

General Description

The HSH047P06 is the high cell density trench P-ch MOSFETs, which provide excellent $R_{DS(on)}$ and gate charge for most of the synchronous buck converter applications.

The HSH047P06 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

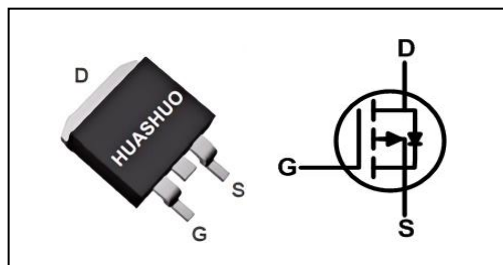
Product Summary

V_{DS}	-60	V
$R_{DS(on),typ}$	3.9	m Ω
I_D	-150	A

Features

- 100% EAS Guaranteed
- Green Device Available
- Super Low Gate Charge
- 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	-60	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25^\circ C$	Continuous Drain Current ¹	-150	A
$I_D@T_C=100^\circ C$	Continuous Drain Current ¹	-85	A
I_{DM}	Pulsed Drain Current ²	-520	A
EAS	Single Pulse Avalanche Energy ³	480	mJ
$P_D@T_C=25^\circ C$	Total Power Dissipation ⁴	183	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	---	0.68	$^\circ C/W$

P-Ch 60V Fast Switching MOSFETs
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
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=-10V, I_D=-50A$	---	3.9	4.7	$m\Omega$
		$V_{GS}=-4.5V, I_D=-30A$	---	4.8	6.2	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=-250\mu A$	-1.0	-1.5	-2.5	V
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	$V_{DS}=-10V, I_D=-3A$	---	18	---	S
Q_g	Total Gate Charge (-4.5V)	$V_{DS}=-48V, V_{GS}=-10V, I_D=-5A$	---	280	---	nC
Q_{gs}	Gate-Source Charge		---	55	---	
Q_{gd}	Gate-Drain Charge		---	24	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=-48V, V_{GS}=-10V, R_G=6\Omega, I_D=-1A$	---	88	---	ns
T_r	Rise Time		---	258	---	
$T_{d(off)}$	Turn-Off Delay Time		---	509	---	
T_f	Fall Time	$V_{DS}=-25V, V_{GS}=0V, f=1\text{MHz}$	---	244	---	pF
C_{iss}	Input Capacitance		---	17900	---	
C_{oss}	Output Capacitance		---	1701	---	
C_{rss}	Reverse Transfer Capacitance		---	680	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current ^{1,5}	$V_G=V_D=0V$, Force Current	---	---	-150	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V, I_S=-40A, T_J=25^\circ\text{C}$	---	---	-1	V
T_{rr}	Reverse Recovery Time	$I_{sd}=-10A, di/dt=100A/\mu s$	---	46	---	ns
Q_{rr}	Reverse Recovery Charge		---	117	---	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 $V_{DD}=-25V, V_{GS}=-10V, L=0.1mH, I_{as}=98A$

