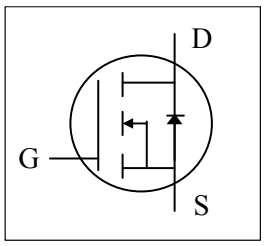
AP6NA3R3LI

Halogen-Free Product

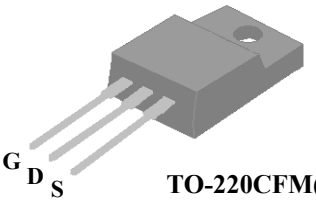
Advanced Power Electronics Corp.

N-CHANNEL ENHANCEMENT MODE POWER MOSFET

- ▼ **100% R_g & UIS Test**
- ▼ **Simple Drive Requirement**
- ▼ **Ultra Low On-resistance**
- ▼ **RoHS Compliant & Halogen-Free**



BV_{DSS}	60V
$R_{DS(ON)}$	3.3mΩ
I_D	76A



TO-220CFM(I)

Description

AP6NA3R3L 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-220CFM package is widely preferred for all commercial-industrial through hole applications. The mold compound provides a high isolation voltage capability and low thermal resistance between the tab and the external heat-sink.

Absolute Maximum Ratings@T_j=25°C(unless otherwise specified)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Drain Current, V_{GS} @ 10V	76	A
I_D@T_C=100℃	Drain Current, V_{GS} @ 10V	48	A
I_{DM}	Pulsed Drain Current[1]	300	A
P_D@T_C=25℃	Total Power Dissipation	32.9	W
P_D@T_A=25℃	Total Power Dissipation	1.92	W
E_{AS}	Single Pulse Avalanche Energy[3]	125	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	3.8	℃/W
Rthj-a	Maximum Thermal Resistance, Junction-ambient	65	℃/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	60	-	-	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V, I_D=40A	-	-	3.3	mΩ
		V_{GS}=5V, I_D=30A	-	-	5.4	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250uA	1	-	3	V
g_{fs}	Forward Transconductance	V_{DS}=5V, I_D=40A	-	100	-	S
I_{DSS}	Drain-Source Leakage Current	V_{DS}=48V, V_{GS}=0V	-	-	25	uA
I_{GSS}	Gate-Source Leakage	V_{GS}=±20V, V_{DS}=0V	-	-	±0.1	uA
Q_g	Total Gate Charge	I_D=40A	-	60	96	nC
Q_{gs}	Gate-Source Charge	V_{DS}=30V	-	13	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	V_{GS}=10V	-	15	-	nC
$t_{d(on)}$	Turn-on Delay Time	V_{DS}=30V	-	12	-	ns
t_r	Rise Time	I_D=40A	-	56	-	ns
$t_{d(off)}$	Turn-off Delay Time	R_G=3Ω	-	33	-	ns
t_f	Fall Time	V_{GS}=10V	-	12	-	ns
C_{iss}	Input Capacitance	V_{GS}=0V	-	3050	4880	pF
C_{oss}	Output Capacitance	V_{DS}=50V	-	600	-	pF
C_{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	25	-	pF
R_g	Gate Resistance	f=1.0MHz	-	1	2	Ω

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward On Voltage[2]	I_S=40A, V_{GS}=0V	-	-	1.3	V
t_{rr}	Reverse Recovery Time	I_S=40A, V_{GS}=0V	-	45	-	ns
Q_{rr}	Reverse Recovery Charge	dI/dt=100A/μs	-	36	-	nC

Notes:

1.Pulse width limited by Max. junction temperature.

