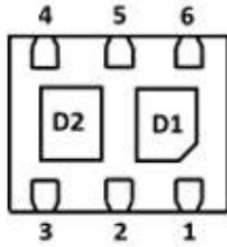
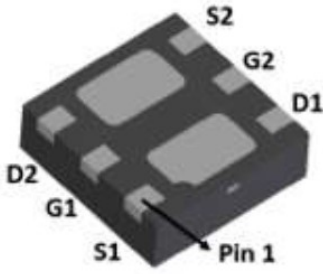
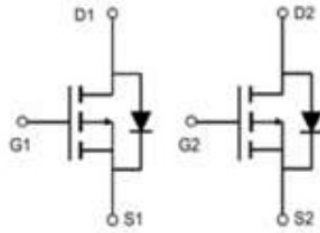


## P-Channel Enhancement Mode Field Effect Transistor



**DFN2020-6L**



### Product Summary

- $V_{DS}$  -20V
- $I_D$  -4A
- $R_{DS(ON)}$ ( at  $V_{GS}=-4.5V$ ) <51mohm
- $R_{DS(ON)}$ ( at  $V_{GS}=-2.5V$ ) <67mohm
- $R_{DS(ON)}$ ( at  $V_{GS}=-1.8V$ ) <91mohm
- 100%  $\nabla V_{DS}$  Tested

### General Description

- Trench Power LV MOSFET technology
- Low  $R_{DS(ON)}$
- Low Gate Charge

### Applications

- Video monitor
- Power management

### ■ Absolute Maximum Ratings ( $T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-source Voltage		$V_{DS}$	-20	V
Gate-source Voltage		$V_{GS}$	$\pm 10$	V
Drain Current	$T_A=25^\circ\text{C}$	$I_D$	-4	A
	$T_A=70^\circ\text{C}$		-3.2	
Pulsed Drain Current <sup>A</sup>		$I_{DM}$	-16	A
Total Power Dissipation	$T_A=25^\circ\text{C}$	$P_D$	1.3	W
	$T_A=70^\circ\text{C}$		0.8	
Thermal Resistance Junction-to-Ambient <sup>B</sup>		$R_{\theta JA}$	96	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature Range		$T_J, T_{STG}$	-55~+150	$^\circ\text{C}$

### ■ Ordering Information (Example)

PREFERRED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
YJQ2301A	F1	2301	3000	30000	120000	7" reel



# YJQ2301A

## ■ Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
<b>Static Parameter</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =-250μA	-20			V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =-20V, V <sub>GS</sub> =0V			-1	μA
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±10V, V <sub>DS</sub> =0V			±100	nA
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA	-0.4	-0.62	-1.0	V
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-3.7A		42	51	mΩ
		V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-3A		55	67	
		V <sub>GS</sub> =-1.8V, I <sub>D</sub> =-2.5A		76	91	
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =-3.4A, V <sub>GS</sub> =0V			-1.2	V
<b>Dynamic Parameters</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =-10V, V <sub>GS</sub> =0V, f=1MHz		438		pF
Output Capacitance	C <sub>oss</sub>			76		
Reverse Transfer Capacitance	C <sub>rss</sub>			62		
<b>Switching Parameters</b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>GS</sub> =-10V, V <sub>DS</sub> =-10V, I <sub>D</sub> =-3.7A		5.41		nC
Gate-Source Charge	Q <sub>gs</sub>			1.17		
Gate-Drain Charge	Q <sub>gd</sub>			1.24		
Reverse Recovery Charge	Q <sub>rr</sub>	I <sub>F</sub> =-3.7A, di/dt=100A/us		4		ns
Reverse Recovery Time	t <sub>rr</sub>			24.5		
Turn-on Delay Time	t <sub>D(on)</sub>	V <sub>GS</sub> =-4.5V, V <sub>DS</sub> =-10V, I <sub>D</sub> =-1A R <sub>GEN</sub> =3Ω		6.4		ns
Turn-on Rise Time	t <sub>r</sub>			21.8		
Turn-off Delay Time	t <sub>D(off)</sub>			37.4		
Turn-off fall Time	t <sub>f</sub>			34		

A. Pulse Test: Pulse Width ≤ 300μs, Duty cycle ≤ 2%.

B. R<sub>θJA</sub> is the sum of the junction-to-case and case-to-ambient thermal resistance, where the case thermal reference is defined as the solder mounting surface of the drain pins. R<sub>θJC</sub> is guaranteed by design, while R<sub>θJA</sub> is determined by the board design. The maximum rating presented here is based on mounting on a 1 in 2 pad of 2oz copper.



