

**Description**

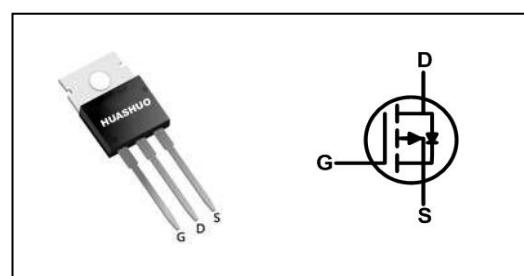
The HSP3119 is the high cell density trenched P-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The HSP3119 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
$R_{DS(ON),typ}$	2.7	m $\Omega$
$I_D$	-150	A

**TO-220 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, $V_{GS} @ -10V^{1,6}$	-150	A
$I_D@T_C=100^\circ C$	Continuous Drain Current, $V_{GS} @ -10V^{1,6}$	-95	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>	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 <sup>1</sup> (Steady State)	---	62	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-case <sup>1</sup>	---	0.81	$^\circ C/W$



**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
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>2</sup>	V <sub>GS</sub> =-10V, I <sub>D</sub> =-30A	---	2.7	3.0	mΩ
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-20A	---	3.5	4.2	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =-250uA	-1.0	---	-2.5	V
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	---	---	-1	uA
		V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V, T <sub>J</sub> =125°C	---	---	-100	
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> = ± 20V, V <sub>DS</sub> =0V	---	---	± 100	nA
R <sub>g</sub>	Gate resistance	V <sub>DS</sub> =0V, V <sub>GS</sub> =0V, f=1MHz		1.8		Ω
Q <sub>g</sub>	Total Gate Charge (-10V)	V <sub>DS</sub> =-15V, V <sub>GS</sub> =-10V, I <sub>D</sub> =-20A	---	210	---	nC
Q <sub>gs</sub>	Gate-Source Charge		---	2.2	---	
Q <sub>gd</sub>	Gate-Drain Charge		---	3.3	---	
T <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DD</sub> =-15V, V <sub>GS</sub> =-10V, R <sub>G</sub> =3Ω, I <sub>D</sub> =-10A	---	17	---	ns
T <sub>r</sub>	Rise Time		---	6	---	
T <sub>d(off)</sub>	Turn-Off Delay Time		---	21	---	
T <sub>f</sub>	Fall Time		---	39	---	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =-15V, V <sub>GS</sub> =0V, f=1MHz	---	12700	---	pF
C <sub>oss</sub>	Output Capacitance		---	1380	---	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	1210	---	

**Diode Characteristics**

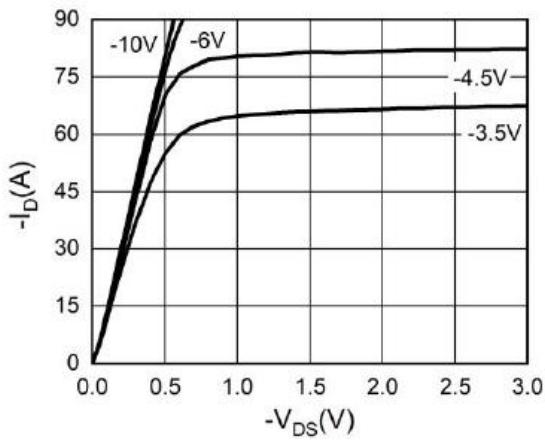
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current <sup>1,5</sup>	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current	---	---	-150	A
V <sub>SD</sub>	Diode Forward Voltage <sup>2</sup>	V <sub>GS</sub> =0V, I <sub>S</sub> =-20A, T <sub>J</sub> =25°C	---	---	-1.2	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>F</sub> =-20A, di/dt=100A/μs, T <sub>J</sub> =25°C	---	37	---	nS
Q <sub>rr</sub>	Reverse Recovery Charge		---	30	---	nC

Note :

