HSH200N02

N-Ch 200V Fast Switching MOSFETs

Description

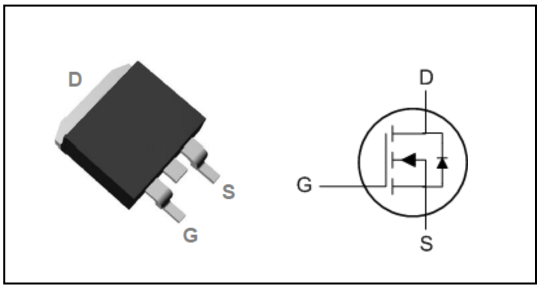
The HSH200N02 is the highest performance trench N-ch MOSFETs with extreme high cell density, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.
The HSH200N02 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

- Power Switching application
- Green Device Available
- Excellent Cdv/dt effect decline
- Advanced high cell density Trench technology

Product Summary

V_{DS}	200	V
$R_{DS(ON),typ}$	27	mΩ
I_D	70	A

TO263 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	200	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25˚C	Continuous Drain Current, V_{GS} @ 10V[1]	70	A
I_D@T_C=100˚C	Continuous Drain Current, V_{GS} @ 10V[1]	46	A
I_{DM}	Pulsed Drain Current[2]	252	A
EAS	Single Pulse Avalanche Energy[3]	580	mJ
P_D@T_C=25˚C	Total Power Dissipation[3]	200	W
T_{STG}	Storage Temperature Range	-55 to 150	˚C
T_J	Operating Junction Temperature Range	-55 to 150	˚C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{θJA}$	Thermal Resistance Junction-ambient [1]	---	60	˚C/W
$R_{θJC}$	Thermal Resistance Junction-Case[1]	---	0.55	˚C/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	200	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=30A	---	27	33	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	2	---	4	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=160V , V_{GS}=0V , T_J=25˚C	---	---	1	uA
		V_{DS}=160V , V_{GS}=0V , T_J=55˚C	---	---	5	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	3	---	Ω
Q_g	Total Gate Charge (10V)	V_{DS}=100V , V_{GS}=10V , I_D=30A	---	110	---	nC
Q_{gs}	Gate-Source Charge		---	32	---	
Q_{gd}	Gate-Drain Charge		---	38	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=100V , V_{GS}=10V , R_G=2.5Ω I_D=30A	---	30	---	ns
T_r	Rise Time		---	18	---	
$T_{d(off)}$	Turn-Off Delay Time		---	22	---	
T_f	Fall Time		---	33	---	
C_{iss}	Input Capacitance	V_{DS}=25V , V_{GS}=0V , f=1MHz	---	5082	---	pF
C_{oss}	Output Capacitance		---	343	---	
C_{rss}	Reverse Transfer Capacitance		---	129	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	---	---	70	A
I_{SM}	Pulsed Source Current[2,5]		---	---	252	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=30A , T_J=25˚C	---	---	1.2	V
t_{rr}	Reverse Recovery Time	I_F=30A , dI/dt=100A/µs , T_J=25˚C	---	47	---	nS
Q_{rr}	Reverse Recovery Charge		---	81	---	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=0.3mH

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.

