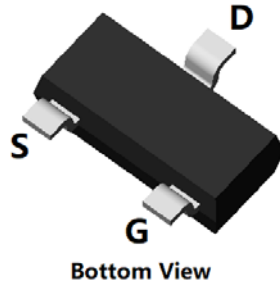
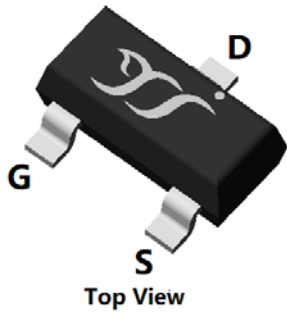
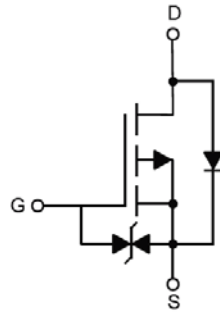


## P-Channel Enhancement Mode Field Effect Transistor



**SOT-23**



### Product Summary

- $V_{DS}$  -20 V
- $I_D$  - 3.9A
- $R_{DS(ON)}$  ( at  $V_{GS}=-4.5V$ ) < 45 m $\Omega$
- $R_{DS(ON)}$  ( at  $V_{GS}=-2.5V$ ) < 75 m $\Omega$
- ESD Protected Up to 2.0KV (HBM)

### General Description

- Split gate trench MOSFET technology
- Low  $R_{DS(on)}$  & FOM
- Extremely low switching loss
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Part no. with suffix "Q" means AEC-Q101 qualified
- Halogen Free

### Applications

- Power management
- Portable equipment

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

Parameter	Symbol	Limit	Unit
Drain-source Voltage	$V_{DS}$	-20	V
Gate-source Voltage	$V_{GS}$	$\pm 10$	V
Drain Current	$I_D$	$T_A=25^\circ C$	-3.9
		$T_A=100^\circ C$	-2.4
Pulsed Drain Current <sup>A</sup>	$I_{DM}$	-23	A
Total Power Dissipation <sup>C</sup>	$P_D$	$T_A=25^\circ C$	1
		$T_A=100^\circ C$	0.4
Junction and Storage Temperature Range	$T_J, T_{STG}$	-55~+150	$^\circ C$

### ■ Thermal resistance

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

### ■ Ordering Information (Example)

PREFERRED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
YJL3415KCQ	F2	3415C	3000	30000	120000	7" reel



# YJL3415KCQ

## ■ 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	μA
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	-0.5	-0.85	-1.25	V
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-3.9A	-	28	45	mΩ
		V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-2A	-	50	75	mΩ
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =-3.9A, V <sub>GS</sub> =0V	-	-0.9	-1.2	V
Gate resistance	R <sub>G</sub>	f=1MHz, Open drain	-	17	-	Ω
<b>Dynamic Parameters</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =-10V, V <sub>GS</sub> =0V, f=1MHz	-	540	-	pF
Output Capacitance	C <sub>oss</sub>		-	120	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	100	-	
<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> =-5A	-	13	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	2	-	
Gate-Drain Charge	Q <sub>gd</sub>		-	2	-	
Reverse Recovery Charge	Q <sub>rr</sub>	I <sub>F</sub> =-5A, di/dt=100A/us	-	2.5	-	nC
Reverse Recovery Time	t <sub>rr</sub>		-	20	-	ns
Turn-on Delay Time	t <sub>D(on)</sub>	V <sub>GS</sub> =-10V, V <sub>DD</sub> =-10V, I <sub>D</sub> =-5A R <sub>GEN</sub> =2.2Ω	-	5	-	ns
Turn-on Rise Time	t <sub>r</sub>		-	47	-	
Turn-off Delay Time	t <sub>D(off)</sub>		-	52	-	
Turn-off fall Time	t <sub>f</sub>		-	69	-	

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 R<sub>θJA</sub> is measured with the device mounted on 1 in<sup>2</sup> FR-4 board with 2oz. Copper, 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.



