

• 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
- Battery protection

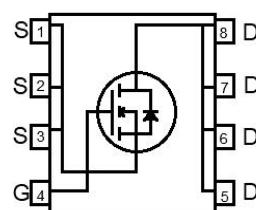
• Ordering Information:

Part NO.	ZMSA018N04HN
Marking	ZMS018N04H
Packing Information	REEL TAPE
Basic ordering unit (pcs)	3000

• Absolute Maximum Ratings ($T_C=25^{\circ}\text{C}$)

Parameter	Symbol	Conditions	Value	Unit
Drain-Source Voltage	V_{DS}		40	V
Gate-Source Voltage ^①	V_{GS}		± 20	V
Continuous Drain Current	I_D	$T_C=25^{\circ}\text{C}$	120	A
	I_D	$T_C=75^{\circ}\text{C}$	120	A
	I_D	$T_C=100^{\circ}\text{C}$	109	A
Pulsed Drain Current	I_{DM}	Pulsed; $t_p \leq 10 \mu\text{s}$; $T_{mb} = 25^{\circ}\text{C}$;	480	A
Total Power Dissipation	P_D	$T_C=25^{\circ}\text{C}$	107	W
Total Power Dissipation	P_D	$T_A=25^{\circ}\text{C}$	3.3	W
Operating Junction Temperature	T_J		-55 to +175	$^{\circ}\text{C}$
Storage Temperature	T_{STG}		-55 to +175	$^{\circ}\text{C}$
Single Pulse Avalanche Energy	E_{AS}	$L=0.1\text{mH}$, $V_{GS}=10\text{V}$, $R_g=25\Omega$,	210	mJ
		$L=0.5\text{mH}$, $V_{GS}=10\text{V}$, $R_g=25\Omega$,	460	mJ
ESD Level (HBM)	CLASS 2			

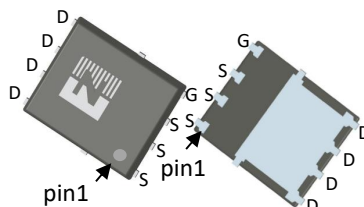
• Product Summary



$$V_{DS} = 40\text{V}$$

$$R_{DS(ON)} = 1.8\text{m}\Omega$$

$$I_D = 120\text{A}$$



DFN5*6



•Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	RthJC		-	1.4	°C/W
Thermal resistance, junction-ambient	RthJA ^②		-	45	°C/W
Soldering temperature	Tsold		-	260	°C

•Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V, I _D = 250uA	40			V
Gate Threshold Voltage	V _{GS(TH)}	V _{GS} = V _{DS} , I _D = 250uA	2.0	2.7	4.0	V
Drain-Source Leakage Current	I _{DSS}	V _{GS} = 0V, V _{DS} = 40V			1.0	uA
Gate- Source Leakage Current	I _{GSS}	V _{GS} = ±20V, V _{DS} = 0V			100	nA
Static Drain-source On Resistance	R _{DS(ON)}	V _{GS} = 10V, I _D = 40A		1.8	2.4	mΩ
Forward Transconductance	g _{FS}	V _{DS} = 5V, I _{SD} = 10A		15		s
Diode Forward Voltage	V _{FSD}	V _{GS} = 0V, I _{SD} = 40A			1.3	V

•Dynamic characteristics

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Input capacitance	Ciss	f = 1MHz, V _{DS} = 25V	-	3310	-	pF
Output capacitance	Coss		-	853	-	
Reverse transfer capacitance	Crss		-	47	-	
Gate Resistance	Rg	f = 1MHz	-	1.9		Ω
Total gate charge	Qg	V _{DD} = 15V, I _D = 20A, V _{GS} = 10V	-	49	-	nC
Gate - Source charge	Qgs		-	11.6	-	
Gate - Drain charge	Qgd		-	11.9	-	
Turn-ON Delay time	t _{D(on)}	V _{GS} = 10V, V _{DS} = 15V, R _G = 3.3Ω, I _D = 20A	-	10	-	ns
Turn-ON Rise time	t _r		-	9	-	ns
Turn-Off Delay time	t _{D(off)}		-	16	-	ns
Turn-Off Fall time	t _f		-	12	-	ns
Reverse Recovery Time	t _{RR}	V _{DD} = 20V, dI _S /dt = 100A/us, I _S = 50A	-	52	-	ns
Reverse Recovery Charge	Q _{RR}		-	61	-	nC

