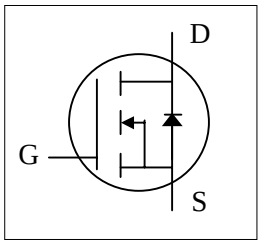
AP09N20H/J-HF

Halogen-Free Product

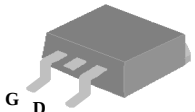
Advanced Power Electronics Corp.

N-CHANNEL ENHANCEMENT MODE POWER MOSFET

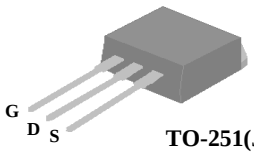
- ▼ **Simple Drive Requirement**
- ▼ **Low On-resistance**
- ▼ **Fast Switching Characteristics**
- ▼ **RoHS Compliant**



BV_{DSS}	200V
$R_{DS(ON)}$	380mΩ
I_D	8.6A



TO-252(H)



TO-251(J)

Description

AP09N20 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-252 package is widely preferred for all commercial-industrial surface mount applications using infrared reflow technique and suited for high current application due to the low connection resistance. The through-hole version (AP09N20J) are available for low-profile applications.

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	200	V
V_{GS}	Gate-Source Voltage	±30	V
I_D@T_C=25℃	Drain Current, V_{GS} @ 10V	8.6	A
I_D@T_C=100℃	Drain Current, V_{GS} @ 10V	5.5	A
I_{DM}	Pulsed Drain Current[1]	36	A
P_D@T_C=25℃	Total Power Dissipation	69	W
	Linear Derating Factor	0.55	W/℃
E_{AS}	Single Pulse Avalanche Energy[2]	40	mJ
I_{AR}	Avalanche Current	8.6	A
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter	Value	Unit
Rthj-c	Maximum Thermal Resistance, Junction-case	1.8	℃/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	200	-	-	V
$\Delta BV_{DSS}/\Delta T_j$	Breakdown Voltage Temperature Coefficient	Reference to 25℃, I_D=1mA	-	0.24	-	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=5A	-	-	380	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250uA	2	-	4	V
g_{fs}	Forward Transconductance	V_{DS}=10V, I_D=5A	-	3.7	-	S
I_{DSS}	Drain-Source Leakage Current	V_{DS}=200V, V_{GS}=0V	-	-	10	uA
	Drain-Source Leakage Current (T_j=125°C)	V_{DS}=160V, 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=8.6A	-	23	37	nC
Q_{gs}	Gate-Source Charge	V_{DS}=160V	-	4	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	V_{GS}=10V	-	13	-	nC
$t_{d(on)}$	Turn-on Delay Time[3]	V_{DD}=100V	-	12	-	ns
t_r	Rise Time	I_D=8.6A	-	25	-	ns
$t_{d(off)}$	Turn-off Delay Time	R_G=10Ω	-	36	-	ns
t_f	Fall Time	V_{GS}=10V	-	16	-	ns
C_{iss}	Input Capacitance	V_{GS}=0V	-	500	800	pF
C_{oss}	Output Capacitance	V_{DS}=25V	-	90	-	pF
C_{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	40	-	pF

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward On Voltage[3]	I_S=8.6A, V_{GS}=0V	-	-	1.3	V
t_{rr}	Reverse Recovery Time	I_S=8.6A, V_{GS}=0V,	-	225	-	ns
Q_{rr}	Reverse Recovery Charge	dI/dt=100A/μs	-	2260	-	nC

Notes:

1.Pulse width limited by safe operating area.

2.Starting T_j=25°C , V_{DD}=50V , L=1mH , R_G=25Ω , I_{AS}=8.6A.

3.Pulse width ≤300us , duty cycle ≤2%.

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

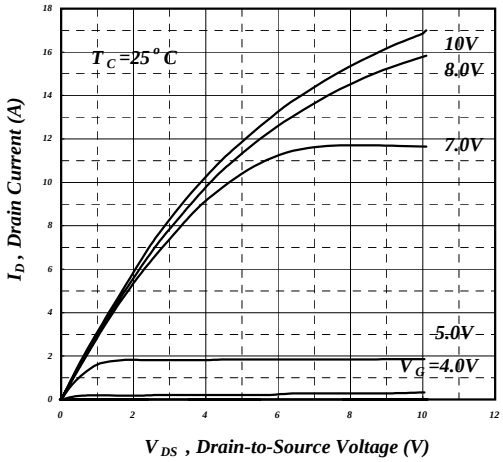


Fig 1. Typical Output Characteristics

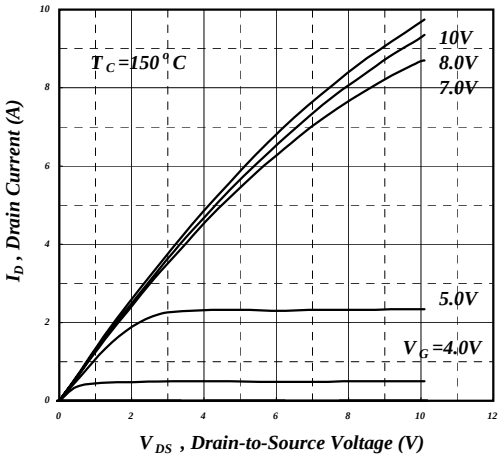


Fig 2. Typical Output Characteristics

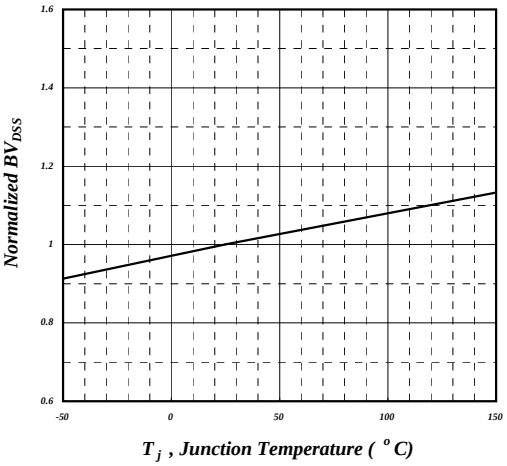


Fig 3. Normalized BV_{DSS} v.s. Junction Temperature

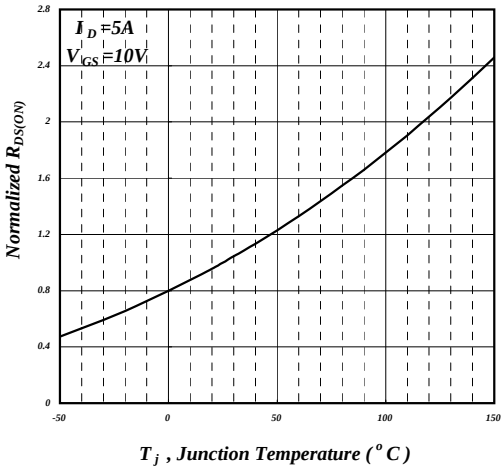


Fig 4. Normalized On-Resistance v.s. Junction Temperature

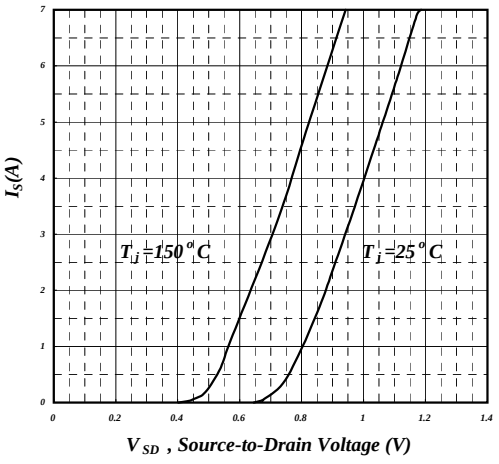


Fig 5. Forward Characteristic of Reverse Diode

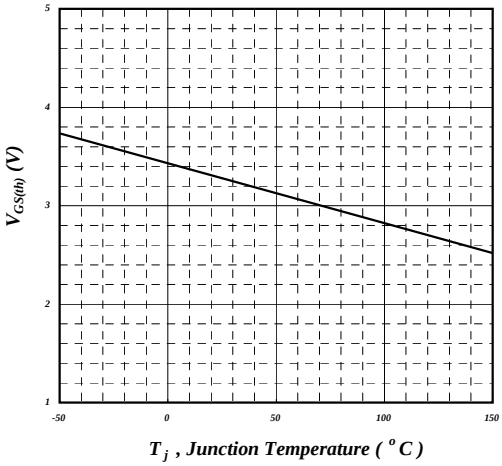


