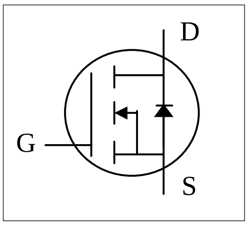
AP18N20GS/P-HF

Halogen-Free Product

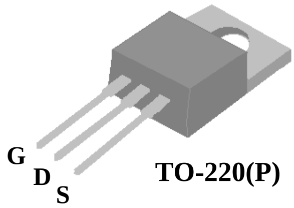
Advanced Power Electronics Corp.

N-CHANNEL ENHANCEMENT MODE POWER MOSFET

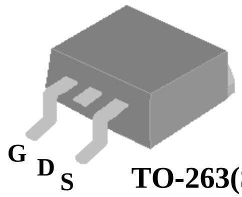
- ▼ **Low Gate Charge**
- ▼ **Simple Drive Requirement**
- ▼ **Fast Switching Characteristic**
- ▼ **RoHS Compliant & Halogen-Free**



BV_{DSS}	200V
$R_{DS(ON)}$	170mΩ
I_D	18A



TO-220(P)



TO-263(S)

Description

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-220 package is widely preferred for all commercial-industrial surface mount applications and suited for low voltage applications such as DC/DC converters. The through-hole version (AP18N20GS) are available for low-profile applications.

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	200	V
V_{GS}	Gate-Source Voltage	$\pm$20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V	18	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V	9.5	A
I_{DM}	Pulsed Drain Current[1]	60	A
P_D@T_C=25℃	Total Power Dissipation	89	W
	Linear Derating Factor	0.7	W/℃
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	1.4	℃/W
Rthj-a	Maximum Thermal Resistance, Junction-ambient (PCB mount)[3]	40	℃/W
Rthj-a	Maximum Thermal Resistance, Junction-ambient	62	℃/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	-	0.25	-	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=8A	-	-	170	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=10A	-	9.5	-	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	-	-	250	uA
I_{GSS}	Gate-Source Leakage	V_{GS}=$\pm$20V, V_{DS}=0V	-	-	$\pm$100	nA
Q_g	Total Gate Charge[2]	I_D=10A	-	19	30	nC
Q_{gs}	Gate-Source Charge	V_{DS}=160V	-	5	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	V_{GS}=10V	-	6	-	nC
$t_{d(on)}$	Turn-on Delay Time[2]	V_{DD}=100V	-	9	-	ns
t_r	Rise Time	I_D=11A	-	21	-	ns
$t_{d(off)}$	Turn-off Delay Time	R_G=9.1Ω,V_{GS}=10V	-	25	-	ns
t_f	Fall Time	R_D=9.1Ω	-	19	-	ns
C_{iss}	Input Capacitance	V_{GS}=0V	-	1065	1700	pF
C_{oss}	Output Capacitance	V_{DS}=25V	-	185	-	pF
C_{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	3	-	pF
R_g	Gate Resistance	f=1.0MHz	-	1.6	2.4	Ω

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward On Voltage[2]	I_S=10A, V_{GS}=0V	-	-	1.3	V
t_{rr}	Reverse Recovery Time	I_S=10A, V_{GS}=0V	-	180	-	ns
Q_{rr}	Reverse Recovery Charge	dI/dt=100A/µs	-	1150	-	nC

Notes:

1.Pulse width limited by Maximum junction temperature.

2.Pulse test

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

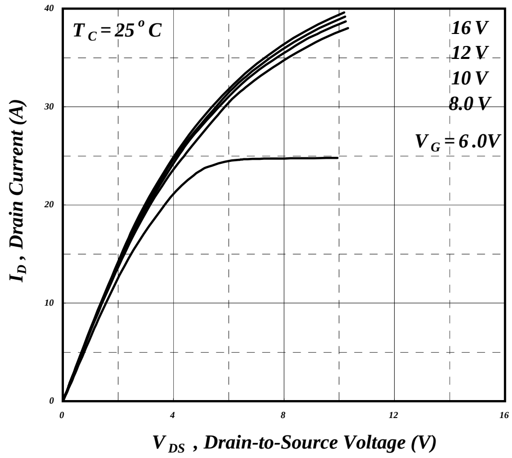


Fig 1. Typical Output Characteristics

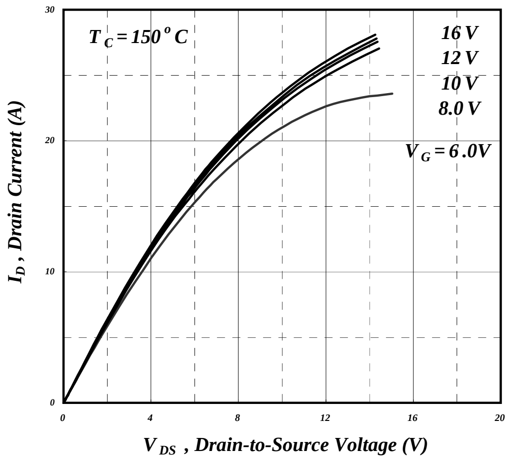


Fig 2. Typical Output Characteristics

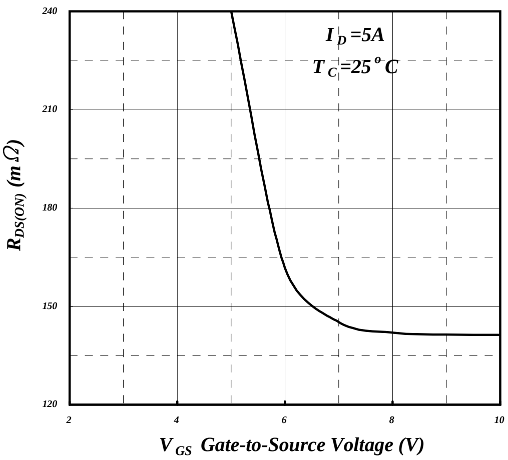


Fig 3. On-Resistance v.s. Gate Voltage

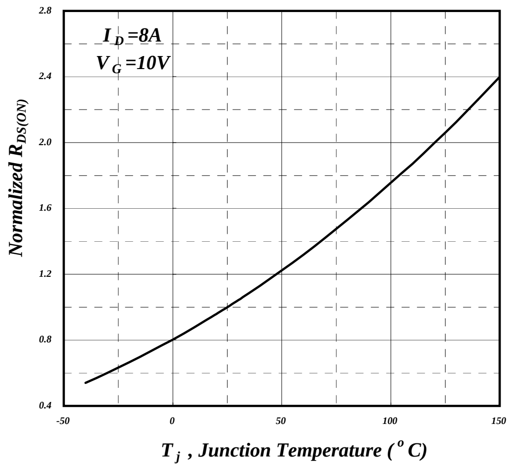


Fig 4. Normalized On-Resistance v.s. Junction Temperature

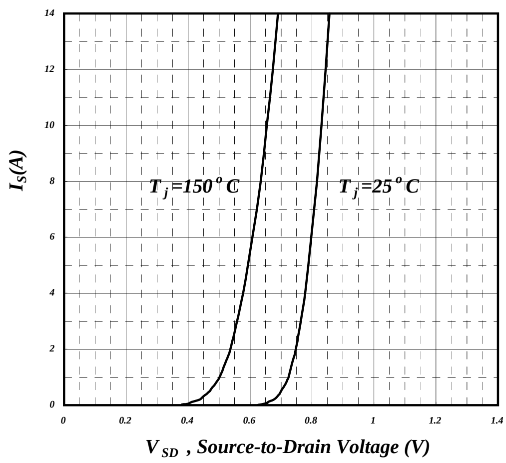


Fig 5. Forward Characteristic of Reverse Diode

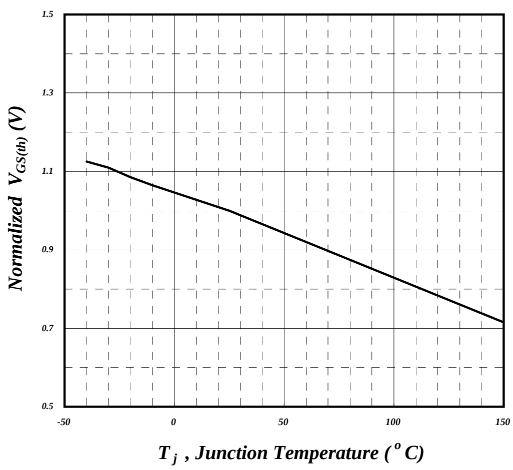


