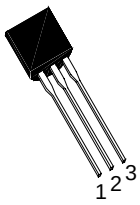
H01N45A

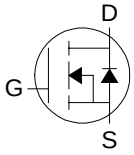
N-Channel Power Field Effect Transistor

H01N45A Pin Assignment



3-Lead Plastic **TO-92**
Package Code: A
Pin 1: Gate
Pin 2: Drain
Pin 3: Source

Symbol:



Features

- Typical $R_{DS(on)}$=4.1Ω
- 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}=20KΩ)	450	V
V_{GS}	Gate-Source Voltage	±30	V
I_D	Drain Current (Continuous) at T_C=25°C	0.5	A
I_D	Drain Current (Continuous) at T_C=100°C	0.315	A
I_{DM}	Drain Current (Pulsed)	2	A
P_D	Total Power Dissipation at T_C=25°C	2.5	W
	Derate Factor	0.025	W/°C
dv/dt	Peak Diode recovery Voltage Slope	3	V/ns
T_j, T_{stg}	Operating Junction and Storage Temperature Range	-65 to 150	°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-Tj=25°C (V_{DD}=100V, V_{GS}=10V, I_L=2A, L=10mH, R_G=25Ω)	25	mJ

Thermal Data

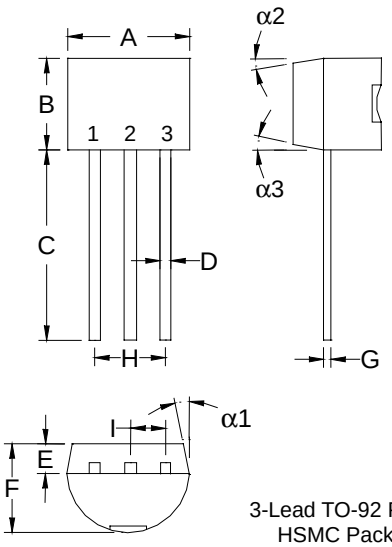
Symbol	Parameter	Value	Units
$R_{thj\text{-}amb}$	Thermal Resistance Junction-Ambient (Max.)	120	°C/W
$R_{thj\text{-}lead}$	Thermal Resistance Junction-Leadt (Max.)	40	°C/W
T_L	Maximum Lead Temperature for Soldering Purpose	260	°C

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}≥$I_{D(on)}$x$R_{DS(on)max.}$, 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		-	27.5	-	
C_{rss}	Reverse Transfer Capacitance		-	6	10	
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		-	4	-	
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		-	2	-	
Q_{gd}	Gate-Drain Charge		-	3.2	-	
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		-	12	-	
t_C	Cross-Over Time		-	18	-	
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

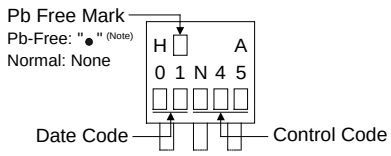
*1: Pulse Test: Pulse duration=300us, duty cycle 1.5%
*2: Pulse width limited by safe operating area.

TO-92 Dimension



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

Marking:



Note: Green label is used for pb-free packing

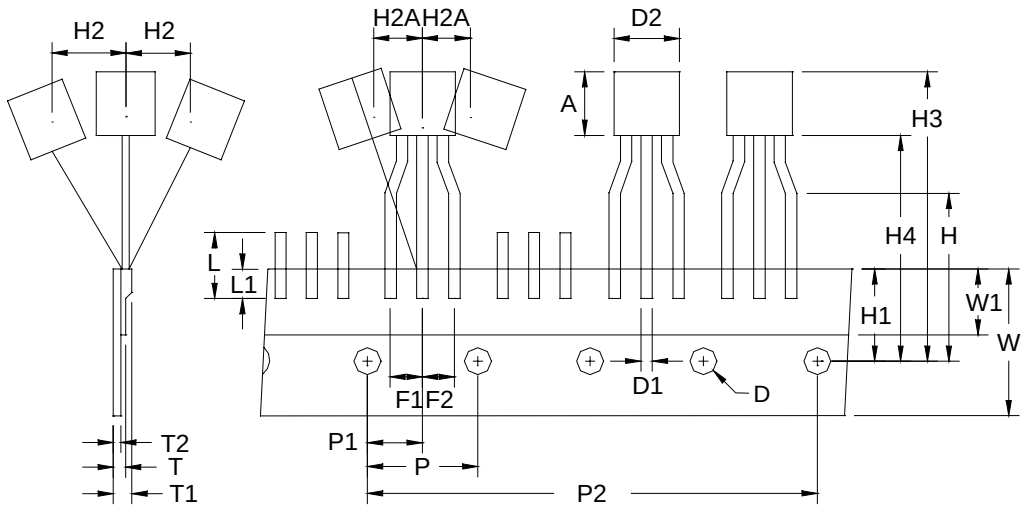
Pin Style: 1.Gate 2.Drain 3.Source

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
α1	-	*5°
α2	-	*2°
α3	-	*2°

*: Typical, Unit: mm

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

Head Office And Factory:

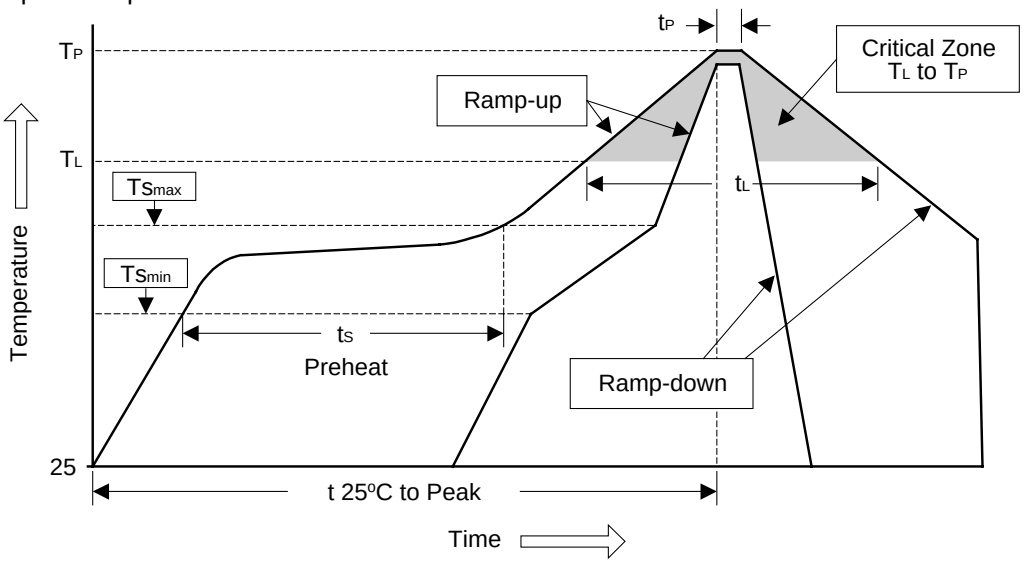
- **Head Office** (Hi-Sincerity Microelectronics Corp.): 10F.,No. 61, Sec. 2, Chung-Shan N. Rd. Taipei Taiwan R.O.C.
  Tel: 886-2-25212056 Fax: 886-2-25632712, 25368454
- **Factory 1:** No. 38, Kuang Fu S. Rd., Fu-Kou Hsin-Chu Industrial Park Hsin-Chu Taiwan. R.O.C
  Tel: 886-3-5983621~5 Fax: 886-3-5982931

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	5sec ±1sec
Pb-Free devices.	260°C +0/-5°C	5sec ±1sec