

# AP01L60H/J-HF

**Halogen-Free Product**

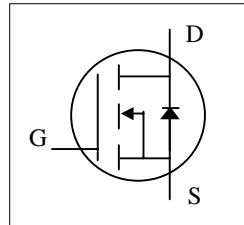


**Advanced Power  
Electronics Corp.**

*N-CHANNEL ENHANCEMENT MODE*

*POWER MOSFET*

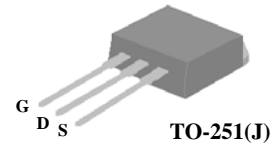
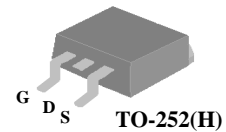
- ▼ 100% Avalanche Test
- ▼ Fast Switching Characteristics
- ▼ Simple Drive Requirement
- ▼ RoHS Compliant & Halogen-Free



$BV_{DSS}$	600V
$R_{DS(ON)}$	12 $\Omega$
$I_D$	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.



## Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	600	V
$V_{GS}$	Gate-Source Voltage	$\pm 30$	V
$I_D@T_C=25^\circ C$	Continuous Drain Current, $V_{GS}$ @ 10V	1	A
$I_D@T_C=100^\circ C$	Continuous Drain Current, $V_{GS}$ @ 10V	0.8	A
$I_{DM}$	Pulsed Drain Current <sup>1</sup>	3	A
$P_D@T_C=25^\circ C$	Total Power Dissipation	29	W
	Linear Derating Factor	0.232	W/ $^\circ C$
$E_{AS}$	Single Pulse Avalanche Energy <sup>2</sup>	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	$^\circ C$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ C$

## Thermal Data

Symbol	Parameter	Value	Units
Rthj-c	Maximum Thermal Resistance, Junction-case	4.3	$^\circ C/W$
Rthj-a	Maximum Thermal Resistance, Junction-ambient (PCB mount) <sup>4</sup>	62.5	$^\circ C/W$
Rthj-a	Maximum Thermal Resistance, Junction-ambient	110	$^\circ C/W$



# AP01L60H/J-HF

## Electrical Characteristics @ $T_j=25^{\circ}\text{C}$ (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 $25^{\circ}\text{C}, I_D=1mA$	-	0.8	-	$V/^{\circ}\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance <sup>3</sup>	$V_{GS}=10V, I_D=0.5A$	-	-	12	$\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	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	$\mu A$
	Drain-Source Leakage Current ( $T_j=125^{\circ}\text{C}$ )	$V_{DS}=480V, V_{GS}=0V$	-	-	100	$\mu A$
$I_{GSS}$	Gate-Source Leakage	$V_{GS}=\pm 30V, V_{DS}=0V$	-	-	$\pm 100$	nA
$Q_g$	Total Gate Charge <sup>3</sup>	$I_D=1A$	-	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 <sup>3</sup>	$V_{DD}=300V$	-	6.6	-	ns
$t_r$	Rise Time	$I_D=1A$	-	5.0	-	ns
$t_{d(off)}$	Turn-off Delay Time	$R_G=3.3\Omega, V_{GS}=10V$	-	11.7	-	ns
$t_f$	Fall Time	$R_D=300\Omega$	-	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 ) <sup>1</sup>		-	-	5	A
$V_{SD}$	Forward On Voltage <sup>3</sup>	$T_j=25^{\circ}\text{C}, I_S=1A, V_{GS}=0V$	-	-	1.2	V

### Notes:

1. Pulse width limited by Max. junction temperature.
2. Starting  $T_j=25^{\circ}\text{C}$ ,  $V_{DD}=50V$ ,  $L=1.0mH$ ,  $R_G=25\Omega$ ,  $I_{AS}=1.0A$ .
3. Pulse test
4. Surface mounted on 1 in<sup>2</sup> copper pad of FR4 board

THIS PRODUCT IS SENSITIVE TO ELECTROSTATIC DISCHARGE, PLEASE HANDLE WITH CAUTION.

USE OF THIS PRODUCT AS A CRITICAL COMPONENT IN LIFE SUPPORT OR OTHER SIMILAR SYSTEMS IS NOT AUTHORIZED.

