

General Description

The HSH4129 is the high cell density trench P-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The HSH4129 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

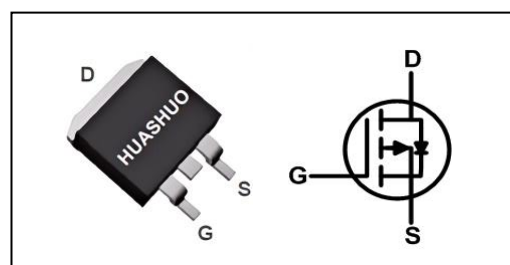
Product Summary

V_{DS}	-40	V
$R_{DS(ON),typ}$	1.9	m Ω
I_D	-180	A

Features

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

TO-263 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-40	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ -10V^{1,6}$	-180	A
$I_D@T_C=100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ -10V^{1,6}$	-113	A
I_{DM}	Pulsed Drain Current ²	-720	A
EAS	Single Pulse Avalanche Energy ³	1750	mJ
I_{AS}	Avalanche Current	-100	A
$P_D@T_C=25^\circ\text{C}$	Total Power Dissipation ⁴	200	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 ¹ (Steady State)	---	62	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-case ¹	---	0.85	$^\circ\text{C/W}$

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-40	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=-10V, I_D=-30A$	---	1.9	2.3	$m\Omega$
		$V_{GS}=-4.5V, I_D=-20A$	---	2.5	3.0	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=-250\mu A$	-1.0	-1.7	-2.5	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=-40V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	-1	μA
		$V_{DS}=-40V, V_{GS}=0V, T_J=125^\circ\text{C}$	---	---	-100	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA
R_g	Gate resistance	$V_{DS}=0V, V_{GS}=0V, f=1\text{MHz}$		1.7		Ω
Q_g	Total Gate Charge (-10V)	$V_{DS}=-20V, V_{GS}=-10V, I_D=-20A$	---	390	---	nC
Q_{gs}	Gate-Source Charge		---	48	---	
Q_{gd}	Gate-Drain Charge		---	76	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=-20V, V_{GS}=-10V, R_G=3\Omega, I_D=-10A$	---	18	---	ns
T_r	Rise Time		---	3.6	---	
$T_{d(off)}$	Turn-Off Delay Time		---	21	---	
T_f	Fall Time		---	39	---	
C_{iss}	Input Capacitance	$V_{DS}=-20V, V_{GS}=0V, f=1\text{MHz}$	---	21300	---	pF
C_{oss}	Output Capacitance		---	1480	---	
C_{rss}	Reverse Transfer Capacitance		---	1360	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current ^{1,5}	$V_G=V_D=0V$, Force Current	---	---	-180	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V, I_S=-20A, T_J=25^\circ\text{C}$	---	---	-1.2	V
t_{rr}	Reverse Recovery Time	$I_F=-20A, di/dt=100A/\mu s, T_J=25^\circ\text{C}$	---	52	---	nS
Q_{rr}	Reverse Recovery Charge		---	128	---	nC

Note :

- 1.The data tested by surface mounted on a 1 inch² 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 $V_{DD}=-40V, V_{GS}=-10V, L=0.5mH, I_{AS}=-100A$
- 4.The power dissipation is limited by 150°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

