

General Description

The HSM4407 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 HSM4407 meet the RoHS and Green Product requirement 100% EAS guaranteed with full function reliability approved.

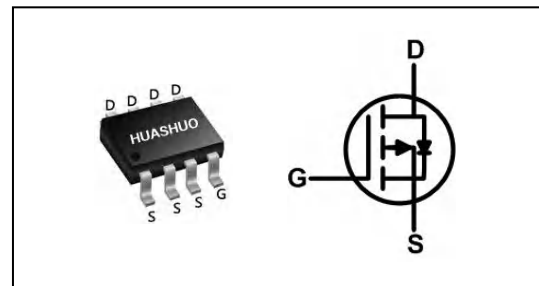
Features

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

Product Summary

V_{DS}	-30	V
$R_{DS(ON),max}$	12	mΩ
I_D	-12	A

SOP8 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-30	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_A=25^\circ\text{C}$	Continuous Drain Current, V_{GS} @ -10V ¹	-12	A
$I_D@T_A=70^\circ\text{C}$	Continuous Drain Current, V_{GS} @ -10V ¹	-10	A
I_{DM}	Pulsed Drain Current ²	-48	A
$P_D@T_A=25^\circ\text{C}$	Total Power Dissipation ¹	2.0	W
$P_D@T_A=70^\circ\text{C}$	Total Power Dissipation ¹	1.3	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 ^{1,2} Steady State	74	110	$^\circ\text{C/W}$
	Thermal Resistance Junction-Ambient ¹ ($t \leq 10\text{s}$)	48	62.5	$^\circ\text{C/W}$
$R_{\theta JL}$	Thermal Resistance Junction-Lead	35	50	$^\circ\text{C/W}$



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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=-250\mu A$	-30	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance ³	$V_{GS}=-10V$, $I_D=-12A$	---	9.5	12	$m\Omega$
		$V_{GS}=-4.5V$, $I_D=-10A$	---	12	15	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=-250\mu A$	-1.0	-1.4	-2.0	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=-30V$, $V_{GS}=0V$, $T_J=25^\circ\text{C}$	---	---	-1	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	± 100	nA
g_{fs}	Forward Transconductance ³	$V_{DS}=-5V$, $I_D=-12A$	15	---	---	S
R_g	Gate Resistance	$V_{DS}=0V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	9	---	Ω
Q_g	Total Gate Charge	$V_{DS}=-15V$, $V_{GS}=-10V$, $I_D=-12A$	---	72	---	nC
Q_{gs}	Gate-Source Charge		---	12.6	---	
Q_{gd}	Gate-Drain Charge		---	13.6	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=-15V$, $V_{GS}=-10V$, $R_G=1.0\Omega$ $I_D=-12A$	---	13.6	---	ns
T_r	Rise Time		---	58.2	---	
$T_{d(off)}$	Turn-Off Delay Time		---	77	---	
T_f	Fall Time		---	81	---	
C_{iss}	Input Capacitance	$V_{DS}=-15V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	3580	---	pF
C_{oss}	Output Capacitance		---	340	---	
C_{rss}	Reverse Transfer Capacitance		---	278	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{SD}	Diode Forward Voltage	$V_{GS}=0V$, $I_S=-12A$, $T_J=25^\circ\text{C}$	---	-0.81	-1	V

Note :

- 1.Surface mounted on 1" x 1 " FR4 Board.
- 2.Pluse width limited by maximum junction temperature.
- 3.Plise Test : Pluse width $\leq 300\mu s$, duty cycle $\leq 2\%$.



