

### Description

The HSH30N15A 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.

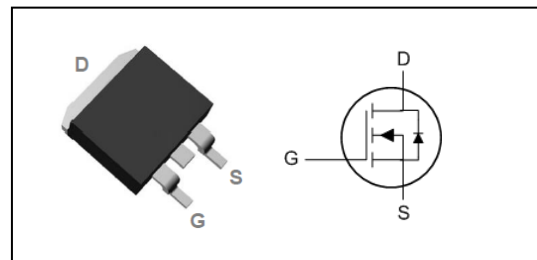
The HSH30N15A meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

- Super Low Gate Charge
- Green Device Available
- Excellent Cdv/dt effect decline
- Advanced high cell density Trench technology

### Product Summary

$V_{DS}$	150	V
$R_{DS(ON),typ}$	40	m $\Omega$
$I_D$	30	A

### TO-263 Pin Configuration



### Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	150	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D@T_C=25^\circ\text{C}$	Continuous Drain Current, $V_{GS}$ @ 10V <sup>1</sup>	30	A
$I_D@T_C=100^\circ\text{C}$	Continuous Drain Current, $V_{GS}$ @ 10V <sup>1</sup>	18	A
$I_D@T_A=25^\circ\text{C}$	Continuous Drain Current, $V_{GS}$ @ 10V <sup>1</sup>	4.9	A
$I_D@T_A=70^\circ\text{C}$	Continuous Drain Current, $V_{GS}$ @ 10V <sup>1</sup>	3.9	A
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	60	A
$P_D@T_C=25^\circ\text{C}$	Total Power Dissipation <sup>3</sup>	81	W
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

### Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient <sup>1</sup>	---	60	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case <sup>1</sup>	---	1.2	$^\circ\text{C}/\text{W}$



### Electrical Characteristics (T<sub>J</sub>=25 °C, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	150	---	---	V
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>2</sup>	V <sub>GS</sub> =10V, I <sub>D</sub> =10A	---	40	56	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	2	2.9	4	V
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =120V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	---	---	1	uA
		V <sub>DS</sub> =120V, V <sub>GS</sub> =0V, T <sub>J</sub> =55°C	---	---	5	
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	---	---	±100	nA
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>D</sub> =10A	---	25	---	S
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =75V, V <sub>GS</sub> =10V, I <sub>D</sub> =10A	---	23	---	nC
Q <sub>gs</sub>	Gate-Source Charge		---	5.8	---	
Q <sub>gd</sub>	Gate-Drain Charge		---	4.2	---	
T <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DD</sub> =75V, V <sub>GS</sub> =10V, R <sub>G</sub> =3.3Ω I <sub>D</sub> =10A	---	16	---	ns
T <sub>r</sub>	Rise Time		---	18.6	---	
T <sub>d(off)</sub>	Turn-Off Delay Time		---	28.5	---	
T <sub>f</sub>	Fall Time		---	6.5	---	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =75V, V <sub>GS</sub> =0V, f=1MHz	---	1190	---	pF
C <sub>oss</sub>	Output Capacitance		---	73	---	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	4	---	

### Diode Characteristics

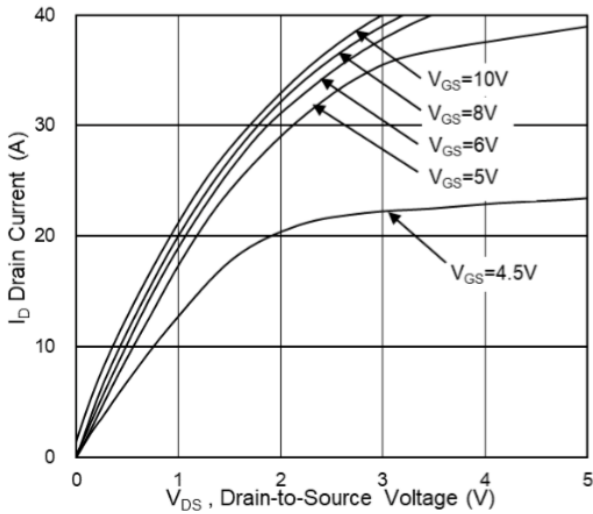
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V <sub>SD</sub>	Diode Forward Voltage <sup>2</sup>	V <sub>GS</sub> =0V, I <sub>S</sub> =1A, T <sub>J</sub> =25°C	---	---	1.2	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>F</sub> =10A, dI/dt=100A/μs, T <sub>J</sub> =25°C	---	45	---	nS
Q <sub>rr</sub>	Reverse Recovery Charge		---	138	---	nC

Note :

