



H2305N

P-Channel Enhancement-Mode MOSFET (-20V, -4.5A)

Features

- $R_{DS(on)} < 58m\Omega @ V_{GS} = -4.5V, I_D = -4.2A$
- $R_{DS(on)} < 71m\Omega @ V_{GS} = -2.5V, I_D = -2A$
- Simple Drive Requirement
- Small Package Outline
- ISurface Mount Device

Description

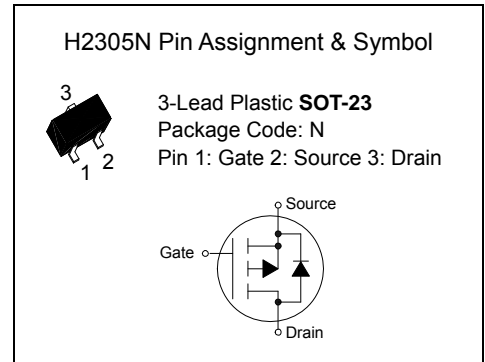
The Advanced Power MOSFETS from APEC provide the designer with the best combination of fast switching low on-resistance and cost-effectiveness.

The SOT-23 package is universally preferred for all commercial-industrial surface mount applications and suited for low voltage, applications such as DC/DC converters.

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	± 8	V
$I_{D@TA=25^\circ C}$	Continuous Drain Current)	-4.5	A
$I_{D@TA=70^\circ C}$	Continuous Drain Current	-3.5	A
I_{DM}	Drain Current (Pulsed) ^{*1}	-10	A
P_D	Total Power Dissipation @ $T_A = 25^\circ C$	1.38	W
T_{stg}	Storage Temperature Range	-55 to +150	$^\circ C$
T_j	Operating Junction Temperature Range	-55 to +150	$^\circ C$

*1: Repetitive Rating: Pulse width limited by the maximum junction temperature.
 *2: 1-in² 2oz Cu PCB board





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
$\Delta BV_{DSS}/\Delta T_j$	Breakdown Voltage Temperature Coefficient	Reference to 25°C , $I_D=-1\text{mA}$		-0.1		$V/^\circ\text{C}$
$R_{DS(on)}$	Drain-Source On-State Resistance	$V_{GS}=-4.5V, I_D=-2.8A$	-		58	m Ω
		$V_{GS}=-2.5V, I_D=-2A$			71	
		$V_{GS}=-1.8V, I_D=-1A$	-		108	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.45			V
I_{DSS}	Zero Gate Voltage Drain Current ($T_j=25^\circ\text{C}$)	$V_{DS}=-20V, V_{GS}=0V$	-		-1	μA
	Zero Gate Voltage Drain Current ($T_j=55^\circ\text{C}$)	$V_{DS}=-16V, V_{GS}=0V$	-		-10	μA
I_{GSS}	Gate-Body Leakage Current	$V_{GS}=\pm 8V, V_{DS}=0V$	-	-	± 100	nA
g_{FS}	Forward Transconductance	$V_{DS}=-5V, I_D=-2.8A$	-	9.0	-	S

