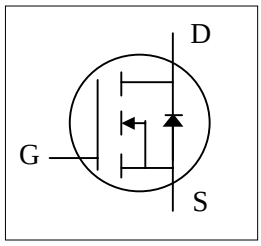
AP09N20BGS-HF

Halogen-Free Product

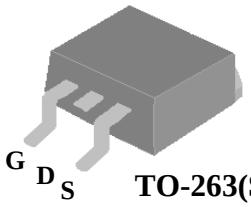
Advanced Power Electronics Corp.

N-CHANNEL ENHANCEMENT MODE POWER MOSFET

- **Simple Drive Requirement**
- **Lower Gate Charge**
- **Fast Switching Characteristics**
- **RoHS Compliant & Halogen-Free**



BV_{DSS}	200V
$R_{DS(ON)}$	460mΩ
I_D	7.8A



TO-263(S)

Description

AP09N20B 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-263 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.

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	200	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V	7.8	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V	5	A
I_{DM}	Pulsed Drain Current[1]	20	A
P_D@T_C=25℃	Total Power Dissipation	69	W
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)[3]	40	℃/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=250uA	200	-	-	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V, I_D=5A	-	-	460	mΩ
		V_{GS}=4.5V, I_D=3A	-	-	500	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250uA	1	-	3	V
g_{fs}	Forward Transconductance	V_{DS}=10V, I_D=5A	-	9	-	S
I_{DSS}	Drain-Source Leakage Current	V_{DS}=160V, V_{GS}=0V	-	-	25	uA
I_{GSS}	Gate-Source Leakage	V_{GS}= ±20V, V_{DS}=0V	-	-	±100	nA
Q_g	Total Gate Charge	I_D=5A	-	21	33.6	nC
Q_{gs}	Gate-Source Charge	V_{DS}=160V	-	2	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	V_{GS}=4.5V	-	14	-	nC
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=100V	-	6	-	ns
t_r	Rise Time	I_D=5A	-	9	-	ns
$t_{d(off)}$	Turn-off Delay Time	R_G=3.3Ω	-	39	-	ns
t_f	Fall Time	V_{GS}=10V	-	10	-	ns
C_{iss}	Input Capacitance	V_{GS}=0V	-	630	1000	pF
C_{oss}	Output Capacitance	V_{DS}=25V	-	90	-	pF
C_{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	45	-	pF

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward On Voltage[2]	I_S=5A, V_{GS}=0V	-	-	1.3	V
t_{rr}	Reverse Recovery Time	I_S=5A, V_{GS}=0V,	-	190	-	ns
Q_{rr}	Reverse Recovery Charge	dI/dt=100A/μs	-	1.7	-	uC

Notes:

1.Pulse width limited by Max. junction temperature.

2.Pulse test

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

THIS PRODUCT IS SENSITIVE TO ELECTROSTATIC DISCHARGE, PLEASE HANDLE WITH CAUTION.

USE OF THIS PRODUCT AS A CRITICAL COMPONENT IN LIFE SUPPORT OR OTHER SIMILAR SYSTEMS IS NOT AUTHORIZED.

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APEC RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN.

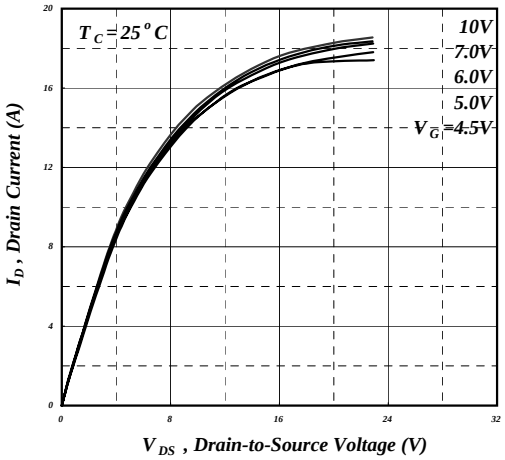


Fig 1. Typical Output Characteristics

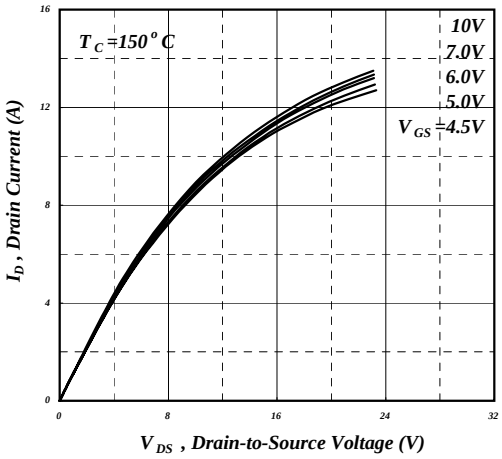


Fig 2. Typical Output Characteristics

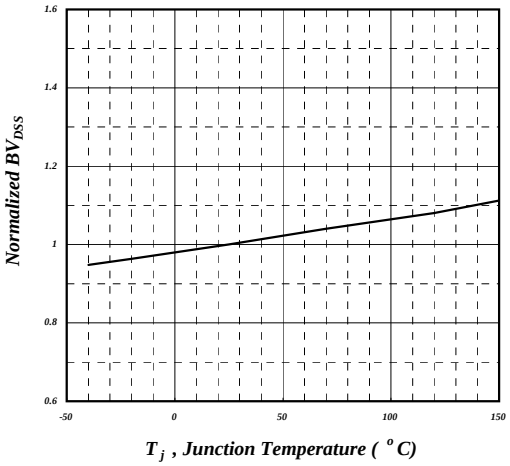


Fig 3. Normalized BV_{DSS} v.s. Junction Temperature

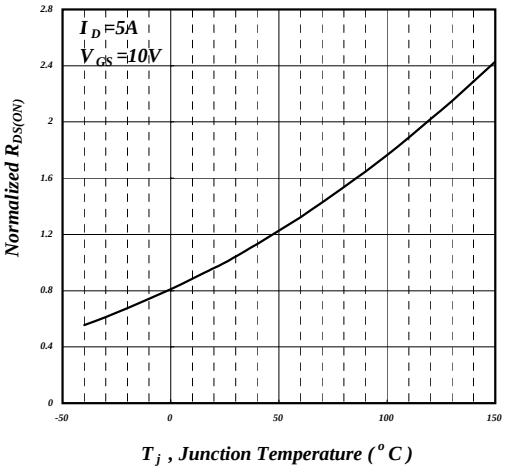


Fig 4. Normalized On-Resistance v.s. Junction Temperature

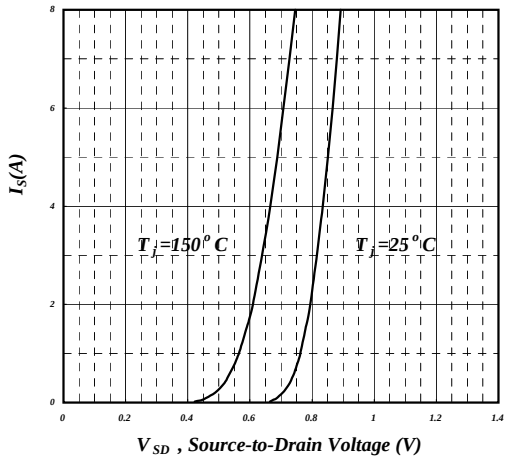


Fig 5. Forward Characteristic of Reverse Diode

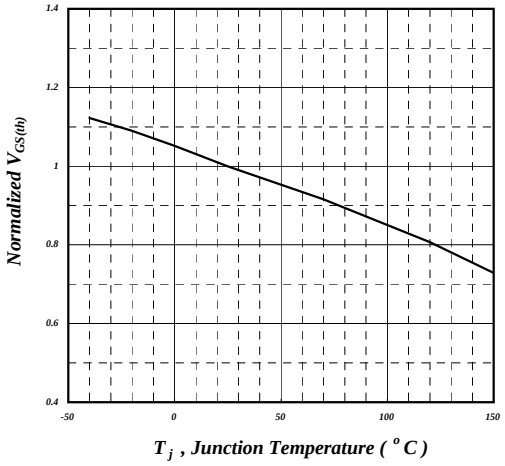


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

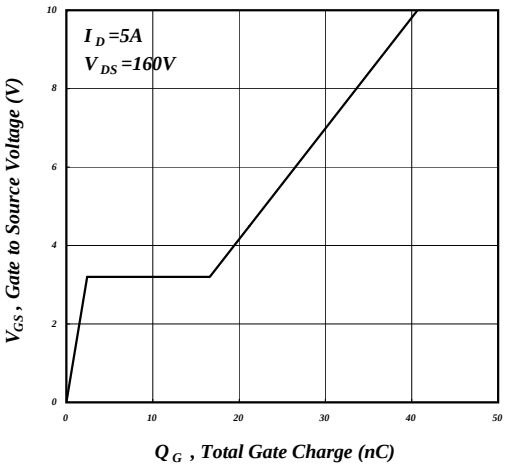


Fig 7. Gate Charge Characteristics

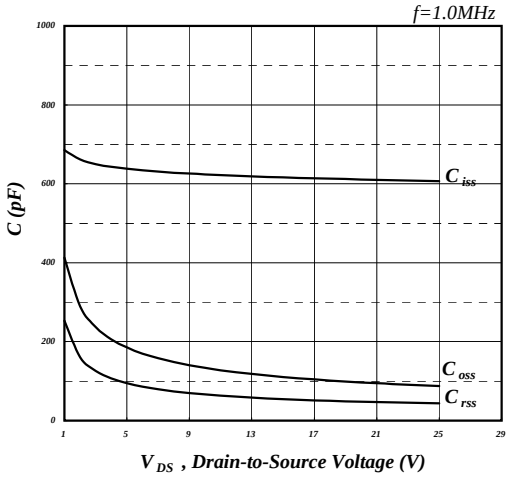


Fig 8. Typical Capacitance Characteristics

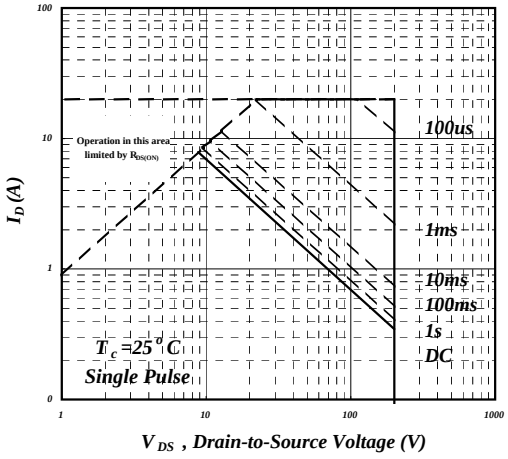


Fig 9. Maximum Safe Operating Area

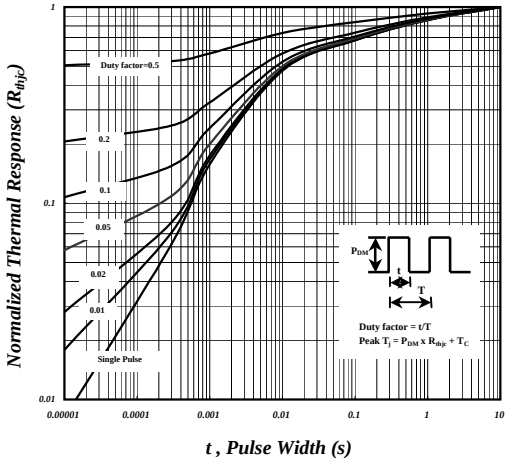


Fig10. Effective Transient Thermal Impedance

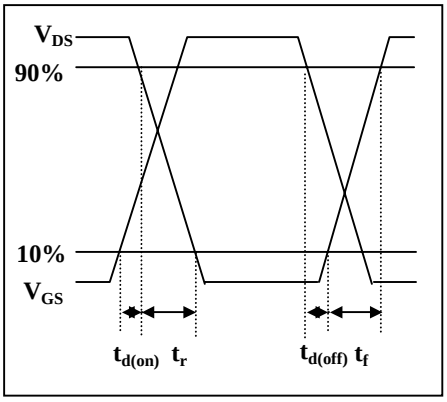


Fig 11. Switching Time Waveform

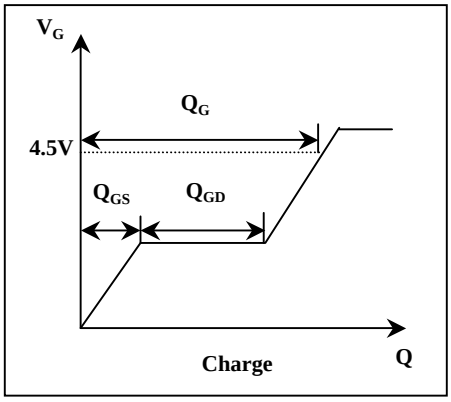


Fig 12. Gate Charge Waveform