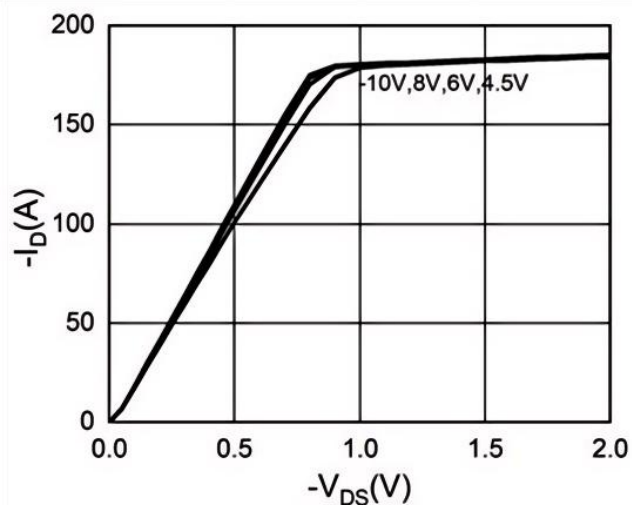


Fig.1 Typical Output Characteristics

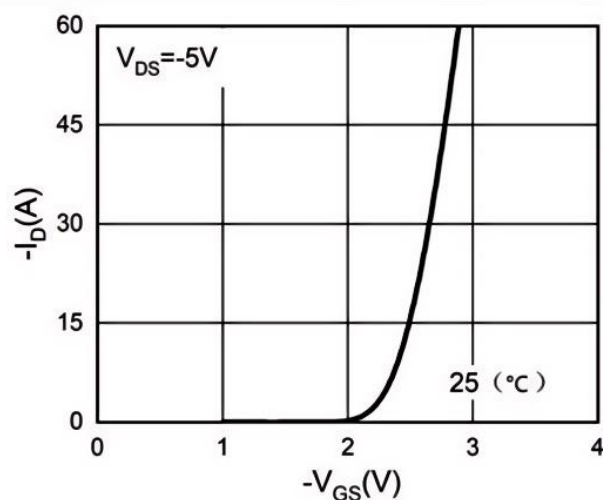


Fig.2 Transfer Characteristics

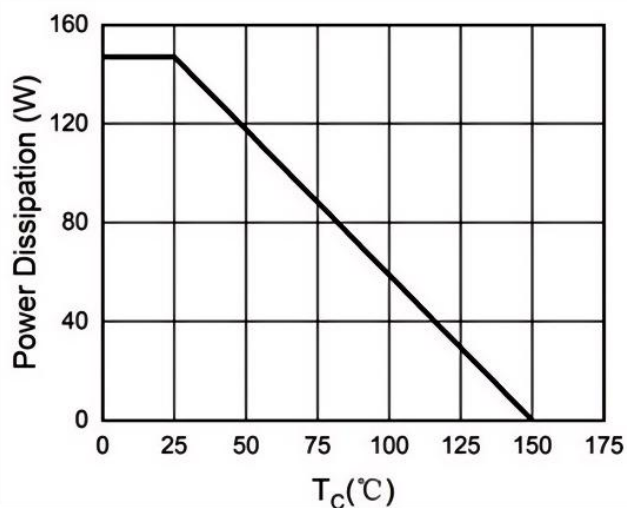


Fig.3 Power Dissipation

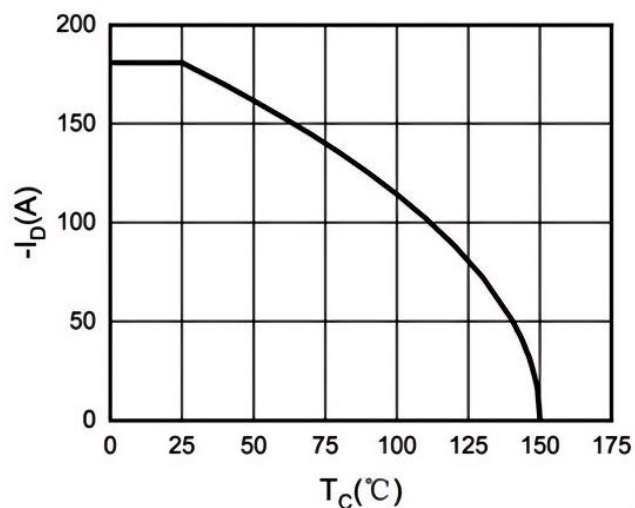


Fig.4 Drain Current

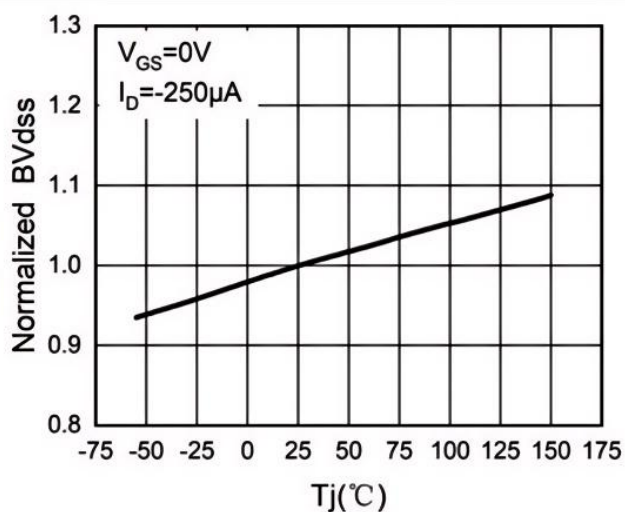


Fig.5 BV_{DS} vs Junction Temperature

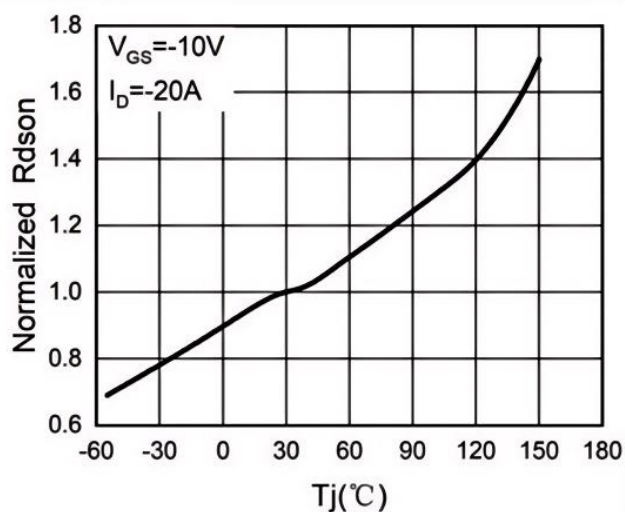


Fig.6 $R_{DS(on)}$ vs Junction Temperature

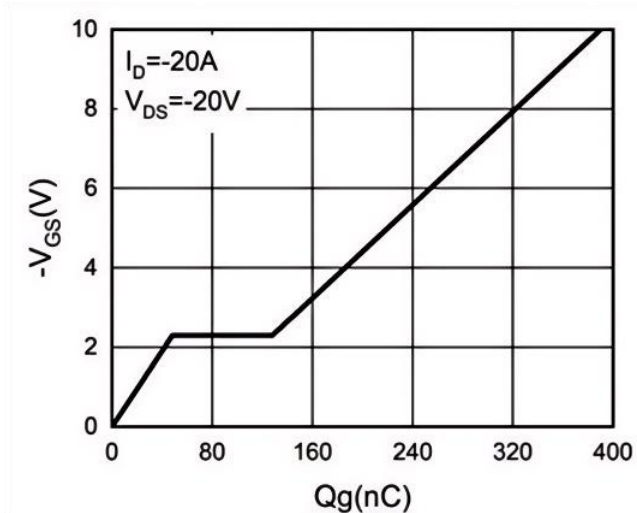


Fig.7 Gate Charge Waveforms

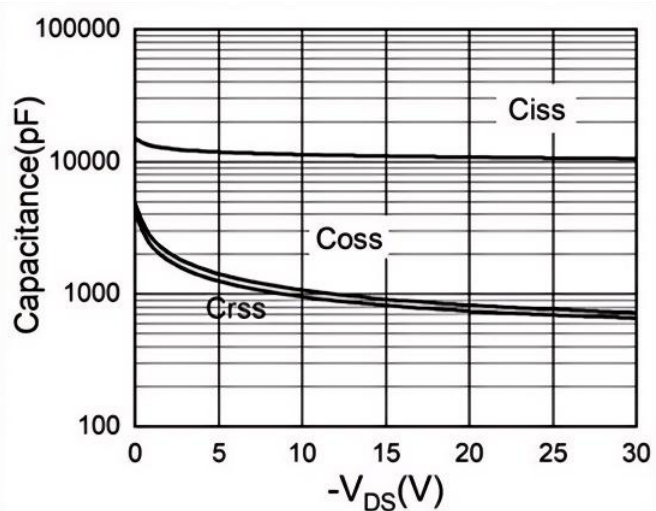


Fig.8 Capacitance

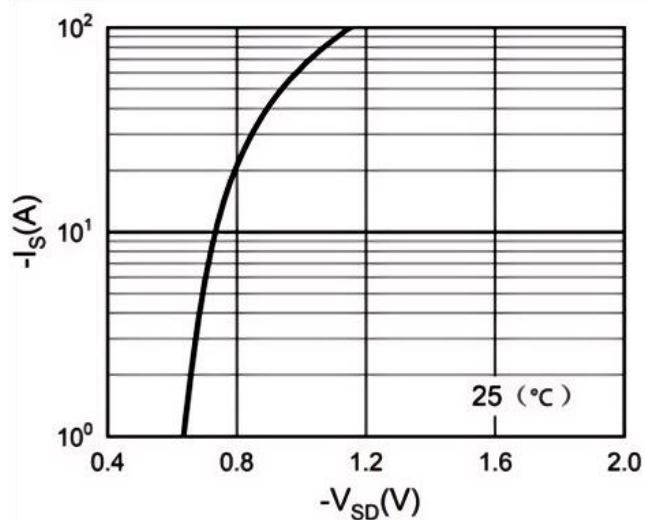


Fig.9 Body Diode Characteristics

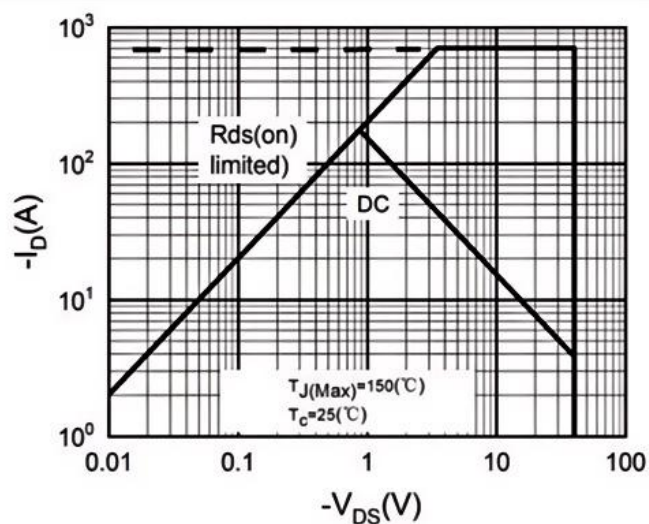
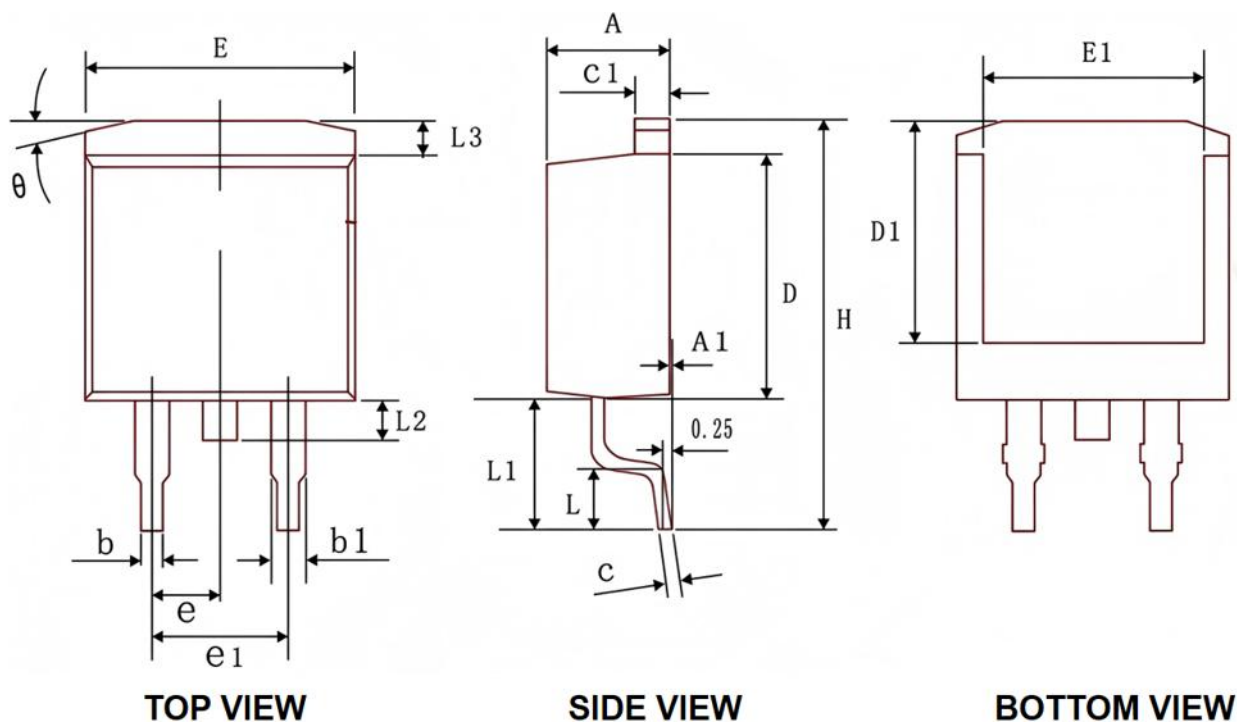


Fig.10 Maximum Safe Operating Area

Ordering Information

Part Number	Package code	Packaging
HSH4129	TO-263	800/Tape&Reel

TO-263 Package Outline



COMMON DIMENSIONS(UNIT OF MEASURE - MM)

SYMBOL	MIN	NOM	MAX
A	4.37	4.57	4.77
A1	0.00	-	0.25
b	0.70	0.83	0.96
b1	1.00	1.24	1.47
C	0.35	0.45	0.55
C1	1.25	1.30	1.35
D	8.50	8.90	9.30
D1	7.50	8.00	8.50
H	14.7	15.20	15.7
E	9.80	10.08	10.4
E1	7.35	7.80	8.25
e1	4.93	5.08	5.23
L	2.00	2.30	2.60
L1	4.50	4.75	5.00
L2	1.30	1.53	1.75
L3	1.10	1.29	1.47
e	2.54 BSC		
θ	13°TYP		

HSH4129 Marking:

