



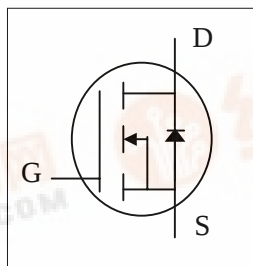
**Advanced Power
Electronics Corp.**

AP02N90I

Pb Free Plating Product

*N-CHANNEL ENHANCEMENT MODE
POWER MOSFET*

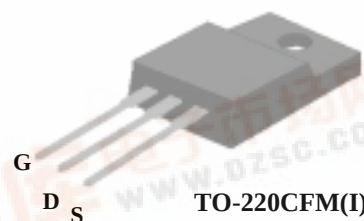
- ▼ Simple Drive Requirement
- ▼ Isolation Full Package
- ▼ Fast Switching Characteristics
- ▼ RoHS compliant



BV_{DSS}	900V
$R_{DS(ON)}$	7.2 Ω
I_D	1.9A

Description

The TO-220CFM package is universally preferred for all commercial-industrial applications. The device is suited for switch mode power supplies, AC-DC converters and high current high speed switching circuits.



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	900	V
V_{GS}	Gate-Source Voltage	± 30	V
$I_D @ T_C = 25$	Continuous Drain Current, $V_{GS} @ 10V$	1.9	A
$I_D @ T_C = 100$	Continuous Drain Current, $V_{GS} @ 10V$	1.2	A
I_{DM}	Pulsed Drain Current ¹	6	A
$P_D @ T_C = 25$	Total Power Dissipation	34.7	W
	Linear Derating Factor	0.28	W/
E_{AS}	Single Pulse Avalanche Energy ²	36	mJ
I_{AR}	Avalanche Current	1.9	A
T_{STG}	Storage Temperature Range	-55 to 150	
T_J	Operating Junction Temperature Range	-55 to 150	

Thermal Data

Symbol	Parameter	Value	Units
R_{thj-c}	Thermal Resistance Junction-case Max.	3.6	/W
R_{thj-a}	Thermal Resistance Junction-ambient Max.	62	/W



AP02N90I

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 =1mA	900	-	-	V
ΔBV _{DSS} /ΔT _j	Breakdown Voltage Temperature Coefficient	Reference to 25 °C, I _D =1mA	-	0.8	-	V/°C
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =0.85A	-	-	7.2	Ω
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	2	-	4	V
g _{fs}	Forward Transconductance	V _{DS} =10V, I _D =1.9A	-	2	-	S
I _{DSS}	Drain-Source Leakage Current (T _j =25°C)	V _{DS} =900V, V _{GS} =0V	-	-	10	μA
	Drain-Source Leakage Current (T _j =150°C)	V _{DS} =720V, V _{GS} =0V	-	-	100	μA
I _{GSS}	Gate-Source Leakage	V _{GS} =±30V	-	-	±100	nA
Q _g	Total Gate Charge ³	I _D =1.9A	-	12	20	nC
Q _{gs}	Gate-Source Charge	V _{DS} =540V	-	2.5	-	nC
Q _{gd}	Gate-Drain ("Miller") Charge	V _{GS} =10V	-	4.7	-	nC
t _{d(on)}	Turn-on Delay Time ³	V _{DD} =450V	-	10	-	ns
t _r	Rise Time	I _D =1.9A	-	5	-	ns
t _{d(off)}	Turn-off Delay Time	R _G =10Ω, V _{GS} =10V	-	18	-	ns
t _f	Fall Time	R _D =236Ω	-	9	-	ns
C _{iss}	Input Capacitance	V _{GS} =0V	-	630	1000	pF
C _{oss}	Output Capacitance	V _{DS} =25V	-	40	-	pF
C _{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	4	-	pF

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V _{SD}	Forward On Voltage ³	I _S =1.9A, V _{GS} =0V	-	-	1.3	V
t _{rr}	Reverse Recovery Time	I _S =1.9A, V _{GS} =0V,	-	360	-	ns
Q _{rr}	Reverse Recovery Charge	di/dt=100A/μs	-	1.8	-	μC

Notes:

- 1.Pulse width limited by safe operating area.
- 2.Starting T_j=25°C , V_{DD}=50V , L=20mH , R_G=25Ω , I_{AS}=1.9A.
- 3.Pulse width ≤300us , duty cycle ≤2%.

