General Description

The WSF30150A is the highest performance trench N-Ch MOSFET with extreme high cell density , which provide excellent RDSON and gate charge for most of the synchronous buck converter applications .

The WSF30150A meet the RoHS and Green Product requirement , 100% EAS guaranteed with full function reliability approved.

Features

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

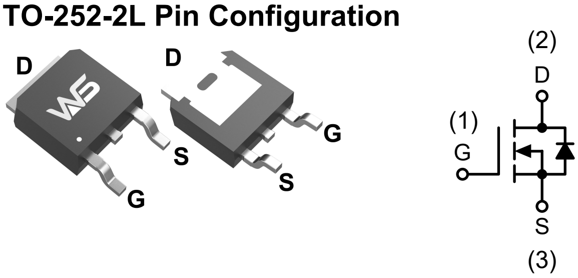
Product Summery

BVDSS	RDSON	ID
30V	2.2mΩ	145A

Applications

- High Frequency Point-of-Load Synchronous Buck Converter
- Networking DC-DC Power System
- Power Tool Application

TO-252-2L Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1,7]	145	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1,7]	75	A
I_{DM}	Pulsed Drain Current[2]	310	A
EAS	Single Pulse Avalanche Energy[3]	372	mJ
I_{AS}	Avalanche Current	86	A
P_D@T_C=25℃	Total Power Dissipation[4]	78	W
T_{STG}	Storage Temperature Range	-55 to 175	℃
T_J	Operating Junction Temperature Range	-55 to 175	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{θJA}$	Thermal Resistance Junction-Ambient [1]	---	55	℃/W
$R_{θJC}$	Thermal Resistance Junction-Case[1]	---	1.6	℃/W

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	30	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	0.022	---	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=20A	---	2.2	3.5	mΩ
		V_{GS}=4.5V , I_D=15A	---	3.1	4.2	
$V_{GS(th)}$	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		---	-6.1	---	mV/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=24V , V_{GS}=0V , T_J=25℃	---	---	2	uA
		V_{DS}=24V , V_{GS}=0V , T_J=55℃	---	---	10	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forwar Trd ansconductance	V_{DS}=5V , I_D=15A	---	32	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	1.1	2.5	Ω
Q_g	Total Gate Charge (4.5V)	V_{DS}=15V , V_{GS}=4.5V , I_D=20A	---	22	---	nC
Q_{gs}	Gate-Source Charge		---	4.3	---	
Q_{gd}	Gate-Drain Charge		---	8.3	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=15V , V_{GEN}=10V , R_G=6Ω, I_D=1A, R_L=15Ω.	---	11	---	ns
T_r	Rise Time Rise Time		---	16	---	
$T_{d(off)}$	Turn-Off Delay Time		---	35	---	
T_f	Turn-Off Fall Time		---	40	---	
C_{iss}	Input Capacitance	V_{DS}=15V , V_{GS}=0V , f=1MHz	---	2450	---	pF
C_{oss}	Output Capacitance		---	590	---	
C_{rss}	Reverse Transfer Capacitance		---	245	---	

Guaranteed Avalanche Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
EAS	Single Pulse Avalanche Energy[5]	V_{DD}=25V , L=0.1mH , I_{AS}=15A	85	---	---	mJ

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,6]	V_G=V_D=0V , Force Current	---	---	50	A
I_{SM}	Pulsed Source Current[2,6]		---	---	310	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=20A , T_J=25℃	---	---	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}=20A
4.The power dissipation is limited by 150℃ junction temperature
5.The Min. value is 100% EAS tested guarantee.
6.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.
7.Package limitation current is 100A.

