

Description

The HSH100P06 is the high cell density trench P-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

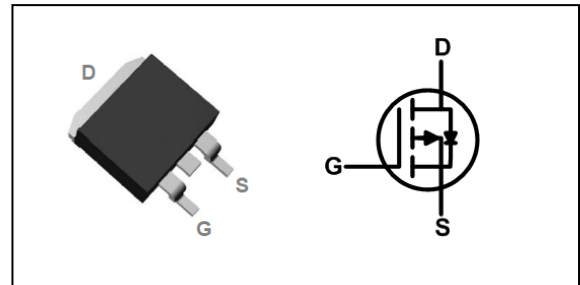
The HSH100P06 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

- 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}	-60	V
$R_{DS(ON),typ}$	5.5	m Ω
I_D	-100	A

TO-263 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-60	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25^\circ C$	Continuous Drain Current, $-V_{GS}$ @ $-10V^1$	-100	A
$I_D@T_C=100^\circ C$	Continuous Drain Current, $-V_{GS}$ @ $-10V^1$	-70	A
I_{DM}	Pulsed Drain Current ²	-280	A
EAS	Single Pulse Avalanche Energy ³	310	mJ
I_{AS}	Avalanche Current	100	A
$P_D@T_C=25^\circ C$	Total Power Dissipation ⁴	210	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 ¹	---	62	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	0.71	$^\circ C/W$



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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=-250\mu A$	-60	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C , $I_D=-1mA$	---	-0.036	---	V/ $^\circ\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=-10V$, $I_D=-20A$	---	5.5	7	m Ω
		$V_{GS}=-4.5V$, $I_D=-10A$	---	7.3	9	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=-250\mu A$	-1.0	-2.0	-3.0	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	4.28	---	mV/ $^\circ\text{C}$
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=-48V$, $V_{GS}=0V$, $T_J=25^\circ\text{C}$	---	---	1	μA
		$V_{DS}=-48V$, $V_{GS}=0V$, $T_J=55^\circ\text{C}$	---	---	10	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	± 100	nA
g_{fs}	Forward Transconductance	$V_{DS}=-10V$, $I_D=-3A$	---	15	---	S
Q_g	Total Gate Charge	$V_{DS}=-30V$, $V_{GS}=-10V$, $I_D=-5A$	---	85	---	nC
Q_{gs}	Gate-Source Charge		---	13	---	
Q_{gd}	Gate-Drain Charge		---	10	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=-48V$, $V_{GS}=-10V$, $R_G=6\Omega$, $I_D=-1A$	---	60	---	ns
T_r	Rise Time		---	186	---	
$T_{d(off)}$	Turn-Off Delay Time		---	390	---	
T_f	Fall Time		---	188	---	
C_{iss}	Input Capacitance	$V_{DS}=-30V$, $V_{GS}=0V$, $f=1MHz$	---	5200	---	pF
C_{oss}	Output Capacitance		---	890	---	
C_{rss}	Reverse Transfer Capacitance		---	50	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current ^{1,5}	$V_G=V_D=0V$, Force Current	---	---	-72	A
I_{SM}	Pulsed Source Current ^{2,5}		---	---	-144	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V$, $I_S=-1A$, $T_J=25^\circ\text{C}$	---	---	-1	V

Note :

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 20Z 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 $V_{DD}=-50V$, $V_{GS}=-10V$, $L=0.1mH$, $R_G=25\Omega$, $I_{AS}=-100A$
- 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.