Fig.1 Gate-Charge Characteristics

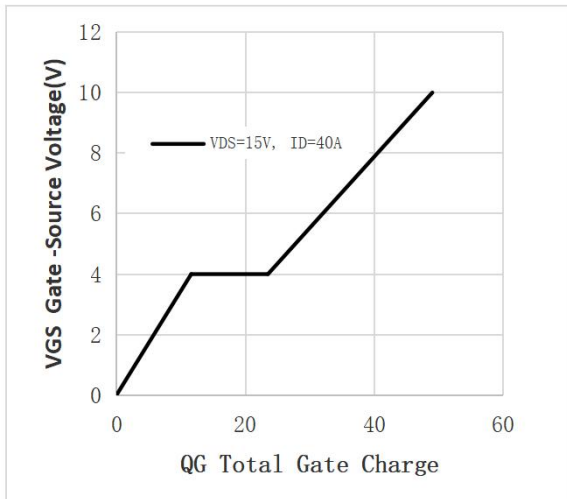


Fig.2 Capacitance Characteristics

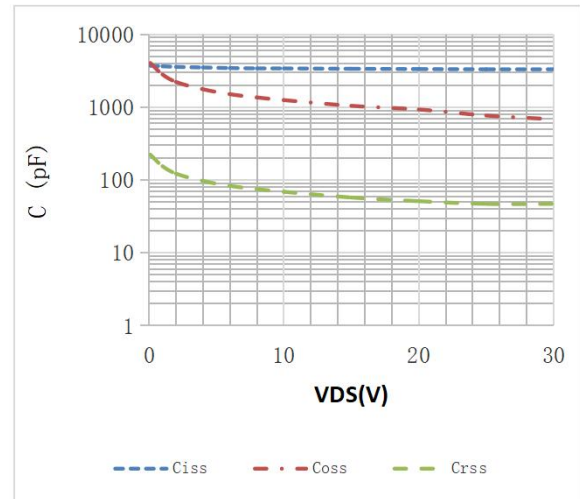


Fig.3 Power Dissipation

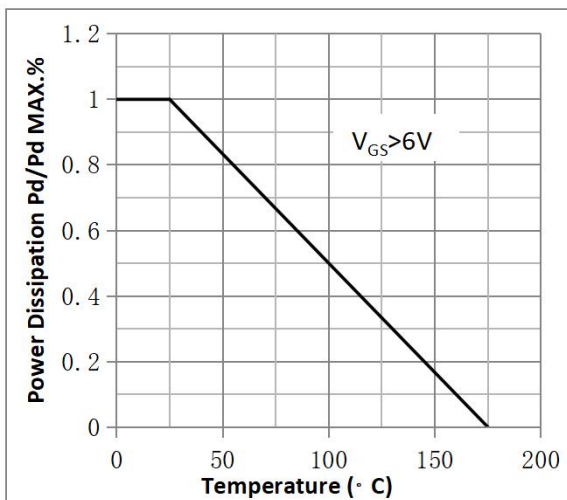


Fig.4 Typical output Characteristics

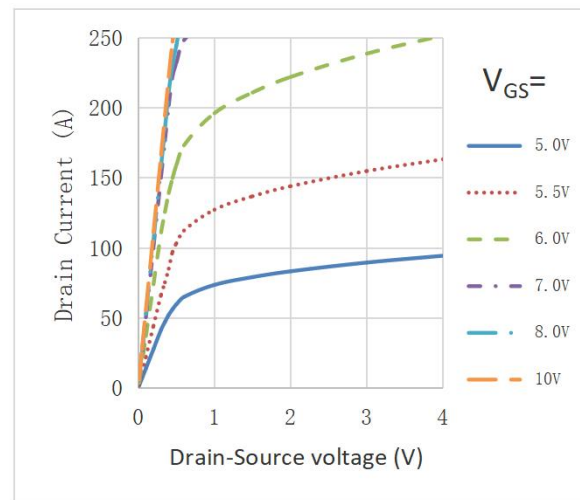


Fig.5 Threshold Voltage V.S Junction Temperature

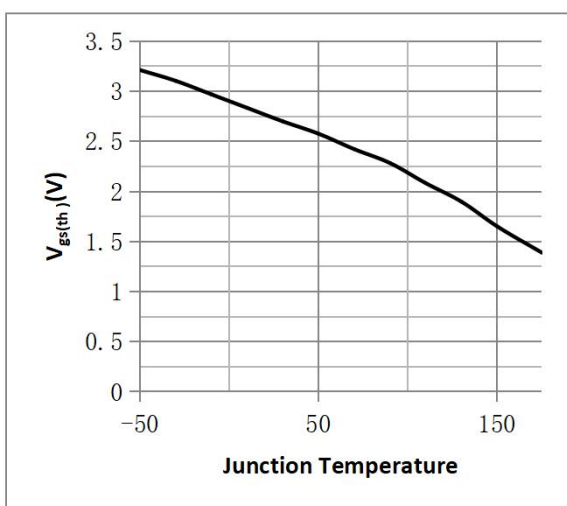


