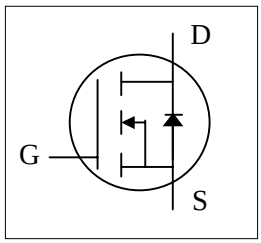
AP0103GP-HF

Halogen-Free Product

Advanced Power Electronics Corp.

N-CHANNEL ENHANCEMENT MODE POWER MOSFET

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

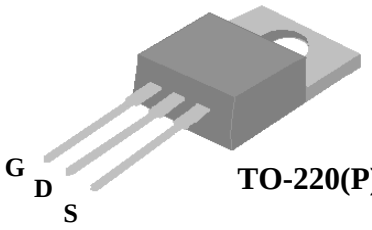


B_{VDSS}@T_j=125°C	40V
$R_{DS(ON)}$	2.99mΩ
I_D	220A

Description

AP0103 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-220 package is widely preferred for all commercial-industrial through hole applications. The low thermal resistance and low package cost contribute to the worldwide popular package.



TO-220(P)

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}@T_j=125°C	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current (Chip)	220	A
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[3]	80	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[3]	80	A
I_{DM}	Pulsed Drain Current[1]	320	A
P_D@T_C=25℃	Total Power Dissipation	250	W
P_D@T_A=25℃	Total Power Dissipation	2	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	0.5	℃/W
Rthj-a	Maximum 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	38	-	-	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V, I_D=40A	-	-	2.99	mΩ
		V_{GS}=4.5V, I_D=30A	-	-	4.2	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=40A	-	108	-	S
I_{DSS}	Drain-Source Leakage Current	V_{DS}=32V, 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=40A	-	30	48	nC
Q_{gs}	Gate-Source Charge	V_{DS}=32V	-	2.3	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	V_{GS}=4.5V	-	20	-	nC
$t_{d(on)}$	Turn-on Delay Time	V_{DS}=20V	-	10	-	ns
t_r	Rise Time	I_D=40A	-	80	-	ns
$t_{d(off)}$	Turn-off Delay Time	R_G=3.3Ω	-	40	-	ns
t_f	Fall Time	V_{GS}=10V	-	85	-	ns
C_{iss}	Input Capacitance	V_{GS}=0V	-	2760	4410	pF
C_{oss}	Output Capacitance	V_{DS}=25V	-	605	-	pF
C_{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	210	-	pF
R_g	Gate Resistance	f=1.0MHz	-	1.4	2.8	Ω

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward On Voltage[2]	I_S=40A, V_{GS}=0V	-	-	1.2	V
t_{rr}	Reverse Recovery Time	I_S=10A, V_{GS}=0V,	-	32	-	ns
Q_{rr}	Reverse Recovery Charge	dI/dt=100A/μs	-	24	-	nC

Notes:

1.Pulse width limited by Max. junction temperature.

2.Pulse test

3.Package limitation current is 80A.

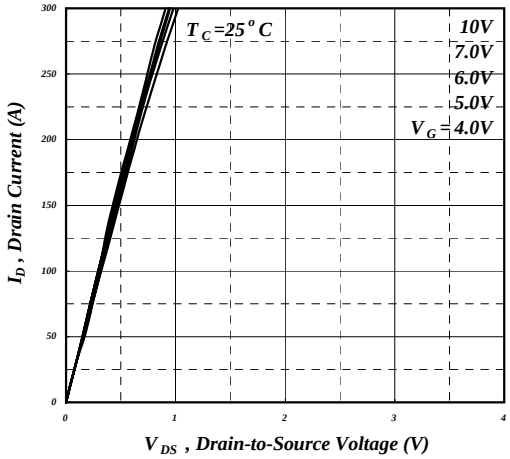


Fig 1. Typical Output Characteristics

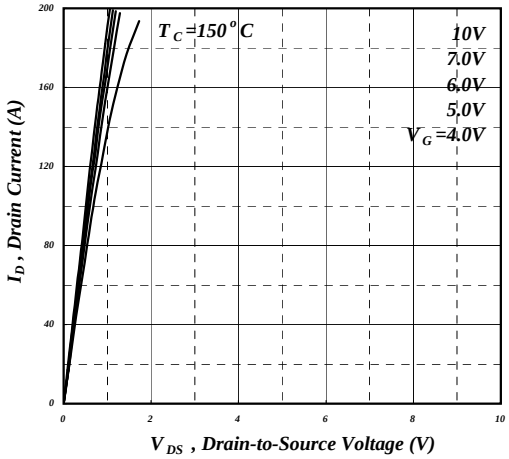


Fig 2. Typical Output Characteristics

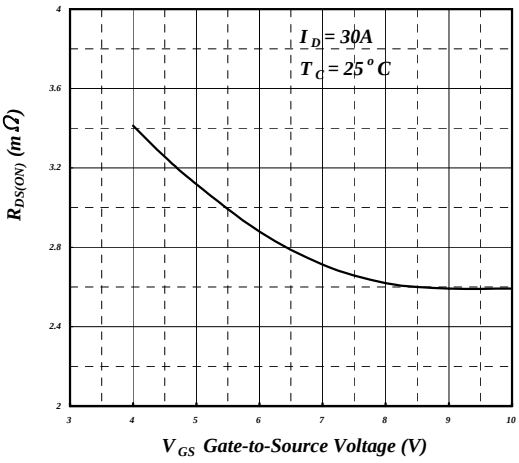


Fig 3. On-Resistance v.s. Gate Voltage

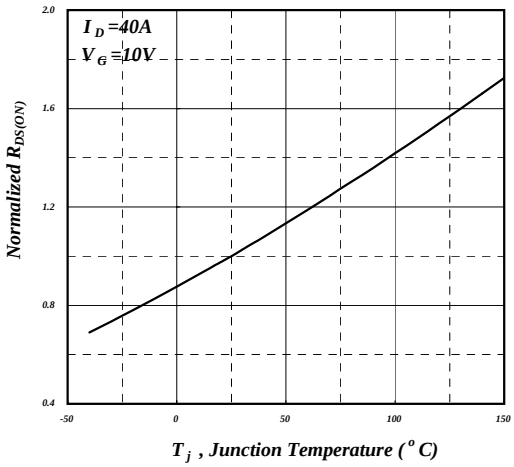


Fig 4. Normalized On-Resistance v.s. Junction Temperature

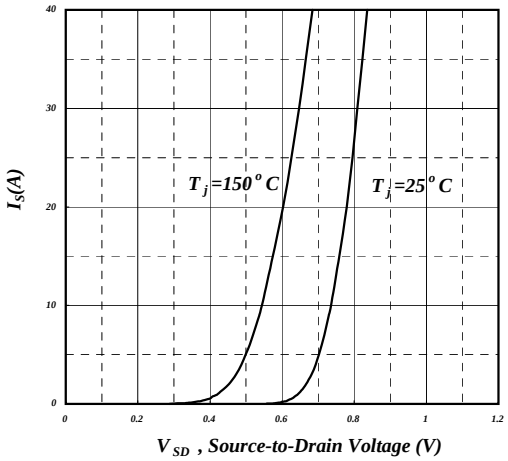


Fig 5. Forward Characteristic of Reverse Diode

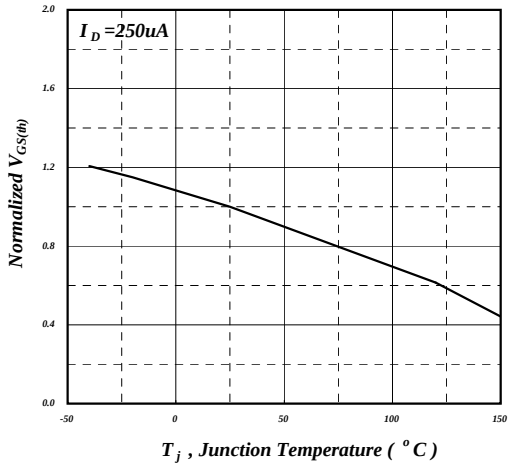


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

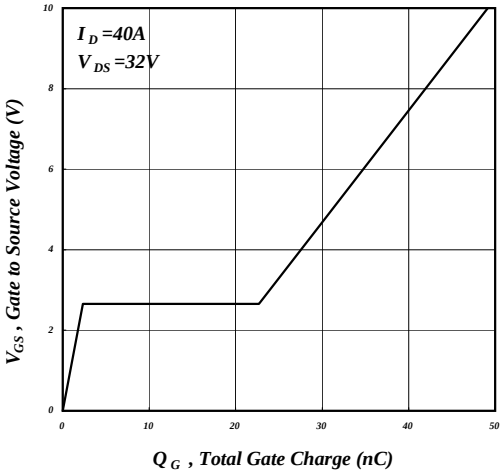


Fig 7. Gate Charge Characteristics

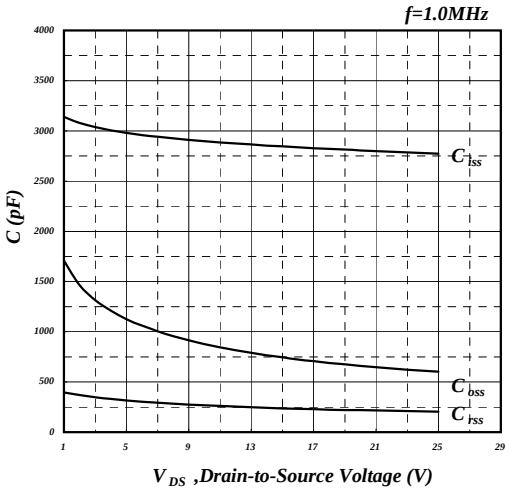


Fig 8. Typical Capacitance Characteristics

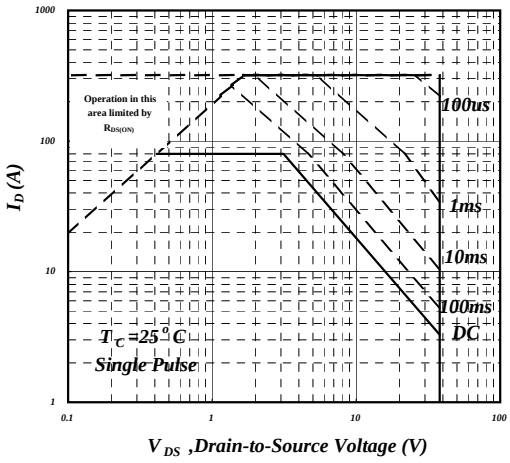


Fig 9. Maximum Safe Operating Area

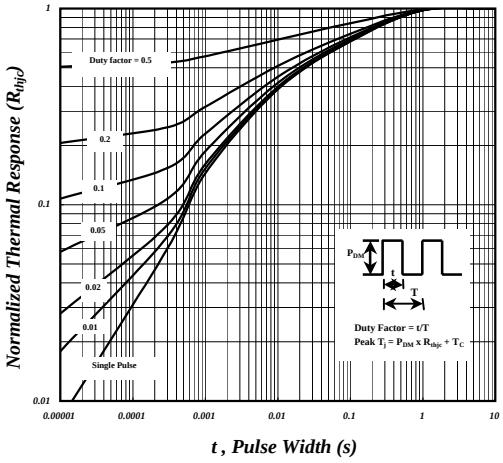


Fig 10. Effective Transient Thermal Impedance

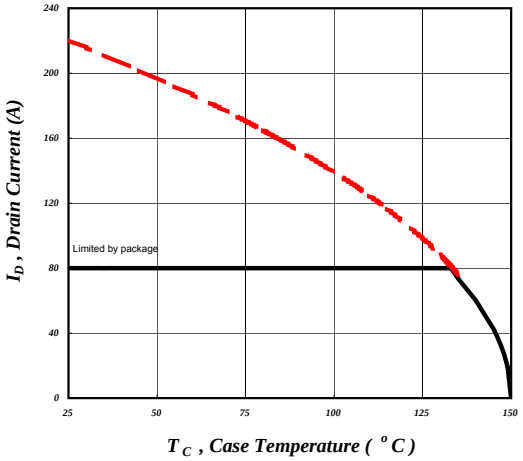


Fig 11. Maximum Continuous Drain Current v.s. Case Temperature

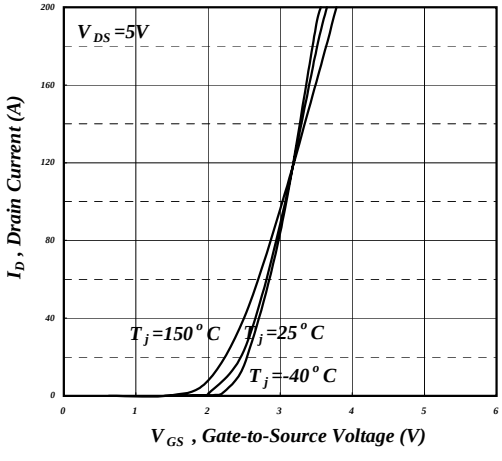


Fig 12. Transfer Characteristics