

**Description**

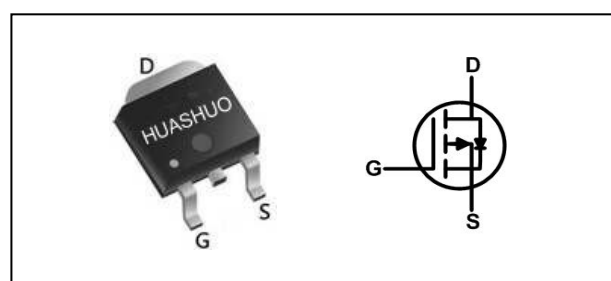
The HSU3119 is the high cell density trenched P-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The HSU3119 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

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

**Product Summary**

$V_{DS}$	-30	V
$R_{DS(ON),Max}$	3.0	m $\Omega$
$I_D$	-130	A

**TO-252 Pin Configuration**

**Absolute Maximum Ratings**

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	-30	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D@T_C=25^\circ C$	Continuous Drain Current, $V_{GS} @ -10V^{1,6}$	-130	A
$I_D@T_C=100^\circ C$	Continuous Drain Current, $V_{GS} @ -10V^{1,6}$	-81	A
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	-510	A
EAS	Single Pulse Avalanche Energy <sup>3</sup>	1050	mJ
$I_{AS}$	Avalanche Current	-75	A
$P_D@T_C=25^\circ C$	Total Power Dissipation <sup>4</sup>	135	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 <sup>1</sup> ( $t \leq 10S$ )	---	20	$^\circ C/W$
	Thermal Resistance Junction-ambient <sup>1</sup> (Steady State)	---	60	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-case <sup>1</sup>	---	1.8	$^\circ C/W$

**Electrical Characteristics ( $T_J=25\text{ }^\circ\text{C}$ , unless otherwise noted)**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-30	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance <sup>2</sup>	$V_{GS}=-10V, I_D=-30A$	---	---	3.0	$m\Omega$
		$V_{GS}=-4.5V, I_D=-20A$	---	---	4.2	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=-250\mu A$	-1.0	---	-2.5	V
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=-30V, V_{GS}=0V, T_J=25^\circ C$	---	---	-1	$\mu A$
		$V_{DS}=-30V, V_{GS}=0V, T_J=125^\circ C$	---	---	-100	$\mu A$
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	$\pm 100$	nA
$R_g$	Gate resistance	$V_{DS}=0V, V_{GS}=0V, f=1MHz$		1.8		$\Omega$
$Q_g$	Total Gate Charge (-10V)	$V_{DS}=-15V, V_{GS}=-10V, I_D=-20A$	---	210	---	nC
$Q_{gs}$	Gate-Source Charge		---	2.2	---	
$Q_{gd}$	Gate-Drain Charge		---	3.3	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=-15V, V_{GS}=-10V, R_G=3\Omega, I_D=-10A$	---	17	---	ns
$T_r$	Rise Time		---	6	---	
$T_{d(off)}$	Turn-Off Delay Time		---	21	---	
$T_f$	Fall Time		---	39	---	
$C_{iss}$	Input Capacitance	$V_{DS}=-15V, V_{GS}=0V, f=1MHz$	---	12700	---	pF
$C_{oss}$	Output Capacitance		---	1380	---	
$C_{rss}$	Reverse Transfer Capacitance		---	1210	---	

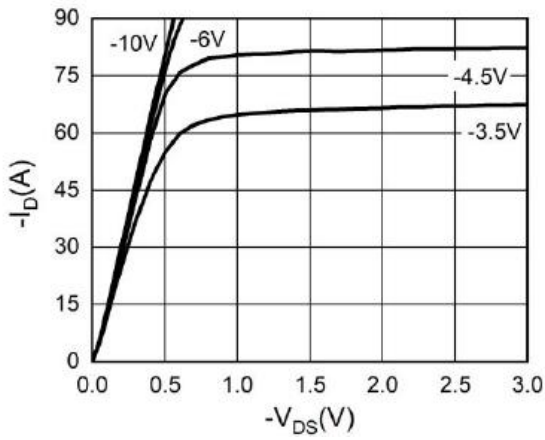
**Diode Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_S$	Continuous Source Current <sup>1,5</sup>	$V_G=V_D=0V$ , Force Current	---	---	-130	A
$V_{SD}$	Diode Forward Voltage <sup>2</sup>	$V_{GS}=0V, I_S=-20A, T_J=25^\circ C$	---	---	-1.2	V
$t_{rr}$	Reverse Recovery Time	$I_F=-20A, di/dt=100A/\mu s,$	---	37	---	nS
$Q_{rr}$	Reverse Recovery Charge	$T_J=25^\circ C$	---	30	---	nC