Typical Characteristics

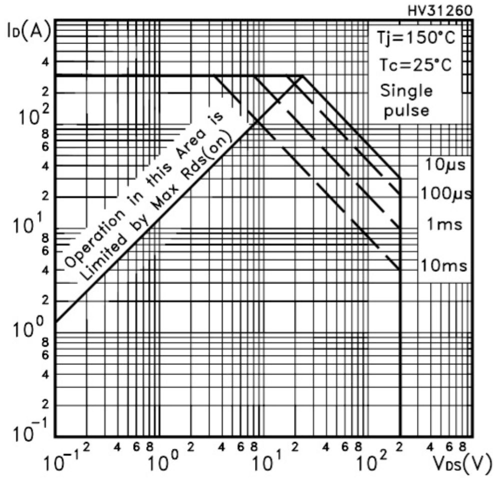


Fig.1 Safe operating area for TO-220

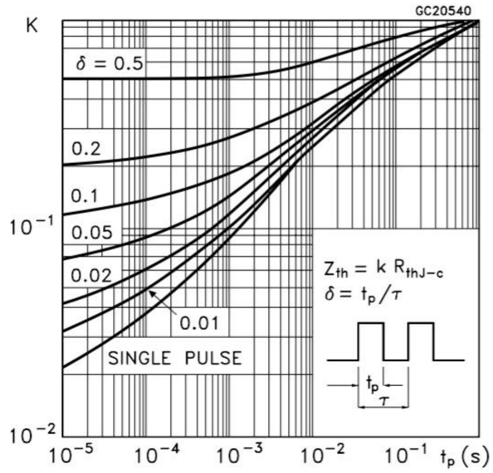


Fig.2 Thermal impedance for TO-220

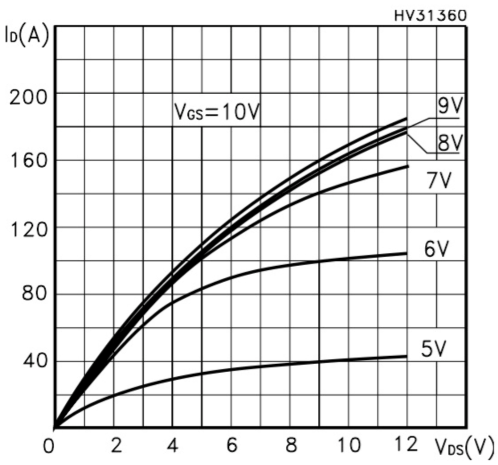


Fig.3 Output characterisics

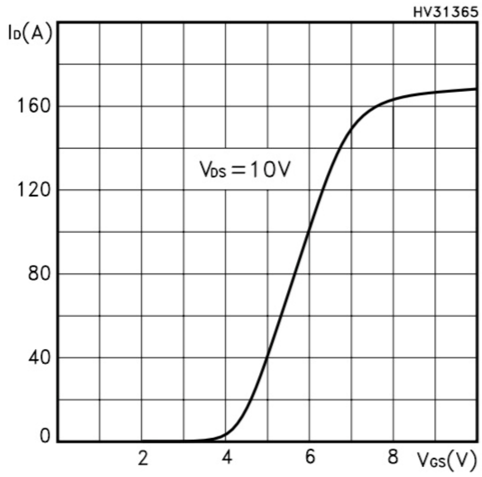


Fig.4 Transfer characteristics

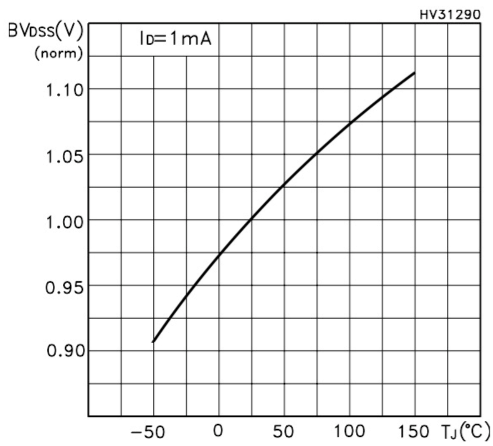


Fig.5 Normalized BVDSS vs temperature

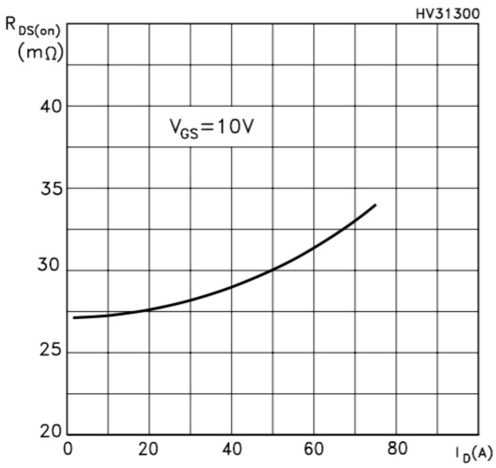


Fig.6 Static drain-source on resistance

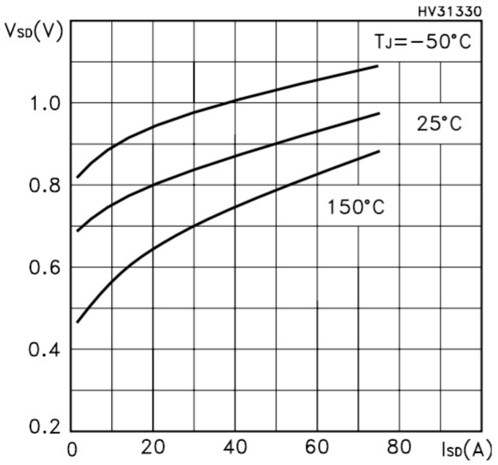


