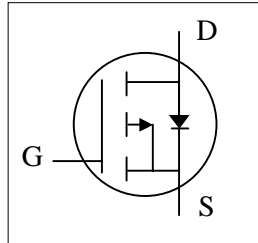# AP40P03GI

Advanced Power Electronics Corp.

P-CHANNEL ENHANCEMENT MODE

POWER MOSFET

- **Lower On-resistance**
- **Simple Drive Requirement**
- **Fast Switching Characteristic**
- **RoHS Compliant**
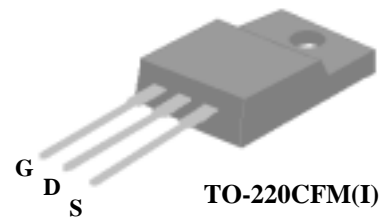

BV_{DSS}	-30V
$R_{DS(ON)}$	28m
I_D	-30A

Description

The 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-220CFM isolation package is universally preferred for all commercial-industrial through hole applications.

TO-220CFM(I)

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-30	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25	Continuous Drain Current, V_{GS} @ 10V	-30	A
I_D@T_C=100	Continuous Drain Current, V_{GS} @ 10V	-18	A
I_{DM}	Pulsed Drain Current[1]	-120	A
P_D@T_C=25	Total Power Dissipation	31.3	W
	Linear Derating Factor	0.25	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	Thermal Resistance Junction-case	Max.	4	/W
Rthj-a	Thermal Resistance Junction-ambient	Max.	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	-30	-	-	V
BV$_{DSS}$/ T$_j$	Breakdown Voltage Temperature Coefficient	Reference to 25 , I$_D$=-1mA	-	-0.02	-	V/
R$_{DS(ON)}$	Static Drain-Source On-Resistance^2	V$_{GS}$=-10V, I$_D$=-18A	-	-	28	m
		V$_{GS}$=-4.5V, I$_D$=-10A	-	-	50	m
V$_{GS(th)}$	Gate Threshold Voltage	V$_{DS}$=V$_{GS}$, I$_D$=-250uA	-1	-	-3	V
g$_{fs}$	Forward Transconductance	V$_{DS}$=-10V, I$_D$=-18A	-	21	-	S
I$_{DSS}$	Drain-Source Leakage Current (T$_j$=25°C)	V$_{DS}$=-30V, V$_{GS}$=0V	-	-	-1	uA
	Drain-Source Leakage Current (T$_j$=150°C)	V$_{DS}$=-24V, V$_{GS}$=0V	-	-	-25	uA
I$_{GSS}$	Gate-Source Leakage	V$_{GS}$= ±20V	-	-	±100	nA
Q$_g$	Total Gate Charge^2	I$_D$=-18A	-	15	24	nC
Q$_{gs}$	Gate-Source Charge	V$_{DS}$=-25V	-	3	-	nC
Q$_{gd}$	Gate-Drain ("Miller") Charge	V$_{GS}$=-4.5V	-	10	-	nC
t$_{d(on)}$	Turn-on Delay Time^2	V$_{DS}$=-15V	-	10	-	ns
t$_r$	Rise Time	I$_D$=-18A	-	48	-	ns
t$_{d(off)}$	Turn-off Delay Time	R$_G$=3.3 ,V$_{GS}$=-10V	-	31	-	ns
t$_f$	Fall Time	R$_D$=0.8	-	66	-	ns
C$_{iss}$	Input Capacitance	V$_{GS}$=0V	-	910	1460	pF
C$_{oss}$	Output Capacitance	V$_{DS}$=-25V	-	300	-	pF
C$_{rss}$	Reverse Transfer Capacitance	f=1.0MHz	-	210	-	pF
R$_g$	Gate Resistance	f=1.0MHz	-	11	17	

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V$_{SD}$	Forward On Voltage^2	I$_S$=-18A, V$_{GS}$=0V	-	-	-1.3	V
t$_{rr}$	Reverse Recovery Time^2	I$_S$=-18A, V$_{GS}$=0V,	-	30	-	ns
Q$_{rr}$	Reverse Recovery Charge	dI/dt=-100A/µs	-	25	-	nC

Notes:

1.Pulse width limited by safe operating area.

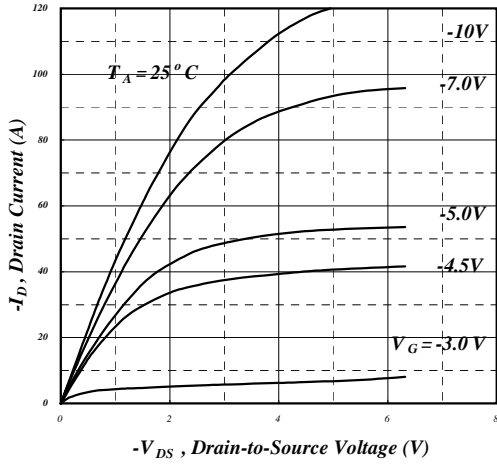2.Pulse width ≤300us , duty cycle ≤2%.

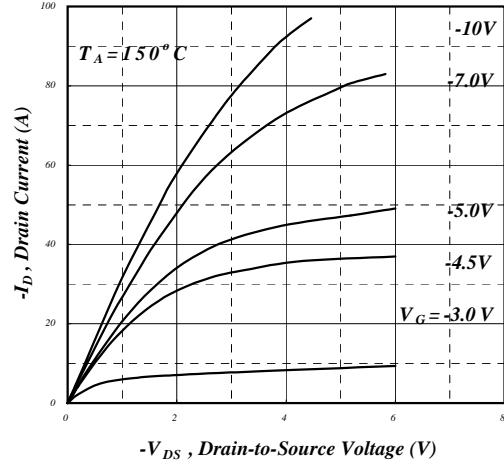**Fig 1. Typical Output Characteristics**

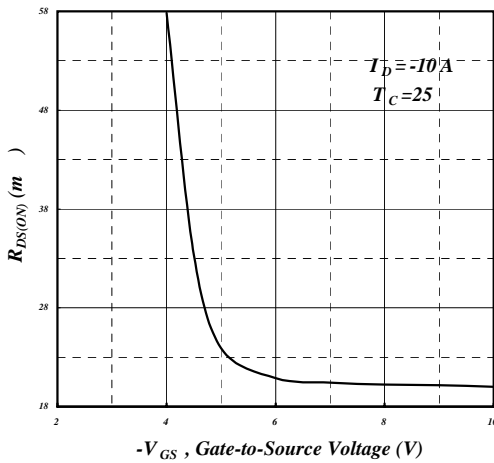**Fig 2. Typical Output Characteristics**

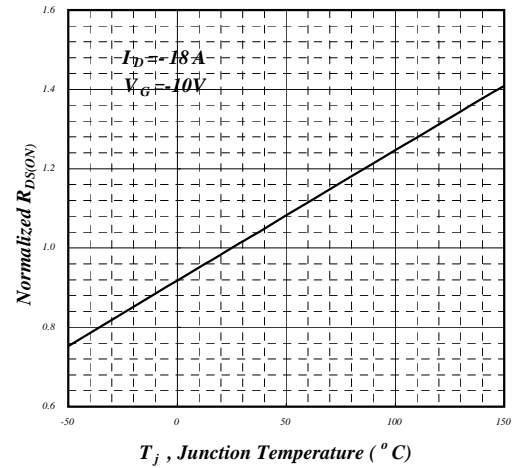**Fig 3. On-Resistance v.s. Gate Voltage**

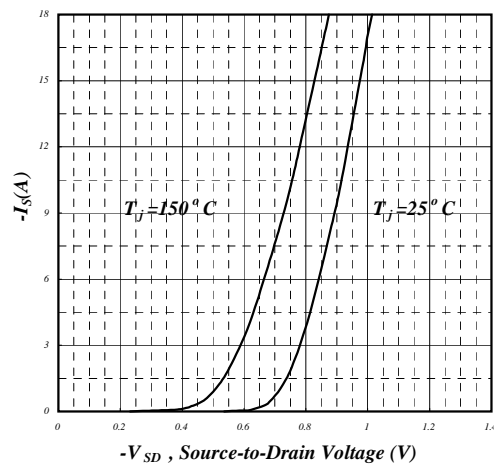**Fig 4. Normalized On-Resistance
v.s. Junction Temperature**

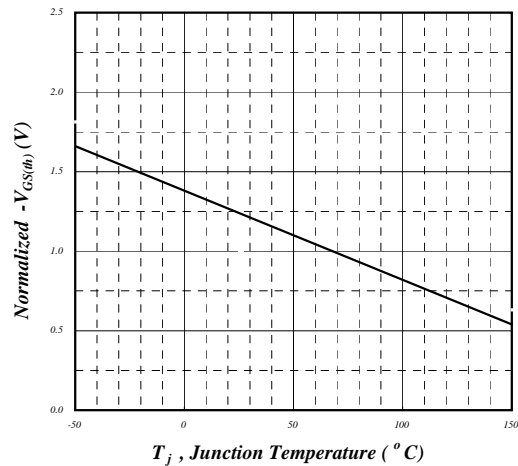**Fig 5. Forward Characteristic of
Reverse Diode**

