HUASHUO SEMICONDUCTOR

HSP150N15

N-Ch 150V Fast Switching MOSFETs

Description

The HSP150N15 is the high cell density trenched N-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

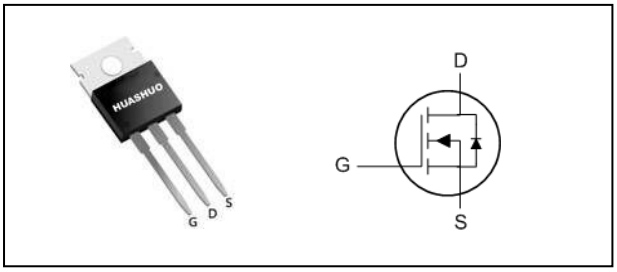
The HSP150N15 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

- 100% EAS Guaranteed
- Load Switch
- SR(Synchronous rectification)
- DC/DC Converter
- Advanced high cell density Trench technology

Product Summary

V_{DS}	150	V
$R_{DS(ON),TYP}$	5	mΩ
I_D	150	A

TO-220 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	150	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1,6]	150	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1,6]	95	A
I_{DM}	Pulsed Drain Current[2]	600	A
EAS	Single Pulse Avalanche Energy[3]	1350	mJ
P_D@T_C=25℃	Total Power Dissipation[4]	310	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	---	62	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	0.41	℃/W

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	150	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance2	V_{GS}=10V , I_D=30A	---	5	6	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	2	3	4	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=120V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=120V , V_{GS}=0V , T_J=85℃	---	---	10	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=10V , I_D=3A	---	19	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	2.8	---	Ω
Qg	Total Gate Charge (10V)	V_{DD}=75V , V_{GS}=10V , I_D=80A	---	120	---	nC
Qgs	Gate-Source Charge		---	35	---	
Qgd	Gate-Drain Charge		---	33	---	
Td(on)	Turn-On Delay Time	V_{DD}=75V , V_{GS}=10V , R_G=6Ω, I_D=80A	---	70	---	ns
Tr	Rise Time		---	200	---	
Td(off)	Turn-Off Delay Time		---	440	---	
Tf	Fall Time		---	200	---	
Ciss	Input Capacitance	V_{DS}=75V , V_{GS}=0V , f=1MHz	---	8600	---	pF
Coss	Output Capacitance		---	700	---	
Crss	Reverse Transfer Capacitance		---	26	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current1,5	V_G=V_D=0V , Force Current	---	---	150	A
V_{SD}	Diode Forward Voltage2	V_{GS}=0V , I_S=50A , T_J=25℃	---	---	1	V
t_{rr}	Reverse Recovery Time	I_F=20A , dI/dt=100A/μs , T_J=25℃	---	130	---	nS
Q_{rr}	Reverse Recovery Charge		---	720	---	nC

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=50V,V_{GS}=10V,L=1mH,I_{AS}=52A.,R_G=25 ,Starting T_J=25°C.
3. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
4. Essentially independent of operating temperature.