Typical Characteristics

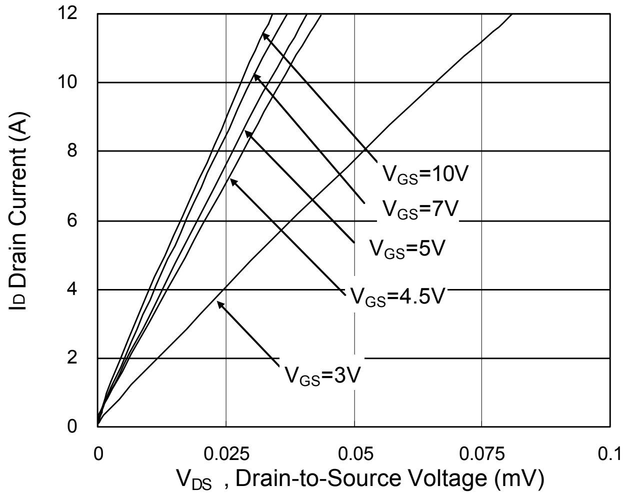


Fig.1 Typical Output Characteristics

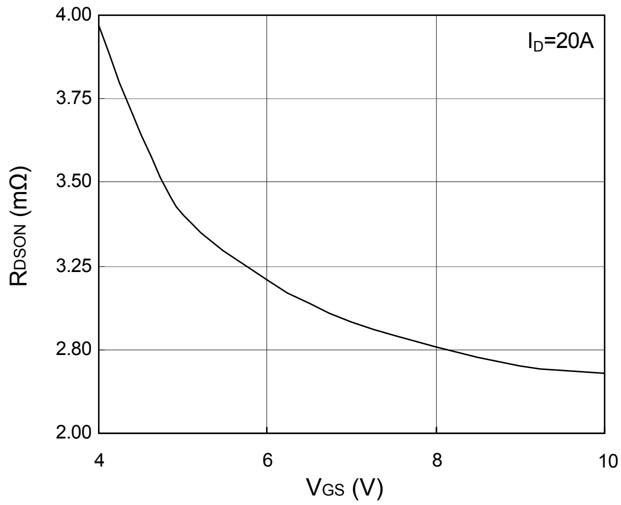


Fig.2 On-Resistance v.s Gate- Source

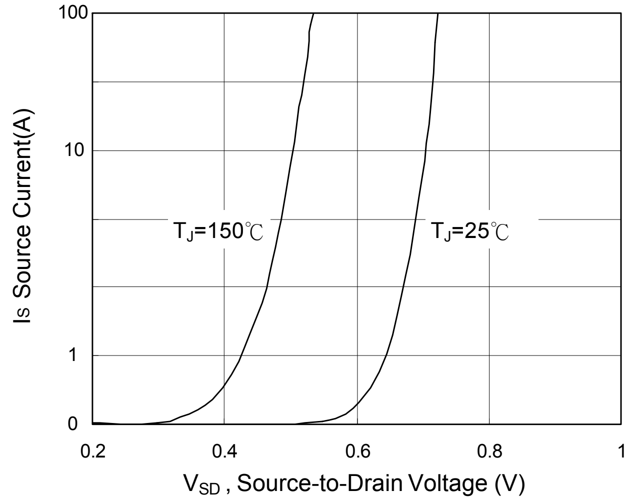


Fig.3 Forward Characteristics of Reverse

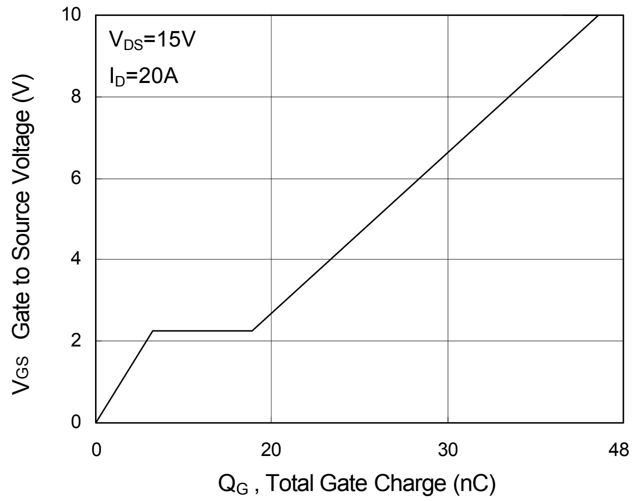


Fig.4 Gate-Charge Characteristics

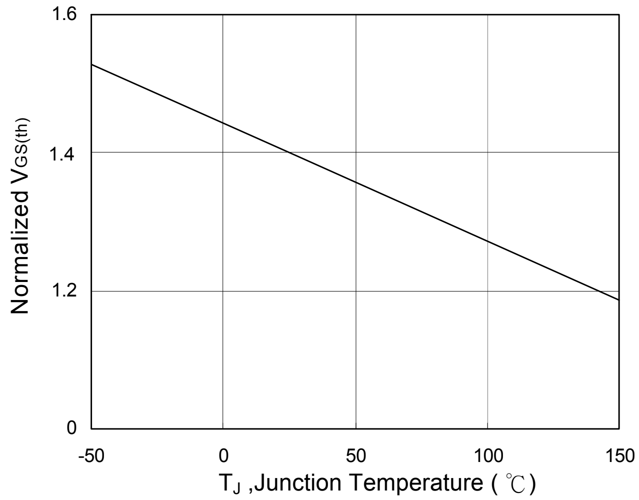


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

