N-Channel Enhancement Mode Field Effect Transistor

Top View

Bottom View
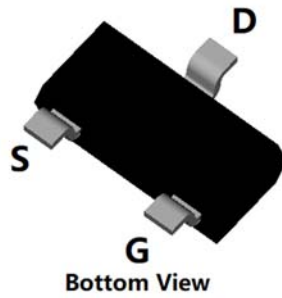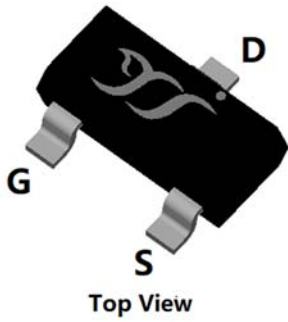
SOT-23
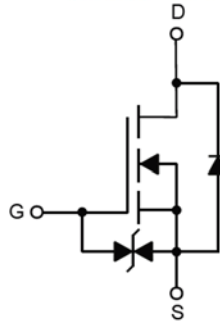
Product Summary

- V_{DS} 40V
- I_D 2.5A
- $R_{DS(ON)}$(at V_{GS}=10V)   ＜100mohm
- $R_{DS(ON)}$(at V_{GS}=6V)   ＜140mohm
- ESD protected up to 2.0KV (HBM)

General Description

- Voltage controlled small signal switch
- Low input Capacitance
- Fast Switching Speed
- Low Input / Output Leakage
- Moisture Sensitivity Level 1
- Part no. with suffix "Q" means AEC-Q101 qualified

Applications

- Battery operated systems
- Solid-state relays
- Direct logic-level interface：TTL/CMOS
- 12V Automotive systems

■ Absolute Maximum Ratings (T$_A$=25℃ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-source Voltage	V_{DS}	40	V
Gate-source Voltage	V_{GS}	±20	V
Drain Current	I_D	2.5	A
Pulsed Drain Current [A]	I_{DM}	12	A
Total Power Dissipation @ T$_A$=25℃	P_D	1.1	W
Thermal Resistance Junction-to-Ambient @ Steady State [B]	$R_{\theta JA}$	110	℃/ W
Junction and Storage Temperature Range	T_J ,T_{STG}	-55～+150	℃

■ Ordering Information (Example)

PREFERED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
YJL02N04AKHQ	F2	02N04A.	3000	30000	120000	7" reel

YJL02N04AKHQ

■ **Electrical Characteristics** (T$_J$=25℃ unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV$_{DSS}$	V$_{GS}$= 0V, I$_D$=250μA	40			V
Zero Gate Voltage Drain Current	I$_{DSS}$	V$_{DS}$=40V,V$_{GS}$=0V			1	μA
Gate-Body Leakage Current	I$_{GSS}$	V$_{GS}$= ±20V, V$_{DS}$=0V			±10	μA
Gate Threshold Voltage	V$_{GS(th)}$	V$_{DS}$= V$_{GS}$, I$_D$=250μA	1	1.6	2.5	V
Static Drain-Source On-Resistance	R$_{DS(ON)}$	V$_{GS}$= 10V, I$_D$=2.5A		70	100	mΩ
		V$_{GS}$= 4.5V, I$_D$=2A		98	140	
Diode Forward Voltage	V$_{SD}$	I$_S$=2A,V$_{GS}$=0V		0.9	1.2	V
Dynamic Parameters						
Gate resistance	R$_G$	f=1MHz		4		Ω
Input Capacitance	C$_{iss}$	V$_{DS}$=25V,V$_{GS}$=0V,f=1MHZ		150		pF
Output Capacitance	C$_{oss}$			23		
Reverse Transfer Capacitance	C$_{rss}$			15		
Switching Parameters						
Total Gate Charge	Q$_g$	V$_{GS}$=10V,V$_{DS}$=20V,I$_D$=2.5A		4.45		nC
Gate Source Charge	Q$_{gs}$			1.25		
Gate Drain Charge	Q$_{gd}$			0.8		
Reverse Recovery Charge	Q$_{rr}$	I$_{SD}$=2.5A,di/dt=100A/us		6.1		nC
Reverse Recovery Time	t$_{rr}$			16.3		ns
Turn-on Delay Time	t$_{D(on)}$	V$_{GS}$=10V,V$_{DS}$=20V, I$_D$=2.5A, R$_g$=3Ω		3.68		ns
Turn-on Rise Time	t$_r$			1.54		
Turn-off Delay Time	t$_{D(off)}$			8.75		
Turn-off Fall Time	t$_f$			1.25		