■ Typical Performance Characteristics

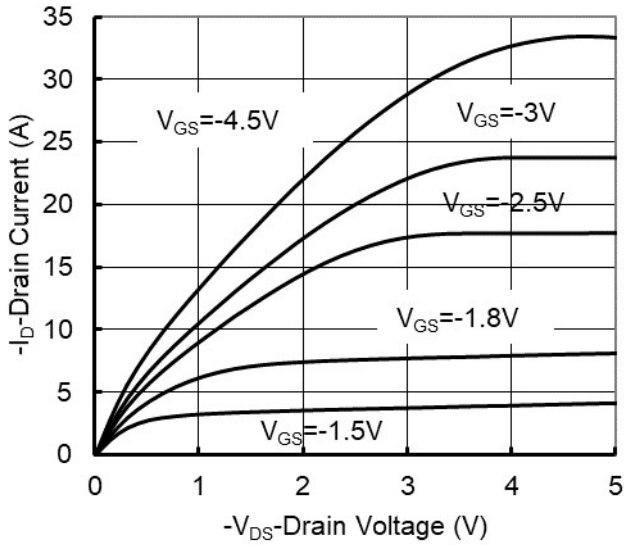


Figure1. Output Characteristics

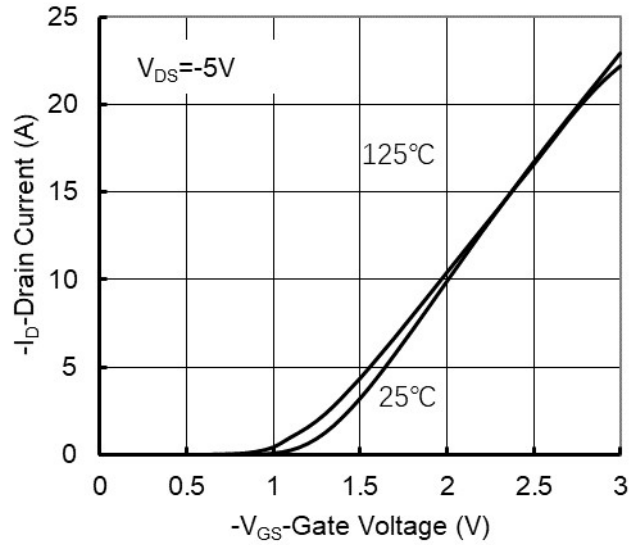


Figure2. Transfer Characteristics

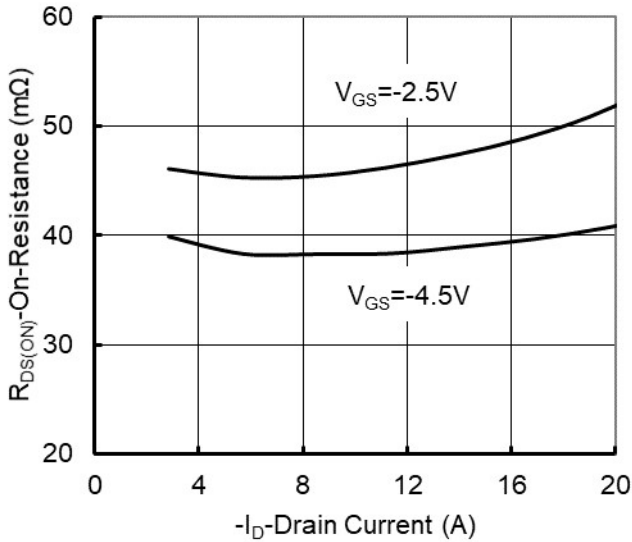


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

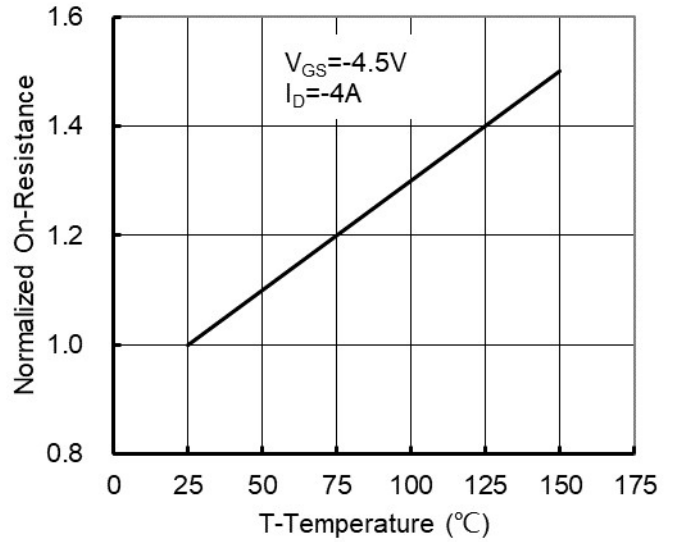


