

AP9452AGG-HF

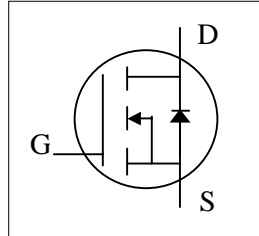
Halogen-Free Product



**Advanced Power
Electronics Corp.**

*N-CHANNEL ENHANCEMENT MODE
POWER MOSFET*

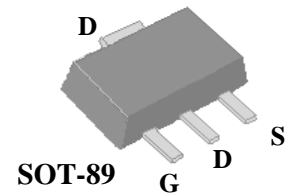
- ▼ Lower Gate Charge
- ▼ Capable of 2.5V Gate Drive
- ▼ Single Drive Requirement
- ▼ RoHS Compliant & Halogen-Free



BV_{DSS}	20V
$R_{DS(ON)}$	50m Ω
I_D	4A

Description

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



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	± 12	V
$I_D@T_A=25^\circ\text{C}$	Continuous Drain Current, V_{GS} @ 4.5V ³	4	A
$I_D@T_A=70^\circ\text{C}$	Continuous Drain Current, V_{GS} @ 4.5V ³	2.5	A
I_{DM}	Pulsed Drain Current ¹	12	A
$P_D@T_A=25^\circ\text{C}$	Total Power Dissipation	1.25	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

Thermal Data

Symbol	Parameter	Value	Unit
R_{thj-a}	Maximum Thermal Resistance, Junction-ambient ³	100	$^\circ\text{C}/\text{W}$



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	$V_{GS}=0V, I_D=250\mu A$	20	-	-	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=10V, I_D=4A$	-	-	38	m Ω
		$V_{GS}=4.5V, I_D=4A$	-	-	50	m Ω
		$V_{GS}=2.5V, I_D=3A$	-	-	80	m Ω
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	0.4	-	1.2	V
g_{fs}	Forward Transconductance ²	$V_{DS}=5V, I_D=3A$	-	12.6	-	S
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=20V, V_{GS}=0V$	-	-	1	μA
I_{GSS}	Gate-Source Leakage	$V_{GS}=\pm 12V, V_{DS}=0V$	-	-	± 100	nA
Q_g	Total Gate Charge ²	$I_D=4A$	-	7	11.2	nC
Q_{gs}	Gate-Source Charge	$V_{DS}=16V$	-	0.7	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	$V_{GS}=4.5V$	-	3.4	-	nC
$t_{d(on)}$	Turn-on Delay Time ²	$V_{DS}=10V$	-	8	-	ns
t_r	Rise Time	$I_D=1A$	-	9.5	-	ns
$t_{d(off)}$	Turn-off Delay Time	$R_G=3.3\Omega, V_{GS}=5V$	-	13	-	ns
t_f	Fall Time	$R_D=10\Omega$	-	5	-	ns
C_{iss}	Input Capacitance	$V_{GS}=0V$	-	260	415	pF
C_{oss}	Output Capacitance	$V_{DS}=20V$	-	90	-	pF
C_{rss}	Reverse Transfer Capacitance	$f=1.0\text{MHz}$	-	85	-	pF
R_g	Gate Resistance	$f=1.0\text{MHz}$	-	1.6	-	Ω

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward On Voltage ²	$I_S=1A, V_{GS}=0V$	-	-	1.2	V
t_{rr}	Reverse Recovery Time ²	$I_S=2A, V_{GS}=0V,$	-	18.5	-	ns
Q_{rr}	Reverse Recovery Charge	$dI/dt=100A/\mu s$	-	9	-	nC

Notes:

- 1.Pulse width limited by Max. junction temperature.
- 2.Pulse test
- 3.Surface mount on FR4 board, $t \leq 10s$.

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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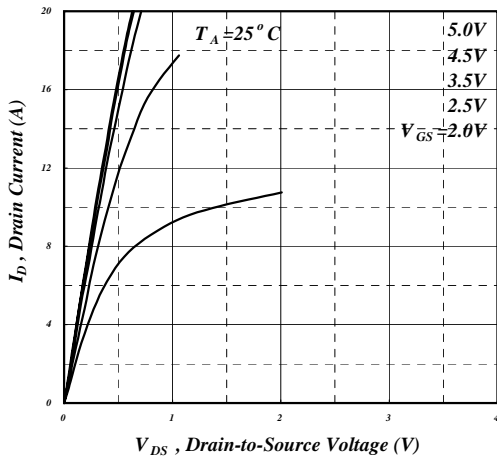


Fig 1. Typical Output Characteristics

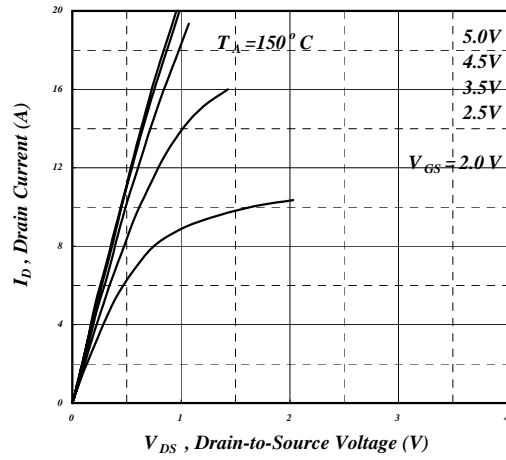


Fig 2. Typical Output Characteristics

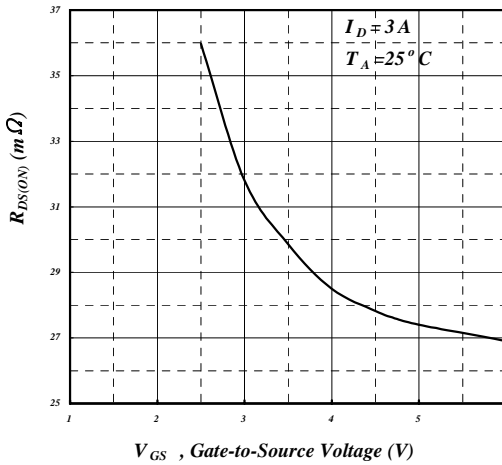


Fig 3. On-Resistance v.s. Gate Voltage

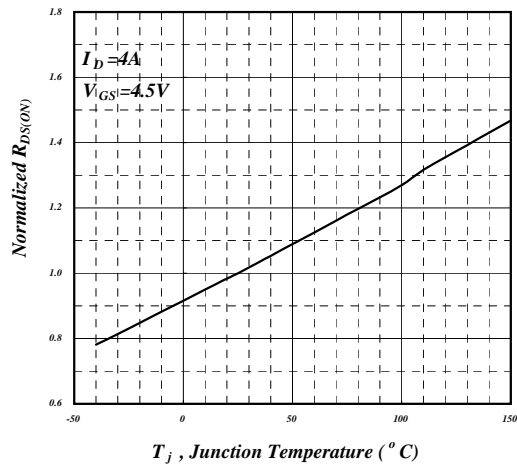


Fig 4. Normalized On-Resistance v.s. Junction Temperature

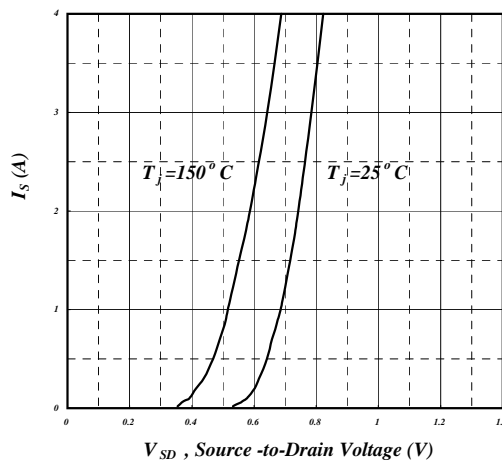


Fig 5. Forward Characteristic of Reverse Diode

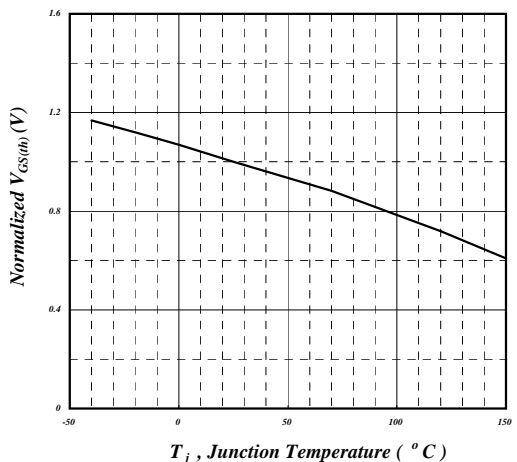


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