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

B. The value of R$_{θJA}$ is measured with the device mounted on 1 in^2 FR-4 board with 2oz. Copper, in the still air environment with T$_A$ =25℃.
The maximum allowed junction temperature of 150℃. The value in any given application depends on the user's specific board design.

YJL02N04AKHQ

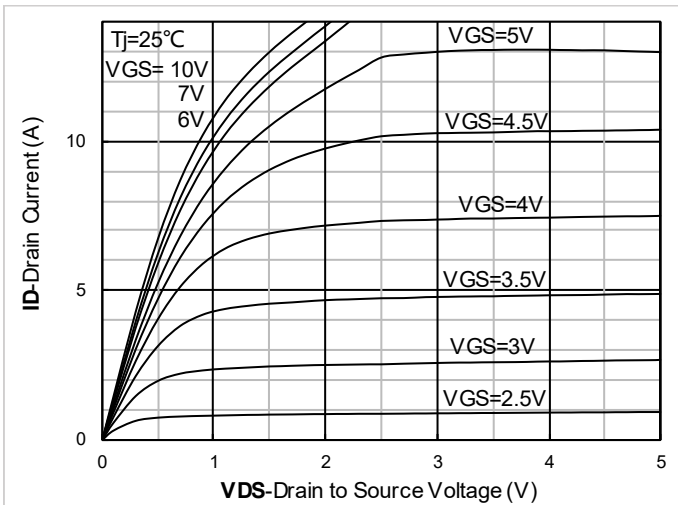■ **Typical Performance Characteristics**
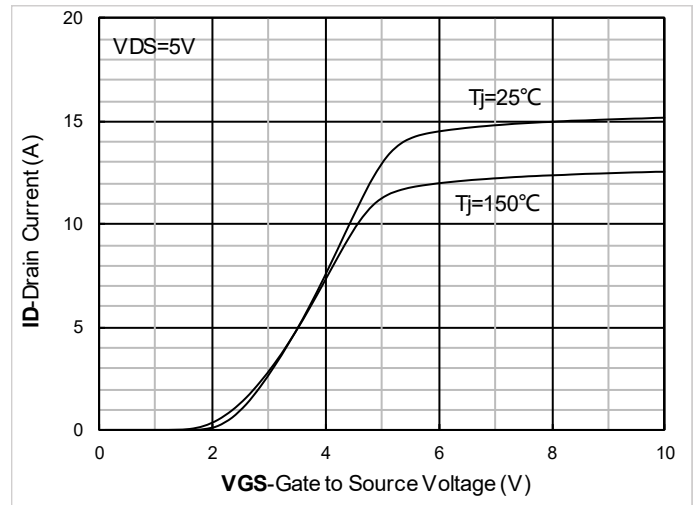