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

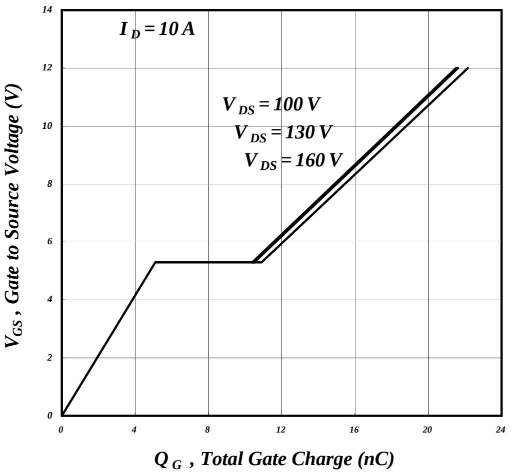


Fig 7. Gate Charge Characteristics

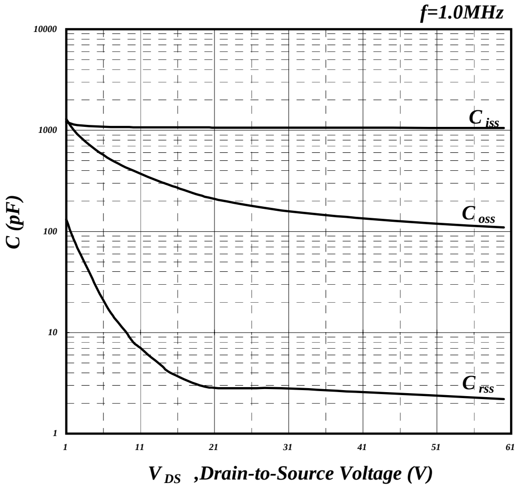


Fig 8. Typical Capacitance Characteristics

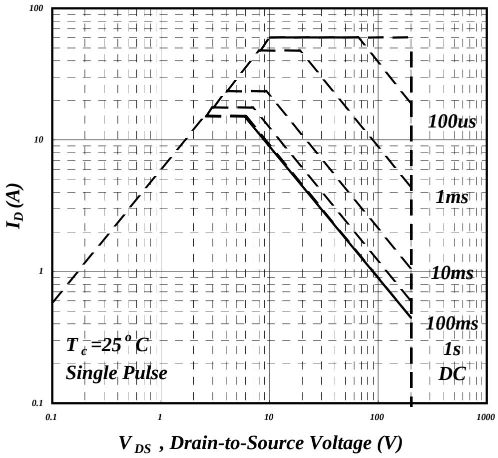


Fig 9. Maximum Safe Operating Area

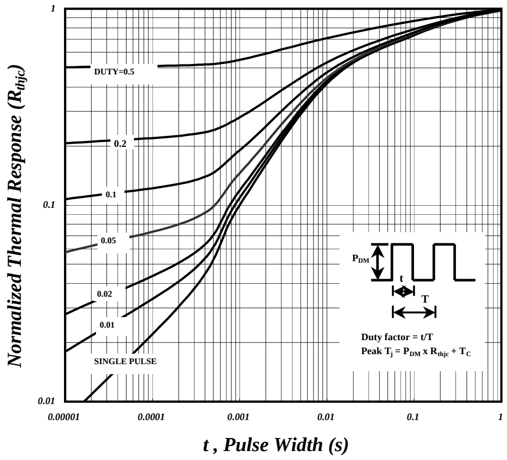


Fig 10. Effective Transient Thermal Impedance

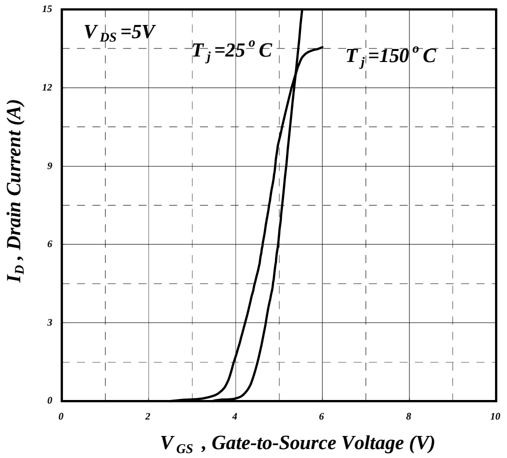


Fig 11. Transfer Characteristics

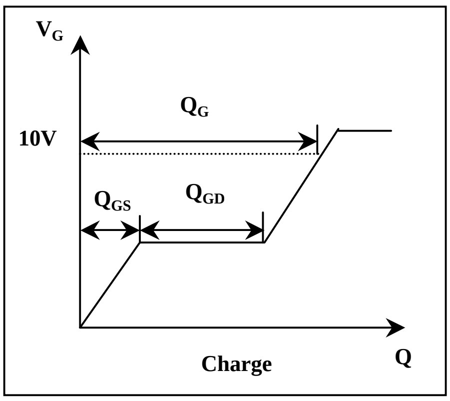


Fig 12. Gate Charge Waveform