DFN2020 Plastic-Encapsulate MOSFETS

LJP2025AD2

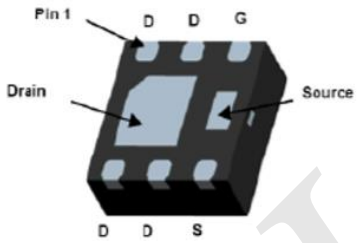
Silicon P-Channel Power MOSFET

General Description:

The LJP2025AD2 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications. The package orm is DFN2020-6L, which accords with the RoHS standard.

V_{DSS}	-20	V
I_D	-10	A
P_D	15	W
$R_{DS(ON)type}$	19	mΩ

DFN2020-6L



Inner Equivalent Principium Chart

Features:

- $R_{DS(ON)}$ <25mΩ @ V_{GS}=4.5V (Typ 19mΩ)
- High density cell design for ultra-low $R_{DS(on)}$
- Fully characterized avalanche voltage and current
- Excellent package for good heat dissipation

Applications:

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply

Absolute Maximum Ratings (TA= 25℃ unless otherwise specified):

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-to-Source Voltage	-20	V
I_D	Continuous Drain Current	-10	A
I_{DM}	Pulsed Drain Current	-40	A
V_{GS}	Gate-to-Source Voltage	±12	V
P_D	Power Dissipation	15	W
T_J, T_{stg}	Operating Junction and Storage Temperature Range	155, −55 to 175	℃

Electrical Characteristics (Tc= 25℃ unless otherwise specified):

OFF Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
V_{DSS}	Drain to Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	-20	--	--	V
I_{DSS}	Drain to Source Leakage Current	V_{DS}=-20V, V_{GS}= 0V,T_a=25℃	--	--	-1.0	μA
$I_{GSS(F)}$	Gate to Source Forward Leakage	V_{GS}=+12V	--	--	0.1	μA
$I_{GSS(R)}$	Gate to Source Reverse Leakage	V_{GS}=-12V	--	--	-0.1	μA

ON Characteristics[a3]						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$R_{DS(ON)1}$	Drain-to-Source On-Resistance	V_{GS}=-4.5V, I_D=-5.0A	--	19	25	mΩ
$R_{DS(ON)2}$	Drain-to-Source On-Resistance	V_{GS}=-2.5V, I_D=-4.0A	--	25	35	mΩ
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250μA	-0.4	-0.65	-1.0	V
Pulse width tp≤380μs,δ≤2%						

Dynamic Characteristics[a4]						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
g_{fs}	Forward Transconductance	V_{DS}=-10V, I_D=-5.0A	--	6.5	8	S
C_{iss}	Input Capacitance	V_{GS}=0V	--	1200	--	pF
C_{oss}	Output Capacitance	V_{DS}=-10V	--	310	--	
C_{rss}	Reverse Transfer Capacitance	f=1.0MHz	--	240	--	

Resistive Switching Characteristics[a4]						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=-10V	--	25	--	ns
tr	Rise Time	I_D=-1A	--	30	--	
$t_{d(OFF)}$	Turn-Off Delay Time	V_{GS}=-4.5V	--	60	--	
t_f	Fall Time	R_G=6.0Ω	--	45	--	
Q_g	Total Gate Charge	V_{DD}=-10V	--	10	--	nC
Q_{gs}	Gate to Source Charge	I_D=-5.0A	--	1.8	--	
Q_{gd}	Gate to Drain (“Miller”) Charge	V_{GS}=-4.5V	--	3	--	

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I_S	Continuous Source Current [a2](Body Diode)		--	--	-10	A
V_{SD}	Diode Forward Voltage[a3]	I_S=-5A, V_{GS}=0V	--	--	-1.2	V

Symbol	Parameter	Typ.	Units
$R_{\theta JA}$	Junction-to-Ambient	50	℃/W

[a1]: Repetitive Rating: Pulse width limited by maximum junction temperature.
[a2]: Surface Mounted on FR4 Board, t≤10sec.
[a3]: Pulse Test: Pulse Width≤300μs, Duty Cycle≤2%.
[a4]: Guaranteed by design, not subject to production

Characteristics Curve:

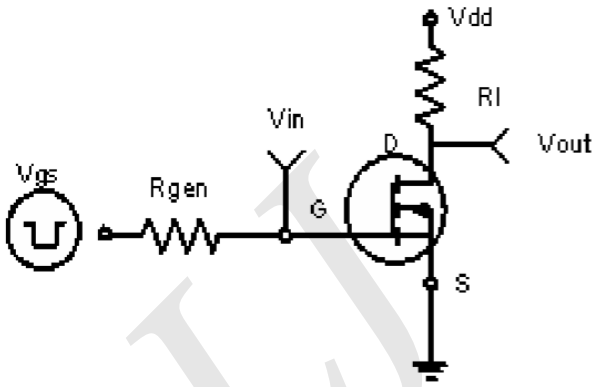


Figure 1 Switching Test Circuit

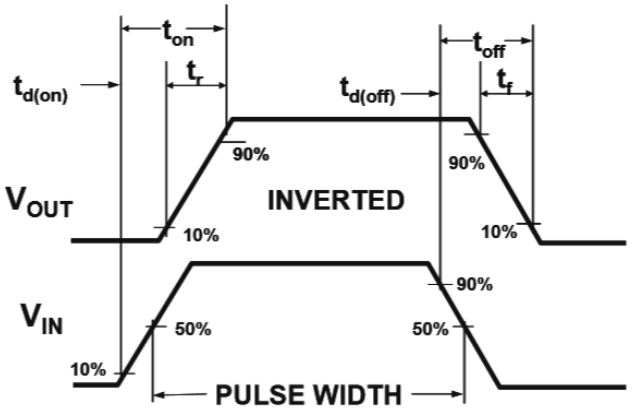


Figure 2 Switching Waveforms

Typical Characteristics

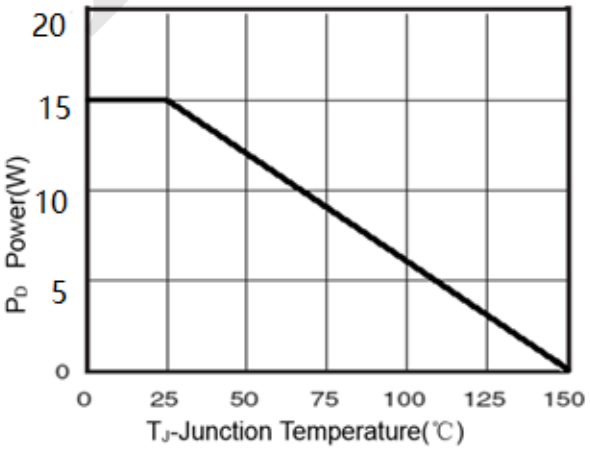


Figure 3 Power Dissipation

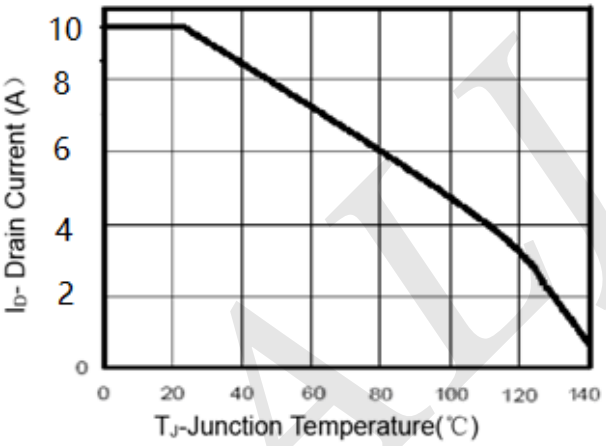


Figure 4 Drain Current

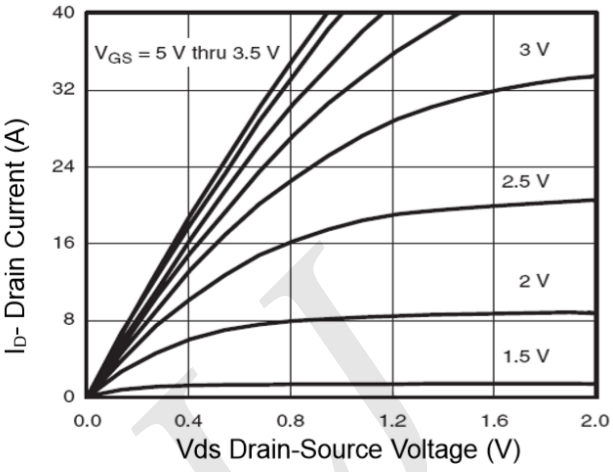


Figure 5 Output Characteristics