Fig.6 Resistance V.S Drain Current

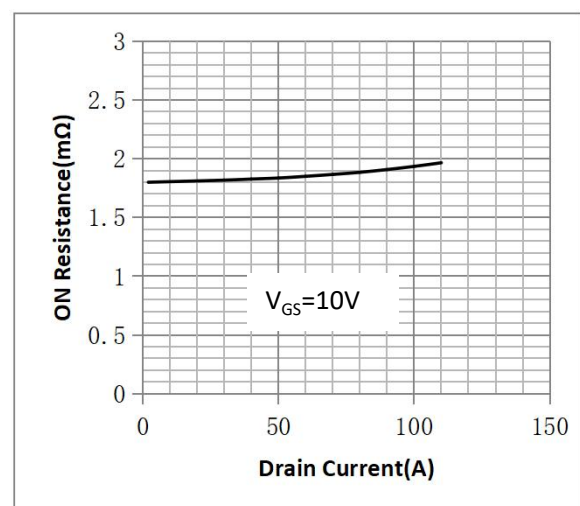


Fig.7 On-Resistance VS Gate Source Voltage

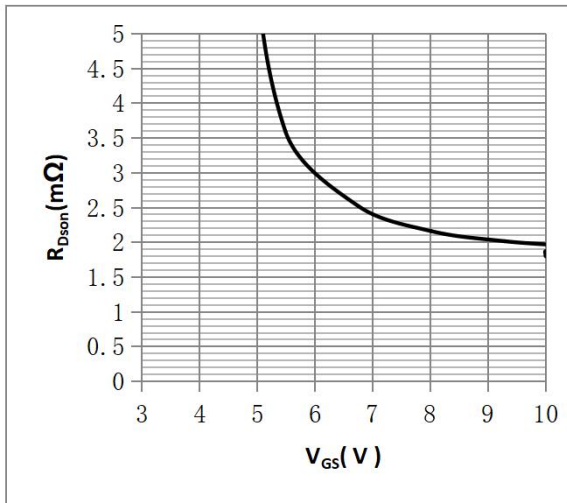


Fig.8 On-Resistance V.S Junction Temperature

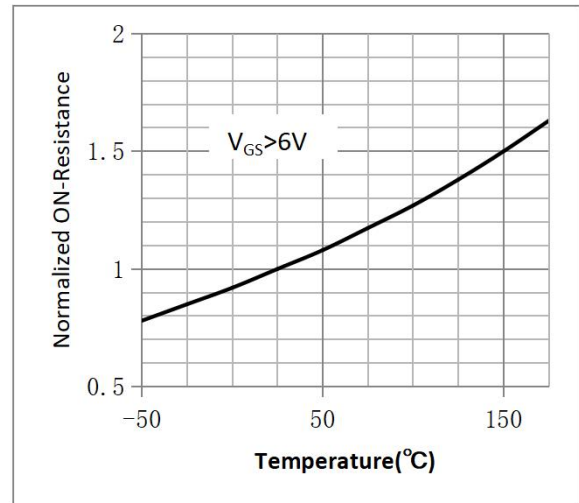


Figure 9. Diode Forward Voltage vs. Current

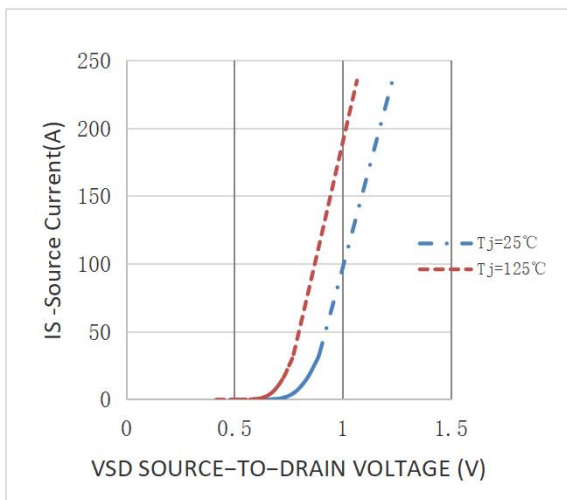


Figure 10. Transfer Characteristics

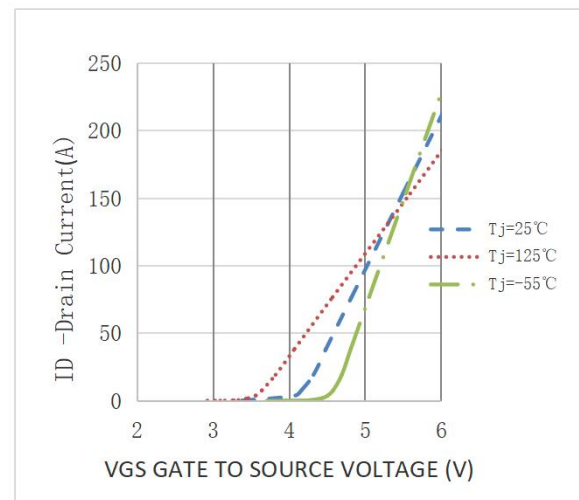


