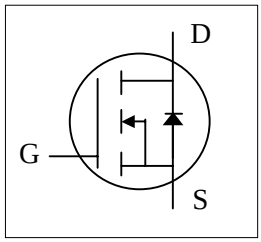
AP3989I-HF

Halogen-Free Product

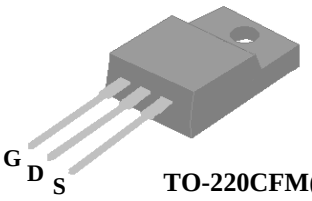
Advanced Power Electronics Corp.

N-CHANNEL ENHANCEMENT MODE POWER MOSFET

- ▼ **100% Avalanche Test**
- ▼ **Simple Drive Requirement**
- ▼ **Fast Switching Characteristic**
- ▼ **RoHS Compliant & Halogen-Free**



BV_{DSS}	600V
$R_{DS(ON)}$	0.68Ω
I_D	10A



TO-220CFM(I)

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-220CFM isolation package is widely preferred for commercial-industrial through hole applications.

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	600	V
V_{GS}	Gate-Source Voltage	±30	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V	10	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V	5	A
I_{DM}	Pulsed Drain Current[1]	40	A
P_D@T_C=25℃	Total Power Dissipation	39	W
E_{AS}	Single Pulse Avalanche Energy[2]	50	mJ
I_{AR}	Avalanche Current	10	A
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	3.2	℃/W
Rthj-a	Maximum Thermal Resistance, Junction-ambient	65	℃/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	600	-	-	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance[3]	V_{GS}=10V, I_D=5A	-	-	0.68	Ω
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250uA	2	-	4	V
g_{fs}	Forward Transconductance	V_{DS}=10V, I_D=5A	-	4.5	-	S
I_{DSS}	Drain-Source Leakage Current	V_{DS}=480V, V_{GS}=0V	-	-	100	uA
I_{GSS}	Gate-Source Leakage	V_{GS}=±30V, V_{DS}=0V	-	-	±100	nA
Q_g	Total Gate Charge[3]	I_D=9A	-	48	77	nC
Q_{gs}	Gate-Source Charge	V_{DS}=480V	-	10	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	V_{GS}=10V	-	20	-	nC
$t_{d(on)}$	Turn-on Delay Time[3]	V_{DD}=300V	-	16	-	ns
t_r	Rise Time	I_D=9A	-	25	-	ns
$t_{d(off)}$	Turn-off Delay Time	R_G=10Ω,V_{GS}=10V	-	70	-	ns
t_f	Fall Time	R_D=33.3Ω	-	35	-	ns
C_{iss}	Input Capacitance	V_{GS}=0V	-	2150	3440	pF
C_{oss}	Output Capacitance	V_{DS}=25V	-	355	-	pF
C_{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	28	-	pF

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward On Voltage[3]	I_S=9A, V_{GS}=0V	-	-	1.5	V
t_{rr}	Reverse Recovery Time[3]	I_S=9A, V_{GS}=0V	-	570	-	ns
Q_{rr}	Reverse Recovery Charge	dI/dt=100A/μs	-	9.7	-	uC

Notes:

1.Pulse width limited by Max junction temperature.

2.Starting T_j=25°C , V_{DD}=50V , L=1mH , R_G=25Ω

3.Pulse test

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.

