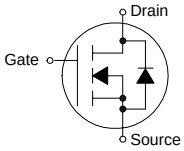
H2302N

N-Channel Enhancement-Mode MOSFET (20V, 2.4A)

H2302N Pin Assignment & Symbol

3-Lead Plastic **SOT-23**
Package Code: N
Pin 1: Gate 2: Source 3: Drain



Features

- $R_{DS(on)}$<60mΩ@V_{GS}=4.5V, I_D=2.8A
- $R_{DS(on)}$<115mΩ@V_{GS}=-2.5V, I_D=2A
- Advanced Trench Process Technology
- High Density Cell Design for Ultra Low On-Resistance
- Fully Characterized Avalanche Voltage and Current
- Improved Shoot-Through FOM

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

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	±8	V
I_D	Drain Current (Continuous)	2.4	A
I_{DM}	Drain Current (Pulsed) *1	8	A
P_D	Total Power Dissipation @T_A=25°C	0.9	W
	Total Power Dissipation @T_A=75°C	0.57	W
T_j, T_{stg}	Operating Junction and Storage Temperature Range	-55 to +150	°C
$R_{\theta JA}$	Thermal Resistance Junction to Ambient (PCB mounted)*2	145	°C/W

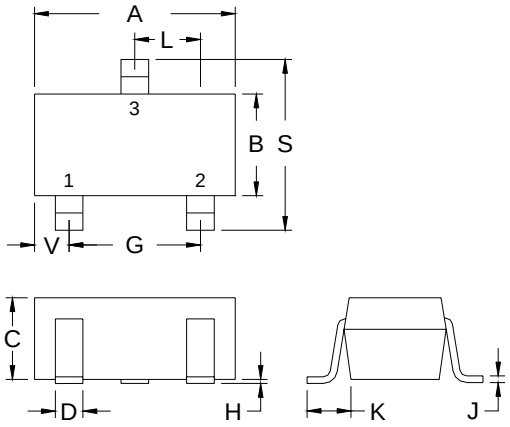
*1: Repetitive Rating: Pulse width limited by the maximum junction temperation.
*2: 1-in^2 2oz Cu PCB board

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	20	-	-	V
$R_{DS(on)}$	Drain-Source On-State Resistance	V_{GS}=4.5V, I_D=2.8A	-	45	60	mΩ
		V_{GS}=2.5V, I_D=2A	-	70	115	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250uA	0.65	0.95	1.2	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=9.6V, V_{GS}=0V	-	-	1	uA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±8V, V_{DS}=0V	-	-	±100	nA
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=4A	-	6.5	-	S
• **Dynamic**						
Q_g	Total Gate Charge	V_{DS}=6V, I_D=2.8A, V_{GS}=4.5V	-	3.69	-	nC
Q_{gs}	Gate-Source Charge		-	0.7	-	
Q_{gd}	Gate-Drain Charge		-	1.06	-	
C_{iss}	Input Capacitance	V_{DS}=6V, V_{GS}=0V, f=1MHz	-	427.12	-	PF
C_{oss}	Output Capacitance		-	80.56	-	
C_{rss}	Reverse Transfer Capacitance		-	57	-	
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=6V, R_L=6Ω, I_D=1A, V_{GEN}=4.5V, R_G=6Ω	-	6.16	-	nS
t_r	Turn-on Rise Time		-	7.56	-	
$t_{d(off)}$	Turn-off Delay Time		-	16.61	-	
t_f	Turn-off Fall Time		-	4.07	-	
• **Drain-Source Diode Characteristics**						
I_S	Maximum Diode Forward Current		-	-	2.4	A
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS}=0V, I_S=0.75A	-	0.8	1.2	V

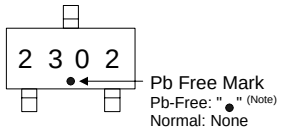
Note: Pulse Test: Pulse Width ≤300us, Duty Cycle≤2%

SOT-23 Dimension



3-Lead SOT-23 Plastic
Surface Mounted Package
HSMC Package Code: N

Marking:



Note: Pb-free product can distinguish by the green label or the extra description on the right side of the label.

Pin Style: 1.Gate 2.Source 3.Drain

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	2.80	3.04
B	1.20	1.60
C	0.89	1.30
D	0.30	0.50
G	1.70	2.30
H	0.013	0.10
J	0.085	0.177
K	0.32	0.67
L	0.85	1.15
S	2.10	2.75
V	0.25	0.65

*: Typical, Unit: mm

Head Office And Factory:

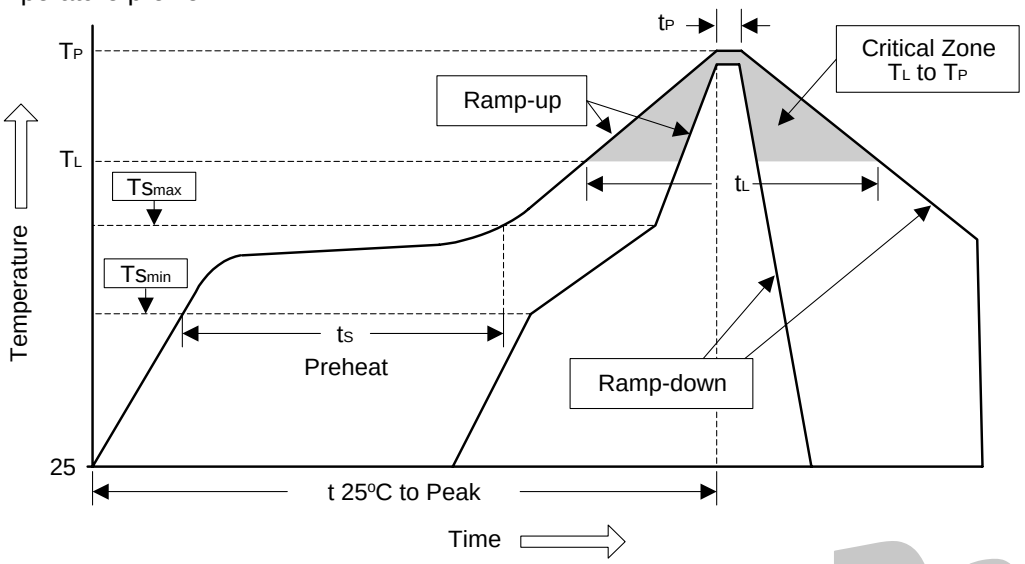
- **Head Office** (Hi-Sincerity Microelectronics Corp.): 10F.,No. 61, Sec. 2, Chung-Shan N. Rd. Taipei Taiwan R.O.C.
  Tel: 886-2-25212056 Fax: 886-2-25632712, 25368454
- **Factory 1:** No. 38, Kuang Fu S. Rd., Fu-Kou Hsin-Chu Industrial Park Hsin-Chu Taiwan. R.O.C
  Tel: 886-3-5983621~5 Fax: 886-3-5982931

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	10sec ±1sec
Pb-Free devices.	260°C ±5°C	10sec ±1sec