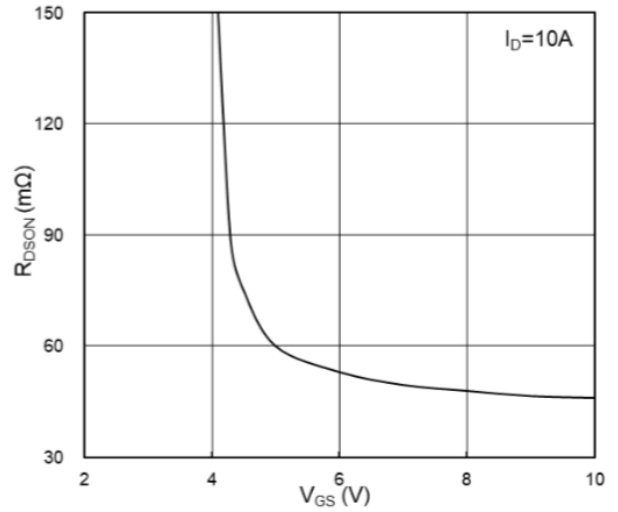
- 1.The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%
- 3.The power dissipation is limited by 150°C junction temperature
- 4.The data is theoretically the same as I<sub>D</sub> and I<sub>DM</sub> , in real applications , should be limited by total power dissipation.



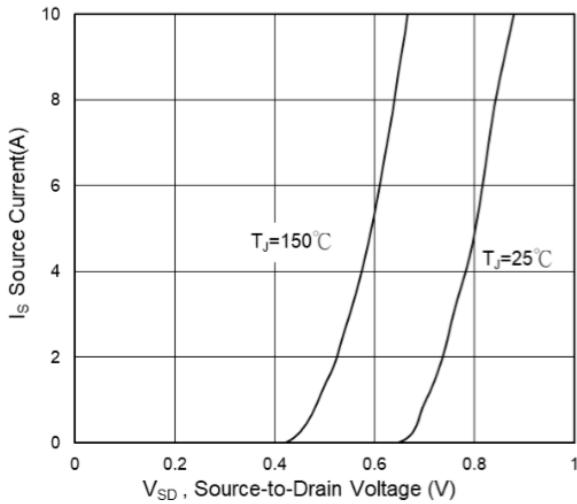
### Typical Characteristics



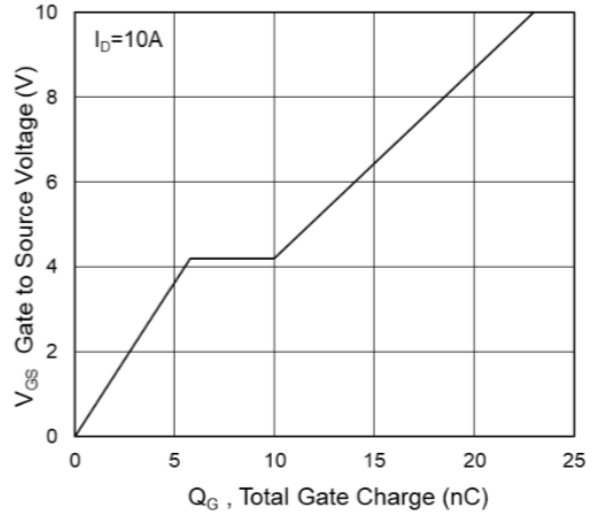
**Fig.1 Typical Output Characteristics**



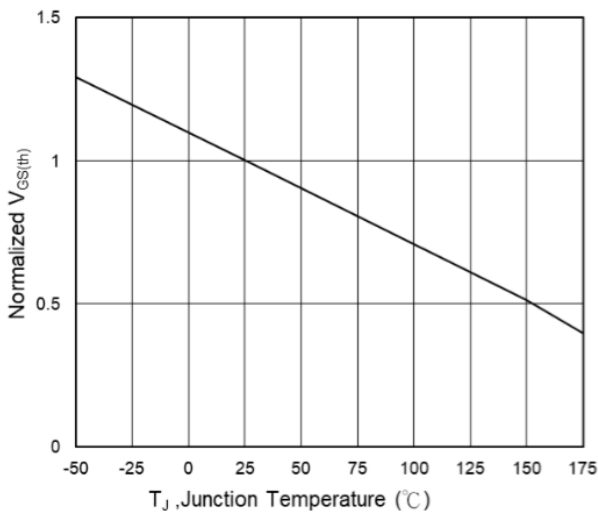
**Fig.2 On-Resistance vs. Gate-Source Voltage**



