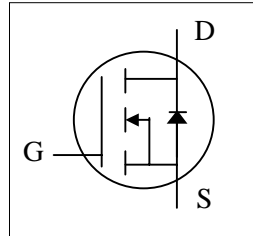




- ▼ Simple Drive Requirement
- ▼ Low On-resistance
- ▼ Fast Switching Characteristics

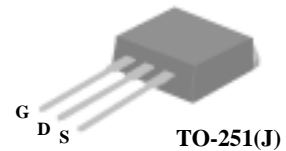
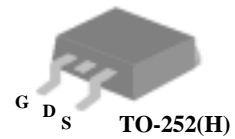


$BV_{DSS}$	200V
$R_{DS(ON)}$	380mΩ
$I_D$	8.6A

**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.



**Absolute Maximum Ratings**

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

**Thermal Data**

Symbol	Parameter	Value	Unit
Rthj-c	Thermal Resistance Junction-case	Max. 1.8	°C/W
Rthj-a	Thermal Resistance Junction-ambient	Max. 110	°C/W



# AP09N20H/J

## 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	$V_{GS}=0V, I_D=1mA$	200	-	-	V
$\Delta BV_{DSS}/\Delta T_j$	Breakdown Voltage Temperature Coefficient	Reference to $25^\circ\text{C}, I_D=1mA$	-	0.24	-	$V/^\circ\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=5A$	-	-	380	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	2	-	4	V
$g_{fs}$	Forward Transconductance	$V_{DS}=10V, I_D=5A$	-	3.7	-	S
$I_{DSS}$	Drain-Source Leakage Current ( $T_j=25^\circ\text{C}$ )	$V_{DS}=200V, V_{GS}=0V$	-	-	10	$\mu A$
	Drain-Source Leakage Current ( $T_j=150^\circ\text{C}$ )	$V_{DS}=160V, V_{GS}=0V$	-	-	100	$\mu A$
$I_{GSS}$	Gate-Source Leakage	$V_{GS}=\pm 30V$	-	-	$\pm 100$	nA
$Q_g$	Total Gate Charge <sup>3</sup>	$I_D=8.6A$	-	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 <sup>3</sup>	$V_{DD}=100V$	-	12	-	ns
$t_r$	Rise Time	$I_D=8.6A$	-	74	-	ns
$t_{d(off)}$	Turn-off Delay Time	$R_G=10\Omega, V_{GS}=10V$	-	36	-	ns
$t_f$	Fall Time	$R_D=11.6\Omega$	-	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 <sup>3</sup>	$I_S=8.6A, V_{GS}=0V$	-	-	1.3	V
$t_{rr}$	Reverse Recovery Time	$I_S=8.6A, V_{GS}=0V,$	-	225	-	ns
$Q_{rr}$	Reverse Recovery Charge	$di/dt=100A/\mu s$	-	2260	-	nC

### Notes:

1. Pulse width limited by safe operating area.
2. Starting  $T_j=25^\circ\text{C}$ ,  $V_{DD}=50V$ ,  $L=1mH$ ,  $R_G=25\Omega$ ,  $I_{AS}=8.6A$ .
3. Pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .

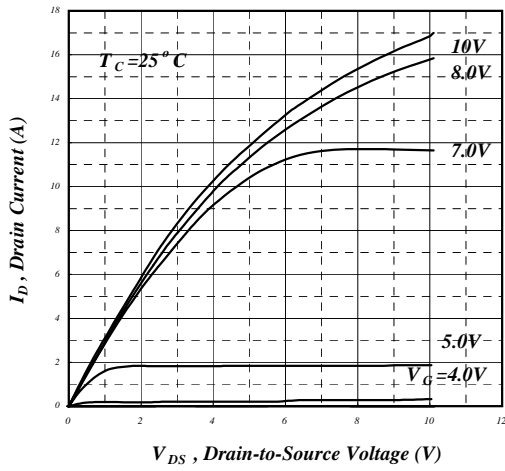


Fig 1. Typical Output Characteristics

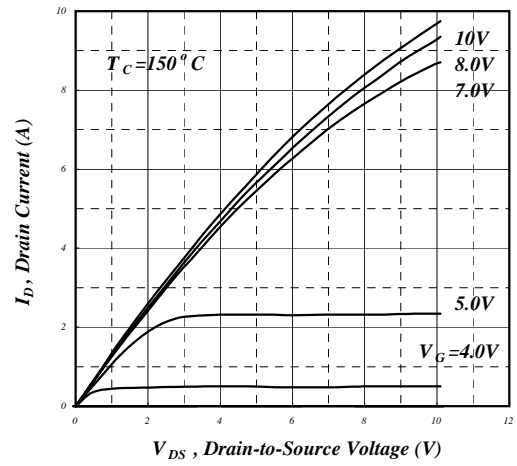


Fig 2. Typical Output Characteristics

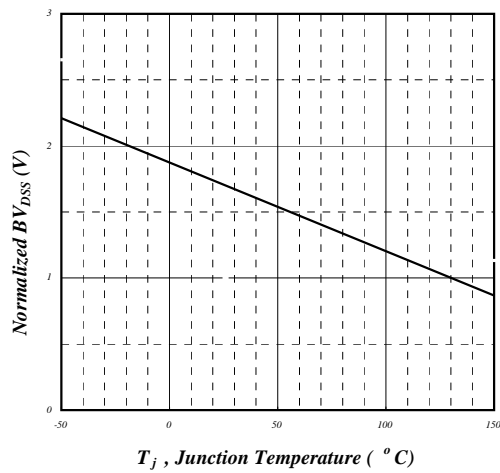


Fig 3. Normalized  $BV_{DSS}$  v.s. Junction Temperature

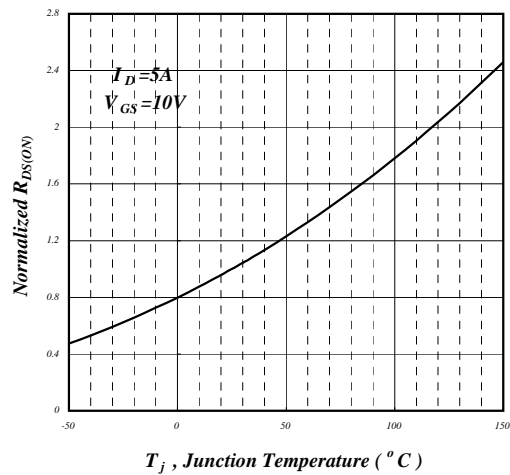


Fig 4. Normalized On-Resistance v.s. Junction Temperature

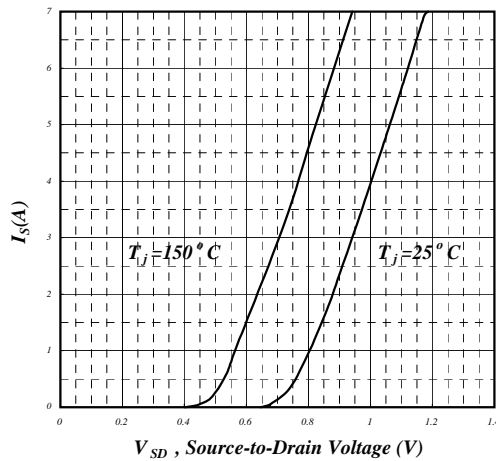


Fig 5. Forward Characteristic of Reverse Diode

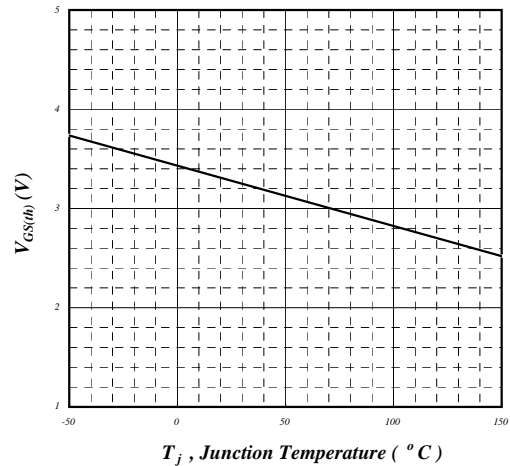


