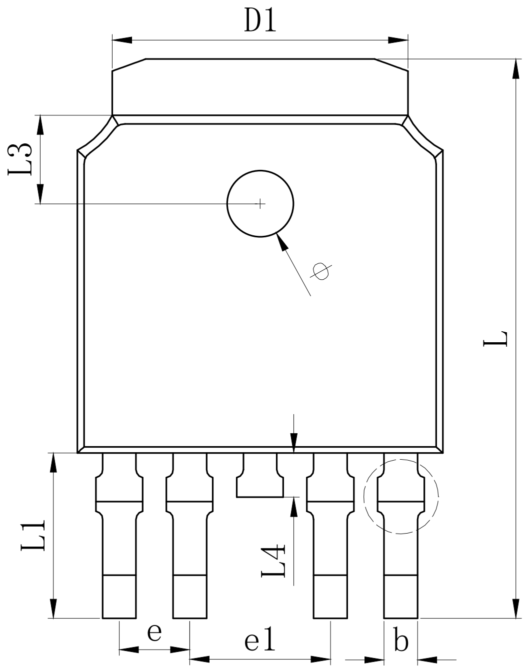
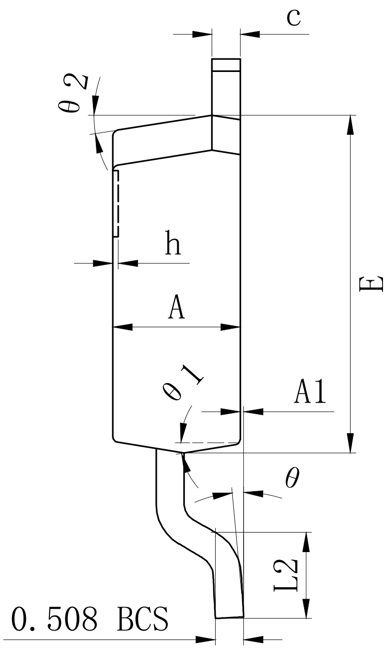


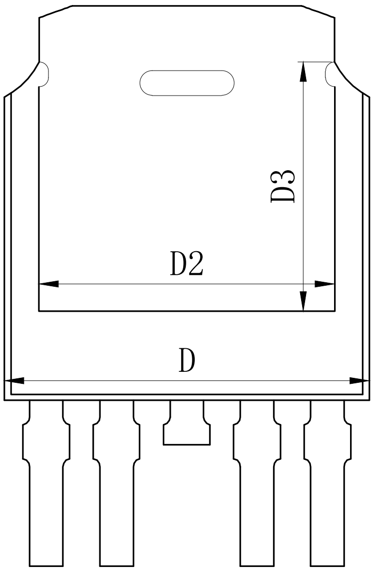
Fig.10 Switching Time Waveform

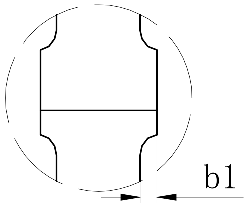
Fig.11 Unclamped Inductive Waveform

Mechanical Dimensions for TO-252-4L









SYMBOL	MILLIMETER		
	MIN	Typ.	MAX
A	2.200	2.300	2.400
A1	0.000		0.127
b	0.550	0.600	0.650
b1	0.000		0.120
c(电镀后)	0.460	0.520	0.580
D	6.500	6.600	6.700
D1	5.334 REF		
D2	5.346 REF		
D3	4.490 REF		
E	6.000	6.100	6.200
e	1.270 TYP		
e1	2.540 TYP		
h	0.000	0.100	0.200
L	9.900	10.100	10.300
L1	2.988 REF		
L2	1.400	1.550	1.700
L3	1.600 REF		
L4	0.700	0.800	0.900
Φ	1.100	1.200	1.300
θ	0°		8°
θ1	9° TYP		
θ2	9° TYP		

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