APJ7N70MSI2

700V N-Channel Enhancement Mode MOSFET

Description

The APJ7N70MSI is **CoolFET III** MOSFET family that is utilizing charge balance technology for extremely low on-resistance and low gate charge performance.

APJ7N70MSI is suitable for applications which require superior power density and outstanding efficiency

General Features

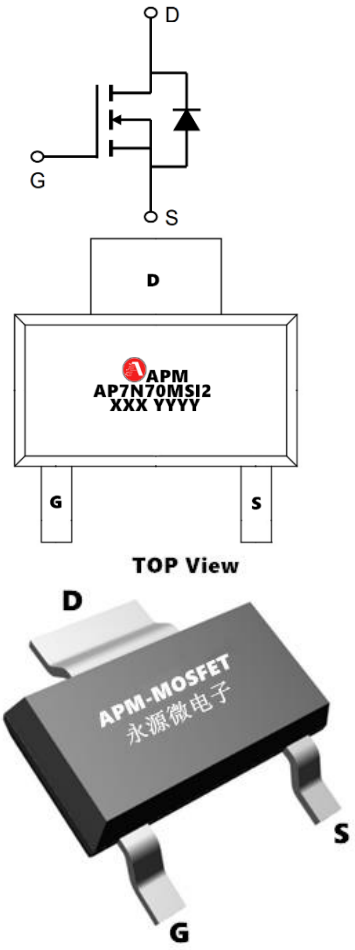
V_{DS} = 700V IDM =7A

$R_{DS(ON)}$ < 1100mΩ @ V_{GS}=10V **（Type：1000mΩ）**

Application

Uninterruptible Power Supply(UPS)

Power Factor Correction (PFC)



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
APJ7N70MSI2	SOT223-2L	APJ7N70MSI2 XXX YYYY	3000

Absolute Maximum Ratings (T_C=25℃unless otherwise noted)

Symbol	Parameter	Value	Unit
VDSS	Drain-Source Voltage (V_{GS} = 0V)	700	V
ID	Continuous Drain Current	4	A
IDM	Pulsed Drain Current (note1)	7	A
VGS	Gate-Source Voltage	±30	V
E_{AS}	Single Pulse Avalanche Energy (note2)	30	mJ
P_D	Power Dissipation (T_C = 25ºC)	28.5	W
TJ, Tstg	Operating Junction and Storage Temperature Range	-55~+150	ºC
RthJC	Thermal Resistance, Junction-to-Case	4.4	ºC/W
RthJA	Thermal Resistance, Junction-to-Ambient	85	ºC/W

Electrical Characteristics (T_J=25℃, unless otherwise noted)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain to source breakdown voltage	V_{GS}=0V, I_D=250uA	650	--	--	V
ΔBV_{DSS} / ΔTJ	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C	--	0.7	--	V/°C
IDSS	Drain to source leakage current	V_{DS}=650V, V_{GS}=0V	--	--	1	uA
		V_{DS}=520V, T_C=125°C	--	--	10	uA
IGSS	Gate to source leakage current, forward	V_{GS}=30V, V_{DS}=0V	--	--	100	nA
	Gate to source leakage current, reverse	V_{GS}=-30V, V_{DS}=0V	--	--	-100	nA
VGS(TH)	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	2.5	3.5	4.5	V
RDS(ON)	Drain to source on state resistance	V_{GS}=10V, I_D=2A	--	1.0	1.2	Ω
Gfs	Forward Transconductance	V_{DS}=10V, I_D=2A	--	3.4	--	S
Ciss	Input capacitance	V_{GS}=0V V_{DS}=100V f=1MHz	--	246	--	pF
Coss	Output capacitance		--	12	--	
Crss	Reverse transfer capacitance		--	0.6	--	
td(on)	Turn on delay time	V_{DS}=325V I_D=4A R_G=25Ω, V_{GS}=10V	--	11.6	--	ns
tr	Rising time		--	10.5	--	
td(off)	Turn off delay time		--	36	--	
t_f	Fall time		--	8.4	--	
Q_g	Total gate charge	V_{DS}=325V, V_{GS}=10V, I_D=4A	--	6.48	--	nC
Qgs	Gate-source charge		--	1.42	--	
Qgd	Gate-drain charge		--	2.78	--	
Rg	Gate Resistance	V_{DS}=0V, Scan F mode	--	18	--	Ω
IS	Continuous source current	Integral reverse p-n Junction diode in the MOSFET	--	--	4	A
ISM	Pulsed source current		--	--	12	A
VSD	Diode forward voltage drop.	I_S=4A, V_{GS}=0V	--	0.9	1.3	V
T_{rr}	Reverse recovery time	I_S=4A, V_{GS}=0V, dI_F/dt=100A/us	--	147	--	ns
Qrr	Reverse recovery Charge		--	0.96	--	uC