2.Pulse test

3.Starting T_j=25°C , V_{DD}=30V , L=0.1mH , R_G=25Ω , V_{GS}=10V

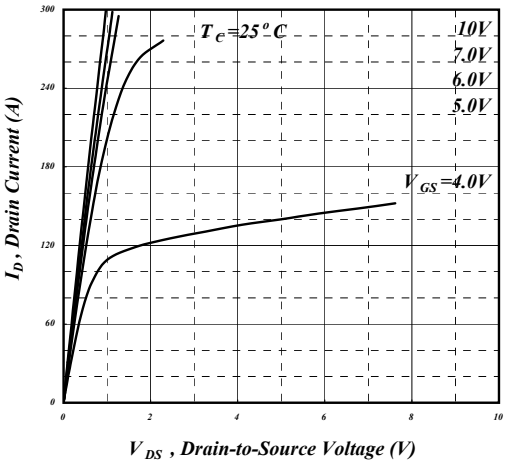


Fig 1. Typical Output Characteristics

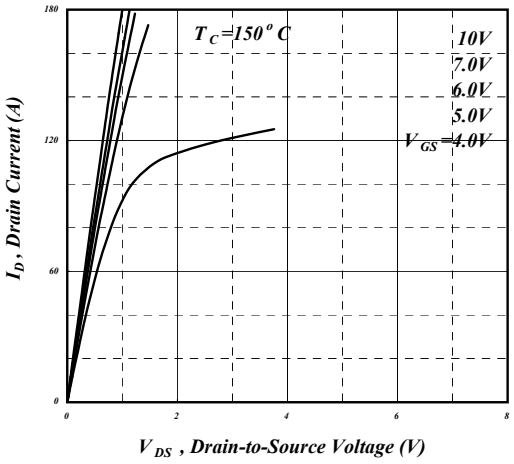


Fig 2. Typical Output Characteristics

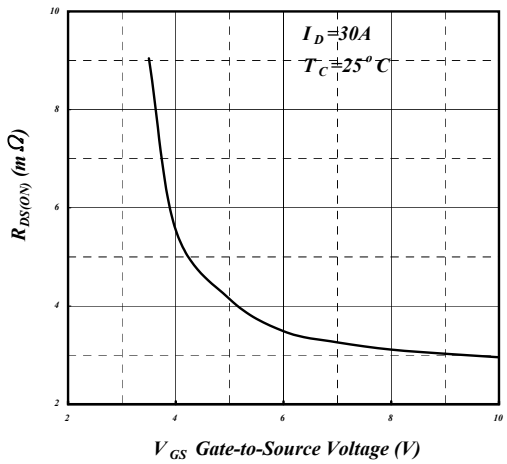


Fig 3. On-Resistance v.s. Gate Voltage

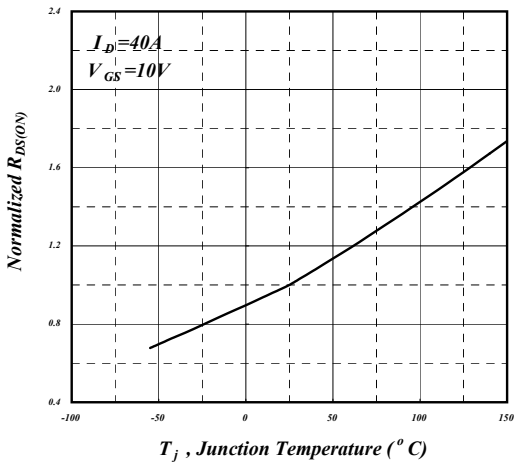


Fig 4. Normalized On-Resistance v.s. Junction Temperature

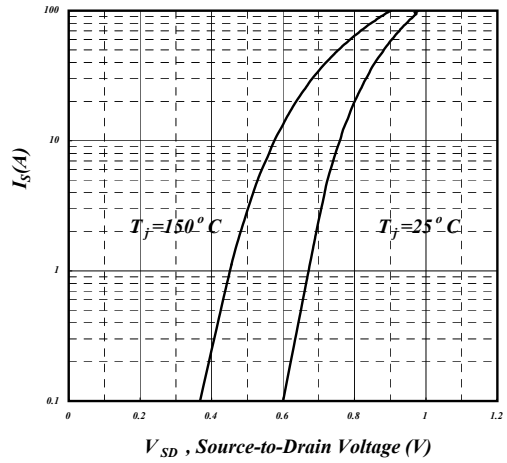


Fig 5. Forward Characteristic of Reverse Diode

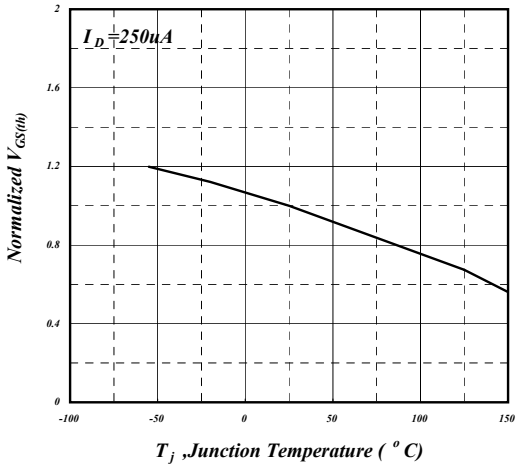


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

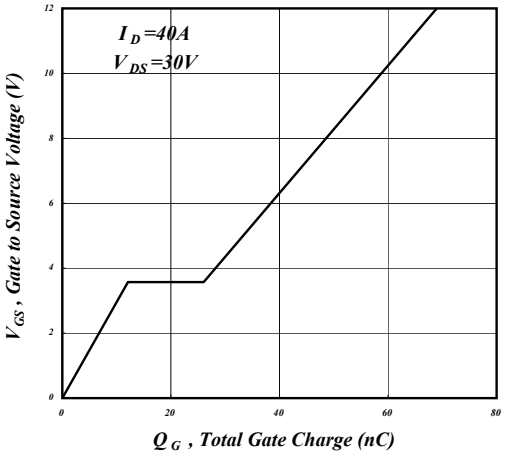


Fig 7. Gate Charge Characteristics

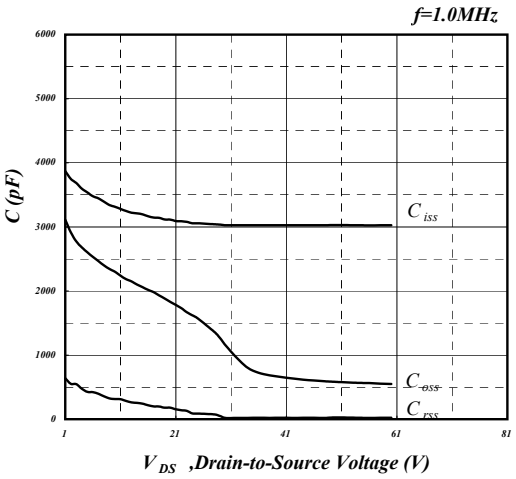


Fig 8. Typical Capacitance Characteristics

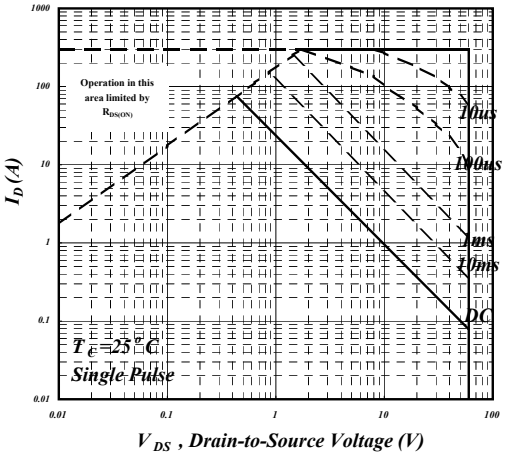


Fig 9. Maximum Safe Operating Area

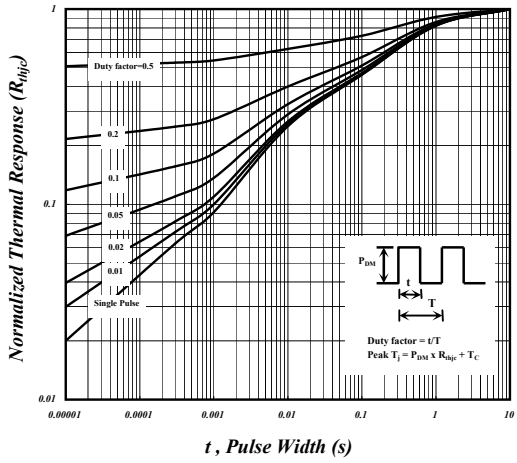


Fig 10. Effective Transient Thermal Impedance

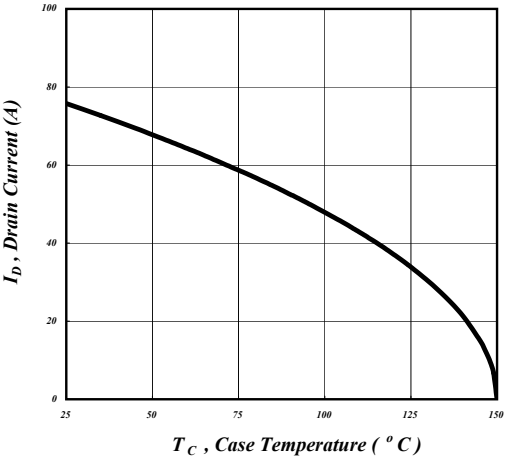


