AP9971GI-HF

Halogen-Free Product

Advanced Power Electronics Corp.

N-CHANNEL ENHANCEMENT MODE

POWER MOSFET

▼ **Fast Switching Performance**
▼ **Single Drive Requirement**
▼ **Full Isolation Package**
▼ **RoHS Compliant**

BV_{DSS}	60V
$R_{DS(ON)}$	36mΩ
I_D	23A

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	60	V
V_{GS}	Gate-Source Voltage	$\pm$20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V	23	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V	14	A
I_{DM}	Pulsed Drain Current[1]	80	A
P_D@T_C=25℃	Total Power Dissipation	31.3	W
	Linear Derating Factor	0.25	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	4.0	℃/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	60	-	-	V
$\Delta BV_{DSS}/\Delta T_j$	Breakdown Voltage Temperature Coefficient	Reference to 25℃, I$_D$=1mA	-	0.05	-	V/℃
R$_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V$_{GS}$=10V, I$_D$=18A	-	-	36	mΩ
		V$_{GS}$=4.5V, I$_D$=12A	-	-	50	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$_D$=18A	-	17	-	S
I$_{DSS}$	Drain-Source Leakage Current	V$_{DS}$=60V, V$_{GS}$=0V	-	-	10	uA
	Drain-Source Leakage Current (T$_j$=125°C)	V$_{DS}$=48V ,V$_{GS}$=0V	-	-	250	uA
I$_{GSS}$	Gate-Source Leakage	V$_{GS}$=±20V, V$_{DS}$=0V	-	-	±100	nA
Q$_g$	Total Gate Charge[2]	I$_D$=18A	-	18	30	nC
Q$_{gs}$	Gate-Source Charge	V$_{DS}$=48V	-	6	-	nC
Q$_{gd}$	Gate-Drain ("Miller") Charge	V$_{GS}$=4.5V	-	11	-	nC
t$_{d(on)}$	Turn-on Delay Time[2]	V$_{DS}$=30V	-	9	-	ns
t$_r$	Rise Time	I$_D$=18A	-	24	-	ns
t$_{d(off)}$	Turn-off Delay Time	R$_G$=3.3Ω,V$_{GS}$=10V	-	26	-	ns
t$_f$	Fall Time	R$_D$=1.67Ω	-	7	-	ns
C$_{iss}$	Input Capacitance	V$_{GS}$=0V	-	1700	2700	pF
C$_{oss}$	Output Capacitance	V$_{DS}$=25V	-	160	-	pF
C$_{rss}$	Reverse Transfer Capacitance	f=1.0MHz	-	110	-	pF

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V$_{SD}$	Forward On Voltage[2]	I$_S$=25A, V$_{GS}$=0V	-	-	1.2	V
t$_{rr}$	Reverse Recovery Time[2]	I$_S$=18A, V$_{GS}$=0V,	-	37	-	ns
Q$_{rr}$	Reverse Recovery Charge	dI/dt=100A/µs	-	38	-	nC

Notes:

1.Pulse width limited by Max. junction temperature.
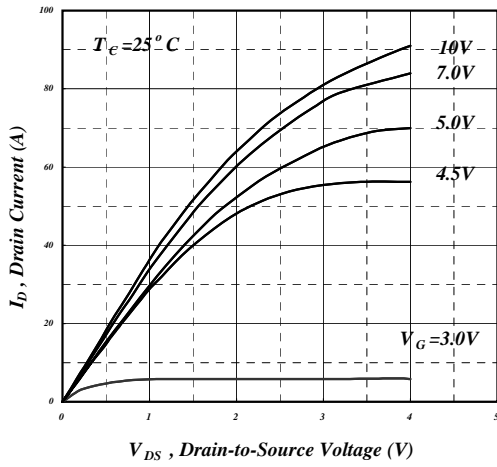
2.Pulse test

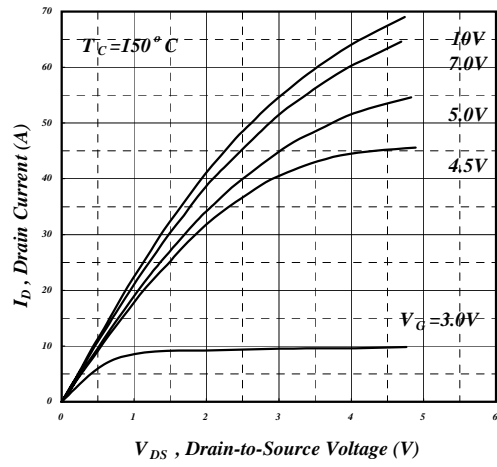Fig 1. Typical Output Characteristics
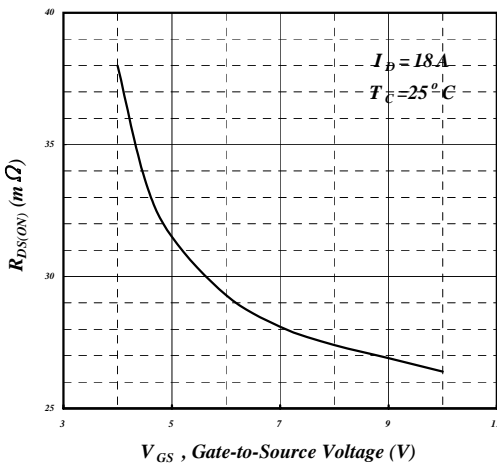

Fig 2. Typical Output Characteristics

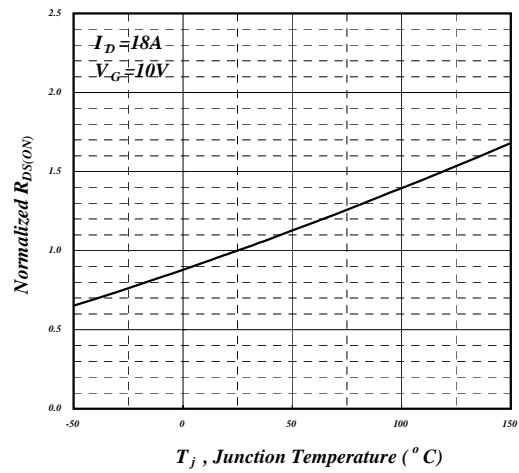Fig 3. On-Resistance v.s. Gate Voltage

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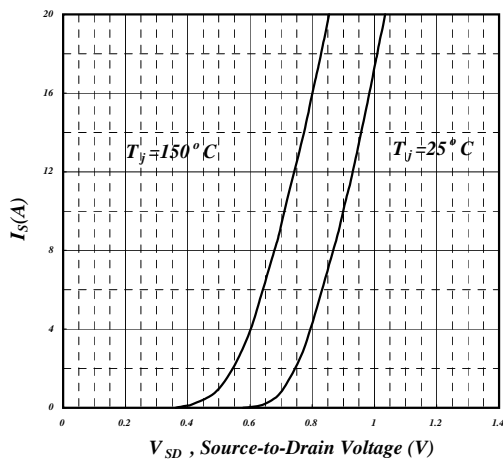v.s. Junction Temperature
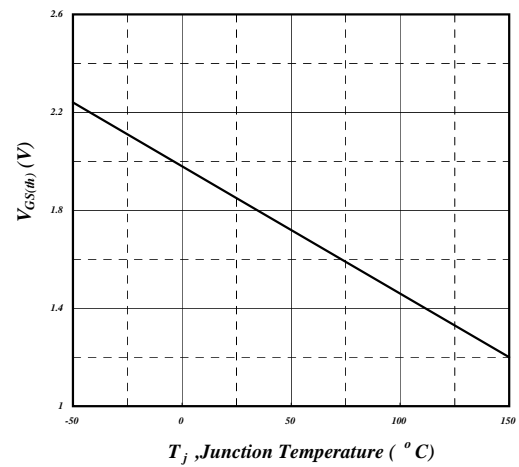

Fig 5. Forward Characteristic of
Reverse Diode

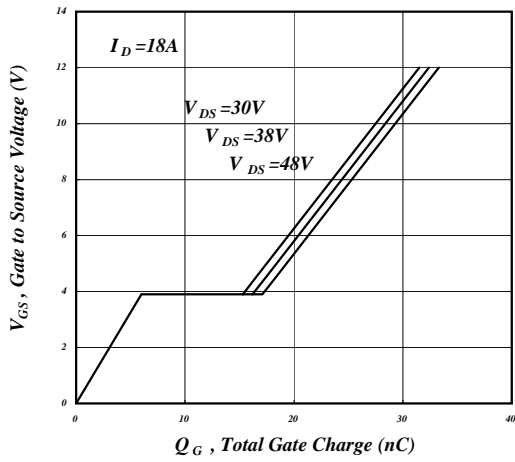Fig 6. Gate Threshold Voltage v.s.
Junction Temperature