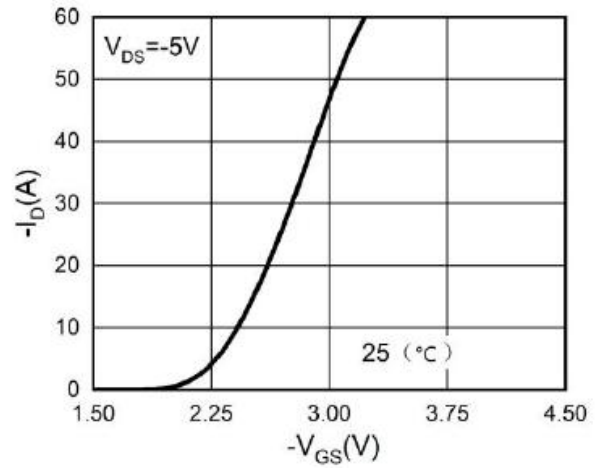
Note :

- 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  $\leq 300\mu s$  , duty cycle  $\leq 2\%$
- 3.The EAS data shows Max. rating . The test condition is  $V_{DD}=-30V, V_{GS}=-10V, L=0.5mH, I_{AS}=-75A$
- 4.The power dissipation is limited by 150 $^\circ C$  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
- 6.The maximum current rating is package limited.

