



H01N45A

N-Channel Power Field Effect Transistor

Features

- Typical $R_{DS(on)}=4.1\Omega$
- Extremely High dv/dt Capability
- 100% Avalanche Tested
- Gate Charge Minimized
- New High Voltage Benchmark

Applications

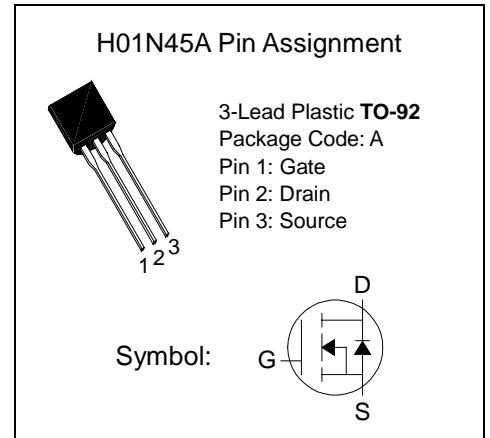
- Switch Mode Low Power Supplies (SMPS)
- Low Power, Low Cost CFL (Compact Fluorescent Lamps)
- Low Power Battery Chargers

Absolute Maximum Ratings

Symbol	Parameter	Value	Units
V_{DS}	Drain-Source Voltage ($V_{GS}=0$)	450	V
V_{DGR}	Drain-Gate Voltage ($R_{GS}=20K\Omega$)	450	V
V_{GS}	Gate-Source Voltage	± 30	V
I_D	Drain Current (Continuous) at $T_C=25^\circ C$	0.5	A
I_D	Drain Current (Continuous) at $T_C=100^\circ C$	0.315	A
I_{DM}	Drain Current (Pulsed)	2	A
P_D	Total Power Dissipation at $T_C=25^\circ C$	2.5	W
	Derate Factor	0.025	W/ $^\circ C$
dv/dt	Peak Diode recovery Voltage Slope	3	V/ns
T_j, T_{stg}	Operating Junction and Storage Temperature Range	-65 to 150	$^\circ C$
I_{AR}	Avalanche Current, Repetitive or Not-Repetitive (Pulse width limited by T_J Max.)	1.5	A
E_{AS}	Single Pulse Drain-to-Source Avalanche Enrgy- $T_j=25^\circ C$ ($V_{DD}=100V, V_{GS}=10V, I_L=2A, L=10mH, R_G=25\Omega$)	25	mJ

Thermal Data

Symbol	Parameter	Value	Units
$R_{thj-amb}$	Thermal Resistance Junction-Ambient (Max.)	120	$^\circ C/W$
$R_{thj-lead}$	Thermal Resistance Junction-Leadt (Max.)	40	$^\circ C/W$
T_L	Maximum Lead Temperature for Soldering Purpose	260	$^\circ C$





Electrical Characteristics (T_{case}=25°C, unless otherwise specified)

Symbol	Characteristic	Test Conditions	Min.	Typ.	Max.	Unit
ON/OFF						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	450	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current (V _{GS} =0)	V _{DS} =Max. Rating	-	-	1	uA
		V _{DS} =Max. Rating, T _C =125°C	-	-	50	
I _{GSS}	Gate-Body Leakage Current (V _{DS} =0)	V _{GS} =±30V	-	-	±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250uA	2.3	3	3.7	V
R _{DS(on)}	Static Drain-Source On Resistance	V _{GS} =10V, I _D =0.5A	-	4.1	4.5	Ω
Dynamic						
g _{FS} ^{*1}	Forward Transconductance	V _{DS} ≥I _{D(on)} ×R _{DS(on)max.} , I _D =0.5A	-	1.1	-	S
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, f=1MHz	-	185	230	pF
C _{oss}	Output Capacitance					
C _{rss}	Reverse Transfer Capacitance					
Switching On						
t _{d(on)}	Turn-on Delay Time	(V _{DD} =225V, I _D =0.5A, R _G =4.7Ω, V _{GS} =10V)	-	6.7	-	ns
t _r	Rise Time					
Q _g	Total Gate Charge	(V _{DS} =360V, I _D =0.5A, V _{GS} =10V, R _G =4.7Ω)	-	14	20	nC
Q _{gs}	Gate-Source Charge					
Q _{gd}	Gate-Drain Charge					
Switching Off						
t _{r(Voff)}	Off-Voltage Rise Time	(V _{DD} =360V, I _D =1.5A, R _G =4.7Ω, V _{GS} =10V)	-	8.5	-	ns
t _f	Fall Time					
t _c	Cross-Over Time					
Source Drain Diode						
I _{SD}	Source-Drain Current		-	-	1.5	A
I _{SDM} ^{*2}	Source-Drain Current (pulsed)		-	-	6	
V _{SD} ^{*1}	Forward On Voltage	I _{SD} =1.5A, V _{GS} =0	-	-	1.6	V
t _{rr}	Reverse Recovery Time	I _{SD} =1.5A, di/dt=100A/us	-	225	-	ns
Q _{rr}	Reverse Recovery Charge	V _{DD} =100V, T _J =150oC	-	530	-	uC
I _{RRM}	Reverse Recovery Current		-	4.7	-	A

*1: Pulse Test: Pulse duration=300us, duty cycle 1.5%

*2: Pulse width limited by safe operating area.