## Typical Electrical and Thermal Characteristics Diagrams

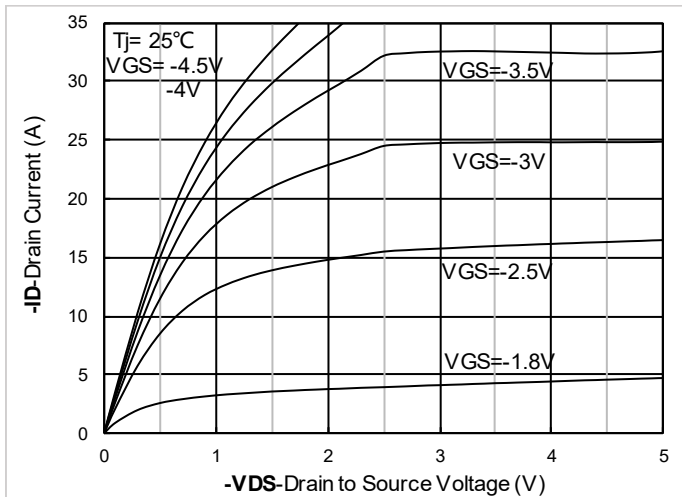


Figure 1. Output Characteristics

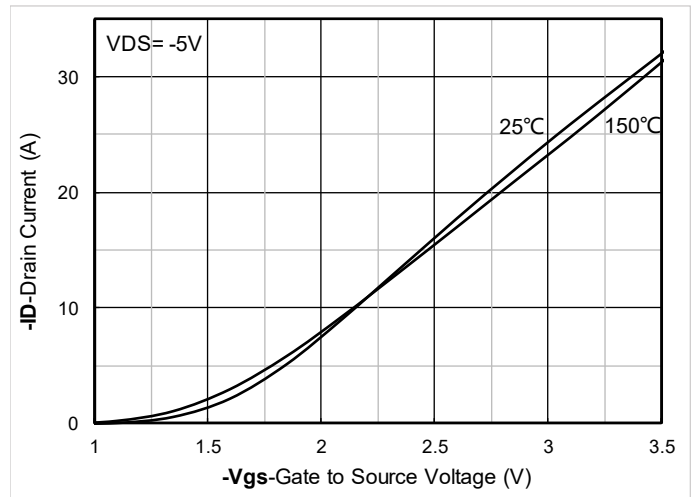


Figure 2. Transfer Characteristics

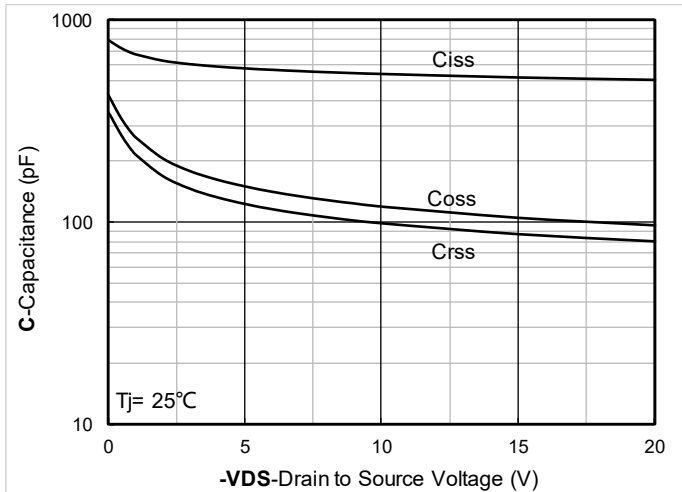


Figure 3. Capacitance Characteristics

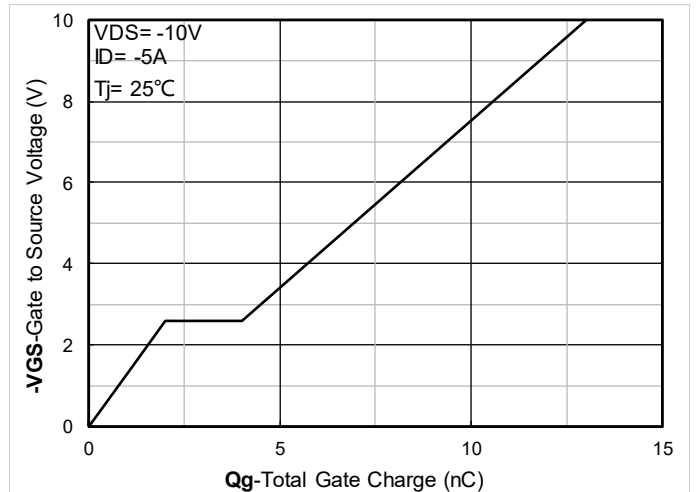


Figure 4. Gate Charge

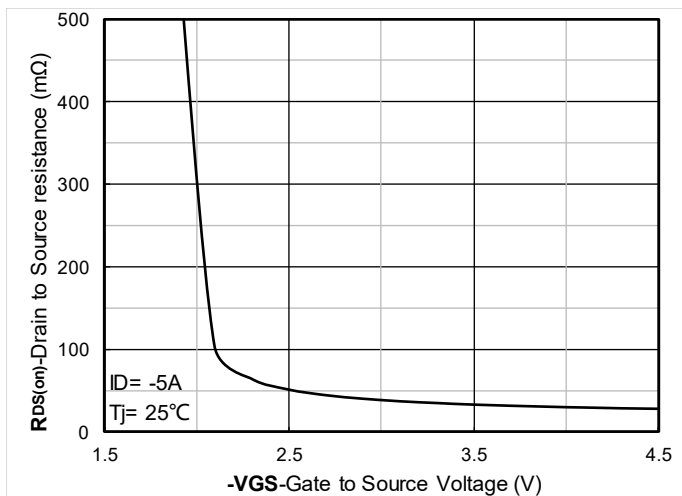


Figure 5. On-Resistance vs Gate to Source Voltage

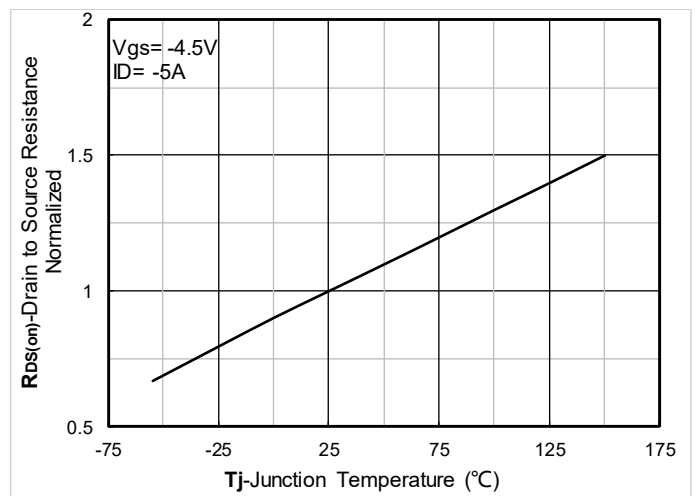


Figure 6. Normalized On-Resistance



# YJL3415KCQ

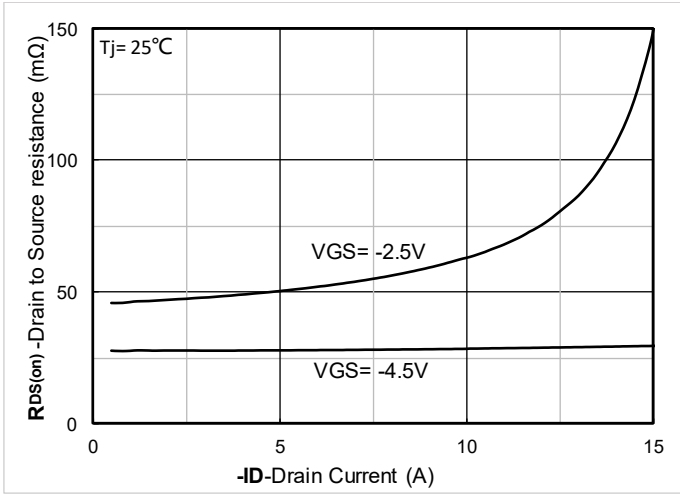


Figure 7.  $R_{DS(on)}$  VS Drain Current