Typical Characteristics

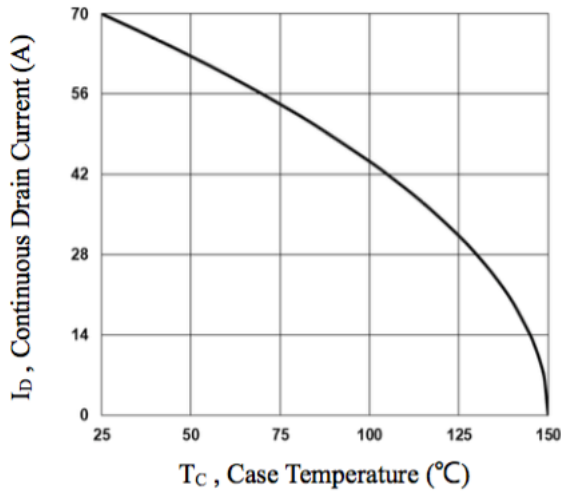


Fig.1 Continuous Drain Current vs. T_C

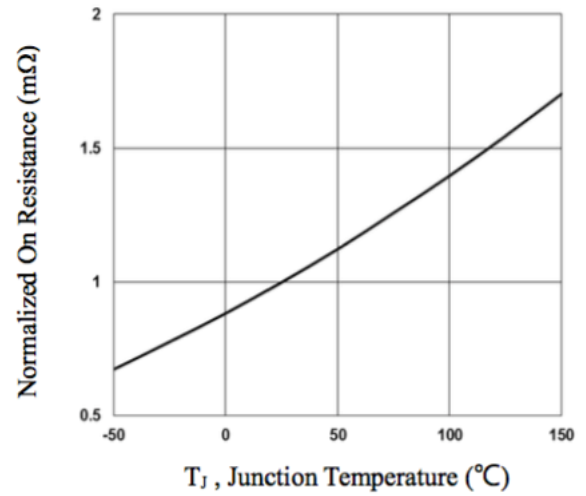


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

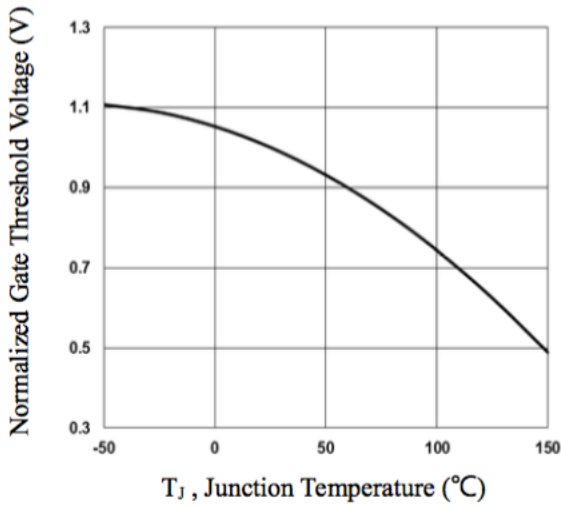


Fig.3 Normalized V_{th} vs. T_J

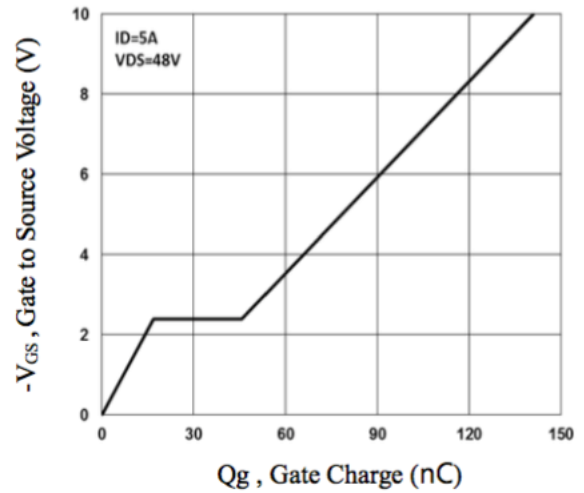


Fig.4 Gate Charge Waveform

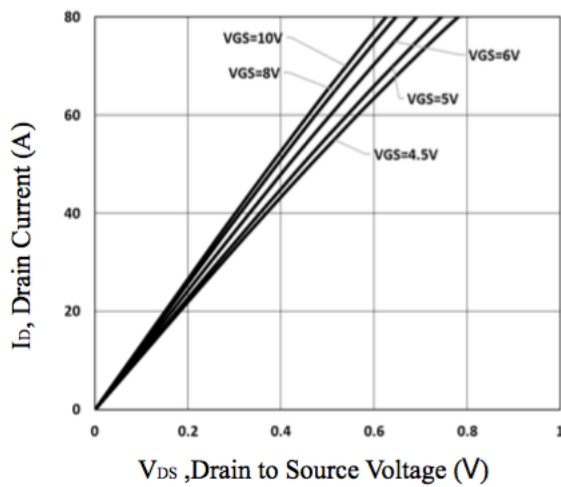


Fig.5 Typical Output Characteristics

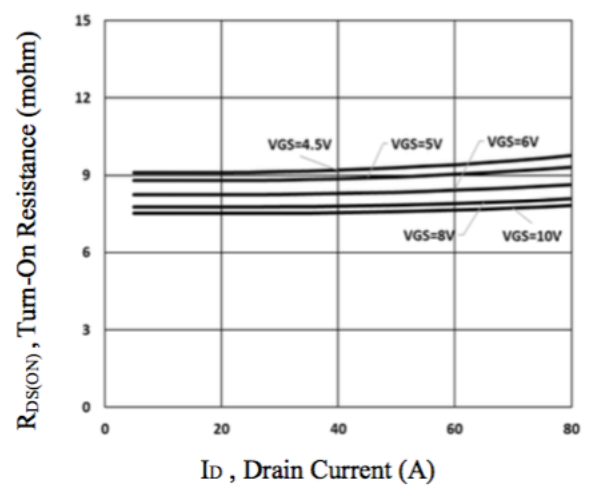


Fig.6 Turn-on Resistances vs. I_D



