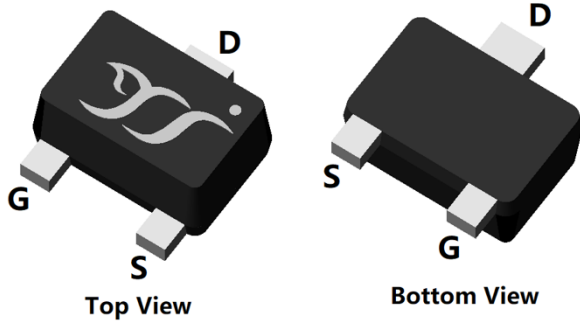
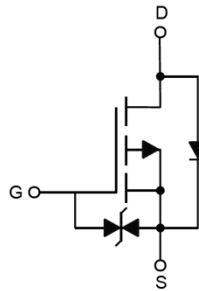


## P-Channel Enhancement Mode Field Effect Transistor



**SOT-723**



### Product Summary

• $V_{DS}$	-20 V
• $I_D$	-0.5 A
• $R_{DS(ON)}$ ( at $V_{GS}=-4.5V$ )	<850 m $\Omega$
• $R_{DS(ON)}$ ( at $V_{GS}=-2.5V$ )	<1200 m $\Omega$
• $R_{DS(ON)}$ ( at $V_{GS}=-1.8V$ )	<2000 m $\Omega$

### General Description

- Trench Power LV MOSFET technology
- Extremely low switching loss
- Excellent stability and uniformity
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free

### Applications

- PWM application
- Portable equipment

### ■ 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	$T_A=25^\circ\text{C}$	$I_D$	-0.5	A
	$T_A=100^\circ\text{C}$		-0.3	
Pulsed Drain Current <sup>A</sup>		$I_{DM}$	-2.5	A
Total Power Dissipation <sup>B</sup>	$T_A=25^\circ\text{C}$	$P_D$	0.28	W
	$T_A=100^\circ\text{C}$		0.1	
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	$R_{\theta JA}$	350	450	$^\circ\text{C/W}$

### ■ Ordering Information (Example)

PREFERRED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
YJL3139KAT	F2	KA	8000	80000	320000	7" reel



# YJL3139KAT

## ■ 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
		V <sub>DS</sub> =-20V, V <sub>GS</sub> =0V, T <sub>J</sub> =150°C	-	-	-100	
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±10V, V <sub>DS</sub> =0V	-	-	±10	μA
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =-250μA	-0.35	-0.7	-1.1	V
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-0.5A	-	650	850	mΩ
		V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-0.3A	-	900	1200	
		V <sub>GS</sub> =-1.8V, I <sub>D</sub> =-0.2A	-	1400	2000	
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =-0.5A, V <sub>GS</sub> =0V	-	-0.95	-1.2	V
Maximum Body-Diode Continuous Current	I <sub>S</sub>		-	-	-0.5	A
<b>Dynamic Parameters</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =-10V, V <sub>GS</sub> =0V, f=1MHz	-	40	-	pF
Output Capacitance	C <sub>oss</sub>		-	15	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	10	-	
<b>Switching Parameters</b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>GS</sub> =-4.5V, V <sub>DS</sub> =-10V, I <sub>D</sub> =-0.5A	-	1.24	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	0.37	-	
Gate-Drain Charge	Q <sub>gd</sub>		-	0.27	-	
Reverse Recovery Charge	Q <sub>rr</sub>	I <sub>F</sub> =-0.5A, di/dt=100A/us	-	0.97	-	nC
Reverse Recovery Time	t <sub>rr</sub>		-	26	-	ns
Turn-on Delay Time	t <sub>D(on)</sub>	V <sub>GS</sub> =-4.5V, V <sub>DD</sub> =-10V, I <sub>D</sub> =-0.5A RGEN=3Ω	-	4	-	ns
Turn-on Rise Time	t <sub>r</sub>		-	19	-	
Turn-off Delay Time	t <sub>D(off)</sub>		-	16	-	
Turn-off fall Time	t <sub>f</sub>		-	25	-	

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

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

C. The value of RθJA is measured with the device mounted on the minimum recommend pad size, in the still air environment with TA =25°C. The maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.