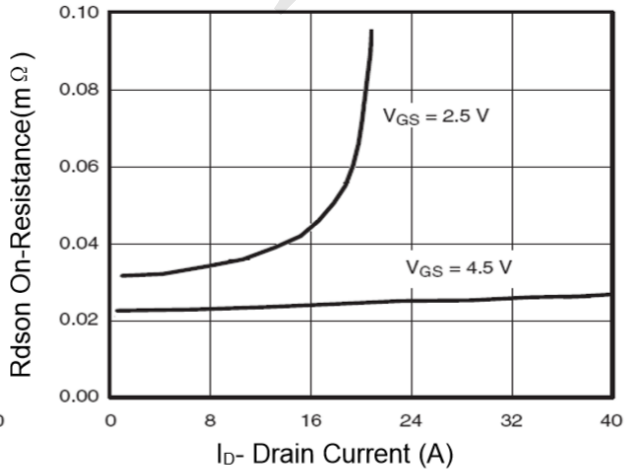


Figure 6 Drain-Source On-Resistance

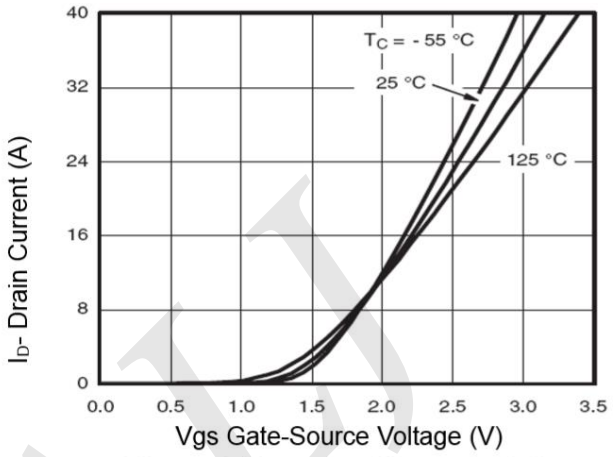


Figure 7 Transfer Characteristics

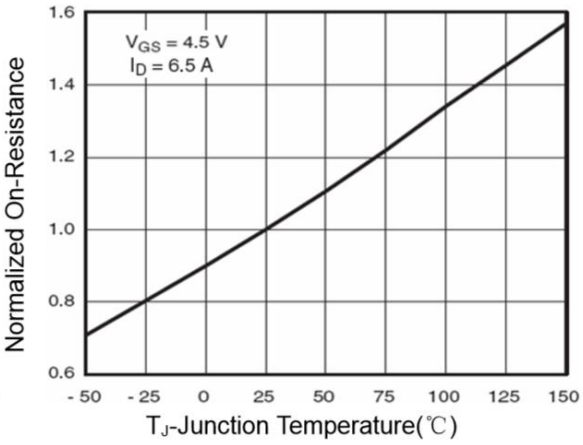


Figure 8 Drain-Source On-Resistance

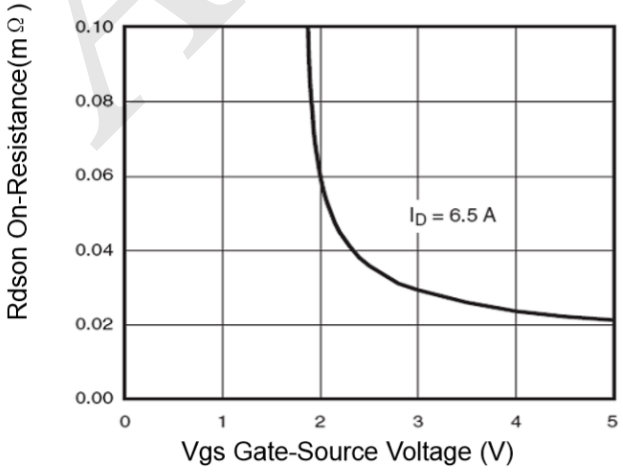


Figure 9 Rdson vs Vgs

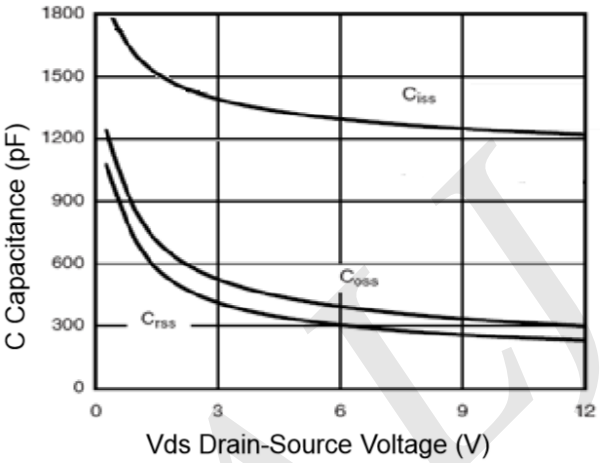


Figure 10 Capacitance vs Vds

