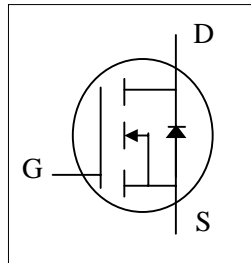




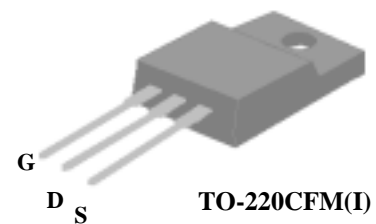
- Simple Drive Requirement
- Isolation Full Package
- Fast Switching Characteristics
- RoHS compliant



$BV_{DSS}$	900V
$R_{DS(ON)}$	7.2
$I_D$	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	$\pm 30$	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 <sup>1</sup>	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 <sup>2</sup>	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
Rthj-c	Thermal Resistance Junction-case	Max. 3.6	/W
Rthj-a	Thermal Resistance Junction-ambient	Max. 62	/W



# AP02N90I

## Electrical Characteristics @ $T_j=25^{\circ}\text{C}$ (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
$BV_{DSS}/T_j$	Breakdown Voltage Temperature Coefficient	Reference to $25^{\circ}\text{C}$ , $I_D=1mA$	-	0.8	-	V/
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=0.85A$	-	-	7.2	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	2	-	4	V
$g_{fs}$	Forward Transconductance	$V_{DS}=10V, I_D=1.9A$	-	2	-	S
$I_{DSS}$	Drain-Source Leakage Current ( $T_j=25^{\circ}\text{C}$ )	$V_{DS}=900V, V_{GS}=0V$	-	-	10	$\mu A$
	Drain-Source Leakage Current ( $T_j=150^{\circ}\text{C}$ )	$V_{DS}=720V, V_{GS}=0V$	-	-	100	$\mu A$
$I_{GSS}$	Gate-Source Leakage	$V_{GS}=\pm 30V$	-	-	$\pm 100$	nA
$Q_g$	Total Gate Charge <sup>3</sup>	$I_D=1.9A$	-	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 <sup>3</sup>	$V_{DD}=450V$	-	10	-	ns
$t_r$	Rise Time	$I_D=1.9A$	-	5	-	ns
$t_{d(off)}$	Turn-off Delay Time	$R_G=10\Omega, V_{GS}=10V$	-	18	-	ns
$t_f$	Fall Time	$R_D=236\Omega$	-	9	-	ns
$C_{iss}$	Input Capacitance	$V_{GS}=0V$	-	630	1000	pF
$C_{oss}$	Output Capacitance	$V_{DS}=25V$	-	40	-	pF
$C_{riss}$	Reverse Transfer Capacitance	$f=1.0MHz$	-	4	-	pF

## Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_{SD}$	Forward On Voltage <sup>3</sup>	$I_S=1.9A, V_{GS}=0V$	-	-	1.3	V
$t_{rr}$	Reverse Recovery Time	$I_S=1.9A, V_{GS}=0V,$	-	360	-	ns
$Q_{rr}$	Reverse Recovery Charge	$dI/dt=100A/\mu s$	-	1.8	-	$\mu C$

### Notes:

1. Pulse width limited by safe operating area.
2. Starting  $T_j=25^{\circ}\text{C}$ ,  $V_{DD}=50V$ ,  $L=20mH$ ,  $R_G=25\Omega$ ,  $I_{AS}=1.9A$ .
3. Pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .

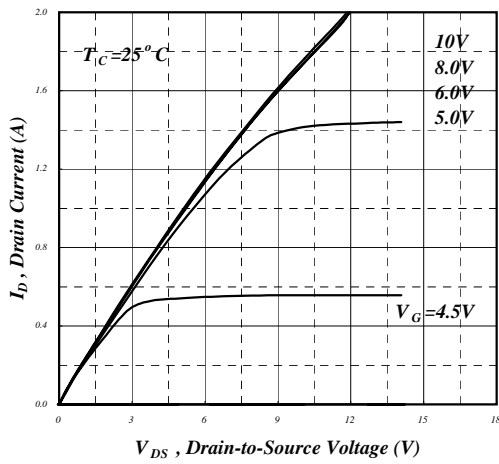


Fig 1. Typical Output Characteristics

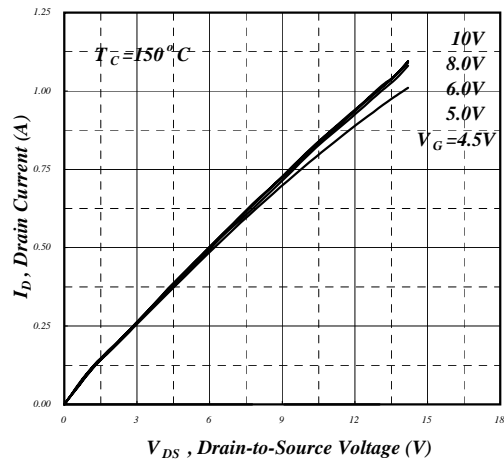


Fig 2. Typical Output Characteristics

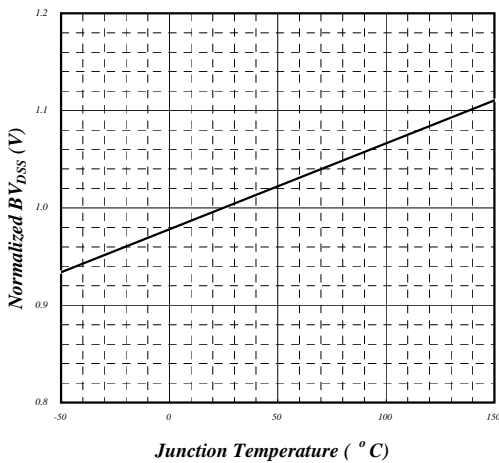


Fig 3. Normalized  $BV_{DSS}$  v.s. Junction Temperature

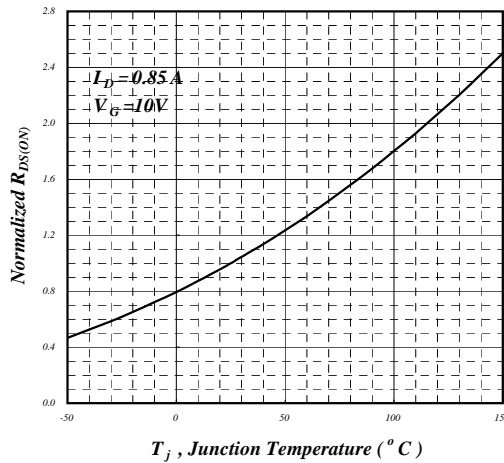


Fig 4. Normalized On-Resistance v.s. Junction Temperature

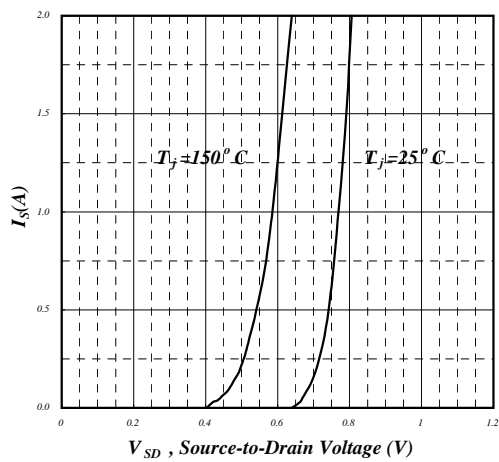


Fig 5. Forward Characteristic of Reverse Diode

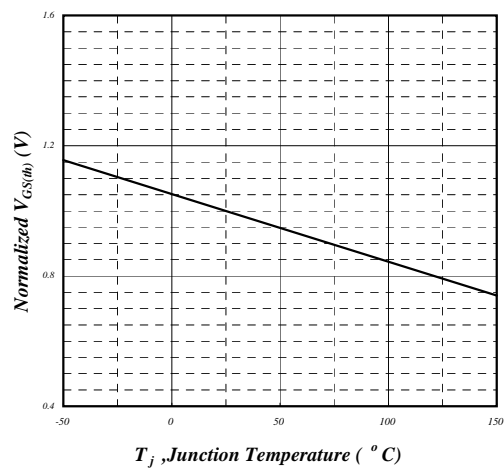


