

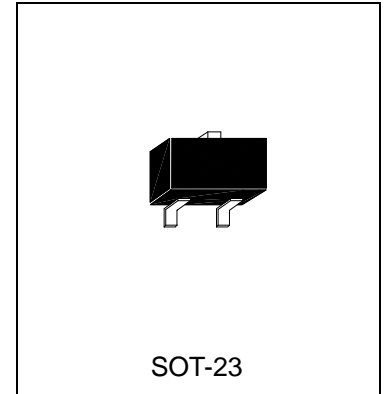


# H2N7002

N-CHANNEL TRANSISTOR

## Description

N-channel enhancement-mode MOS transistor.



## Absolute Maximum Ratings

Drain-Source Voltage .....	60 V
Drain-Gate Voltage ( $R_{GS}=1M\Omega$ ).....	60 V
Gate-Source Voltage .....	$\pm 20$ V
Continuous Drain Current ( $T_A=25^\circ C$ ) <sup>(1)</sup> .....	200 mA
Continuous Drain Current ( $T_A=100^\circ C$ ) <sup>(1)</sup> .....	115 mA
Pulsed Drain Current ( $T_A=25^\circ C$ ) <sup>(2)</sup> .....	800 mA
Total Power Dissipation ( $T_C=25^\circ C$ ).....	200 mW
Derate above $25^\circ C$ .....	0.16 mW / $^\circ C$
Storage Temperature.....	-55 to 150 $^\circ C$
Operating Junction Temperature.....	-55 to 150 $^\circ C$
Lead Temperature, for 10 second Soldering.....	260 $^\circ C$

