

Description

The HSM4435 is the high cell density trenched P-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

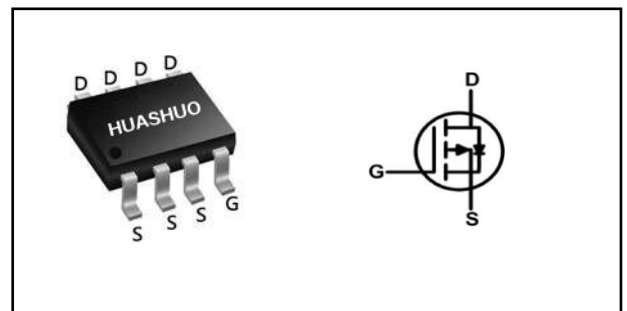
The HSM4435 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

- 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),typ}	18	mΩ
I _D	-9.5	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°C	Continuous Drain Current, V _{GS} @ -10V ₁	-9.5	A
I _D @T _A =70°C	Continuous Drain Current, V _{GS} @ -10V ₁	-7.6	A
I _{DM}	Pulsed Drain Current ₂	-50	A
EAS	Single Pulse Avalanche Energy ₃	72.2	mJ
I _{AS}	Avalanche Current	-38	A
P _D @T _A =25°C	Total Power Dissipation ₄	3.1	W
P _D @T _A =70°C	Total Power Dissipation ₄	2	W
T _{STG}	Storage Temperature Range	-55 to 150	°C
T _J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
R _{θJA}	Thermal Resistance Junction-Ambient ₁	---	75	°C/W
	Thermal Resistance Junction-Ambient ₁ (t≤10s)	---	40	°C/W
R _{θJC}	Thermal Resistance Junction-Case ₁	---	24	°C/W



Electrical Characteristics (T_J=25 °C, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
B _V DSS	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250uA	-30	---	---	V
ΔB _V DSS/ΔT _J	B _V DSS Temperature Coefficient	Reference to 25°C, I _D =-1mA	---	-0.022	---	V/°C
R _{DS(ON)}	Static Drain-Source On-Resistance ₂	V _{GS} =-10V, I _D =-6A	---	18	20	mΩ
		V _{GS} =-4.5V, I _D =-4A	---	27	32	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =-250uA	-1.0	---	-2.5	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	4.6	---	mV/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =-24V, V _{GS} =0V, T _J =25°C	---	---	-1	uA
		V _{DS} =-24V, V _{GS} =0V, T _J =55°C	---	---	-5	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	---	---	±100	nA
g _{fs}	Forward Transconductance	V _{DS} =-5V, I _D =-6A	---	17	---	S
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz	---	13	---	Ω
Q _g	Total Gate Charge (-4.5V)	V _{DS} =-15V, V _{GS} =-4.5V, I _D =-6A	---	12.6	---	nC
Q _{gs}	Gate-Source Charge		---	4.8	---	
Q _{gd}	Gate-Drain Charge		---	4.8	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =-15V, V _{GS} =-10V, R _G =3.3Ω, I _D =-6A	---	4.6	---	ns
T _r	Rise Time		---	14.8	---	
T _{d(off)}	Turn-Off Delay Time		---	41	---	
T _f	Fall Time		---	19.6	---	
C _{iss}	Input Capacitance	V _{DS} =-15V, V _{GS} =0V, f=1MHz	---	1345	---	pF
C _{oss}	Output Capacitance		---	194	---	
C _{rss}	Reverse Transfer Capacitance		---	158	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current _{1,5}	V _G =V _D =0V, Force Current	---	---	-9.5	A
I _{SM}	Pulsed Source Current _{2,5}		---	---	-50	A
V _{SD}	Diode Forward Voltage ₂	V _{GS} =0V, I _S =-1A, T _J =25°C	---	---	-1.2	V
t _{rr}	Reverse Recovery Time	I _F =-6A, dI/dt=100A/μs,	---	16.3	---	nS
Q _{rr}	Reverse Recovery Charge	T _J =25°C	---	5.9	---	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 ≤ 300us, duty cycle ≤ 2%
- 3.The EAS data shows Max. rating. The test condition is V_{DD}=-25V, V_{GS}=-10V, L=0.1mH, I_{AS}=-38A
- 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

