Advanced Power Electronics Corp.

N-CHANNEL ENHANCEMENT MODE

POWER MOSFET

▼ **Simple Drive Requirement**
▼ **Low On-resistance**
▼ **Fast Switching Characteristics**
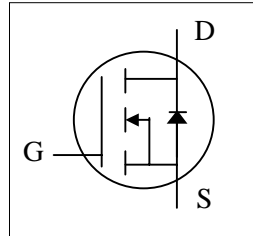
BV_{DSS}	200V
$R_{DS(ON)}$	380mΩ
I_D	8.6A

D

G

S

Description

The Advanced Power MOSFETs from APEC provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

The TO-252 package is universally preferred for all commercial-industrial applications at power dissipation levels to approximately 50 watts. The through-hole version (AP09N20J) is available for low-profile applications.

G D S **TO-252(H)**

G D S **TO-251(J)**
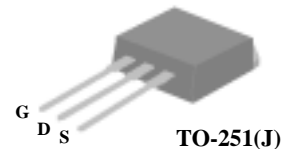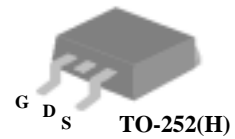
Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	200	V
V_{GS}	Gate-Source Voltage	$\pm$ 30	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V	8.6	A
I_D@T_C=100℃	Continuous 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	Thermal Resistance Junction-case	Max.	1.8	℃/W
Rthj-a	Thermal Resistance Junction-ambient	Max.	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 (T$_j$=25°C)	V$_{DS}$=200V, V$_{GS}$=0V	-	-	10	uA
	Drain-Source Leakage Current (T$_j$=150°C)	V$_{DS}$=160V, V$_{GS}$=0V	-	-	100	uA
I$_{GSS}$	Gate-Source Leakage	V$_{GS}$=$\pm$30V	-	-	±100	nA
Q$_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	-	74	-	ns
t$_{d(off)}$	Turn-off Delay Time	R$_G$=10Ω,V$_{GS}$=10V	-	36	-	ns
t$_f$	Fall Time	R$_D$=11.6Ω	-	44	-	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.

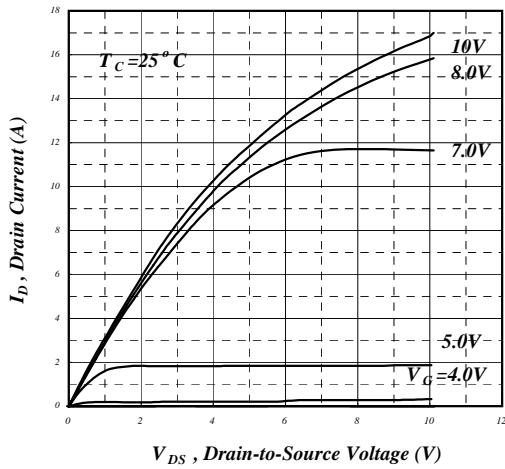3.Pulse width $\leq$300us , duty cycle $\leq$2%.

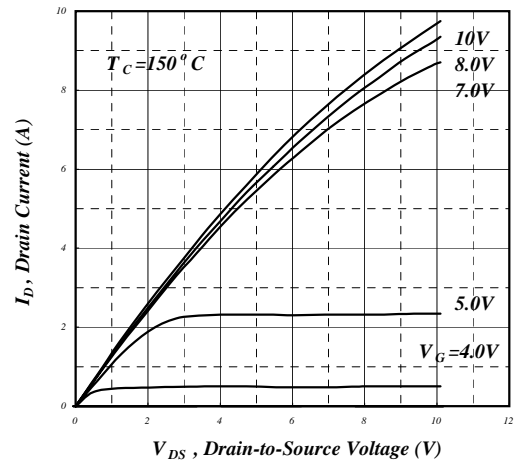**Fig 1. Typical Output Characteristics**

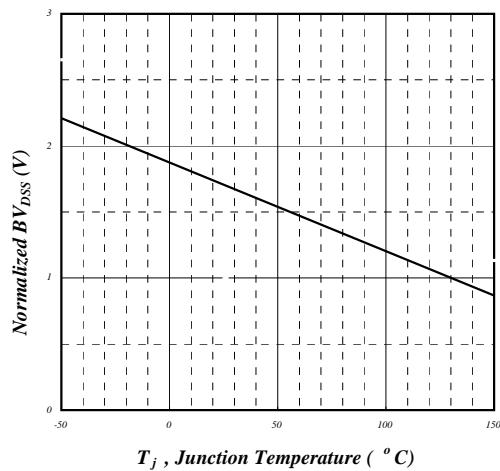**Fig 2. Typical Output Characteristics**

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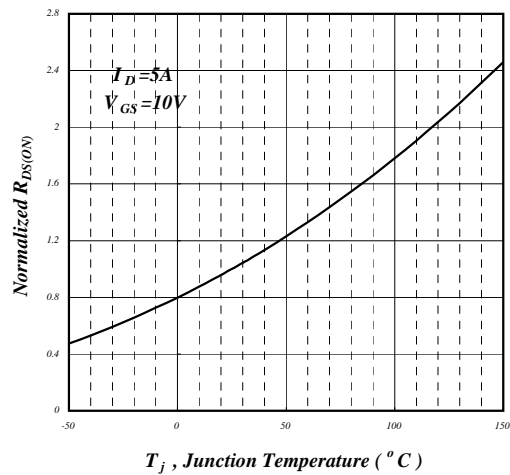

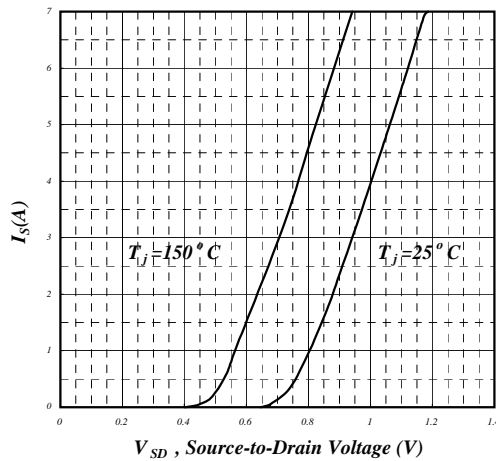**Fig 4. Normalized On-Resistance v.s. Junction Temperature**

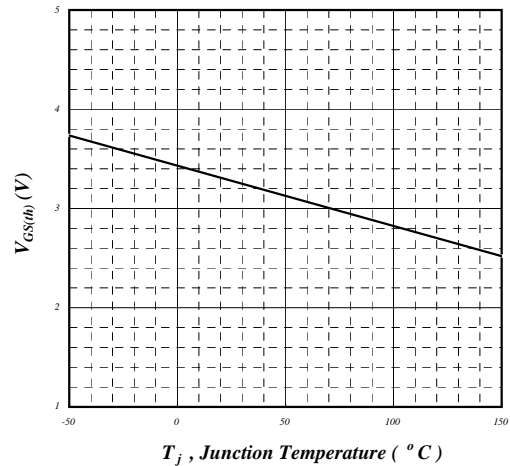**Fig 5. Forward Characteristic of Reverse Diode**

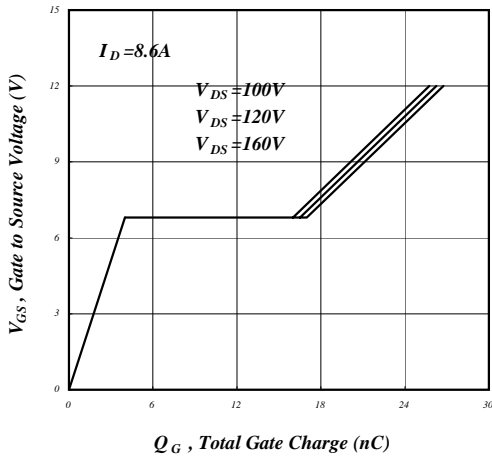**Fig 6. Gate Threshold Voltage v.s. Junction Temperature**

