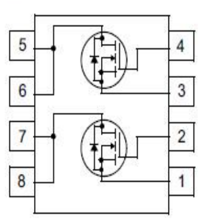
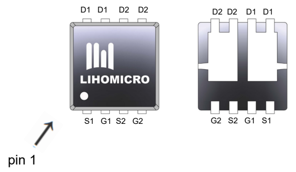
# LH2020A

## 20V Dual N-Channel MOSFET




$V_{DS1}$ =20V
RDS(ON)1 =4.8mΩ
$ID_1$=60A
$V_{DS2}$=20V
RDS(ON)2 =4.8mΩ
$ID_2$=60A

■ RoHS COMPLIANT




DFN3*3

### •General Description

The LH2020A uses trench technology and design to provide excellent $R_{DS(on)}$ with low gate charge.This device is suitable for high current load applications.

### •Features

- ■Advance high cell density trench technology
- ■Low RDS(ON) to minimize conductive loss
- ■Low Gate Charge for fast switching

### •Application

- ■Lighting
- ■Power Supplies
- ■PD Fast Charging

### •Ordering Information:

| | |
|---|---|
| Part Number | LH2020A |
| Package | DFN3*3 |
| Basic Ordering Unit (pcs) | 5000 |
| Normal Package Material Ordering Code | LH2020AD3-DFN3*3-TAP |
| Halogen Free Ordering Code | LH2020AD3-DFN3*3-TAP-HF |

### •Absolute Maximum Ratings（TC =25℃）

| PARAMETER | SYMBOL | VALUE | UNIT |
|---|---|---|---|
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | 20 | V |
| Gate-Source Voltage | $V_{GS}$ | ±12 | V |
| Continuous Drain Current ,$T_C$ = 25°C | $I_D$ | 60 | A |
| Pulsed drain current ($T_C$ = 25°C, tp limited by Tjmax) | $I_{DM}$ | 240 | A |
| Power Dissipation[3] | $P_D(T_C$=25℃) | 35 | W |
| | $P_D(T_A$=25℃) | 0.68 | W |
| Storage Temperature | $T_{STG}/T_J$ | -55~+150 | ℃ |

## ●Electronic Characteristics

| PARAMETER | SYMBOL | TEST CONDITION | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$ =0V, $I_D$=250uA | 20 | -- | -- | V |
| BVDSS Temperature Coefficient | $\Delta BV_{DSS}/\Delta T_J$ | Reference to 25℃,$I_D$=1mA | -- | 0.034 | -- | V |
| Gate Threshold Voltage | $V_{GS(TH)}$ | $V_{DS}$=$V_{GS}$,$I_D$=250uA | 0.4 | -- | 1.0 | V |
| Drain-source On Resistance[2] | $R_{DS(ON)}$ | $V_{GS}$ =4.5V, $I_D$=10A | -- | 4.8 | 6.5 | mΩ |
| | | $V_{GS}$ =2.5V, $I_D$=510A | -- | 7.0 | 9.0 | |
| Drain-Source Leakage Current | $I_{DSS}$ | $V_{DS}$=16V,$V_{GS}$=0V,$T_J$=25℃ | -- | -- | 1 | uA |
| | | $V_{DS}$=16V,$V_{GS}$=0V,$T_J$=55℃ | -- | -- | 5 | |
| Gate-Source Leakage Current | $I_{GSS}$ | $V_{GS}$=±12V,$V_{DS}$=0V | -- | -- | ±100 | nA |
| Gate Resistance | Rg | $V_{DS}$=0V,$V_{GS}$=0V,f=1MHz | -- | 1.2 | -- | Ω |
| Input Capacitance | Ciss | $V_{GS}$ = 0V, $V_{DS}$ = 10V, f = 1.0MHz | -- | 1560 | -- | pF |
| Output Capacitance | Coss | | -- | 273 | -- | |
| Reverse transfer Capacitance | Crss | | -- | 221 | -- | |
| Turn-On Delay Time | $T_{d(on)}$ | $V_{DD}$=10V, $V_{GS}$=4.5V, $R_G$=3.0Ω, ID=1A | -- | 12 | -- | nS |
| Turn-Off Delay Time | $T_{d(off)}$ | | -- | 47 | -- | |
| Turn-On Rise Time | $T_r$ | | -- | 33 | -- | |
| Turn-Off Fall Time | $T_f$ | | -- | 93 | -- | |
| Total Gate Charge | Qg | $I_D$ =5A, $V_{DS}$ = 10V, $V_{GS}$ =4.5V | -- | 20 | -- | nC |
| Gate-to-Source Charge | Qgs | | -- | 3.8 | -- | |
| Gate-to-Drain Charge | Qgd | | -- | 7 | -- | |
| Diode Forward Voltage | $V_{SD}$ | Tj=25°C, Is=1A, $V_{GS}$ =0V | -- | -- | 1.2 | V |

