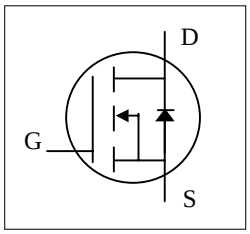
# AP01L60H/J-HF

**Halogen-Free Product**

## Advanced Power Electronics Corp.

*N-CHANNEL ENHANCEMENT MODE POWER MOSFET*

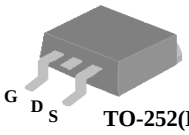
- ▼ **100% Avalanche Test**
- ▼ **Fast Switching Characteristics**
- ▼ **Simple Drive Requirement**
- ▼ **RoHS Compliant & Halogen-Free**



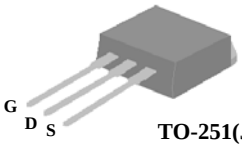

| | |
|---|---|
| $BV_{DSS}$ | 600V |
| $R_{DS(ON)}$ | 12Ω |
| $I_D$ | 1A |

## Description

The TO-252 package is widely preferred for commercial-industrial surface mount applications and suited for AC/DC converters. The through-hole version (AP01L60J) is available for low-profile applications.



TO-252(H)



TO-251(J)

## Absolute Maximum Ratings@$T_j$=25°C(unless otherwise specified)

| Symbol | Parameter | Rating | Units |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | 600 | V |
| $V_{GS}$ | Gate-Source Voltage | ±30 | V |
| $I_D$@$T_C$=25℃ | Drain Current, $V_{GS}$ @ 10V | 1 | A |
| $I_D$@$T_C$=100℃ | Drain Current, $V_{GS}$ @ 10V | 0.8 | A |
| $I_{DM}$ | Pulsed Drain Current[1] | 3 | A |
| $P_D$@$T_C$=25℃ | Total Power Dissipation | 29 | W |
| | Linear Derating Factor | 0.232 | W/℃ |
| $E_{AS}$ | Single Pulse Avalanche Energy[2] | 0.5 | mJ |
| $I_{AR}$ | Avalanche Current | 1 | A |
| $E_{AR}$ | Repetitive Avalanche Energy | 0.5 | mJ |
| $T_{STG}$ | Storage Temperature Range | -55 to 150 | ℃ |
| $T_J$ | Operating Junction Temperature Range | -55 to 150 | ℃ |

## Thermal Data

| Symbol | Parameter | Value | Units |
|---|---|---|---|
| Rthj-c | Maximum Thermal Resistance, Junction-case | 4.3 | ℃/W |
| Rthj-a | Maximum Thermal Resistance, Junction-ambient (PCB mount)[4] | 62.5 | ℃/W |
| Rthj-a | Maximum Thermal Resistance, Junction-ambient | 110 | ℃/W |

## Electrical Characteristics@$T_j$=25°C(unless otherwise specified)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V, $I_D$=1mA | 600 | - | - | V |
| $\Delta BV_{DSS}/\Delta T_j$ | Breakdown Voltage Temperature Coefficient | Reference to 25℃, $I_D$=1mA | - | 0.8 | - | V/℃ |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance[3] | $V_{GS}$=10V, $I_D$=0.5A | - | - | 12 | Ω |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$, $I_D$=250uA | 2 | - | 4 | V |
| $g_{fs}$ | Forward Transconductance | $V_{DS}$=10V, $I_D$=0.5A | - | 0.8 | - | S |
| $I_{DSS}$ | Drain-Source Leakage Current | $V_{DS}$=600V, $V_{GS}$=0V | - | - | 10 | uA |
| | Drain-Source Leakage Current ($T_j$=125°C) | $V_{DS}$=480V, $V_{GS}$=0V | - | - | 100 | uA |
| $I_{GSS}$ | Gate-Source Leakage | $V_{GS}$=±30V, $V_{DS}$=0V | - | - | ±100 | nA |
| $Q_g$ | Total Gate Charge[3] | $I_D$=1A | - | 4.0 | - | nC |
| $Q_{gs}$ | Gate-Source Charge | $V_{DS}$=480V | - | 1.0 | - | nC |
| $Q_{gd}$ | Gate-Drain ("Miller") Charge | $V_{GS}$=10V | - | 1.1 | - | nC |
| $t_{d(on)}$ | Turn-on Delay Time[3] | $V_{DD}$=300V | - | 6.6 | - | ns |
| $t_r$ | Rise Time | $I_D$=1A | - | 5.0 | - | ns |
| $t_{d(off)}$ | Turn-off Delay Time | $R_G$=3.3Ω,$V_{GS}$=10V | - | 11.7 | - | ns |
| $t_f$ | Fall Time | $R_D$=300Ω | - | 9.2 | - | ns |
| $C_{iss}$ | Input Capacitance | $V_{GS}$=0V | - | 170 | - | pF |
| $C_{oss}$ | Output Capacitance | $V_{DS}$=25V | - | 30.7 | - | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | f=1.0MHz | - | 5.1 | - | pF |