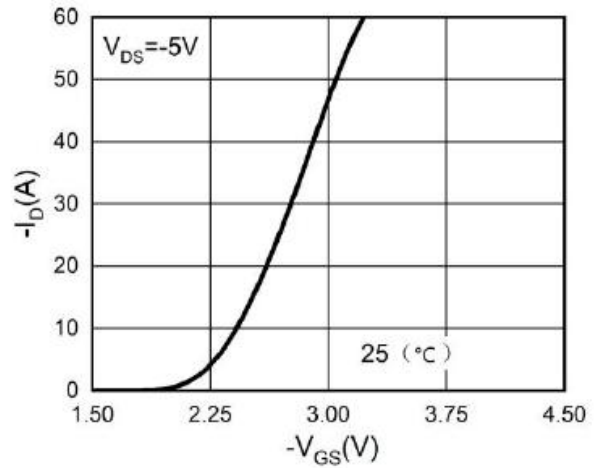
- 1.The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
- 2.The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%
- 3.The EAS data shows Max. rating. The test condition is V<sub>DD</sub>=-30V, V<sub>GS</sub>=-10V, L=0.5mH, I<sub>AS</sub>=-75A
- 4.The power dissipation is limited by 150°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
- 6.The maximum current rating is package limited.



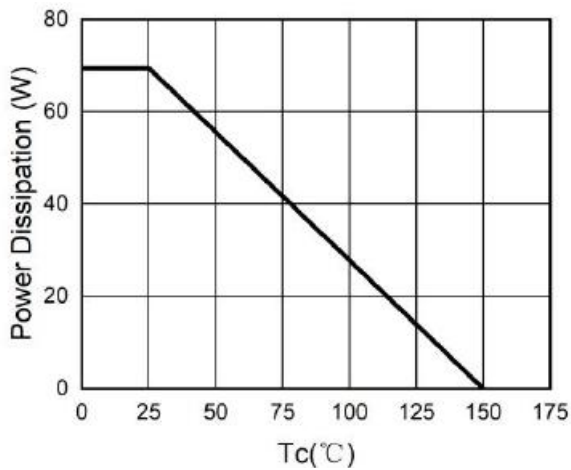
