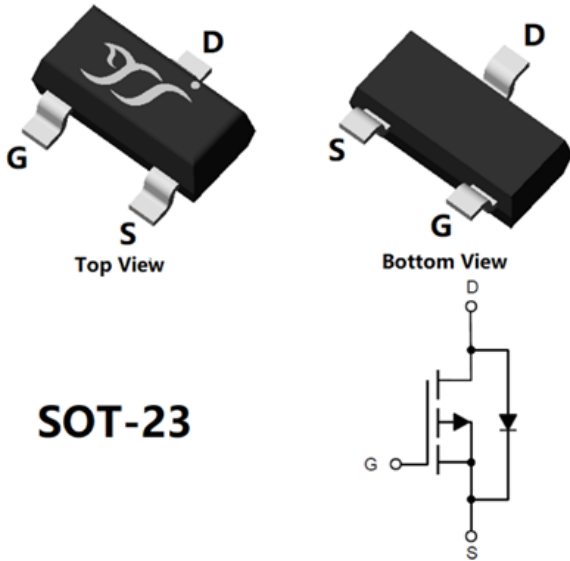


## N-Channel Enhancement Mode Field Effect Transistor



**SOT-23**

### Product Summary

- $V_{DS}$  -40V
- $I_D$  -3A
- $R_{DS(ON)}$  (at  $V_{GS}=-10V$ ) <80m $\Omega$
- $R_{DS(ON)}$  (at  $V_{GS}=-4.5V$ ) <110m $\Omega$

### General Description

- Trench Power LV MOSFET technology
- High Speed switching
- Halogen Free
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free

### Applications

- Power switching application
- Uninterruptible power supply
- PWM application

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

Parameter		Symbol	Limit	Unit
Drain-source Voltage		$V_{DS}$	-40	V
Gate-source Voltage		$V_{GS}$	$\pm 20$	V
Drain Current	$T_A=25^\circ\text{C}$	$I_D$	-3	A
	$T_A=100^\circ\text{C}$		-1.9	
Pulsed Drain Current <sup>A</sup>		$I_{DM}$	-20	A
Total Power Dissipation <sup>B</sup>	$T_A=25^\circ\text{C}$	$P_D$	1	W
	$T_A=100^\circ\text{C}$		0.4	
Junction and Storage Temperature Range		$T_J, T_{STG}$	-55~+150	$^\circ\text{C}$

### ■ Thermal resistance

Parameter		Symbol	Typ	Max	Units
Thermal Resistance Junction-to-Ambient <sup>C</sup>	Steady-State	$R_{\theta JA}$	100	120	$^\circ\text{C/W}$

### ■ Ordering Information (Example)

PREFERRED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
YJL03P04A	F2	03P04.	3000	30000	120000	7 " reel



# YJL03P04A

## ■ 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	-40	-	-	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =-40V, V <sub>GS</sub> =0V	-	-	-1	μA
		V <sub>DS</sub> =-40V, V <sub>GS</sub> =0V, T <sub>J</sub> =150°C	-	-	-100	
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> =-3A	-	61	80	mΩ
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-2A	-	81	110	
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =-3A, V <sub>GS</sub> =0V	-	-0.85	-1.2	V
Gate resistance	R <sub>G</sub>	f=1MHz	-	20	-	Ω
Maximum Body-Diode Continuous Current	I <sub>S</sub>		-	-	-3	A
<b>Dynamic Parameters</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =-20V, V <sub>GS</sub> =0V, f=1MHz	-	400	-	pF
Output Capacitance	C <sub>oss</sub>		-	50	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	40	-	
<b>Switching Parameters</b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>GS</sub> =-10V, V <sub>DS</sub> =-20V, I <sub>D</sub> =-3A	-	8.5	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	1	-	
Gate-Drain Charge	Q <sub>gd</sub>		-	2	-	
Reverse Recovery Charge	Q <sub>rr</sub>	I <sub>F</sub> =-3A, di/dt=100A/us	-	31	-	nC
Reverse Recovery Time	t <sub>rr</sub>		-	34	-	ns
Turn-on Delay Time	t <sub>D(on)</sub>	V <sub>GS</sub> =-10V, V <sub>DD</sub> =-20V, I <sub>D</sub> =-3A R <sub>GEN</sub> =3Ω	-	6	-	ns
Turn-on Rise Time	t <sub>r</sub>		-	6	-	
Turn-off Delay Time	t <sub>D(off)</sub>		-	31	-	
Turn-off fall Time	t <sub>f</sub>		-	19	-	

