

General Description

The HSM24P03 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 HSM24P03 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

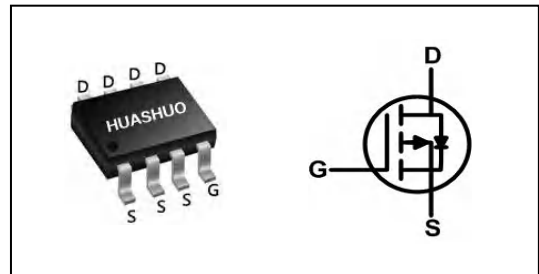
Features

- 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}	-30	V
$R_{DS(ON),typ}$	3.8	m Ω
I_D	-24	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
$I_D@T_C=25^{\circ}C$	Continuous Drain Current, V_{GS} @ -10V ¹	-24	A
$I_D@T_C=100^{\circ}C$	Continuous Drain Current, V_{GS} @ -10V ¹	-	A
I_{DM}	Pulsed Drain Current ²	-96	A
$P_D@T_A=25^{\circ}C$	Total Power Dissipation ⁴	2.1	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 ($t \leq 10S$)	---	-	$^{\circ}C/W$
	Thermal Resistance Junction-ambient ¹ (Steady State)	---	60	$^{\circ}C/W$
$R_{\theta JC}$	Thermal Resistance Junction-case ¹	---	24	$^{\circ}C/W$



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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=-250\mu A$	-30	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=-10V$, $I_D=-17A$	---	3.8	4.8	$m\Omega$
		$V_{GS}=-4.5V$, $I_D=-10A$	---	5.8	7.8	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=-250\mu A$	-1.2	-1.6	-2.2	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=-24V$, $V_{GS}=0V$, $T_J=25^\circ\text{C}$	---	---	-1	μA
		$V_{DS}=-24V$, $V_{GS}=0V$, $T_J=55^\circ\text{C}$	---	---	-10	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	± 100	nA
Q_g	Total Gate Charge (-10V)	$V_{DS}=-15V$, $V_{GS}=-10V$, $I_D=-10A$	---	110	---	nC
Q_{gs}	Gate-Source Charge		---	15	---	
Q_{gd}	Gate-Drain Charge		---	18	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=-15V$, $V_{GS}=-10V$, $R_G=6\Omega$, $I_D=-1A$	---	28	---	ns
T_r	Rise Time		---	17	---	
$T_{d(off)}$	Turn-Off Delay Time		---	180	---	
T_f	Fall Time		---	73	---	
C_{iss}	Input Capacitance	$V_{DS}=-25V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	6240	---	pF
C_{oss}	Output Capacitance		---	780	---	
C_{rss}	Reverse Transfer Capacitance		---	410	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current ^{1,5}	$V_G=V_D=0V$, Force Current	---	---	-24	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 inch²FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- 3.The power dissipation is limited by 150°C junction temperature
- 4.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.