Figure1. Output Characteristics
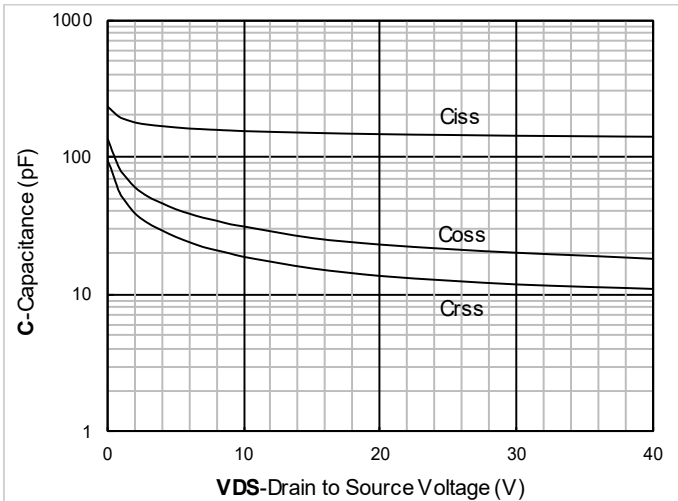

Figure2. Transfer Characteristics

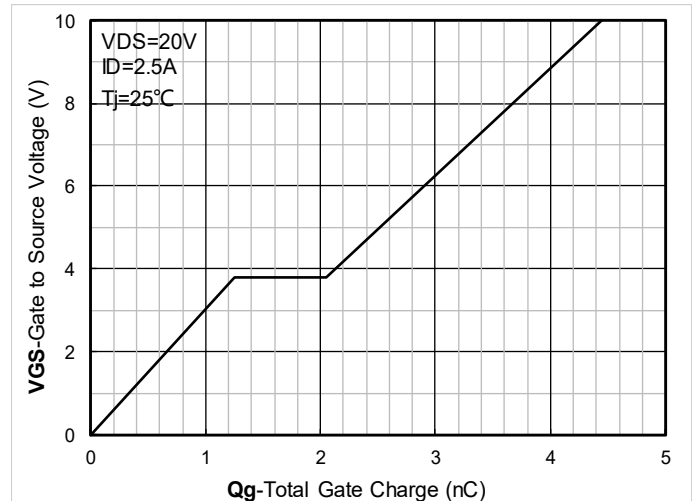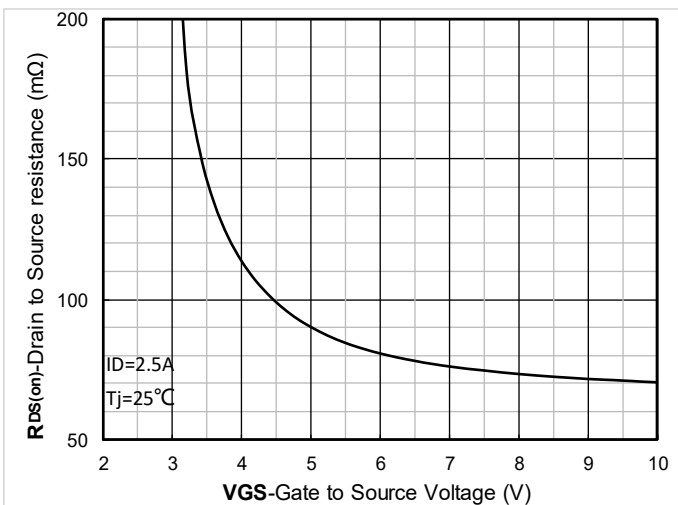Figure3. Capacitance Characteristics

