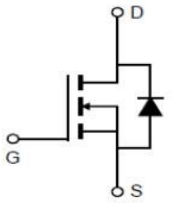
## •General Description

The SJ MOSFET LH60R070FD has the low RDS(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




$V_{DS}$=600V

$R_{DS(ON)}$ =70mΩ

$I_D$=50A


TO-247

■RoHS COMPLIANT

## •Features

■100% Avalanche Tested

■Low Power Loss By High Speed Switching

■Low On-Resistance

## •Application

■DC-DC Converter

■UPS-Micro Inverter System

■PFC Power Supply

## •Ordering Information:

| | |
|---|---|
| Part number | LH60R070FD |
| Package | TO-247 |
| Basic ordering unit (pcs) | 330 |
| Normal Package Material Ordering Code | LH60R070FDT2-T0247-TU |
| Halogen Free Ordering Code | LH60R070FDT2-T0247-TU-HF |

## •Absolute Maximum Ratings（TC =25℃）

| Parameter | Symbol | Rating | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 650 | V |
| Gate-Source Voltage | $V_{GS}$ | ±30 | V |
| Continuous Drain Current | $I_D$ $T_C$ = 25°C | 50 | A |
| | $I_D$ $T_C$ = 100°C | 32 | |
| Pulsed drain current (TC = 25°C, tp limited by Tjmax)[1] | $I_{D\ pulse}$ | 150 | A |
| Power Dissipation(TC=25℃) | $P_D$ | 266 | W |
| Single Pulse Avalanche Energy[2] | $E_{AS}$ | 1135 | mJ |
| Repetitive Avalanche Energy[2] | $E_{AR}$ | 1.78 | mJ |
| Operating Junction Temperature | $T_J$ | -55...+150 | ℃ |
| Storage Temperature | $T_{STG}$ | -55...+150 | ℃ |

## ●Electronic Characteristics

| Parameter | Symbol | Condition | Min. | Typ | Max. | Unit |
|---|---|---|---|---|---|---|
| Drain-SourceBreakdown Voltage | $B_{VDSS}$ | $V_{GS}$=0V, $I_D$=250uA | 650 | | | V |
| Gate Threshold Voltage | $V_{GS(TH)}$ | $V_{DS}$=$V_{GS}$,$I_D$=250uA | 2.0 | | 4.0 | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ =600V, $V_{GS}$=0V, $T_J$=25℃ | | | 1 | uA |
| | | $T_J$=150℃ | | | 100 | nA |
| Gate- Source Leakage Current | $I_{GSS}$ | $V_{GS}$=±30V, $V_{DS}$=0V | | | ±100 | nA |
| Drain-Source On State Resistance | $R_{DS(ON)}$ | $V_{GS}$ =10V, $I_D$=25A | 60 | 70 | 78 | mΩ |
| Rate resistance | $R_G$ | f=1.0MHz open drain | | 4.8 | | Ω |

## ●Electronic Characteristics

| Parameter | Symbol | Condition | Min. | Typ | Max. | Unit |
|---|---|---|---|---|---|---|
| Input capacitance | Ciss | $V_{GS}$ = 0V, $V_{DS}$ =50V F = 1MHZ | | 3480 | | pF |
| Output capacitance | Coss | | | 90 | | |
| Reverse transfer capacitance | Crss | | | 15 | | |
| Turn -Off Delay Time | Td(off) | $V_{DD}$ =400V, $I_D$=50A, $R_G$=25Ω | | 74 | | ns |
| Turn-on delay time | Td(on) | | | 36 | | |
| Rise time | Tr | | | 202 | | |
| Fall time | Tf | | | 76 | | |
| Total Gate Charge | Qg | $I_D$ =50A, $V_{DS}$ =480V $V_{GS}$ =10V | | 86 | | nC |
| Gate-to-Source Charge | Qgs | | | 30 | | |
| Gate-to-Drain Charge | Qgd | | | 38 | | |
| Diode Forward Voltage | $V_{SD}$ | $I_D$=50A $V_{GS}$ =0V | | | 1.4 | V |
| Body Diode Reverse Recovery Time | Trr | $I_D$=23A, Vds=520V | | 248 | | ns |
| Body Diode Reverse Recovery Charge | $Q_{rr}$ | | | 2.7 | | nC |
| Peak Reverse Recovery Current | Irrm | | | 19 | | A |