## Typical Electrical and Thermal Characteristics Diagrams

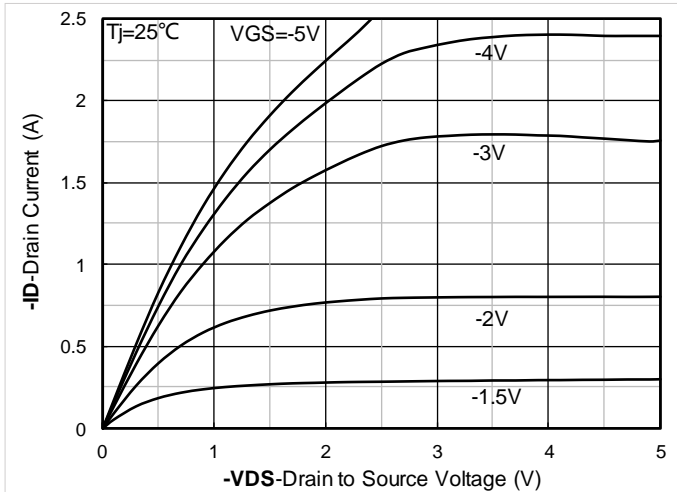


Figure 1. Output Characteristics

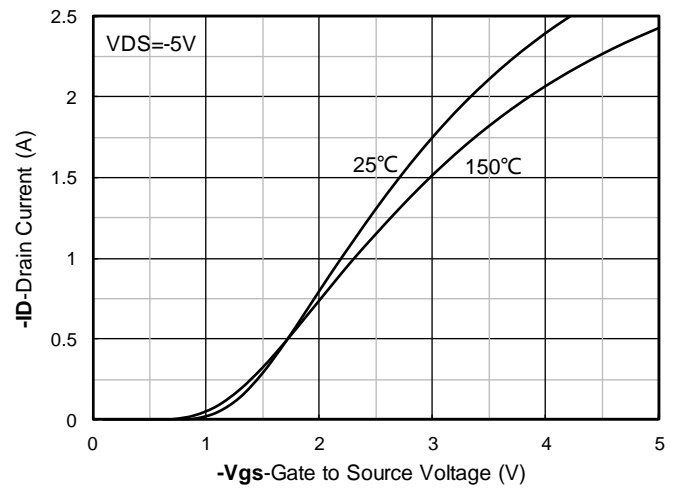


Figure 2. Transfer Characteristics

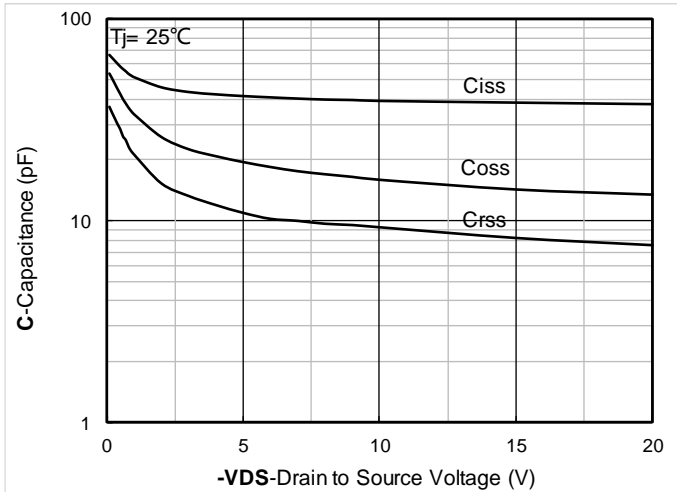


Figure 3. Capacitance Characteristics

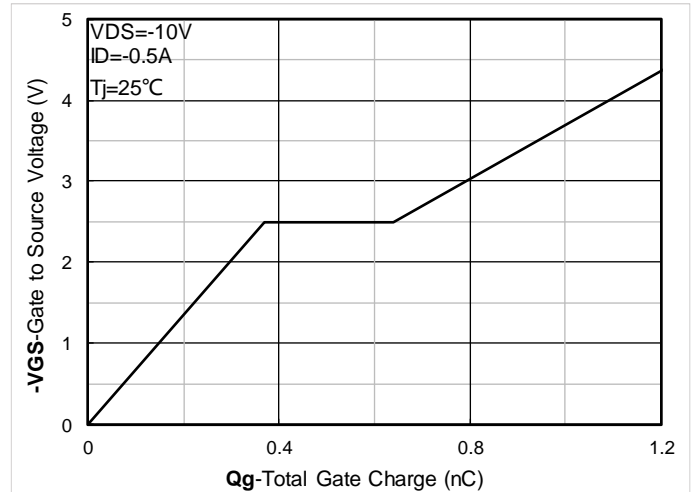


Figure 4. Gate Charge

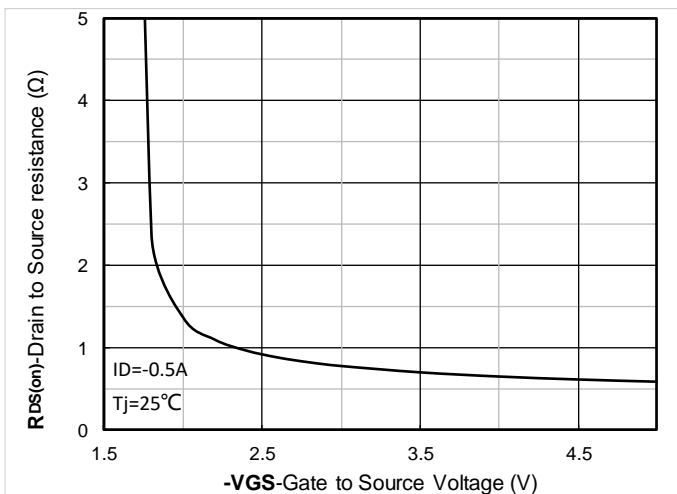


Figure 5. On-Resistance vs Gate to Source Voltage