Fig 11. Drain Current v.s. Case Temperature

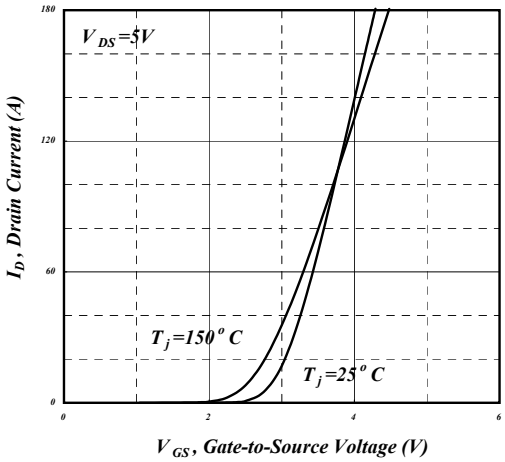


Fig 12. Transfer Characteristics

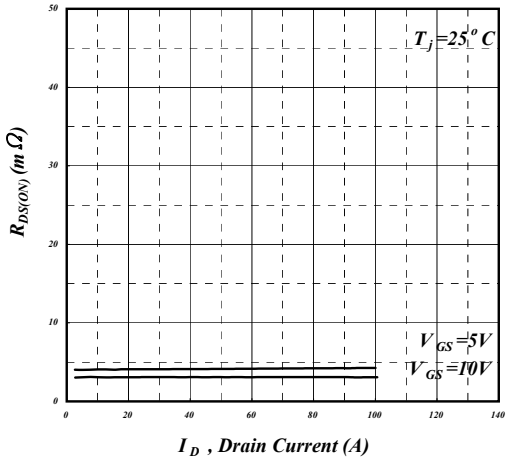


Fig 13. Typ. Drain-Source on State Resistance

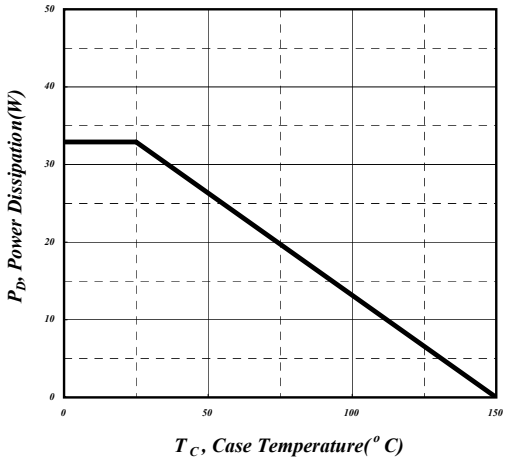


Fig 14. Total Power Dissipation

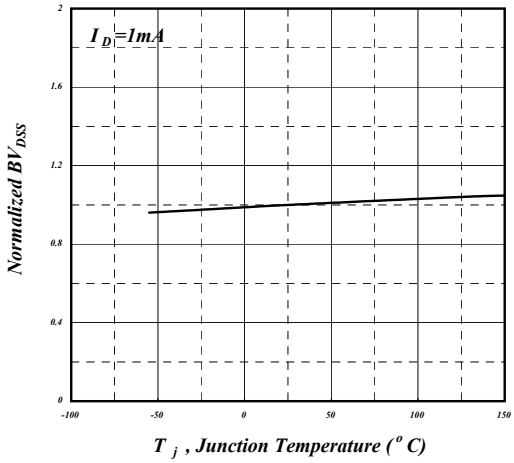
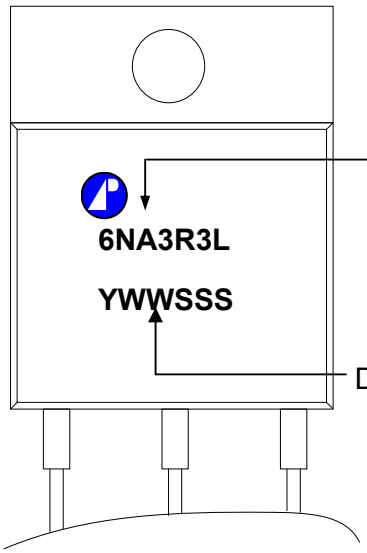
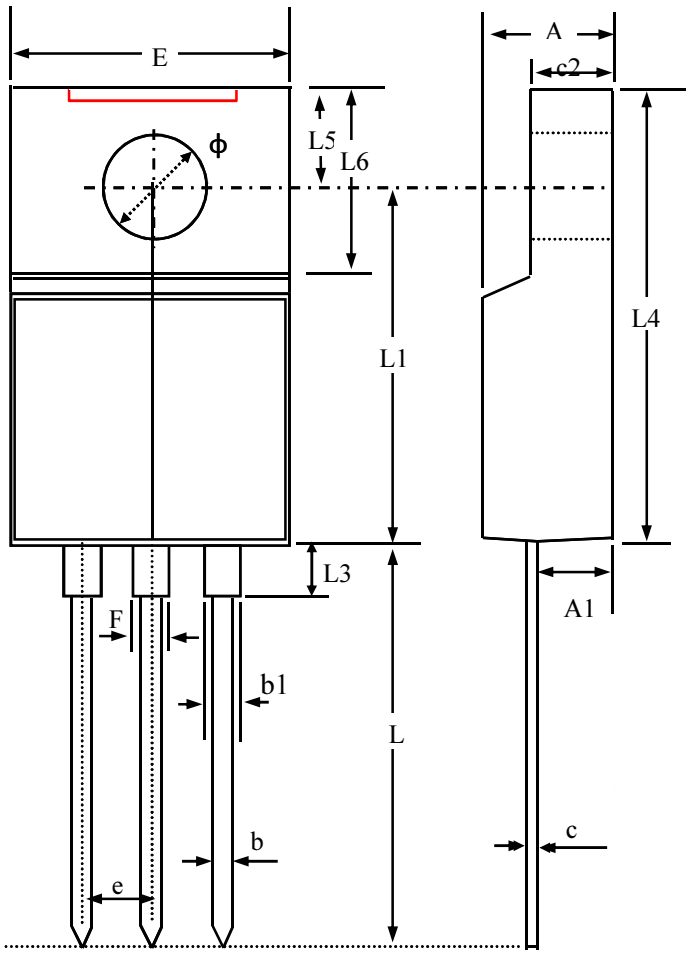


Fig 15. Normalized BV_{DSS} v.s. Junction Temperature

MARKING INFORMATION



Package Outline : TO-220CFM



SYMBOLS	Millimeters		
	MIN	NOM	MAX
A	4.20	4.55	4.90
A1	1.90	2.45	3.00
b	0.50	0.80	1.10
b1	0.85	1.18	1.50
c	0.30	0.65	1.00
c2	2.30	2.60	3.10
E	9.70	10.25	10.80
L	12.00	13.50	15.00
L1	11.50	12.25	13.00
L3	2.82	3.37	3.92
L4	14.70	15.60	16.50
L5	2.30	3.10	3.90
L6	6.20	6.85	7.50
φ	3.00	3.20	3.40
e	2.40	2.55	2.70
F	0.80	1.35	1.90

1.All Dimensions Are in Millimeters.

2.Dimension Does Not Include Mold Protrusions.

Draw No. M1-I3-G-v09-1

TO-220CFM FOOTPRINT：