A. Repetitive rating; pulse width limited by max. junction temperature.

B. P<sub>d</sub> is based on max. junction temperature, using junction-case thermal resistance.

C. The value of R<sub>θJA</sub> is measured with the device mounted on the minimum recommend pad size, in the still air environment with T<sub>A</sub> =25°C. The maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.



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## Typical Electrical and Thermal Characteristics Diagrams

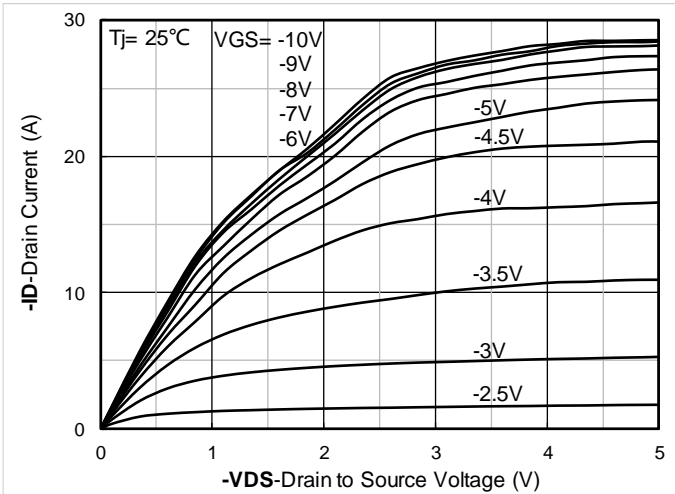


Figure 1. Output Characteristics

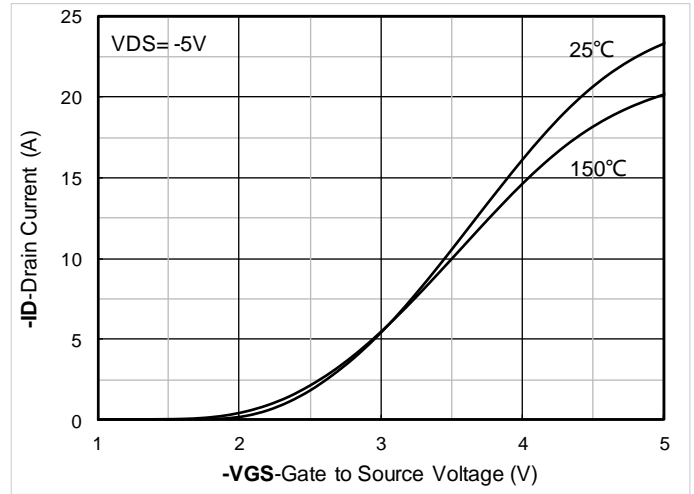


Figure 2. Transfer Characteristics

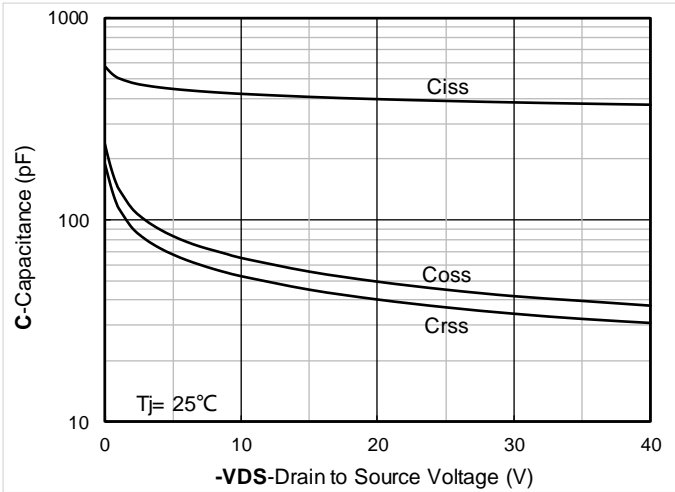


Figure 3. Capacitance Characteristics

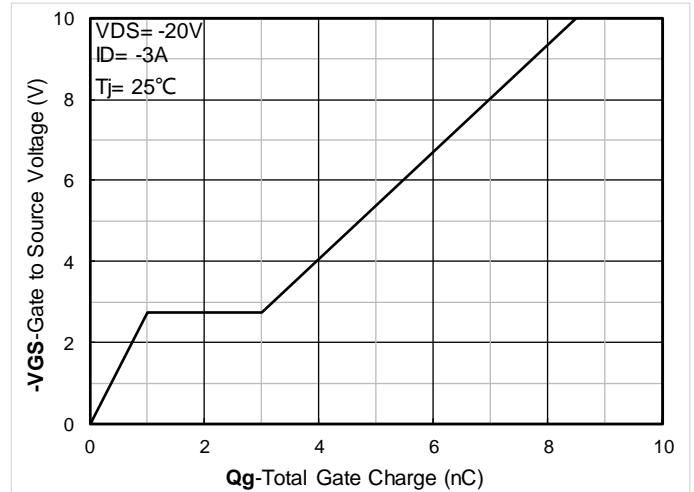


Figure 4. Gate Charge

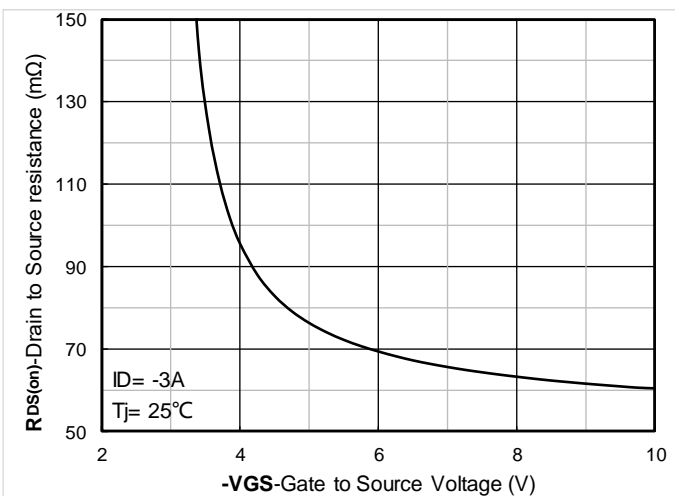


Figure 5. On-Resistance vs Gate to Source Voltage

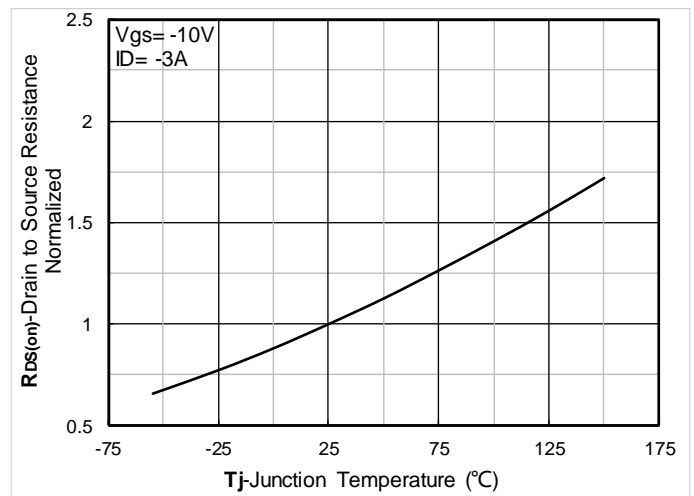


Figure 6. Normalized On-Resistance



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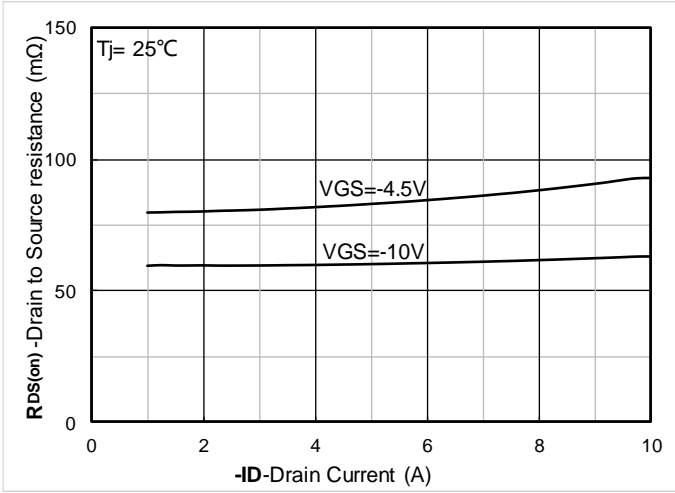