Typical Characteristics

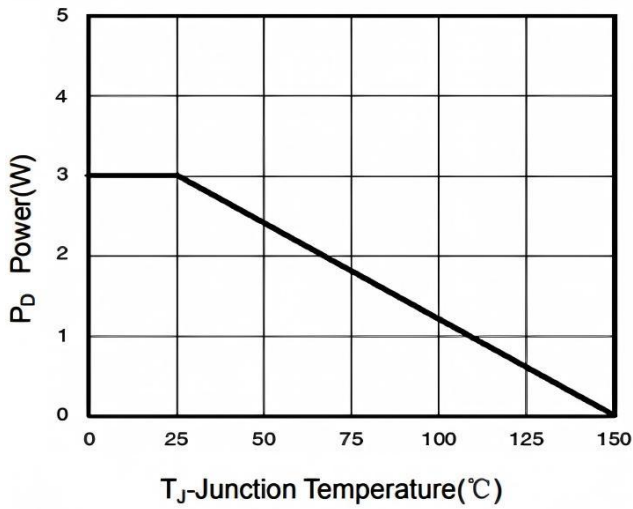


Figure 1 Power Dissipation

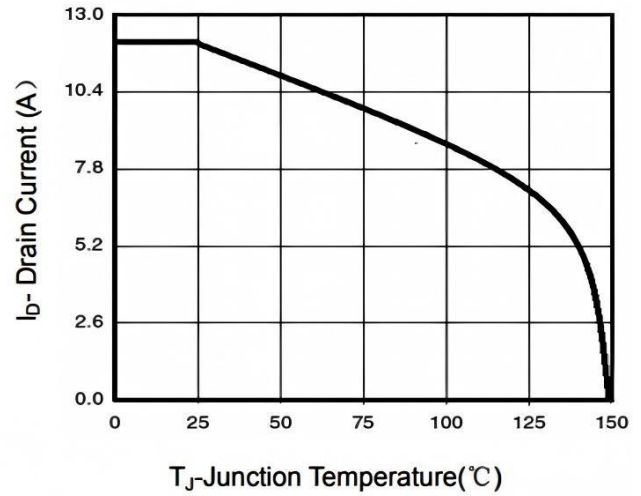


Figure 2 Drain Current

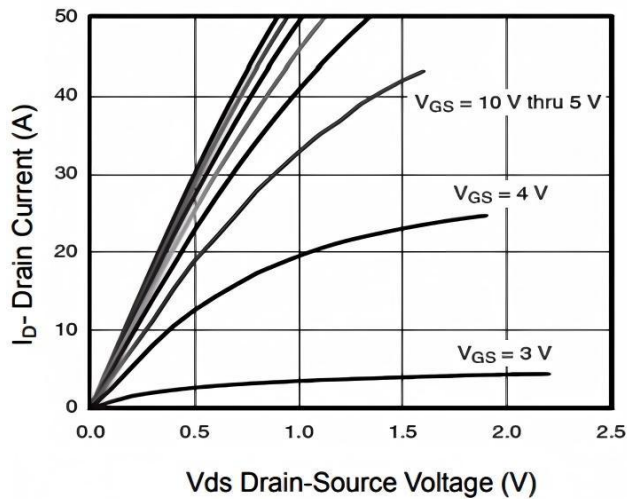


Figure 3 Output Characteristics

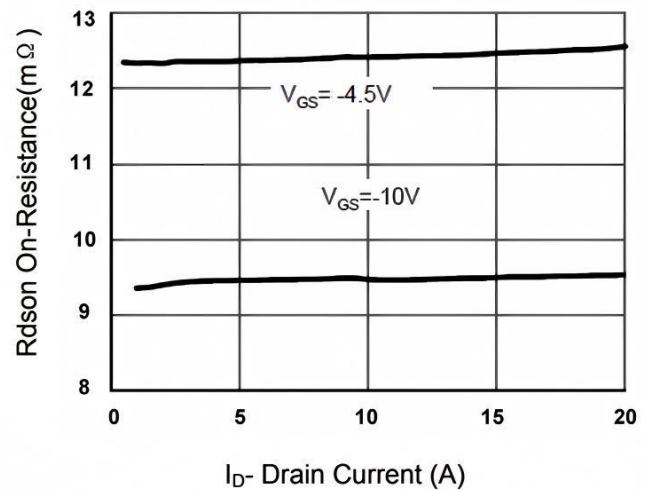


Figure 4 Drain-Source On-Resistance

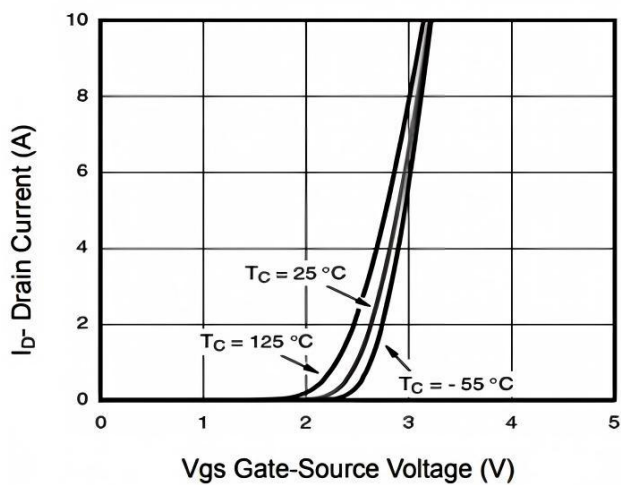