## Thermal Characteristics

Thermal Resistance, Junction-to-Ambient..... 625  $^\circ C / W$

## Electrical Characteristics ( $T_A=25^\circ C$ )

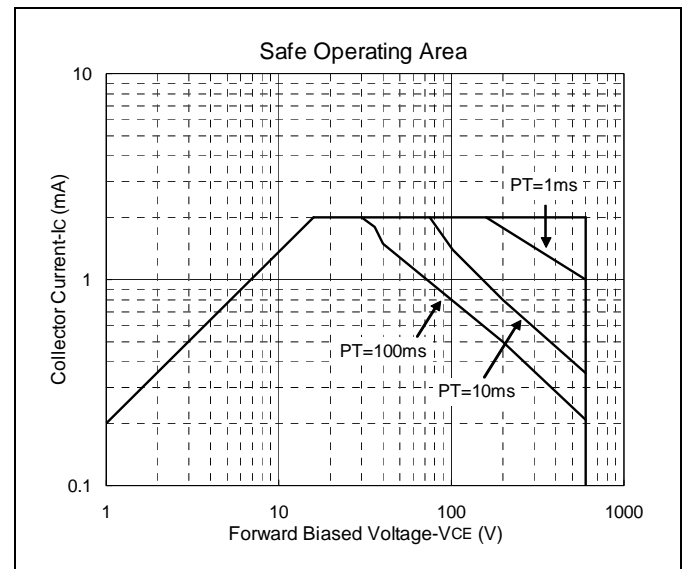
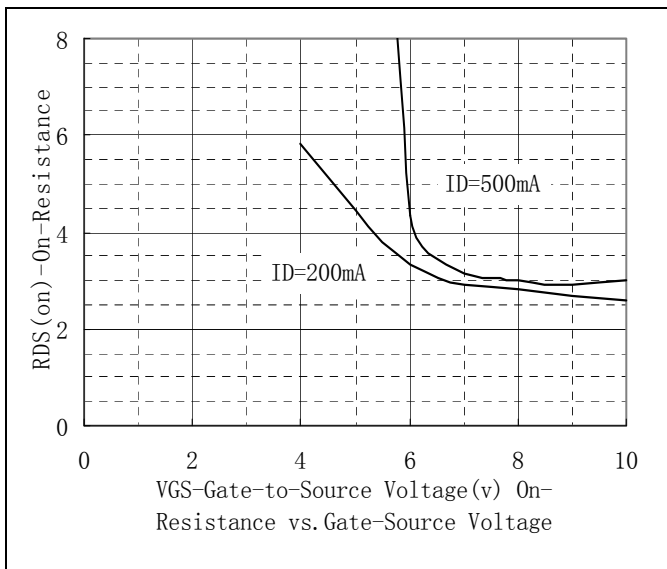
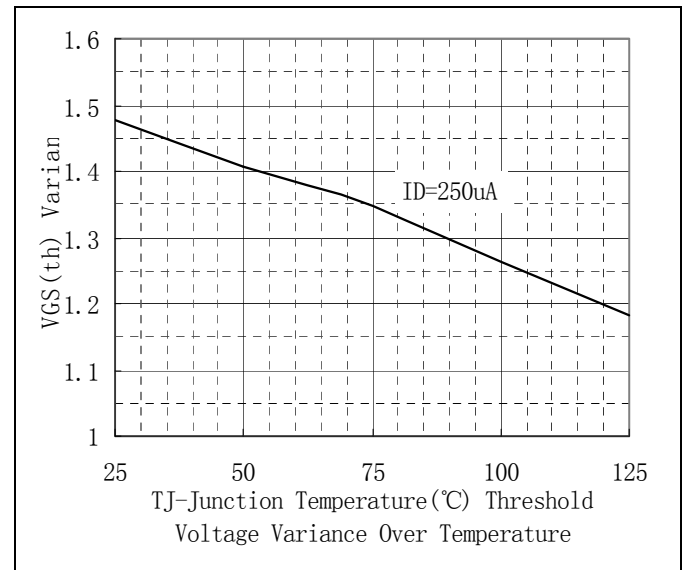
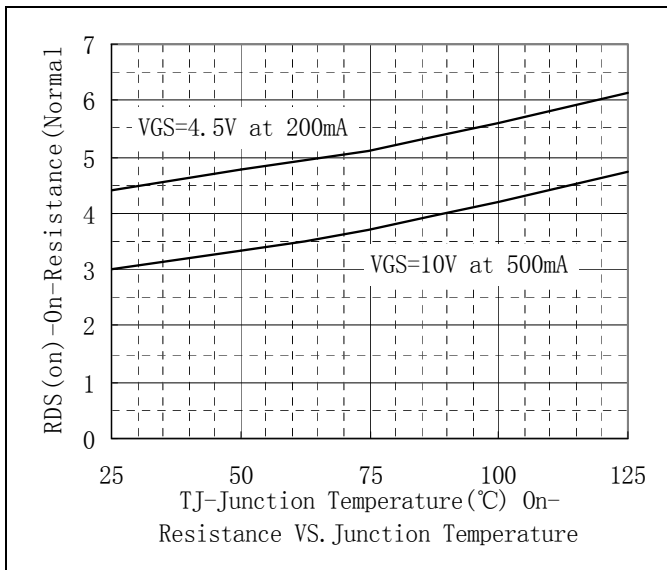
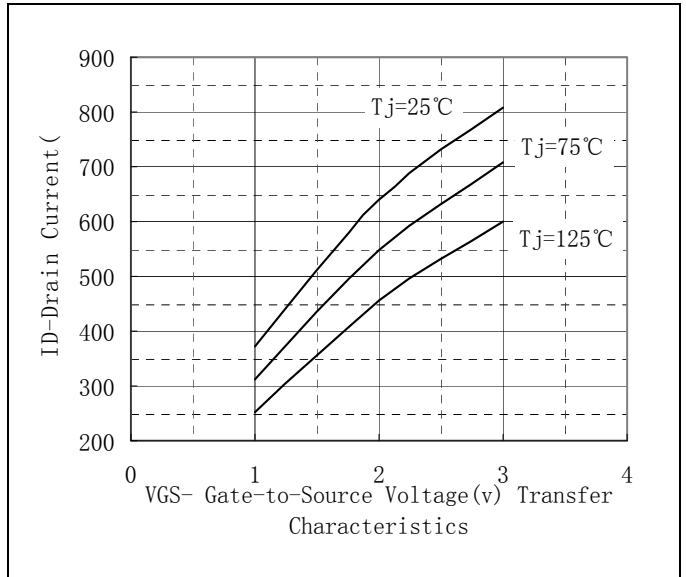
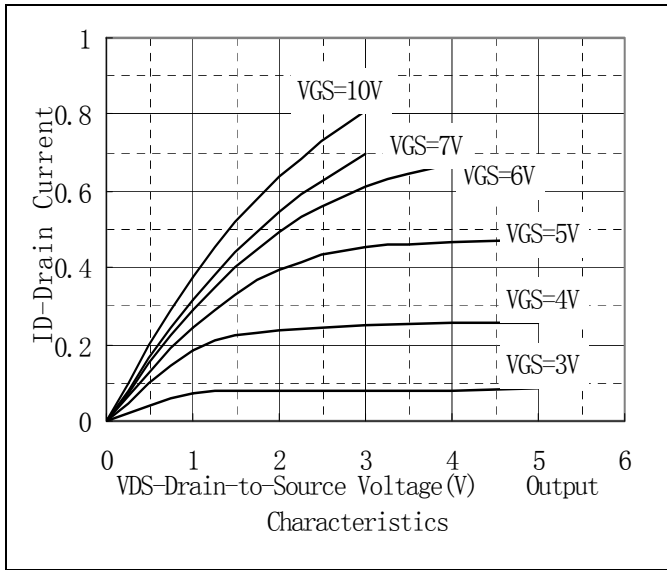
Parameter	Symbol	Test Conditions	Min	Typ.	Max	Unit
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0, I_D=10\mu A$	60	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=2.5V, I_D=0.25mA$	1	-	2.0	V
Gate Source Leakage Current, Forward	$I_{GSS/F}$	$V_{GS}=+20V, V_{DS}=0$	-	-	100	nA
Gate Source leakage Current, Reverse	$I_{GSS/R}$	$V_{GS}=-20V, V_{DS}=0$	-	-	-100	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=60V, V_{GS}=0$	-	-	1	$\mu A$
On-State Drain Current	$I_{D(ON)}$	$V_{DS}>2V_{DS(ON)}, V_{GS}=10V$	500	-	-	mA
Static Drain-Source On-State Voltage	$V_{DS(ON)}$	$I_D=50mA, V_{GS}=5V$	-	-	0.375	V
		$I_D=500mA, V_{GS}=10V$	-	-	3.75	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$I_D=75mA, V_{GS}=4.5V$	-	-	5.3	$\Omega$
		$I_D=50mA, V_{GS}=5V$	-	-	5.0	$\Omega$
		$I_D=500mA, V_{GS}=10V$	-	-	5.0	$\Omega$
Forward Transconductance	$G_{FS}$	$V_{DS}>2V_{DS(ON)}, I_D=200mA$	80	-	-	mS
Turn-on Delay Time	$t_{d(on)}$	$(V_{DD}=50V, R_D=250\Omega, V_{GS}=10V, R_G=50\Omega)$	-	20	-	nS
Turn-off Delay Time	$t_{d(off)}$		-	40	-	nS
Input Capacitance	$C_{iss}$	$V_{DS}=25V, V_{GS}=0, f=1MHz$	-	-	50	pF
Output Capacitance	$C_{oss}$		-	-	25	pF
Reverse Transfer Capacitance	$C_{rss}$		-	-	5	pF