Note :

1、The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper.
2、The EAS data shows Max. rating . L=0.5mH, IAS =2A, VDD =50V, RG=25Ω
3、The test condition is Pulse Test: ISD ≤ ID, di/dt = 100A/us, VDD≤ BVDSS, Starting at TJ =25℃
4、The power dissipation is limited by 150℃ junction temperature
5、The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

Typical Characteristics

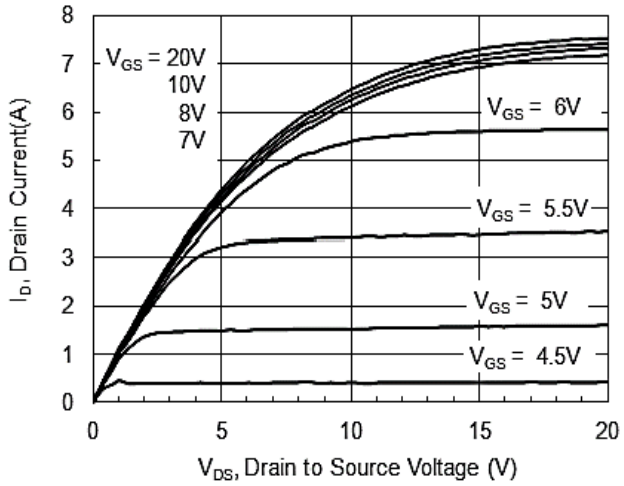


Figure1. Typical Output Characteristics

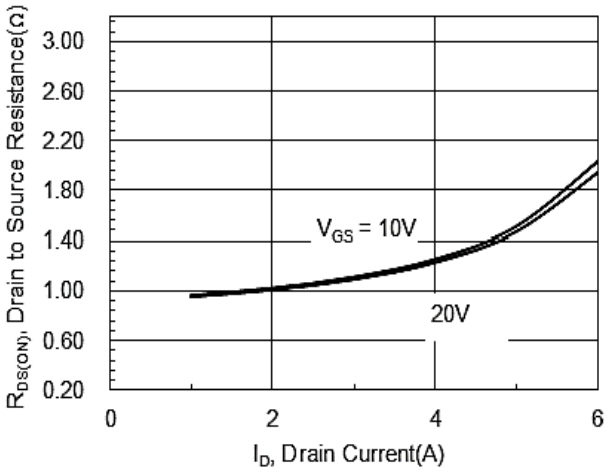


Figure2. Drain-source on-state resistance

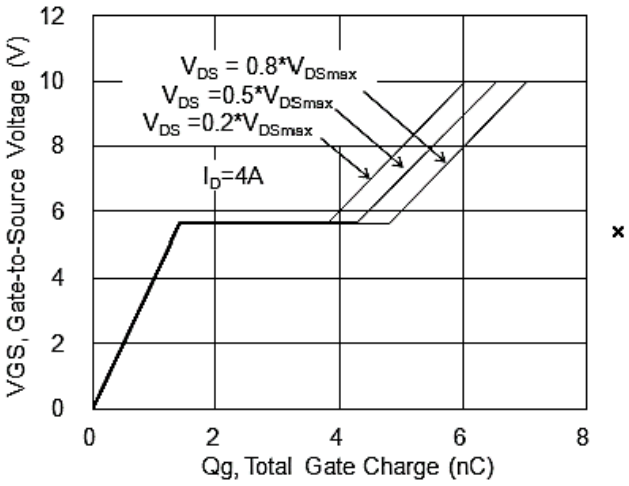


Figure3. Gate charge characteristics

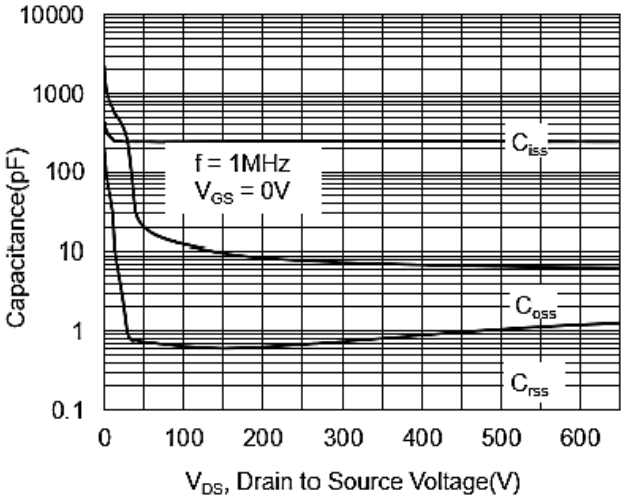


Figure4. Capacitance Characteristics

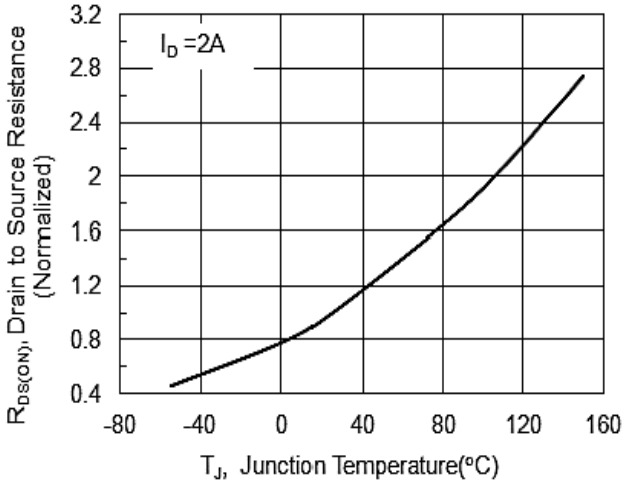


Figure5. RDS (ON) vs junction temperature

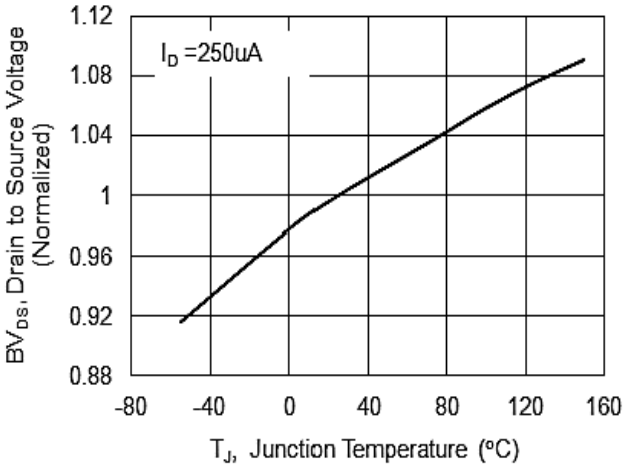


Figure6. BVDSS vs junction temperature

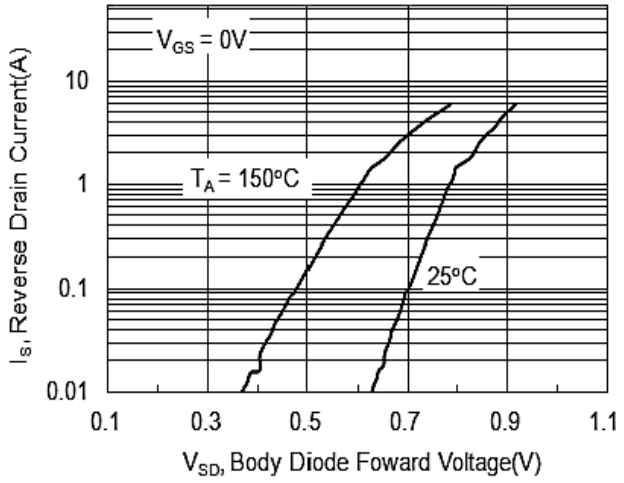