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

P-Ch 60V Fast Switching MOSFETs

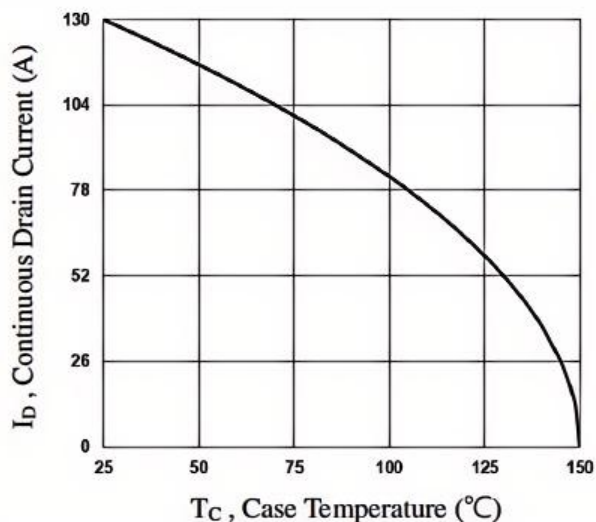


Fig.1 Continuous Drain Current vs. T_C

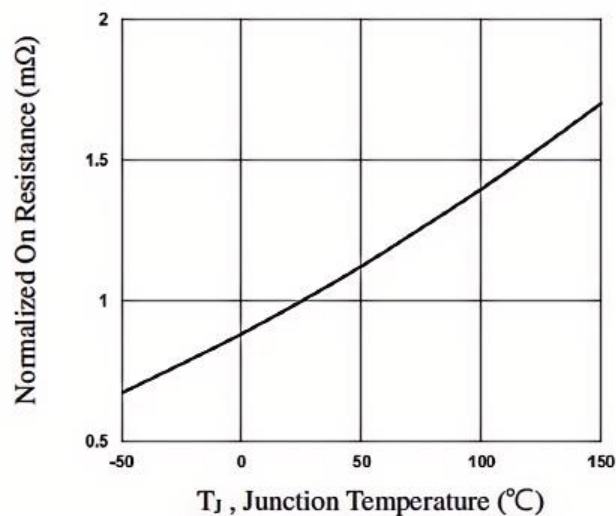


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

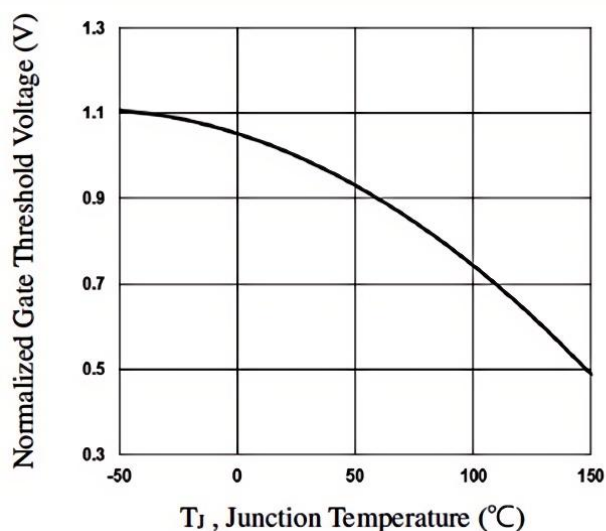


Fig.3 Normalized V_{th} vs. T_J

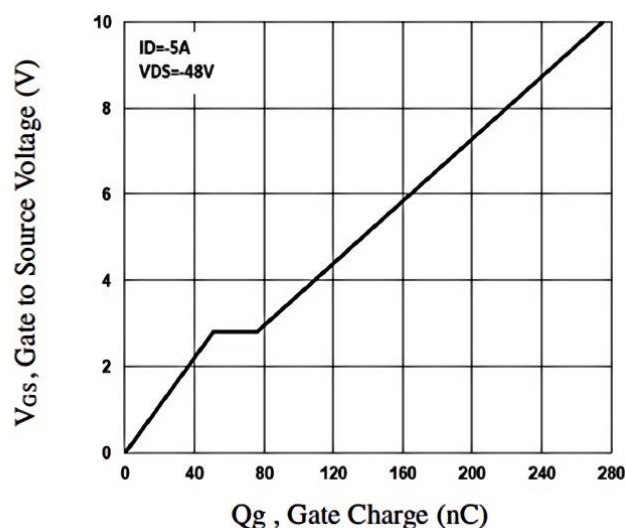


Fig.4 Gate Charge Characteristics

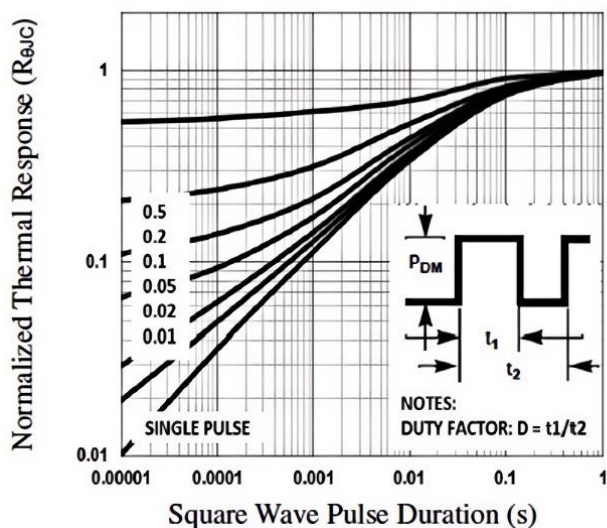