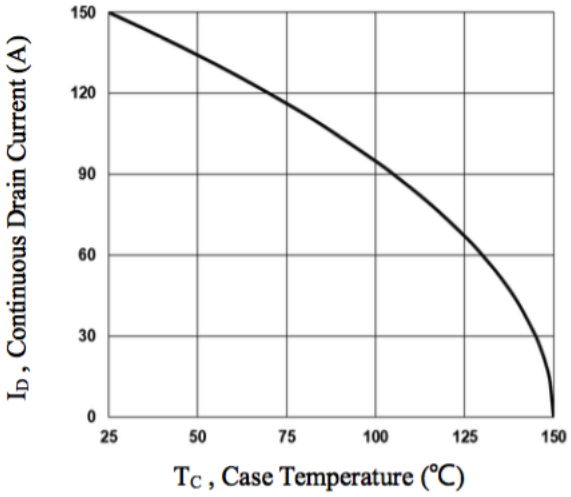


Fig.1 Continuous Drain Current vs. T_C

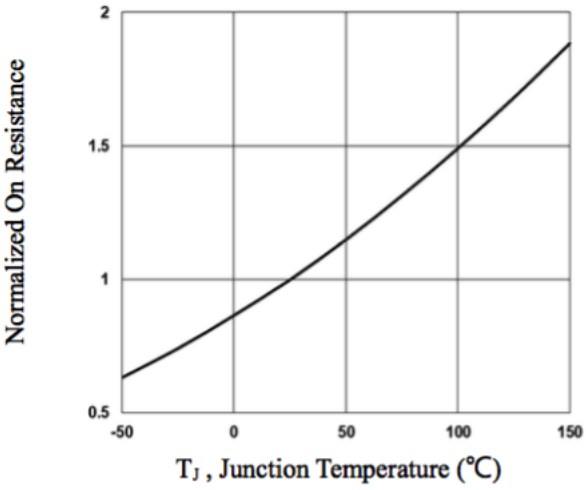


Fig.2 Normalized RDSON vs. T_J

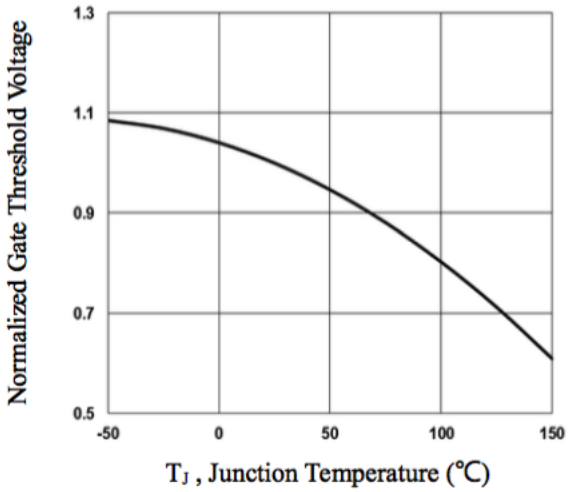


Fig.3 Normalized Vth vs. T_J

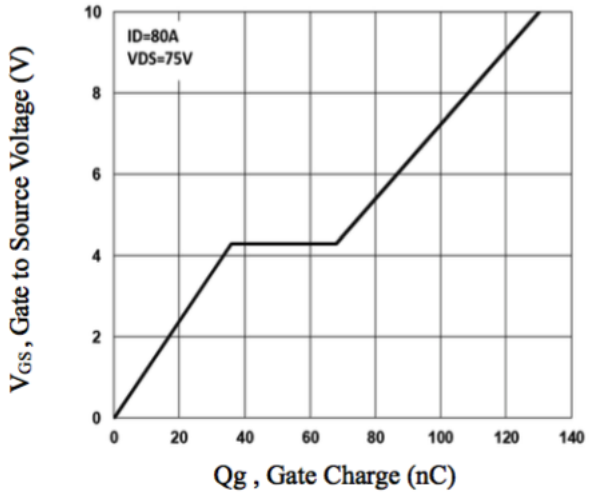


Fig.4 Gate Charge Characteristics

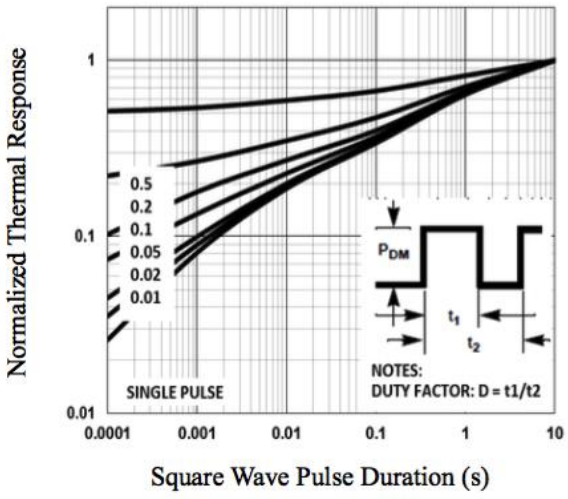


Fig.5 Normalized Transient Impedance

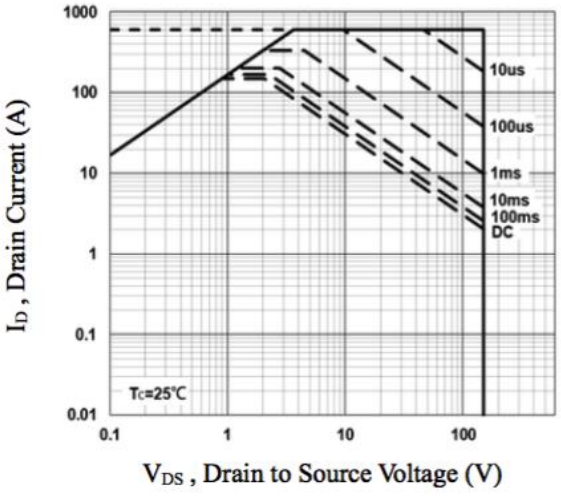


Fig.6 Maximum Safe Operation Area

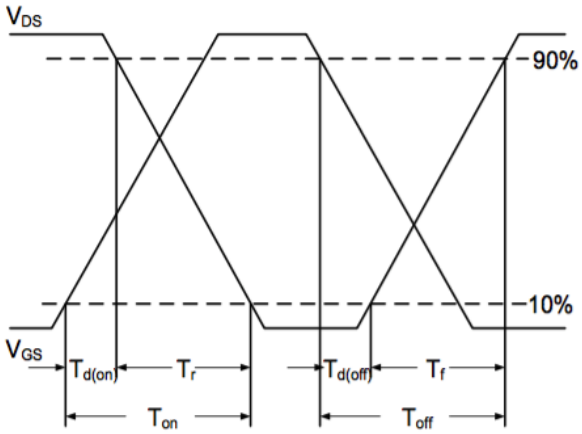


Fig.7 Switching Time Waveform

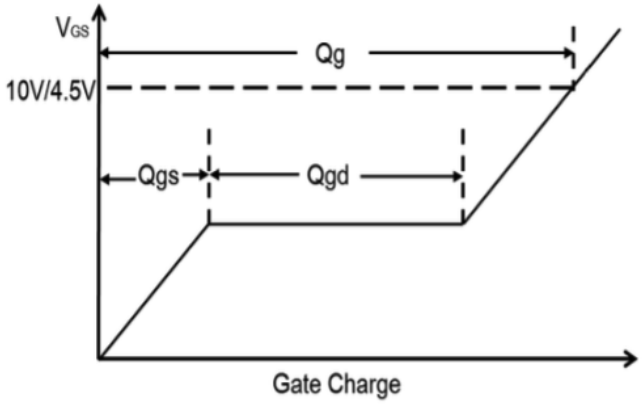
