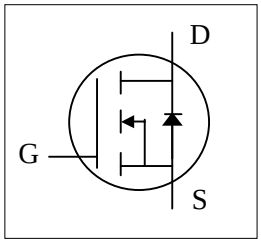
AP04N60S-H-HF

Halogen-Free Product

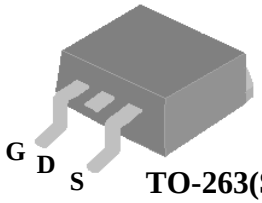
Advanced Power Electronics Corp.

N-CHANNEL ENHANCEMENT MODE POWER MOSFET

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



BV_{DSS}	700V
$R_{DS(ON)}$	2.8Ω
I_D	4A



TO-263(S)

Description

AP04N60 series are specially designed as main switching devices for universal 90~265VAC off-line AC/DC converter applications. It provide high blocking voltage to overcome voltage surge and sag in the toughest power system with the best combination of fast switching design and cost-effectiveness.

The TO-263 package is widely preferred for commercial-industrial surface mount applications and suited for low voltage applications such as DC/DC converters.

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	700	V
V_{GS}	Gate-Source Voltage	±30	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V	4	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V	2.2	A
I_{DM}	Pulsed Drain Current[1]	15	A
P_D@T_C=25℃	Total Power Dissipation	59.5	W
P_D@T_A=25℃	Total Power Dissipation[4]	3.12	W
E_{AS}	Single Pulse Avalanche Energy[3]	8	mJ
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	2.1	℃/W
Rthj-a	Maximum Thermal Resistance, Junction-ambient (PCB mount)[4]	40	℃/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	700	-	-	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V, I_D=2A	-	-	2.8	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=2A	-	3.4	-	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	I_D=1A	-	19	30	nC
Q_{gs}	Gate-Source Charge	V_{DS}=480V	-	3.5	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	V_{GS}=10V	-	8	-	nC
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=300V	-	20	-	ns
t_r	Rise Time	I_D=2A	-	20	-	ns
$t_{d(off)}$	Turn-off Delay Time	R_G=50Ω	-	100	-	ns
t_f	Fall Time	V_{GS}=10V	-	25	-	ns
C_{iss}	Input Capacitance	V_{GS}=0V	-	740	1200	pF
C_{oss}	Output Capacitance	V_{DS}=25V	-	70	-	pF
C_{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	10	-	pF

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward On Voltage[2]	I_S=2A, V_{GS}=0V	-	-	1.5	V
t_{rr}	Reverse Recovery Time	I_S=2A, V_{GS}=0V	-	310	-	ns
Q_{rr}	Reverse Recovery Charge	dI/dt=100A/μs	-	2.9	-	μC

Notes:

1.Pulse width limited by max. junction temperature.

2.Pulse test

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

4.Surface mounted on 1 in^2 copper pad of FR4 board

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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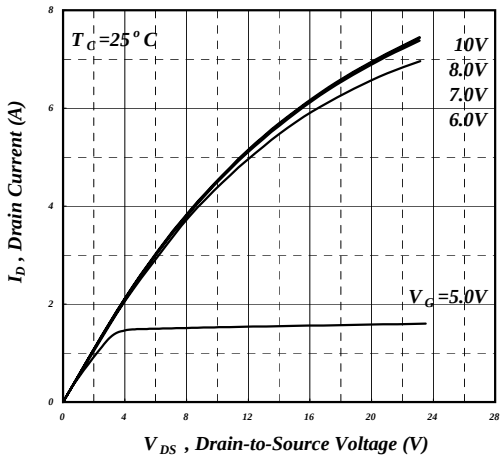

Fig 1. Typical Output Characteristics

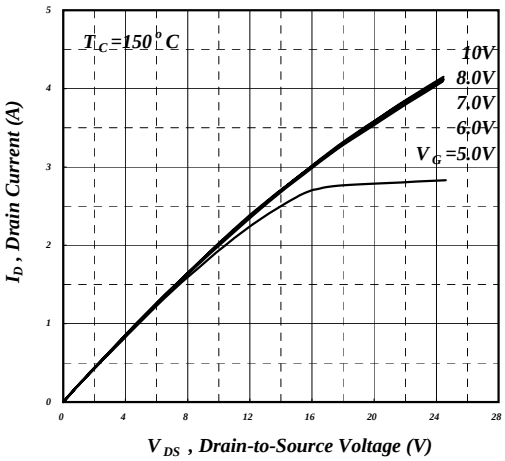

Fig 2. Typical Output Characteristics

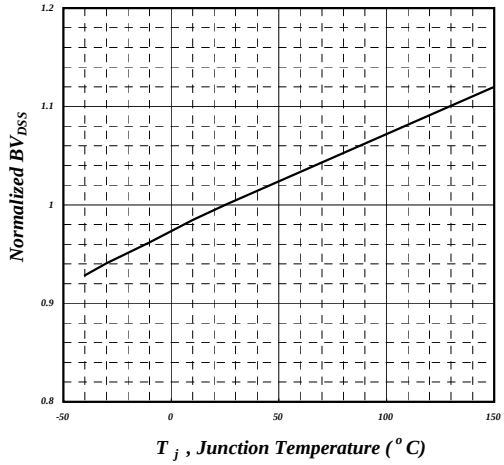

Fig 3. Normalized BV_{DSS} v.s. Junction Temperature

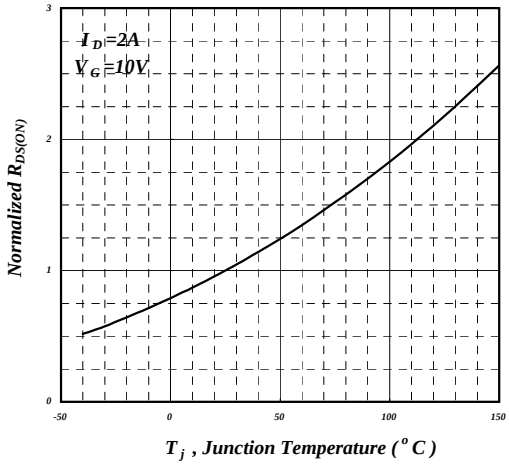

Fig 4. Normalized On-Resistance v.s. Junction Temperature

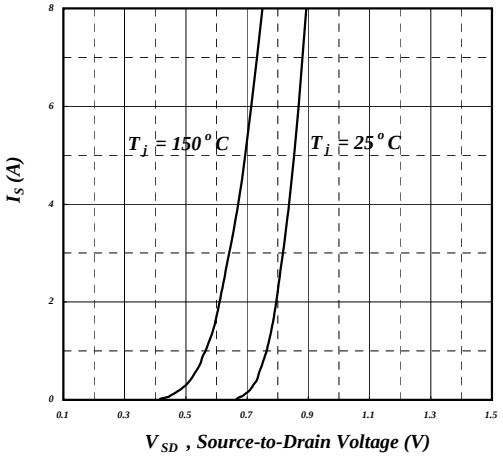

Fig 5. Forward Characteristic of Reverse Diode

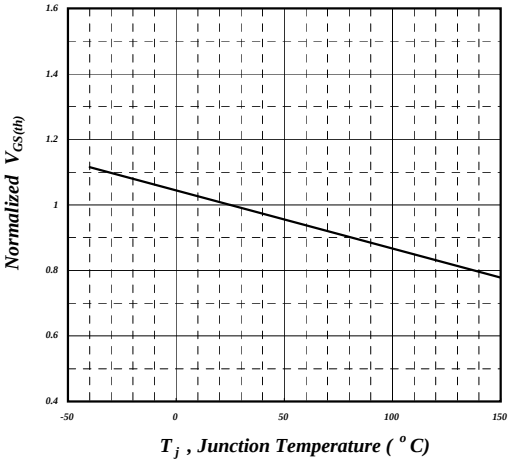

Fig 6. Gate Threshold Voltage v.s. Junction Temperature