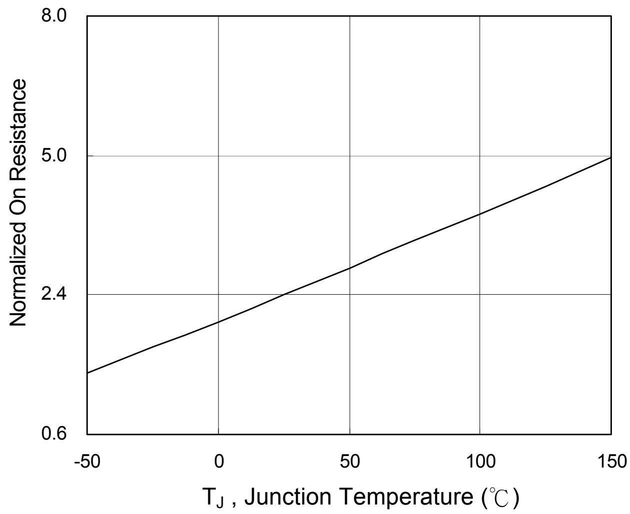


Fig.6 Normalized R_{DSON} v.s T_J

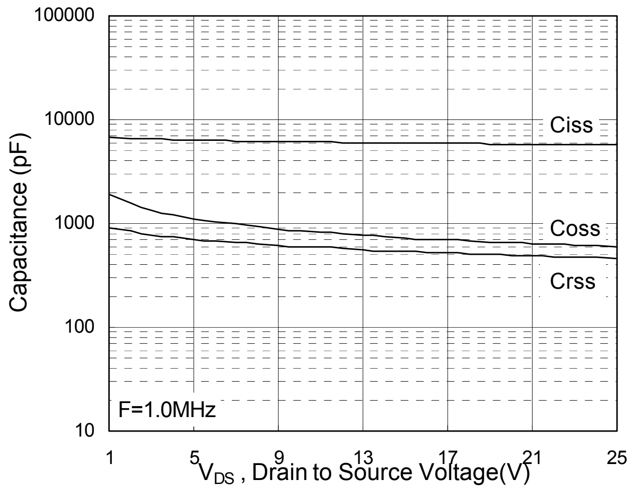


Fig.7 Capacitance

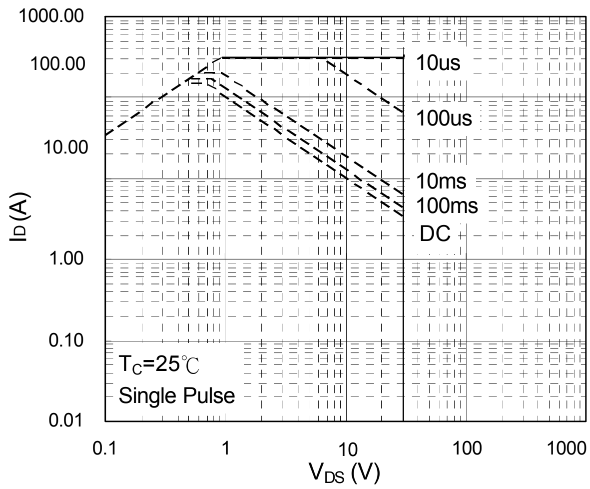


Fig.8 Safe Operating Area

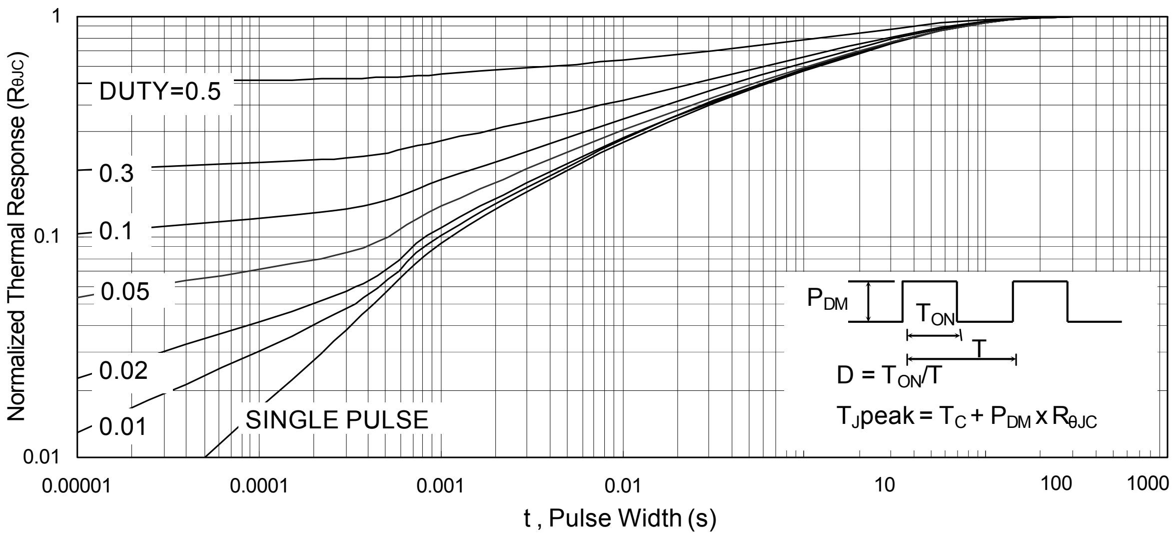


Fig.9 Normalized Maximum Transient Thermal Impedance

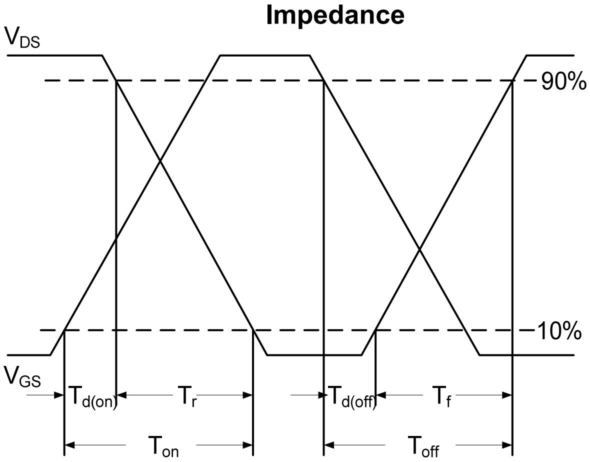


Fig.10 Switching Time Waveform

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