Typical Characteristics

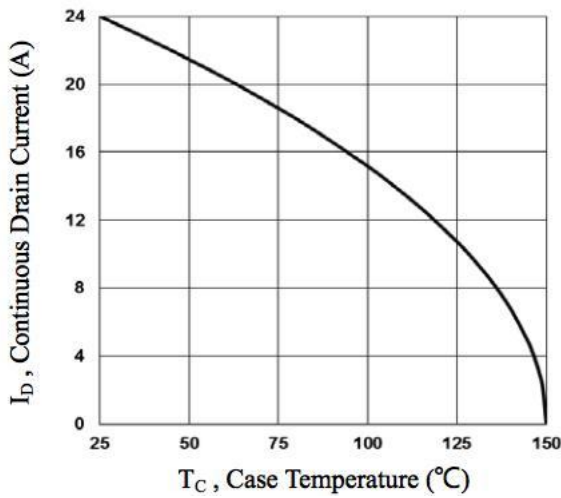


Fig.1 Continuous Drain Current vs. T_C

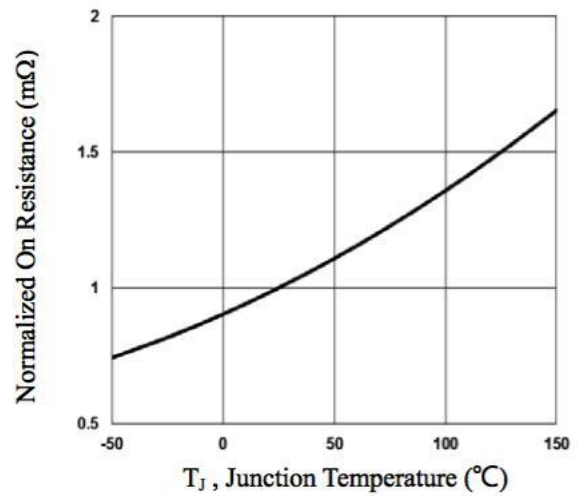


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

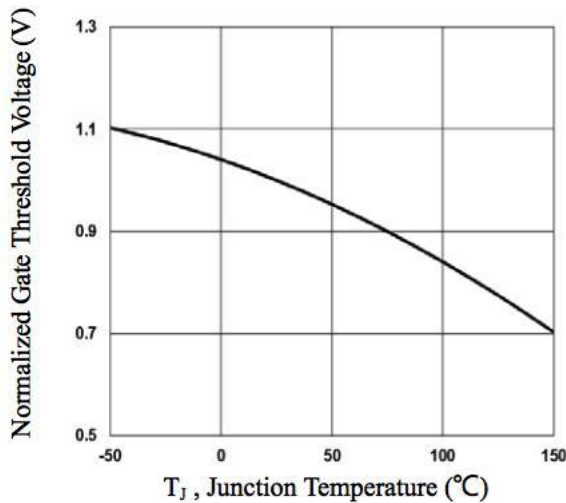


Fig.3 Normalized V_{th} vs. T_J

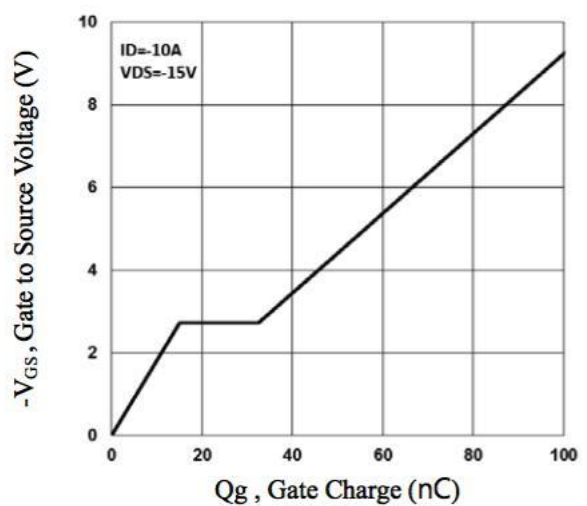


Fig.4 Gate Charge Waveform

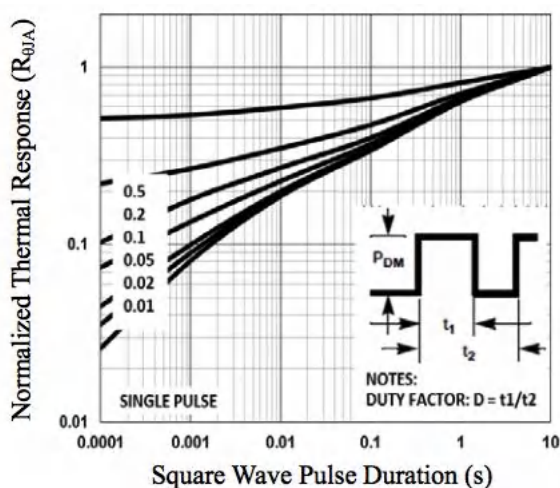


Fig.5 Normalized Transient Impedance

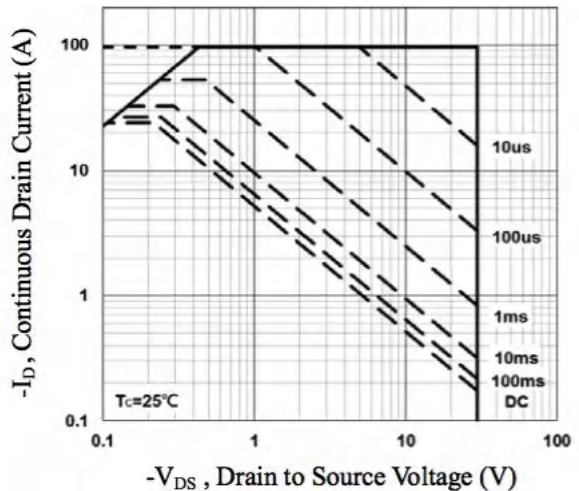


