

Description

The HSH200N02 is the highest performance trench N-ch MOSFETs with extreme high cell density, which provide excellent $R_{DS(ON)}$ and gate charge for most of the synchronous buck converter applications.

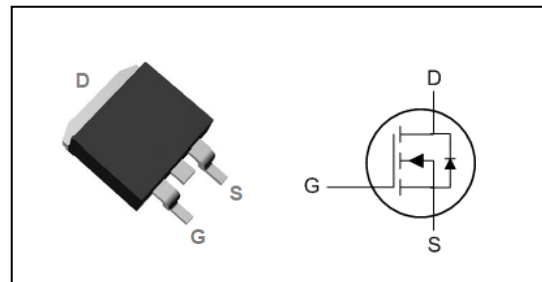
The HSH200N02 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

- Power Switching application
- Green Device Available
- Excellent $C_{dv/dt}$ effect decline
- Advanced high cell density Trench technology

Product Summary

V_{DS}	200	V
$R_{DS(ON),typ}$	27	$m\Omega$
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
$I_D@T_C=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	70	A
$I_D@T_C=100^\circ C$	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
$P_D@T_C=25^\circ C$	Total Power Dissipation ³	200	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient ¹	---	60	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	0.55	$^\circ C/W$

N-Ch 200V Fast Switching MOSFETs

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 inch² 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

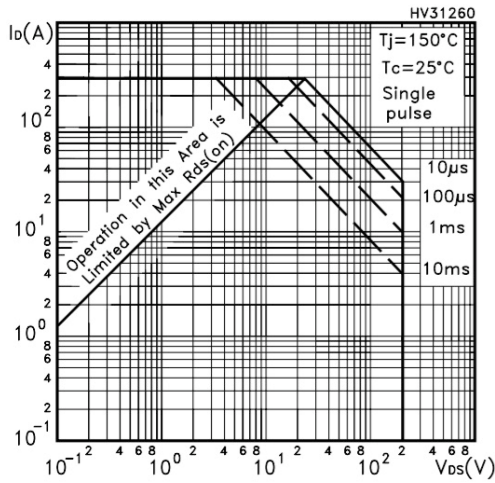


Fig.1 Safe operating area for TO-220

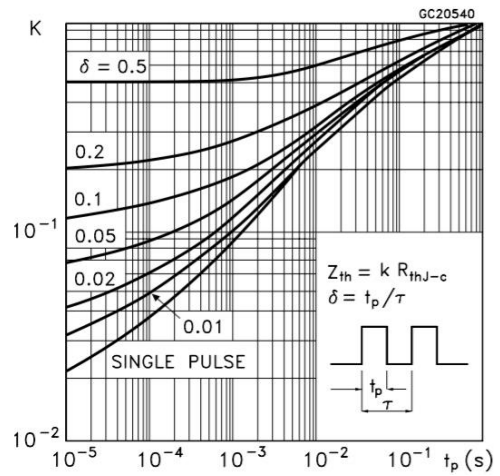


Fig.2 Thermal impedance for TO-220

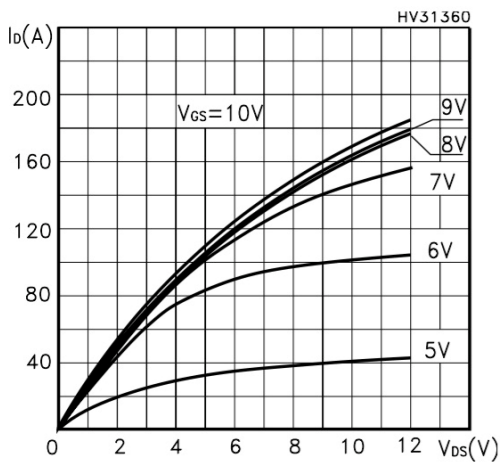


Fig.3 Output characteristics

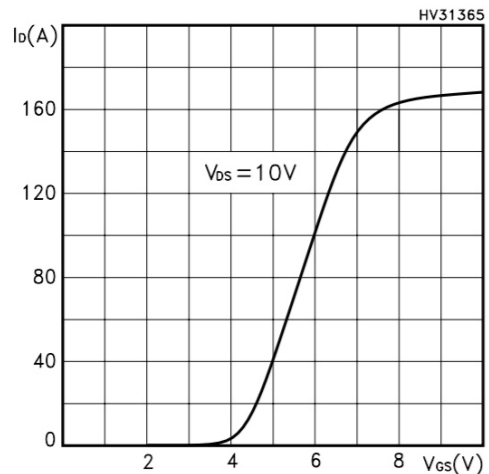


Fig.4 Transfer characteristics

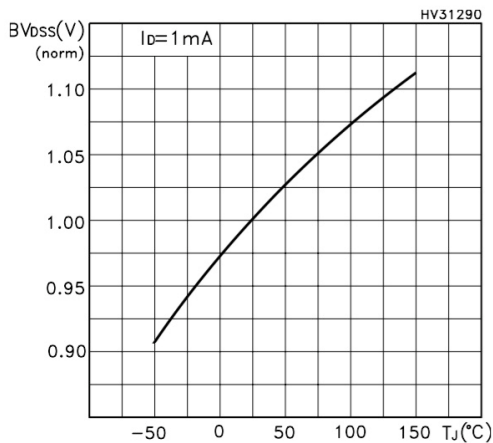


Fig.5 Normalized BVDSS vs temperature

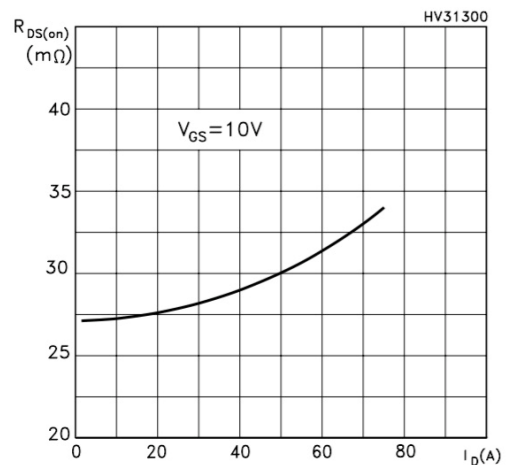


Fig.6 Static drain-source on resistance

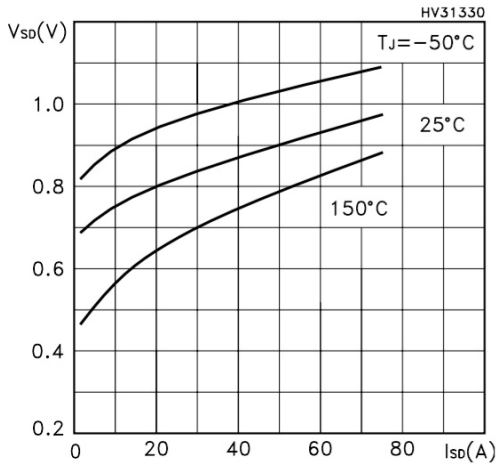