## Source-Drain Diode

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| $I_S$ | Continuous Source Current ( Body Diode ) | $V_D$=$V_G$=0V , $V_S$=1.2V | - | - | 1 | A |
| $I_{SM}$ | Pulsed Source Current ( Body Diode )[1] | | - | - | 5 | A |
| $V_{SD}$ | Forward On Voltage[3] | $T_j$=25℃, $I_S$=1A, $V_{GS}$=0V | - | - | 1.2 | V |

**Notes:**

1.Pulse width limited by Max. junction temperature.

2.Starting $T_j$=25°C , $V_{DD}$=50V , L=1.0mH , $R_G$=25Ω , $I_{AS}$=1.0A.

3.Pulse test

4.Surface mounted on 1 $in^2$ copper pad of FR4 board

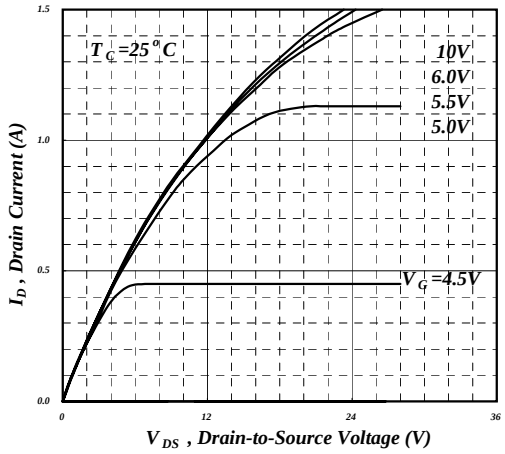



