AP70SL1K4AI

Advanced Power Electronics Corp.

N-CHANNEL ENHANCEMENT MODE

POWER MOSFET

▼ **100% R$_g$ & UIS Test**

▼ **Fast Switching Characteristic**

▼ **Simple Drive Requirement**

▼ **RoHS Compliant & Halogen-Free**

BV$_{DSS}$	700V
R$_{DS(ON)}$	1.4 Ω
I$_D$[3,4]	3.2A

TO-220CFM(I)

Description

AP70SL1K4A 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	700	V
V$_{GS}$	Gate-Source Voltage	$\pm$20	V
I$_D$@T$_C$=25℃	Drain Current, V$_{GS}$ @ 10V[3,4]	3.2	A
I$_D$@T$_C$=100℃	Drain Current, V$_{GS}$ @ 10V[3,4]	2.1	A
I$_{DM}$	Pulsed Drain Current[1]	8.3	A
dv/dt	MOSFET dv/dt Ruggedness (V$_{DS}$ = 0 …400V)	50	V/ns
P$_D$@T$_C$=25℃	Total Power Dissipation	25	W
P$_D$@T$_A$=25℃	Total Power Dissipation	1.13	W
E$_{AS}$	Single Pulse Avalanche Energy[5]	27	mJ
dv/dt	Peak Diode Recovery dv/dt[6]	15	V/ns
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	5	℃/W
Rthj-a	Maximum Thermal Resistance, Junction-ambient	65	℃/W

Data & specifications subject to change without notice

AP70SL1K4AI

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$_D$=1A	-	-	1.4	Ω
V$_{GS(th)}$	Gate Threshold Voltage	V$_{DS}$=V$_{GS}$, I$_D$=250uA	2	-	5	V
g$_{fs}$	Forward Transconductance	V$_{DS}$=20V, I$_D$=1A	-	2.4	-	S
I$_{DSS}$	Drain-Source Leakage Current	V$_{DS}$=560V, V$_{GS}$=0V	-	-	100	uA
I$_{GSS}$	Gate-Source Leakage	V$_{GS}$=±20V, V$_{DS}$=0V	-	-	±100	nA
Q$_g$	Total Gate Charge	I$_D$=1.5A	-	10.5	16.8	nC
Q$_{gs}$	Gate-Source Charge	V$_{DS}$=480V	-	2.8	-	nC
Q$_{gd}$	Gate-Drain ("Miller") Charge	V$_{GS}$=10V	-	4.2	-	nC
t$_{d(on)}$	Turn-on Delay Time	V$_{DD}$=400V	-	10	-	ns
t$_r$	Rise Time	I$_D$=1.5A	-	7	-	ns
t$_{d(off)}$	Turn-off Delay Time	R$_G$=10Ω	-	22	-	ns
t$_f$	Fall Time	V$_{GS}$=10V	-	14	-	ns
C$_{iss}$	Input Capacitance	V$_{GS}$=0V	-	380	608	pF
C$_{oss}$	Output Capacitance	V$_{DS}$=100V	-	15	-	pF
C$_{rss}$	Reverse Transfer Capacitance	f=1.0MHz	-	6	-	pF
R$_g$	Gate Resistance	f=1.0MHz	-	6	12	Ω

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V$_{SD}$	Forward On Voltage[2]	I$_S$=1A, V$_{GS}$=0V	-	0.8	-	V
t$_{rr}$	Reverse Recovery Time	I$_S$=1.5, V$_{GS}$=0V	-	150	-	ns
Q$_{rr}$	Reverse Recovery Charge	dI/dt=50A/μs	-	520	-	nC

Notes:

1.Pulse width limited by max. junction temperature.

2.Pulse test

3.Limited by max. junction temperature. Maximum duty cycle D=0.75

4.Ensure that the junction temperature does not exceed T$_{Jmax.}$.

5.Starting T$_j$=25°C , V$_{DD}$=50V , L=150mH , R$_G$=25Ω

6.I$_{SD}$ ≦ I$_D$, V$_{DD}$ ≦ BV$_{DSS}$, starting T$_J$ = 25°C
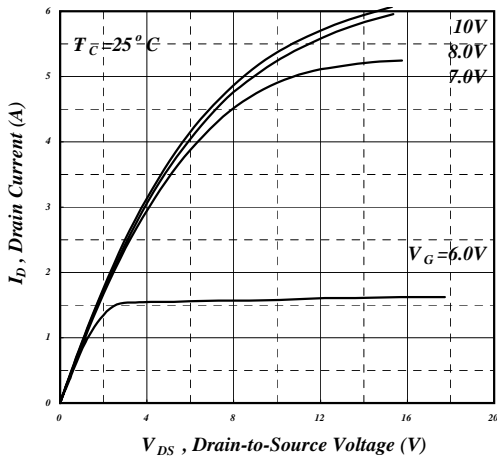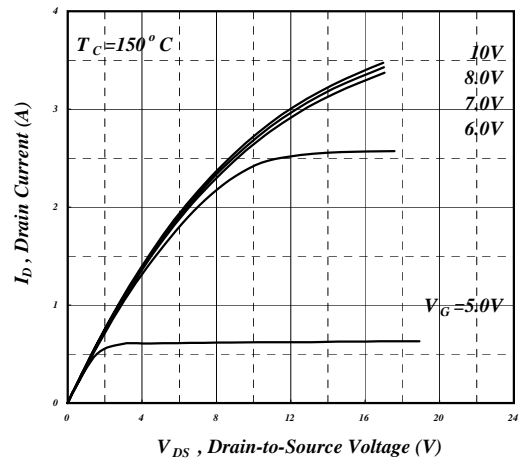
Fig 1. Typical Output Characteristics