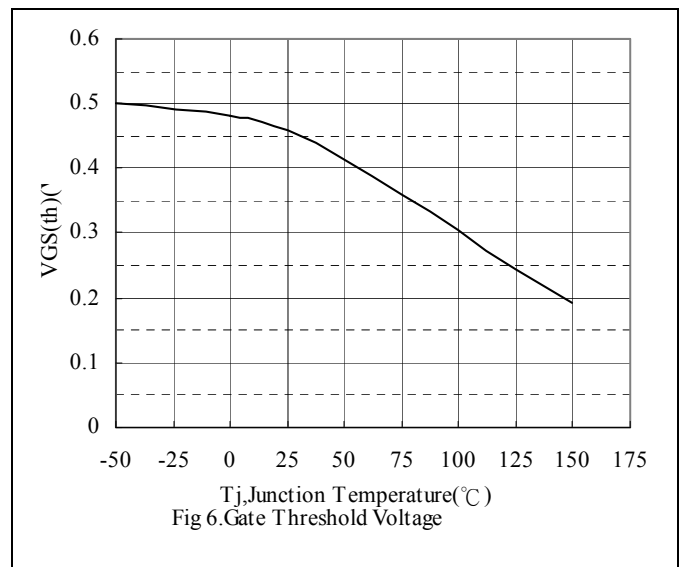
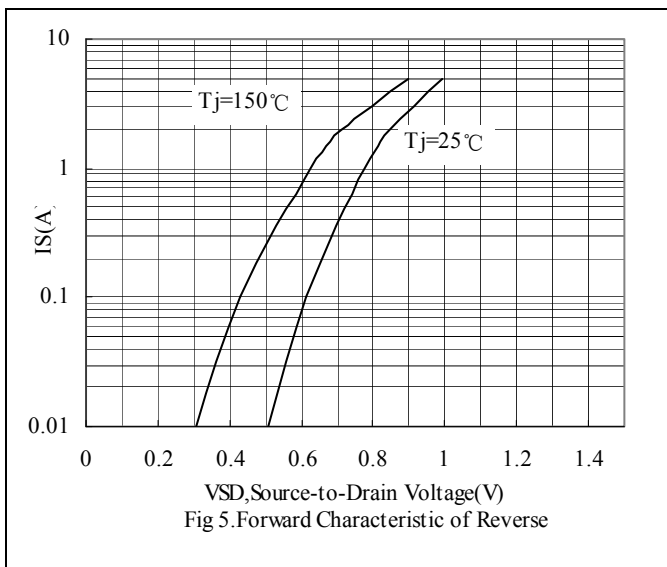
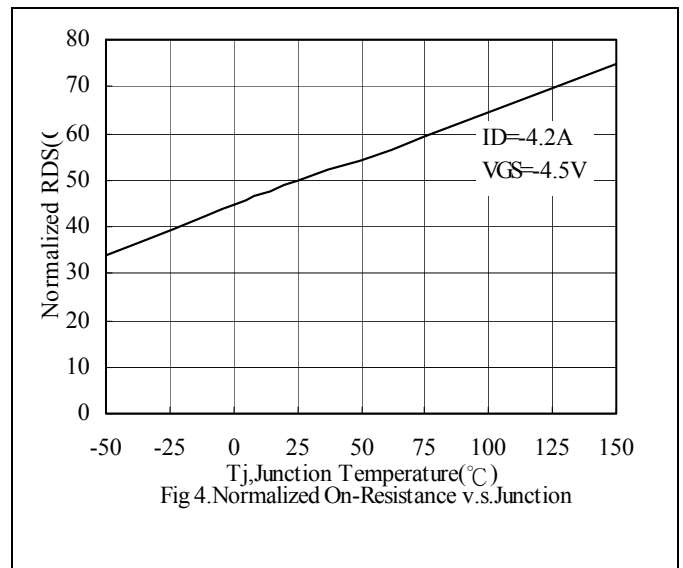
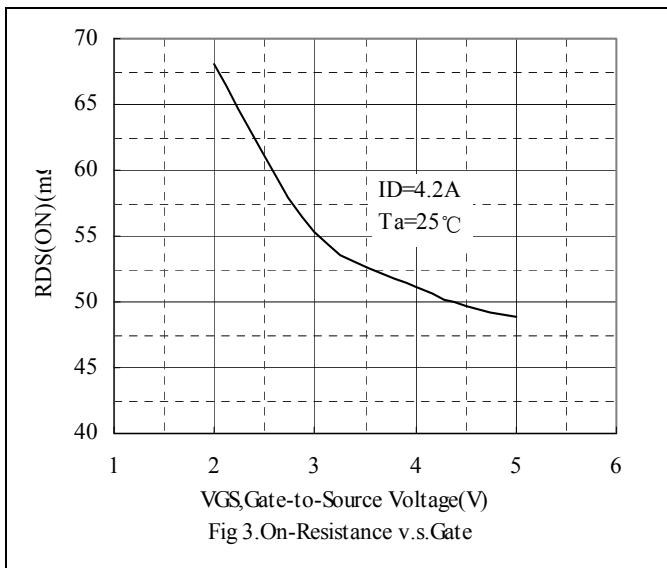
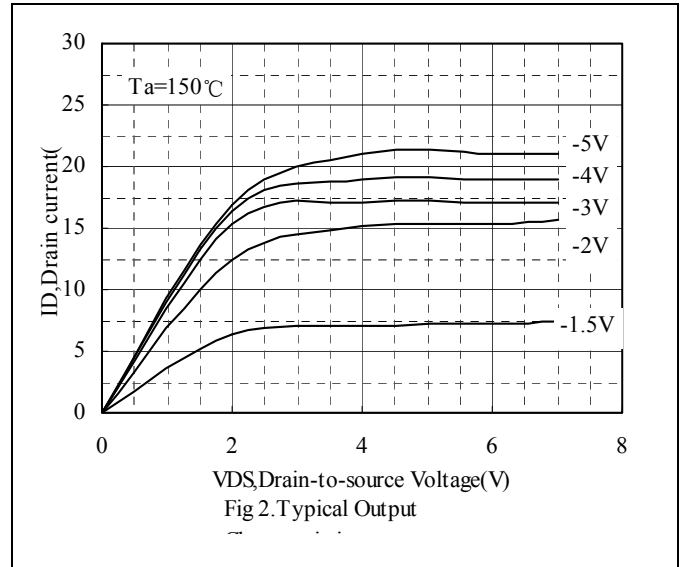
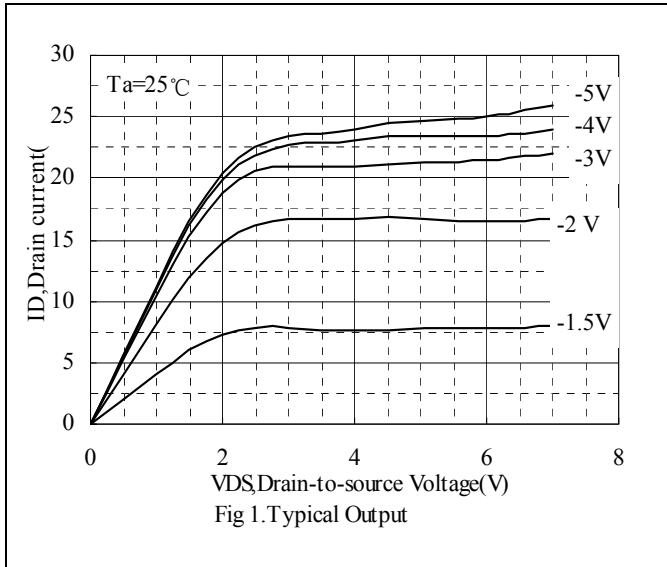
• Drain-Source Diode Characteristics