Fig.6 Maximum Safe Operation Area

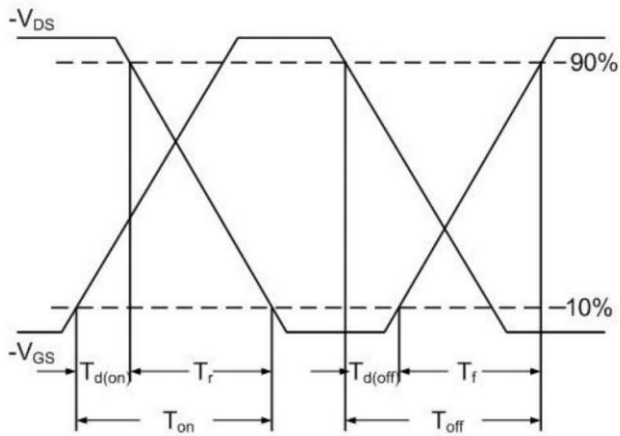


Fig.7 Switching Time Waveform

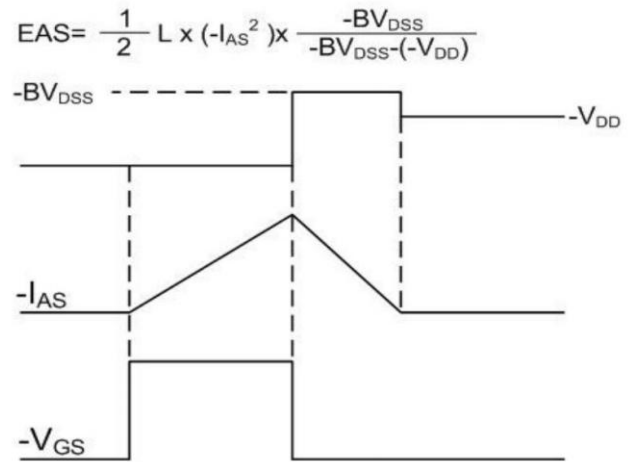


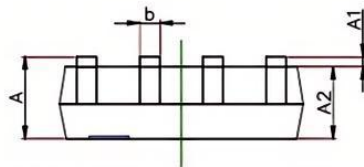
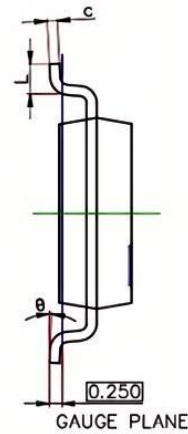
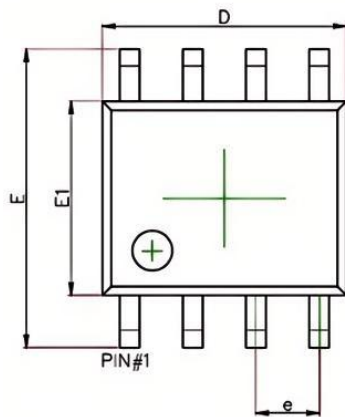
Fig.8 Unclamped Inductive Switching Waveform



Ordering Information

Part Number	Package code	Packaging
HSM24P03	SOP-8	2500/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°



HSM24P03 Marking:

