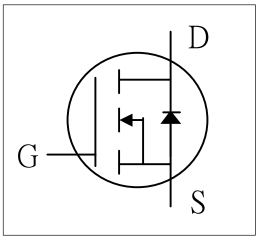
AP09N70I-A-HF

Halogen-Free Product

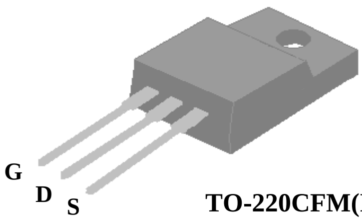
Advanced Power Electronics Corp.

N-CHANNEL ENHANCEMENT MODE POWER MOSFET

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



BV_{DSS}	650V
$R_{DS(ON)}$	0.75Ω
I_D [4]	9A



TO-220CFM(I)

Description

AP09N70 series are from Advanced Power innovated design and silicon process technology to achieve the lowest possible on-resistance and fast switching performance. It provides the designer with an extreme efficient device for use in a wide range of power applications.

The TO-220CFM package is widely preferred for all commercial-industrial through hole applications. The mold compound provides a high isolation voltage capability and low thermal resistance between the tab and the external heat-sink.

Absolute Maximum Ratings@T_j=25^{o}C(unless otherwise specified)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	650	V
V_{GS}	Gate-Source Voltage	±30	V
I_D@T_C=25℃	Drain Current, V_{GS} @ 10V[4]	9	A
I_D@T_C=100℃	Drain Current, V_{GS} @ 10V[4]	5	A
I_{DM}	Pulsed Drain Current[1]	40	A
P_D@T_C=25℃	Total Power Dissipation	42	W
	Linear Derating Factor	0.34	W/℃
E_{AS}	Single Pulse Avalanche Energy[2]	40.5	mJ
I_{AR}	Avalanche Current	9	A
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	3	℃/W
Rthj-a	Maximum Thermal Resistance, Junction-ambient	65	℃/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	650	-	-	V
$\Delta BV_{DSS}/\Delta T_j$	Breakdown Voltage Temperature Coefficient	Reference to 25℃, I_D=1mA	-	0.6	-	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance[3]	V_{GS}=10V, I_D=4.5A	-	-	0.75	Ω
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$, I_D=250uA	2	-	4	V
g_{fs}	Forward Transconductance	V_{DS}=50V, I_D=4.5A	-	4.5	-	S
I_{DSS}	Drain-Source Leakage Current	V_{DS}=480V, V_{GS}=0V	-	-	100	uA
I_{GSS}	Gate-Source Leakage	$V_{GS}=\pm$30V, V_{DS}=0V	-	-	$\pm$100	nA
Q_g	Total Gate Charge	I_D=9A	-	44	-	nC
Q_{gs}	Gate-Source Charge	V_{DS}=480V	-	11	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	V_{GS}=10V	-	12	-	nC
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=300V	-	19	-	ns
t_r	Rise Time	I_D=9A	-	21	-	ns
$t_{d(off)}$	Turn-off Delay Time	R_G=10Ω	-	56	-	ns
t_f	Fall Time	V_{GS}=10V	-	24	-	ns
C_{iss}	Input Capacitance	V_{GS}=0V	-	2660	-	pF
C_{oss}	Output Capacitance	V_{DS}=25V	-	170	-	pF
C_{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	10	-	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=1.5V	-	-	9	A
I_{SM}	Pulsed Source Current (Body Diode)[1]		-	-	40	A
V_{SD}	Forward On Voltage[3]	T_j=25℃, I_S=9A, V_{GS}=0V	-	-	1.5	V

Notes:

1.Pulse width limited by Max. junction temperature.

2.Starting T_j=25°C , V_{DD}=50V , L=1mH , R_G=25Ω , I_{AS}=9A.

3.Pulse test

4.Ensure that the junction temperature does not exceed T_{Jmax}.

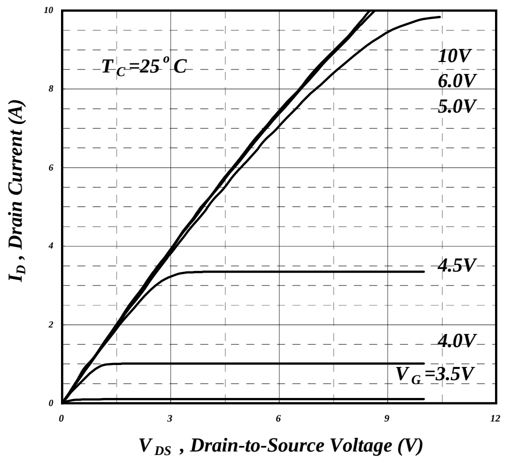


Fig 1. Typical Output Characteristics

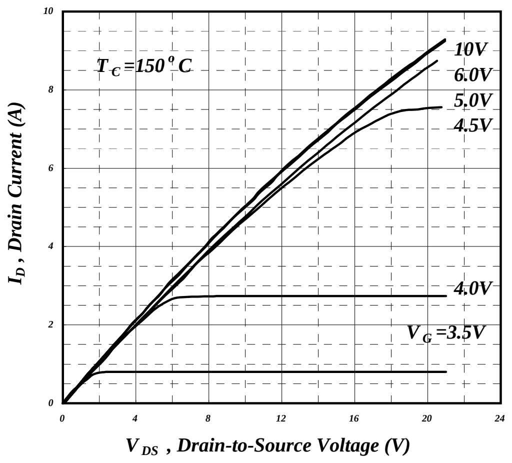


Fig 2. Typical Output Characteristics

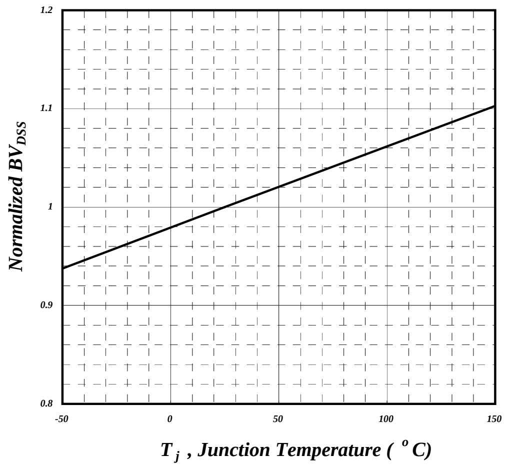


Fig 3. Normalized BV_{DSS} v.s. Junction Temperature

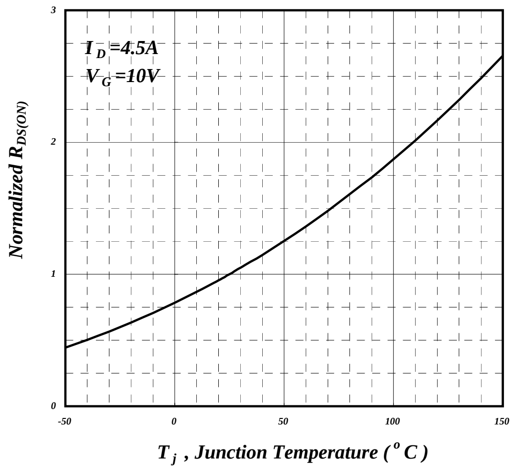


Fig 4. Normalized On-Resistance v.s. Junction Temperature

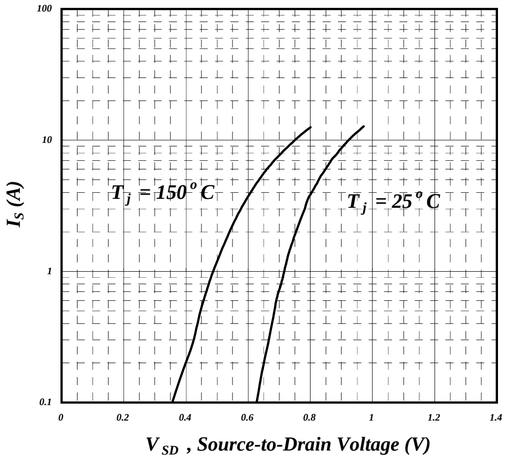


Fig 5. Forward Characteristic of Reverse Diode

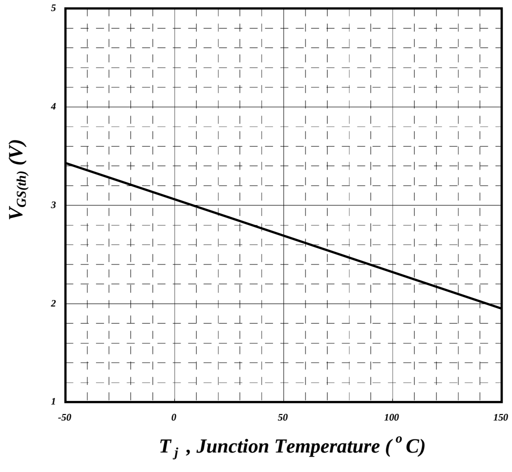


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