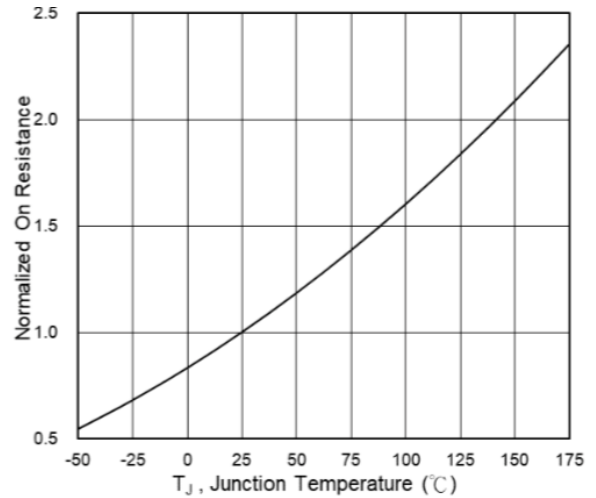
**Fig.3 Forward Characteristics of Reverse**



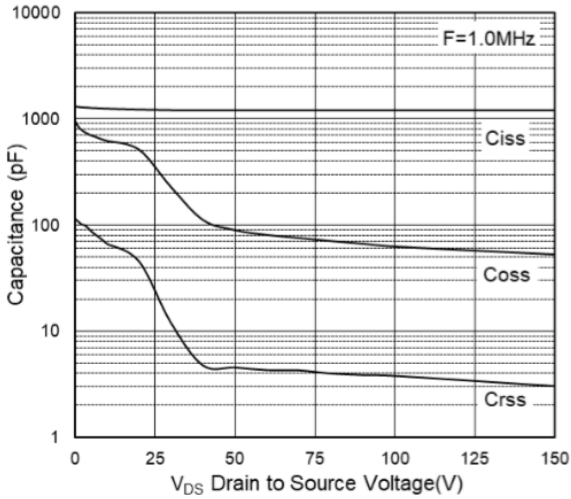
**Fig.4 Gate-Charge Characteristics**



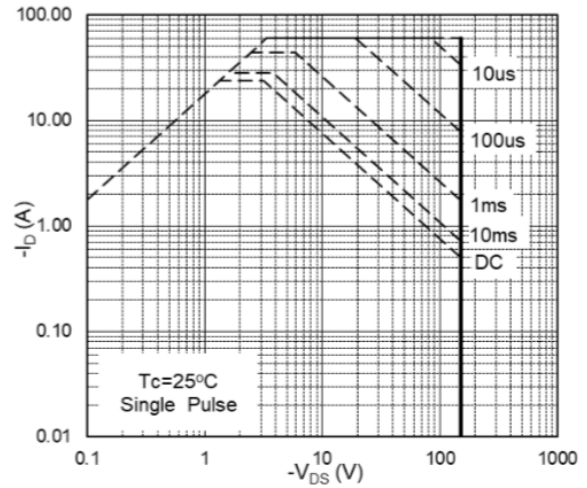
**Fig.5 Normalized  $V_{GS(th)}$  vs.  $T_J$**



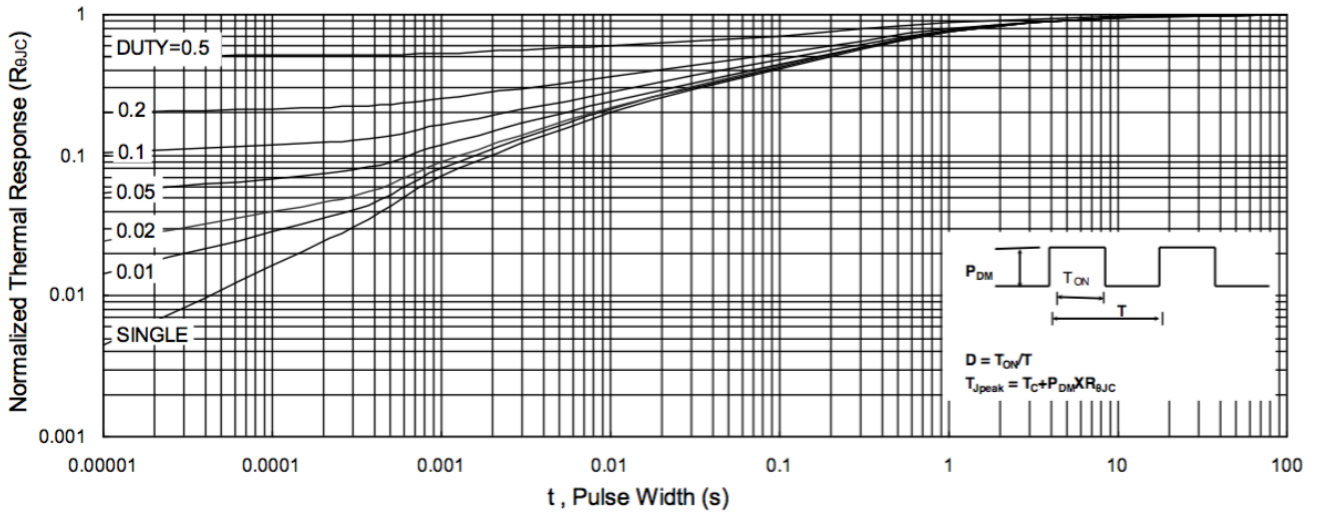
**Fig.6 Normalized  $R_{DS(on)}$  vs.  $T_J$**