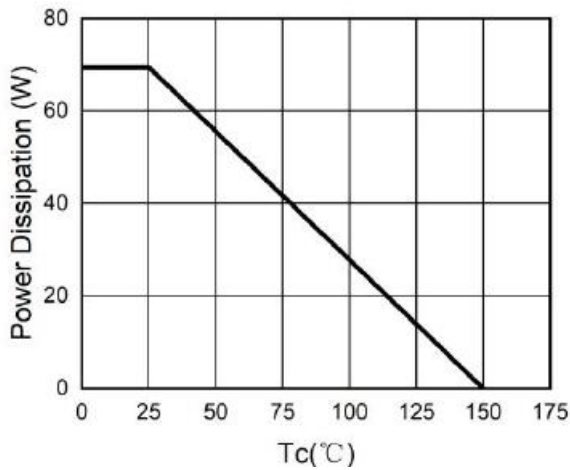
**Typical Characteristics**



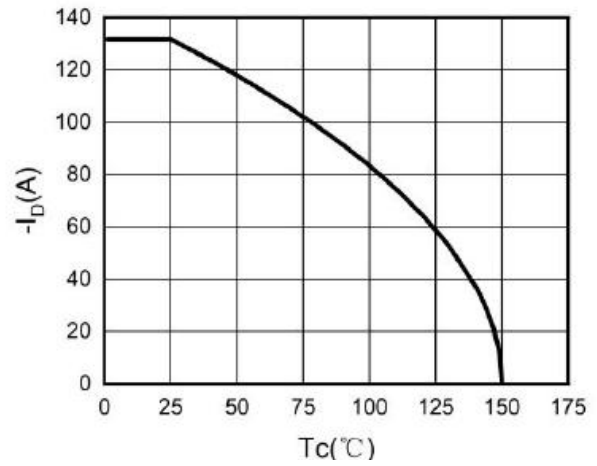
**Fig.1 Output Characteristics**



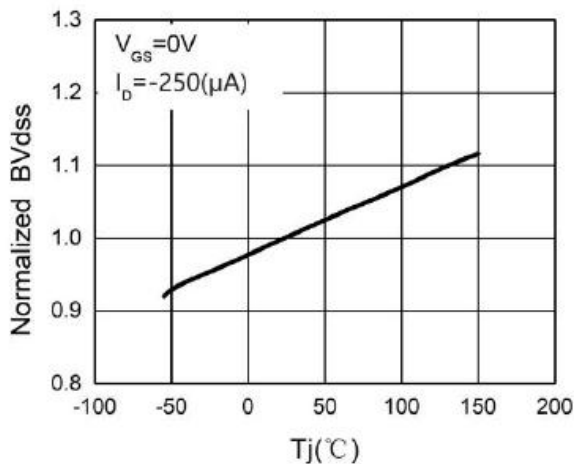
**Fig.2 Transfer Characteristics**



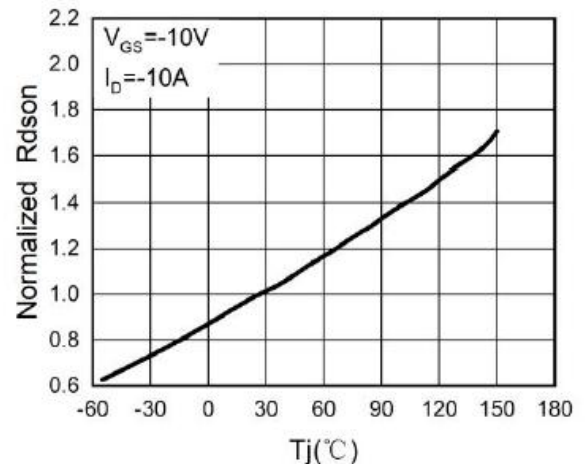
**Fig.3 Power Dissipation**



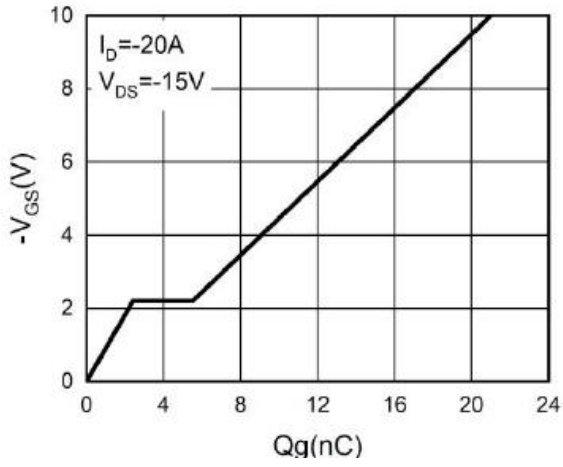
**Fig.4 Drain Current**



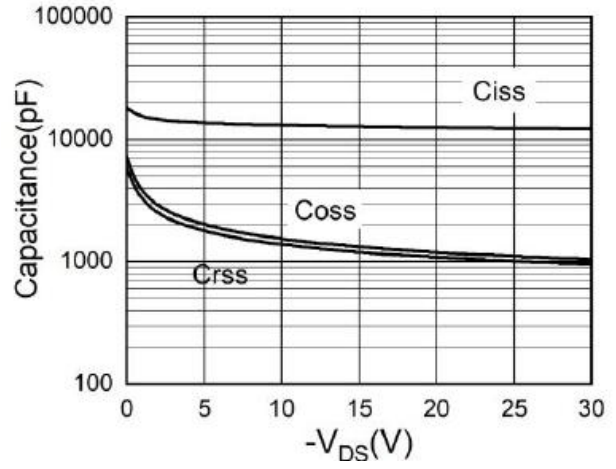
**Fig.5 BV<sub>DSS</sub> vs Junction Temperature**



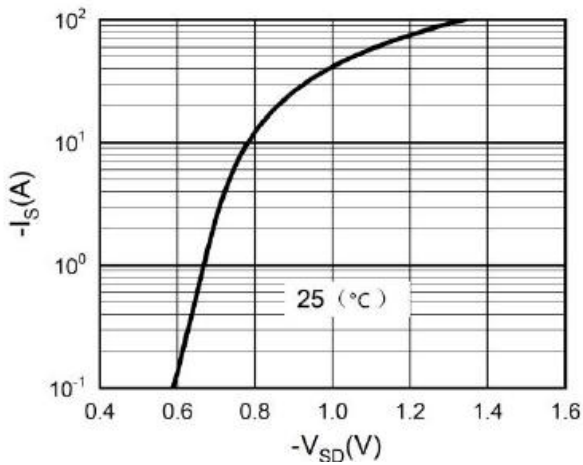
**Fig.6 R<sub>DS(on)</sub> vs Junction Temperature**