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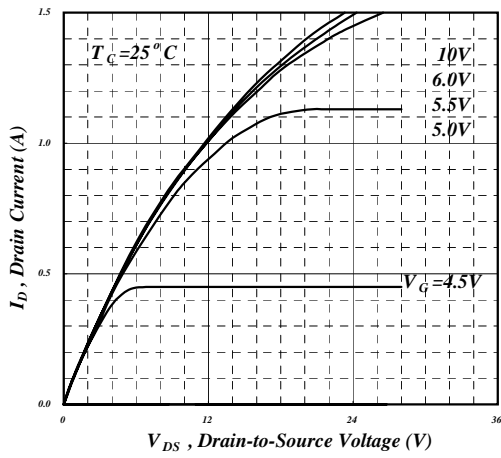


Fig 1. Typical Output Characteristics

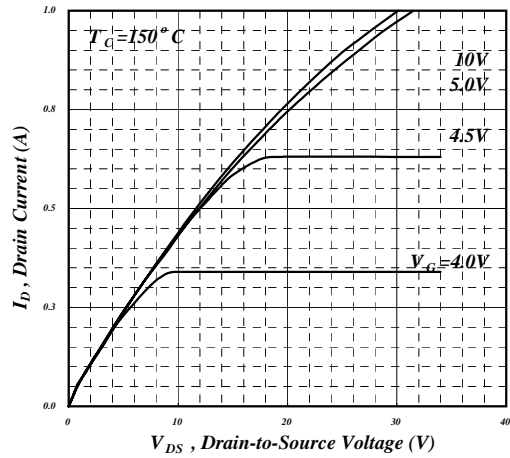


Fig 2. Typical Output Characteristics

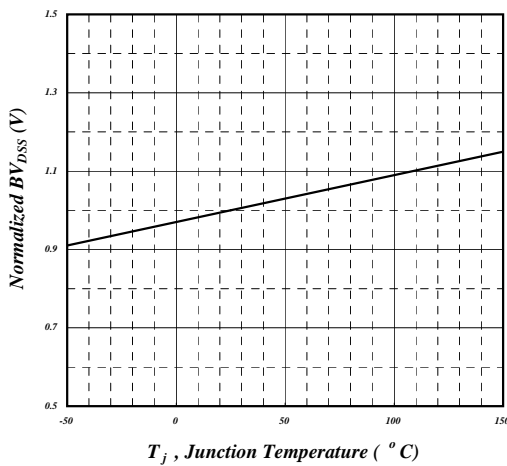


Fig 3. Normalized  $BV_{DSS}$  v.s. Junction Temperature

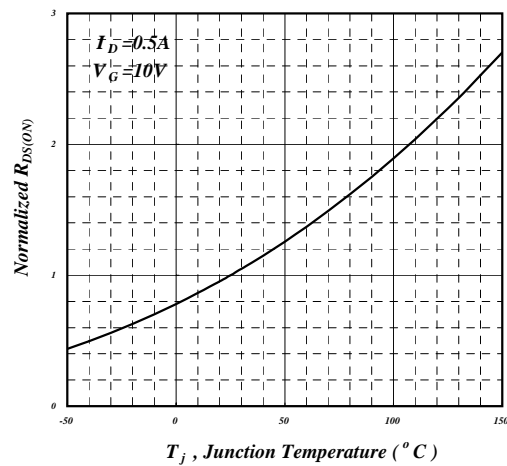


Fig 4. Normalized On-Resistance v.s. Junction Temperature

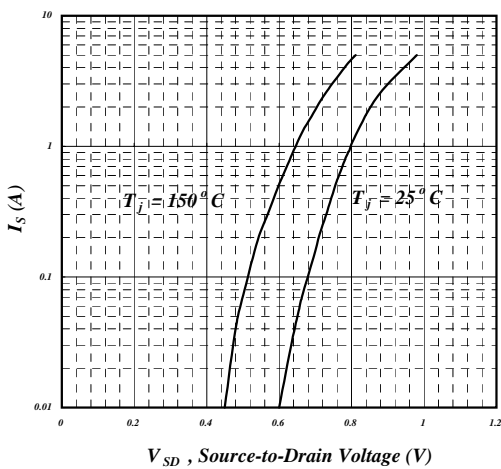


Fig 5. Forward Characteristic of Reverse Diode

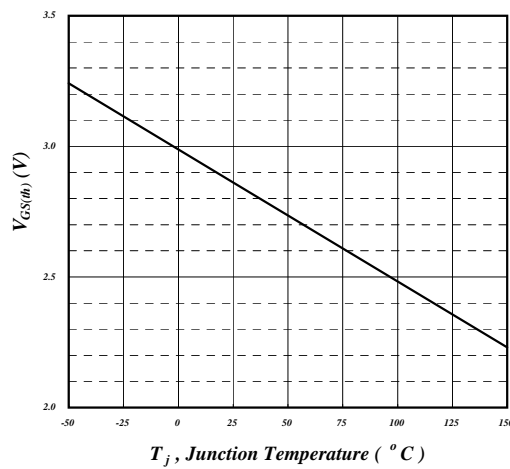


