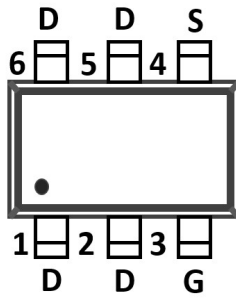
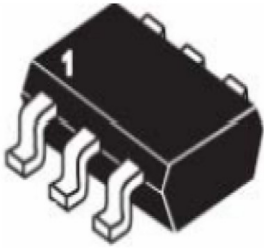
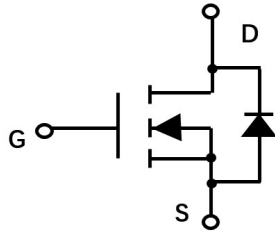


## N-Channel Enhancement Mode Field Effect Transistor



**SOT-23-6L**



### Product Summary

- $V_{DS}$  30V
- $I_D$  9A
- $R_{DS(ON)}$  (at  $V_{GS} = 10V$ ) < 15mohm
- $R_{DS(ON)}$  (at  $V_{GS} = 4.5V$ ) < 18mohm

### General Description

- Trench Power LV MOSFET technology
- High density cell design for low  $R_{DS(ON)}$
- High Speed switching

### Applications

- Battery protection
- Load switch
- Power management

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

Parameter	Symbol	Limit	Unit
Drain-source Voltage	$V_{DS}$	30	V
Gate-source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current	$I_D$	$T_A=25^\circ\text{C}$	9
		$T_A=70^\circ\text{C}$	7.2
Pulsed Drain Current <sup>A</sup>	$I_{DM}$	50	A
Total Power Dissipation @ $T_A=25^\circ\text{C}$	$P_D$	1.25	W
Thermal Resistance Junction-to-Ambient <sup>B</sup>	$R_{\theta JA}$	100	$^\circ\text{C}/\text{W}$
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
YJJ09N03A	F2	0309	3000	30000	120000	7"



# YJJ09N03A

## ■ 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	30			V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V			1	μA
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±20V, 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	1	1.5	2.5	V
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =6.0A		9	15	mΩ
		V <sub>GS</sub> = 4.5V, I <sub>D</sub> =5.0A		12	18	
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =9A, V <sub>GS</sub> =0V			1.2	V
Maximum Body-Diode Continuous Current	I <sub>S</sub>				9	A
<b>Dynamic Parameters</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, f=1MHZ		1015		pF
Output Capacitance	C <sub>oss</sub>			201		
Reverse Transfer Capacitance	C <sub>rss</sub>			164		
<b>Switching Parameters</b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>GS</sub> =10V, V <sub>DS</sub> =15V, I <sub>D</sub> =20A		23.6		nC
Gate-Source Charge	Q <sub>gs</sub>			3.9		
Gate-Drain Charge	Q <sub>gd</sub>			7.0		
Reverse Recovery Chrage	Q <sub>rr</sub>	I <sub>F</sub> =15A, di/dt=100A/us		0.1		ns
Reverse Recovery Time	t <sub>rr</sub>			7		
Turn-on Delay Time	t <sub>D(on)</sub>	V <sub>GS</sub> =10V, V <sub>DD</sub> =20V, I <sub>D</sub> =2A, R <sub>GEN</sub> =3Ω		7		ns
Turn-on Rise Time	t <sub>r</sub>			19		
Turn-off Delay Time	t <sub>D(off)</sub>			24		
Turn-off fall Time	t <sub>f</sub>			24		

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

B. R<sub>θJA</sub> is the sum of the junction-to-lead and lead-to-ambient thermal resistance, where the lead thermal reference is defined as the solder mounting surface of the drain pins. R<sub>θJL</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

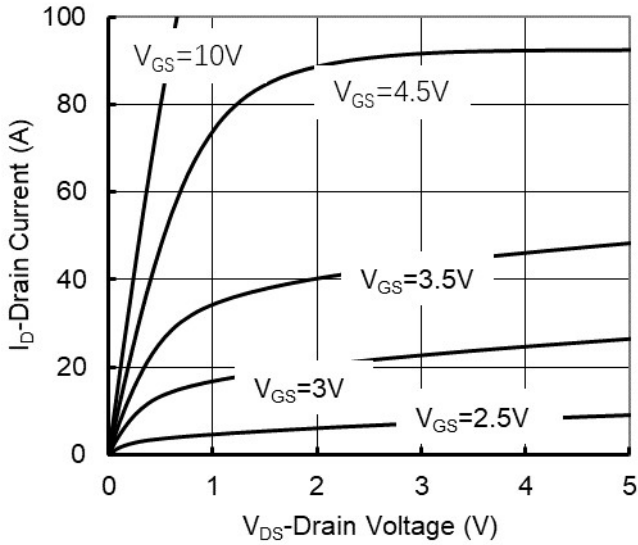


Figure1. Output Characteristics

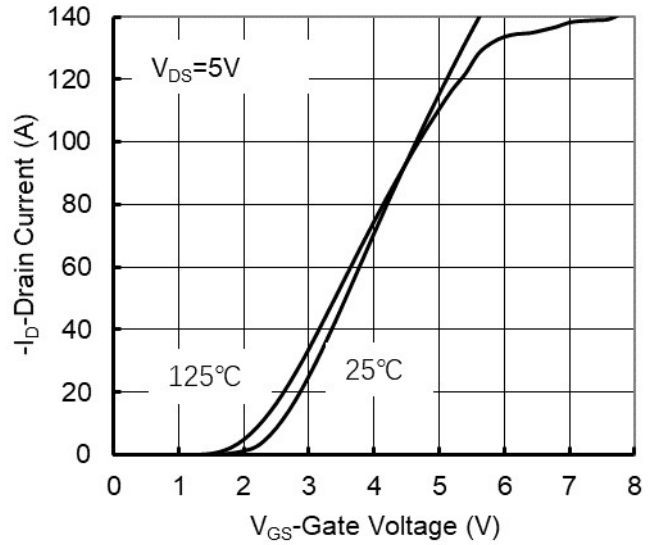


Figure2. Transfer Characteristics

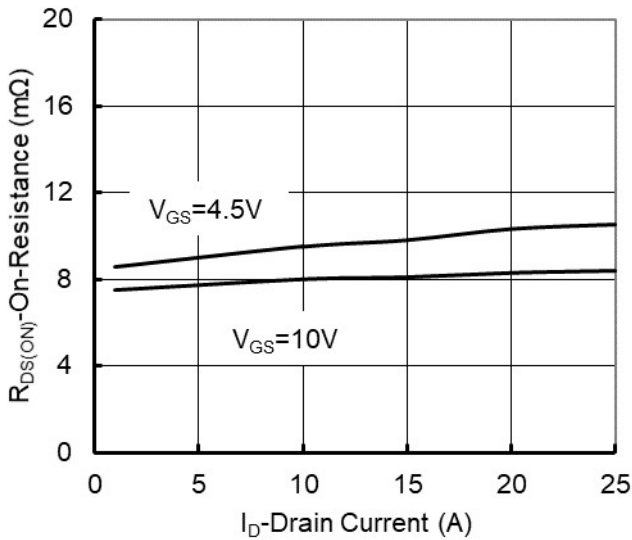


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