TO-92 Dimension

Marking:

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

Date Code Control Code

Note: Green label is used for pb-free packing
 Pin Style: 1.Gate 2.Drain 3.Source

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	4.33	4.83
B	4.33	4.83
C	12.70	-
D	0.36	0.56
E	-	*1.27
F	3.36	3.76
G	0.36	0.56
H	-	*2.54
I	-	*1.27
$\alpha 1$	-	*5°
$\alpha 2$	-	*2°
$\alpha 3$	-	*2°

*: Typical, Unit: mm

3-Lead TO-92 Plastic Package
 HSMC Package Code: A

TO-92 Taping Dimension

DIM	Min.	Max.
A	4.33	4.83
D	3.80	4.20
D1	0.36	0.53
D2	4.33	4.83
F1,F2	2.40	2.90
H	15.50	16.50
H1	8.50	9.50
H2	-	1
H2A	-	1
H3	-	27
H4	-	21
L	-	11
L1	2.50	-
P	12.50	12.90
P1	5.95	6.75
P2	50.30	51.30
T	-	0.55
T1	-	1.42
T2	0.36	0.68
W	17.50	19.00
W1	5.00	7.00

Unit: mm

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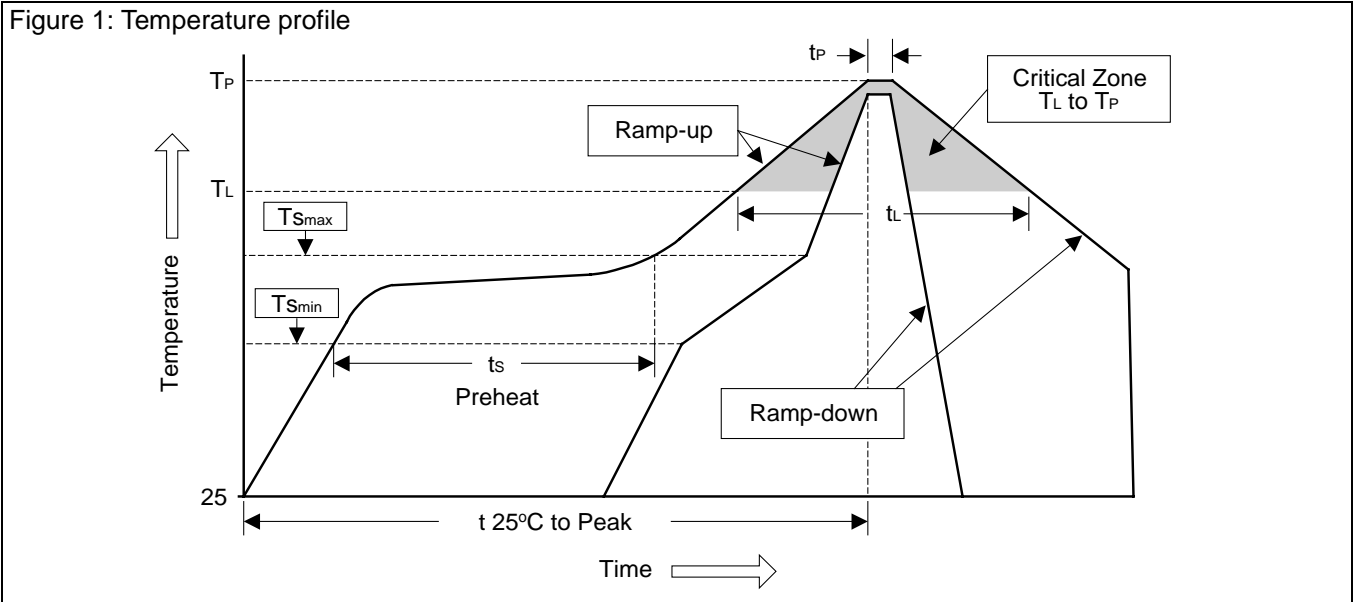
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Soldering Methods for HSMC's Products

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) (ts)	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