Figure 5 Transfer Characteristics

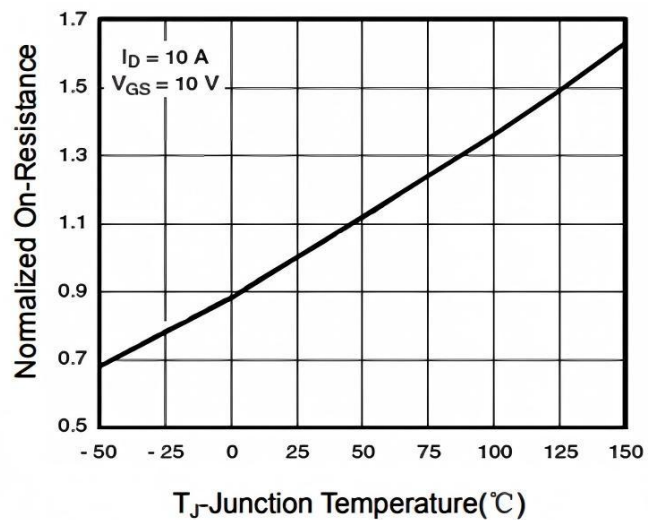


Figure 6 Drain-Source On-Resistance



P-Ch 30V Fast Switching MOSFETs

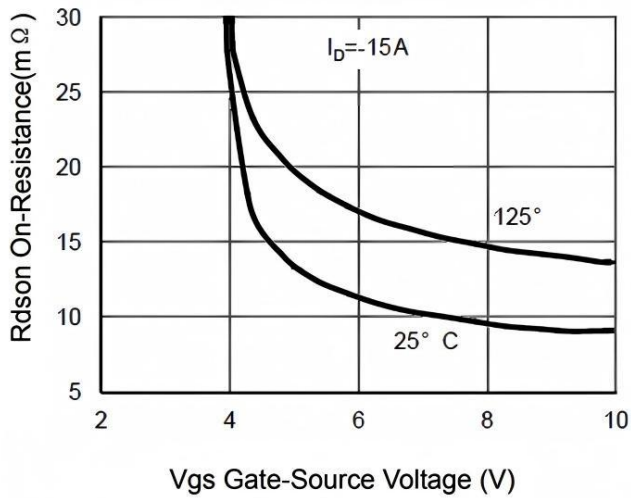


Figure 7 Rdson vs Vgs

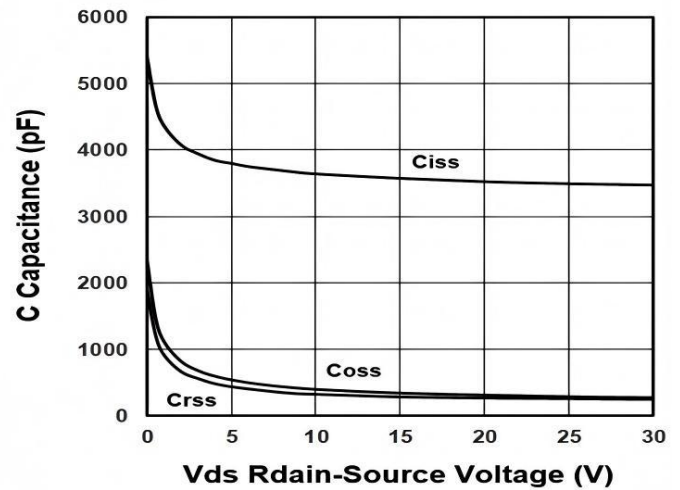


Figure 8 Capacitance vs Vds

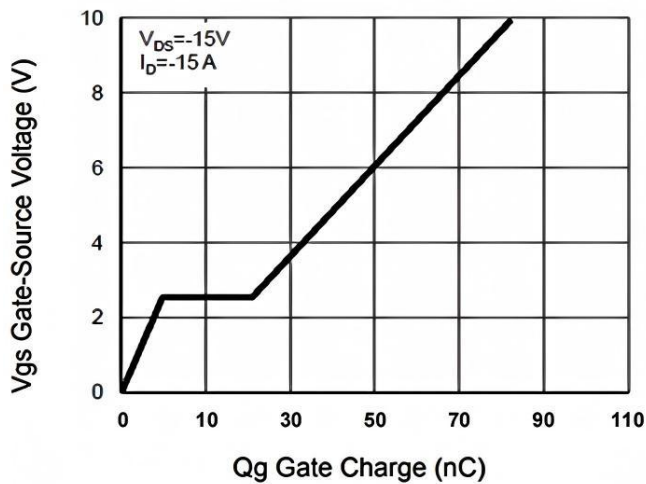


