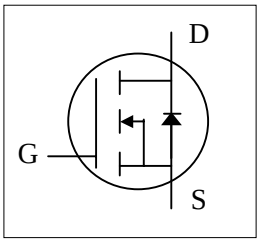
AP9970GP-HF

Halogen-Free Product

Advanced Power Electronics Corp.

N-CHANNEL ENHANCEMENT MODE POWER MOSFET

- ▼ **Simple Drive Requirement**
- ▼ **Lower On-resistance**
- ▼ **RoHS Compliant & Halogen-Free**

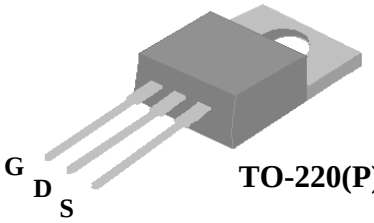


BV_{DSS}	60V
$R_{DS(ON)}$	3.2mΩ
I_D	240A

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 commercial-industrial through-hole applications.



TO-220(P)

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V(Silicon Limited)	240	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V(Silicon Limited)	170	A
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V(Package Limited)	120	A
I_{DM}	Pulsed Drain Current[1]	960	A
P_D@T_C=25℃	Total Power Dissipation	375	W
T_{STG}	Storage Temperature Range	-55 to 175	℃
T_J	Operating Junction Temperature Range	-55 to 175	℃

Thermal Data

Symbol	Parameter	Value	Units
Rthj-c	Maximum Thermal Resistance, Junction-case	0.4	℃/W
Rthj-a	Maixmum 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=250uA	60	-	-	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V, I_D=60A	-	-	3.2	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=60A	-	105	-	S
I_{DSS}	Drain-Source Leakage Current	V_{DS}=60V, V_{GS}=0V	-	-	10	uA
I_{GSS}	Gate-Source Leakage	V_{GS}= ±20V, V_{DS}=0V	-	-	±100	nA
Q_g	Total Gate Charge[2]	I_D=40A	-	100	160	nC
Q_{gs}	Gate-Source Charge	V_{DS}=48V	-	14	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	V_{GS}=10V	-	54	-	nC
$t_{d(on)}$	Turn-on Delay Time[2]	V_{DS}=30V	-	60	-	ns
t_r	Rise Time	I_D=40A	-	200	-	ns
$t_{d(off)}$	Turn-off Delay Time	R_G=25Ω,V_{GS}=10V	-	180	-	ns
t_f	Fall Time	R_D=0.75Ω	-	240	-	ns
C_{iss}	Input Capacitance	V_{GS}=0V	-	4020	6430	pF
C_{oss}	Output Capacitance	V_{DS}=25V	-	1280	-	pF
C_{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	420	-	pF
R_g	Gate Resistance	f=1.0MHz	-	2	-	Ω

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward On Voltage[2]	I_S=40A, V_{GS}=0V	-	-	1.3	V
t_{rr}	Reverse Recovery Time[2]	I_S=40A, V_{GS}=0V	-	80	-	ns
Q_{rr}	Reverse Recovery Charge	dI/dt=100A/μs	-	165	-	nC

Notes:

1.Pulse width limited by Max. junction temperature.

2.Pulse test

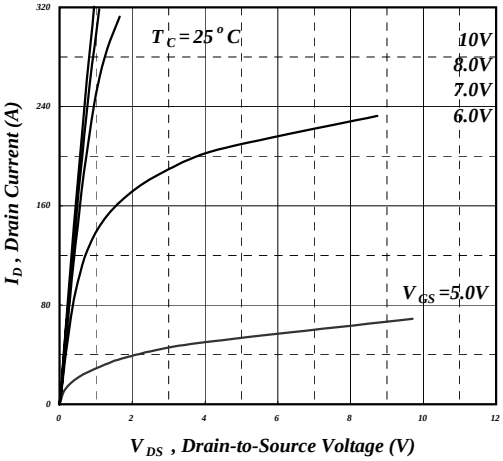


Fig 1. Typical Output Characteristics

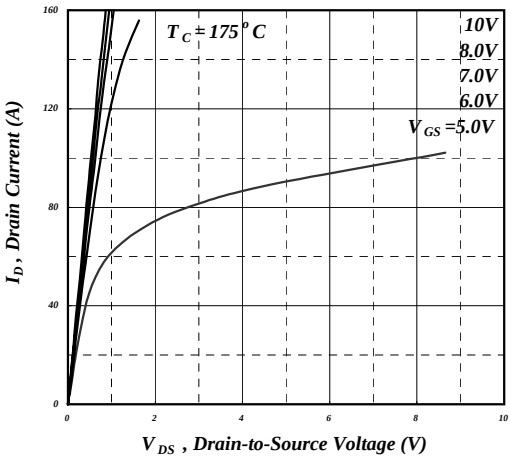


Fig 2. Typical Output Characteristics

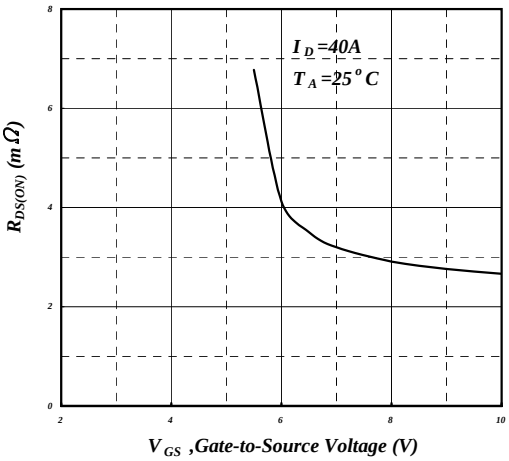


Fig 3. On-Resistance v.s. Gate Voltage

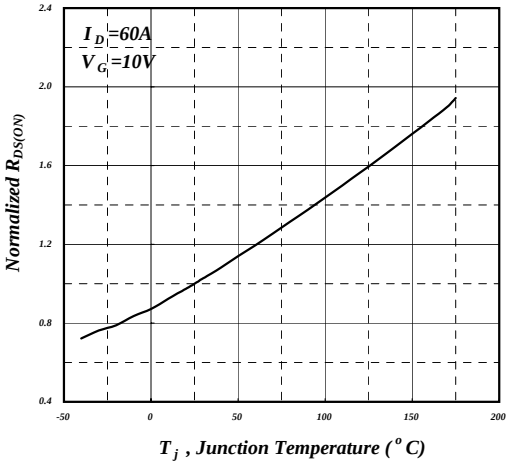


Fig 4. Normalized On-Resistance v.s. Junction Temperature

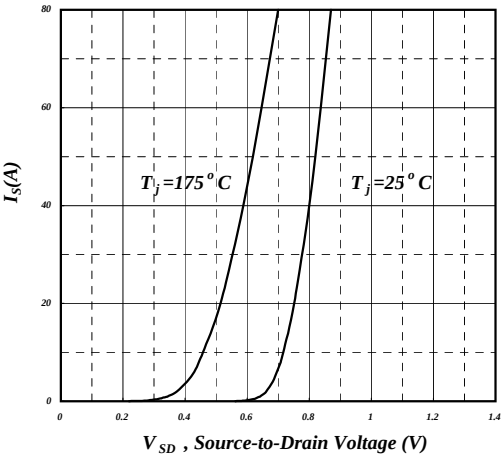


Fig 5. Forward Characteristic of Reverse Diode

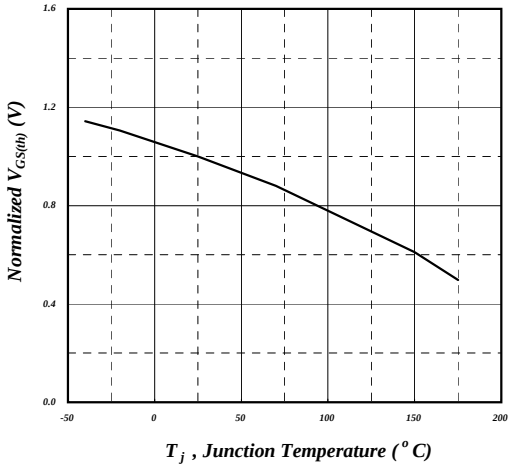