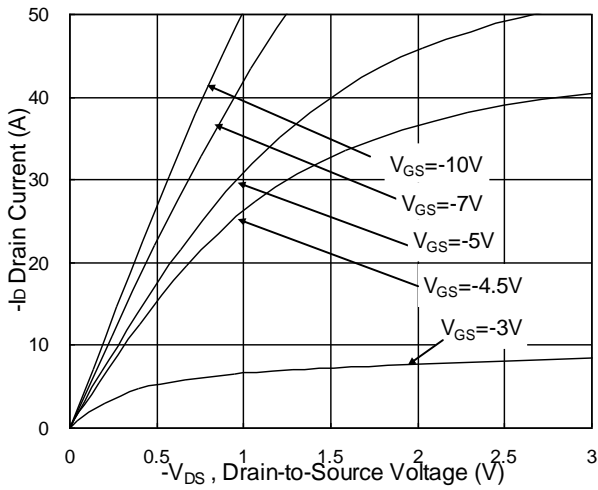


Fig.1 Typical Output Characteristics

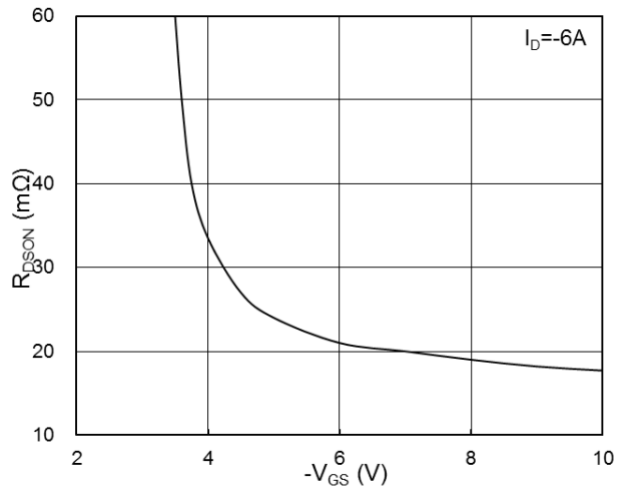


Fig.2 On-Resistance v.s Gate-Source

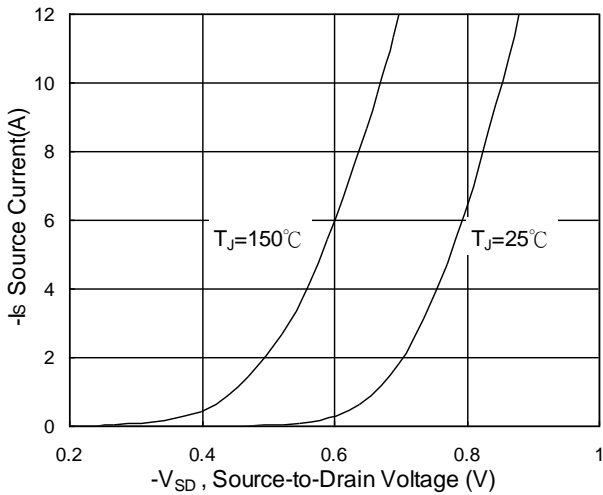


Fig.3 Forward Characteristics of Reverse

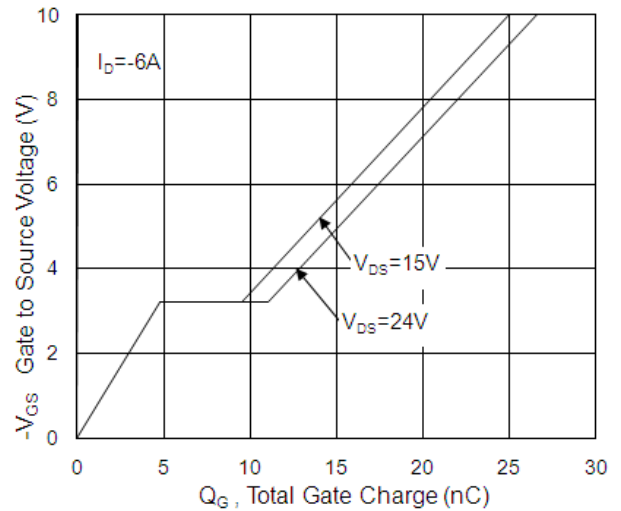


