

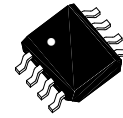


H4435S

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

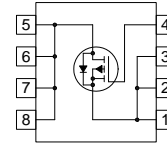
Features

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



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

Absolute Maximum Ratings ($T_A=25^\circ\text{C}$, 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 @ $T_A=25^\circ\text{C}$ | 2.5 | W |
| T_j, T_{stg} | Operating and Storage Temperature Range | -55 to +150 | $^\circ\text{C}$ |
| $R_{\theta JA}$ | Thermal Resistance Junction to Ambient (PCB mounted) ^{*2} | 50 | $^\circ\text{C/W}$ |

*1: Maximum DC current limited by the package

*2: 1-in² 2oz Cu PCB board



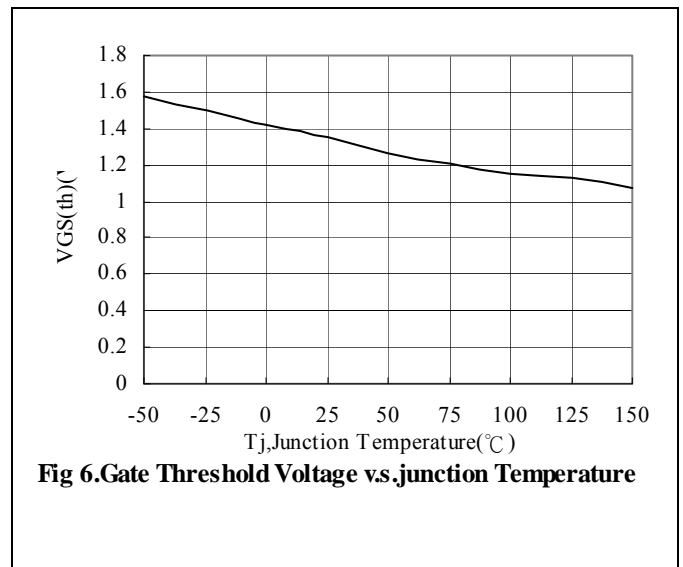
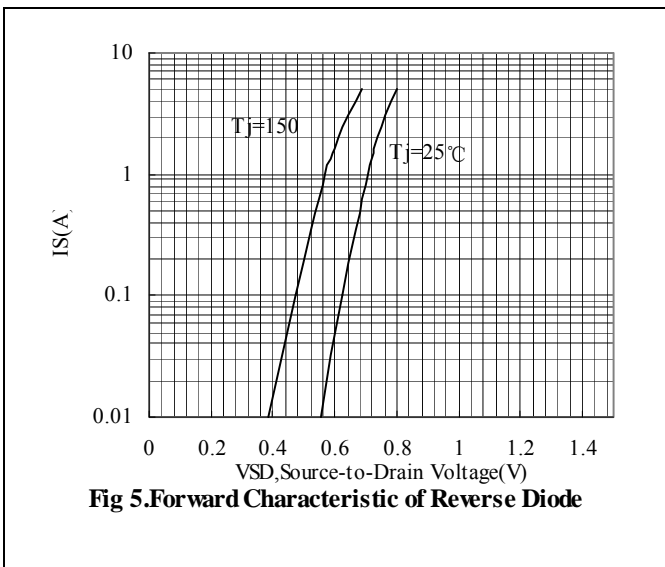
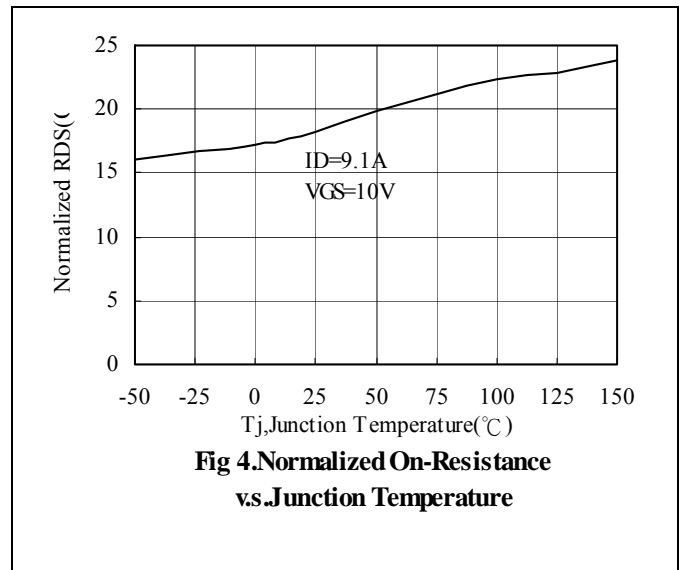
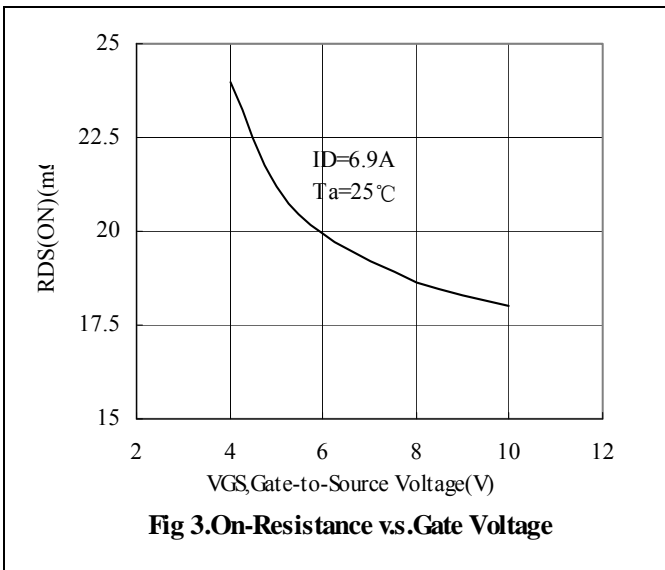
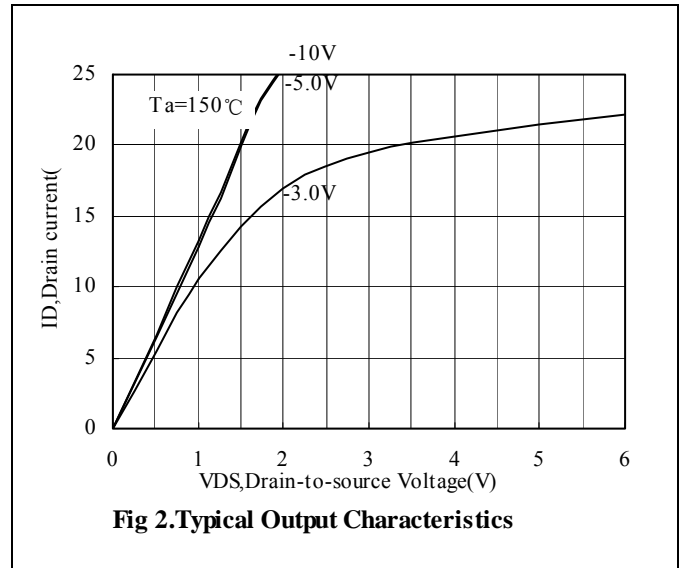
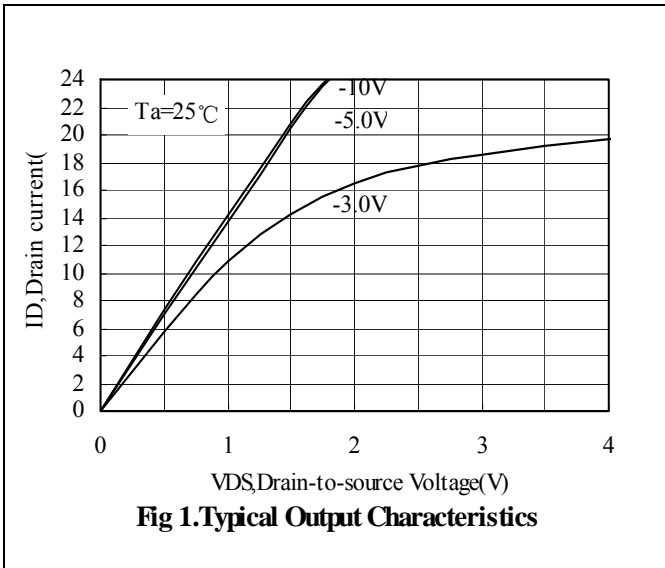
Electrical Characteristics (T_A=25°C, unless otherwise noted)