Fig.7 Source-drain diode forward characteristics

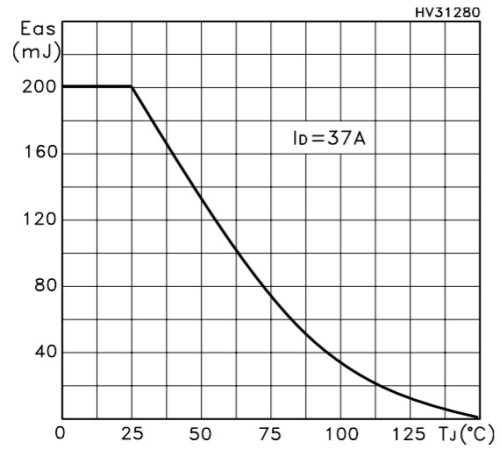


Fig.8 Avalanche energy vs starting T_J

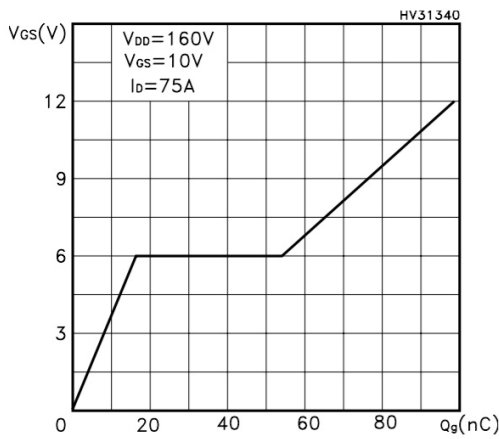


Fig.9 Gate charge vs gate-source voltage

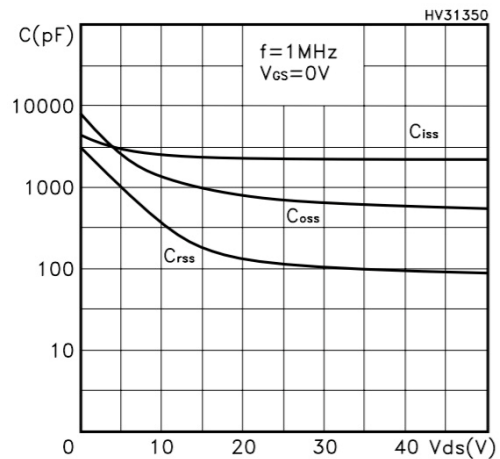


Fig.10 Capacitance variations

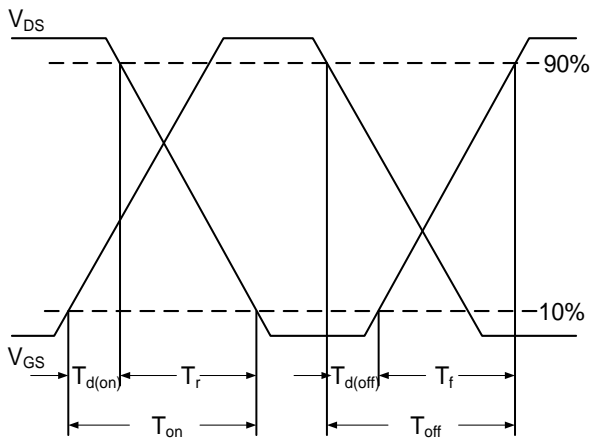


Fig.11 Switching Time Waveform

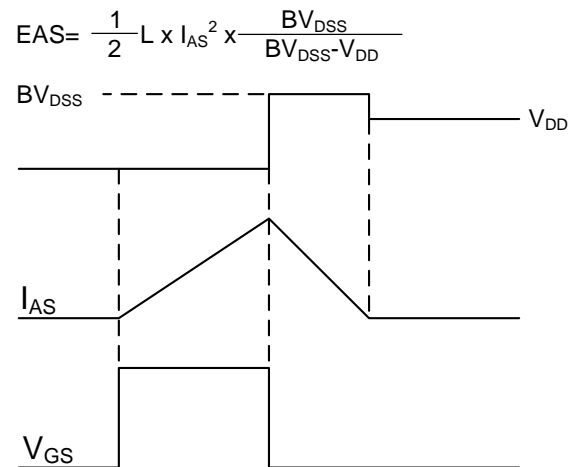
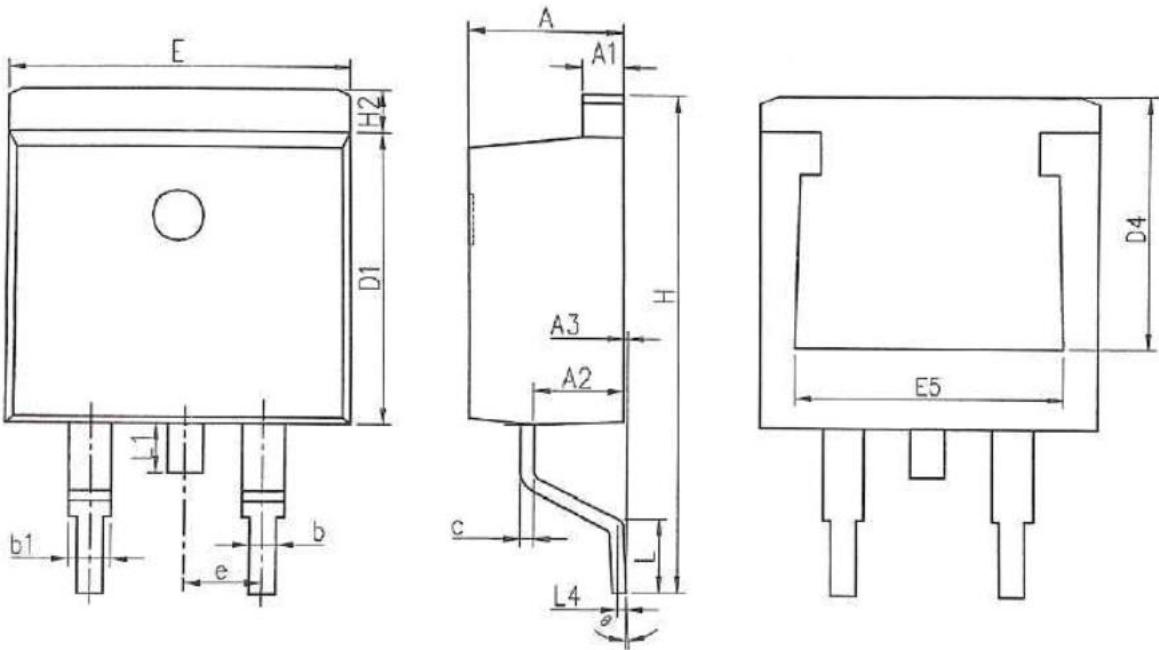


Fig.12 Unclamped Inductive Switching



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°