Fig.4 Gate-Charge Characteristics

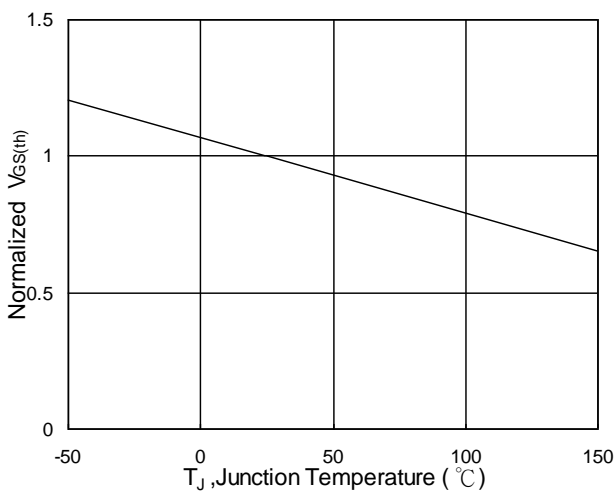


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

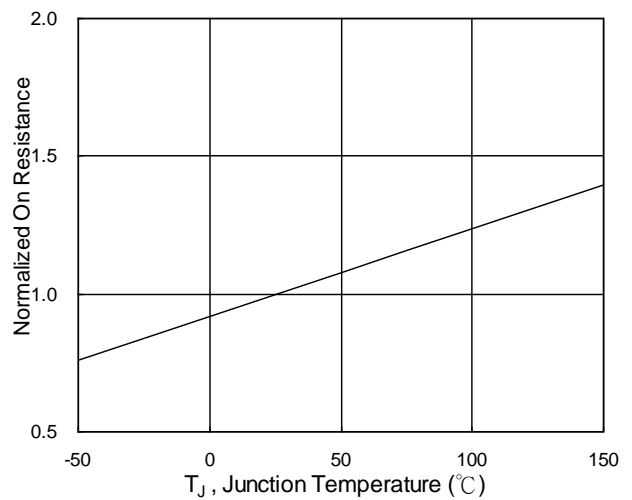


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

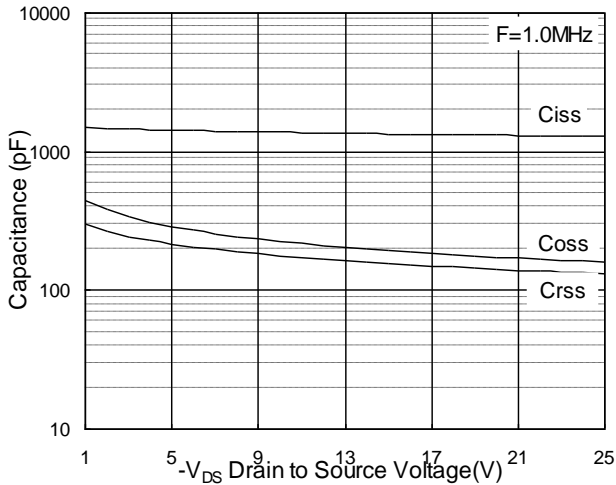