Figure4. Gate Charge
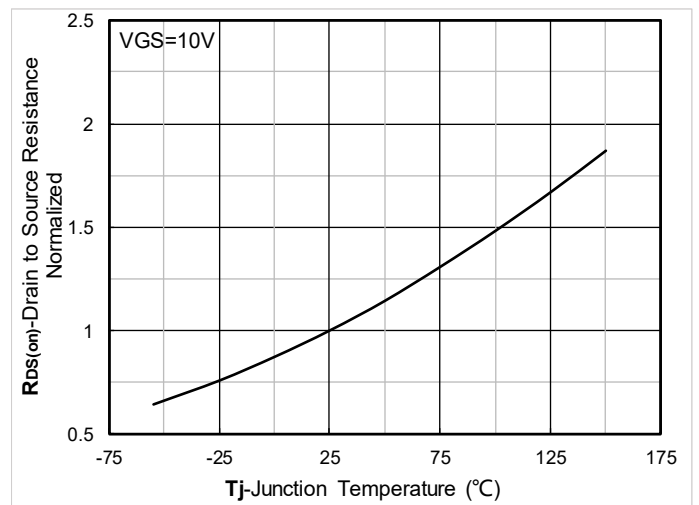

Figure5. On-Resistance vs Gate to Source Voltage
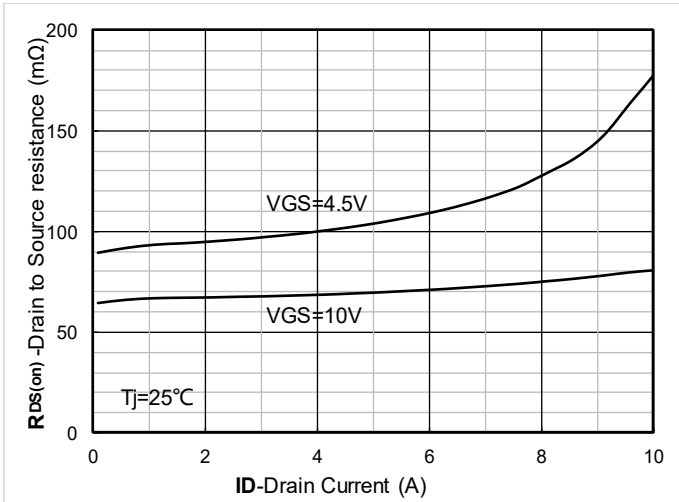

Figure6. Normalized On-Resistance
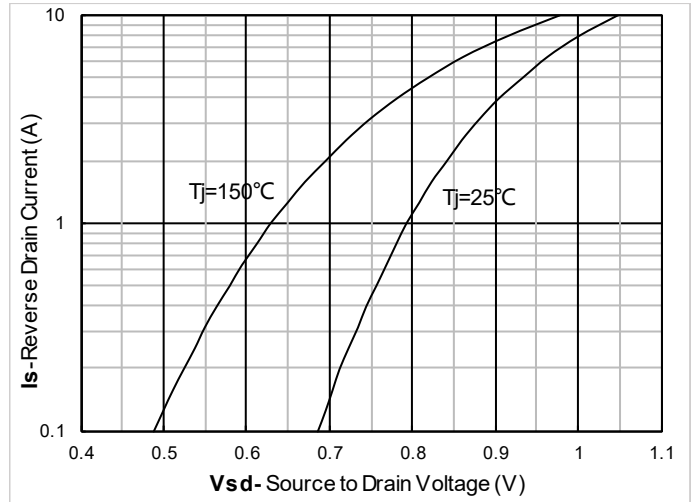
Figure 7. RDS(on) VS Drain Current