Figure 7.  $R_{DS(on)}$  VS Drain Current

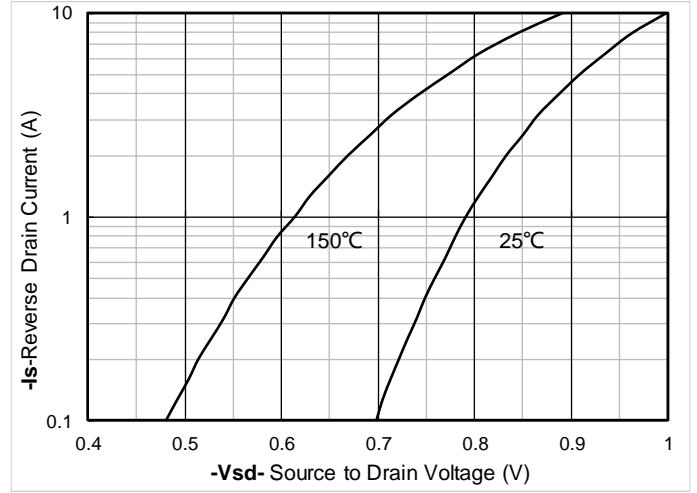


Figure 8. Forward characteristics of reverse diode

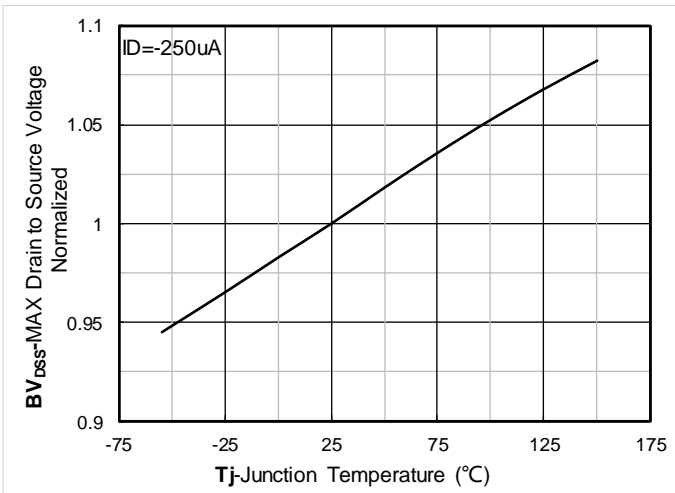


Figure 9. Normalized breakdown voltage

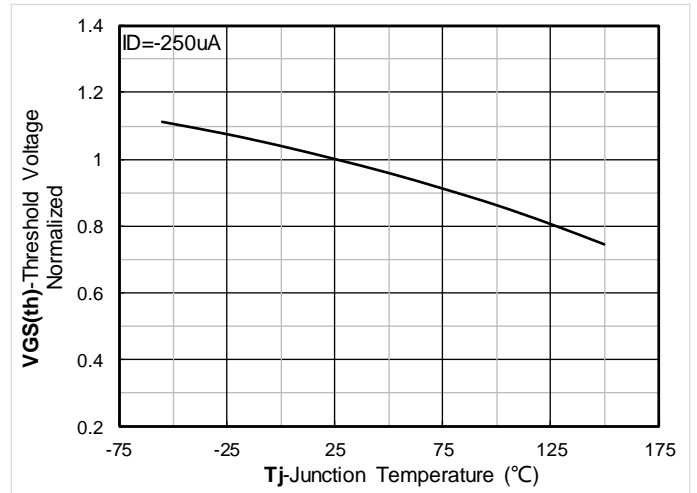


Figure 10. Normalized Threshold voltage

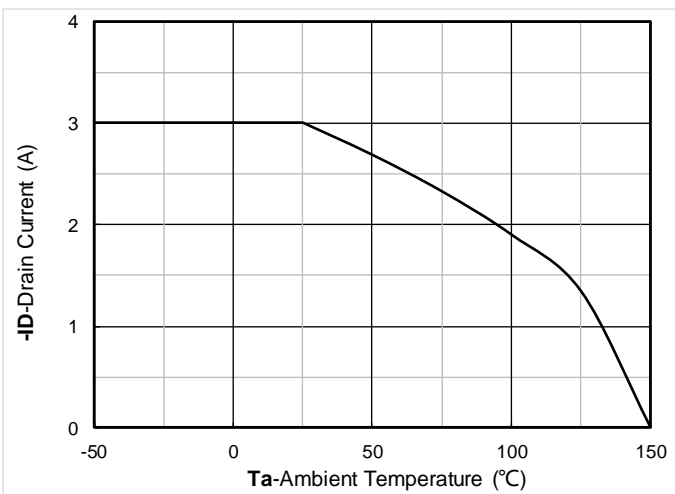


Figure 11. Current dissipation

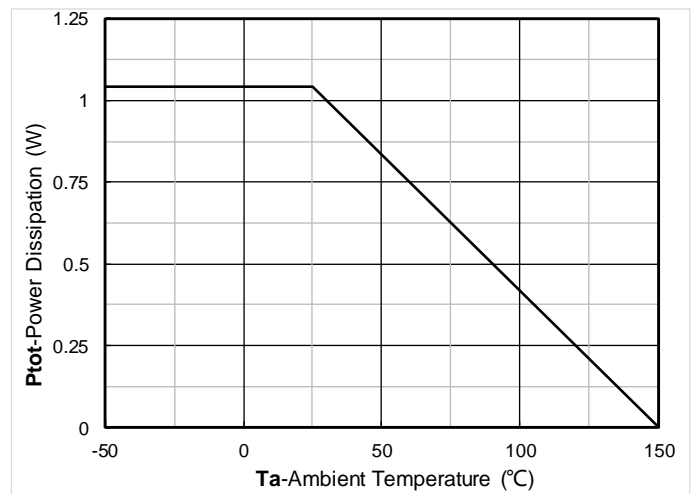


Figure 12. Power dissipation



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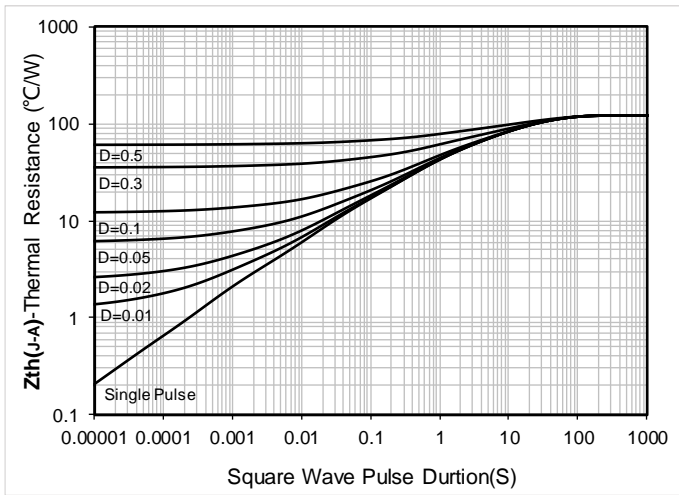