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

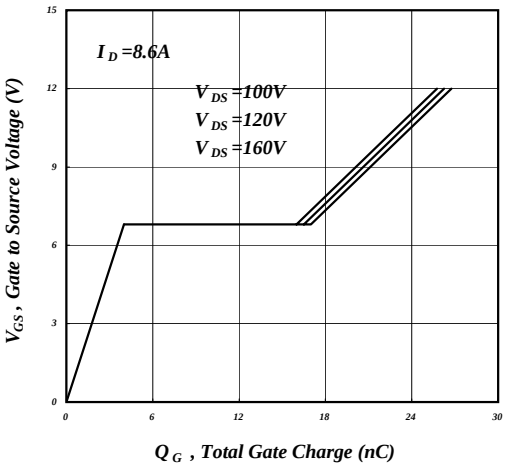


Fig 7. Gate Charge Characteristics

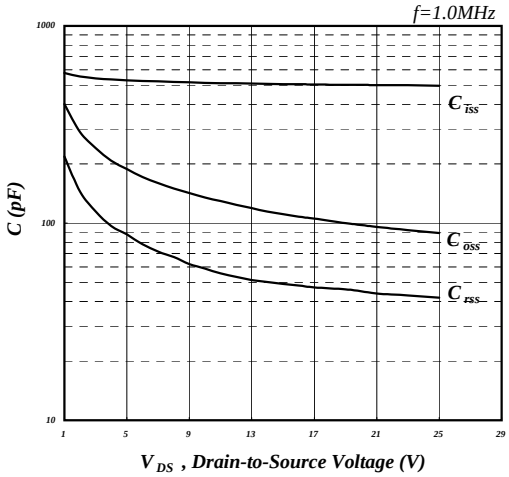


Fig 8. Typical Capacitance Characteristics

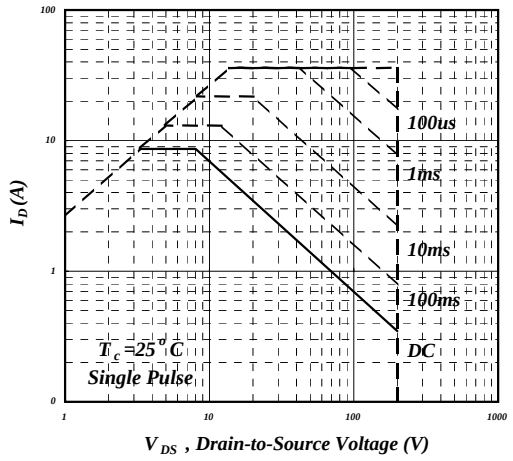


Fig 9. Maximum Safe Operating Area

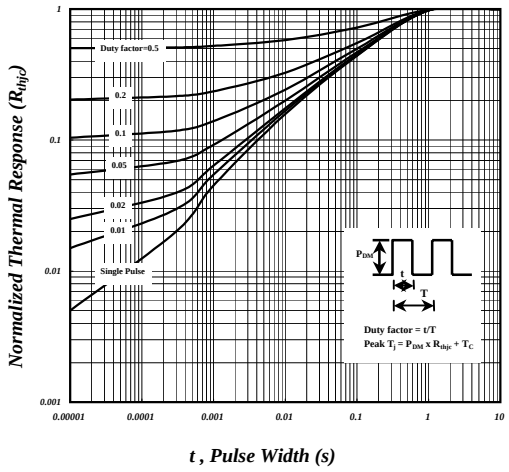


Fig10. Effective Transient Thermal Impedance

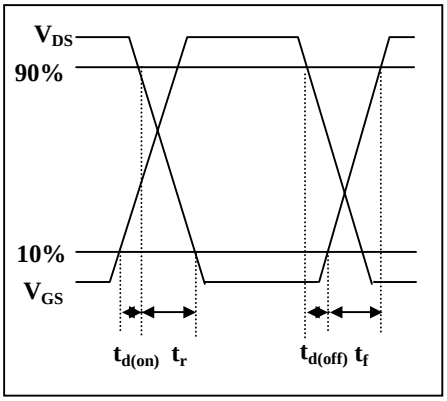


Fig 11. Switching Time Waveform

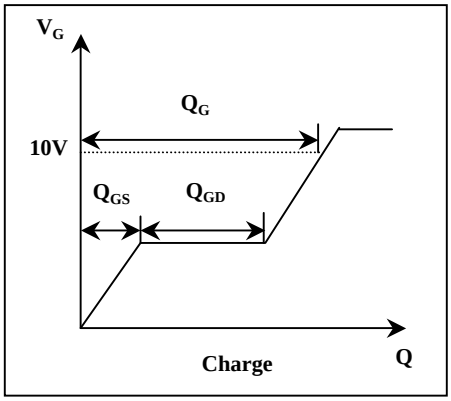
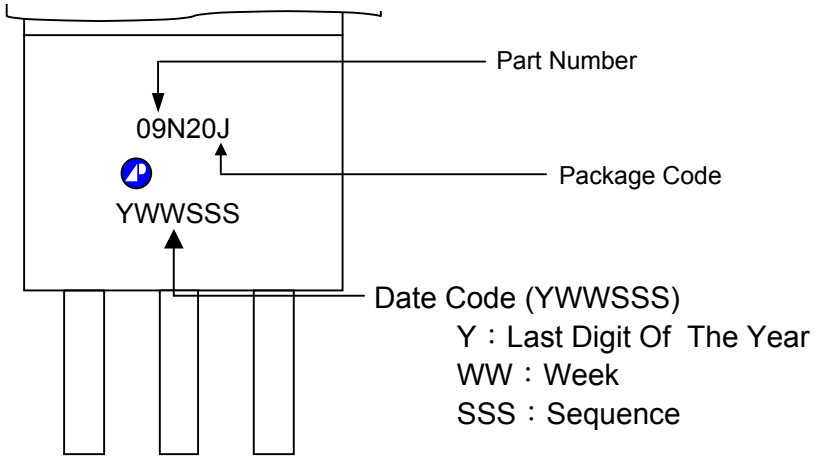