Figure 4: On-Resistance vs. Junction Temperature

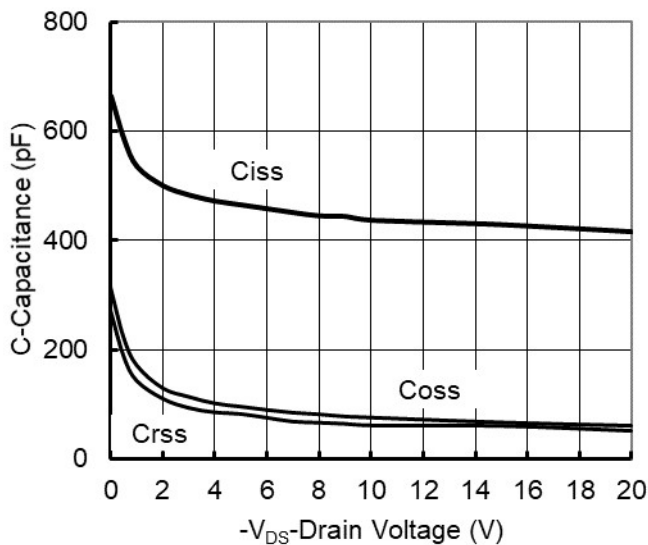


Figure5. Capacitance Characteristics

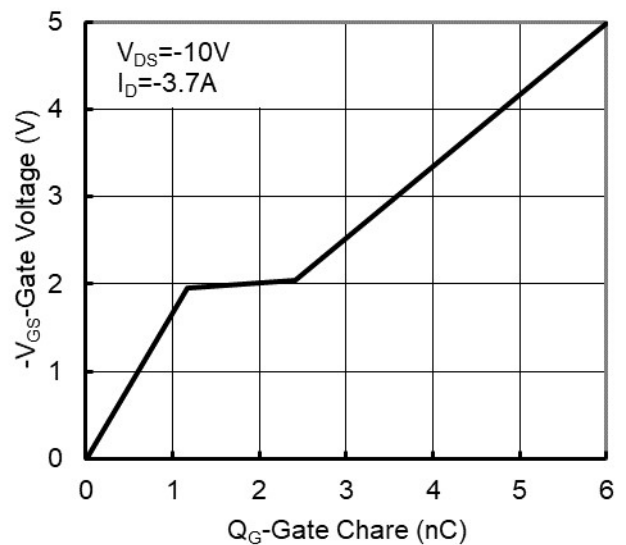


Figure6. Gate Charge



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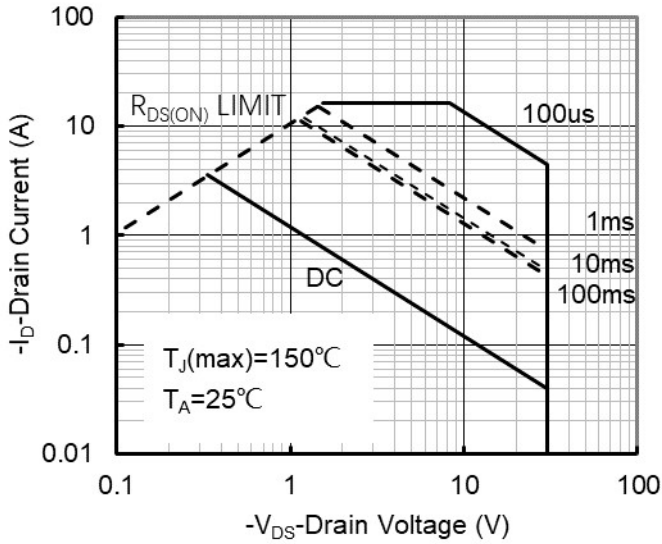