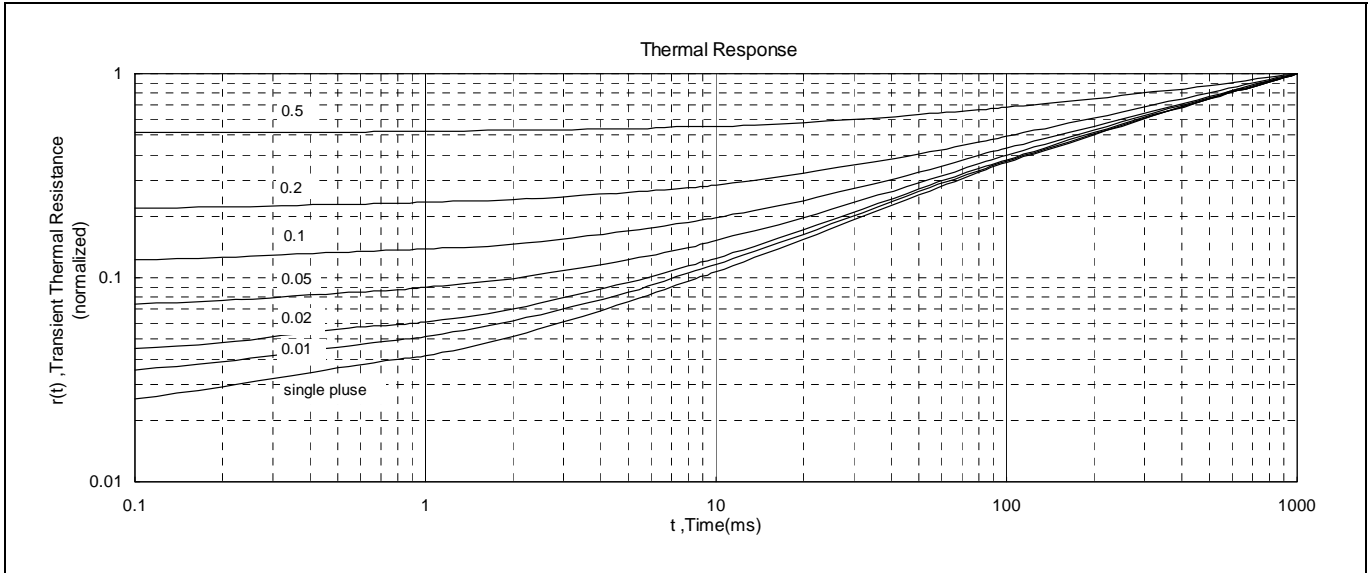
(1)The Power Dissipation of the package may result in a continuous drain current.