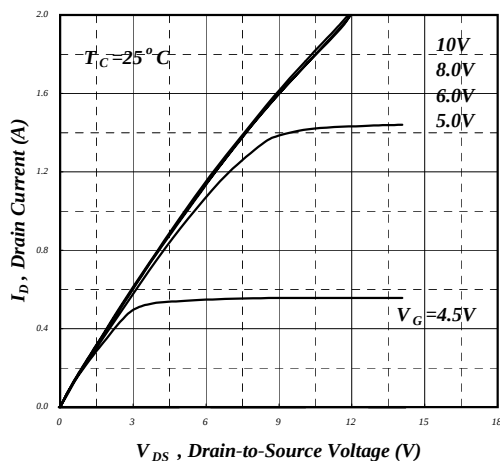


Fig 1. Typical Output Characteristics

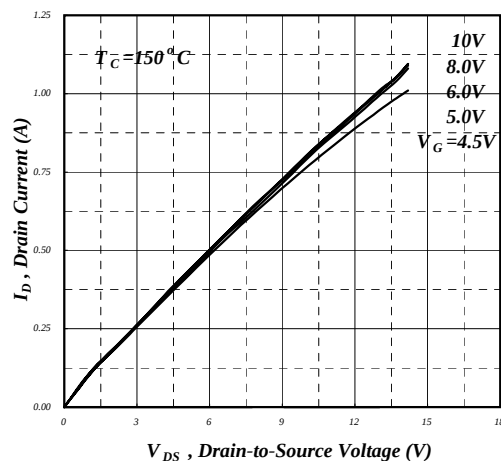


Fig 2. Typical Output Characteristics

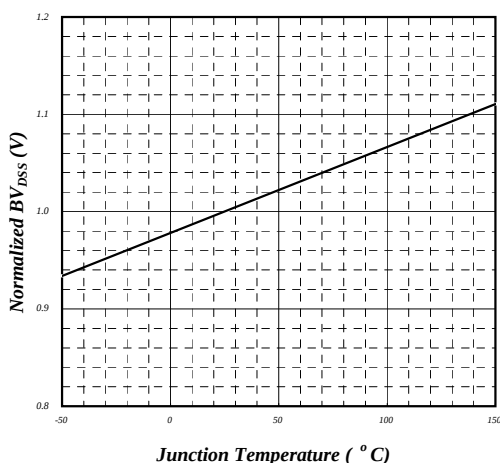


Fig 3. Normalized BV_{DSS} v.s. Junction Temperature

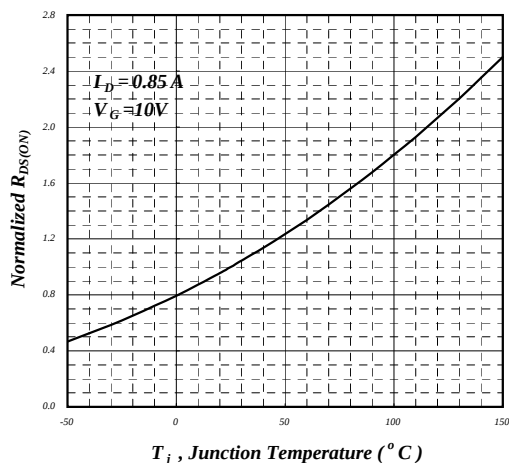


Fig 4. Normalized On-Resistance v.s. Junction Temperature

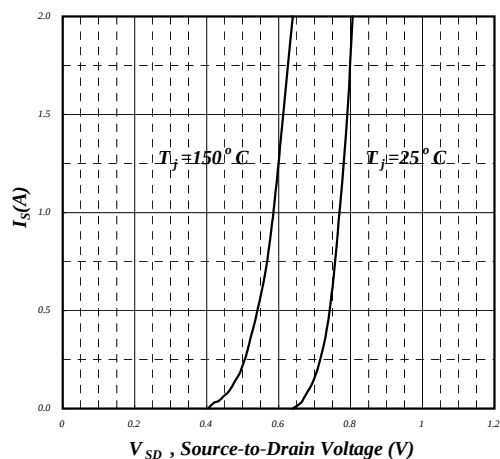


Fig 5. Forward Characteristic of Reverse Diode

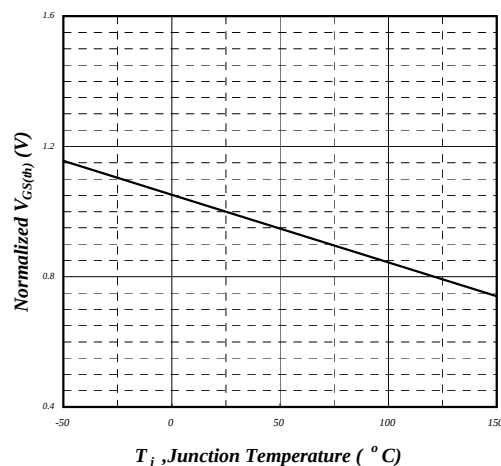


