APJ28N80D

800V N-Channel Enhancement Mode MOSFET

Description

The APJ28N80D is **CoolFET II** MOSFET family that is utilizing charge balance technology for extremely low on-resistance and low gate charge performance.

APJ14N65F/P/T is suitable for applications which require superior power density and outstanding efficiency

General Features

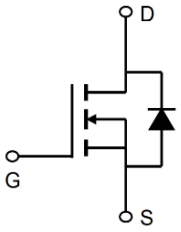
V_{DS} = 800V） IDM =36A

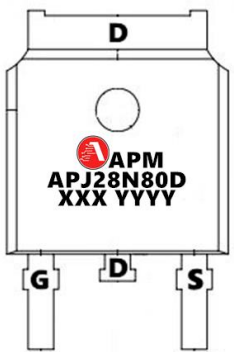
$R_{DS(ON)}$ < 500mΩ @ V_{GS}=10V （**Type：400mΩ**）

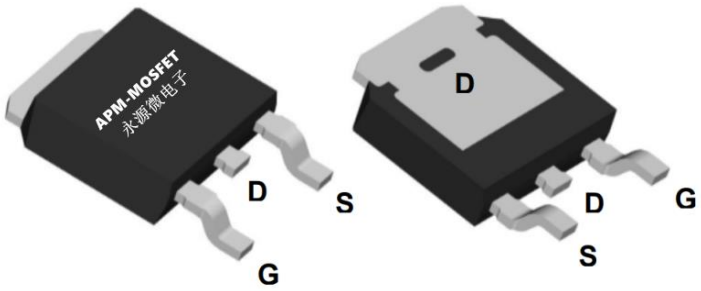
Application

Uninterruptible Power Supply(UPS)

Power Factor Correction (PFC)







Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
APJ28N80D	TO-252-3L	APJ28N80D XXX YYYY	2500

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

Symbol	Parameter	Value	Unit
VDSS	Drain-Source Voltage (V_{GS} = 0V)	800	V
ID	Continuous Drain Current	9	A
IDM	Pulsed Drain Current (note1)	28	A
VGS	Gate-Source Voltage	±30	V
E_{AS}	Single Pulse Avalanche Energy (note2)	270	mJ
P_D	Power Dissipation (T_C = 25ºC)	52	W
TJ, Tstg	Operating Junction and Storage Temperature Range	-55~+150	ºC
RthJC	Thermal Resistance, Junction-to-Case	2.4	ºC/W
RthJA	Thermal Resistance, Junction-to-Ambient	62.5	ºC/W

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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	800	880	--	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}=800V, V_{GS}=0V	--	--	1	uA
		V_{DS}=640V, 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=4.5A	--	400	500	mΩ
Gfs	Forward Transconductance	V_{DS}=10V, I_D=4.5A	--	10.4	--	S
Ciss	Input capacitance	V_{GS}=0V, V_{DS}=100V, f=1MHz	--	1099	--	pF
Coss	Output capacitance		--	52	--	
Crss	Reverse transfer capacitance		--	1	--	
td(on)	Turn on delay time	V_{DS}=400V, I_D=9A, R_G=25Ω,V_{GS}=10V	--	28	--	ns
tr	Rising time		--	34.4	--	
td(off)	Turn off delay time		--	100	--	
t_f	Fall time		--	28	--	
Q_g	Total gate charge	V_{DS}=400V, V_{GS}=10V, I_D=9A	--	24.6	--	nC
Qgs	Gate-source charge		--	5.6	--	
Qgd	Gate-drain charge		--	9	--	
Rg	Gate Resistance	V_{DS}=0V, Scan F mode	--	11	--	Ω
IS	Continuous source current	Integral reverse p-n Junction diode in the MOSFET	--	--	9	A
ISM	Pulsed source current		--	--	27	A
VSD	Diode forward voltage drop.	I_S=9A, V_{GS}=0V	--	0.9	1.3	V
T_{rr}	Reverse recovery time	I_S=9A, V_{GS}=0V, dI_F/dt=100A/us	--	258	--	ns
Qrr	Reverse recovery Charge		--	3.15	--	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=60mH, I_{AS}=3A, V_{DD}=50V, R_G=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