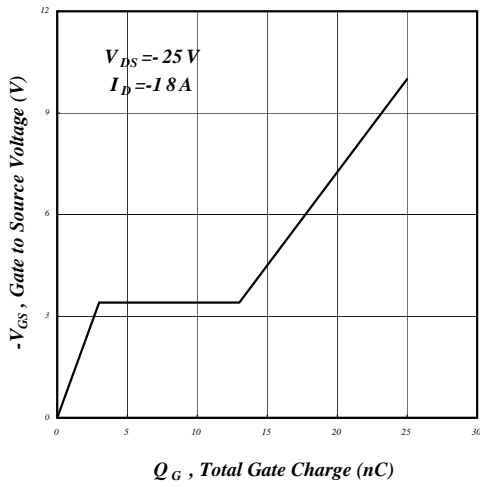**Fig 6. Gate Threshold Voltage v.s.
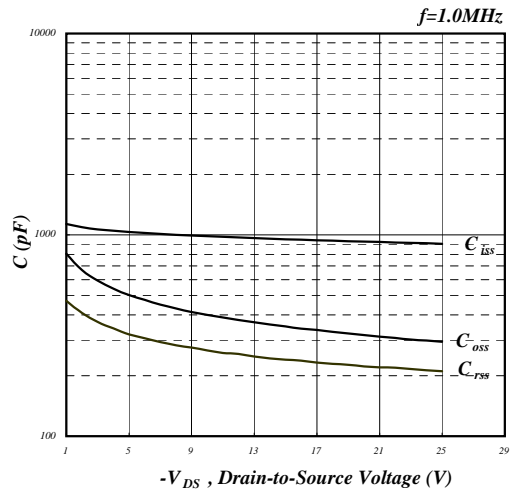Junction Temperature**

Fig 7. Gate Charge Characteristics
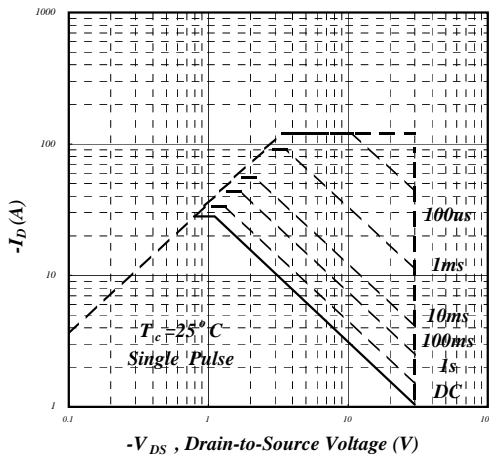

Fig 8. Typical Capacitance Characteristics

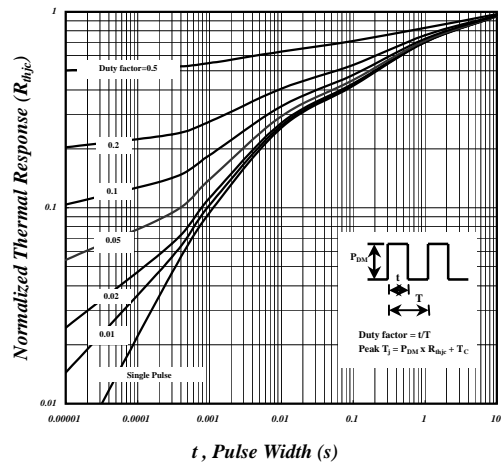**Fig 9. Maximum Safe Operating Area**
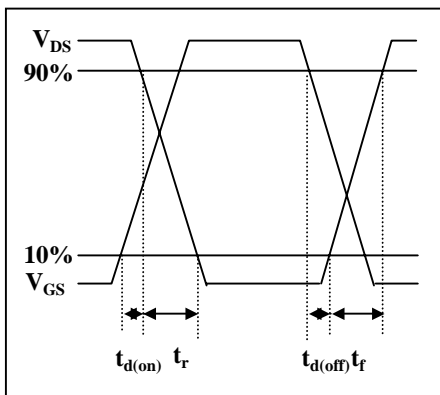

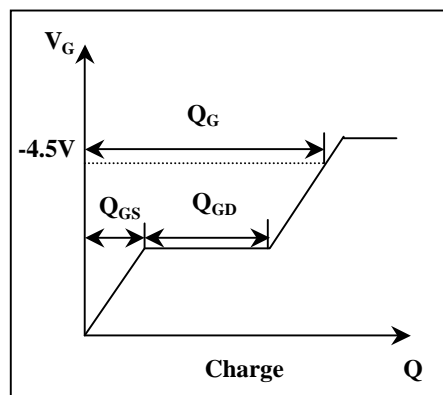**Fig 10. Effective Transient Thermal Impedance**

Fig 11. Switching Time Waveform

Fig 12. Gate Charge Waveform