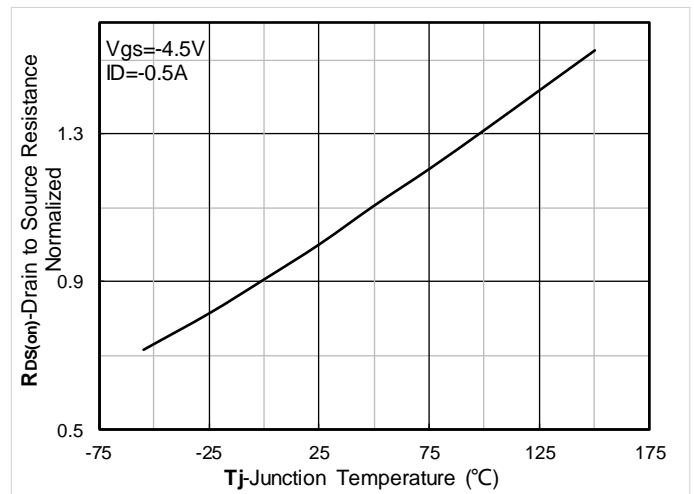


Figure 6. Normalized On-Resistance



# YJL3139KAT

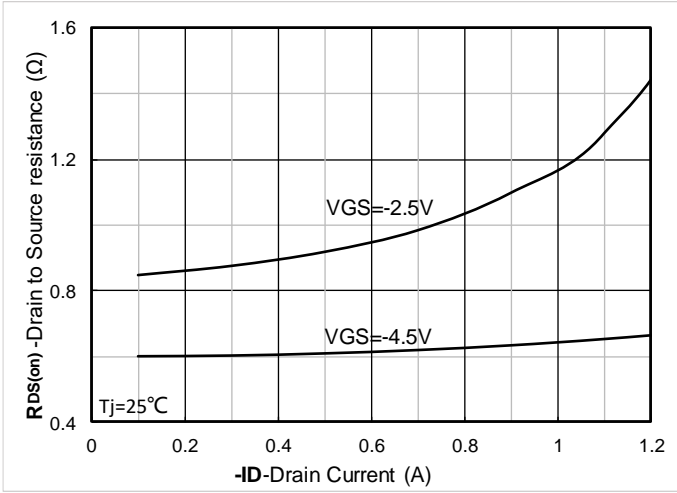


Figure 7.  $R_{DS(on)}$  VS Drain Current

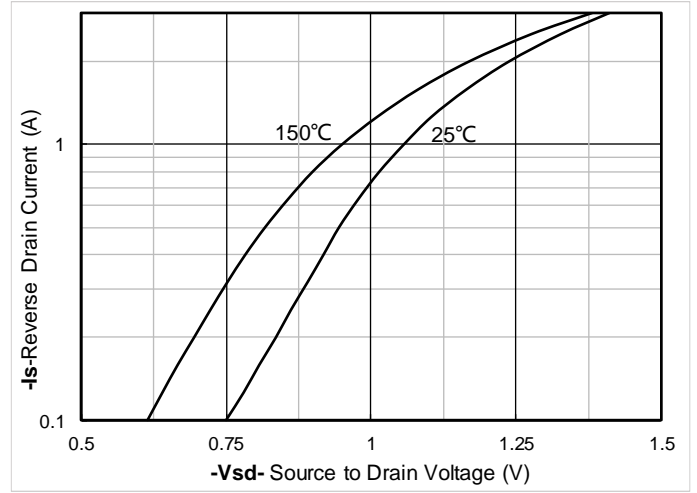


Figure 8. Forward characteristics of reverse diode

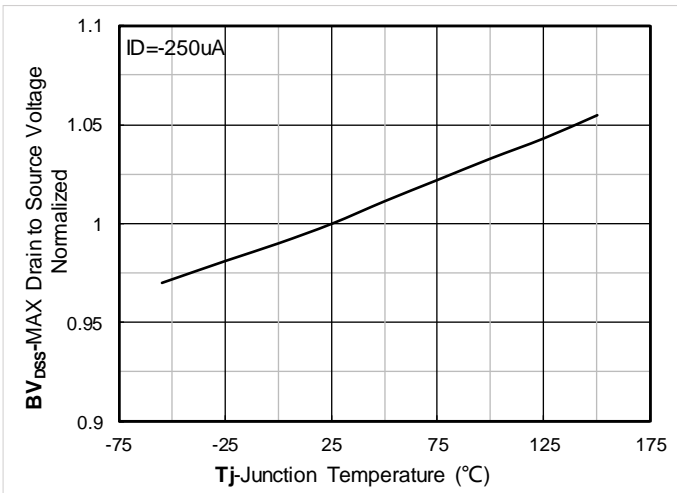


Figure 9. Normalized breakdown voltage

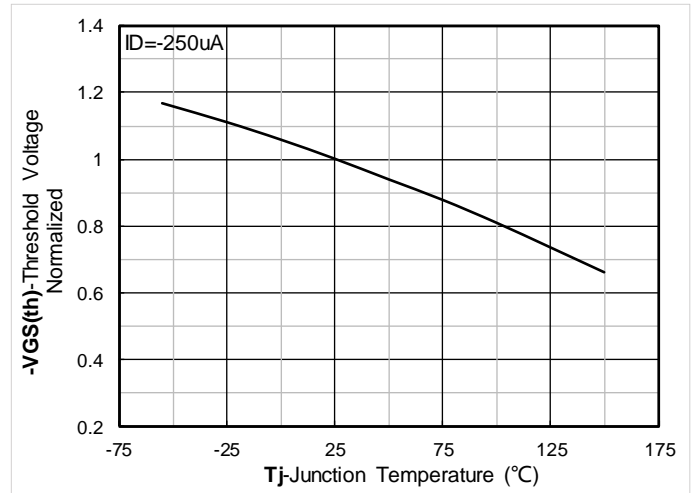


Figure 10. Normalized Threshold voltage

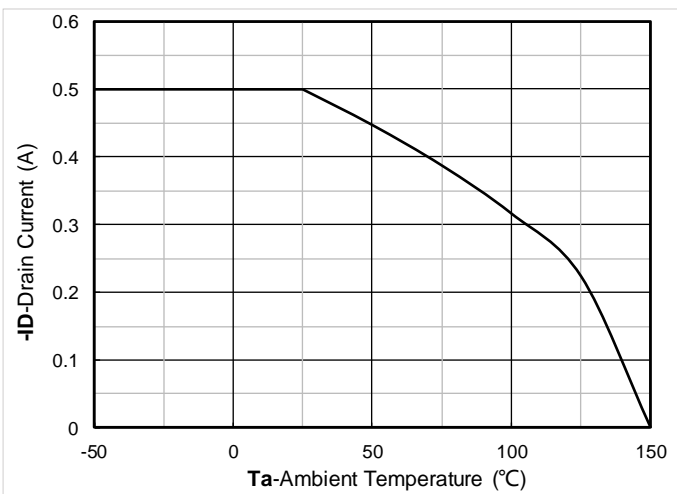