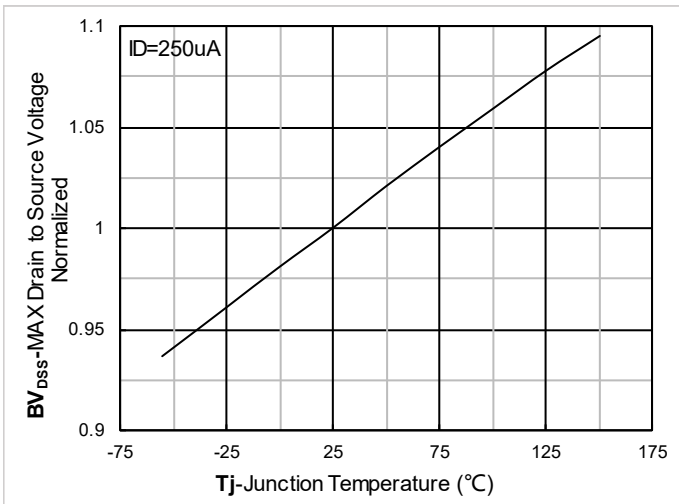
Figure 8. Forward characteristics of reverse diode
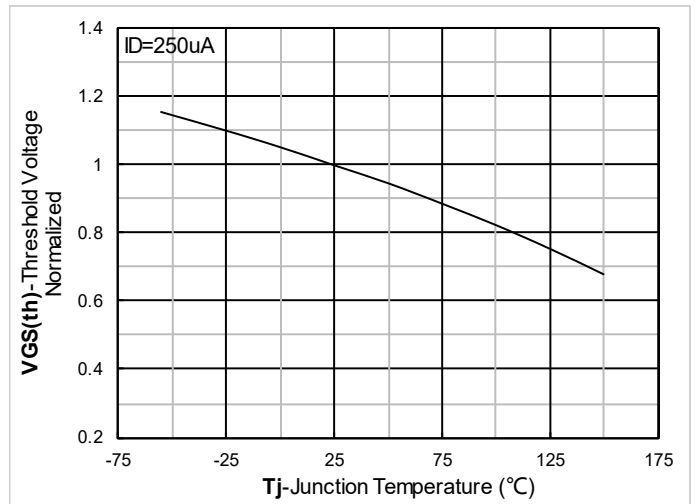

Figure 9. Normalized breakdown voltage

Figure 10. Normalized Threshold voltage
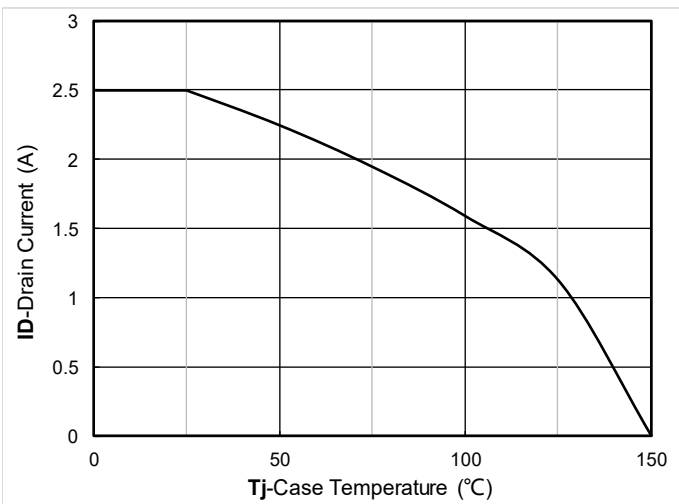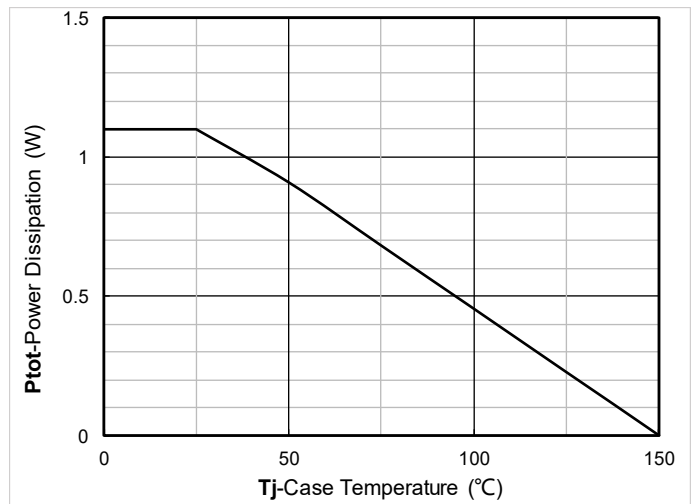