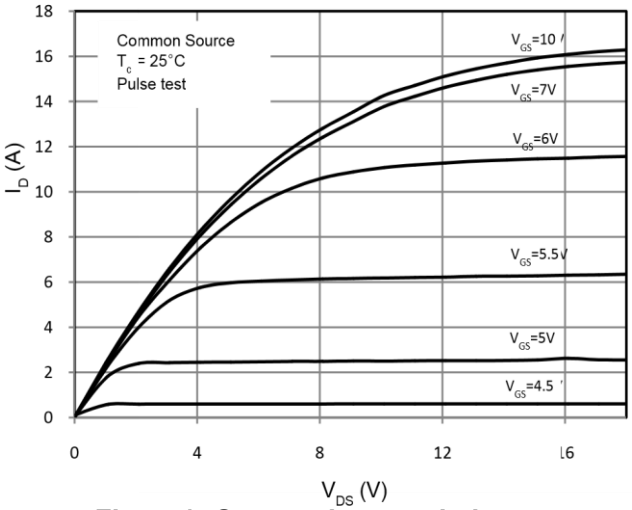


Figure1: Output characteristics

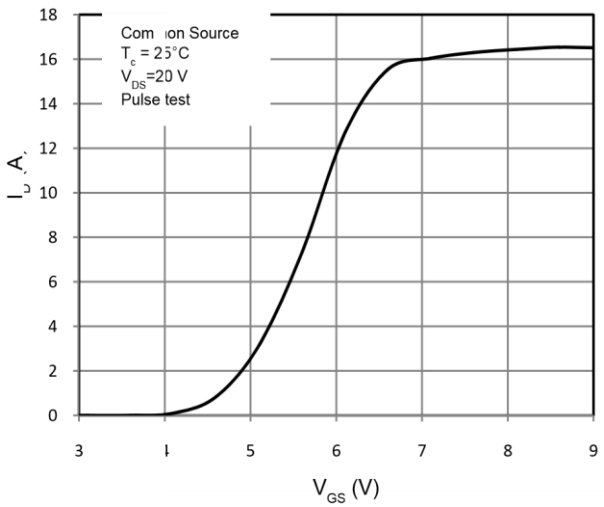


Figure2: Transfer Characteristics

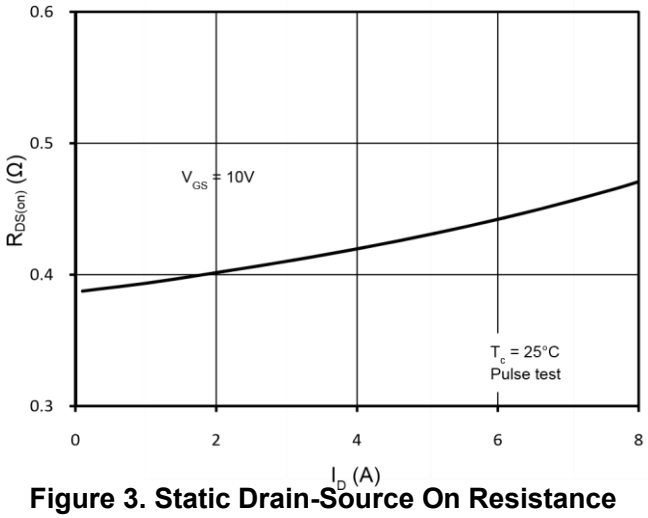


Figure 3. Static Drain-Source On Resistance

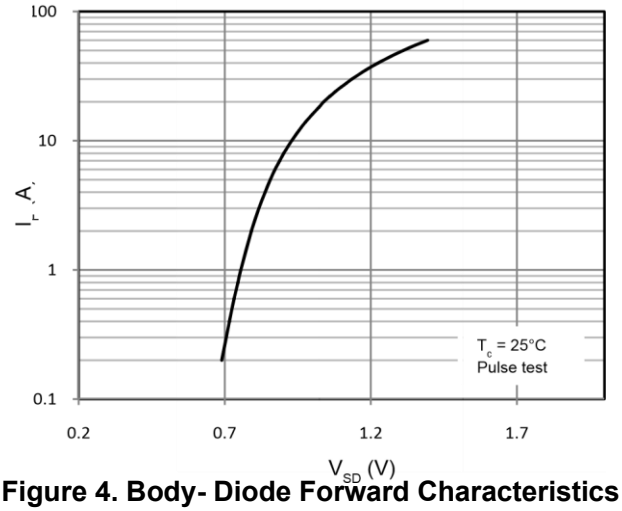


Figure 4. Body- Diode Forward Characteristics

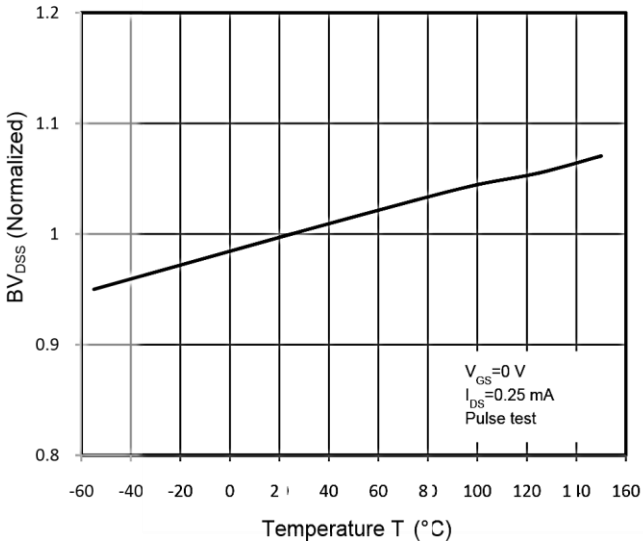


Figure 5. Normalized BV_{DSS} vs. Temperature

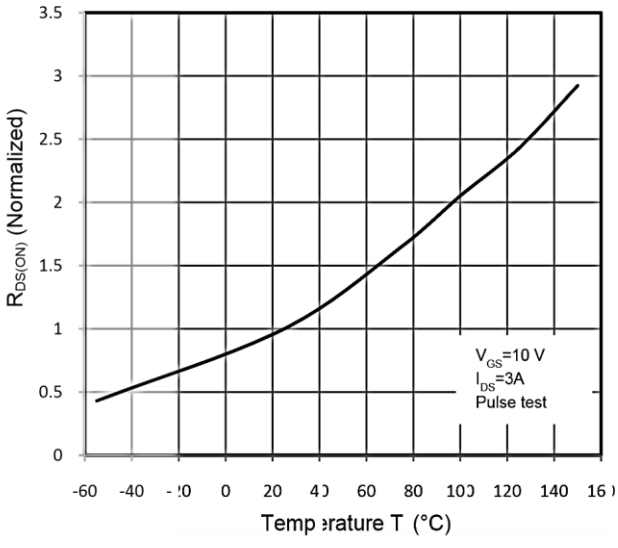


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

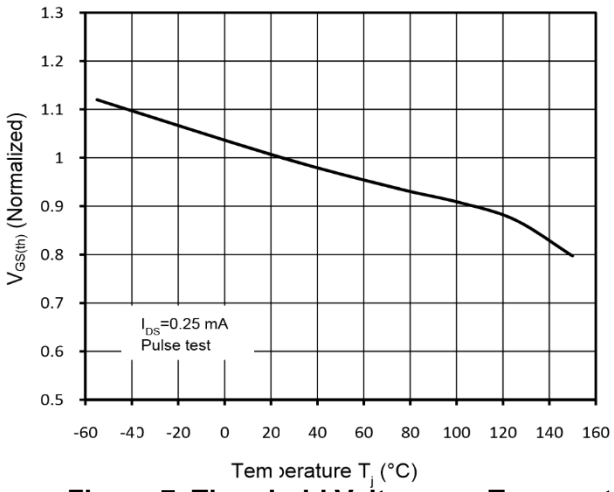


Figure 7. Threshold Voltage vs. Temperature

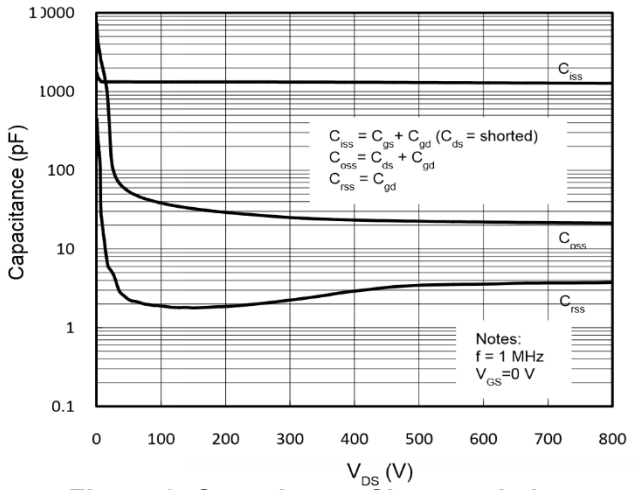


Figure 8. Capacitance Characteristics

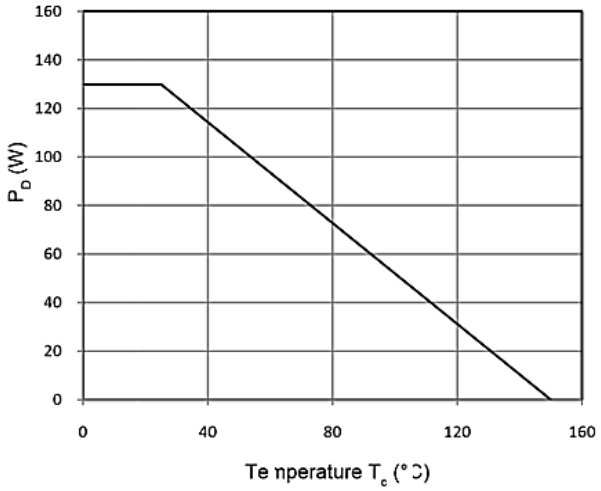


Figure9: VGS（th）vs junction temperature

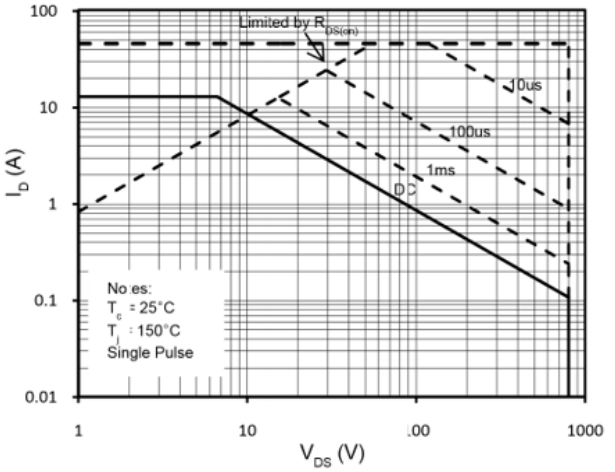


Figure10: Safe operating area

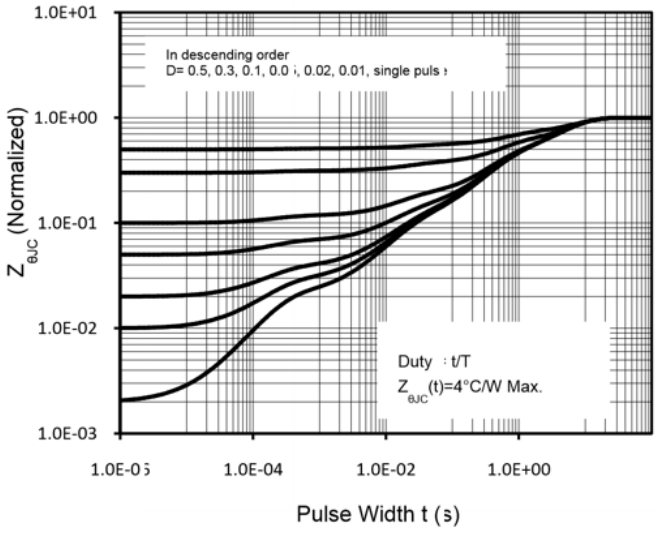
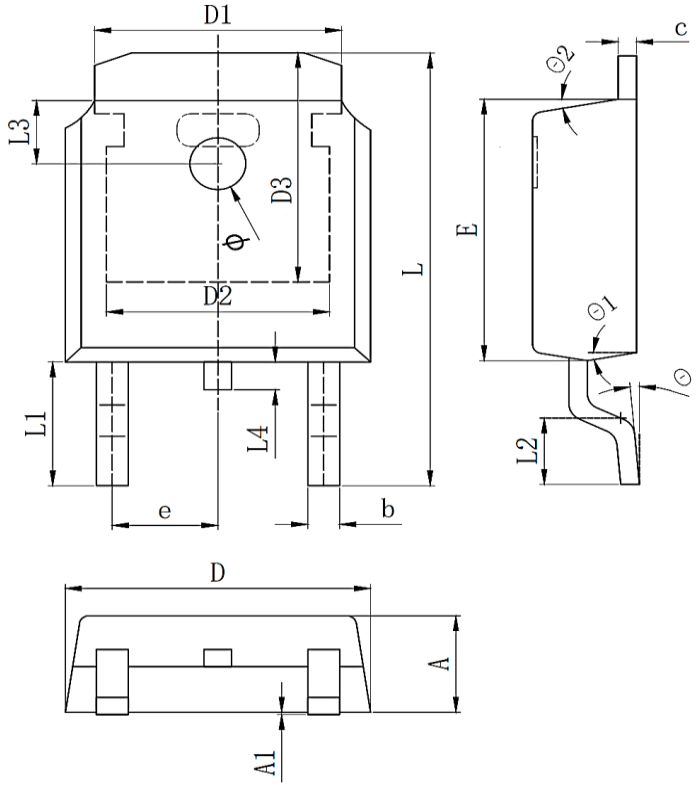


Figure11: Transient thermal impedance

Package Mechanical Data:TO-252-3L



Symbol	Dim in mm		
	Min	Typ	Max
A	2.1	2.3	2.5
A1	0	0.064	0.128
b	0.64	0.75	0.86
c	0.45	0.52	0.6
D	6.4	6.6	6.8
D1	5.33REF		
D2	4.83REF		
D3	5.25REF		
E	5.9	6.1	6.3
e	2.286TYP		
L	9.8	10.1	10.4
L1	2.888REF		
L2	1.4	1.5	1.7
L3	1.65REF		
L4	0.6	0.8	1
ϕ	1.1	1.2	1.3
θ	0°		10°
θ1	5°		10°
θ2	5°		10°

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Edition	Date	Change
REV1.0	2024/1/1	Initial release