(2)Pulse Width $\leq 300\mu s$ , Duty cycle $\geq 2\%$ .



### Characteristics Curve







### SOT-23 Dimension

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

**Marking:**

Control Code  
 Pb Free Mark  
 Pb-Free<sup>(Note)</sup>  
 Normal: None

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

Control Code  
 Halogen free Mark  
 Green free: "••"<sup>(Note)</sup>  
 Normal: None

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

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
S	2.10	2.75
V	0.25	0.65

\*: Typical, Unit: mm

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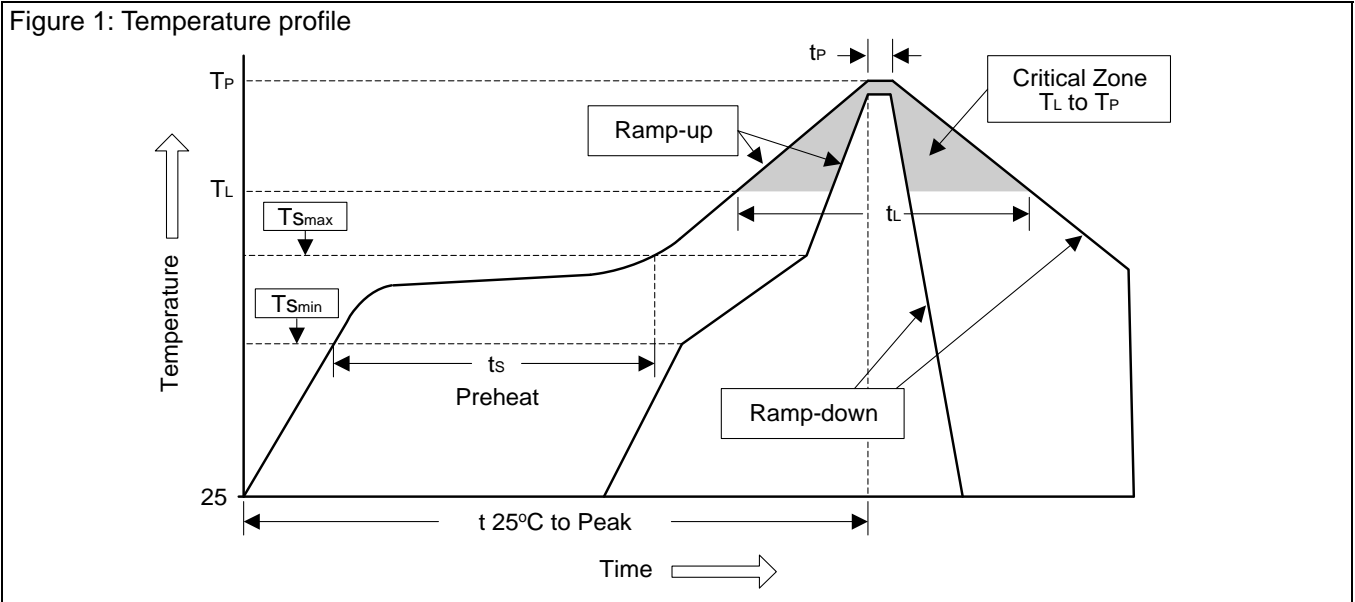
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### Soldering Methods for HSMC's Products

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