Fig.5 Normalized Transient Impedance

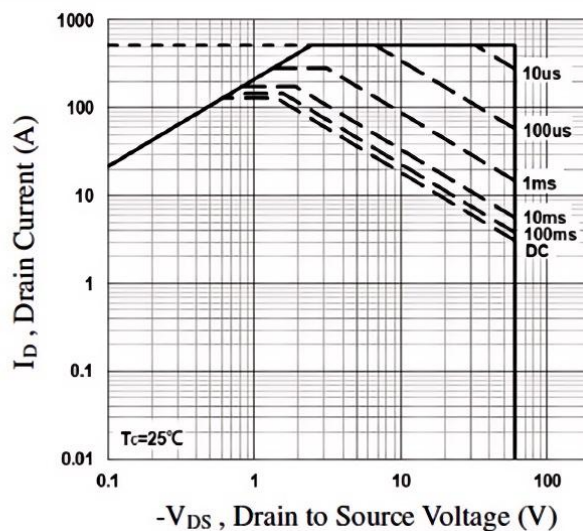


Fig.6 Maximum Safe Operation Area

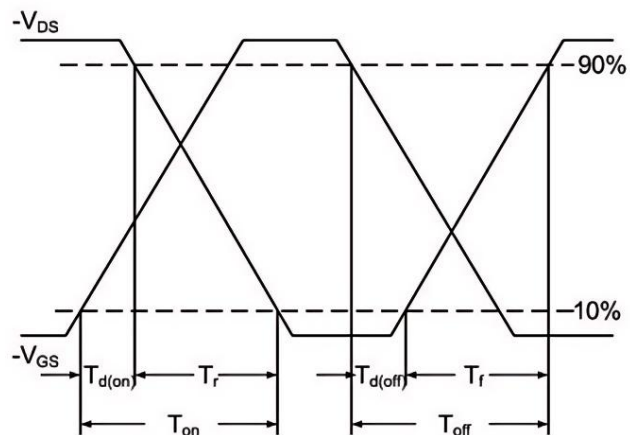


Fig.7 Switching Time Waveform

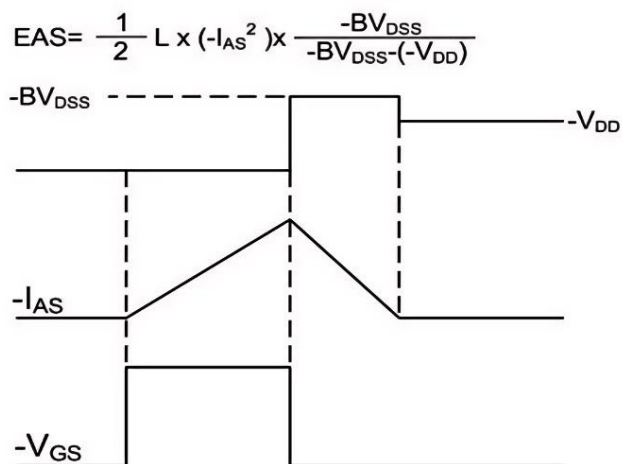
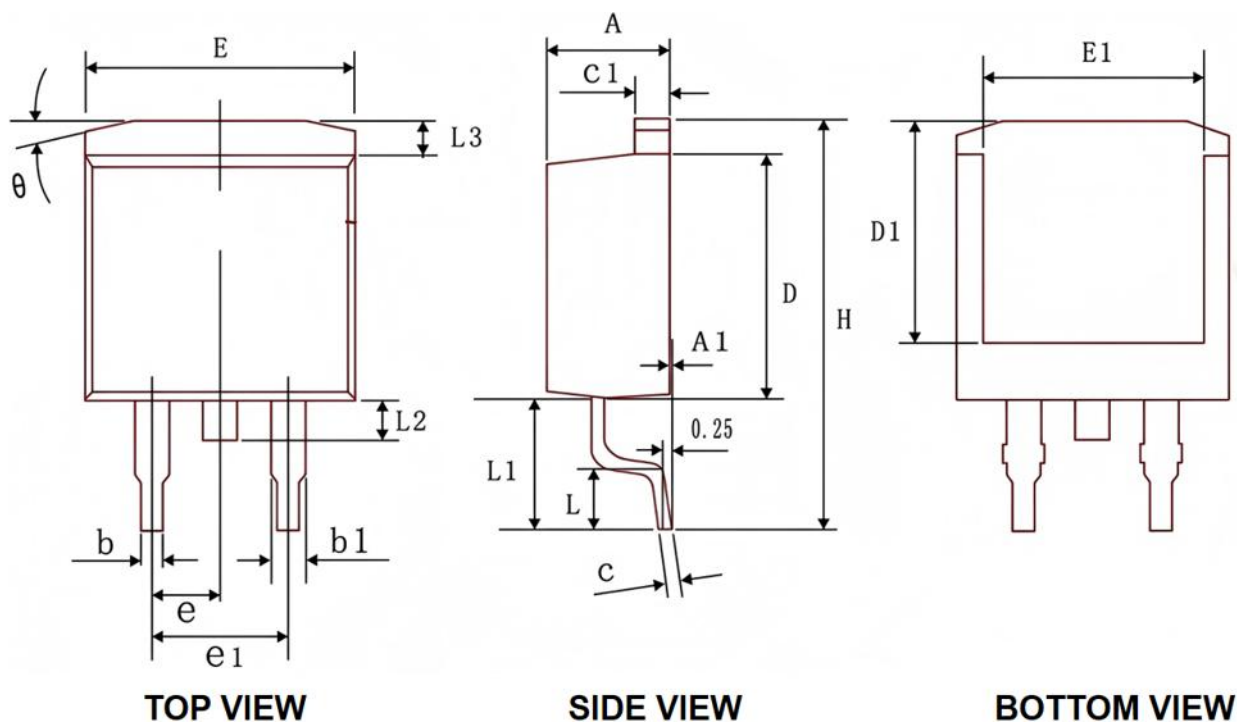


Fig.8 Unclamped Inductive Waveform

Ordering Information

Part Number	Package code	Packaging
HSH047P06	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		

HSH047P06 Marking:

