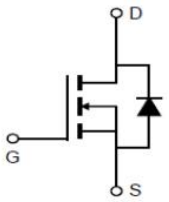
## •General Description

Power MOSFET LH9N50F has the low $R_{DS(on)}$,low gate charge,fast switching and excellent avalanche characteristics.This device offers extremely fast and robust body diode,and is suitable for telecom and power supplies.




VDS =500V

$R_{DS(ON)}$ =650mΩ

ID =9A

■ RoHS COMPLIANT


TO-220


TO-220F

## •Features

■Low Thermal Resistance
■Fast Switching
■High Input Resistance

## •Application

■LED/LCD/PDP TV and monitor Lighting
■Power Supplies

## •Ordering Information:

| Part number | LH9N50F | LH9N50F |
|---|---|---|
| Package | TO-220 | TO-220F |
| Basic ordering unit (pcs) | 1000 | 1000 |
| Normal Package Material Ordering Code | LH9N50FT-T0220-TU | LH9N50FF-T0220F-TU |
| Halogen Free Ordering Code | LH9N50FT-T0220-TU-HF | LH9N50FF-T0220F-TU-HF |

## •Absolute Maximum Ratings（TC =25℃）

| PARAMETER | | SYMBOL | Value | UNIT |
|---|---|---|---|---|
| Drain-Source Breakdown Voltage | | $BV_{DSS}$ | 500 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±30 | V |
| Continuous Drain Current | TC = 25°C | $I_D$ | 9 | A |
| | TC = 100°C | | 5.4 | |
| Pulsed drain current (TC = 25°C, tp limited by Tjmax)[1] | | $I_{DM}$ | 36 | A |
| Single Pulse Avalanche Energy[2] | | $E_{AS}$ | 560 | mJ |
| Power Dissipation(TC=25℃) | | $P_D$ | 38.5 | W |
| Junction Temperature | | $T_J$ | -55~+150 | ℃ |
| Storage Temperature | | $T_{STG}$ | -55~+150 | ℃ |

## ●Electronic Characteristics

| PARAMETER | SYMBOL | TEST CONDITION | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$ =0V, $I_D$=250uA | 500 | -- | -- | V |
| Gate Threshold Voltage | $V_{GS(TH)}$ | $V_{DS}$=VGS,$I_D$=250uA | 2.0 | -- | 4.0 | V |
| Drain-source On Resistance[3] | $R_{DS(ON)}$ | $V_{GS}$ =10V, $I_D$=4.5A | -- | 0.65 | 0.85 | Ω |
| Drain-Source Leakage Current | $I_{DSS}$ | $V_{DS}$=500V,$V_{GS}$=0V,$T_J$=25℃ | -- | -- | 1 | uA |
| | | $V_{DS}$=400V,$V_{GS}$=0V,$T_J$=125℃ | -- | -- | 100 | |
| Gate-Source Leakage Current | $I_{GSS}$ | $V_{GS}$=±30 | -- | -- | ±100 | nA |
| Forward Transconductance[3] | gfs | $V_{DS}$=15V,$I_D$=4.5A | -- | 8 | -- | S |
| Input Capacitance | Ciss | $V_{GS}$ = 0V, $V_{DS}$ = 25V f = 1.0MHz | -- | 1050 | -- | pF |
| Output Capacitance | Coss | | -- | 95 | -- | |
| Reverse transfer Capacitance | Crss | | -- | 12 | -- | |
| Rise Time | Tr | $V_{DD}$=250V, $R_G$=25Ω | -- | 20 | -- | ns |
| Fall Time | Tf | | -- | 18 | -- | |
| Turn-On Delay Time | Td(on) | | -- | 22 | -- | |
| Turn -Off Delay Time[3] | Td(off) | | ---- | 49 | -- | |
| Total Gate Charge | Qg | $I_D$ =9A, $V_{DS}$ = 400V $V_{GS}$ = 10V | -- | 21 | --- | nC |
| Gate-to-Source Charge | Qgs | | -- | 4.8 | -- | |
| Gate-to-Drain Charge | Qgd | | -- | 7.6 | --- | |
| Continuous Diode Forward Current | $I_S$ | | -- | -- | 9 | A |
| Diode Forward Voltage | $V_{SD}$ | Tj=25°C, Is=9A $V_{GS}$ =0V | -- | -- | 1.4 | V |
| Reverse Recovery Time | trr | If=Is $di_F/dt$=100A/μs [3] | -- | 380 | -- | ns |
| Reverse Recovery Charge | Qrr | | -- | 1.9 | -- | uC |

## ●Thermal Characteristics

| PARAMETER | SYMBOL | MAX | UNIT |
|---|---|---|---|
| Thermal Resistance Junction-case | $Rth_{JC}$ | 3.25 | ℃/W |
| Thermal Resistance Junction-ambient | $Rth_{JA}$ | 62.5 | ℃/W |

Notes:

1.Repetitive Rating: Pulse width limited by maximum junction temperature.

2. $I_{AS}$ = 9A, $V_{DD}$ = 50V, $R_G$ = 25Ω,L=14Mh, Starting $T_J$ = 25°C

3. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%

## ●Typical Characteristics

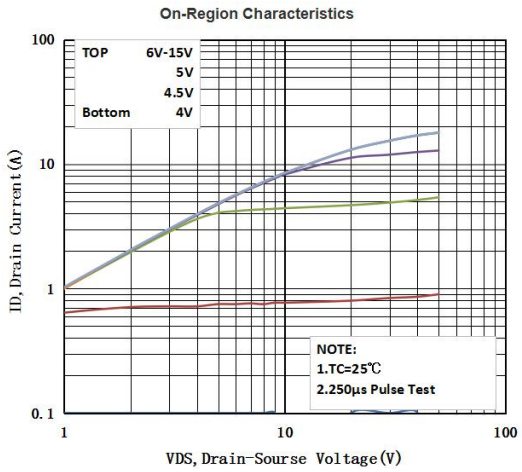



Fig1 Typical Output Characteristics, Tc=25℃

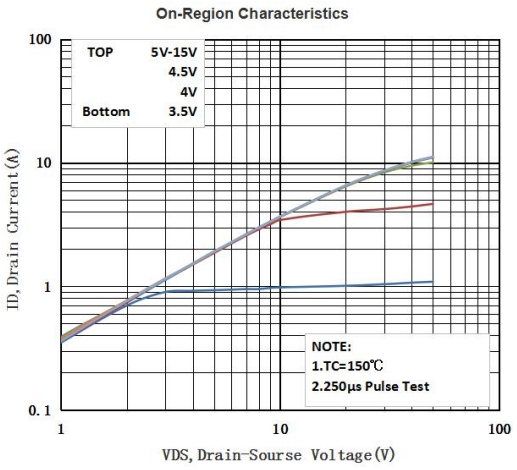



Fig2 Typical Output Characteristics, Tc=150℃

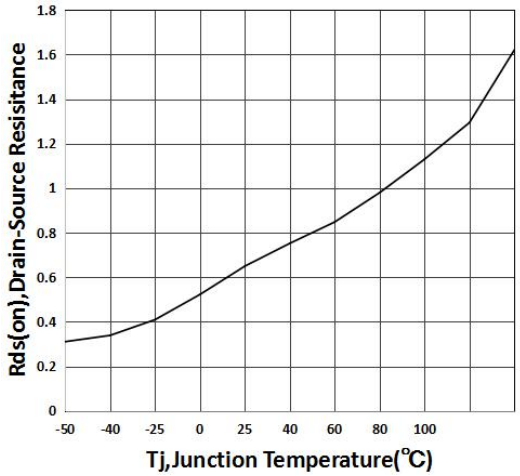



Fig3 Resistance Vs. Temperature

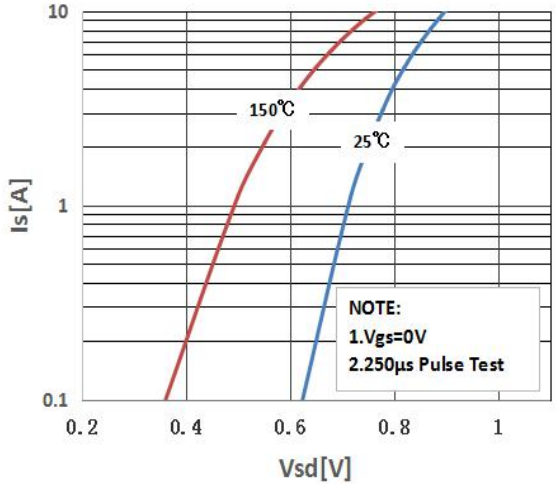



Fig4 Typical Source-Drain Diode Forward Voltage

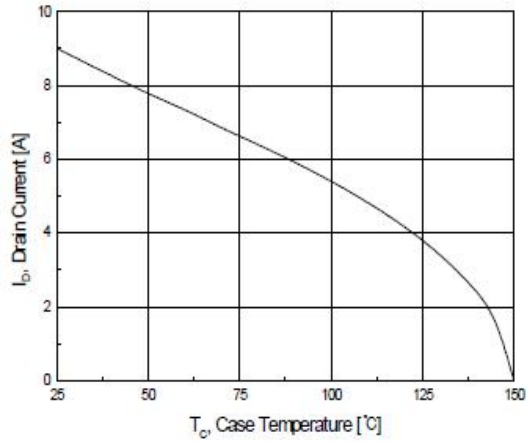



Fig5 Maximum Drain Current Vs. Case Temperature

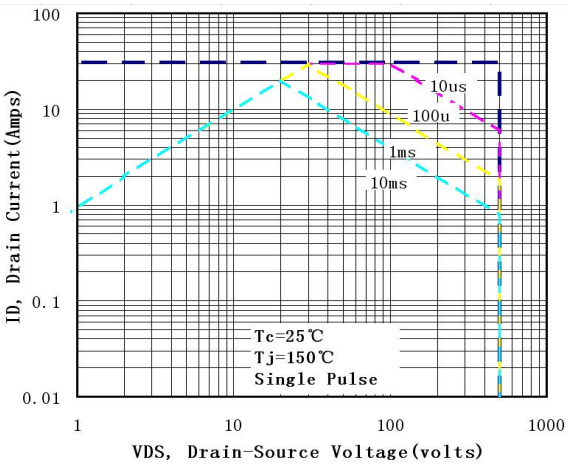
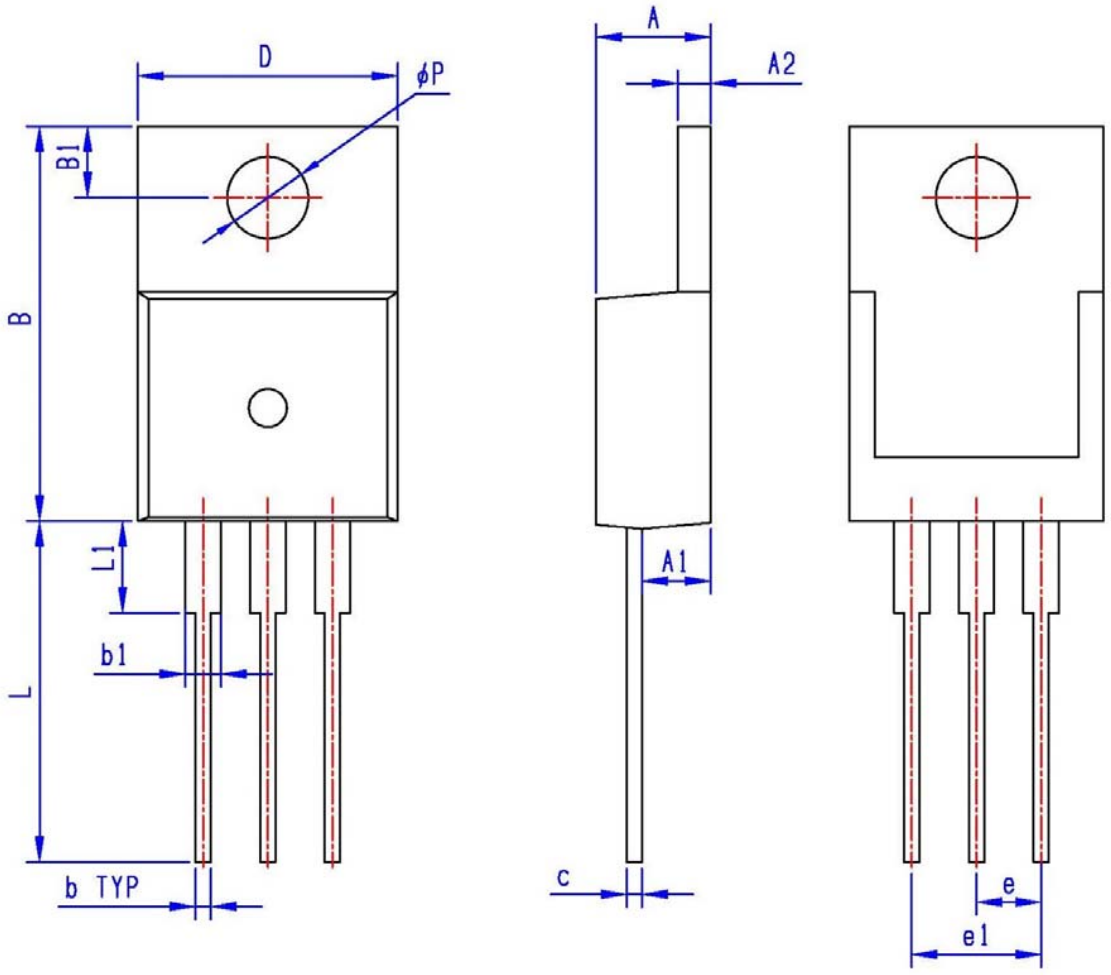



Fig6 Maximum Safe Operating Area

## ●Dimensions（TO-220)

UNIT:mm

| SYMBOL | min | max | SYMBOL | min | max |
|---|---|---|---|---|---|
| A | 4.25 | 4.85 | B1 | 2.60 | 3.00 |
| A1 | 2.30 | 3.00 | e | 2.40 | 2.70 |
| A2 | 1.20 | 1.40 | e1 | 4.95 | 5.25 |
| b | 0.60 | 0.90 | L | 12.60 | 14.40 |
| b1 | 1.10 | 1.70 | L1 | 2.40 | 4.00 |
| c | 0.40 | 0.70 | ⌀P | 3.50 | 3.90 |
| D | 9.80 | 10.60 | | | |
| B | 15.20 | 16.20 | | | |



## ●Dimensions（TO-220F)

UNIT:mm

| SYMBOL | min | max | SYMBOL | min | max |
|---|---|---|---|---|---|
| A | 4.20 | 4.80 | E1 | 8.30 | 8.70 |
| A1 | 2.50 | 2.90 | e | 2.40 | 2.70 |
| A2 | 2.90 | 3.30 | e1 | 4.95 | 5.25 |
| b | 0.40 | 0.80 | F | 2.50 | 2.90 |
| b1 | 1.10 | 1.50 | L | 13.00 | 14.00 |
| c | 0.50 | 0.70 | L1 | 3.00 | 4.00 |
| D | 9.80 | 10.60 | ⌀P | 2.90 | 3.50 |
| E | 14.60 | 15.60 | | | |