## ●Thermal Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Thermal resistance, junction - case | $R_{thJC}$ | | 0.46 | | °C/W |
| Thermal resistance, junction - ambient | $R_{thJA}$ | | 62.5 | | °C/W |

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. $I_{AS}$ =10A, $V_{DD}$ = 50V, $R_G$ = 25Ω, Starting $T_J$ = 25°C

## ●Typical Characteristics

**Figure 1. Output Characteristics**

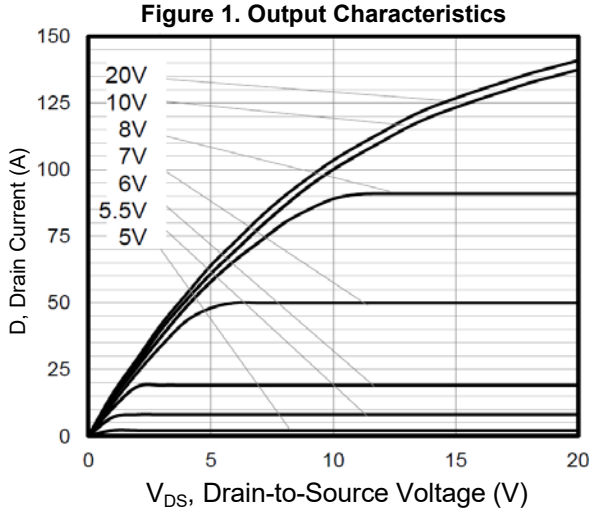



**Figure 2. Transfer Characteristics**

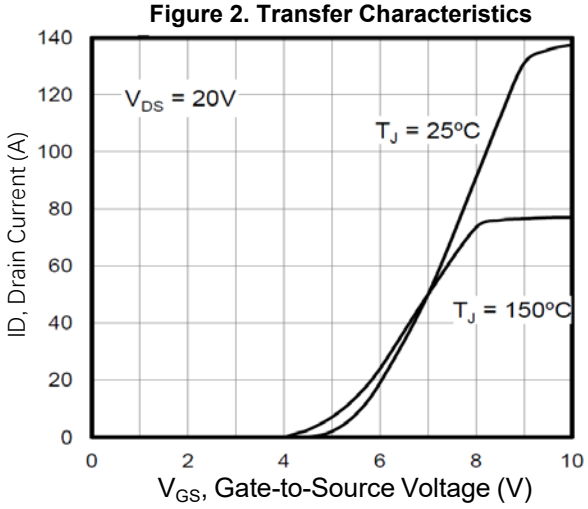



**Figure 3. On-Resistance vs. Drain Current**

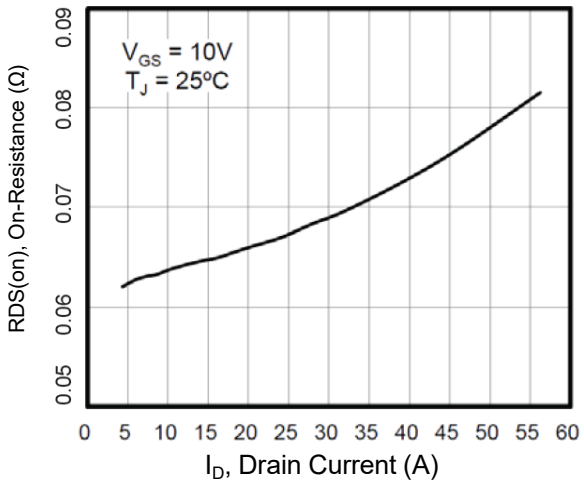



**Figure 4. Capacitance**

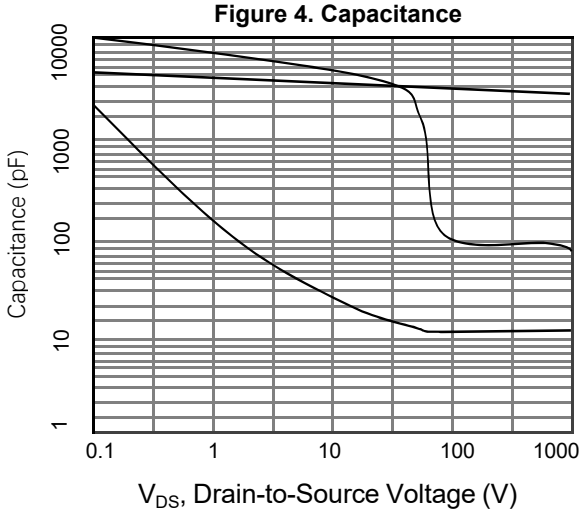
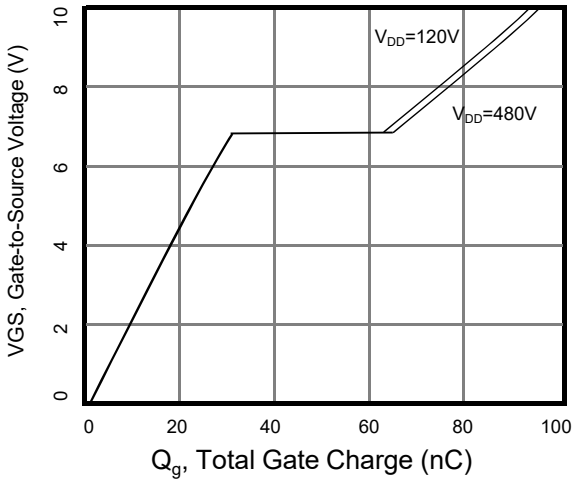
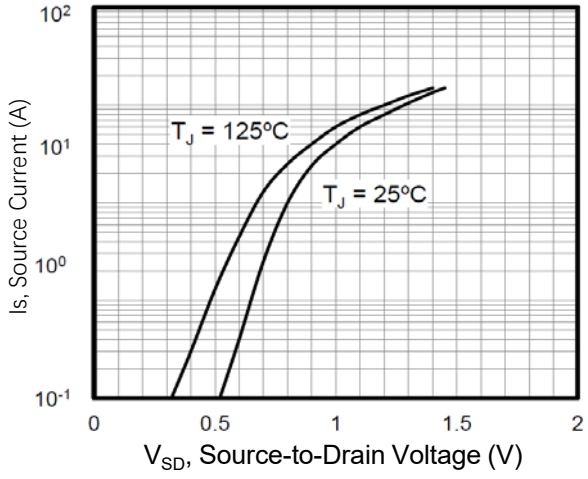



