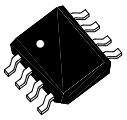
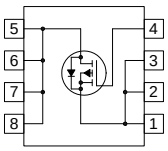
H4435S

P-Channel Enhancement-Mode MOSFET (-30V, -9.1A)



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

H4435S Symbol & Pin Assignment



Pin 1 / 2 / 3: Source
Pin 4: Gate
Pin 5 / 6 / 7 / 8: Drain

Features

- $R_{DS(on)}$=20mΩ@V_{GS}=-10V, I_D=-9.1A
- $R_{DS(on)}$=35mΩ@V_{GS}=-4.5V, I_D=-6.9A
- Advanced trench process technology
- High Density Cell Design for Ultra Low On-Resistance

Absolute Maximum Ratings (T_A=25°C, unless otherwise noted)

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	-30	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current (Continuous)	-9.1	A
I_{DM}	Drain Current (Pulsed) *1	-50	A
P_D	Total Power Dissipation @T_A=25°C	2.5	W
T_j, T_{stg}	Operating and Storage Temperature Range	-55 to +150	°C
$R_{\theta JA}$	Thermal Resistance Junction to Ambient (PCB mounted)*2	50	°C/W

*1: Maximum DC current limited by the package
*2: 1-in^2 2oz Cu PCB board

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

Symbol	Characteristic	Test Conditions	Min.	Typ.	Max.	Unit
• **Static**						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=-250uA	30	-	-	V
$R_{DS(on)}$	Drain-Source On-State Resistance	V_{GS}=-10V, I_D=-9.1A	-	15	20	mΩ
		V_{GS}=-4.5V, I_D=-6.9A	-	20	35	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=-250uA	-1	-	-3	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-30V, V_{GS}=0V	-	-	-1	uA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
g_{FS}	Forward Transconductance	V_{DS}=-10V, I_D=-9.1A		21	-	S
• **Dynamic**						
Q_g	Total Gate Charge	V_{DS}=-24V, I_D=-7.0A, V_{GS}=-4.5V	-	20	30	nC
Q_{gs}	Gate-Source Charge		-	3.43	-	
Q_{gd}	Gate-Drain Charge		-	11	-	
C_{iss}	Input Capacitance	V_{DS}=-25V, V_{GS}=0V, f=1MHz	-	1210	1720-	PF
C_{oss}	Output Capacitance		-	205	-	
C_{rss}	Reverse Transfer Capacitance		-	195	-	
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=-15V, R_L=15Ω, I_D=-1A, V_{GEN}=-10V, R_G=3.3Ω	-	10	-	Ns
t_r	Turn-on Rise Time		-	7.0	-	
$t_{d(off)}$	Turn-off Delay Time		-	45	-	
t_f	Turn-off Fall Time		-	35	-	
• **Drain-Source Diode Characteristics**						
I_S	Maximum Diode Forward Current		-	-	-2.1	A
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS}=0V, I_S=-2.1A	-	-	-1.2	V