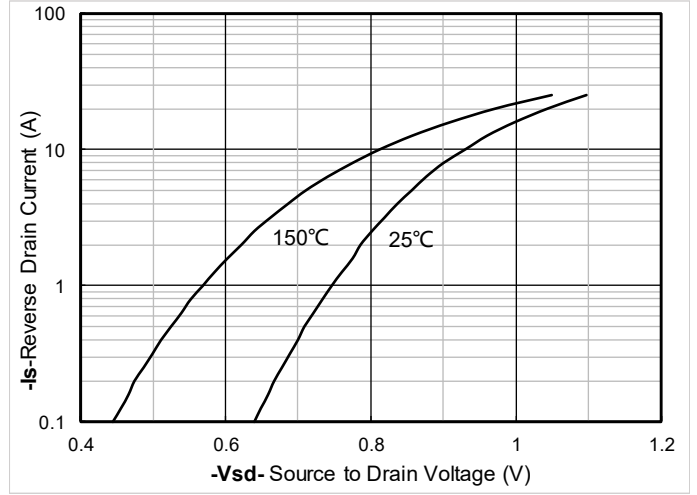


Figure 8. Forward characteristics of reverse diode

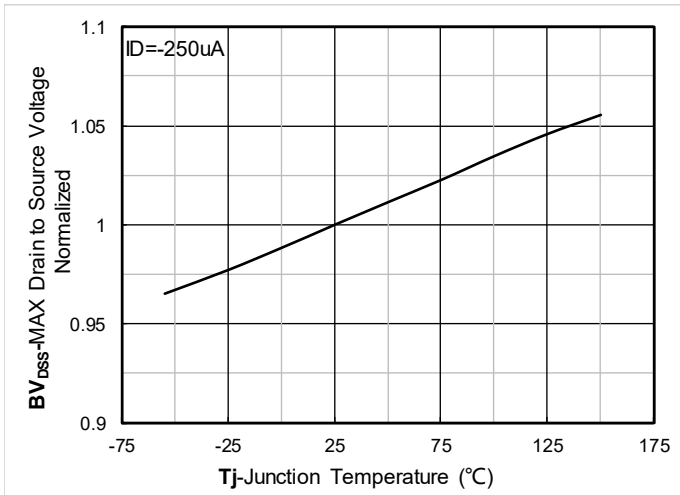


Figure 9. Normalized breakdown voltage

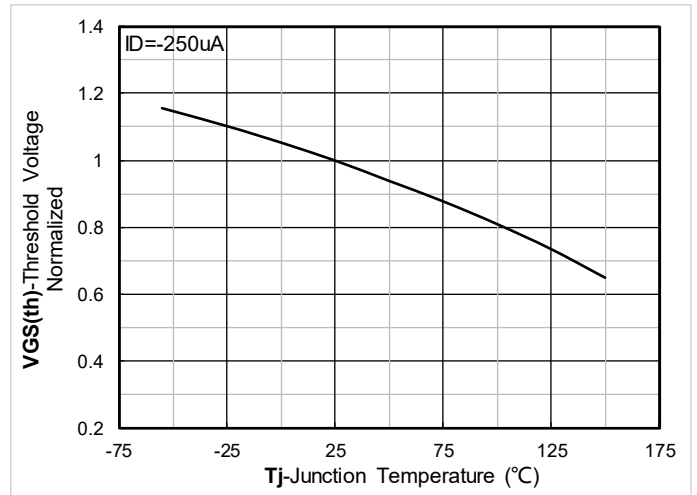


Figure 10. Normalized Threshold voltage

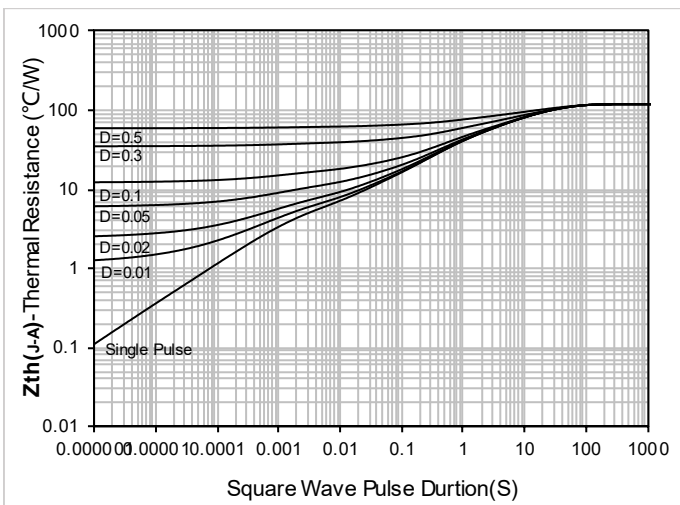


Figure 11. Maximum Transient Thermal Impedance

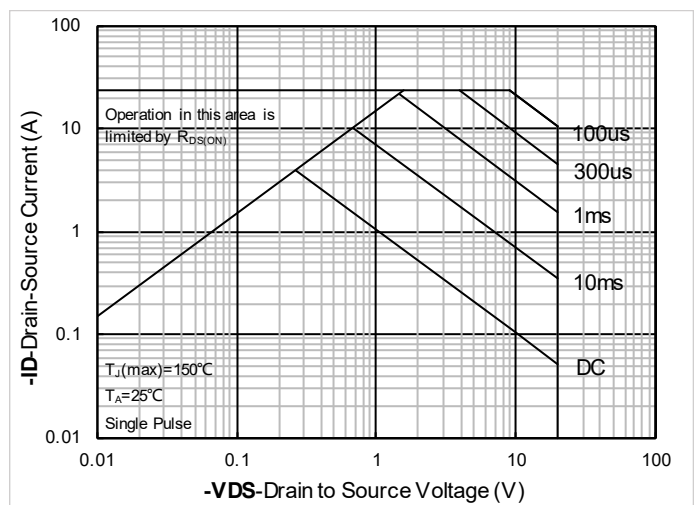
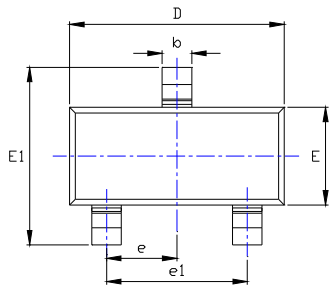


Figure 12. Safe Operation Area

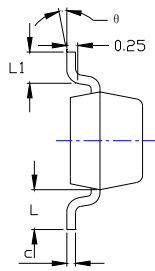


# YJL3415KCQ

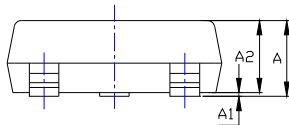
## ■ SOT-23 Package information



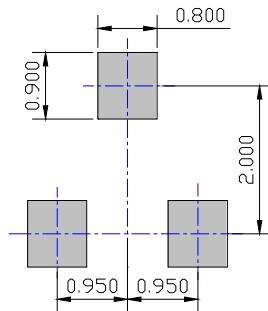
TOP VIEW



SIDE VIEW



SIDE VIEW



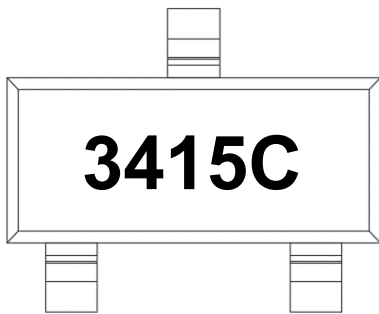
UNIT: mm

SUGGESTED SOLDER PAD LAYOUT

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	0.037TYP		0.950TYP	
e1	0.071	0.079	1.800	2.000
L	0.022REF		0.550REF	
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.

## ■ Marking Information



Note:

1. All marking is at middle of the product body
2. All marking is in laser marking
3. 3415C is Marking Code
4. Body color: Black



## YJL3415KCQ

---

### Disclaimer

The information presented in this document is for reference only. Yangzhou Yangjie Electronic Technology Co., Ltd. reserves the right to make changes without notice for the specification of the products displayed herein to improve reliability, function or design or otherwise.

The product listed herein is designed to be used with automotive electronics, are not designed for use in medical, life-saving, lifesustaining, or military, Yangjie or anyone on its behalf, assumes no responsibility or liability for any damages resulting from such improper use of sale.

This publication supersedes & replaces all information previously supplied. For additional information, please visit our website <http://www.21yangjie.com>, or consult your nearest Yangjie's sales office for further assistance.