

**Description**

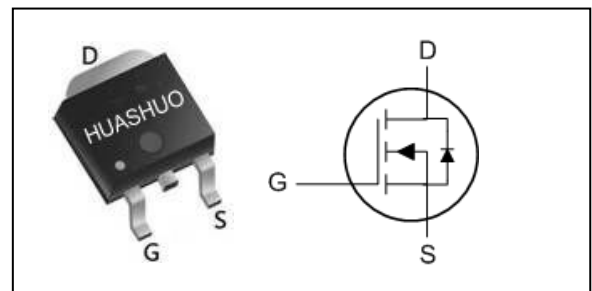
The HSU80N03 is the high cell density trenched N-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The HSU80N03 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>DSON</sub> ,TYP	4.9	mΩ
I <sub>D</sub>	80	A

**TO252 Pin Configuration**

**Absolute Maximum Ratings**

Symbol	Parameter	Rating		Units
		10s	Steady State	
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</sub>	80		A
I <sub>D</sub> @T <sub>C</sub> =100°C	Continuous Drain Current, V <sub>GS</sub> @ 10V <sub>1</sub>	57		A
I <sub>DM</sub>	Pulsed Drain Current <sub>2</sub>	320		A
EAS	Single Pulse Avalanche Energy <sub>3</sub>	300		mJ
P <sub>D</sub> @T <sub>C</sub> =25°C	Total Power Dissipation <sub>4</sub>	115		W
P <sub>D</sub> @T <sub>A</sub> =25°C	Total Power Dissipation <sub>4</sub>	6	2.4	W
T <sub>STG</sub>	Storage Temperature Range	-55 to 175		°C
T <sub>J</sub>	Operating Junction Temperature Range	-55 to 175		°C

**Thermal Data**

Symbol	Parameter	Typ.	Max.	Unit
R <sub>θJA</sub>	Thermal Resistance Junction-ambient (Steady State) <sub>1</sub>	---	50	°C/W
R <sub>θJA</sub>	Thermal Resistance Junction-Ambient <sub>1</sub> (t ≤ 10s)	---	25	°C/W
R <sub>θJC</sub>	Thermal Resistance Junction-Case <sub>1</sub>	---	0.8	°C/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	30	---	---	V
ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	BVDSS Temperature Coefficient	Reference to 25°C, I <sub>D</sub> =1mA	---	0.028	---	V/°C
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sub>2</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =30A	---	4.9	6	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =15A	---	7.5	10	
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	1.0	1.8	3	V
ΔV <sub>GS(th)</sub>	V <sub>GS(th)</sub> Temperature Coefficient		---	-6.16	---	mV/°C
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
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>D</sub> =30A	20	---	---	S
R <sub>g</sub>	Gate Resistance	V <sub>DS</sub> =0V, V <sub>GS</sub> =0V, f=1MHz	---	1.7	3.4	Ω
Q <sub>g</sub>	Total Gate Charge (4.5V)	V <sub>DS</sub> =30V, V <sub>GS</sub> =10V, I <sub>D</sub> =40A	---	84	---	nC
Q <sub>gs</sub>	Gate-Source Charge		---	14	---	
Q <sub>gd</sub>	Gate-Drain Charge		---	30	---	
T <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DD</sub> =30V, V <sub>GS</sub> =10V, R <sub>G</sub> =3Ω I <sub>D</sub> =40A	---	20	---	ns
T <sub>r</sub>	Rise Time		---	15	---	
T <sub>d(off)</sub>	Turn-Off Delay Time		---	50	---	
T <sub>f</sub>	Fall Time		---	8	---	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz	---	2290	---	pF
C <sub>oss</sub>	Output Capacitance		---	360	---	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	280	---	