Note: Pulse Test: Pulse Width ≤300us, Duty Cycle≤2%

Characteristics Curve

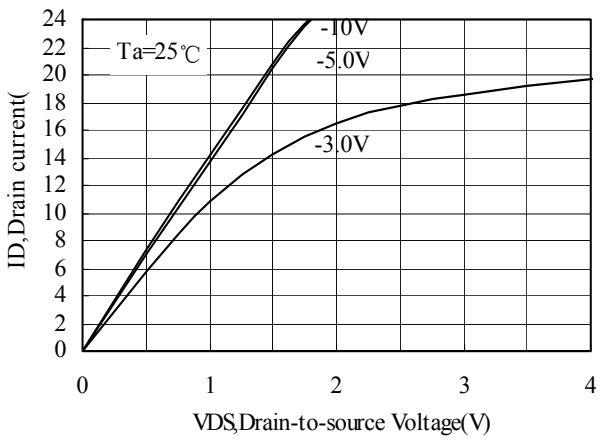


Fig 1.Typical Output Characteristics

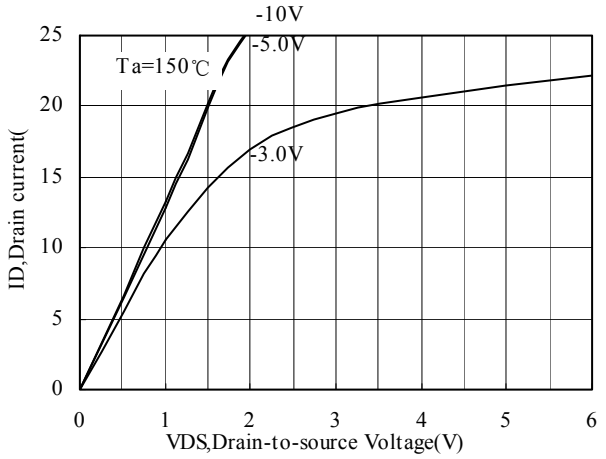


Fig 2.Typical Output Characteristics

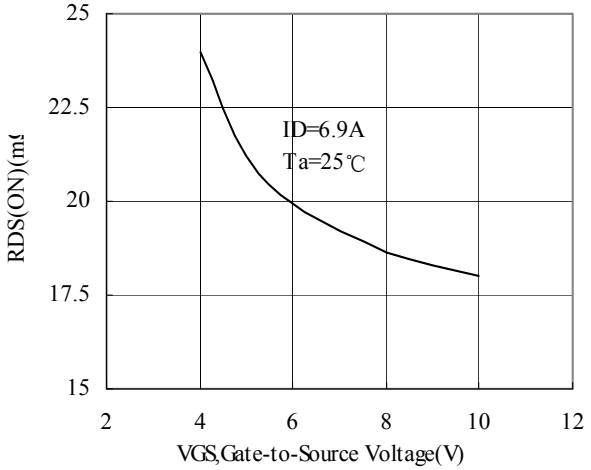


Fig 3.On-Resistance v.s.Gate Voltage

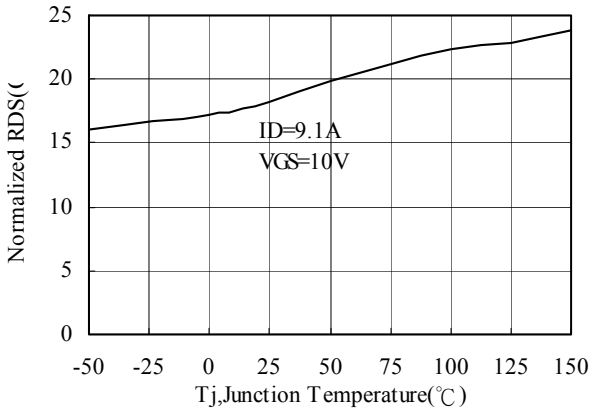


Fig 4.Normalized On-Resistance v.s.Junction Temperature

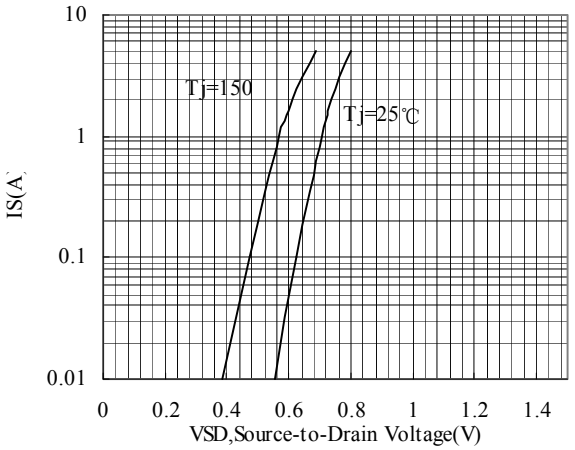


Fig 5.Forward Characteristic of Reverse Diode

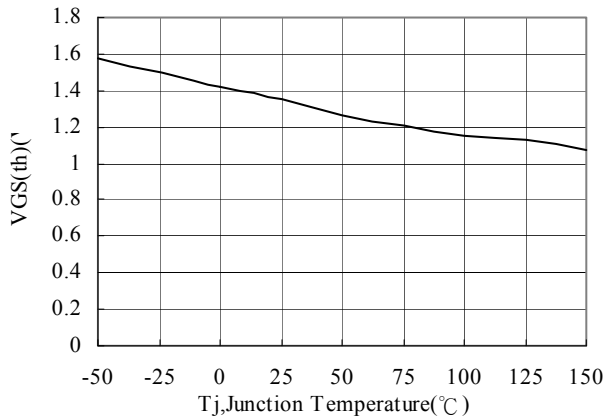
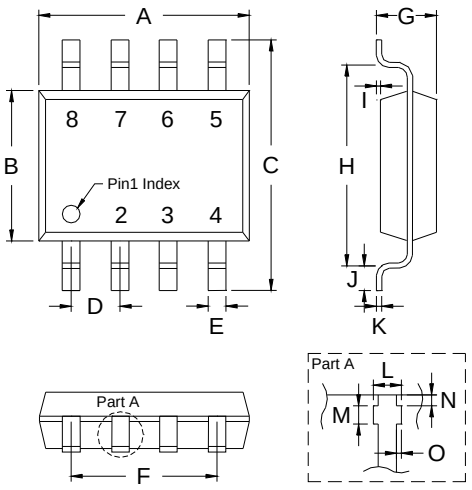
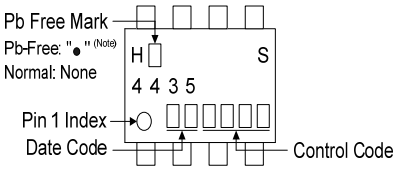


