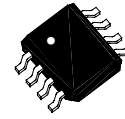




H6968S / H6968CS

Dual N-Channel Enhancement-Mode MOSFET (20V, 6.5A)
(Battery Switch, ESD Protected)



8-Lead Plastic **SO-8**
Package Code: S

Features

- $R_{DS(on)}=32m\Omega@V_{GS}=2.5V, I_D=5.5A$
- $R_{DS(on)}=24m\Omega@V_{GS}=4.5V, I_D=6.5A$
- Advanced Trench Process Technology
- High Density Cell Design for Ultra Low On-Resistance
- Specially Designed for Li ion Battery Packs Use
- Designed for Battery Switch Applications
- ESD Protected

Absolute Maximum Ratings ($T_A=25^\circ C$, unless otherwise noted)

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	± 12	V
I_D	Drain Current (Continuous)	6.5	A
I_{DM}	Drain Current (Pulsed) ^{*1}	30	A
P_D	Total Power Dissipation @ $T_A=25^\circ C$	2	W
	Total Power Dissipation @ $T_A=75^\circ C$	1.3	W
T_j, T_{stg}	Operating and Storage Temperature Range	-55 to +150	$^\circ C$
$R_{\theta JA}$	Thermal Resistance Junction to Ambient (PCB mounted) ^{*2}	62.5	$^\circ C/W$

*1: Maximum DC current limited by the package

*2: 1-in² 2oz Cu PCB board

Pin Assignment & Internal Schematic Diagram

Part No.	Pin Assignment	Internal Schematic Diagram
H6968S		
H6968CS		



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

Symbol	Characteristic	Test Conditions	Min.	Typ.	Max.	Unit
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• Static

BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	20	-	-	V
$R_{DS(on)}$	Drain-Source On-State Resistance	$V_{GS}=2.5V, I_D=5.5A$	-	24	32	$m\Omega$
		$V_{GS}=4.5V, I_D=6.5A$	-	20	24	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	0.6	-	1.6	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=16V, V_{GS}=0V$	-	-	1	μA
I_{GSS}	Gate-Body Leakage Current	$V_{GS}=\pm 4.5V, V_{DS}=0V$	-	-	± 200	nA
g_{FS}	Forward Transconductance	$V_{DS}=10V, I_D=6.5A$	-	30	-	S

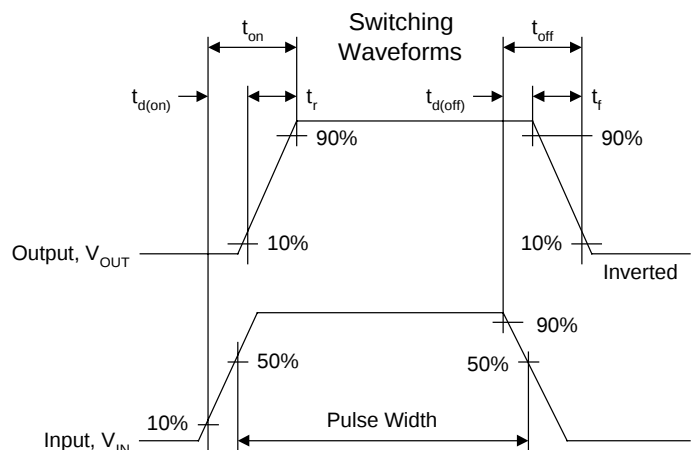
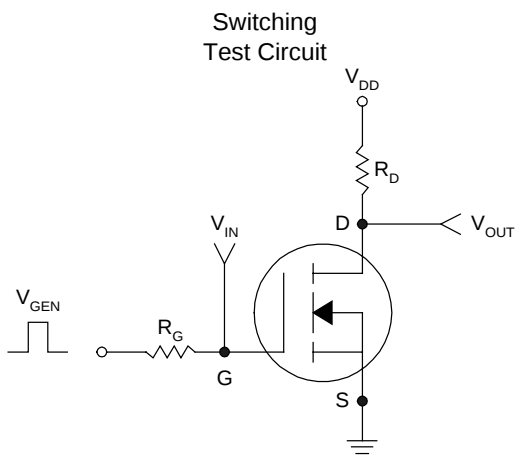
• Dynamic