**Diode Characteristics**

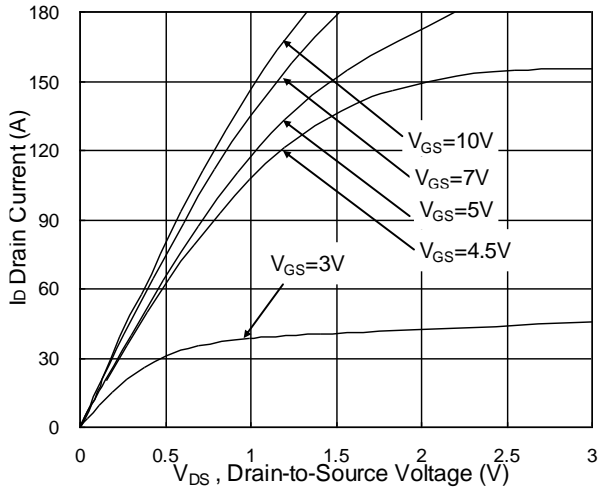
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current <sub>1,5</sub>	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current	---	---	80	A
I <sub>SM</sub>	Pulsed Source Current <sub>2,5</sub>		---	---	160	A
V <sub>SD</sub>	Diode Forward Voltage <sub>2</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =1A, T <sub>J</sub> =25°C	---	---	1	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>F</sub> =40A, di/dt=100A/μs,	---	32	---	nS
Q <sub>rr</sub>	Reverse Recovery Charge	T <sub>J</sub> =25°C	---	60	---	nC

Note :

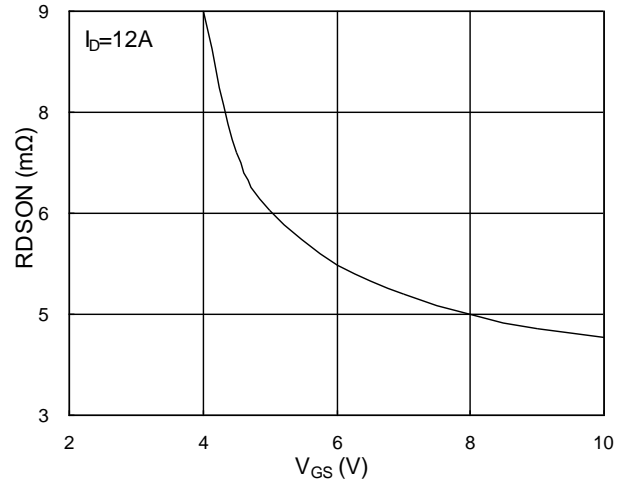
- 1.The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
- 2.The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%
- 3.The EAS data shows Max. rating. The test condition is V<sub>DD</sub>=25V, V<sub>GS</sub>=10V, L=0.1mH, I<sub>AS</sub>=53.8A
- 4.The power dissipation is limited by 175°C junction temperature
- 5.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.



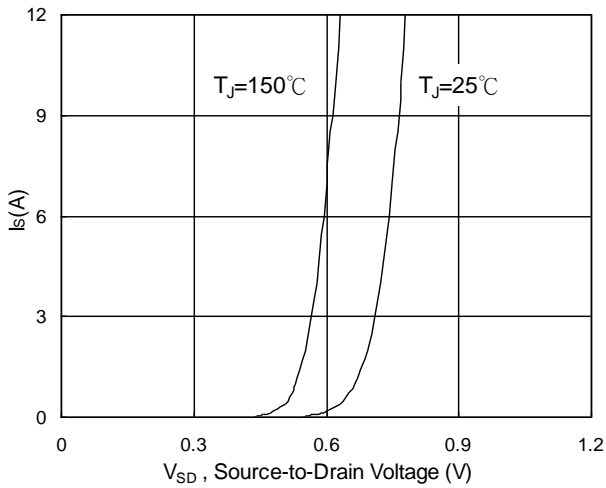
**Typical Characteristics**



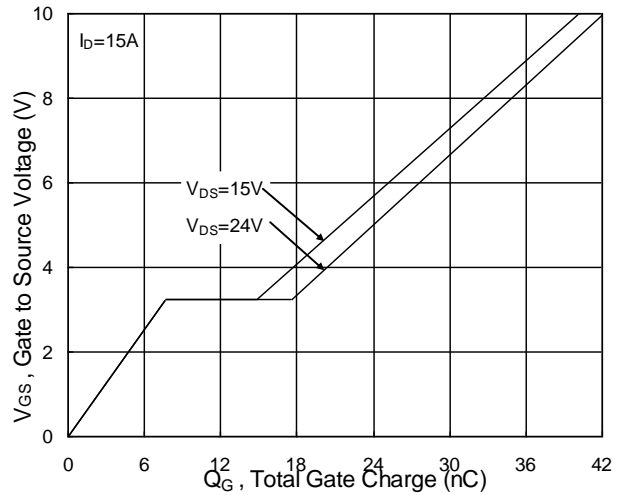
**Fig.1 Typical Output Characteristics**



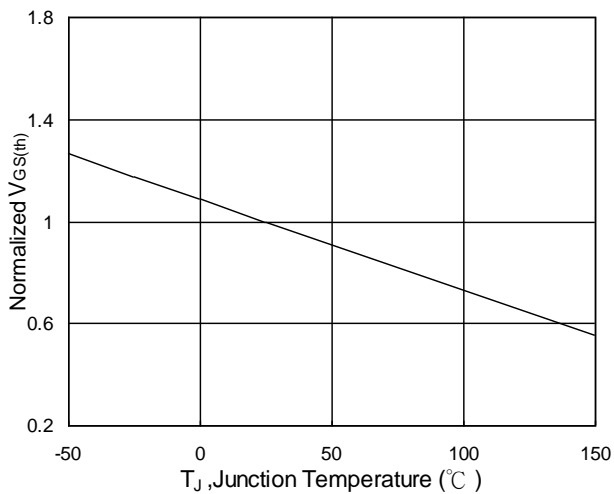
**Fig.2 On-Resistance vs. G-S Voltage**



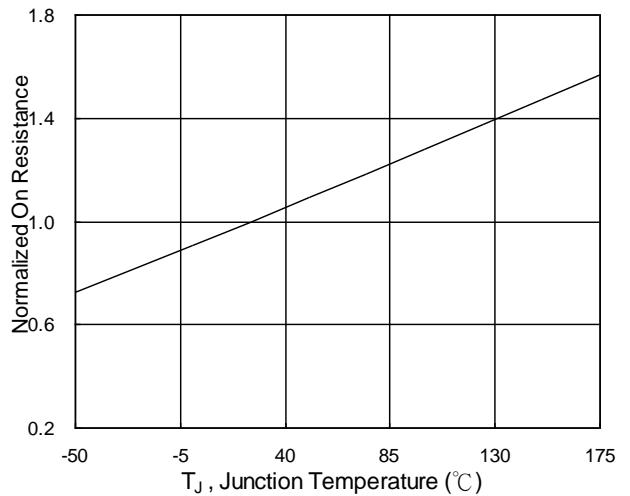
**Fig.3 Forward Characteristics of Reverse**