**Figure 5. GateCharge Characteristics**




0 20 40 60 80 100

**Figure 6. Body Diode Forward**



## Typical Characteristics (cont.)

Figure 7. On-Resistance vs. Junction Temperature

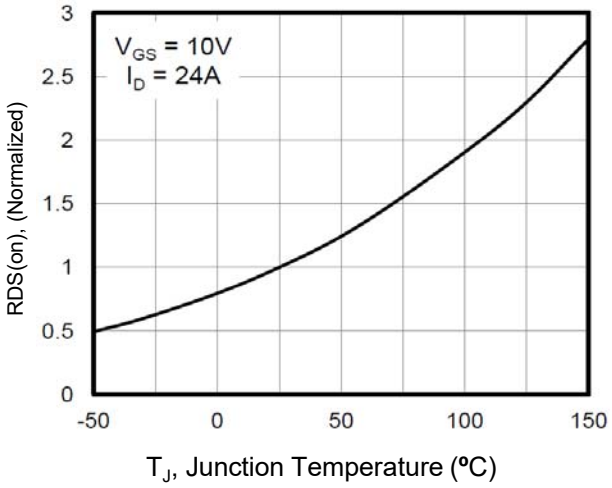



Figure 8. Breakdown voltage vs. Junction Temperature

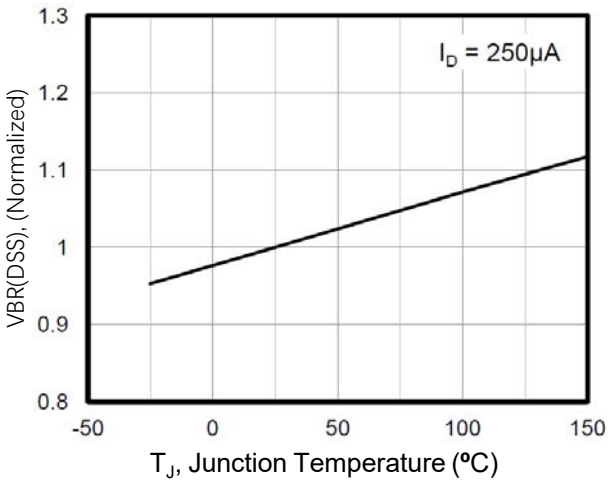



Figure 9. Transient Thermal Impedance for TO-247

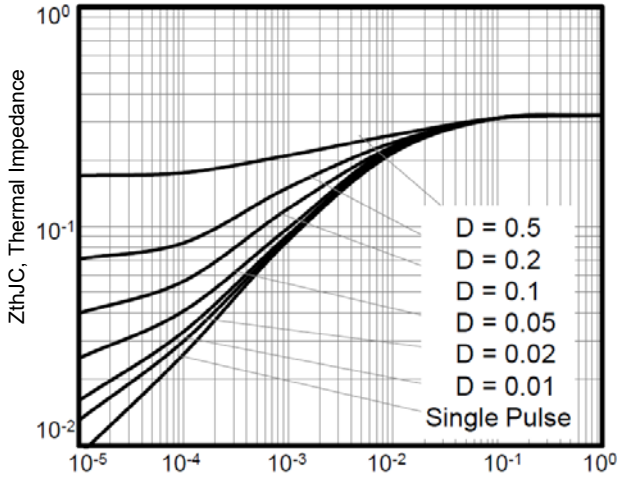
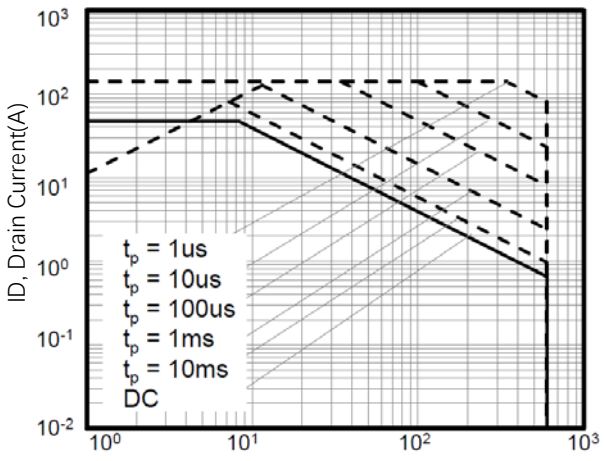