Fig.7 Source-drain diode forword characteristics

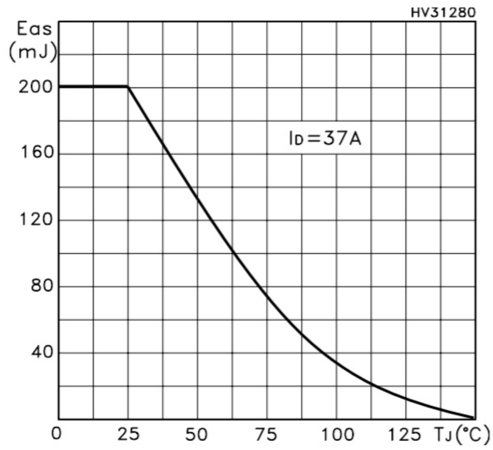


Fig.8 Avalanche energy vs starting Tj

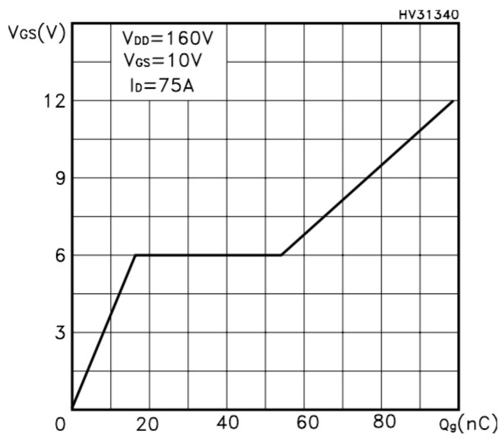


Fig.9 Gate charge vs gate-source voltage

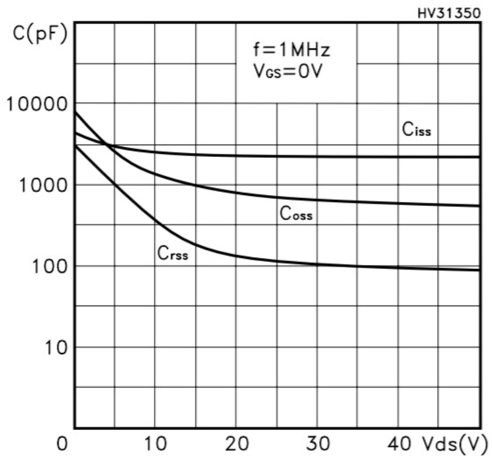


Fig.10 Capacitance variations

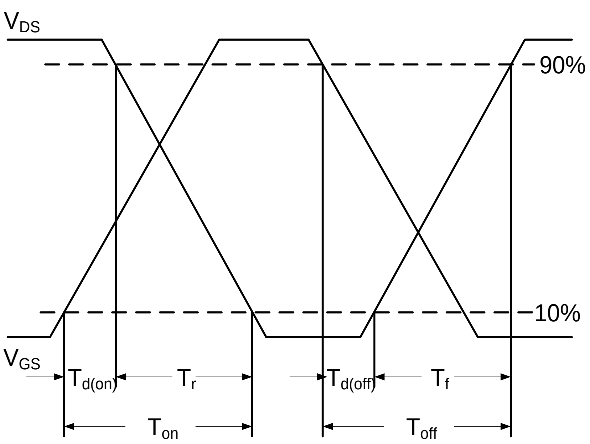


Fig.11 Switching Time Waveform

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

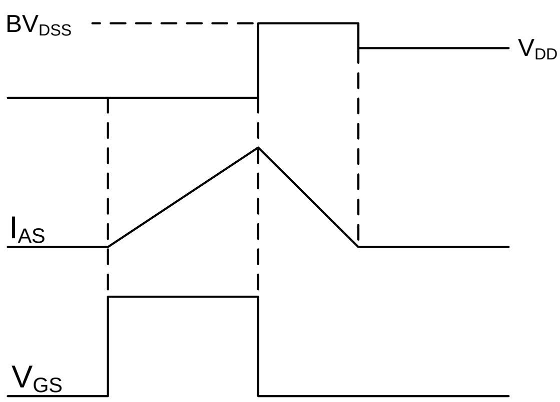
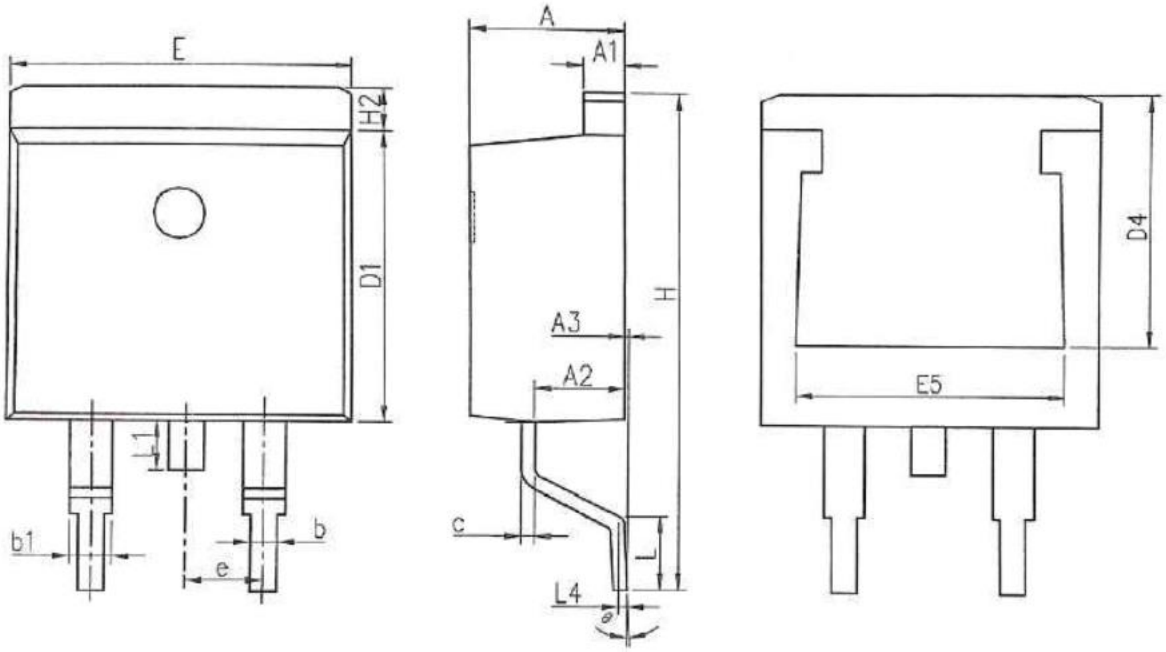


Fig.12 Unclamped Inductive Switching



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.370	4.770	0.172	0.188
A1	1.220	1.420	0.048	0.056
A2	2.200	2.890	0.087	0.114
A3	0.000	0.250	0.000	0.010
b	0.700	0.960	0.028	0.038
b1	1.170	1.470	0.046	0.058
c	0.300	0.530	0.012	0.021
D1	8.500	9.300	0.335	0.366
D4	6.600	-	0.260	-
E	9.860	10.36	0.388	0.408
E5	7.060	-	0.278	-
e	2.540 BSC		0.100 BSC	
H	14.70	15.70	0.579	0.618
H2	1.070	1.470	0.042	0.058
L	2.000	2.600	0.079	0.102
L1	1.400	1.750	0.055	0.069
L4	0.250 BSC		0.010 BSC	
Θ	0°	9°	0°	9°