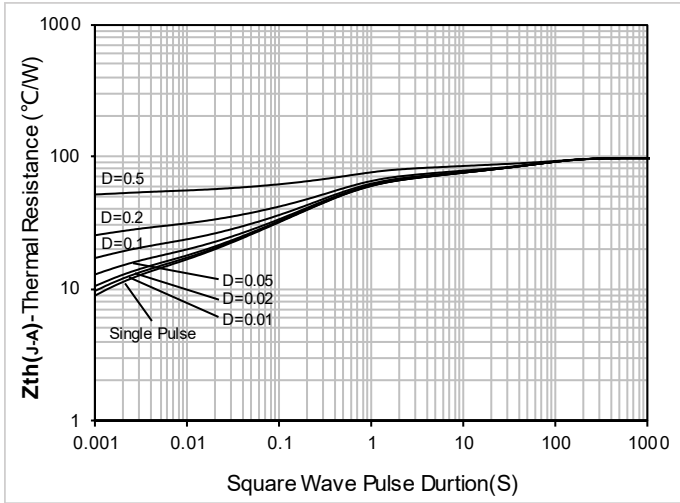Figure 11. Current dissipation

Figure 12. Power dissipation

Figure 13. Maximum Transient Thermal Impedance
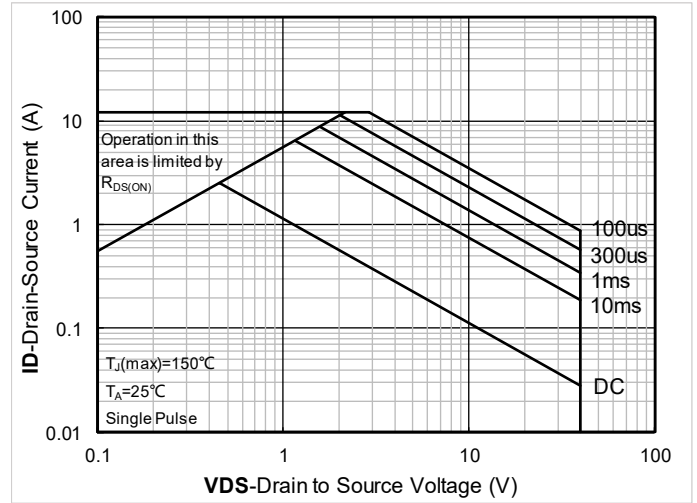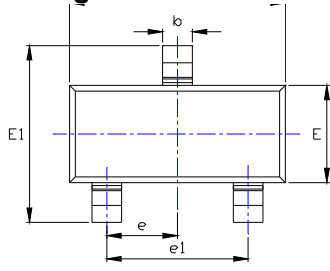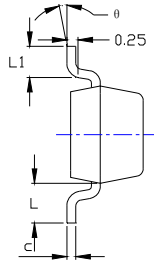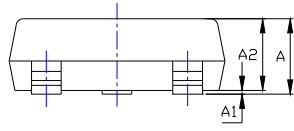

Figure 14. Safe Operation Area

■ SOT-23 Package Outline Dimensions

TOP VIEW

SIDE VIEW

SIDE VIEW

0.800

0.900

2.000

0.950 0.950
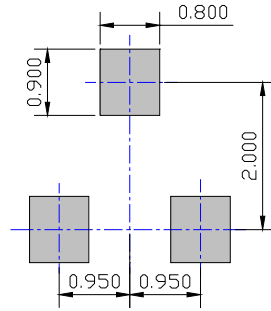
UNIT：mm

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
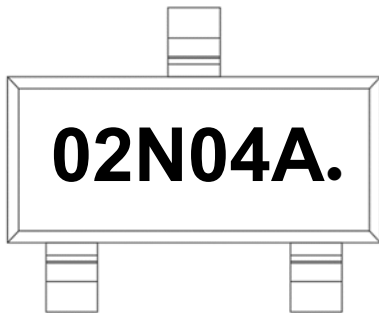
02N04A.

Note:
1. All marking is at middle of the product body
2. All marking is in laser marking
3. 02N04A is Marking Code
4. Body color: Black

Disclaimer

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