Fig.7 Capacitance

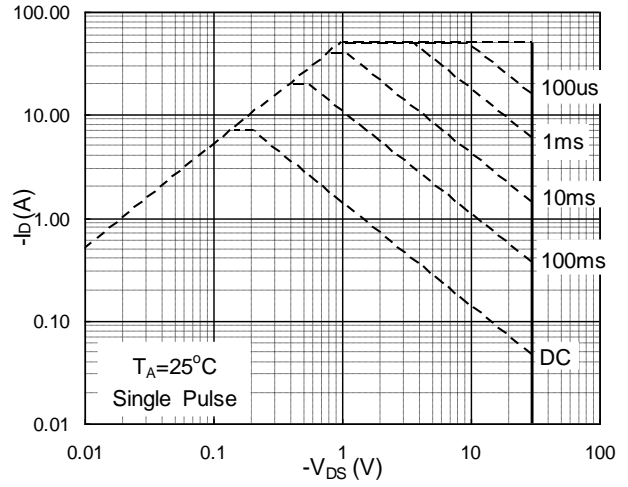


Fig.8 Safe Operating Area

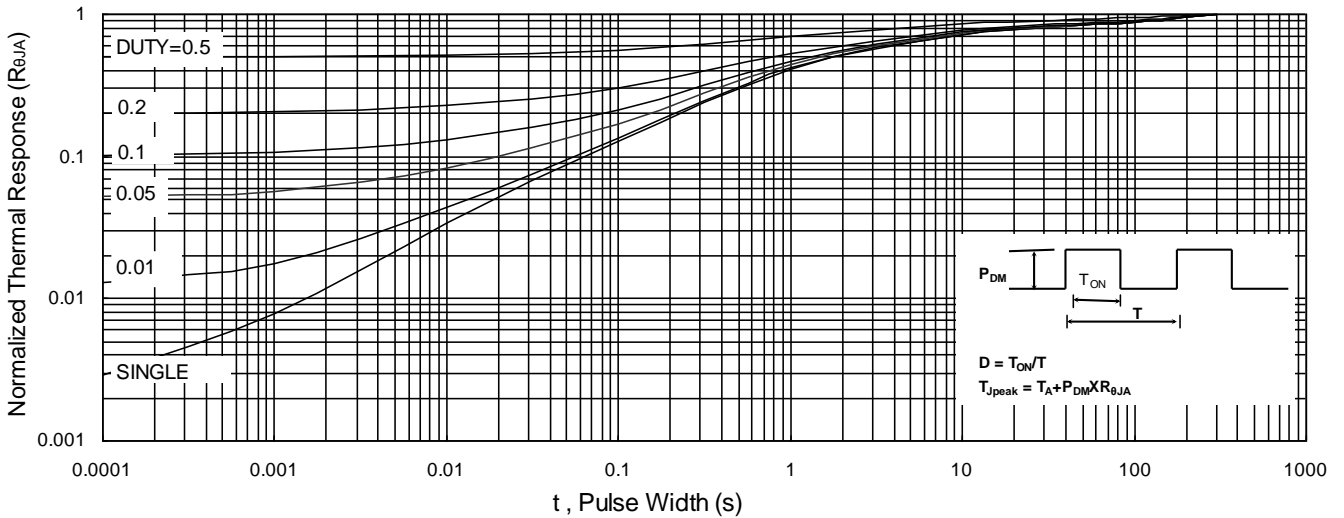


Fig.9 Normalized Maximum Transient Thermal Impedance

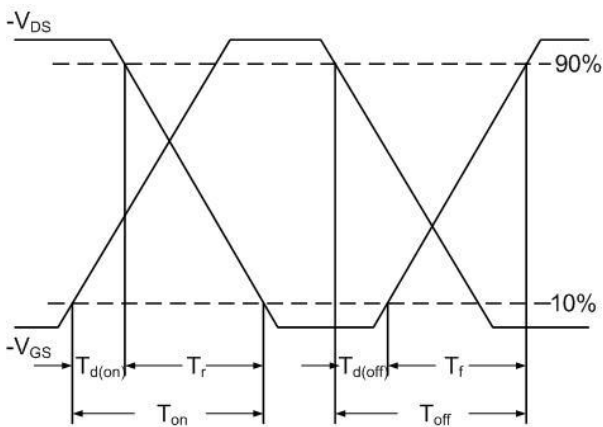


Fig.10 Switching Time Waveform