Figure 9 Gate Charge

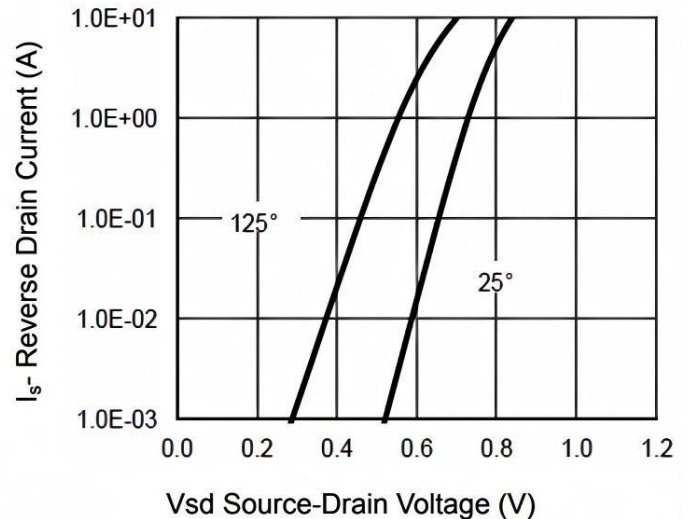


Figure 10 Source- Drain Diode Forward

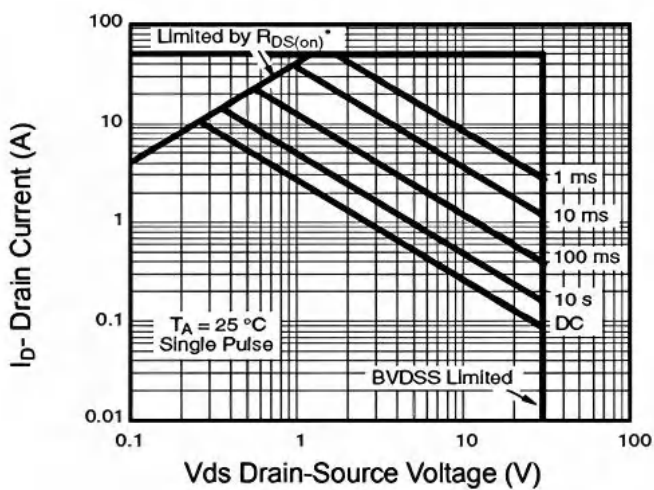


Figure 11 Safe Operation Area

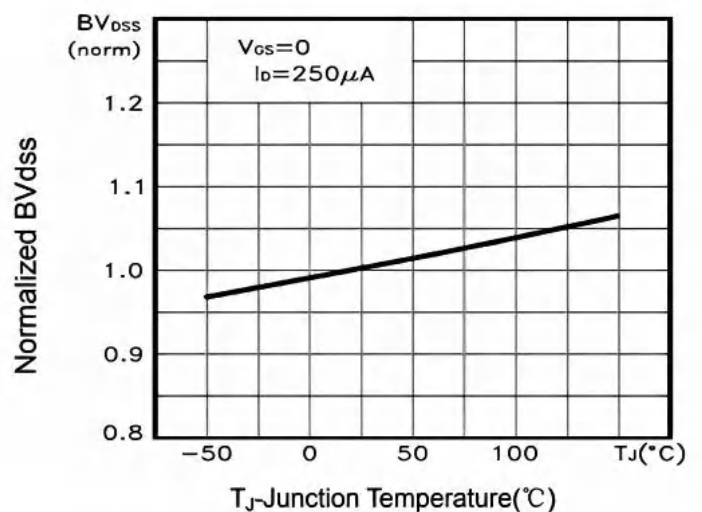


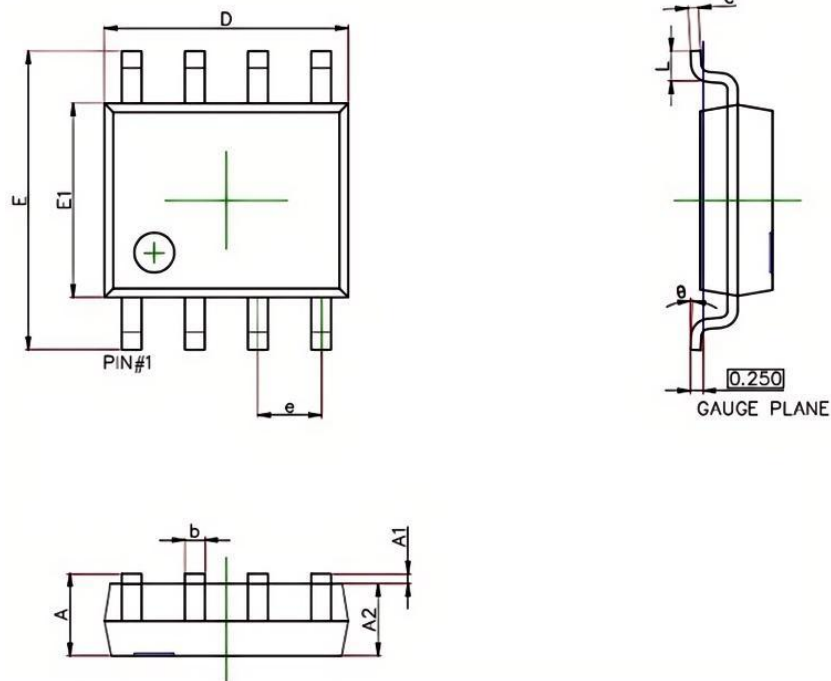
Figure 12 BVDSS vs Junction Temperature



Ordering Information

Part Number	Package code	Packaging
HSM4407	SOP-8	4000/Tape&Reel

SOP-8 Package Outline



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
C	0.170	0.250	0.007	0.010
D	4.800	5.000	0.189	0.197
e	1.270 (BSC)		0.050(BSC)	
E	5.800	6.200	0.228	0.244
E1	3.800	4.000	0.150	0.157
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°



HSM4407 Marking:

