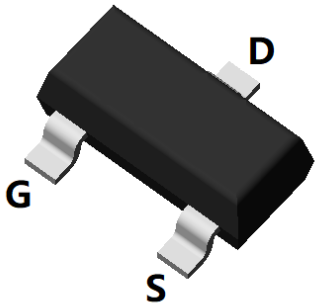
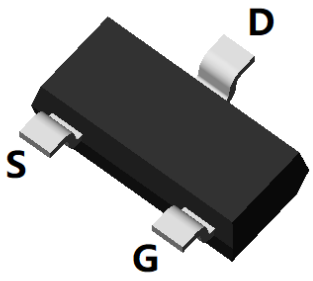
N-Channel Enhancement Mode Field Effect Transistor

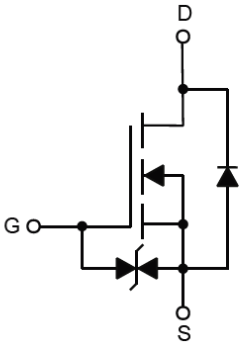


Top View



Bottom View

SOT-23



Product Summary

- V_{DS} 40V
- I_D 2.5A
- $R_{DS(ON)}$(at V_{GS}=10V) ＜100 mΩ
- $R_{DS(ON)}$(at V_{GS}=6V) ＜140 mΩ
- 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
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free

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
L02N04AK	F2	02N04A.	3000	30000	120000	7“ reel

■ 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	RG	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 $R_{\theta JA}$ 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.

■ Typical Performance Characteristics

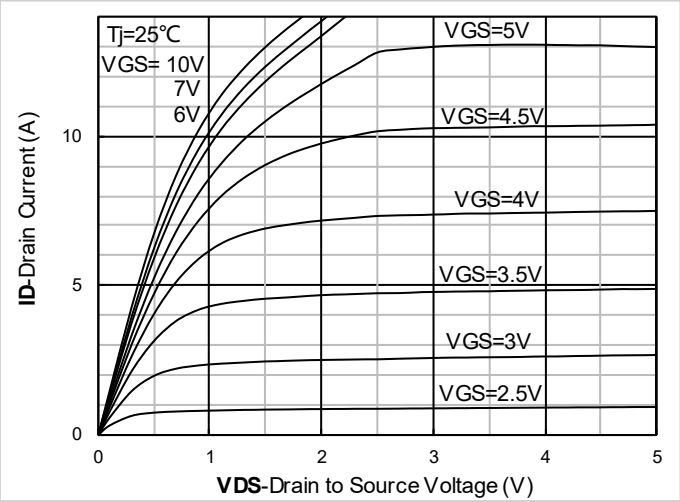


Figure1. Output Characteristics

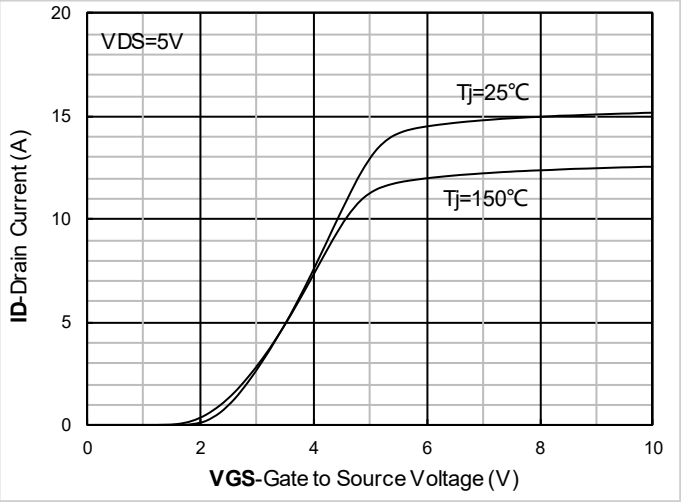


Figure2. Transfer Characteristics

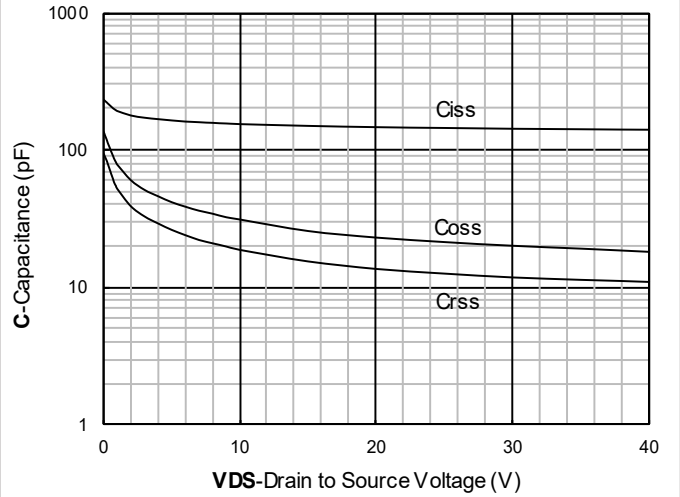


Figure3. Capacitance Characteristics

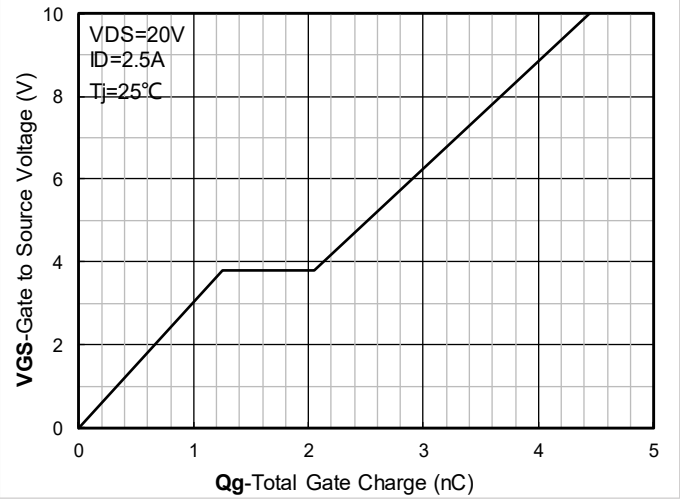


Figure4. Gate Charge

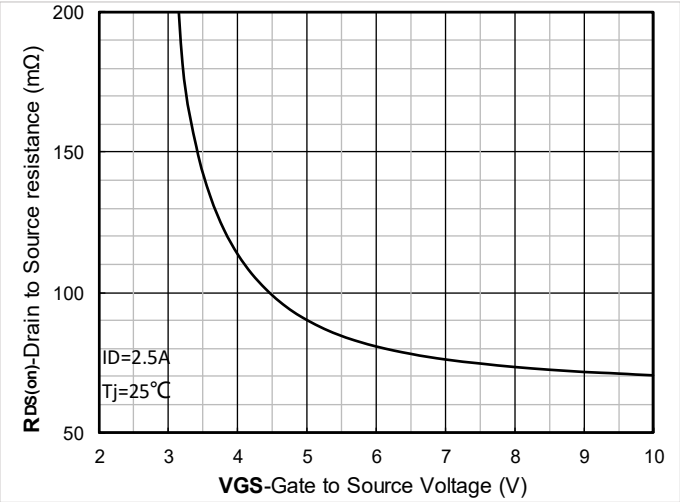


Figure5. On-Resistance vs Gate to Source Voltage

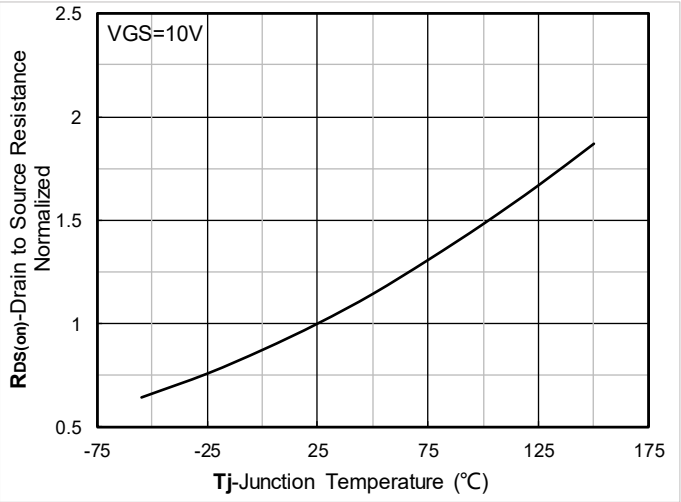


Figure6. Normalized On-Resistance

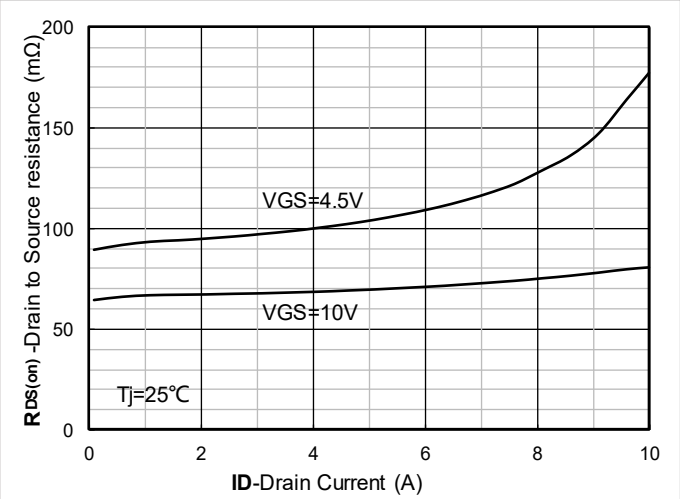


Figure 7. $R_{DS(on)}$ VS Drain Current

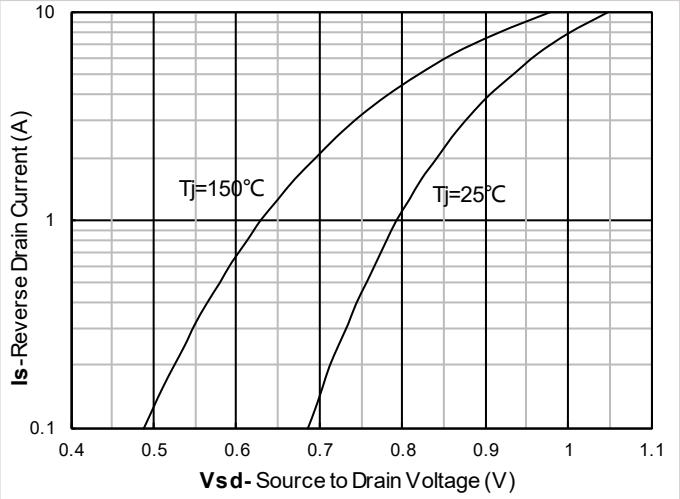


Figure 8. Forward characteristics of reverse diode

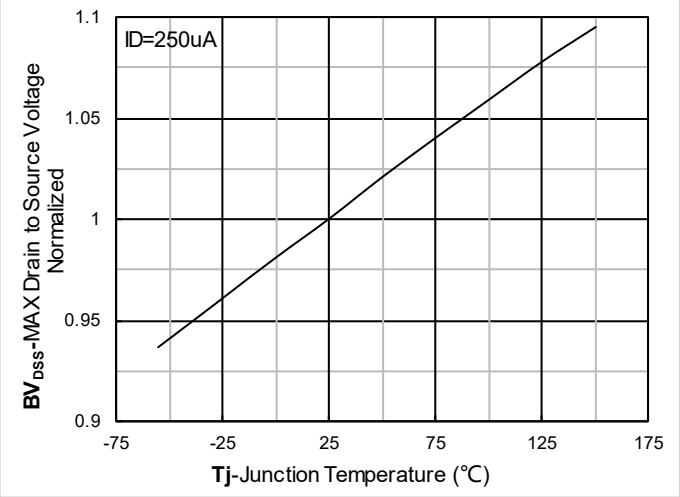


Figure 9. Normalized breakdown voltage

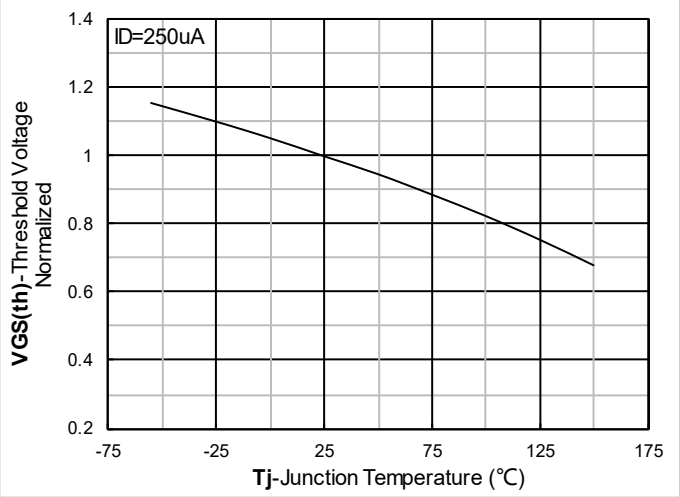


Figure 10. Normalized Threshold voltage

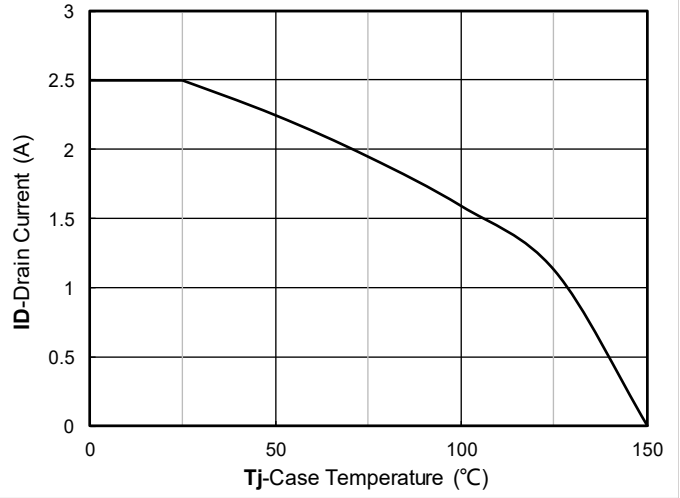


Figure 11. Current dissipation

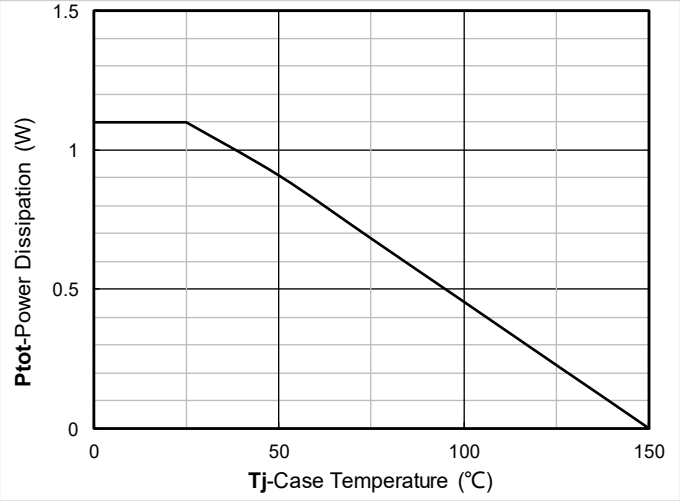


Figure 12. Power dissipation

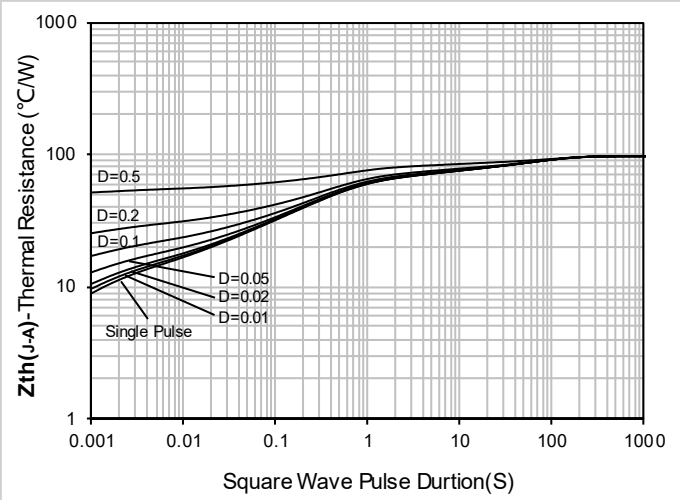


Figure 13. Maximum Transient Thermal Impedance

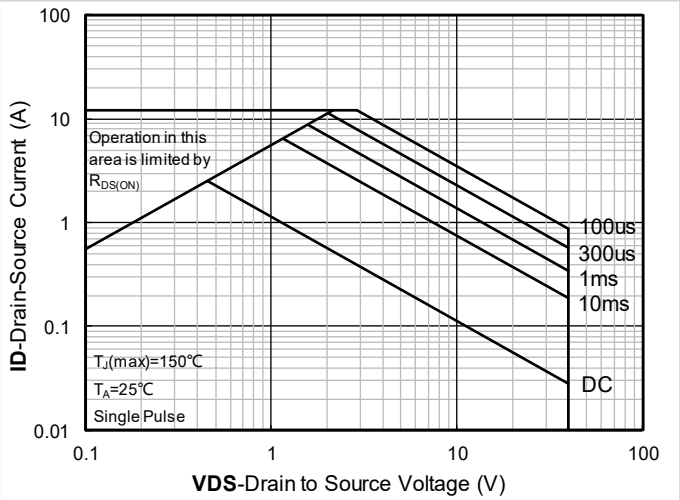
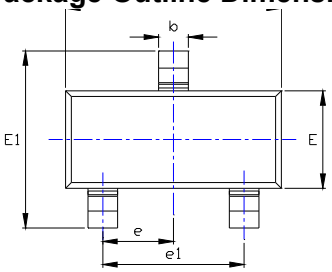
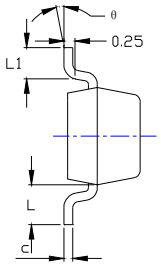


Figure 14. Safe Operation Area

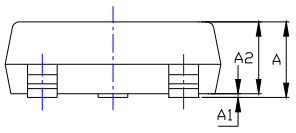
■ SOT-23 Package Outline Dimensions



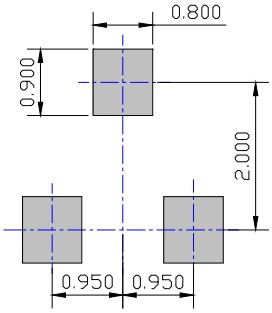
TOP VIEW



SIDE VIEW



SIDE VIEW



UNIT：mm

SUGGESTED SOLDER PAD LAYOUT

DIMENSIONS				
SYMBOL	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.

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