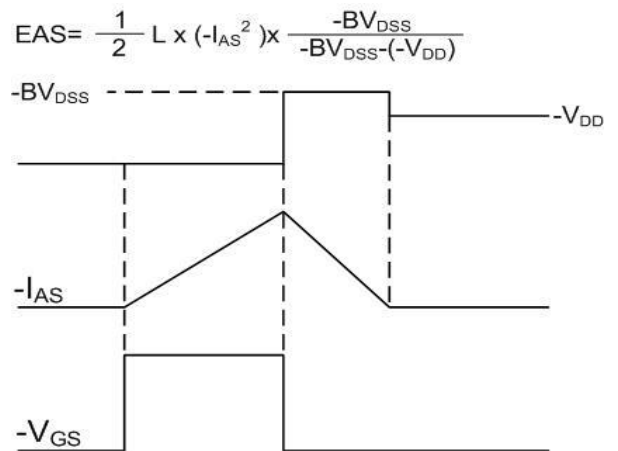
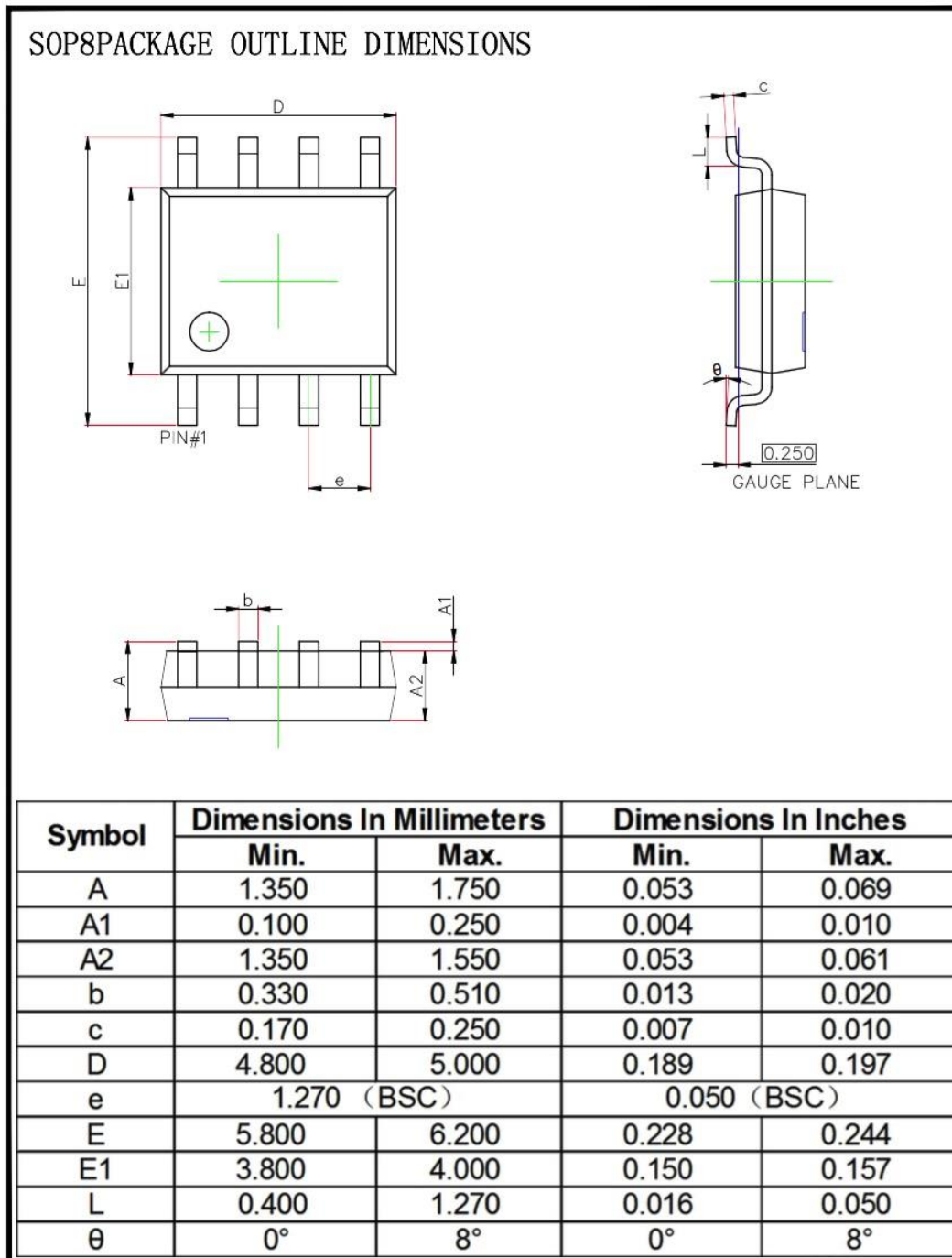


Fig.11 Unclamped Inductive Switching



Ordering Information

Part Number	Package code	Packaging
HSM4435	SOP-8	4000/Tape&Reel



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