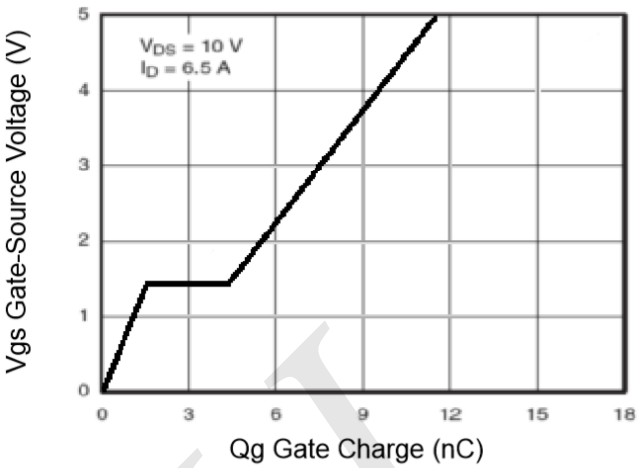


Figure 11 Gate Charge

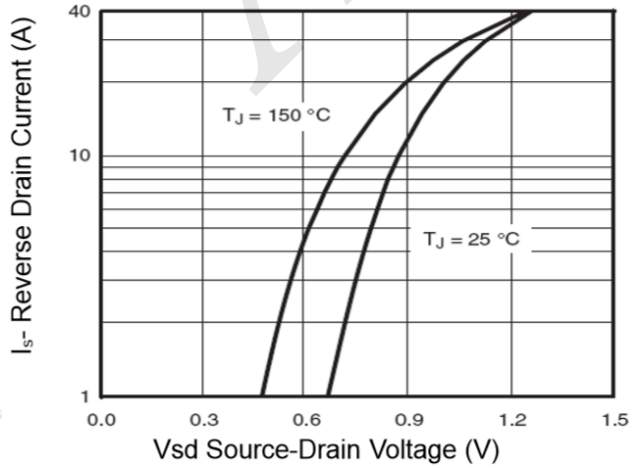


Figure 12 Source- Drain Diode Forward

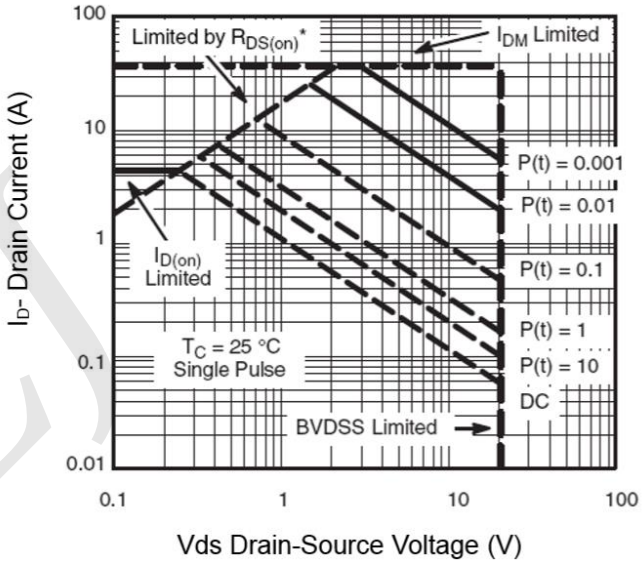


Figure 13 Safe Operation Area

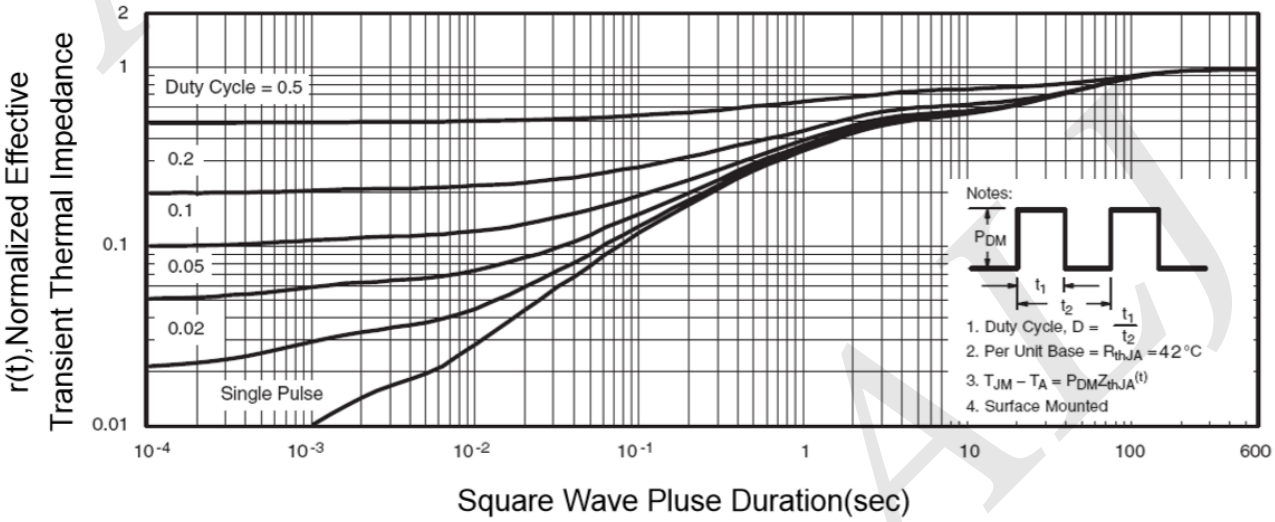
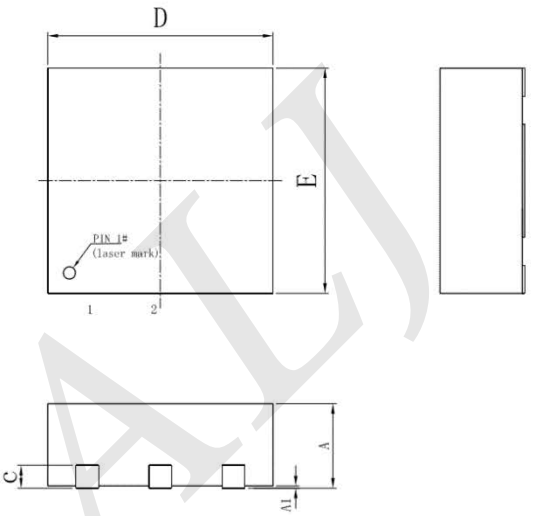
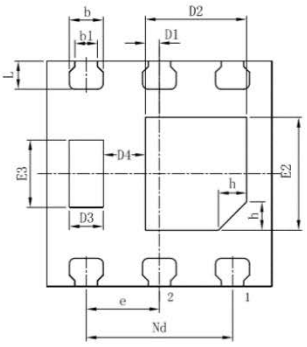


Figure 14 Normalized Maximum Transient Thermal Impedance

Package Information





BOTTOM VIEW

SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.45	0.55	0.65
A1	—	0.02	0.05
b	0.25	0.30	0.35
b1	0.20REF		
c	0.152.3REF		
D	1.95	2.00	2.05
D1	0.08	0.125	0.18
D2	0.85	0.90	0.95
D3	0.25	0.30	0.35
D4	0.33	0.375	0.43
e	0.65BSC		
Nd	1.30BSC		
E	1.95	2.00	2.05
E2	0.95	1.00	1.05
E3	0.55	0.60	0.65
L	0.20	0.25	0.30
h	0.25REF		