**Fig 1. Typical Output Characteristics**

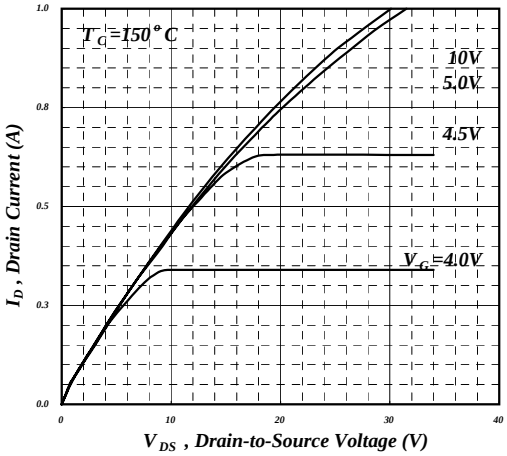



**Fig 2. Typical Output Characteristics**

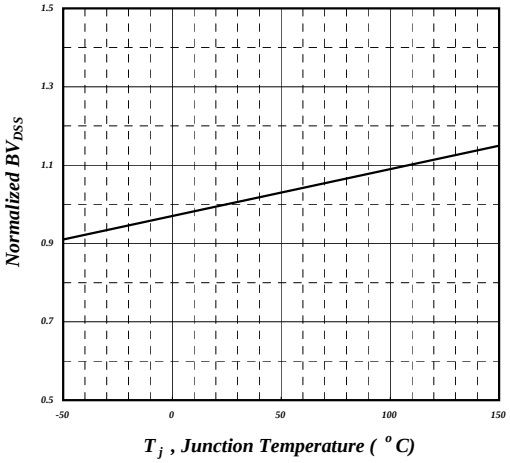



**Fig 3. Normalized $BV_{DSS}$ v.s. Junction Temperature**

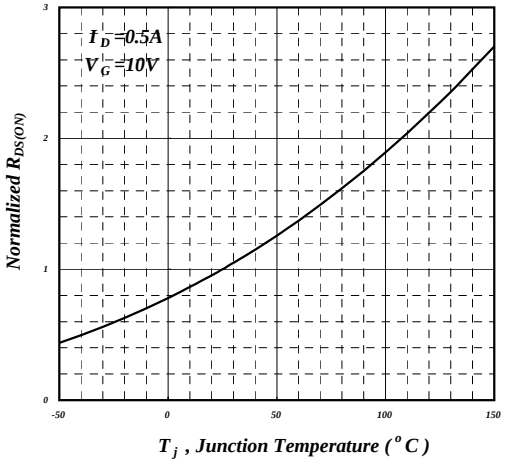



**Fig 4. Normalized On-Resistance v.s. Junction Temperature**

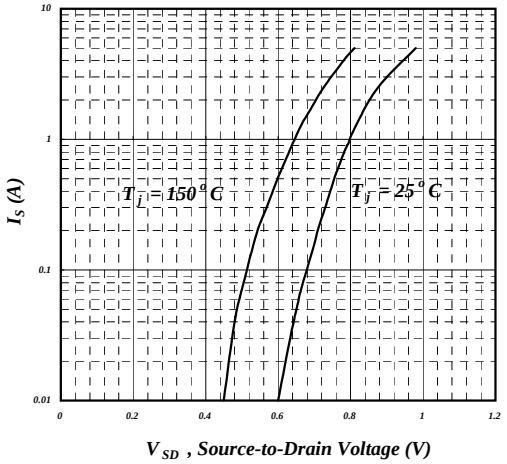



**Fig 5. Forward Characteristic of Reverse Diode**

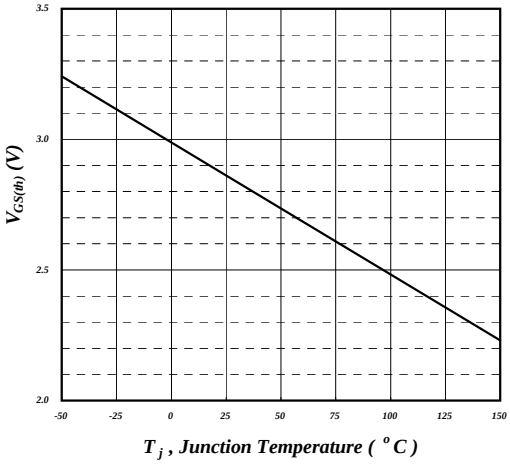



**Fig 6. Gate Threshold Voltage v.s. Junction Temperature**

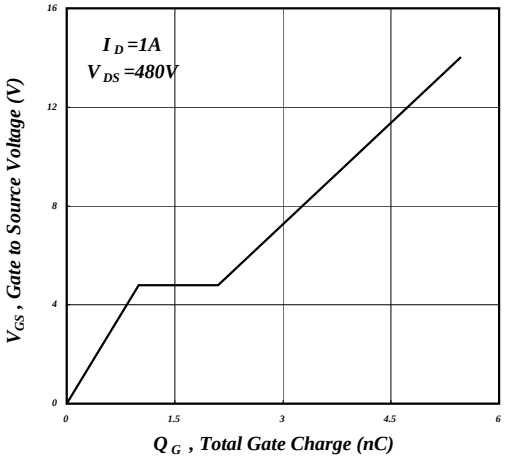