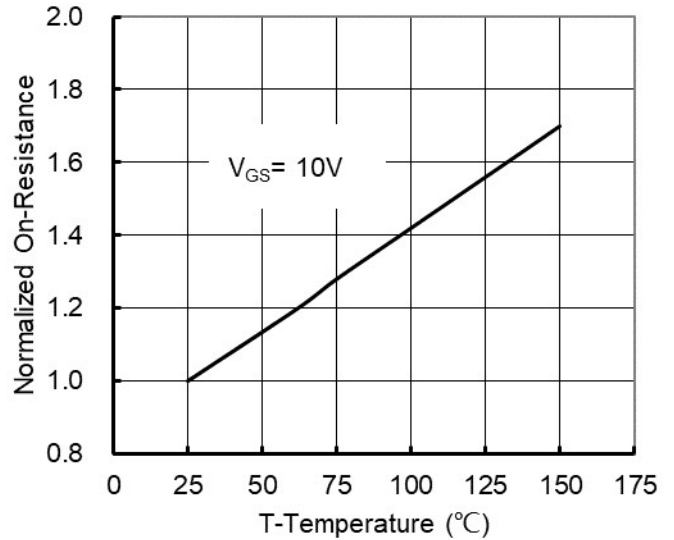


Figure 4: On-Resistance vs. Junction Temperature

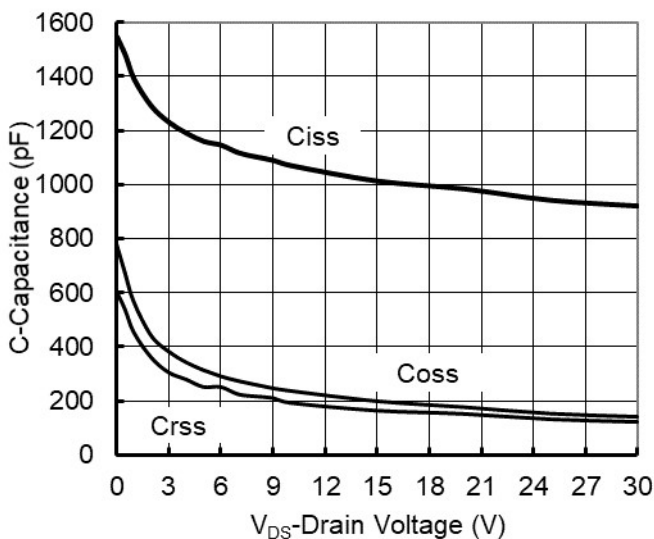


Figure5. Capacitance Characteristics

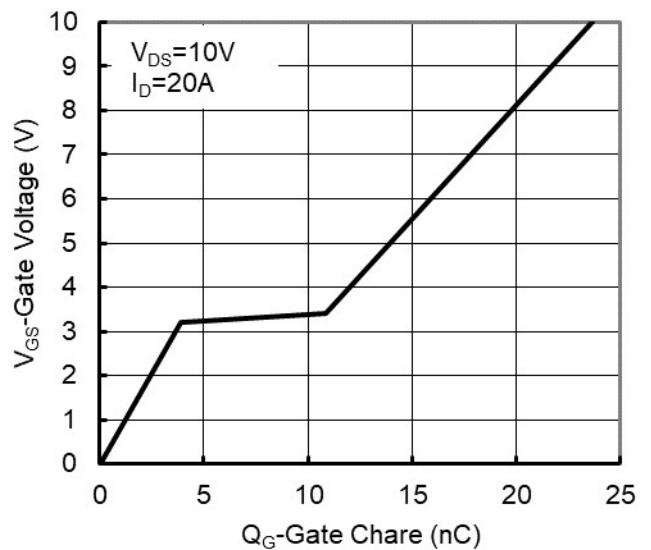


Figure6. Gate Charge



# YJJ09N03A

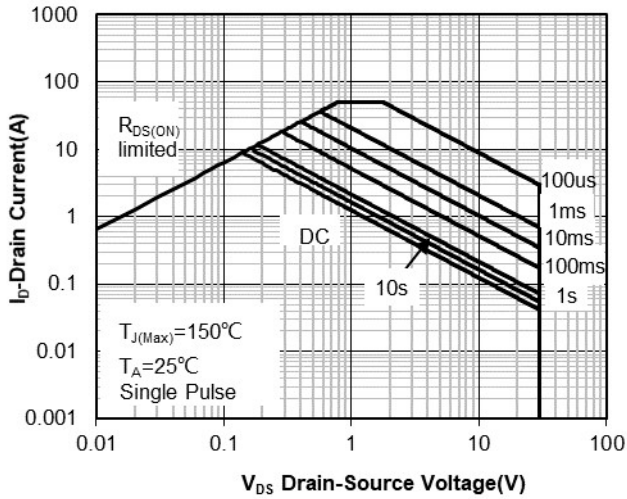


Figure7. Safe Operation Area

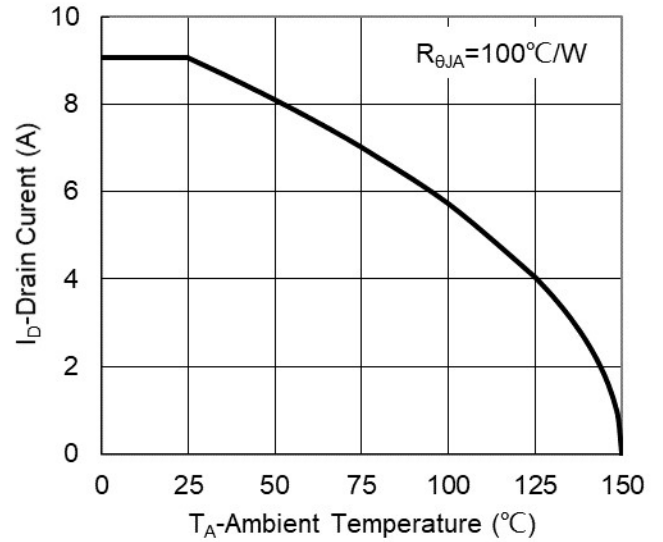


Figure8. Maximum Continuous Drain Current vs Ambient Temperature

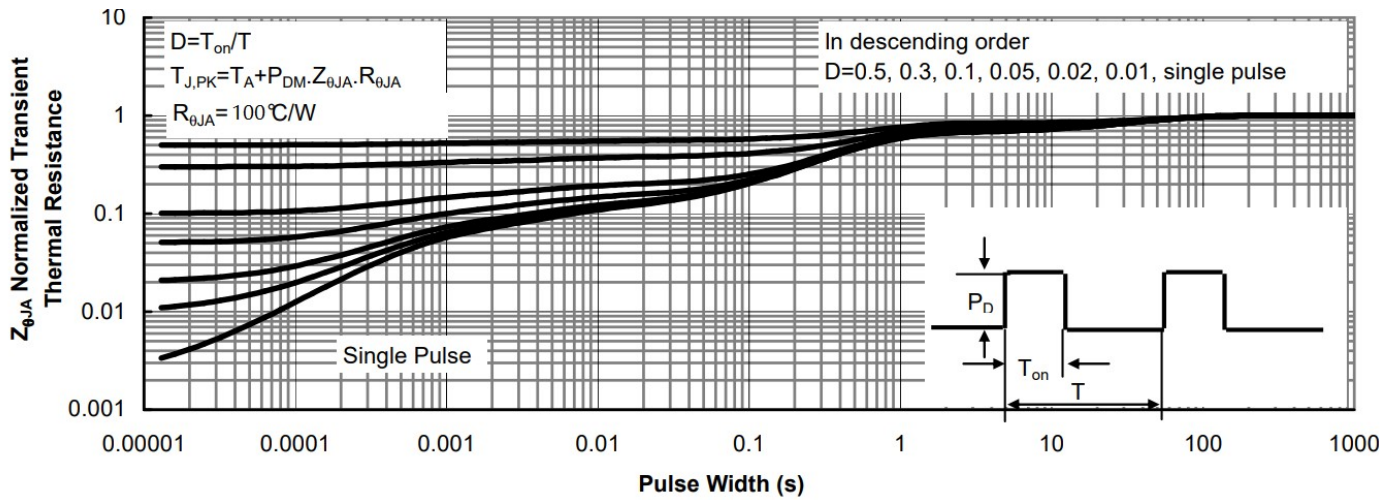
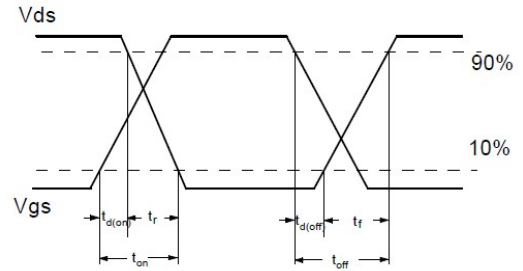
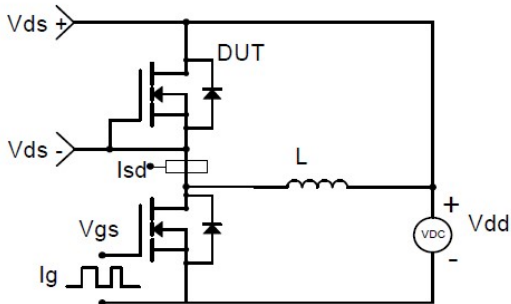