Figure7. Safe Operation Area

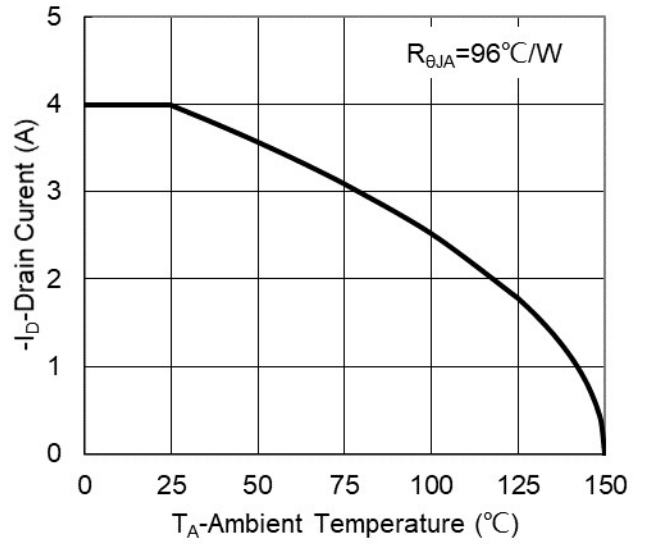


Figure8. Maximum Continuous Drain Current vs Ambient Temperature

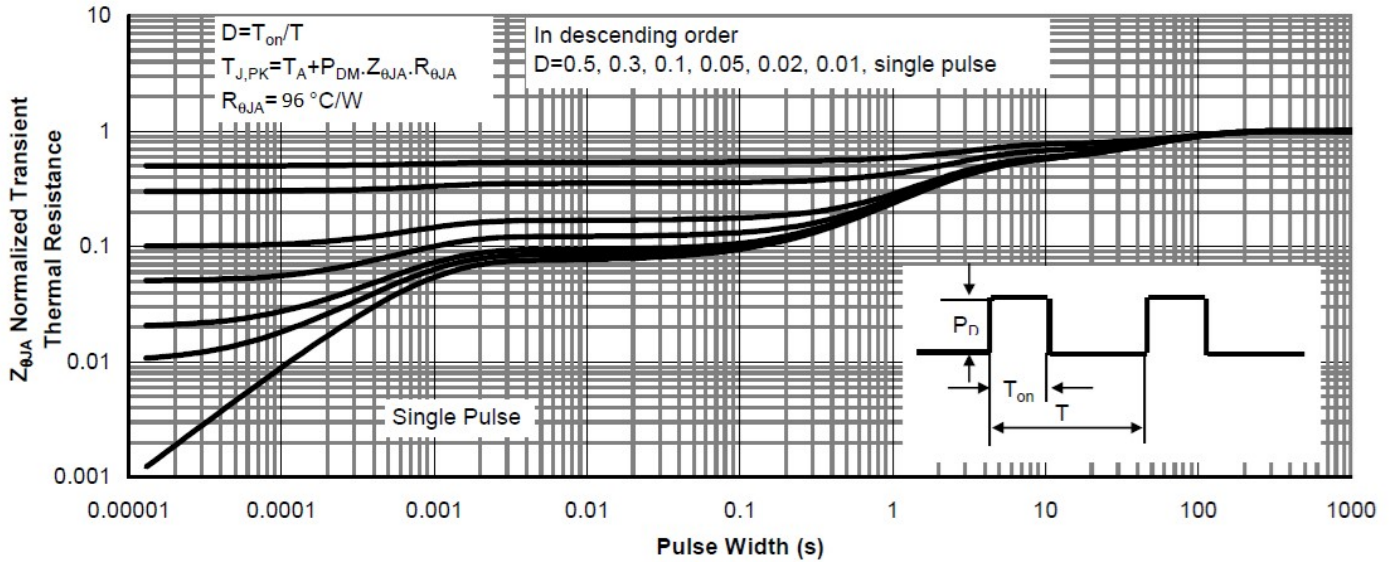
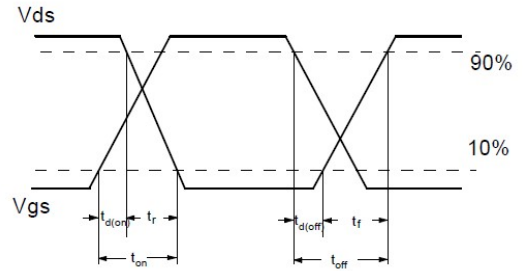
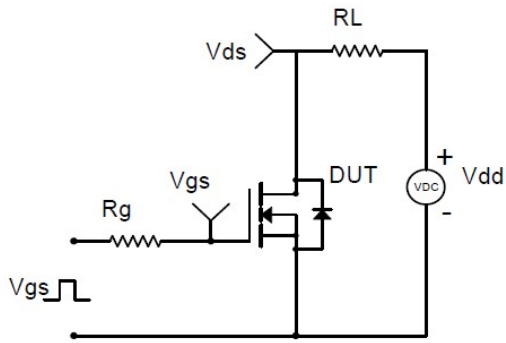
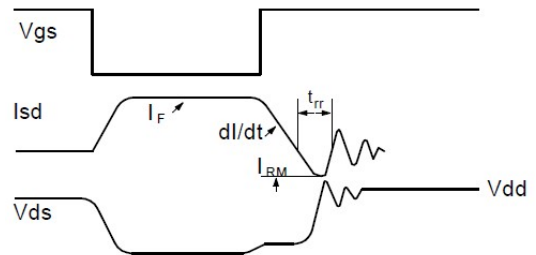
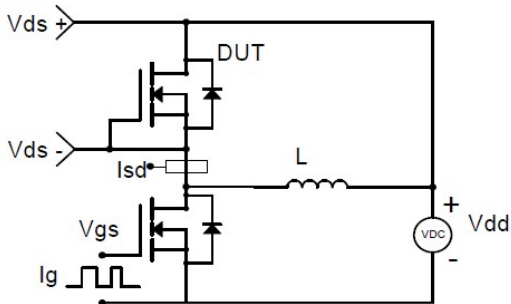