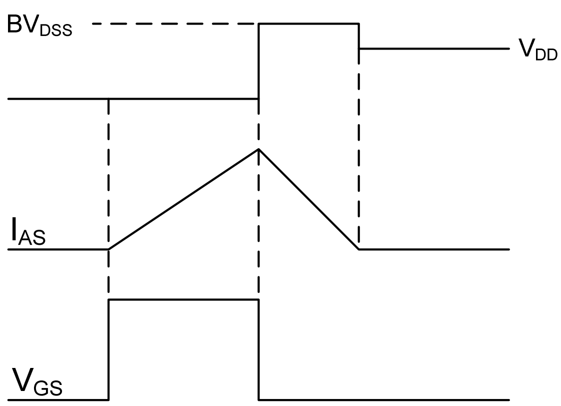
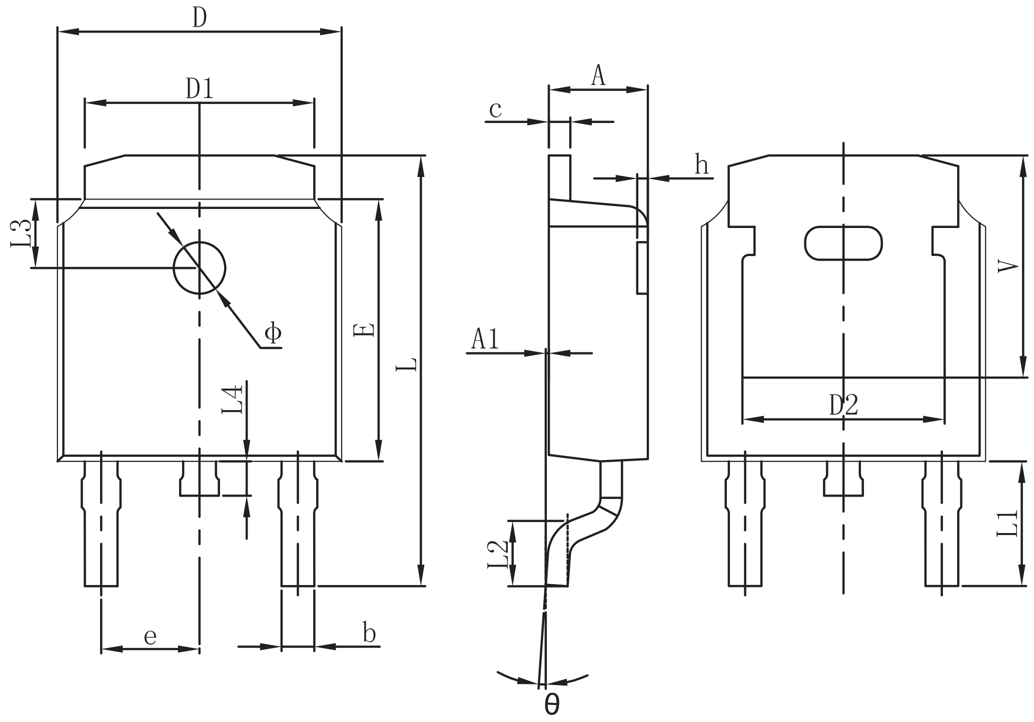


Fig.11 Unclamped Inductive Waveform

Packaging information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.635	0.770	0.025	0.030
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.712	10.312	0.382	0.406
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.250 REF.		0.207 REF.	

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