| 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





SO-8 Dimension

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

H9435S Marking:

Pb Free Mark
 Pb-Free: "●" (Not)
 Normal: None

Pin 1 Index
 Date Code
 Control Code

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

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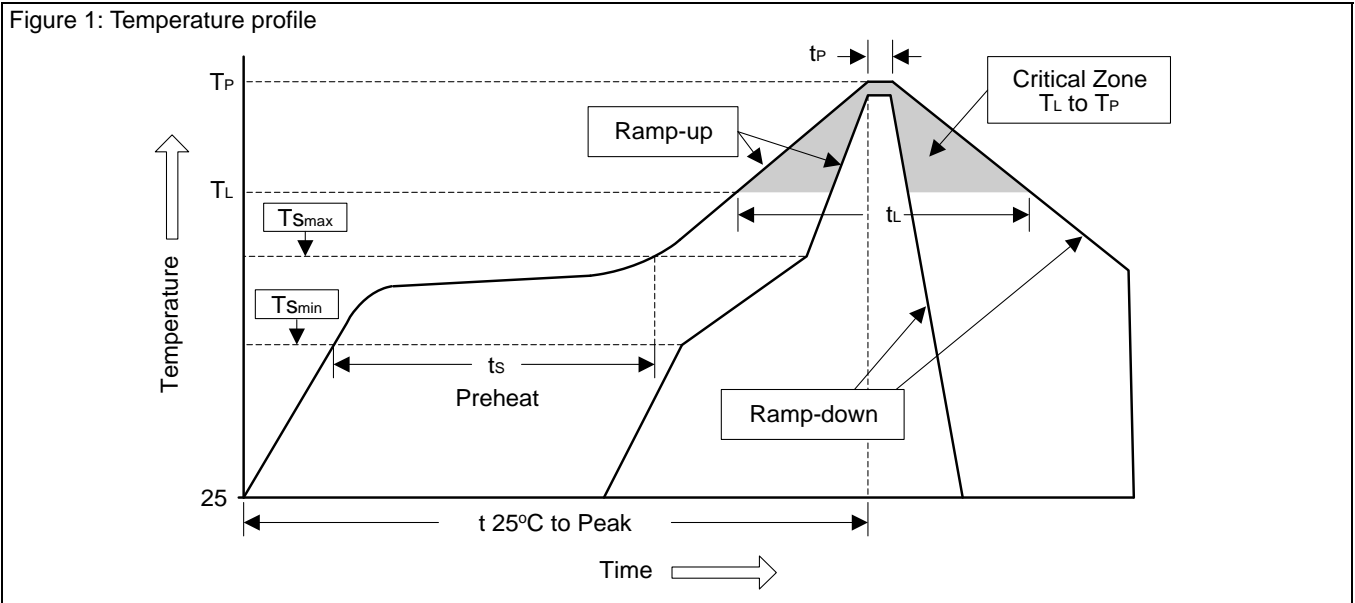
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Soldering Methods for HSMC's Products

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



| 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 |