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

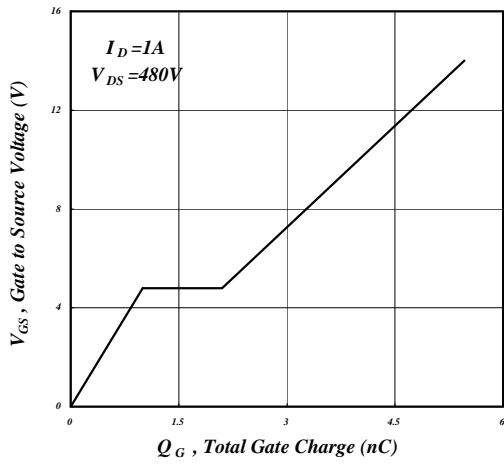


Fig 7. Gate Charge Characteristics

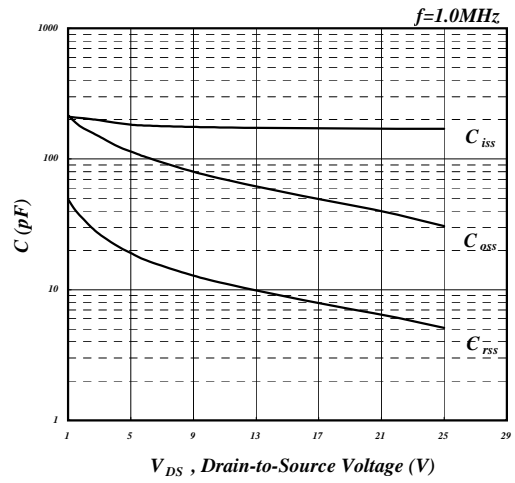


Fig 8. Typical Capacitance Characteristics

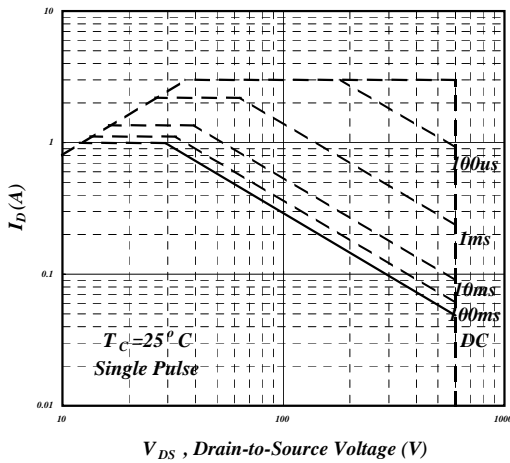


Fig 9. Maximum Safe Operating Area

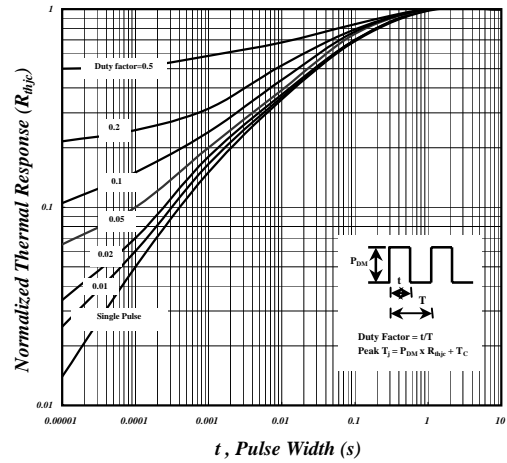


Fig 10. Effective Transient Thermal Impedance

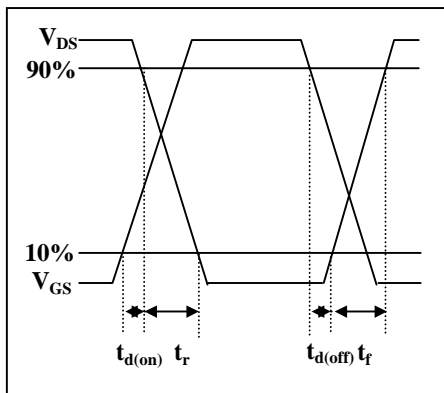


Fig 11. Switching Time Waveform

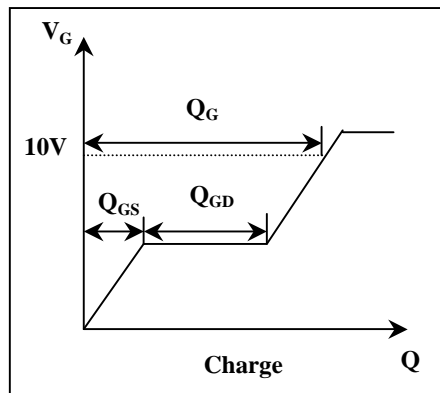


Fig 12. Gate Charge Waveform