V_{SD}	Drain-Source Diode Forward Voltage	$V_{GS}=0V, I_S=-1.2A$	-	-	-1.2	V
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Note: Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$



Characteristics Curve





SOT-23 Dimension

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

Marking:

Pb Free Mark
Pb-Free: "●" (Note)
Normal: None

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

Halogen free Mark
Green free: "●●" (Note)
Normal: None

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

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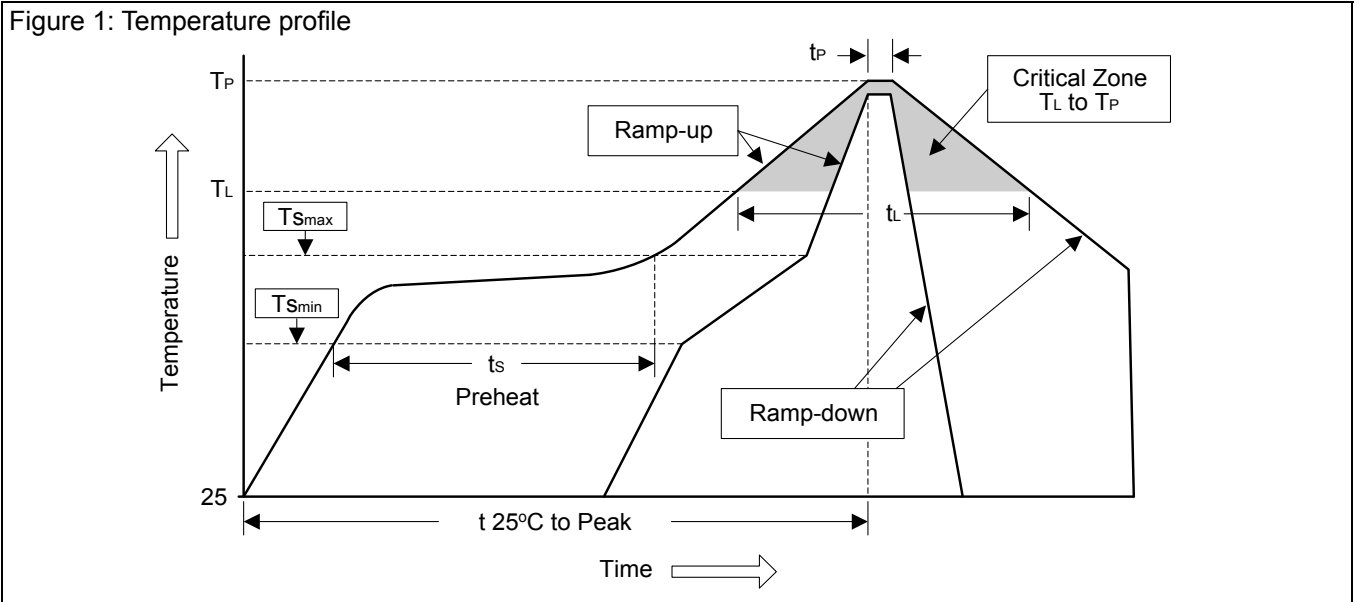
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Soldering Methods for HSMC's Products

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