## ●Thermal Characteristics

| PARAMETER | SYMBOL | MAX | UNIT |
|---|---|---|---|
| Thermal Resistance Junction-case[3] | $Rth_{JC}$ | 3.57 | ℃/W |
| Thermal Resistance Junction-ambient[3] | $Rth_{JA}$ | 62 | ℃/W |

Notes:

1.The EAS data shows Max. rating.The Test condition is L=0.5mH,$R_G$=25Ω,$V_{DD}$=10V,$V_{GS}$=4.5V;

2.The data tested by Pulsed,Pulse width ≤ 300μs, Duty cycle ≤ 2%;

3.The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper;

## ●Typical Characteristics

Fig.1 Typical Output Characteristics

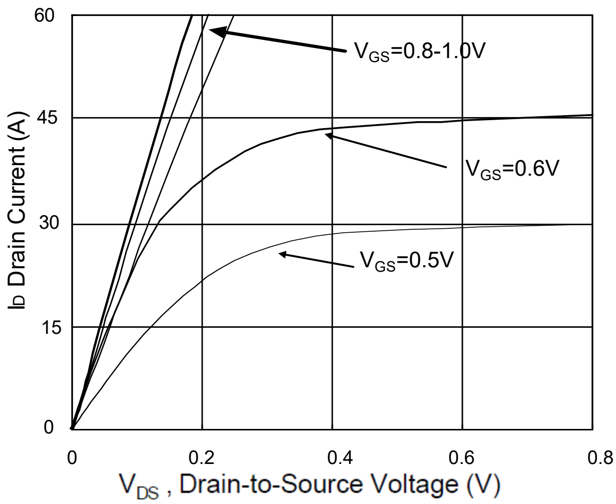



Fig.2 On-Resistance vs G-S Voltage

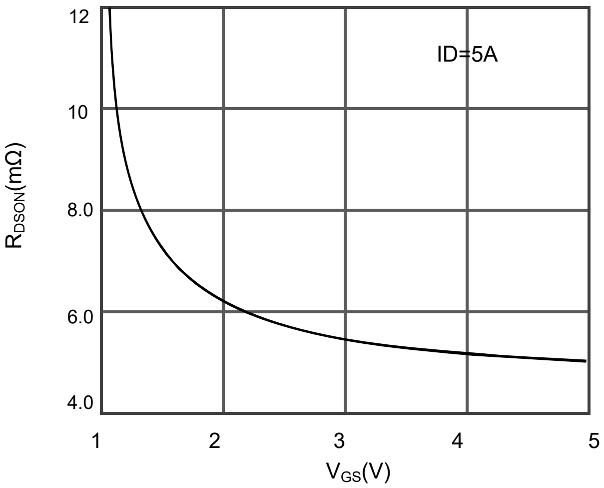



Fig.3 Source Drain Forward Charteristics

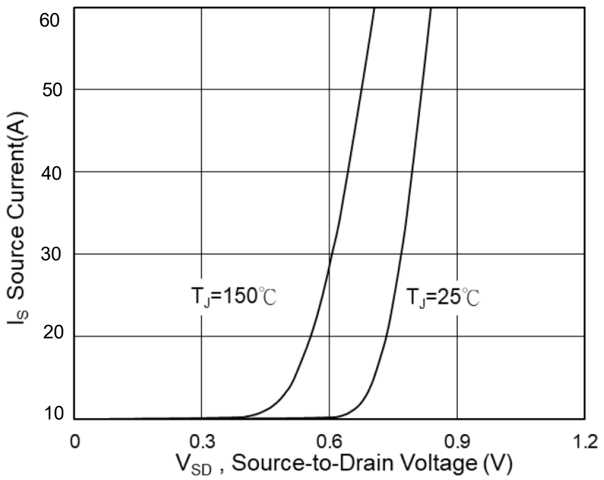



Fig.4 Gate-Charge Characteristics

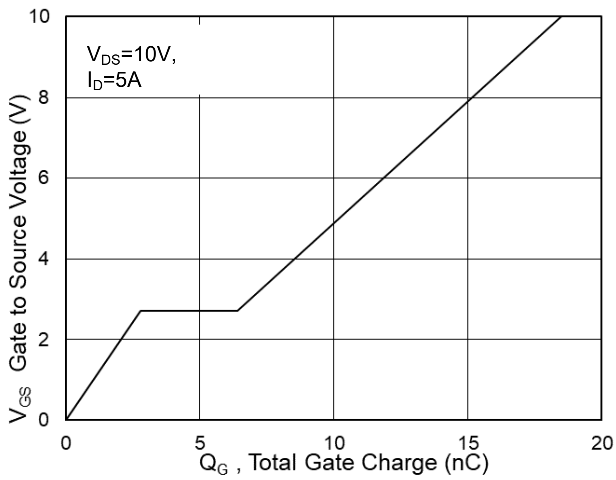



Fig.5 Normalized VGS(th) vs TJ

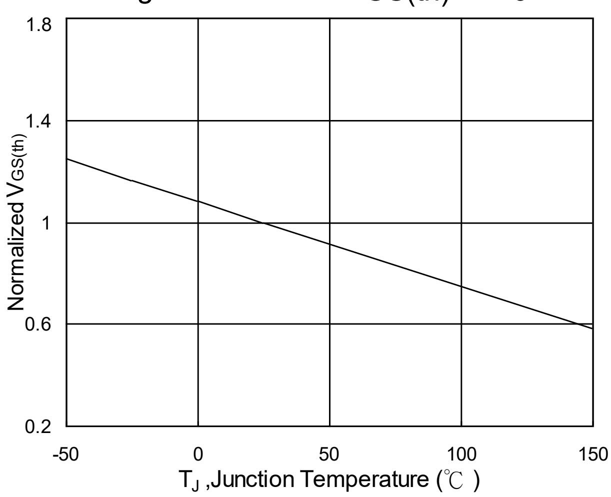
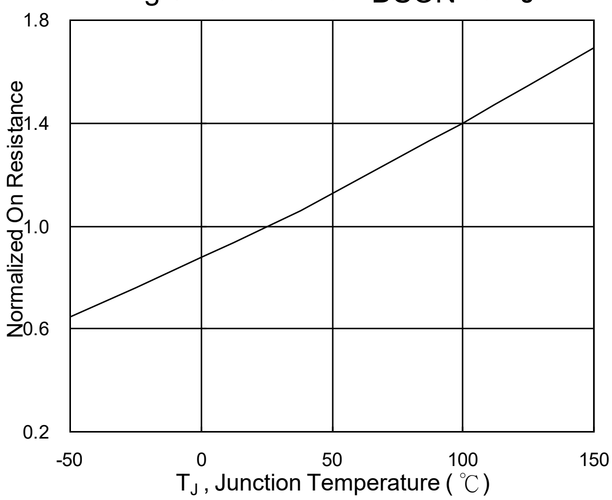