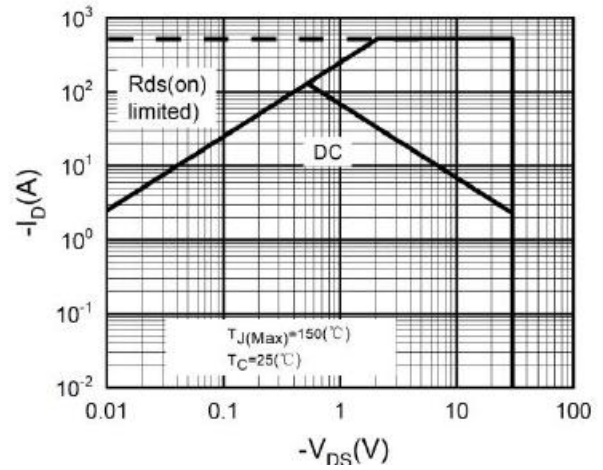
**Fig.7 Gate Charge Waveforms**



**Fig.8 Capacitance**

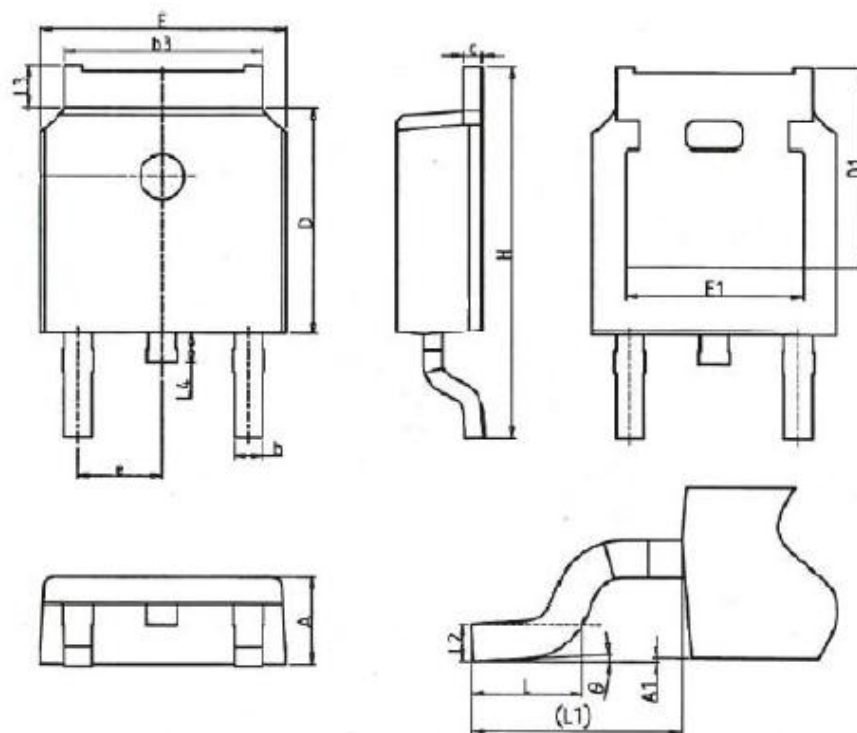


**Fig.9 Body-Diode Characteristics**



**Fig.10 Maximum Safe Operating Area**

# TO252-2L Package Outline



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.18	2.40	0.086	0.095
A1	-	0.2	-	0.008
b	0.68	0.9	0.026	0.036
b3	4.95	5.46	0.194	0.215
c	0.43	0.89	0.017	0.035
D	5.97	6.22	0.235	0.245
D1	5.300REF		0.209REF	
E	6.35	6.73	0.250	0.265
E1	4.32	--	0.170	-
e	2.286BSC		0.09BSC	
H	9.4	10.5	0.370	0.413
L	1.38	1.78	0.054	0.070
L1	2.90REF		0.114REF	
L2	0.51BSC		0.020BSC	
L3	0.88	1.28	0.034	0.050
L4	0.5	1	0.019	0.039
θ	0°	8°	0°	8°

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