Fig 6.Gate Threshold Voltage v.s.junction Temperature

SO-8 Dimension



H9435S Marking:



Pin Style: 1,2,3: Source 4: Gate 5,6,7,8: Drain

Note: Green label is used for pb-free packing

Material:
- Lead solder plating: Sn60/Pb40 (Normal), Sn/3.0Ag/0.5Cu or Pure-Tin (Pb-free)
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0

DIM	Min.	Max.
A	4.85	5.10
B	3.85	3.95
C	5.80	6.20
D	1.22	1.32
E	0.37	0.47
F	3.74	3.88
G	1.45	1.65
H	4.80	5.10
I	0.05	0.20
J	0.30	0.70
K	0.19	0.25
L	0.37	0.52
M	0.23	0.28
N	0.08	0.13
O	0.00	0.15

*: Typical, Unit: mm

8-Lead SO-8 Plastic
Surface Mounted Package
HSMC Package Code: S

Head Office And Factory:

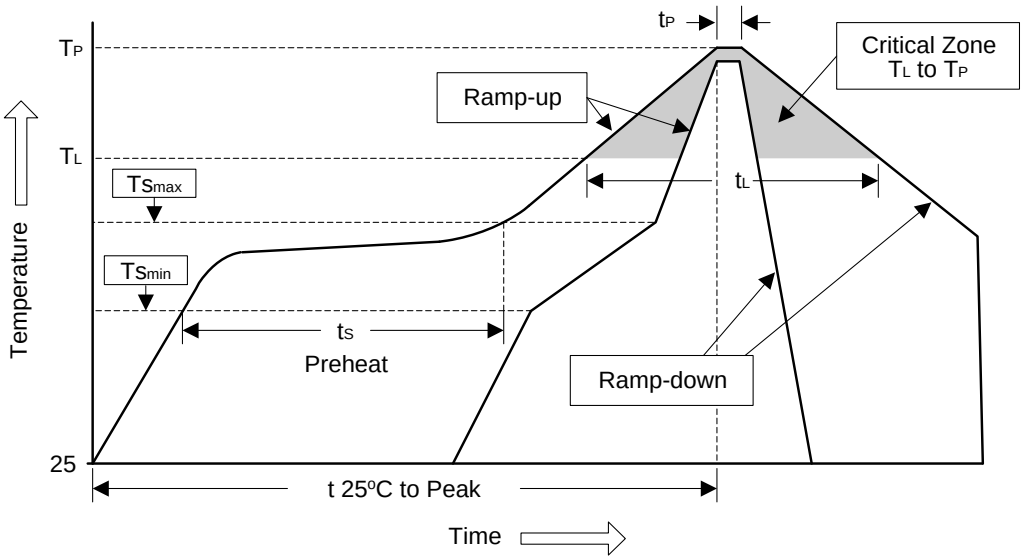
- **Head Office** (Hi-Sincerity Microelectronics Corp.): 10F.,No. 61, Sec. 2, Chung-Shan N. Rd. Taipei Taiwan R.O.C.
  Tel: 886-2-25212056 Fax: 886-2-25632712, 25368454

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 (Ts_{min}) - Temperature Max (Ts_{max}) - Time (min to max) (ts)	 100°C 150°C 60~120 sec	 150°C 200°C 60~180 sec
Tsmax to T_L - Ramp-up Rate	 <3°C/sec	 <3°C/sec
Time maintained above: - Temperature (T_L) - Time (t_L)	 183°C 60~150 sec	 217°C 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