Q_g	Total Gate Charge	$V_{DS}=10V, I_D=6A, V_{GS}=4.5V$	-	9	-	nC
Q_{gs}	Gate-Source Charge		-	2.4	-	
Q_{gd}	Gate-Drain Charge		-	3.6	-	
C_{iss}	Input Capacitance	$V_{DS}=10V, V_{GS}=0V, f=1MHz$	-	476	-	pF
C_{oss}	Output Capacitance		-	65.1	-	
C_{rss}	Reverse Transfer Capacitance		-	49	-	
$t_{d(on)}$	Turn-on Delay Time	$V_{DD}=10V, I_D=1A, V_{GS}=4.5V$ $R_{GEN}=6\Omega$	-	50	-	ns
t_r	Turn-on Rise Time		-	100	-	
$t_{d(off)}$	Turn-off Delay Time		-	500	-	
t_f	Turn-off Fall Time		-	200	-	

• Drain-Source Diode Characteristics

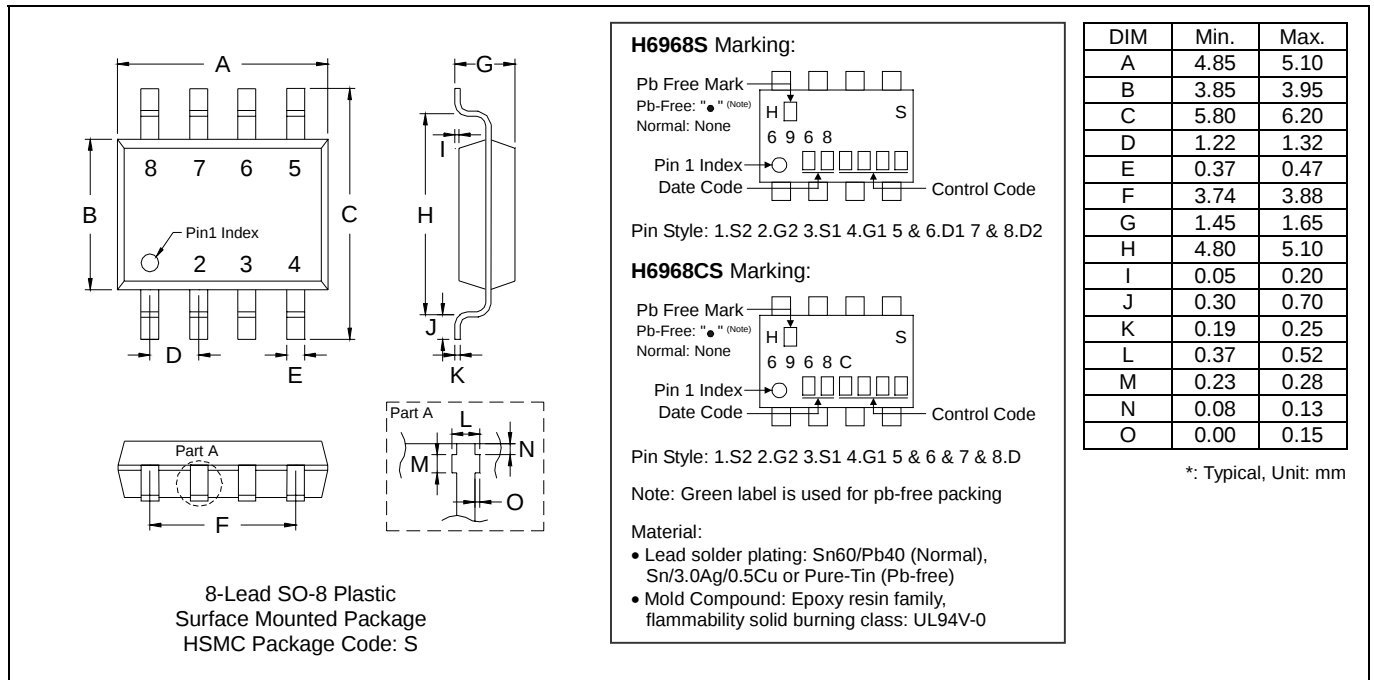
I_S	Maximum Diode Forward Current		-	-	1.7	A
V_{SD}	Drain-Source Diode Forward Voltage	$V_{GS}=0V, I_S=1.5A$	-	0.61	1.2	V

