

General Description

It combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$.

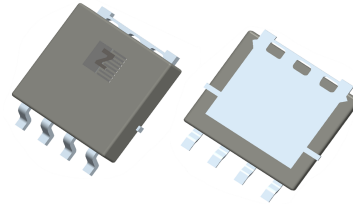
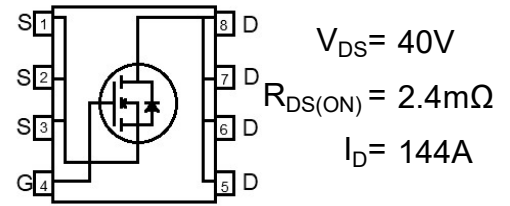
Features

- AEC-Q101 Qualified
- Low $R_{DS(ON)}$ to minimize conductive loss
- Low Gate Charge for fast switching
- Low Thermal resistance

Application

- BLDC Motor driver
- DC-DC
- Load Switch

Product Summary



LFPACK



Ordering Information:

Part NO.	ZMSA022N04HLF
Marking	022N04H
Packing Information	REEL TAPE
Basic ordering unit (pcs)	3000

Absolute Maximum Ratings ($T_C=25^\circ C$)

Parameter	Symbol	Conditions	Value	Unit
Drain-Source Voltage	V_{DS}		40	V
Gate-Source Voltage	V_{GS}		± 20	V
Continuous Drain Current	I_D	$T_C=25^\circ C$	144	A
	I_D	$T_C=75^\circ C$	117	A
	I_D	$T_C=100^\circ C$	102	A
Pulsed Drain Current ^①	I_{DM}	Pulsed; $t_p \leq 10 \mu s$; $T_{mb} = 25^\circ C$;	576	A
Total Power Dissipation	P_D	$T_C=25^\circ C$	125	W
Total Power Dissipation	P_D	$T_A=25^\circ C$	3.0	W
Operating Junction Temperature	T_J		-55 to +175	$^\circ C$
Storage Temperature	T_{STG}		-55 to +175	$^\circ C$
Single Pulse Avalanche Energy	E_{AS}	L=0.1mH, VGS=10V, Rg=25 Ω ,	99	mJ
		L=0.5mH, VGS=10V, Rg=25 Ω ,	178	mJ
ESD Level (HBM)	CLASS 2			

•Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}		-	1.2	°C/W
Thermal resistance, junction-ambient	$R_{thJA\oplus}$		-	50	°C/W
Soldering temperature (total time<10s)	T_{sold}		-	260	°C

•Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	40			V
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	2	2.7	4	V
Drain-Source Leakage Current	I_{DSS}	$V_{GS}=0V, V_{DS}=40V$			1.0	μA
Gate- Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$			100	nA
Static Drain-source On Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=30A$		2.4	3	m Ω
Forward Transconductance	g_{FS}	$V_{GS}=5V, I_{SD}=5A$		15		S
Diode Forward Voltage	V_{FSD}	$V_{GS}=0V, I_{SD}=30A$			1.3	V

•Dynamic characteristics

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Input capacitance	C_{iss}	$f=1MHz, V_{DS}=25V$	-	1826	-	pF
Output capacitance	C_{oss}		-	556	-	
Reverse transfer capacitance	C_{rss}		-	36	-	
Gate Resistance	R_g	$f=1MHz$	-	1.1		Ω
Total gate charge	Q_g	$V_{DD}=15V, I_D=30A, V_{GS}=10V$	-	29.4	-	nC
Gate - Source charge	Q_{gs}		-	7.7	-	
Gate - Drain charge	Q_{gd}		-	7.8	-	
Turn-ON Delay time	$t_{D(on)}$	$V_{GS}=10V, V_{DS}=15V, R_G=3.3\Omega, I_D=20A$	-	14	-	ns
Turn-ON Rise time	t_r		-	48	-	ns
Turn-Off Delay time	$t_{D(off)}$		-	28	-	ns
Turn-Off Fall time	t_f		-	7	-	ns
Reverse Recovery Time	t_{rr}	$V_{DD}=20V, dI_S/dt=100A/\mu s, I_S=20A$	-	48	-	ns
Reverse Recovery Charge	Q_{rr}		-	45	-	nC