Figure 11. Current dissipation

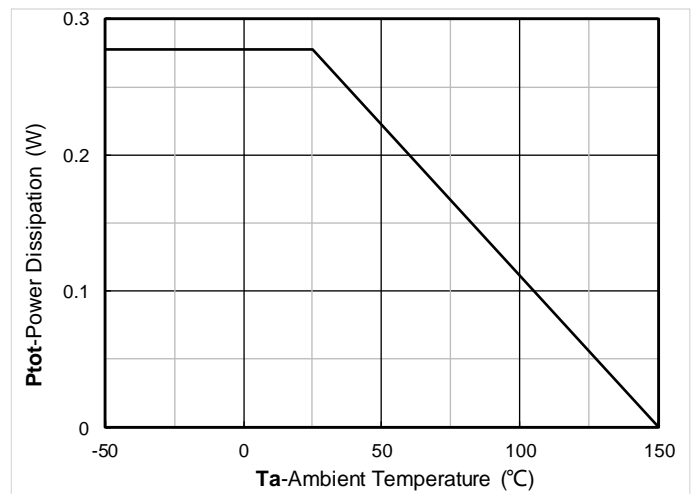


Figure 12. Power dissipation



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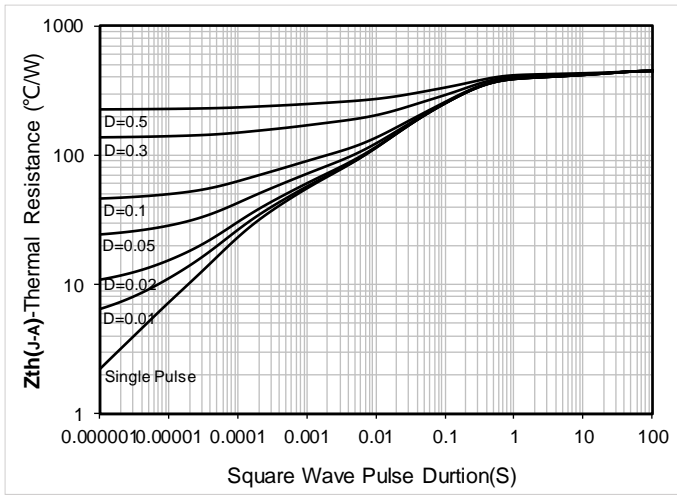


Figure 13. Maximum Transient Thermal Impedance

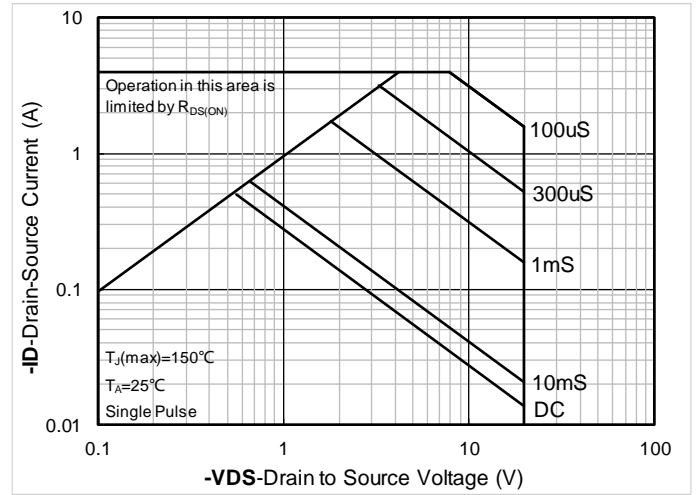
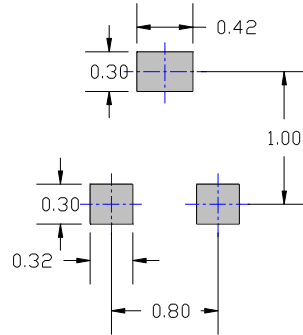
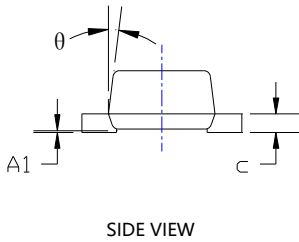
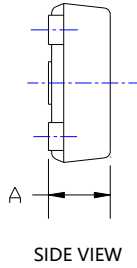
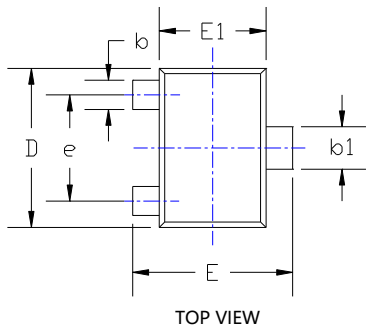


Figure 14. Safe Operation Area

## ■ SOT-723 Package information



SYMBOL	DIMENSIONS			
	INCHES		Millimeter	
	MIN.	MAX.	MIN.	MAX.
A	0.017	0.022	0.430	0.550
A1	0.000	0.002	0.000	0.050
b	0.007	0.011	0.170	0.270
b1	0.011	0.015	0.270	0.370
c	0.003	0.008	0.080	0.200
D	0.045	0.049	1.150	1.250
E	0.045	0.049	1.150	1.250
E1	0.030	0.033	0.750	0.850
e	0.031 TYP.		0.800 TYP.	
θ	7° REF.		7° REF.	

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.



## YJL3139KAT

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