P-Ch 60V Fast Switching MOSFETs

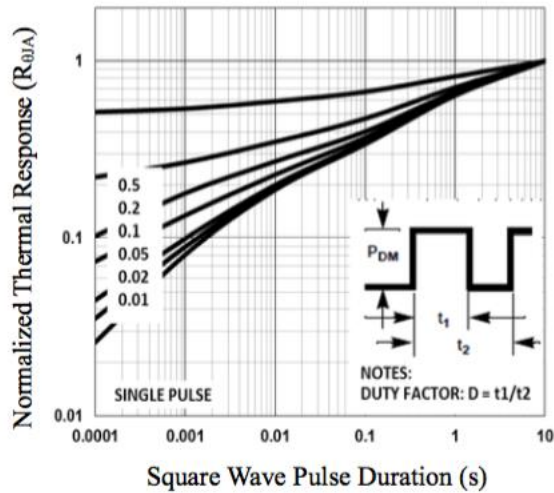


Fig.7 Normalized Transient Impedance

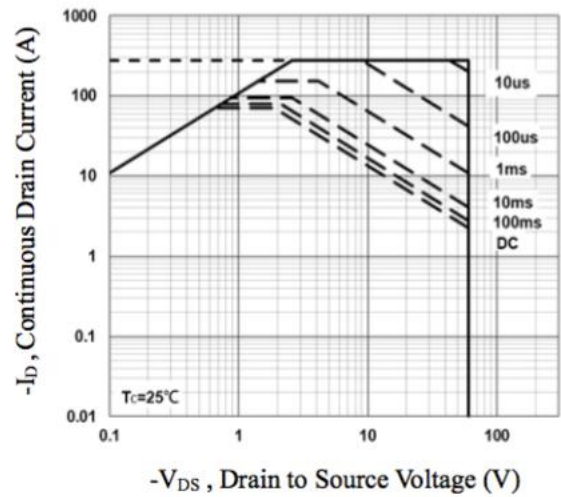


Fig.8 Maximum Safe Operation Area

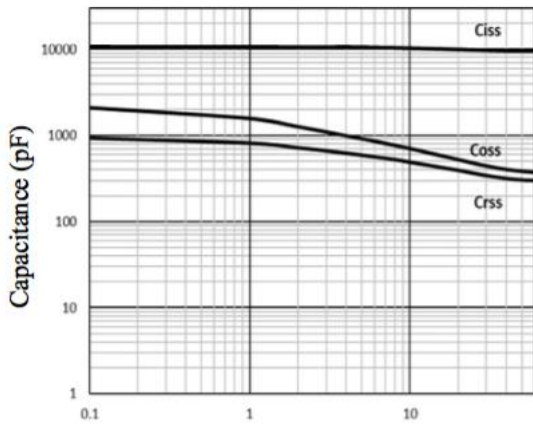


Fig.9 Capacitance Characteristics

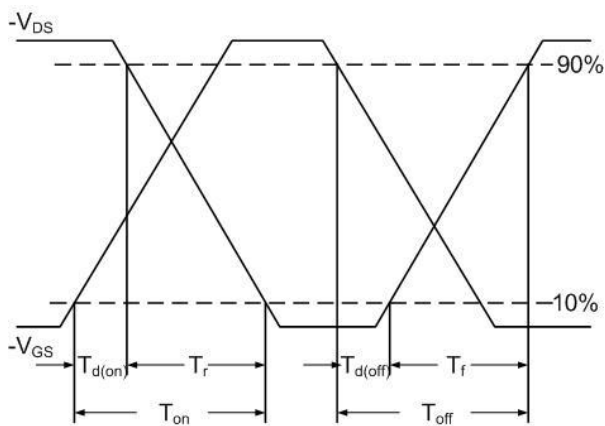


Fig.10 Switching Time Waveform

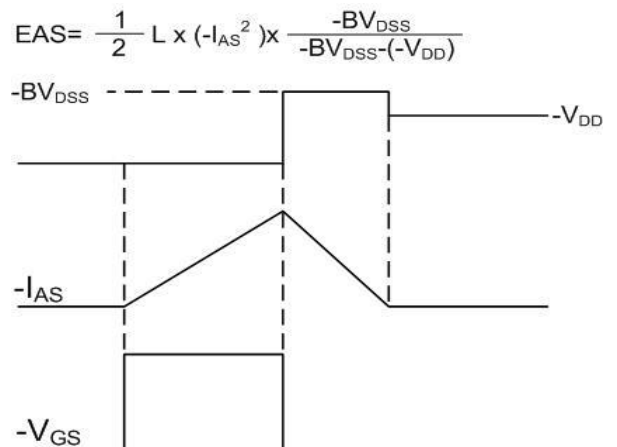
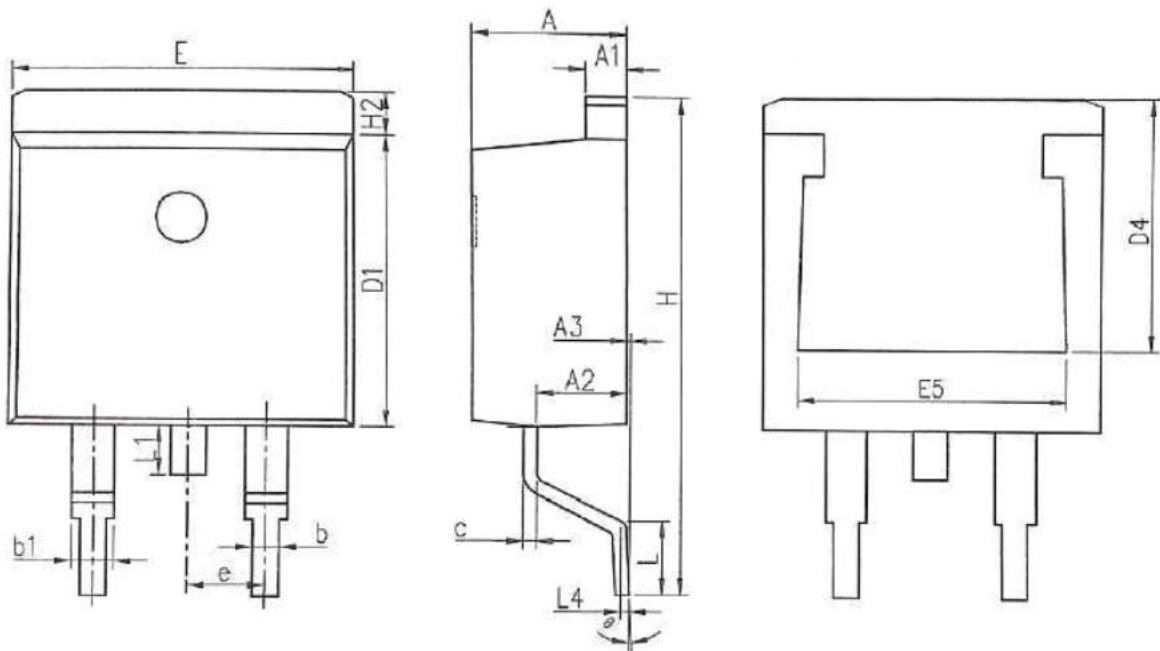


Fig.11 Unclamped Inductive Waveform



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.370	4.770	0.172	0.188
A1	1.220	1.420	0.048	0.056
A2	2.200	2.890	0.087	0.114
A3	0.000	0.250	0.000	0.010
b	0.700	0.960	0.028	0.038
b1	1.170	1.470	0.046	0.058
c	0.300	0.530	0.012	0.021
D1	8.500	9.300	0.335	0.366
D4	6.600	-	0.260	-
E	9.860	10.36	0.388	0.408
E5	7.060	-	0.278	-
e	2.540 BSC		0.100 BSC	
H	14.70	15.70	0.579	0.618
H2	1.070	1.470	0.042	0.058
L	2.000	2.600	0.079	0.102
L1	1.400	1.750	0.055	0.069
L4	0.250 BSC		0.010 BSC	
θ	0°	9°	0°	9°

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