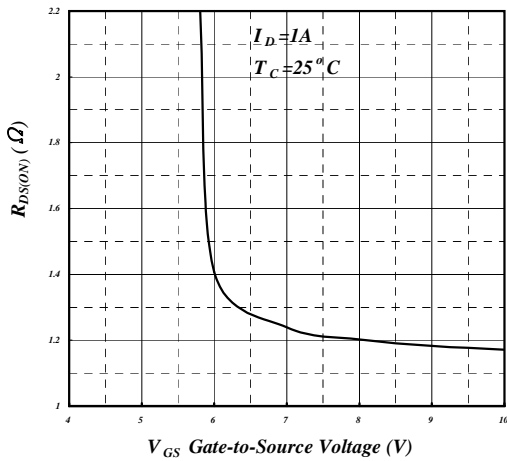**Fig 2. Typical Output Characteristics**

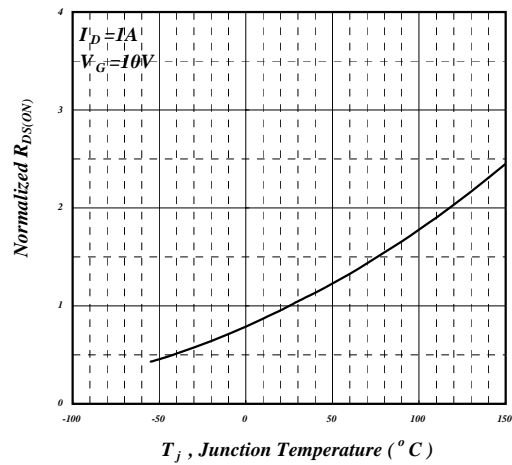**Fig 3. On-Resistance v.s. Gate Voltage**

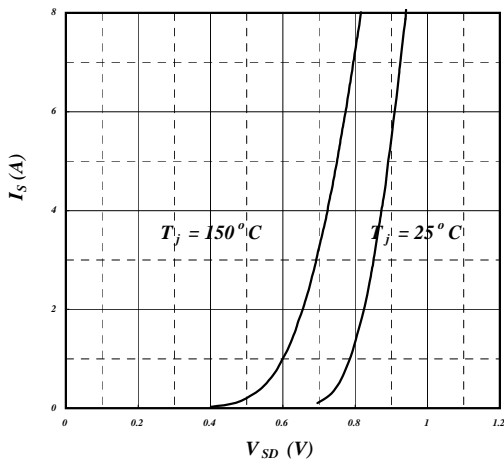**Fig 4. Normalized On-Resistance v.s. Junction Temperature**

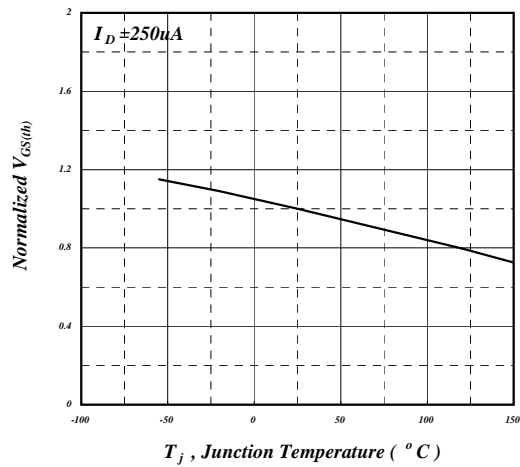**Fig 5. Forward Characteristic of Reverse Diode**
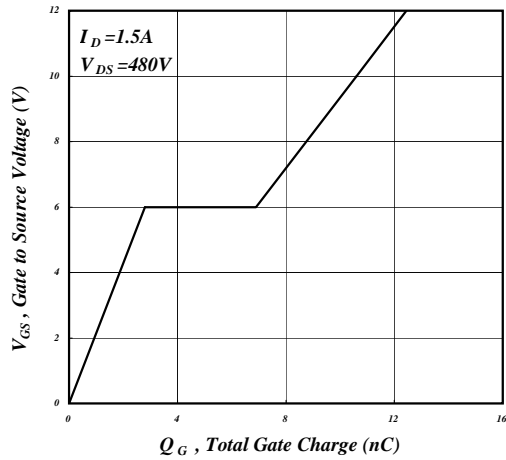
Fig 6. Gate Threshold Voltage v.s. Junction Temperature
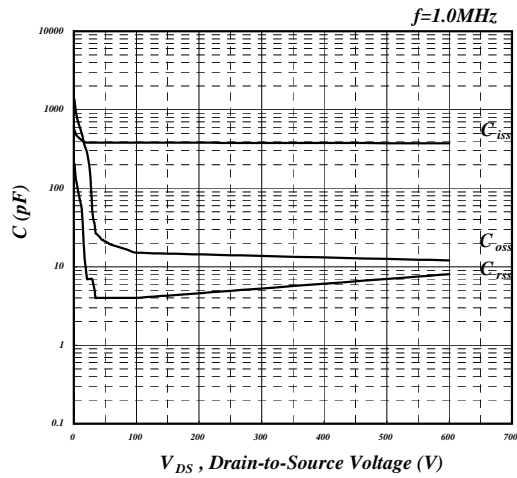
Fig 7. Gate Charge Characteristics