Figure7.Forward characteristics of reverse diode

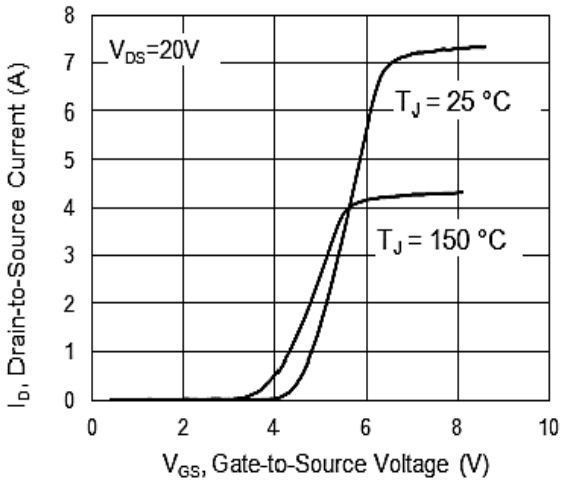


Figure8.Transfer characteristics

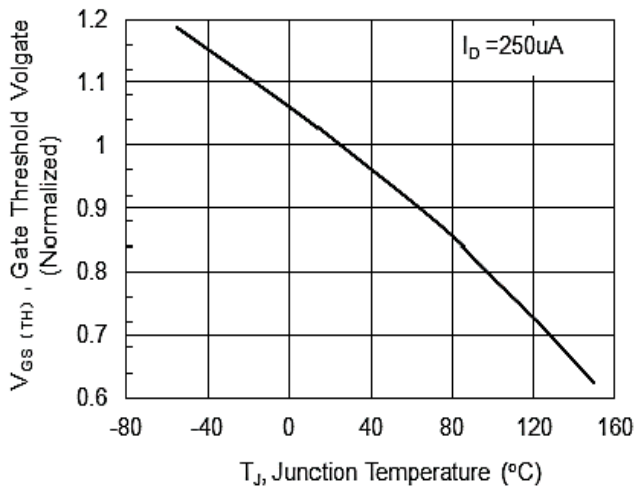


Figure9.VGS(TH) vs junction temperature

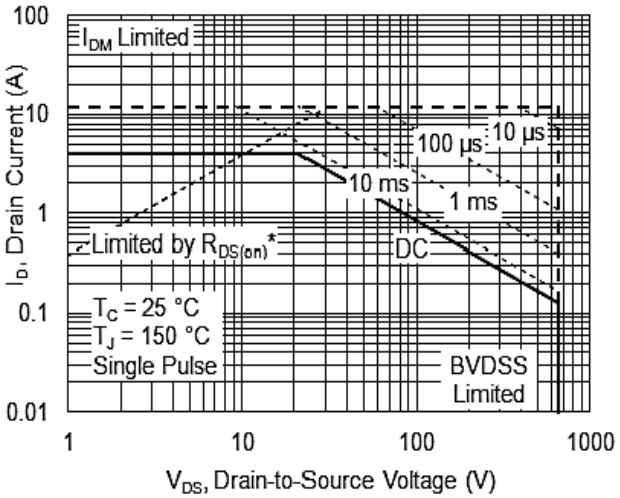


Figure10. Safe operating area

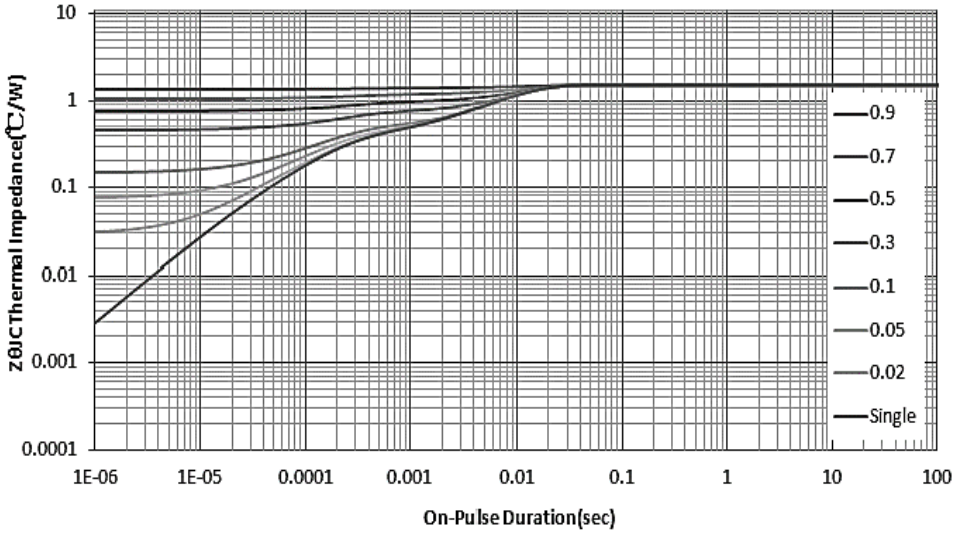
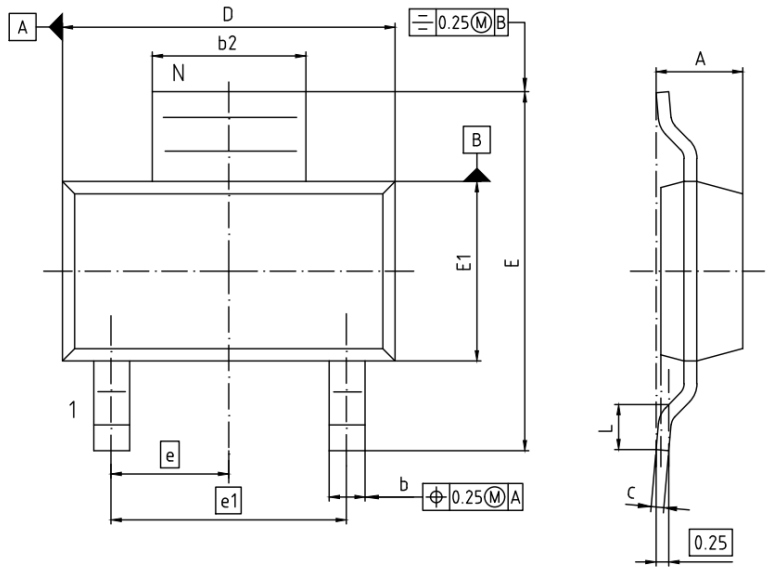


Figure11.Transient thermal impedance

Package Mechanical Data: SOT223-3L



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.52	1.80	0.060	0.071
A1	-	0.10	-	0.004
A2	1,50	1.70	0.059	0.067
b	0.60	0.80	0.024	0.031
b2	2.95	3.10	0.116	0.122
c	0.24	0.32	0.009	0.013
D	6.30	6.70	0.248	0.264
E	6.70	7.30	0.264	0.287
E1	3.30	3.70	0.130	0.146
e	2.3 BASIC		0.091 BASIC	
e1	4.6 BASIC		0.181 BASIC	
L	0.75	1.10	0.030	0.043
N	3		3	
O	0°	10°	0°	10°

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Edition	Date	Change
REV1.0	2023/1/15	Initial release