Figure 13. Maximum Transient Thermal Impedance

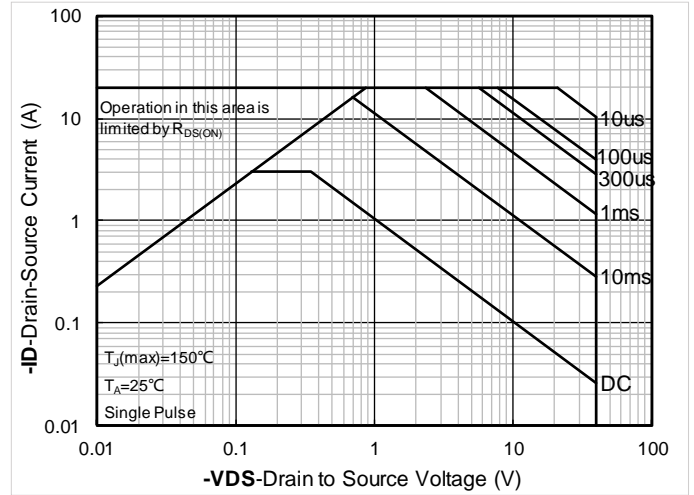
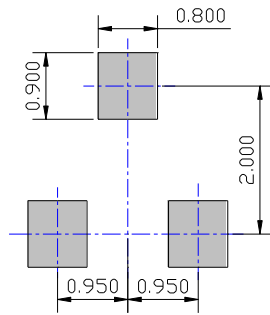
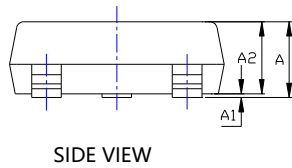
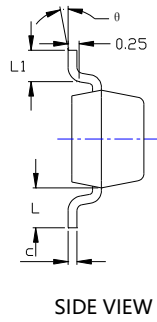
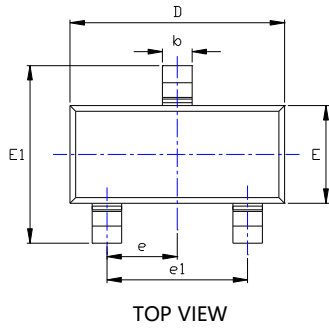


Figure 14. Safe Operation Area

## ■ SOT-23 Package information



UNIT: mm

SYMBOL	DIMENSIONS			
	INCHES		Millimeter	
	MIN.	MAX.	MIN.	MAX.
A	0.035	0.045	0.900	1.150
A1	0.000	0.004	0.000	0.100
A2	0.035	0.041	0.900	1.050
b	0.012	0.020	0.300	0.500
c	0.004	0.008	0.100	0.200
D	0.110	0.118	2.800	3.000
E	0.047	0.055	1.200	1.400
E1	0.089	0.100	2.250	2.550
e	0.037 TYP		0.950 TYP	
e1	0.071	0.079	1.800	2.000
L	0.022 REF		0.550 REF	
L1	0.012	0.020	0.300	0.500
θ	0°	8°	0°	8°

NOTE:  
 1. PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.  
 2. TOLERANCE 0.1mm UNLESS OTHERWISE SPECIFIED.  
 3. THE PAD LAYOUT IS FOR REFERENCE PURPOSES ONLY.



## YJL03P04A

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