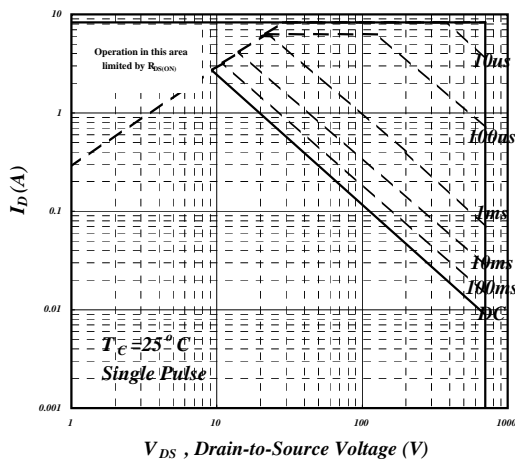**Fig 8. Typical Capacitance Characteristics**

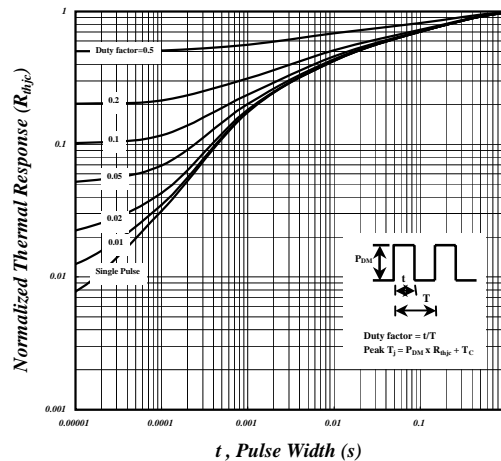**Fig 9. Maximum Safe Operating Area**

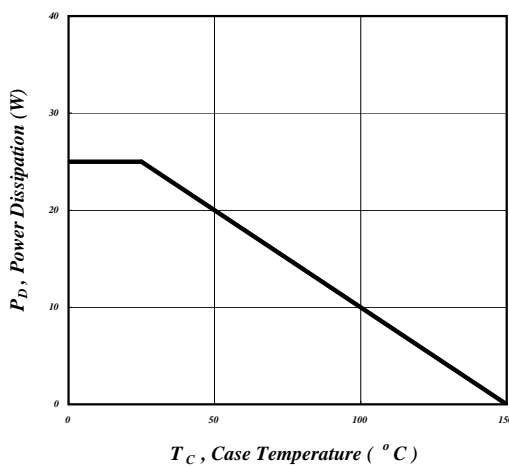**Fig10. Effective Transient Thermal Impedance**
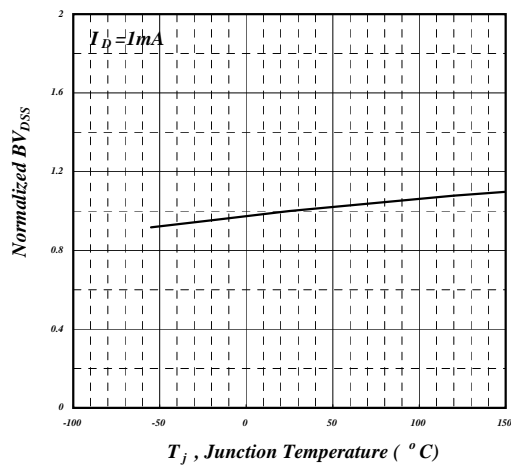

Fig 11. Total Power Dissipation

Fig 12. Normalized BV$_{DSS}$ v.s. Junction Temperature

MARKING INFORMATION

Part Number

70SL1K4A

YWWSSS

Date Code (YWWSSS)
Y：Last Digit Of The Year
WW：Week
SSS：Sequence