Figure 10. Safe operation area for TO-247



## ●Test Circuits & Waveforms

**Figure A：Gate Charge Test Circuit and Waveform**

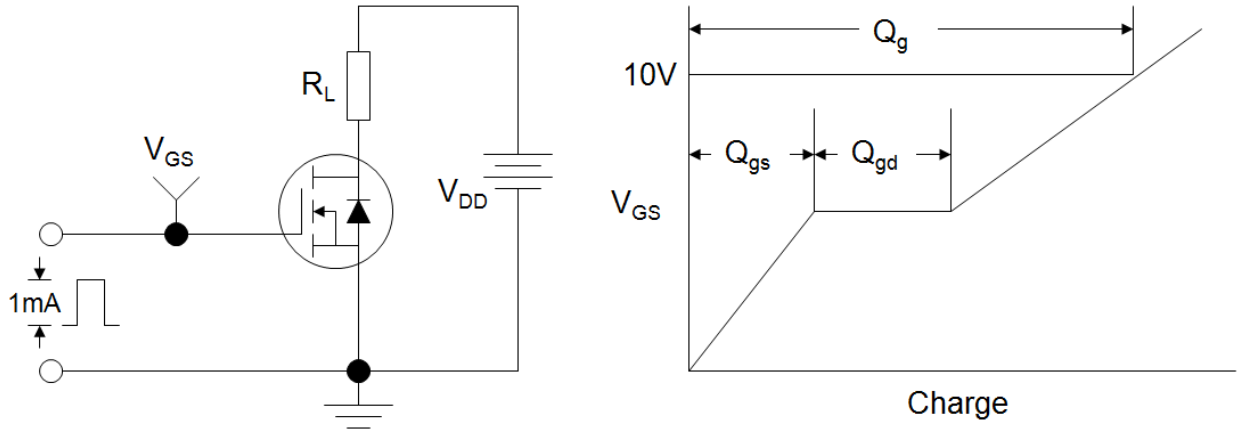



**Figure B：Resistive Switching Test Circuit and Waveform**

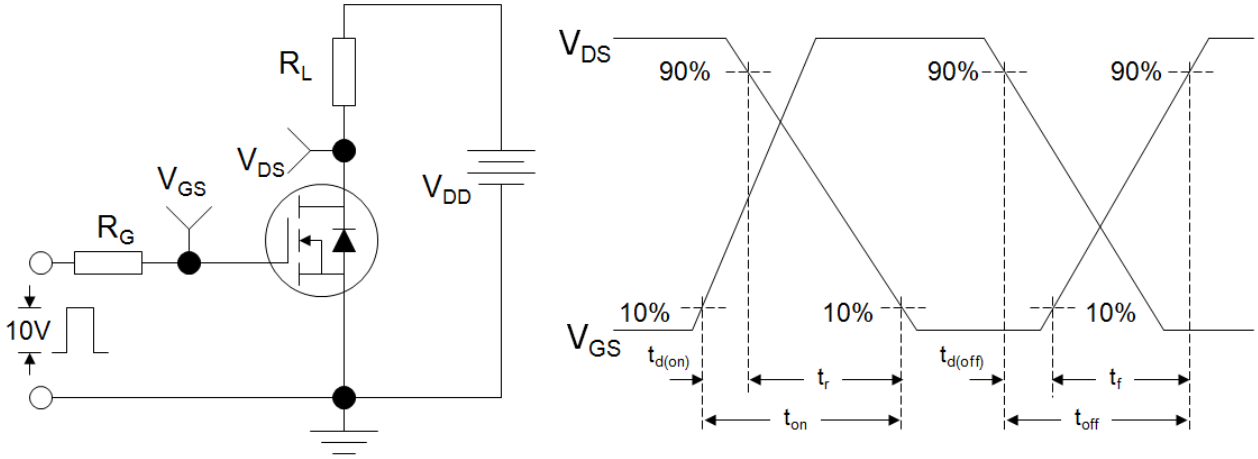
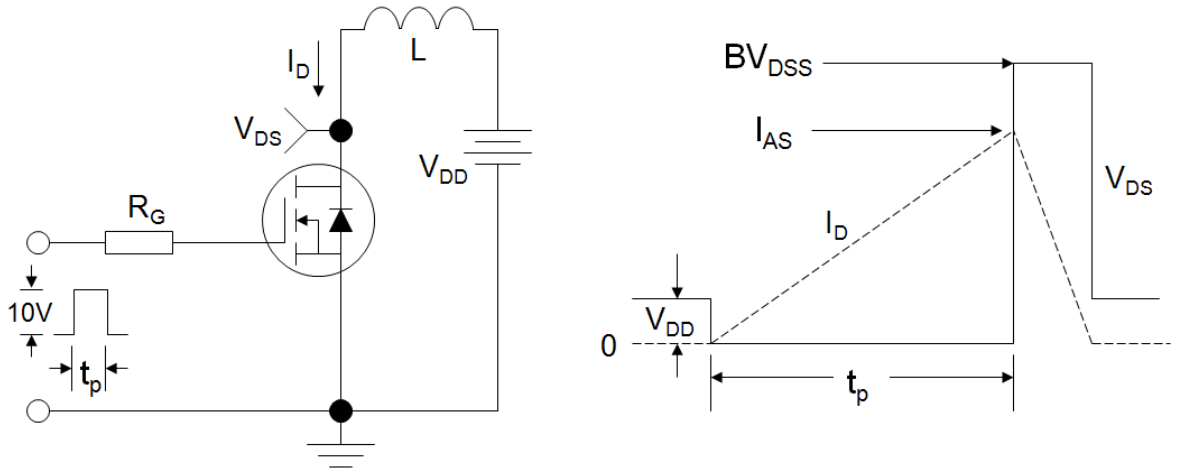



**Figure C：Unclamped Inductive Switching Test Circuit and Waveform**



## ●Dimensions（TO-247）

UNIT:mm

| SYMBOL | min | max | SYMBOL | min | max |
|---|---|---|---|---|---|
| A | 15.60 | 16.00 | G2 | 1.95 | 2.25 |
| B | 20.80 | 21.20 | N | 5.25 | 5.65 |
| C | 4.85 | 5.15 | L1 | 4.00 | 4.30 |
| D | 1.85 | 2.15 | L | 19.60 | 20.40 |
| E | 1.00 | 1.40 | I | 2.30 | 2.50 |
| F | 0.50 | 0.70 | ΦP | 3.30 | 3.70 |
| G1 | 3.00 | 3.30 | | | |