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

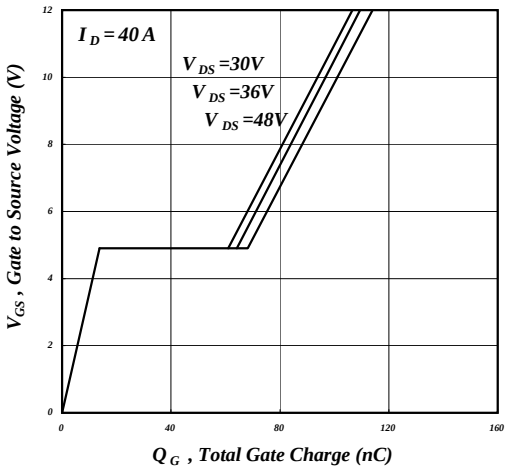


Fig 7. Gate Charge Characteristics

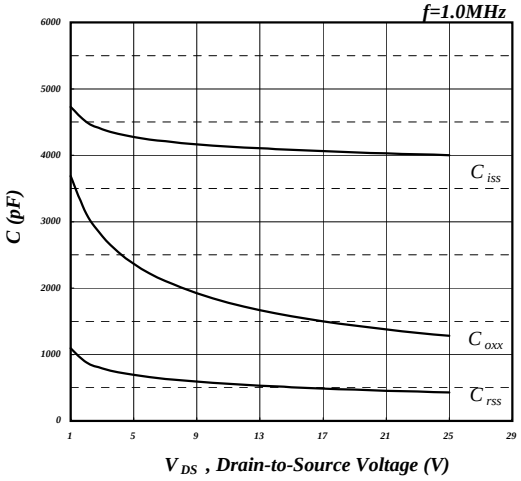


Fig 8. Typical Capacitance Characteristics

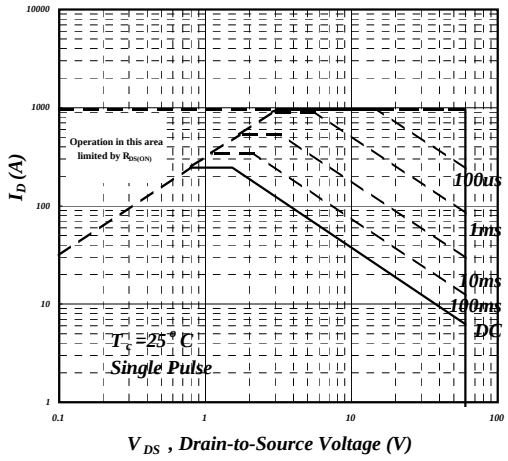


Fig 9. Maximum Safe Operating Area

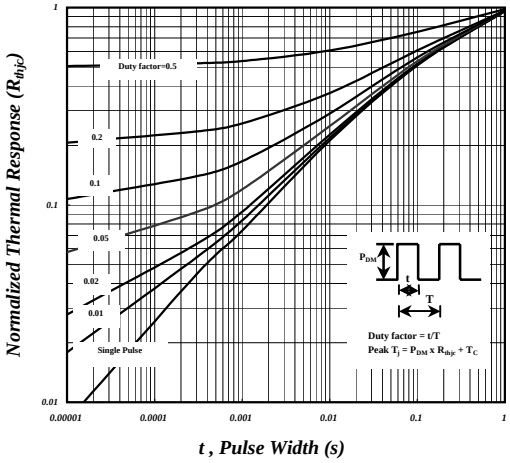


Fig 10. Effective Transient Thermal Impedance

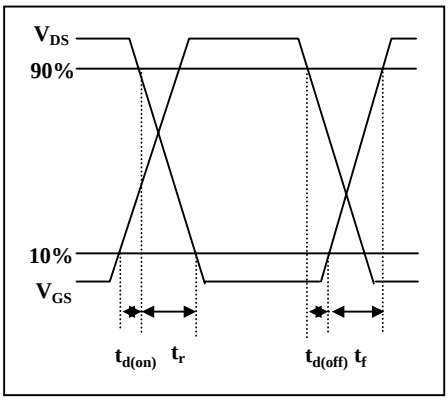


Fig 11. Switching Time Waveform

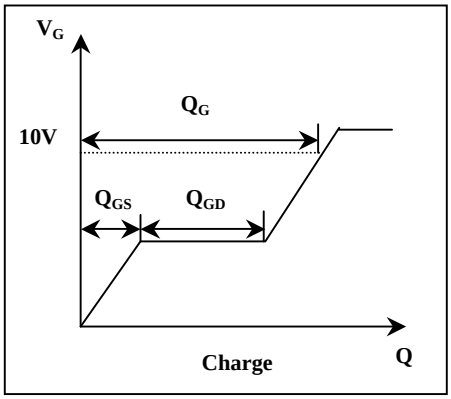


Fig 12. Gate Charge Waveform