Fig 7. Gate Charge Characteristics
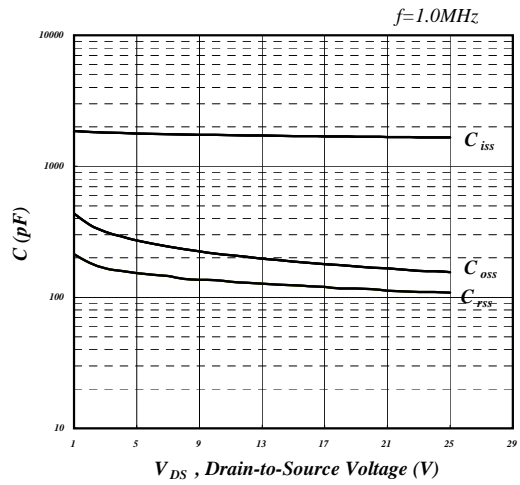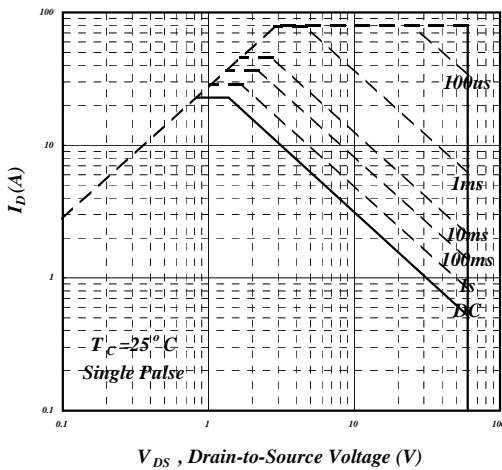

Fig 8. Typical Capacitance Characteristics

Fig 9. Maximum Safe Operating Area

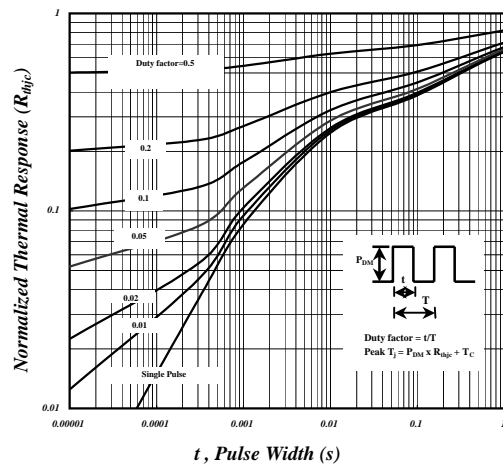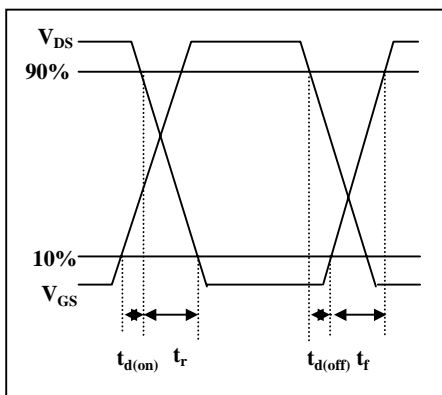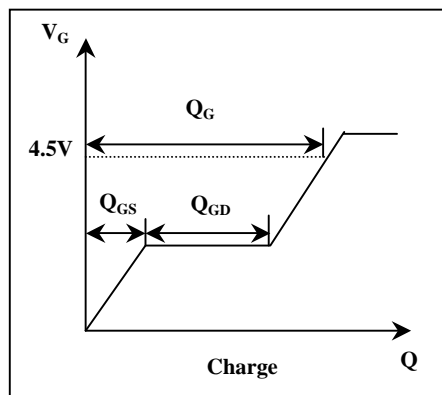**Fig 10. Effective Transient Thermal Impedance**

Fig 11. Switching Time Waveform

Fig 12. Gate Charge Waveform