Figure9. Normalized Maximum Transient Thermal Impedance



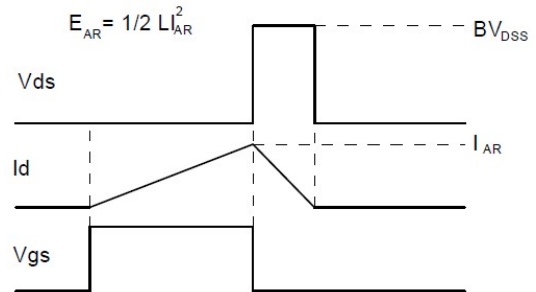
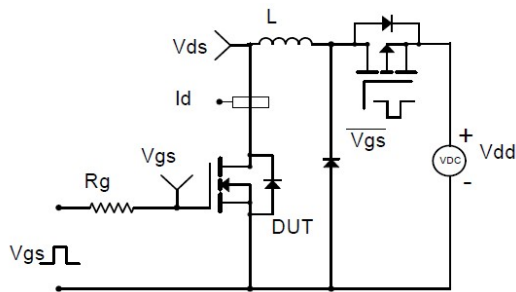
**Resistive Switching Test Circuit & Waveforms**



**Diode Recovery Test Circuit & Waveforms**



**Gate Charge Test Circuit & Waveform**

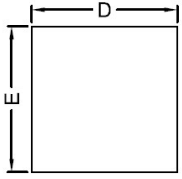


**Unclamped Inductive Switching (UIS) Test Circuit & Waveforms**

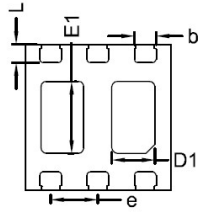


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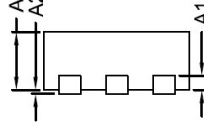
## ■ DFN2020-6L Package Information



Top View  
正面视图

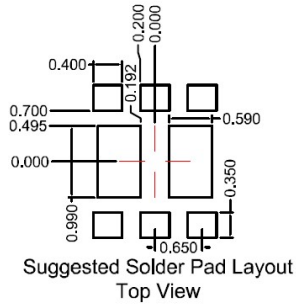


Bottom View  
背面视图



Side View  
侧面视图

SYMBOL	MILLIMETER		
	MIN	NOM	MAX
D	1.90	2.00	2.10
E	1.90	2.00	2.10
A	0.70	0.80	0.90
A1	0.20 BSC		
A2			0.10
D1	0.49	0.59	0.69
E1	0.89	0.99	1.09
L	0.15	0.25	0.35
b	0.20	0.30	0.40
e	0.65 BSC		



Note:

1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.10\text{mm}$ .
3. The pad layout is for reference purposes only.



# YJQ2301A

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