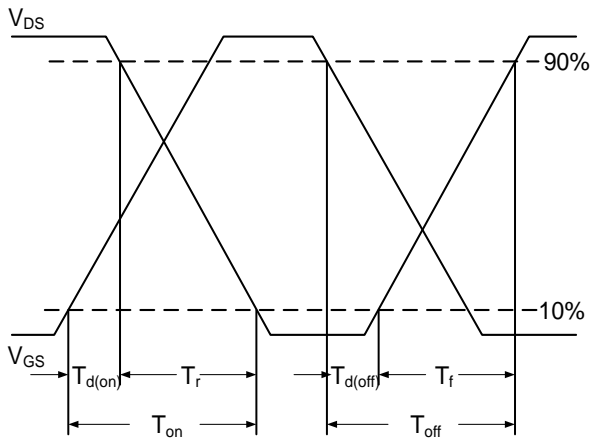
**Fig.7 Capacitance**



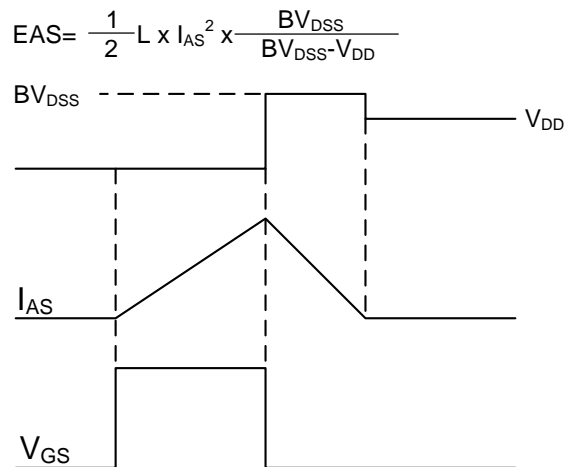
**Fig.8 Safe Operating Area**



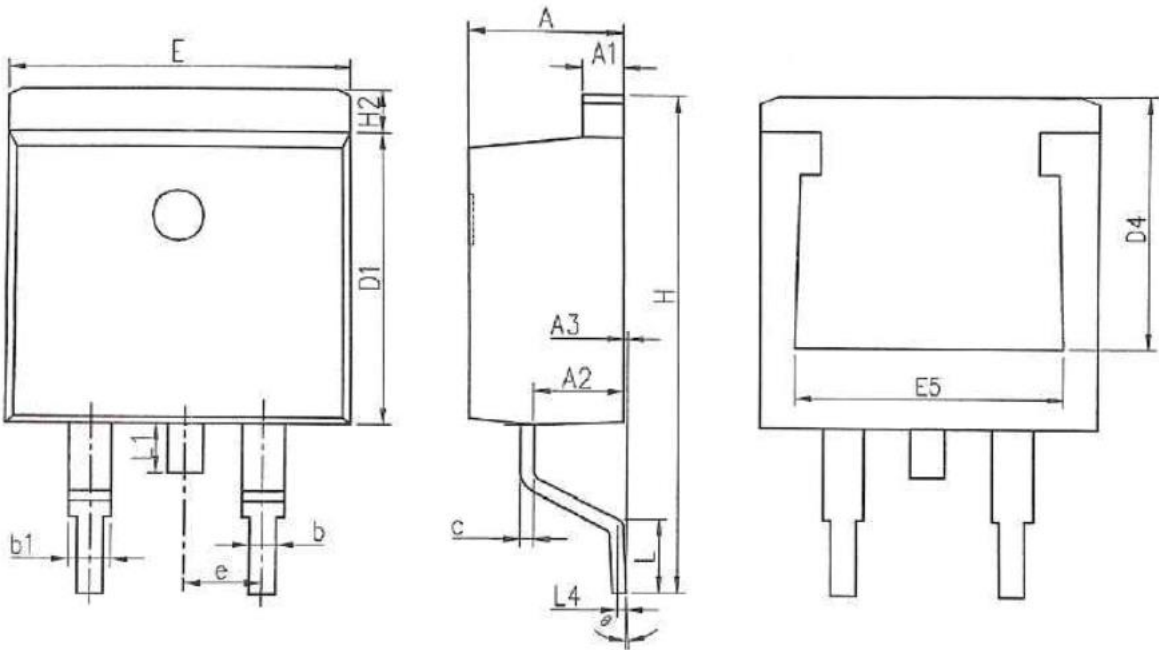
**Fig.9 Normalized Maximum Transient Thermal Impedance**



**Fig.10 Switching Time Waveform**



**Fig.11 Unclamped Inductive 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°