Fig 7. Gate Charge Characteristics

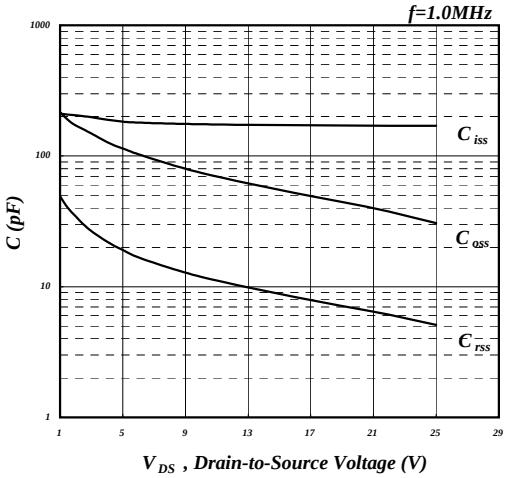



Fig 8. Typical Capacitance Characteristics

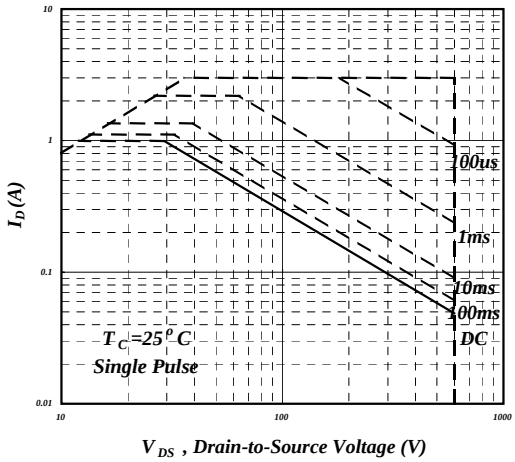



Fig 9. Maximum Safe Operating Area

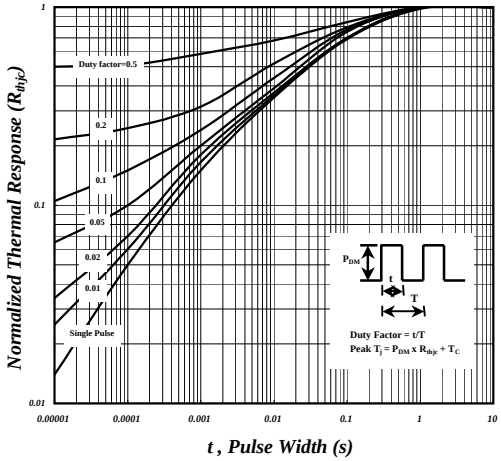



Fig 10. Effective Transient Thermal Impedance

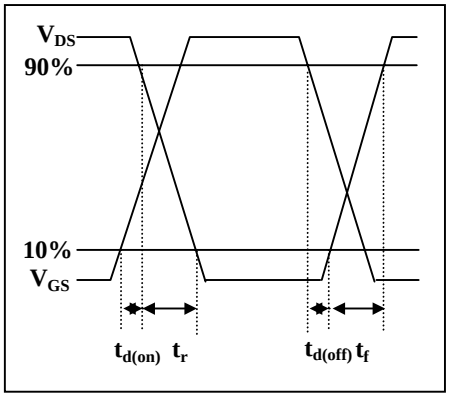



Fig 11. Switching Time Waveform

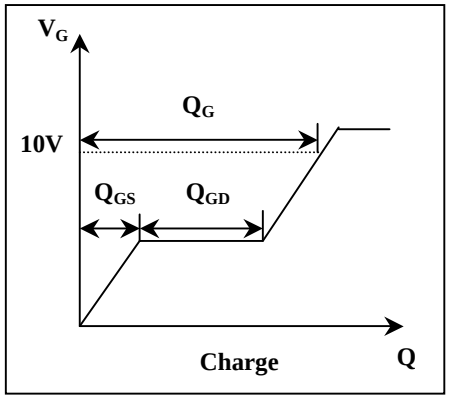
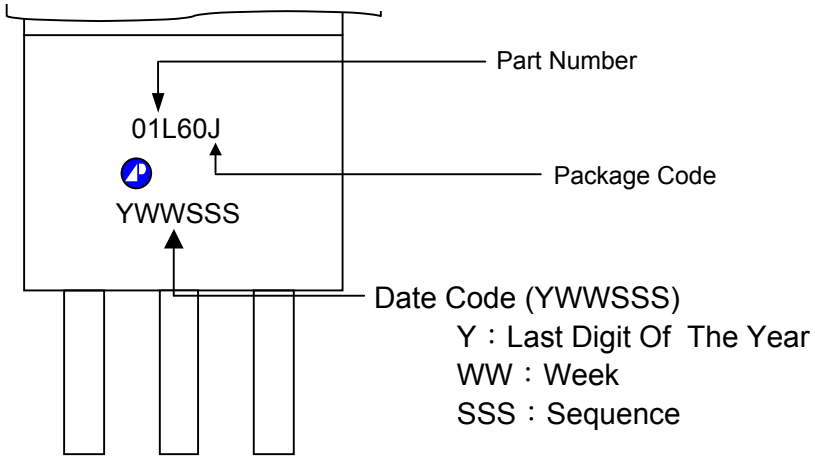



Fig 12. Gate Charge Waveform

# MARKING INFORMATION

**TO-251**

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