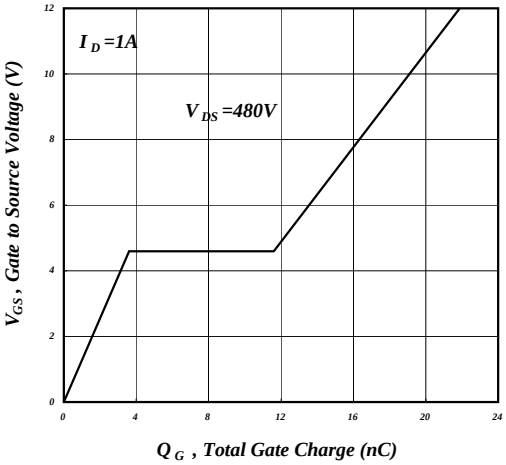

Fig 7. Gate Charge Characteristics

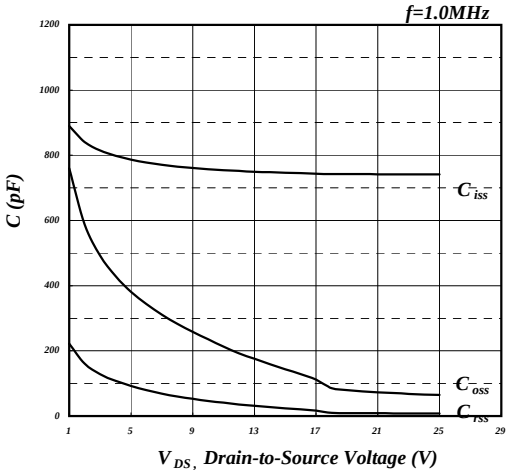

Fig 8. Typical Capacitance Characteristics

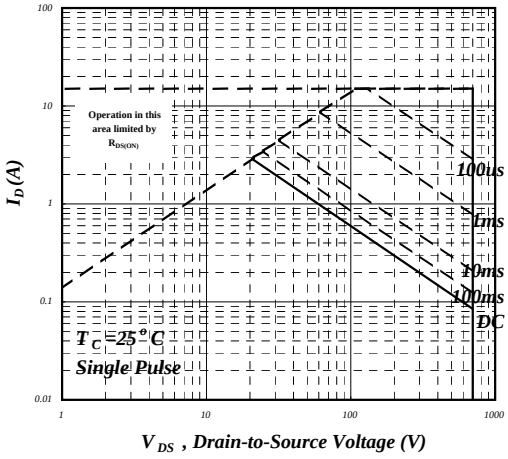

Fig 9. Maximum Safe Operating Area

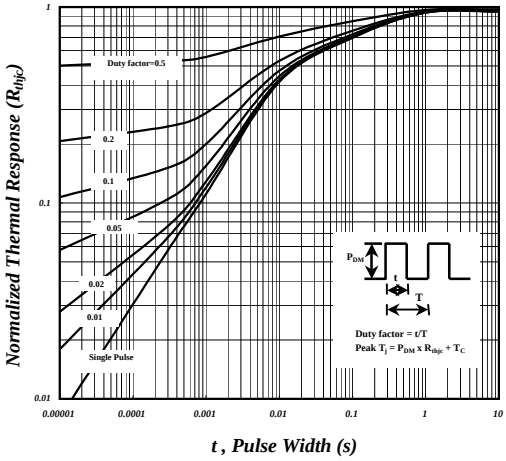

Fig 10. Effective Transient Thermal Impedance

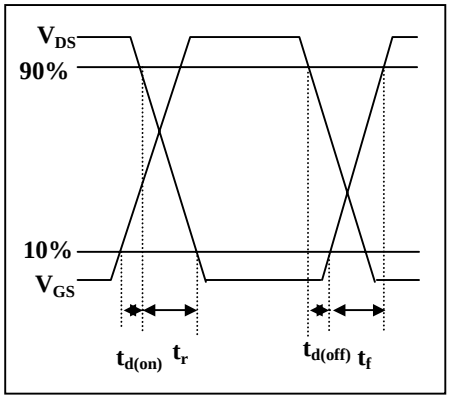

Fig 11. Switching Time Waveform

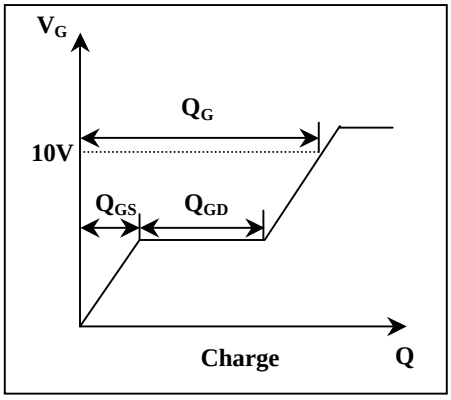

Fig 12. Gate Charge Waveform