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

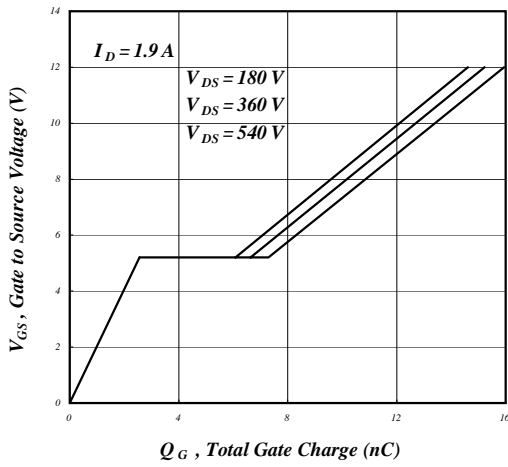


Fig 7. Gate Charge Characteristics

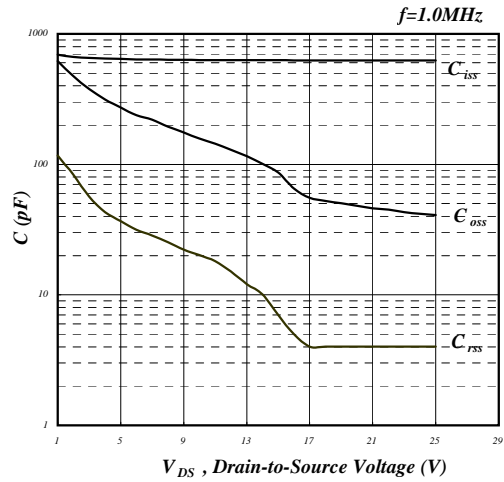


Fig 8. Typical Capacitance Characteristics

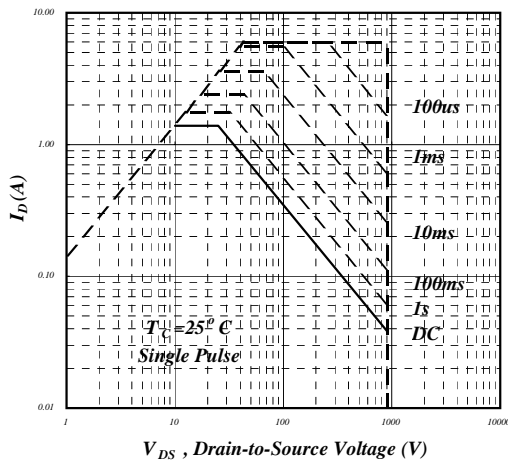


Fig 9. Maximum Safe Operating Area

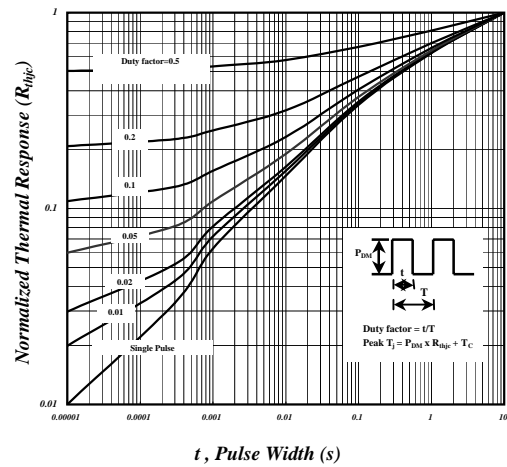


Fig 10. Effective Transient Thermal Impedance

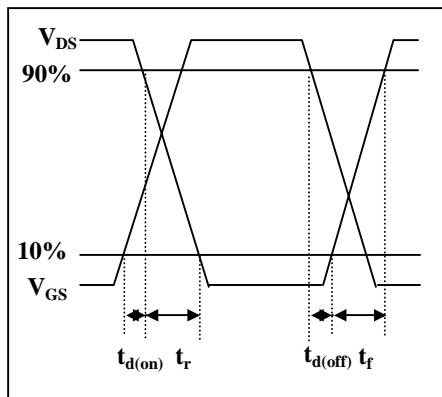


Fig 11. Switching Time Waveform

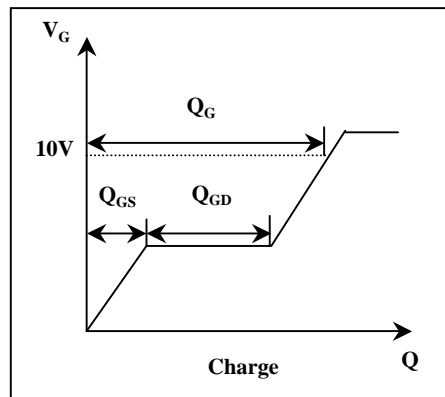


Fig 12. Gate Charge Waveform