

### Description

The HSU150N03 is the high cell density trenched N-ch MOSFETs, which provide excellent R<sub>DS(ON)</sub> and gate charge for most of the synchronous buck converter applications.

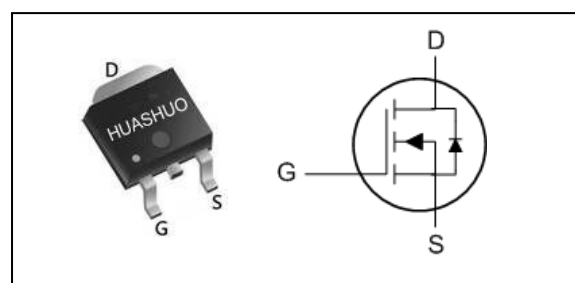
The HSU150N03 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

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

### Product Summary

V <sub>DS</sub>	30	V
R <sub>DS(ON),typ</sub>	2.4	mΩ
I <sub>D</sub>	150	A

### TO252 Pin Configuration



### Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V <sub>DS</sub>	Drain-Source Voltage	30	V
V <sub>GS</sub>	Gate-Source Voltage	±20	V
I <sub>D</sub> @T <sub>C</sub> =25°C	Continuous Drain Current, V <sub>GS</sub> @ 10V <sub>1,6</sub>	150	A
I <sub>D</sub> @T <sub>C</sub> =100°C	Continuous Drain Current, V <sub>GS</sub> @ 10V <sub>1,6</sub>	95	A
I <sub>DM</sub>	Pulsed Drain Current <sub>2</sub>	590	A
EAS	Single Pulse Avalanche Energy <sub>3</sub>	226	mJ
I <sub>AS</sub>	Avalanche Current	30	A
P <sub>D</sub> @T <sub>C</sub> =25°C	Total Power Dissipation <sub>4</sub>	60	W
T <sub>STG</sub>	Storage Temperature Range	-55 to 150	°C
T <sub>J</sub>	Operating Junction Temperature Range	-55 to 150	°C

### Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
R <sub>θJA</sub>	Thermal Resistance Junction-Ambient <sub>1</sub>	---	62	°C/W
R <sub>θJC</sub>	Thermal Resistance Junction-Case <sub>1</sub>	---	1.4	°C/W

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
B <sub>VDS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	30	---	---	V
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>2</sup>	V <sub>GS</sub> =10V, I <sub>D</sub> =30A	---	2.4	3.2	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =20A	---	4.4	6.5	
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	1.2	---	2.5	V
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =24V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	---	---	1	uA
		V <sub>DS</sub> =24V, 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
Q <sub>g</sub>	Total Gate Charge (4.5V)	V <sub>DS</sub> =15V, V <sub>GS</sub> =10V, I <sub>D</sub> =30A	---	39	---	nC
Q <sub>gs</sub>	Gate-Source Charge		---	10	---	
Q <sub>gd</sub>	Gate-Drain Charge		---	12	---	
T <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DD</sub> =15V, V <sub>GS</sub> =10V, R <sub>G</sub> =3.3Ω, I <sub>D</sub> =30A	---	20.1	---	ns
T <sub>r</sub>	Rise Time		---	23	---	
T <sub>d(off)</sub>	Turn-Off Delay Time		---	99	---	
T <sub>f</sub>	Fall Time		---	37	---	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, f=1MHz	---	3500	---	pF
C <sub>oss</sub>	Output Capacitance		---	480	---	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	410	---	

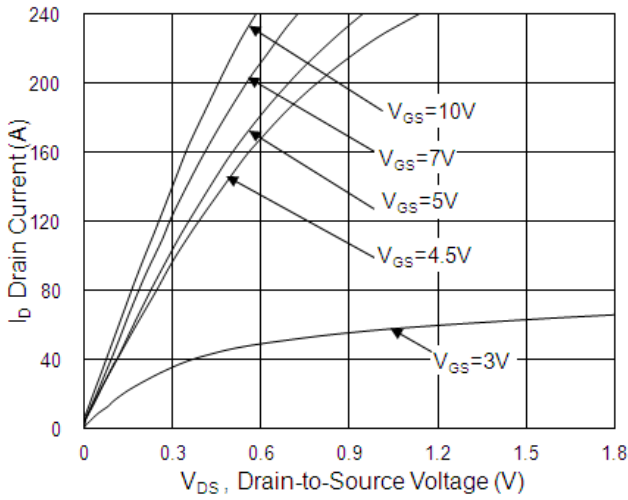
**Diode Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current <sup>1,6</sup>	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current	---	---	150	A
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> =20A, di/dt=100A/us	---	44	---	ns
Q <sub>rr</sub>	Reverse Recovery Charge		---	37	---	nC

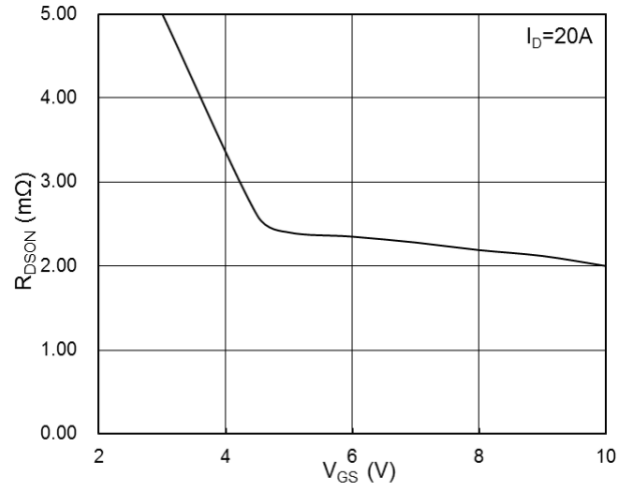
Note :

- The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
- The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%
- The EAS data shows Max. rating. The test condition is V<sub>DD</sub>=15V, V<sub>GS</sub>=10V, L=0.5mH, I<sub>AS</sub>=30A
- The power dissipation is limited by 150°C junction temperature
- 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.
- The maximum current rating is package limited.

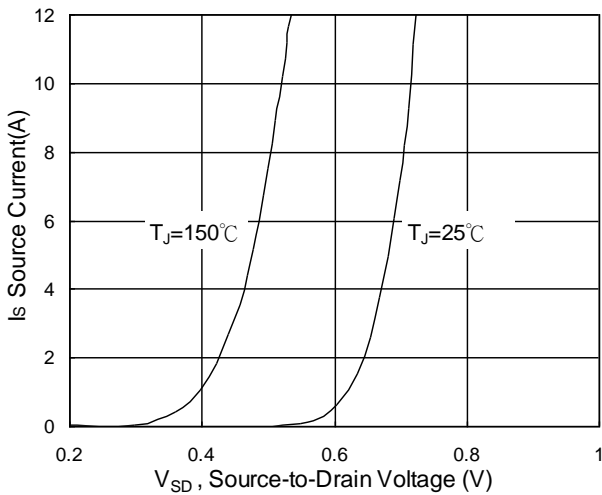
### Typical Characteristics



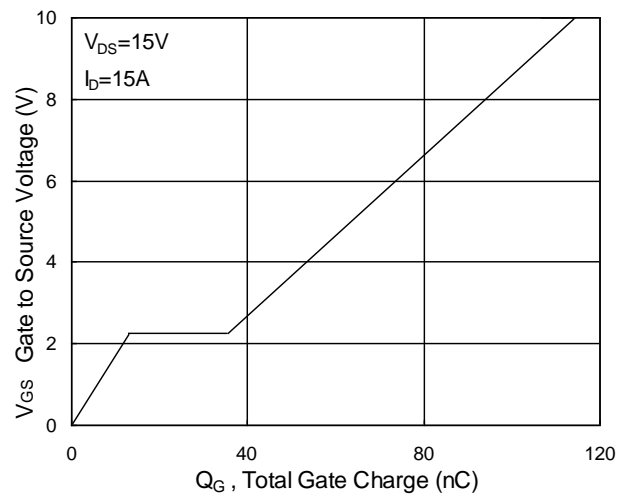
**Fig.1 Typical Output Characteristics**



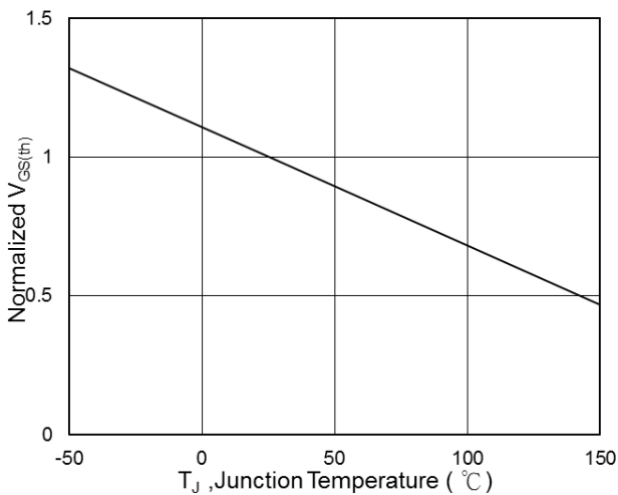
**Fig.2 On-Resistance vs. G-S Voltage**



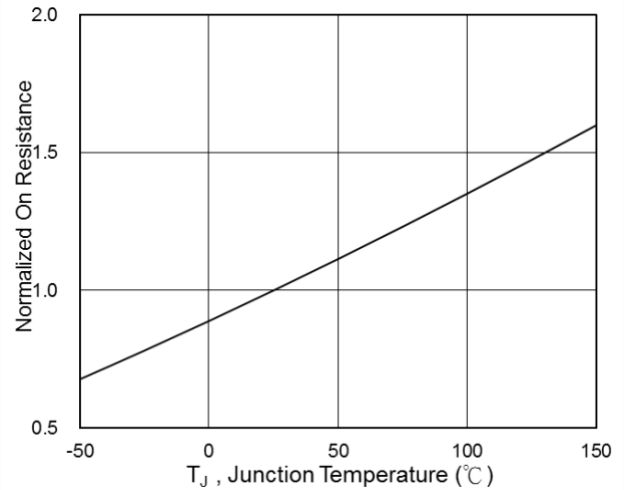
**Fig.3 Source Drain Forward Characteristics**



**Fig.4 Gate-Charge Characteristics**



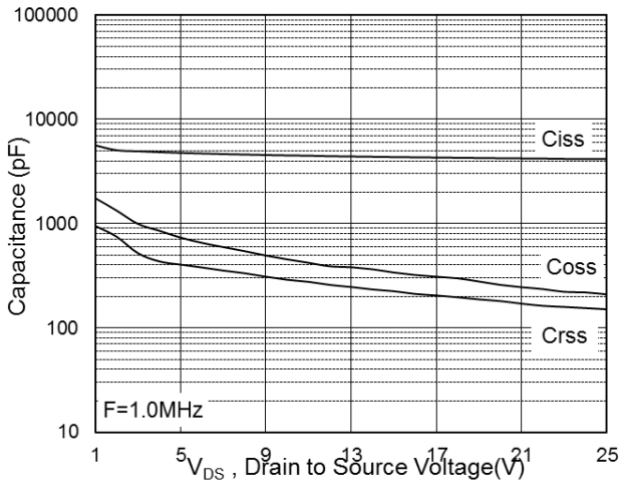
**Fig.5 Normalized  $V_{GS(th)}$  vs.  $T_J$**



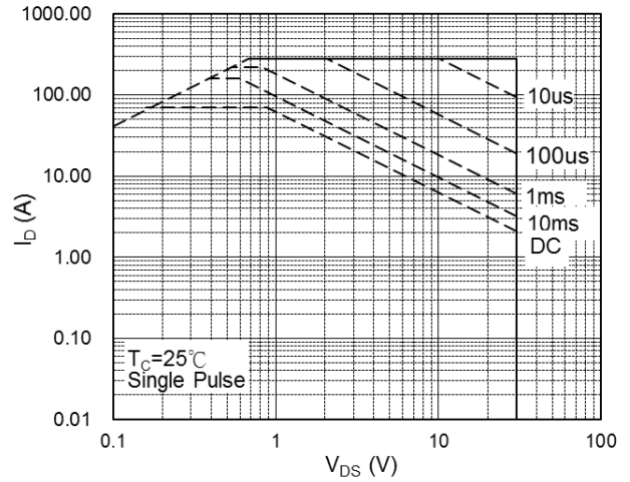
**Fig.6 Normalized  $R_{DSON}$  vs.  $T_J$**



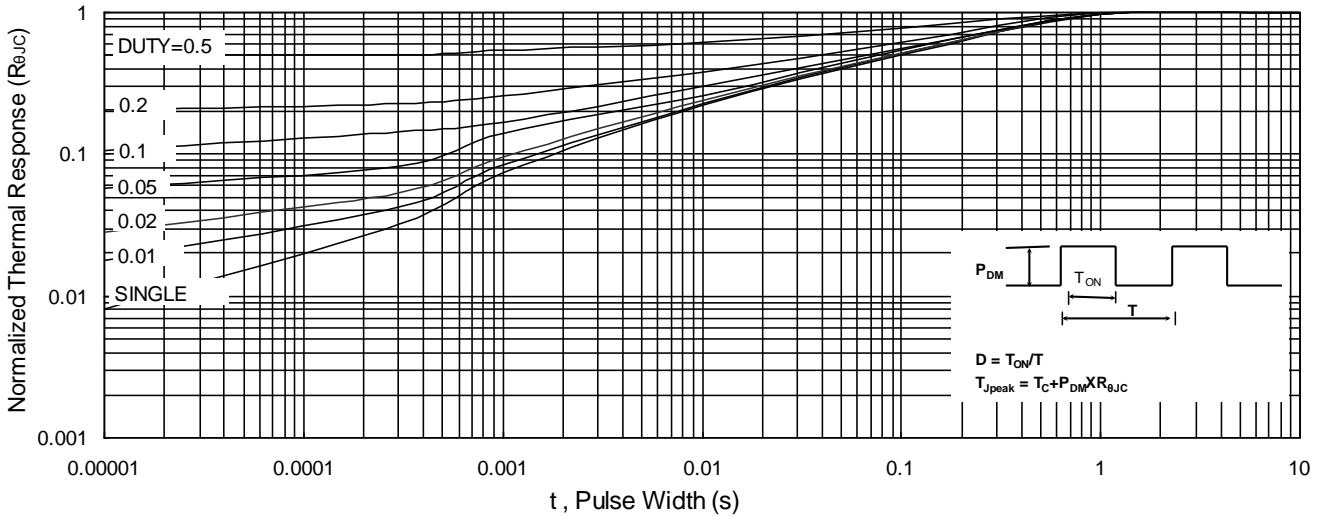
**N-Ch 30V Fast Switching MOSFETs**



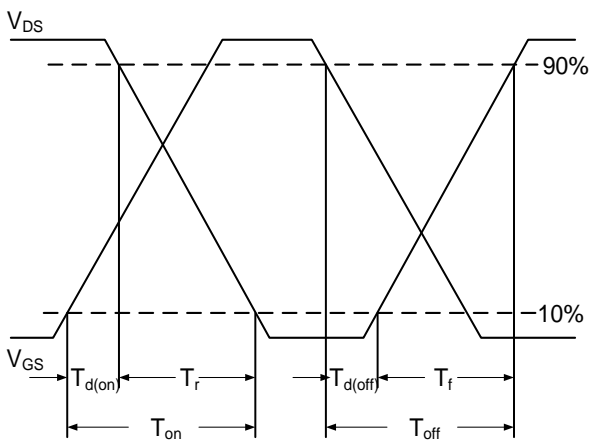
**Fig.7 Capacitance**



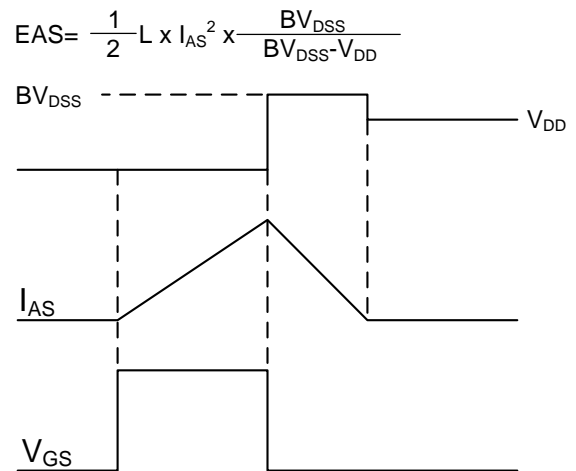
**Fig.8 Safe Operating Area**



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



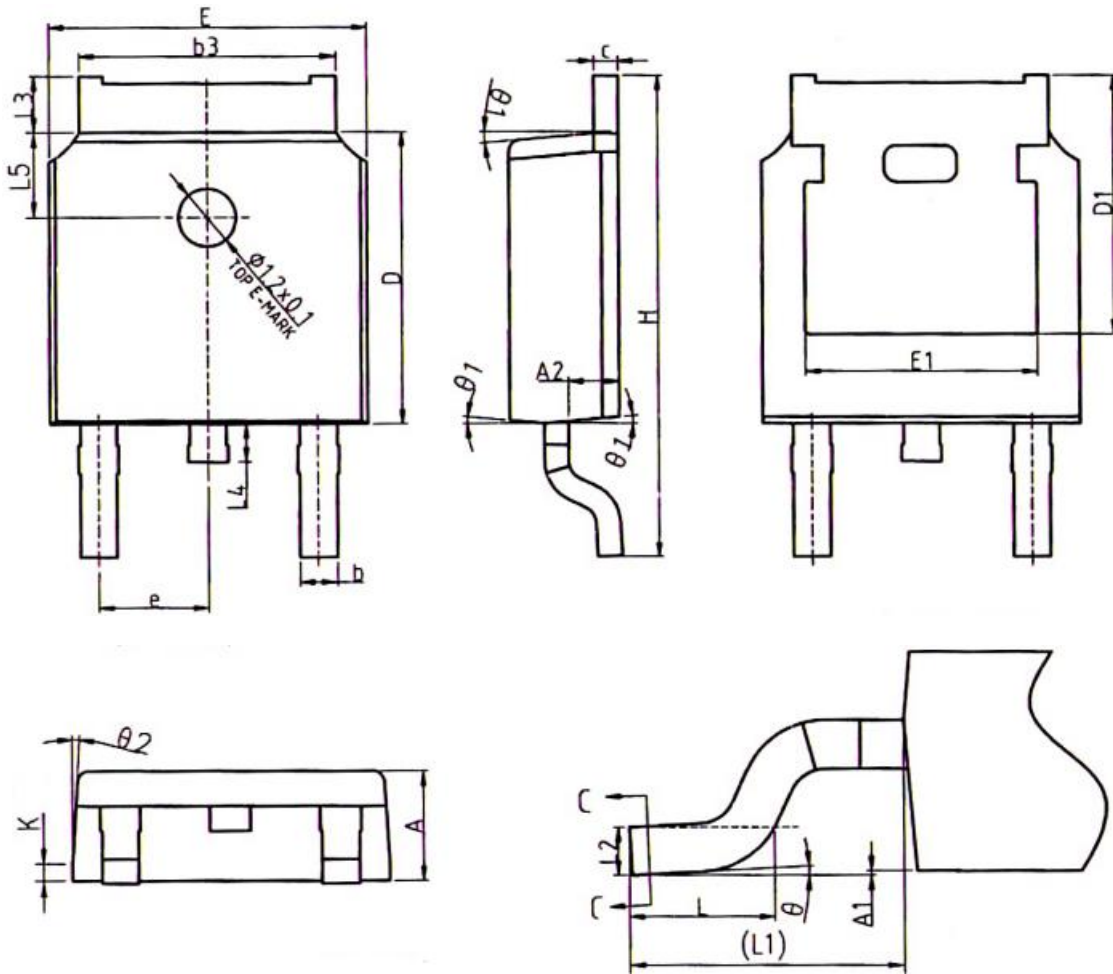
**Fig.10 Switching Time Waveform**



**Fig.11 Unclamped Inductive Switching**



**TO252 Package Outline Dimensions**



SYMBOL	MILLIMETERS			SYMBOL	MILLIMETERS		
	MIN	NOM	MAX		MIN	NOM	MAX
A	2.20	2.30	2.38	H	9.90	10.10	10.30
A1	0.00	---	0.10	L	1.40	1.50	1.70
A2	0.97	1.07	1.17	L1	2.90REF		
b	0.72	0.78	0.85	L2	0.51BSC		
b3	5.23	5.33	5.46	L3	0.90	---	1.25
c	0.47	0.53	0.58	L4	0.60	0.80	1.00
D	6.00	6.10	6.20	L5	1.70	1.80	1.90
D1	5.30REF			θ	0°	---	8°
E	6.50	6.60	6.70	θ1	5°	7°	9°
E1	4.70	4.83	4.92	θ2	5°	7°	9°
e	2.286BSC			K	0.40REF		