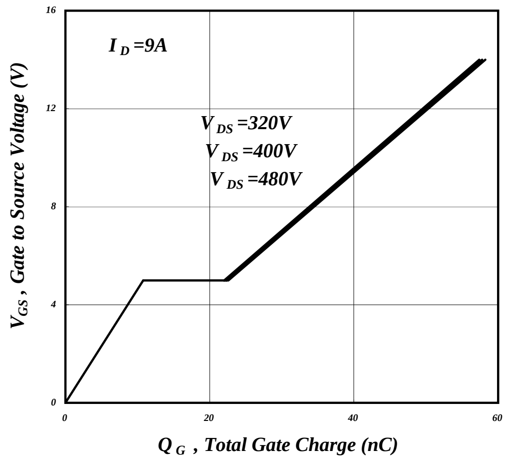


Fig 7. Gate Charge Characteristics

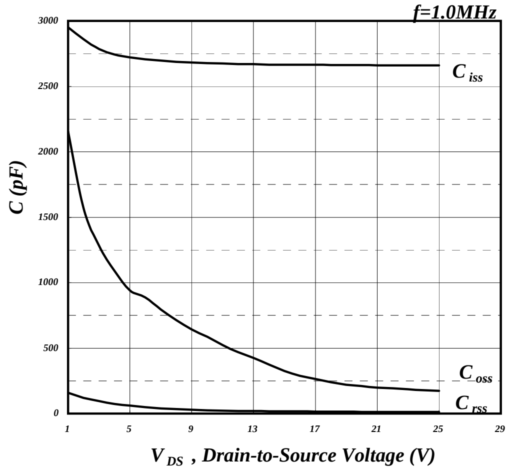


Fig 8. Typical Capacitance Characteristics

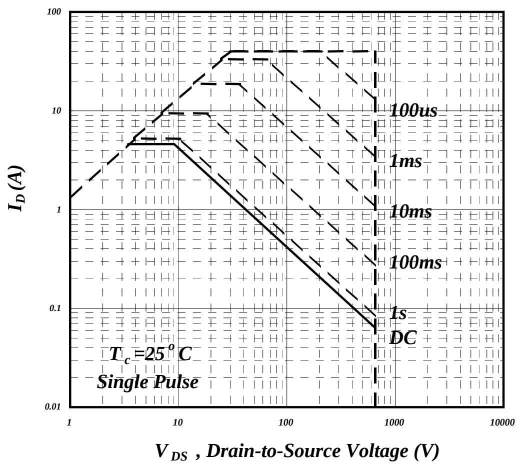


Fig 9. Maximum Safe Operating Area

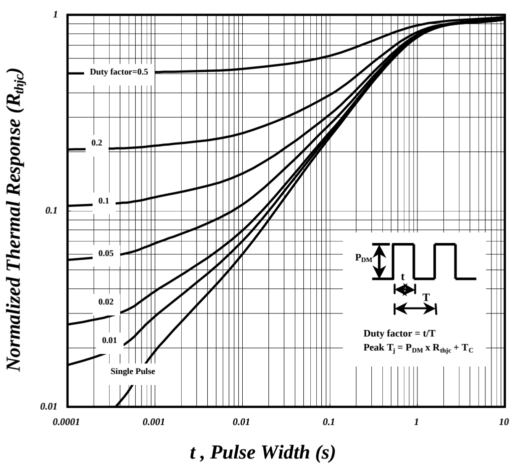


Fig 10. Effective Transient Thermal Impedance

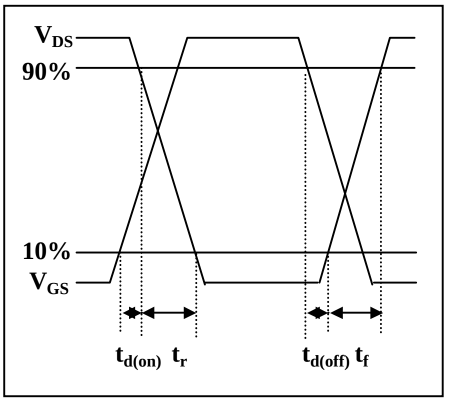


Fig 11. Switching Time Waveform

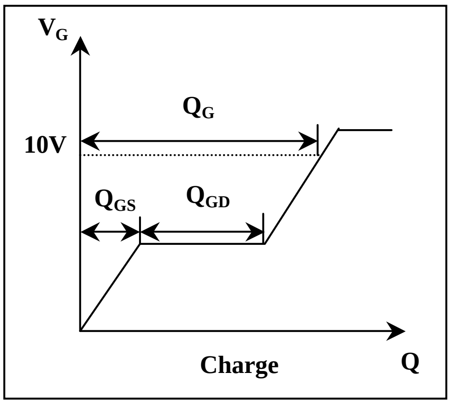


Fig 12. Gate Charge Waveform

MARKING INFORMATION