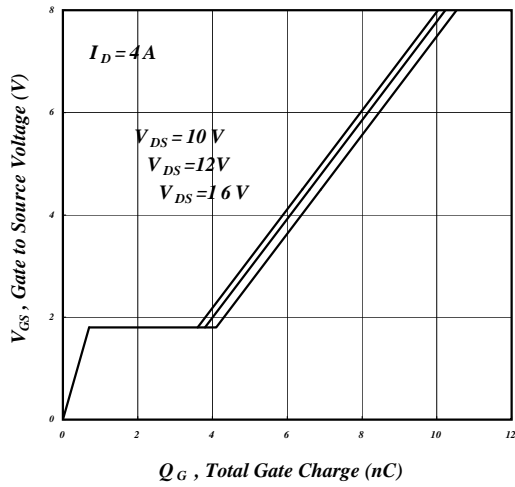


Fig 7. Gate Charge Characteristics

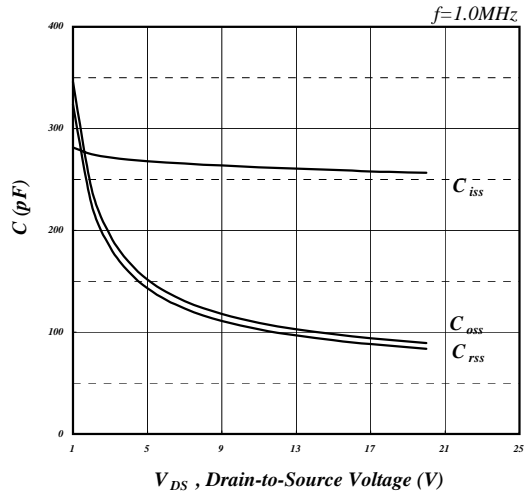


Fig 8. Typical Capacitance Characteristics

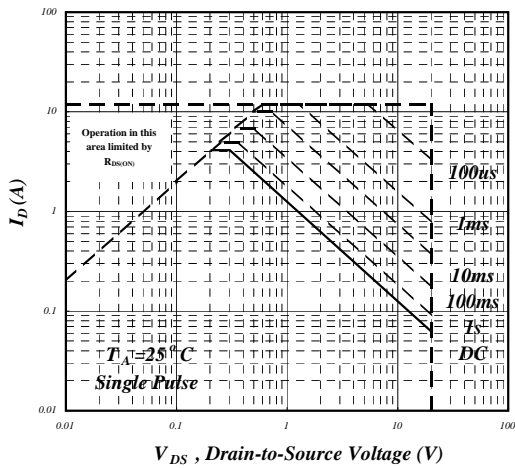


Fig 9. Maximum Safe Operating Area

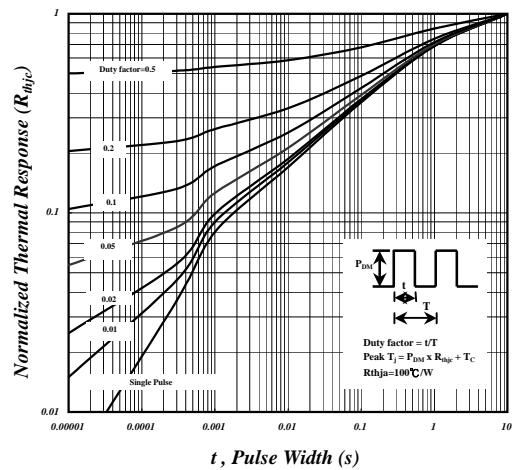


Fig 10. Effective Transient Thermal Impedance

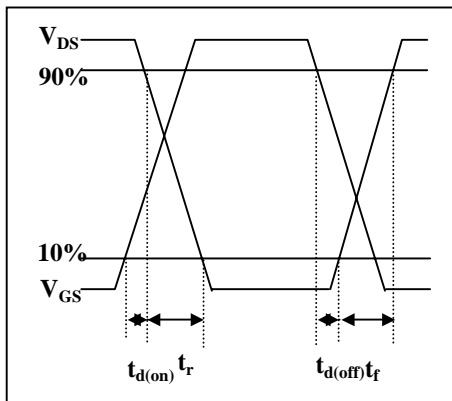


Fig 11. Switching Time Waveform

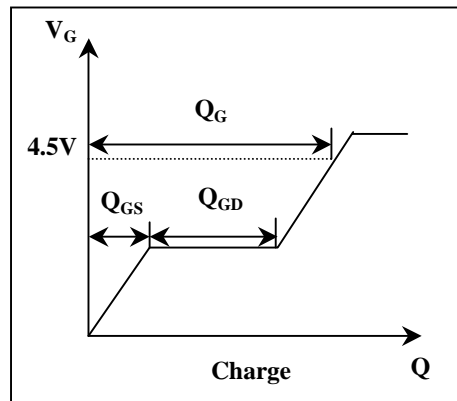


Fig 12. Gate Charge Waveform