Fig 7. Gate Charge Characteristics

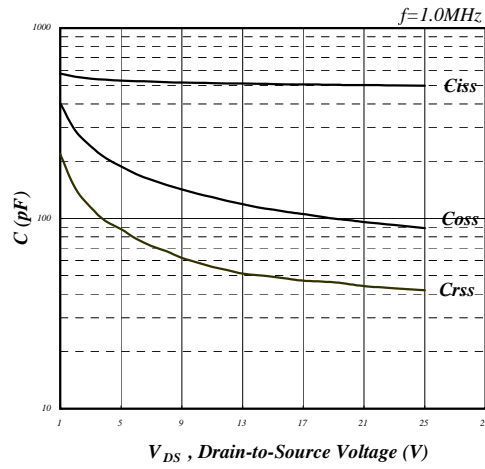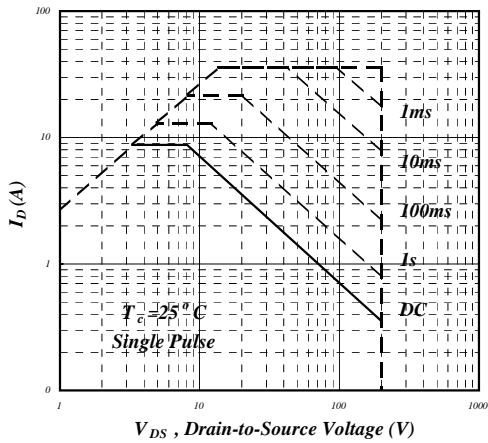Fig 8. Typical Capacitance Characteristics
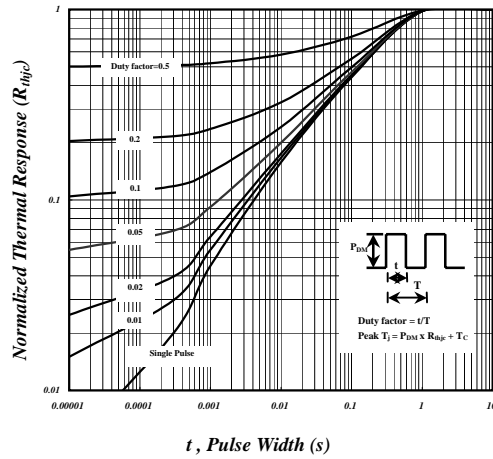

Fig 9. Maximum Safe Operating Area
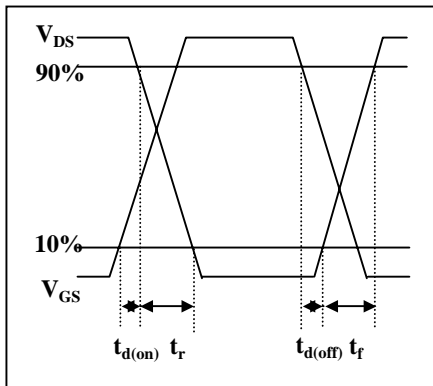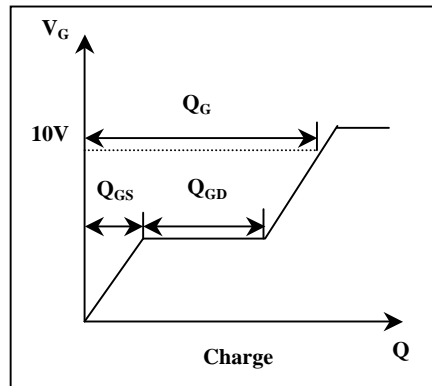

Fig10. Effective Transient Thermal Impedance

Fig 11. Switching Time Waveform

Fig 12. Gate Charge Waveform