Note: Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$





SO-8 Dimension



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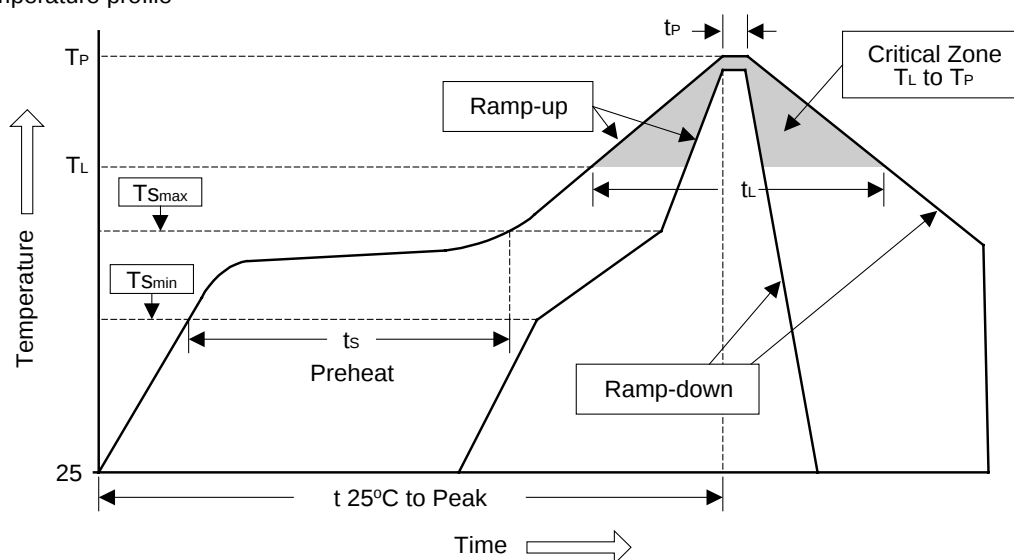
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Soldering Methods for HSMC's Products

1. Storage environment: Temperature=10°C~35°C Humidity=65%±15%
2. Reflow soldering of surface-mount devices

Figure 1: Temperature profile



Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average ramp-up rate (T_L to T_P)	<3°C/sec	<3°C/sec
Preheat		
- Temperature Min (T_{Smin})	100°C	150°C
- Temperature Max (T_{Smax})	150°C	200°C
- Time (min to max) (t_s)	60~120 sec	60~180 sec
T_{Smax} to T_L		
- Ramp-up Rate	<3°C/sec	<3°C/sec
Time maintained above:		
- Temperature (T_L)	183°C	217°C
- Time (t_L)	60~150 sec	60~150 sec
Peak Temperature (T_P)	240°C +0/-5°C	260°C +0/-5°C
Time within 5°C of actual Peak Temperature (t_P)	10~30 sec	20~40 sec
Ramp-down Rate	<6°C/sec	<6°C/sec
Time 25°C to Peak Temperature	<6 minutes	<8 minutes

3. Flow (wave) soldering (solder dipping)

Products	Peak temperature	Dipping time
Pb devices.	245°C ±5°C	5sec ±1sec
Pb-Free devices.	260°C +0/-5°C	5sec ±1sec