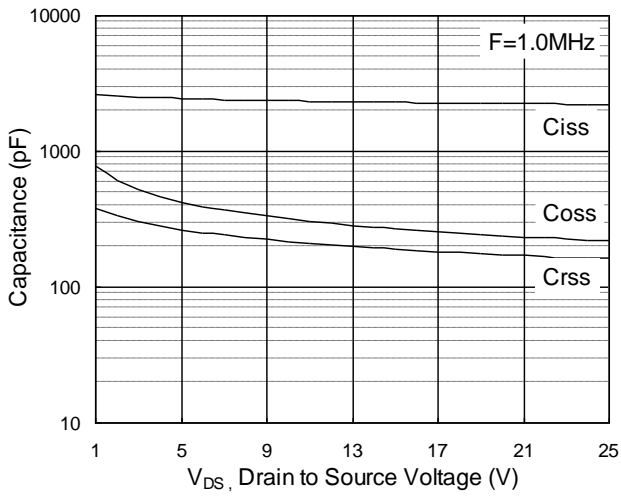
**Fig.4 Gate-Charge Characteristics**



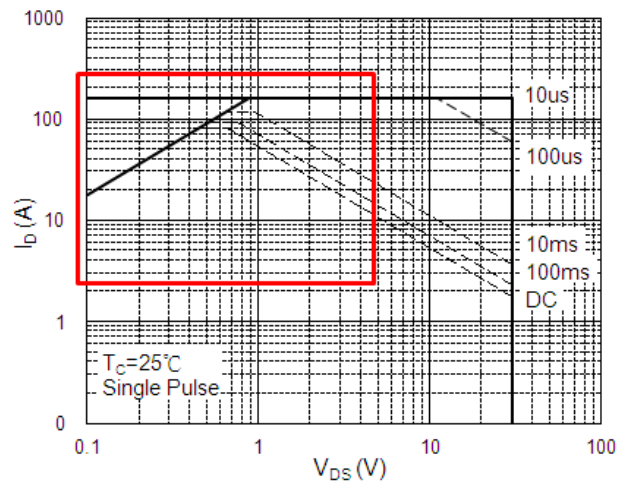
**Fig.5 Normalized  $V_{GS(th)}$  vs.  $T_J$**



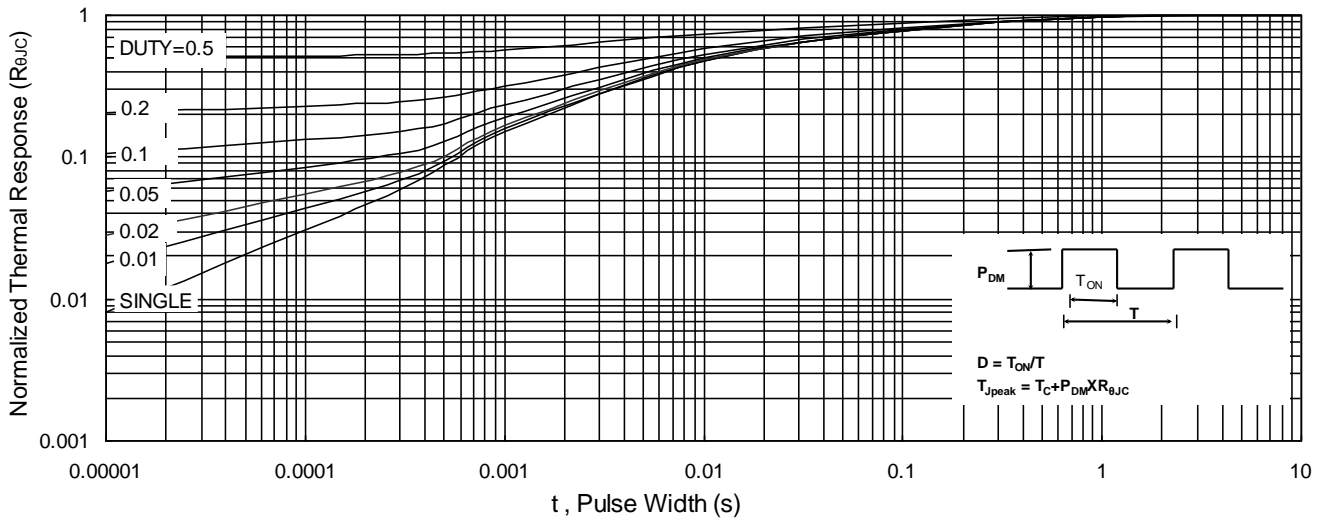
**Fig.6 Normalized  $R_{DSON}$  vs.  $T_J$**



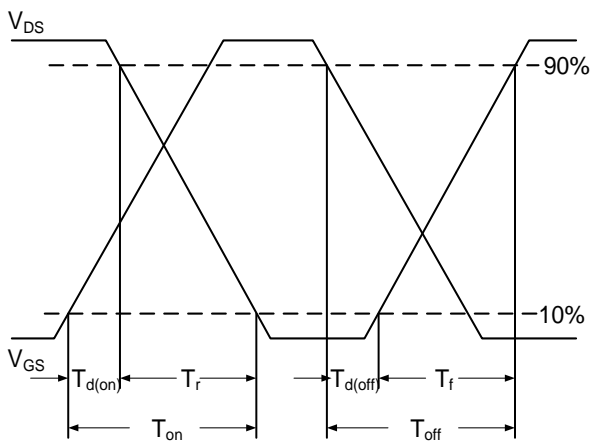
**Fig.7 Capacitance**



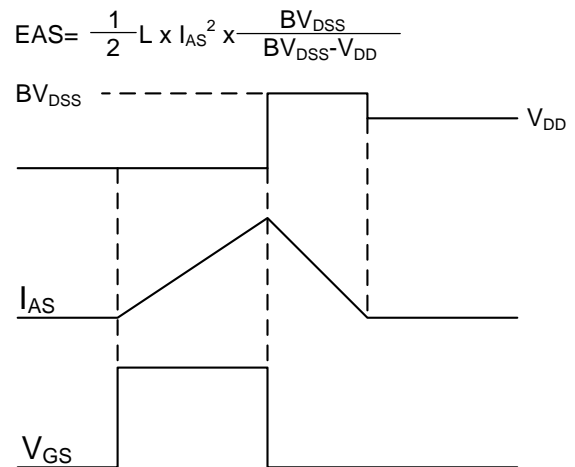
**Fig.8 Safe Operating Area**



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



**Fig.10 Switching Time Waveform**

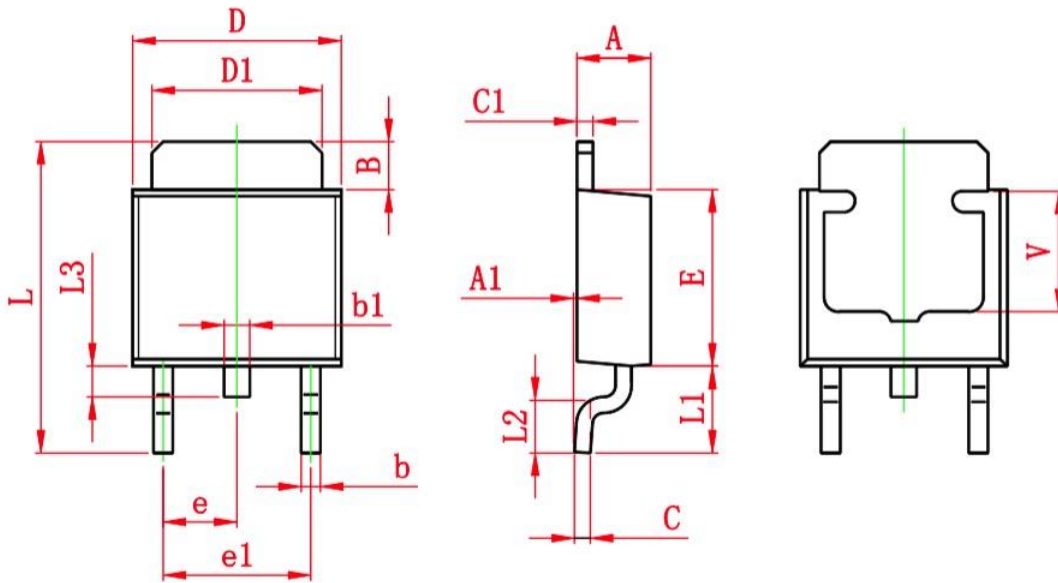


**Fig.11 Unclamped Inductive Switching Waveform**



## Ordering Information

Part Number	Package code	Packaging
HSU80N03	TO252-2	2500/Tape&Reel



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
B	1.350	1.650	0.053	0.065
b	0.500	0.700	0.020	0.028
b1	0.700	0.900	0.028	0.035
c	0.430	0.580	0.017	0.023
c1	0.430	0.580	0.017	0.023
D	6.350	6.650	0.250	0.262
D1	5.200	5.400	0.205	0.213
E	5.400	5.700	0.213	0.224
e	2.300 TYP.		0.091 TYP.	
e1	4.500	4.700	0.177	0.185
L	9.500	9.900	0.374	0.390
L1	2.550	2.900	0.100	0.114
L2	1.400	1.780	0.055	0.070
L3	0.600	0.900	0.024	0.035
V	3.800 REF.		0.150 REF.	