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

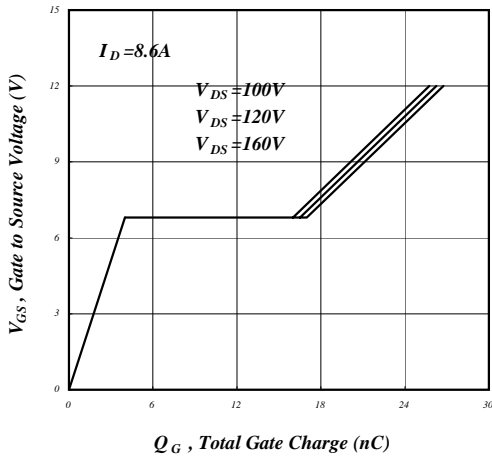


Fig 7. Gate Charge Characteristics

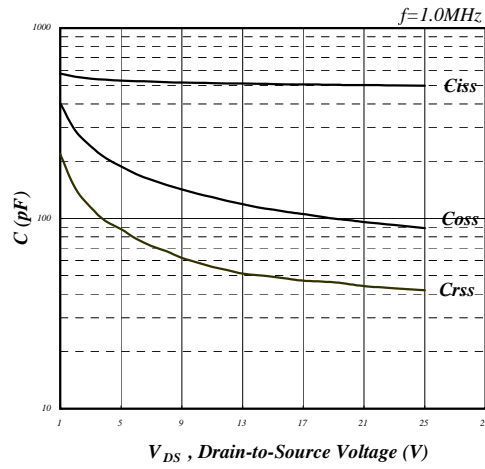


Fig 8. Typical Capacitance Characteristics

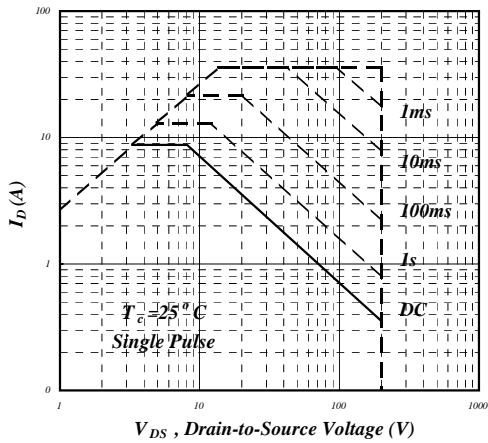


Fig 9. Maximum Safe Operating Area

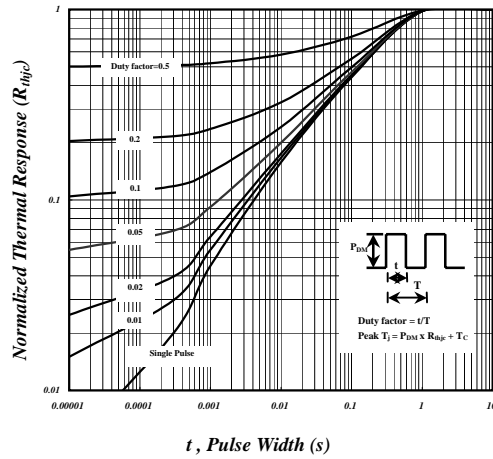


Fig 10. Effective Transient Thermal Impedance

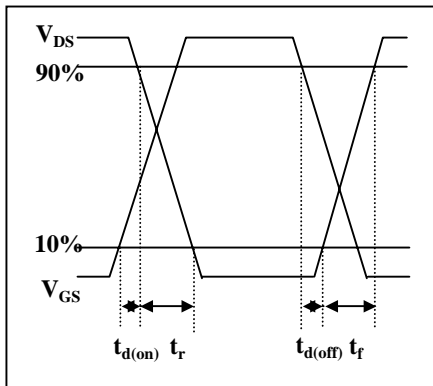


Fig 11. Switching Time Waveform

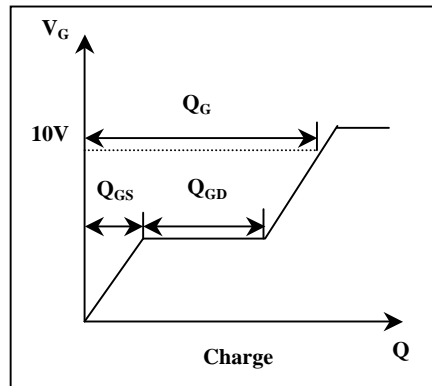


Fig 12. Gate Charge Waveform