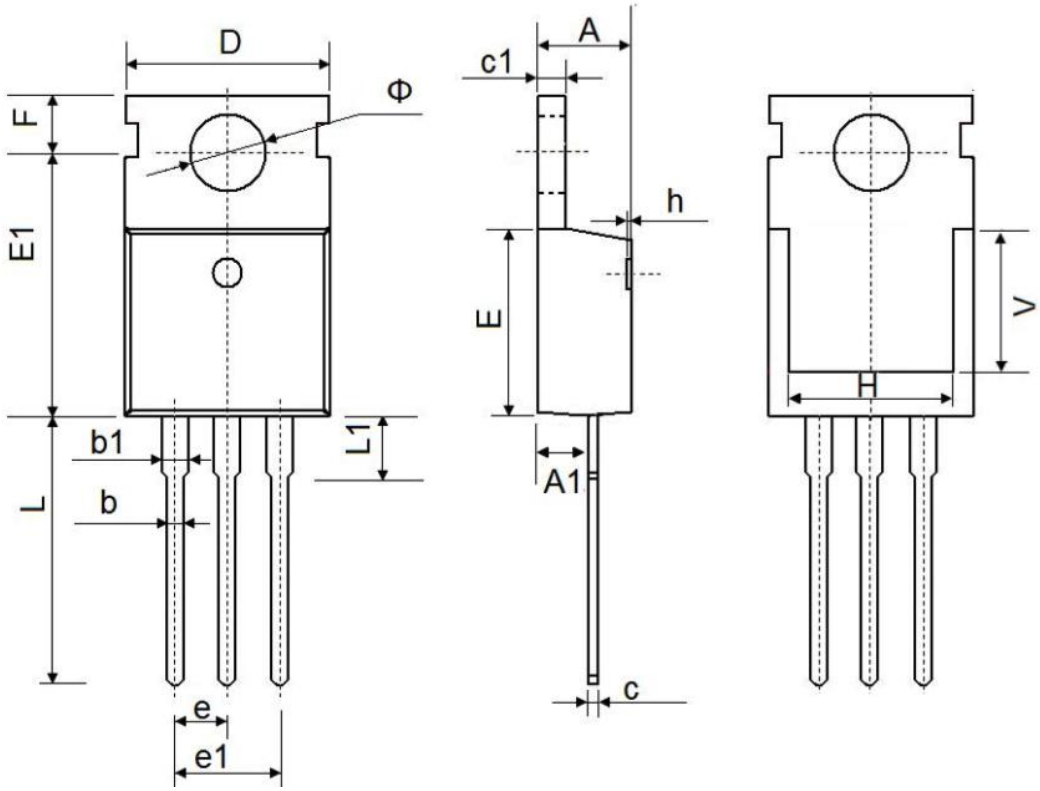


Fig.8 Gate Charge Waveform

TO-220 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max
A	4.300	4.700	0.169	0.185
A1	2.200	2.600	0.087	0.102
b	0.700	0.950	0.028	0.037
b1	1.170	1.410	0.046	0.056
c	0.450	0.650	0.018	0.026
c1	1.200	1.400	0.047	0.055
D	9.600	10.400	0.378	0.409
E	8.8500	9.750	0.348	0.384
E1	12.650	12.950	0.498	0.510
e	2.540 TYP.		0.100TYP.	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.750	14.300	0.502	0.563
L1	2.850	3.950	0.112	0.156
V	7.500 REF.		0.295 REF.	
Φ	3.400	4.000	0.134	0.157