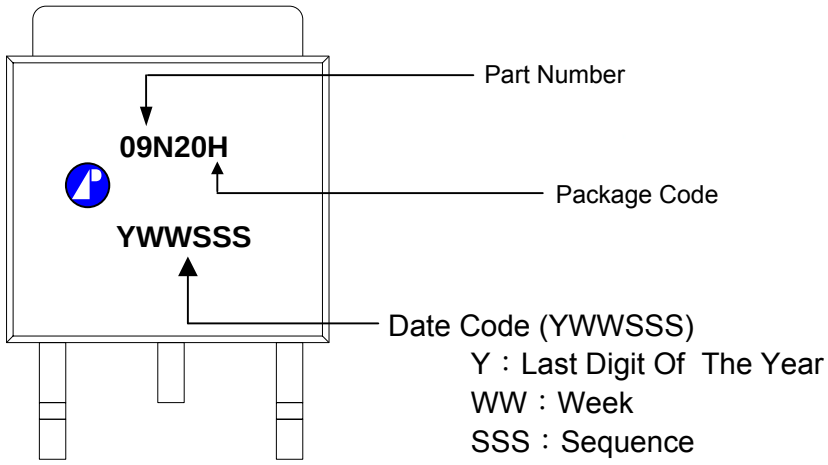
Fig 12. Gate Charge Waveform

MARKING INFORMATION

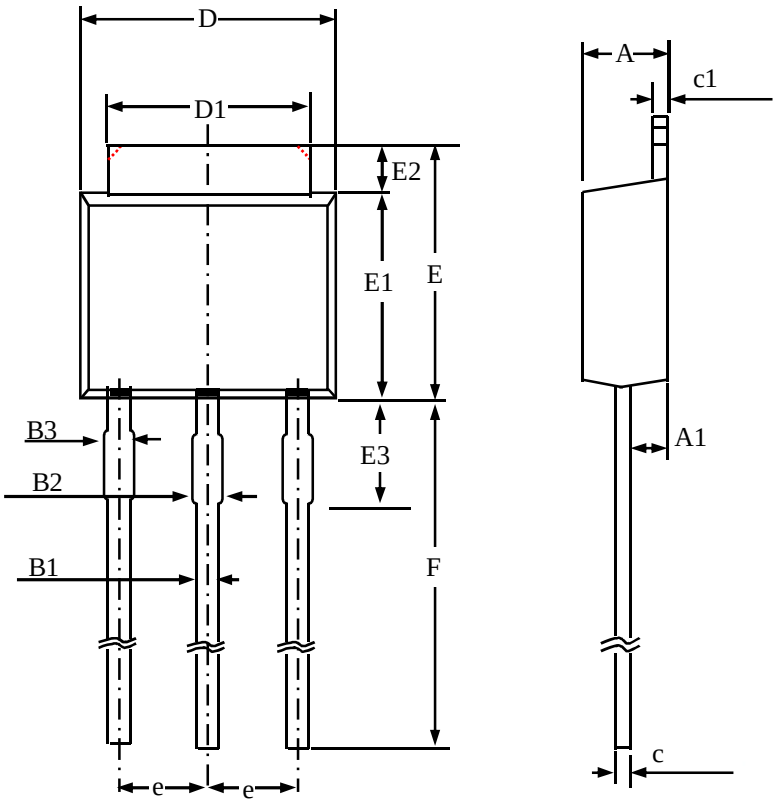
TO-251



TO-252



Package Outline : TO-251



SYMBOLS	Millimeters		
	MIN	NOM	MAX
A	2.10	2.30	2.50
A1	0.80	1.15	1.50
B1	0.40	0.70	1.00
B2	0.60	0.88	1.15
B3	0.50	0.83	1.15
c	0.30	0.50	0.70
c1	0.30	0.50	0.70
D	6.30	6.55	6.80
D1	4.80	5.20	5.60
E	6.70	7.10	7.50
E1	5.30	5.80	6.30
E2	0.50	1.10	1.70
E3	1.30	1.80	2.30
e	----	2.30	----
F	7.00	8.33	9.65

1.All Dimensions Are in Millimeters.

2.Dimension Does Not Include Mold Protrusions.

Draw No. M1-J3-G-v05-1

TO-251 FOOTPRINT：