**Typical Characteristics**



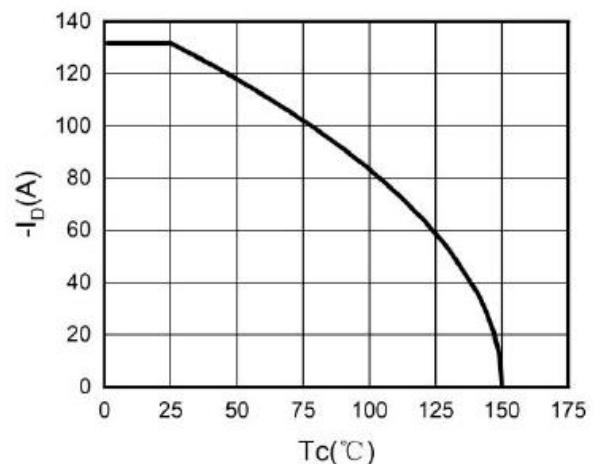
**Fig.1 Output Characteristics**



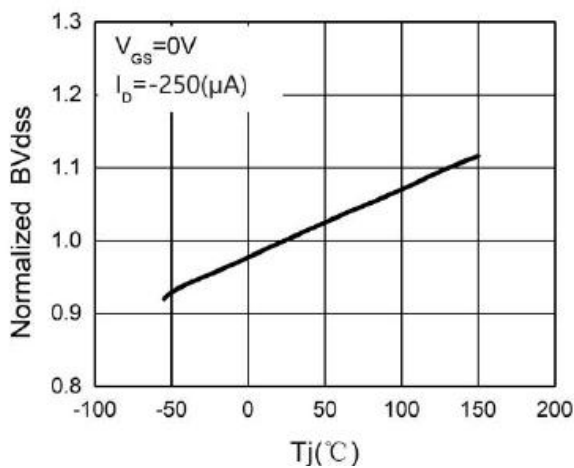
**Fig.2 Transfer Characteristics**



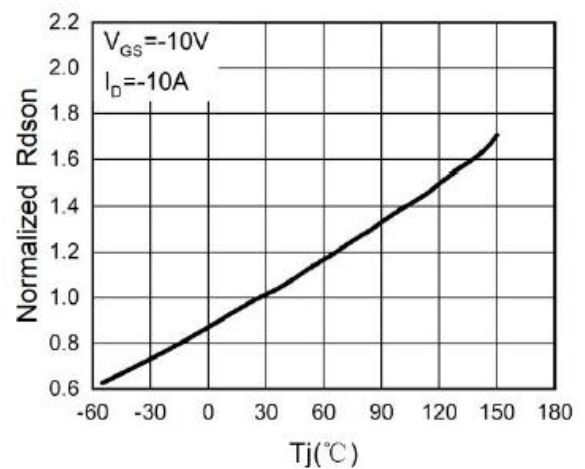
**Fig.3 Power Dissipation**



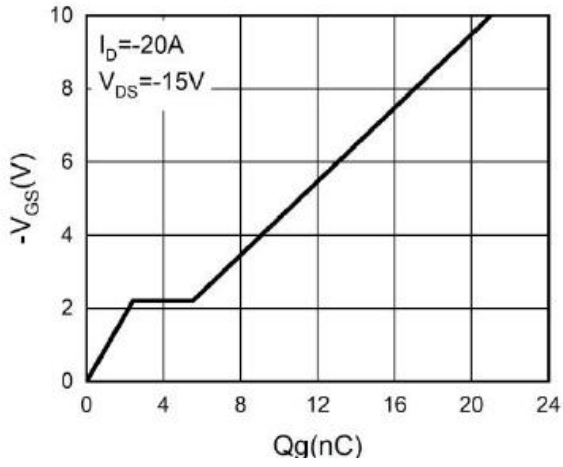
**Fig.4 Drain Current**



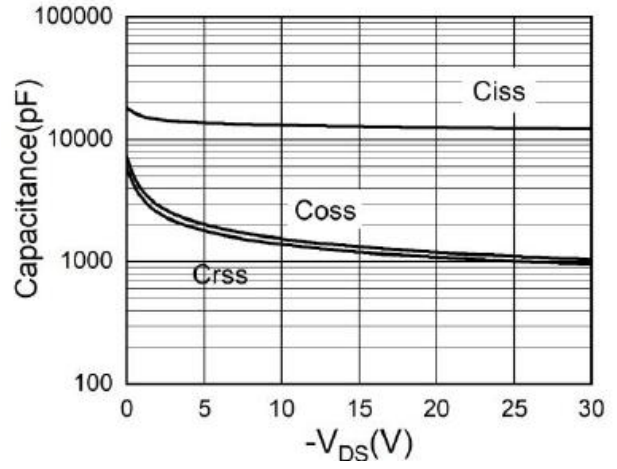
**Fig.5  $BV_{DSS}$  vs Junction Temperature**



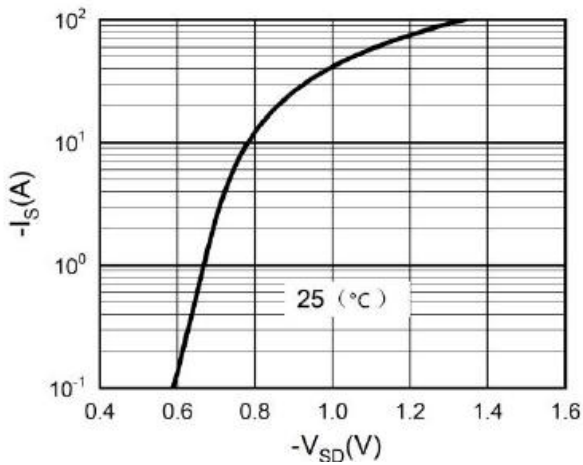
**Fig.6  $R_{DS(on)}$  vs Junction Temperature**