Figure9. Normalized Maximum Transient Thermal Impedance



**Resistive Switching Test Circuit & Waveforms**



**Diode Recovery Test Circuit & Waveforms**



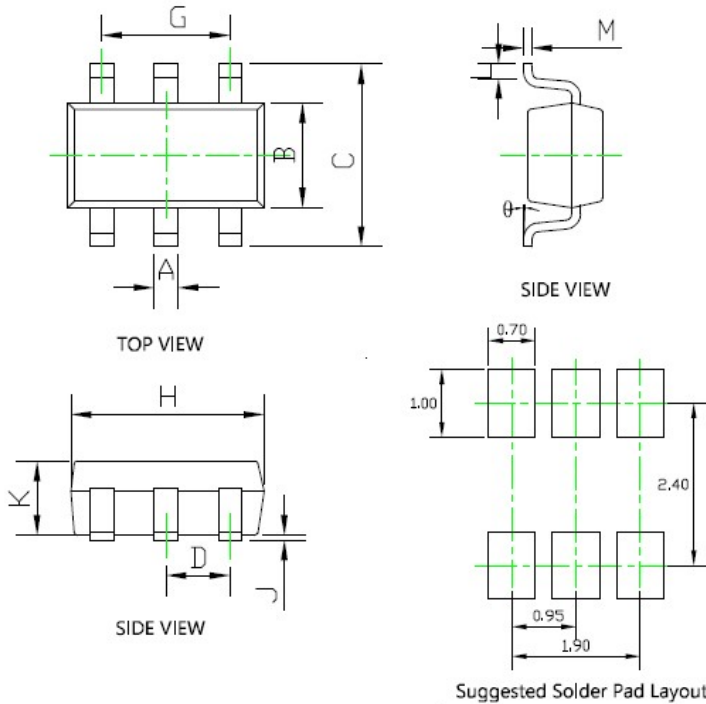
**Gate Charge Test Circuit & Waveform**



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



■ SOT-23-6L Package information



Note:  
 1. Controlling dimension in millimeters.  
 2. General tolerance:  $\pm 0.05\text{mm}$ .  
 3. The pad layout is for reference purposes only.

SYMBOL	DIMENSIONS			
	INCHES		Millimeter	
	MIN.	MAX.	MIN.	MAX.
A	0.012	0.020	0.300	0.500
B	0.059	0.067	1.500	1.700
C	0.104	0.116	2.650	2.950
D	0.037BSC		0.950BSC	
G	0.075BSC		1.900BSC	
H	0.111	0.119	2.820	3.020
J	0.000	0.004	0.000	0.100
K	0.041	0.045	1.050	1.150
L	0.012	0.024	0.300	0.600
M	0.004	0.008	0.100	0.200
$\theta$	0°	8°	0°	8°



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