Fig.6 Normalized RDSON vs TJ



## • Typical Characteristics(cont.)

**Fig.7 Capacitance**

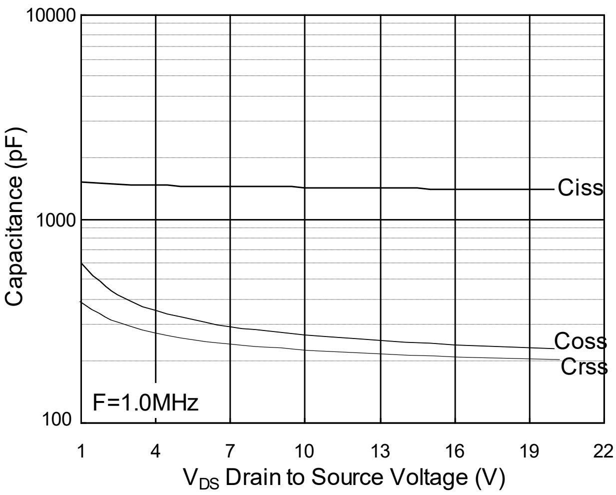



**Fig.8 Safe Operating Area**

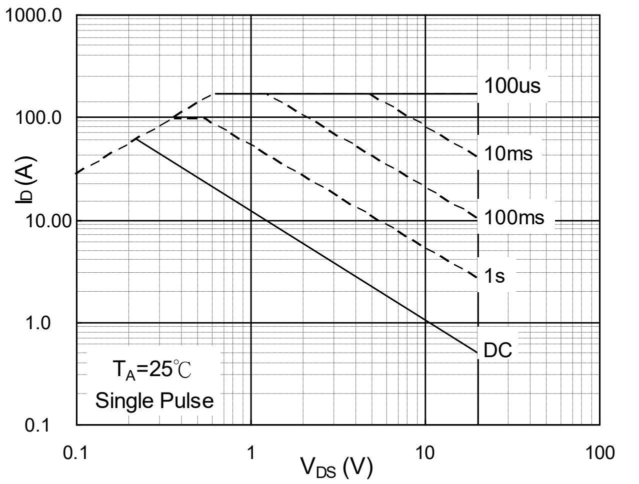



**Fig.9 Normalized Maximum Transient Thermal Impedance**

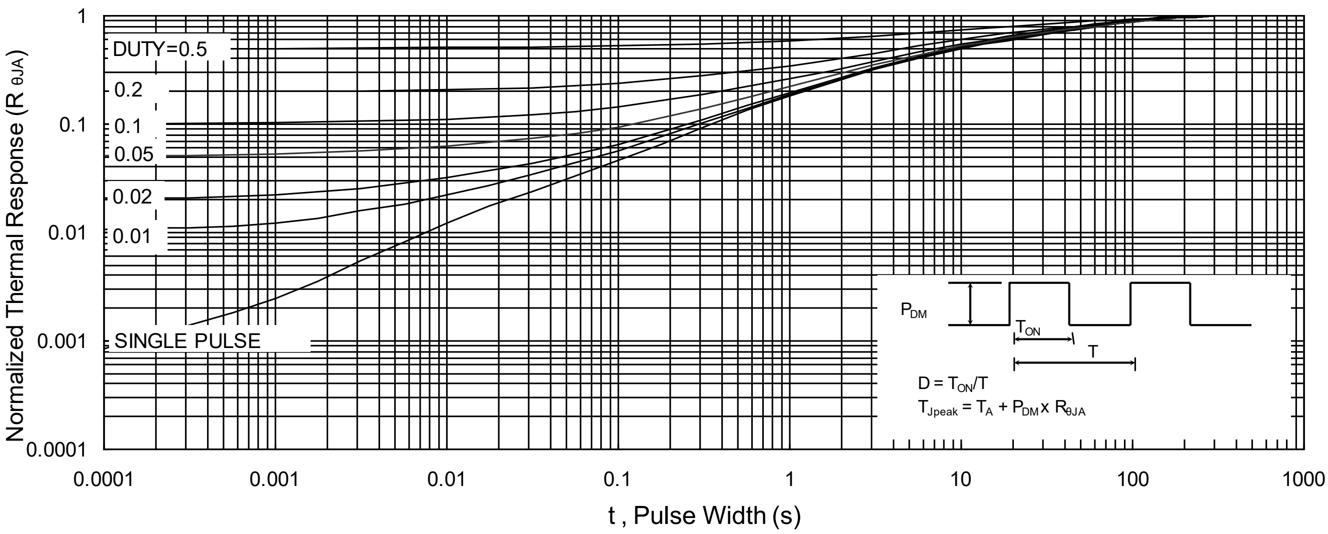



**Fig.10 Switching Time Waveform**

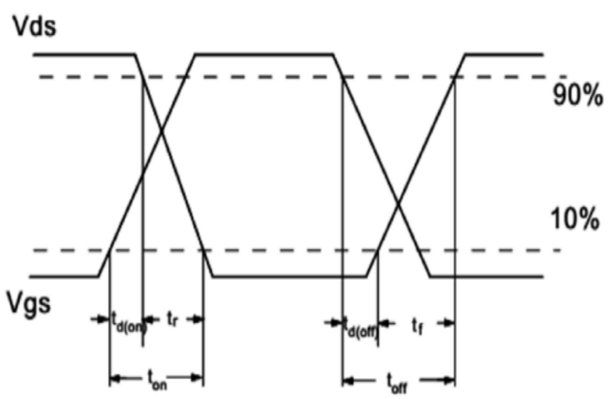
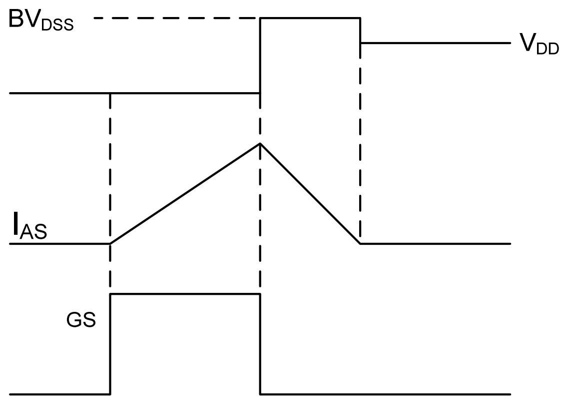



**Fig.11 Unclamped Inductive Waveform**

$$EAS = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$



●**Dimensions（DFN3*3)**

Unit：mm

| SYMBOL | min | max | SYMBOL | min | max |
|---|---|---|---|---|---|
| A | 0.68 | 0.88 | E1 | 3.15 | 3.55 |
| b | 0.27 | 0.47 | e | 0.65BSC | |
| c | 0.15 | 0.35 | L1 | 1.55 | 1.95 |
| D | 3.05 | 3.25 | L2 | 0.5 | 0.9 |
| D1 | 2.25 | 2.65 | I | 3.10 | 3.50 |
| D2 | 0. 90 | 1. 10 | | | |
| E | 3.05 | 3.25 | | | |