APEC DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

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

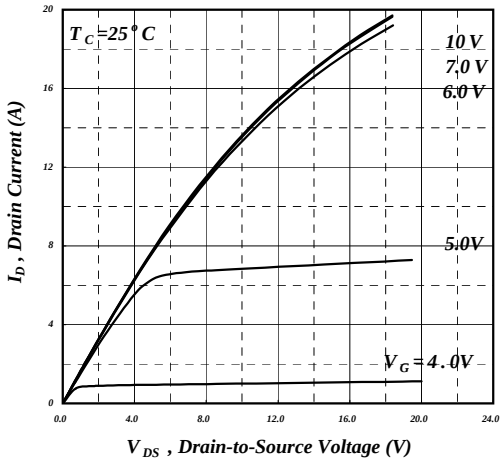


Fig 1. Typical Output Characteristics

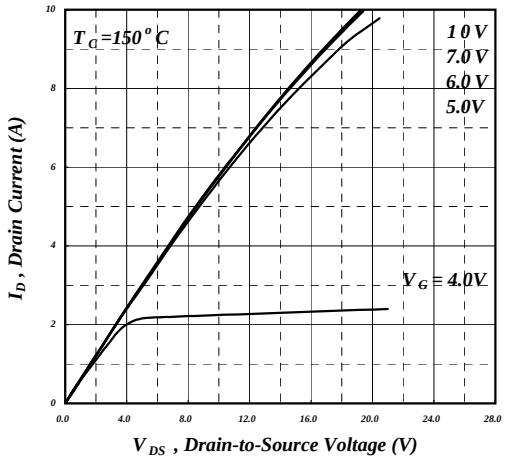


Fig 2. Typical Output Characteristics

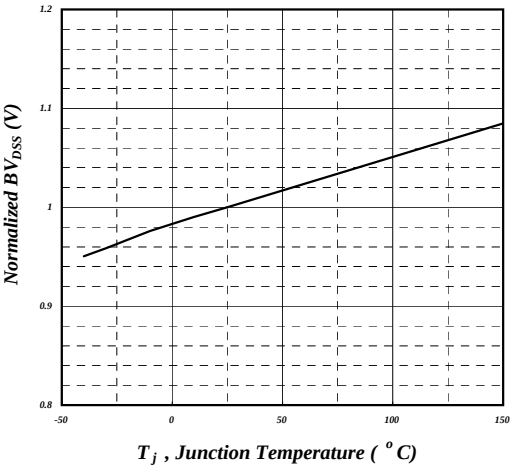


Fig 3. Normalized BV_{DSS} v.s. Junction Temperature

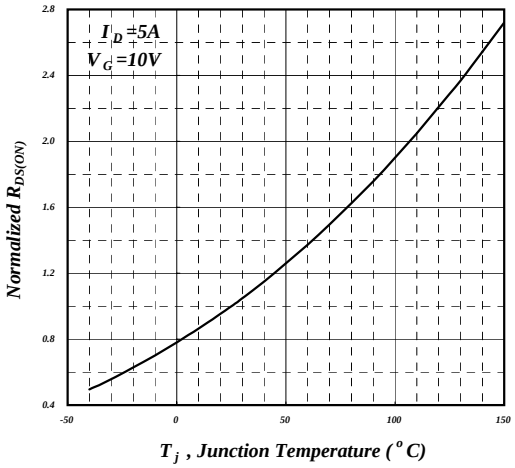


Fig 4. Normalized On-Resistance v.s. Junction Temperature

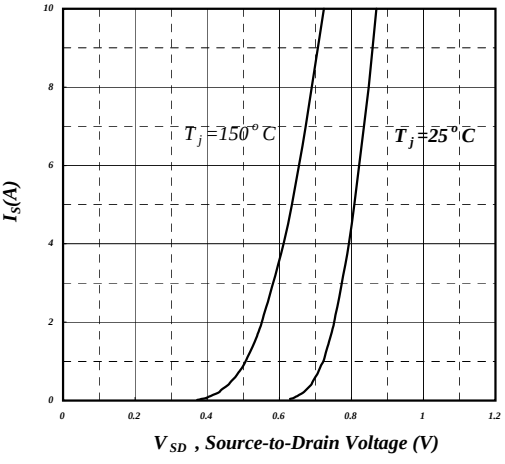


Fig 5. Forward Characteristic of Reverse Diode

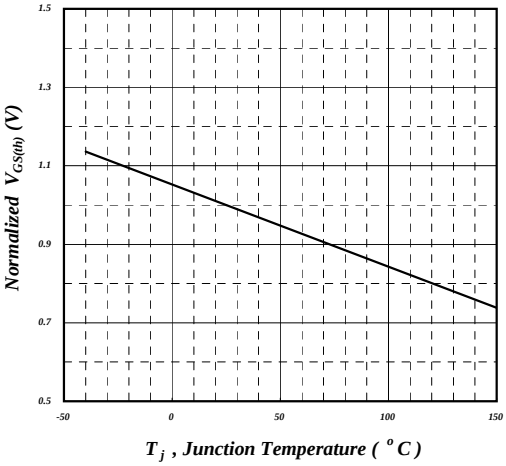


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

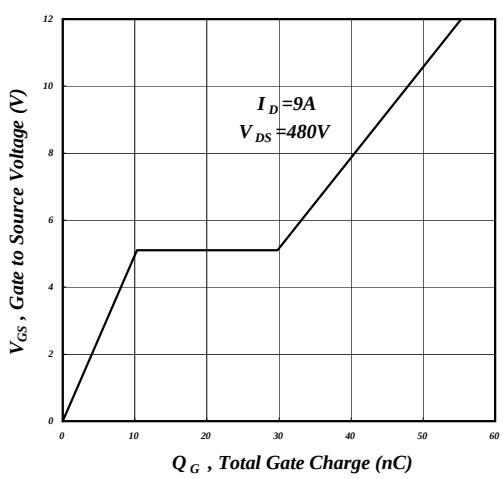


Fig 7. Gate Charge Characteristics

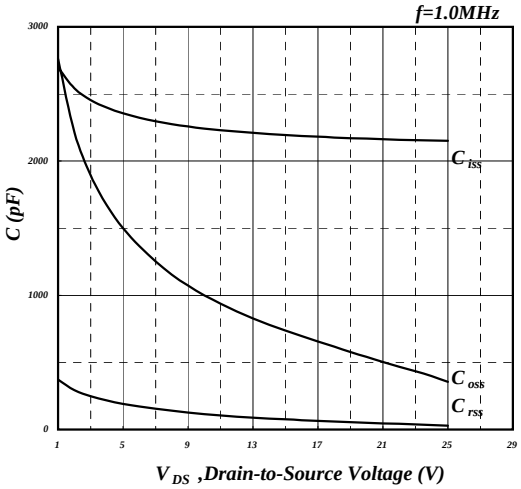


Fig 8. Typical Capacitance Characteristics

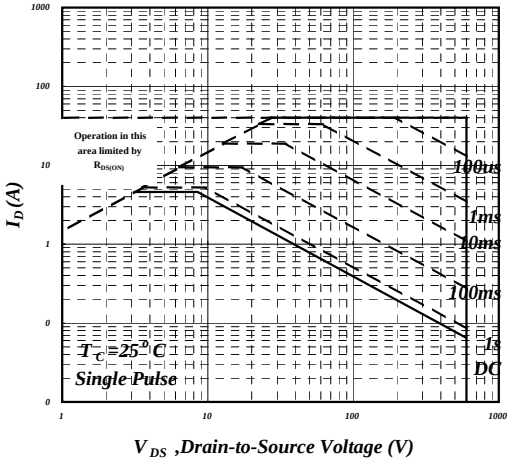


Fig 9. Maximum Safe Operating Area

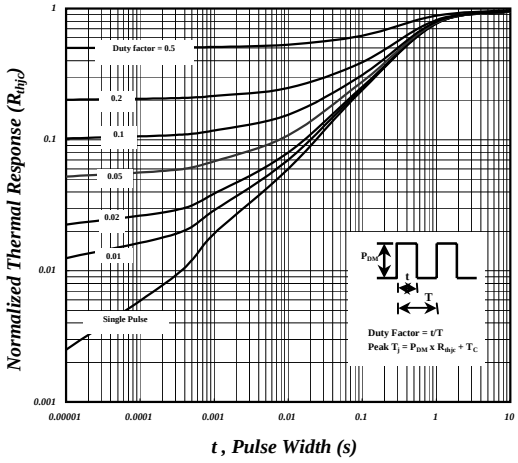


Fig 10. Effective Transient Thermal Impedance

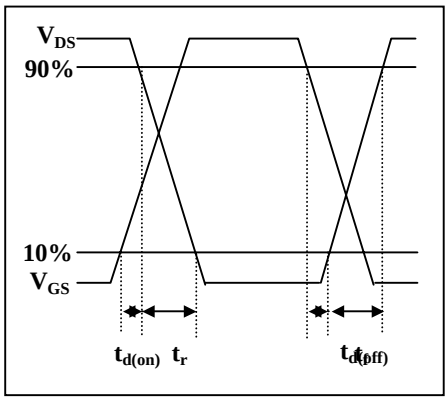


Fig 11. Switching Time Waveform

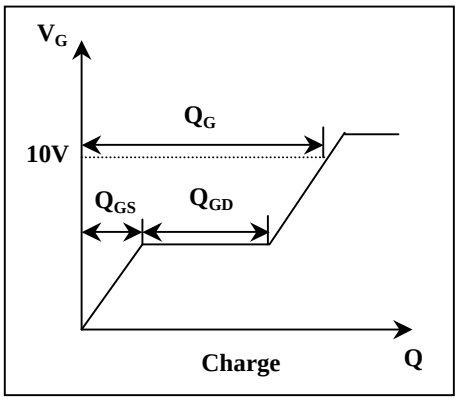


Fig 12. Gate Charge Waveform