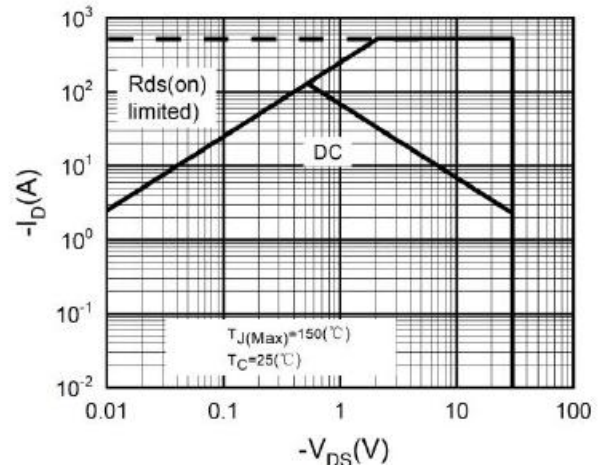
**Fig.7 Gate Charge Waveforms**



**Fig.8 Capacitance**



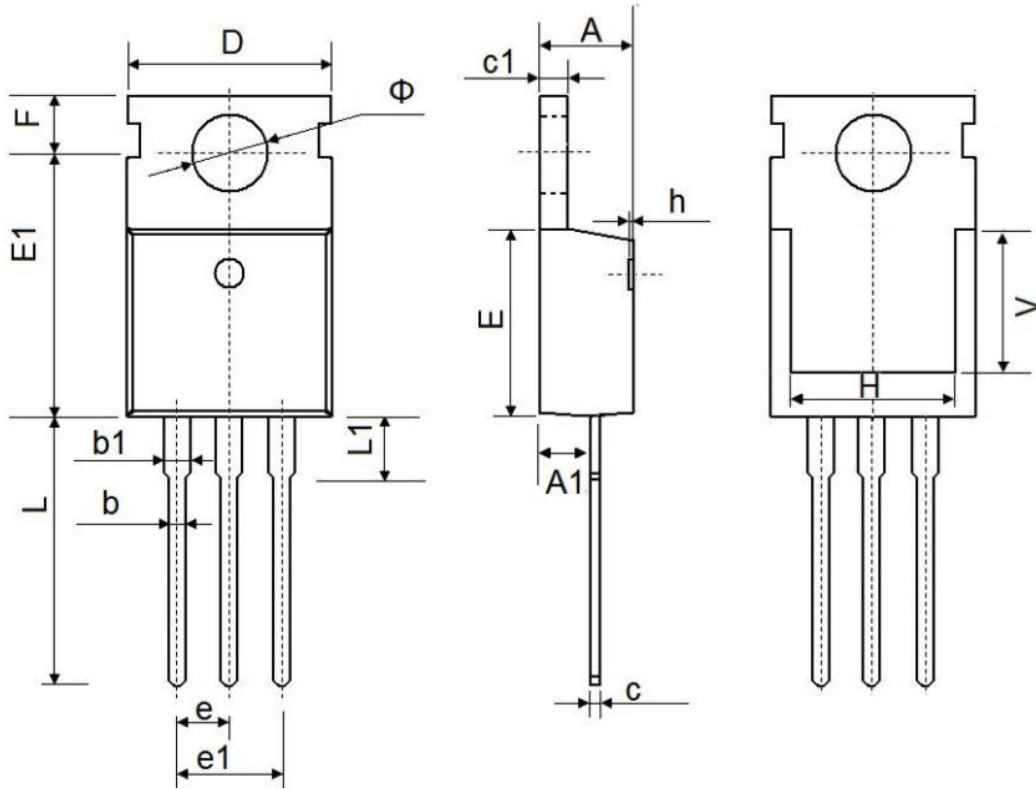
**Fig.9 Body-Diode Characteristics**



**Fig.10 Maximum Safe Operating Area**



**TO-220 Package Information**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.300	4.700	0.169	0.185
A1	2.200	2.600	0.087	0.102
b	0.700	0.950	0.028	0.037
b1	1.170	1.410	0.046	0.056
c	0.450	0.650	0.018	0.026
c1	1.200	1.400	0.047	0.055
D	9.600	10.400	0.378	0.409
E	8.8500	9.750	0.348	0.384
E1	12.650	12.950	0.498	0.510
e	2.540 TYP.		0.100TYP.	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.750	14.300	0.502	0.563
L1	2.850	3.950	0.112	0.156
V	7.500 REF.		0.295 REF.	
Φ	3.400	4.000	0.134	0.157