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

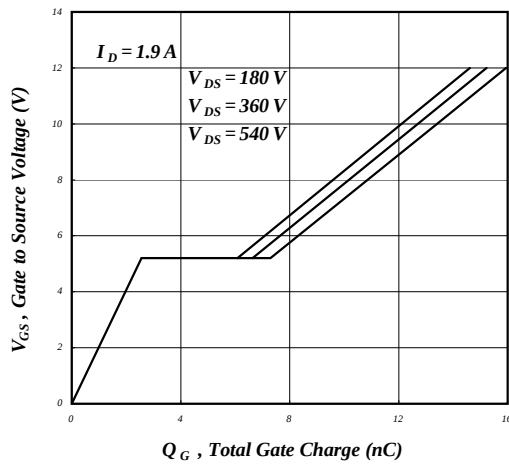


Fig 7. Gate Charge Characteristics

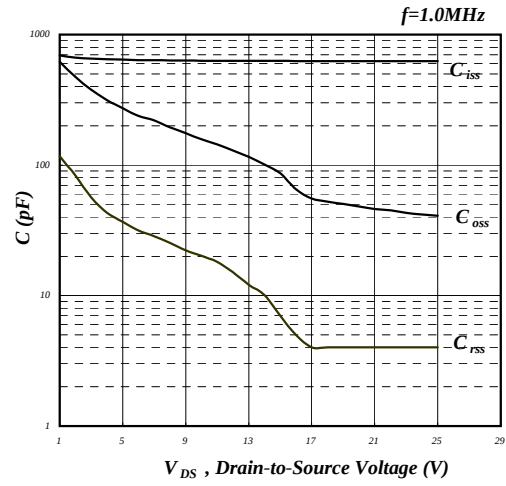


Fig 8. Typical Capacitance Characteristics

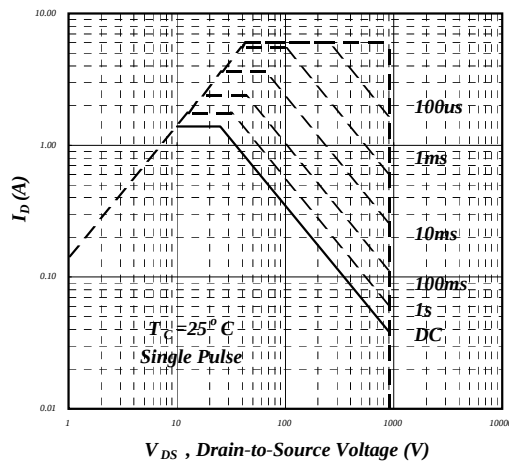


Fig 9. Maximum Safe Operating Area

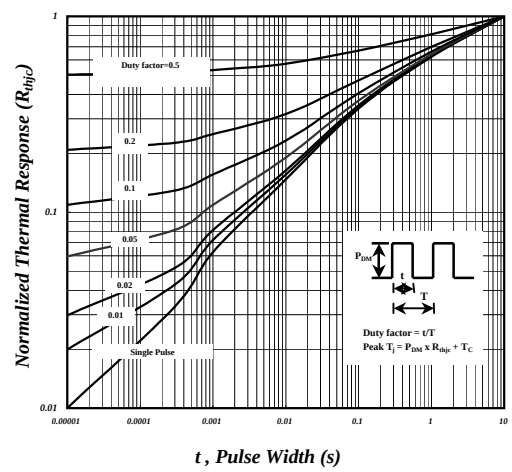


Fig 10. Effective Transient Thermal Impedance

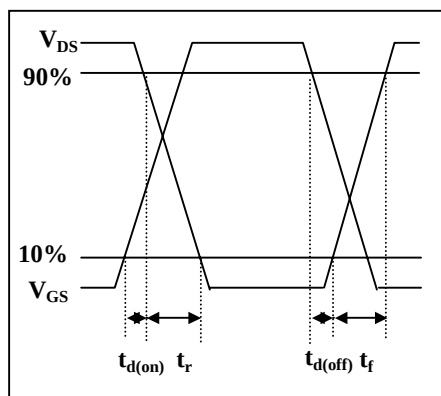


Fig 11. Switching Time Waveform

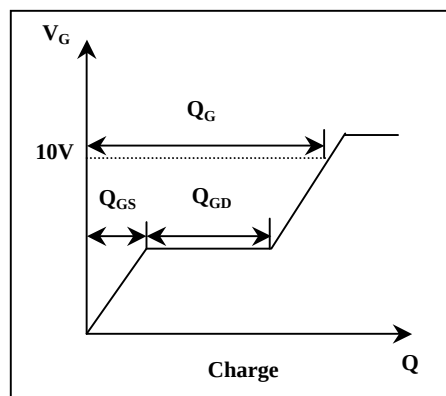


Fig 12. Gate Charge Waveform