Fig.1 Gate-Charge Characteristics

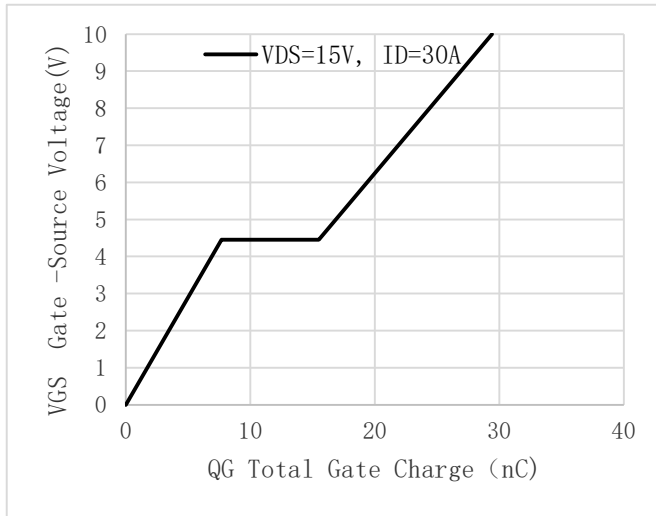


Fig.2 Capacitance Characteristics

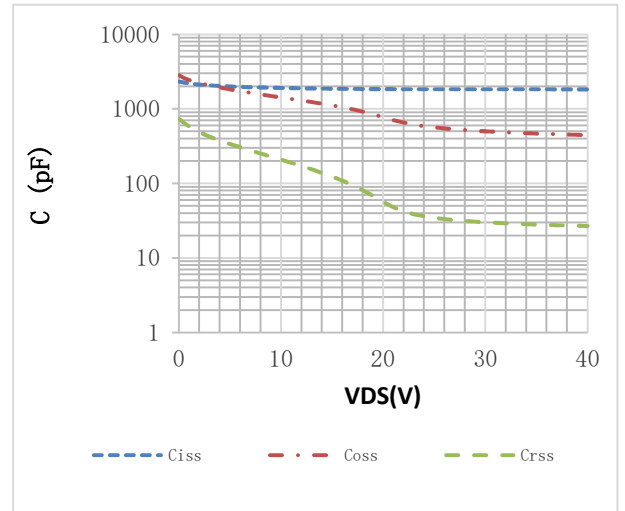


Fig.3 Power Dissipation

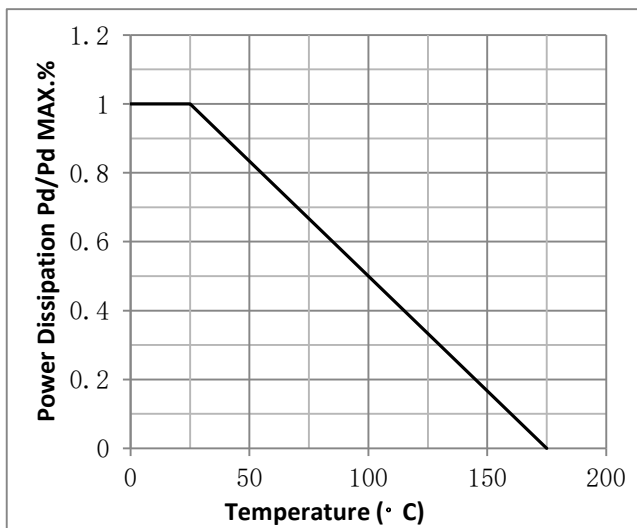


Fig.4 Typical output Characteristics

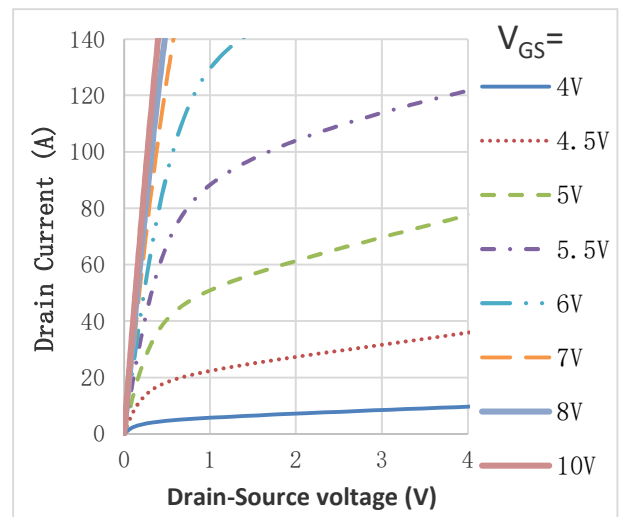


Fig.5 Threshold Voltage V.S Junction Temperature

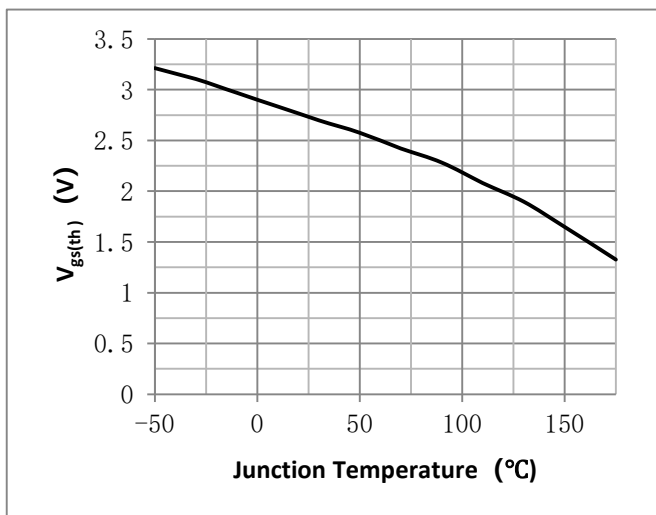


Fig.6 Resistance V.S Drain Current

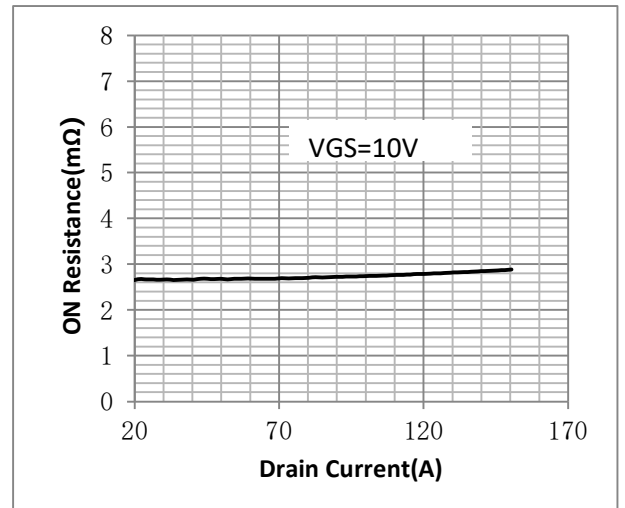


Fig.7 On-Resistance VS Gate Source Voltage

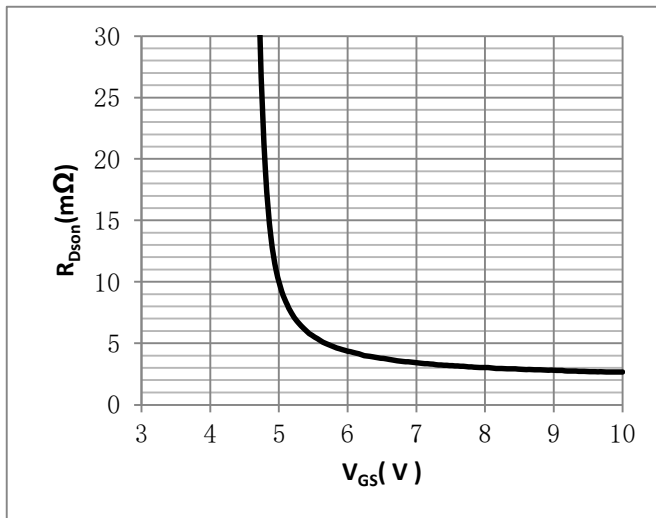


Fig.8 On-Resistance V.S Junction Temperature

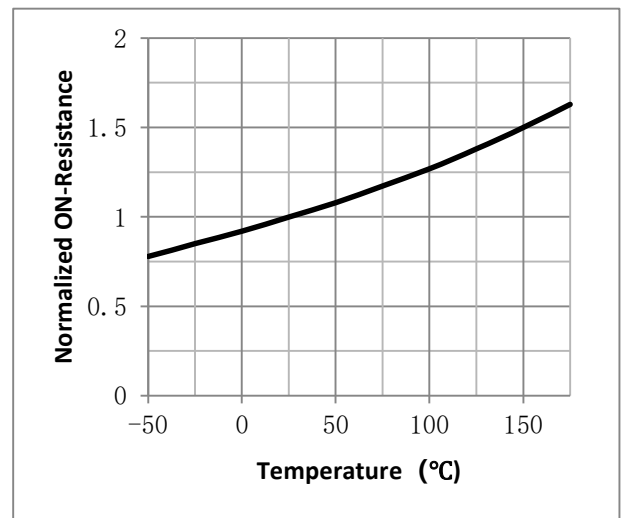


Figure 9. Diode Forward Voltage vs. Current

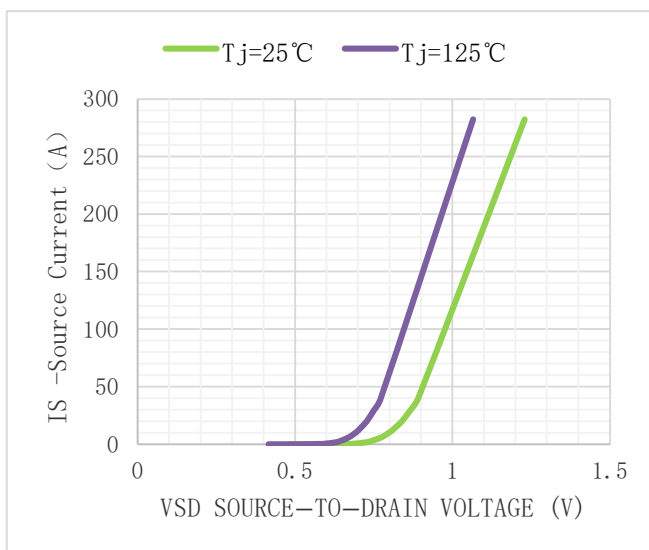


Figure 10. Transfer Characteristics

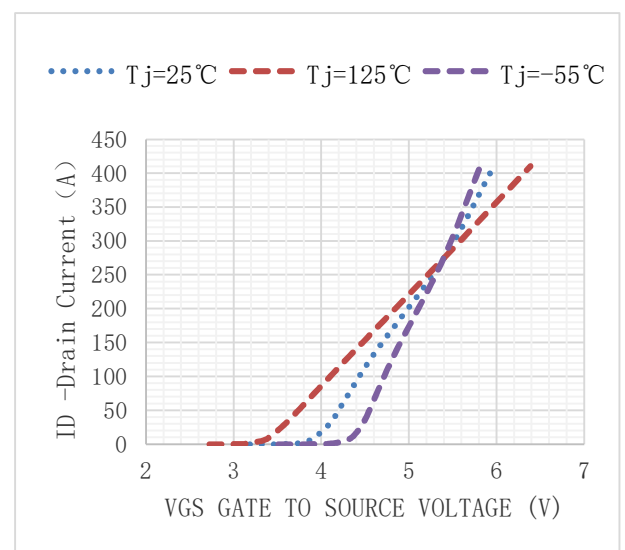


Fig.11 SOA Maximum Safe Operating Area

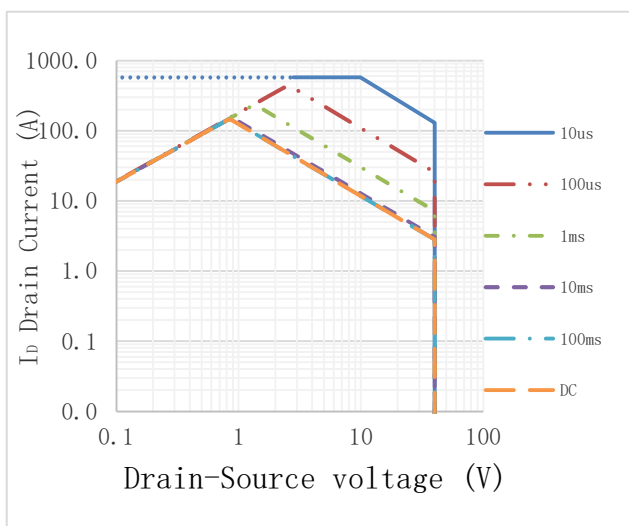
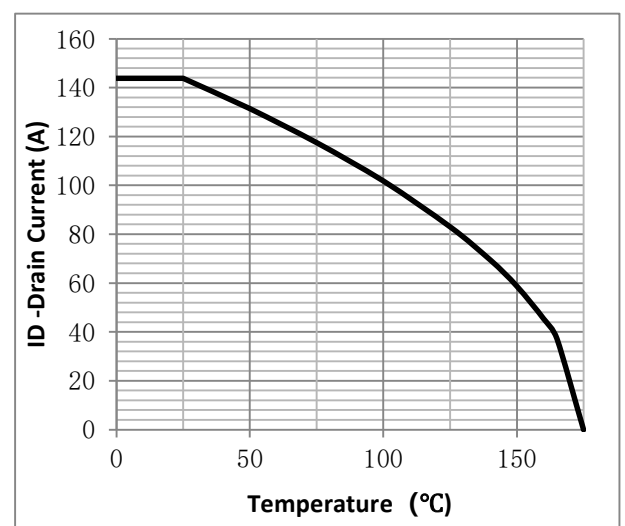
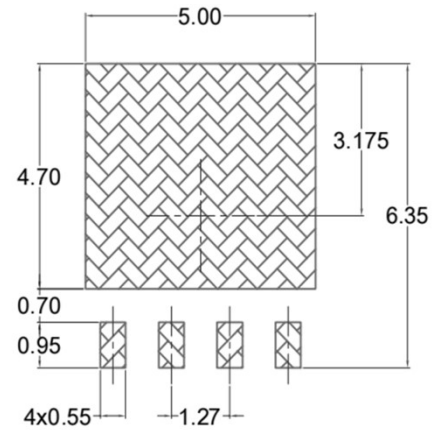
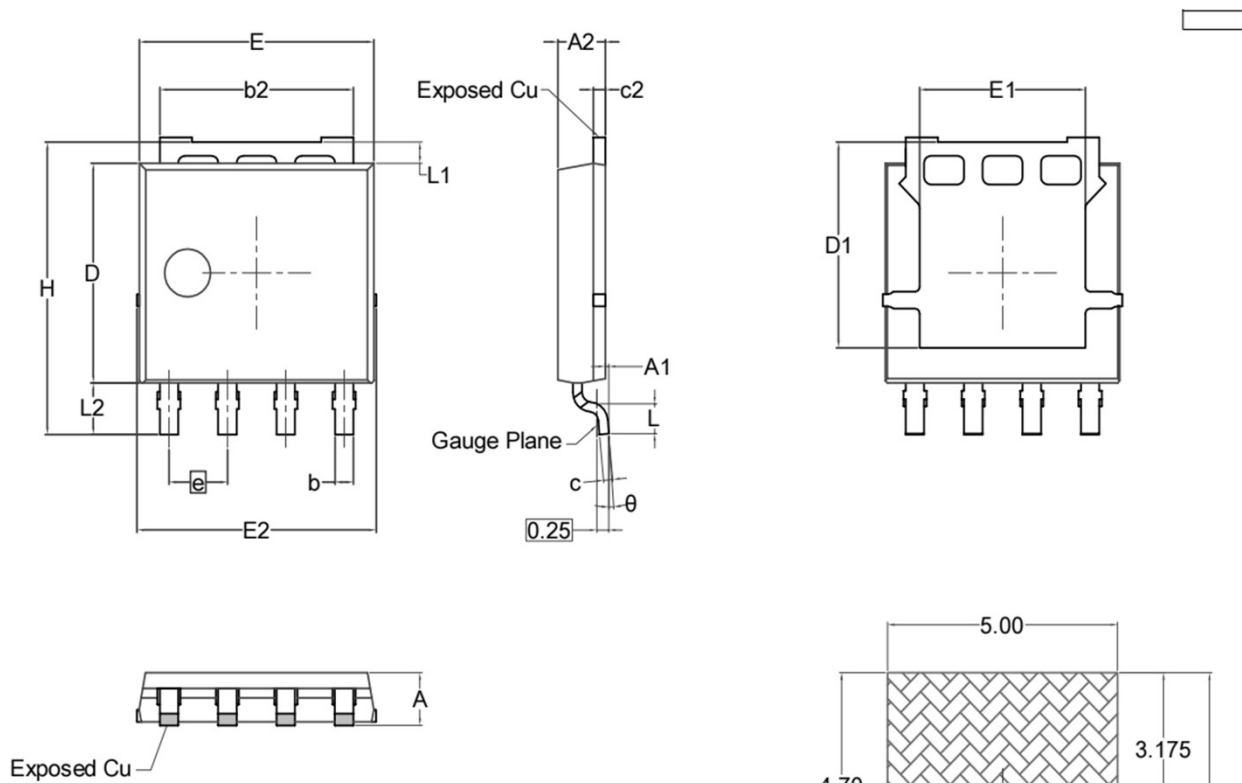


Fig.12 I_D vs. Junction Temperature②



•LFPAK Package Outline



Land Pattern (Only for Reference)

SYMBOL	DIMENSIONS		
	MIN.	NOM.	MAX.
A	1.00	---	1.30
A2	0.98	1.03	1.10
A1	0.00	---	0.15
b	0.35	0.42	0.50
b2	4.02	4.23	4.41
c	0.19	0.22	0.25
c2	0.24	0.27	0.30
D	4.45	4.58	4.70
D1	---	---	4.45
E	4.95	5.13	5.30
E1	3.50	---	3.70
E2	---	---	5.30
e	1.27 BSC.		
H	5.95	---	6.20
L	0.40	0.65	0.85
L1	0.27	---	0.57
L2	0.80	---	1.30
θ	0°	---	8°

Note:

- ① Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate;
- ② Practically the current will be limited by PCB, thermal design and operating temperature. $V_{GS}=10V$.

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Revision History

Version	Date	Change
A	2024/11/1	New
B	2025/2/24	Correct marking information.