Fig.11 Safe Operating Area

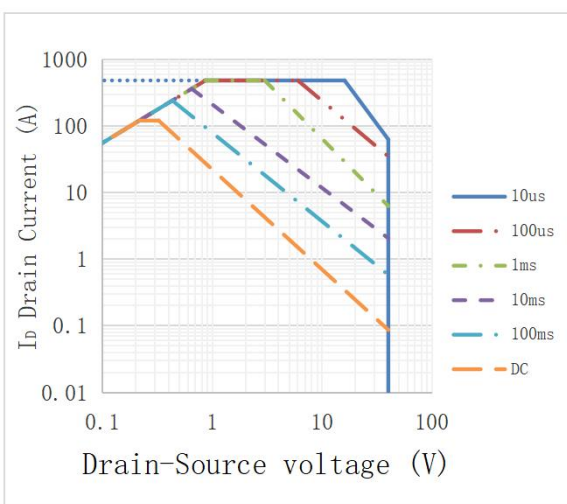
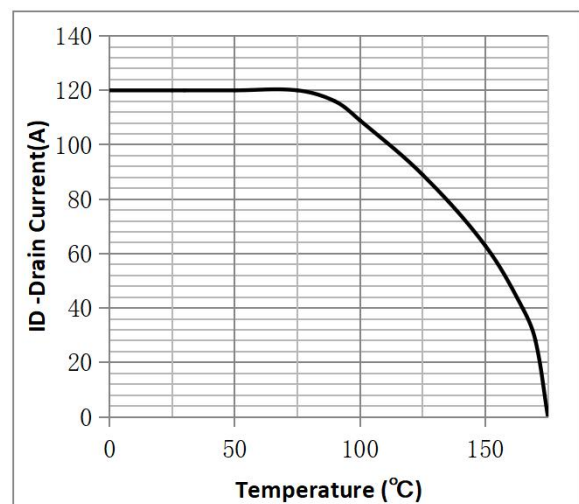
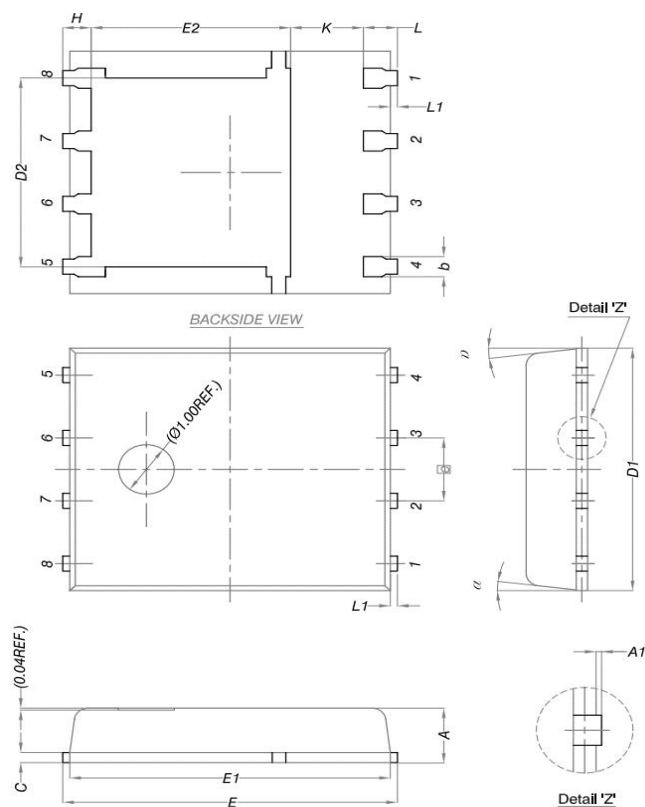


Fig.12 ID vs. Case Temperature^③



•DFN5*6 Package Outline



DIM.	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
A1	0	-	0.05
b	0.33	0.41	0.51
C	0.20	0.25	0.30
D1	4.80	4.90	5.00
D2	3.61	3.81	3.96
E	5.90	6.00	6.10
E1	5.70	5.75	5.80
E2	3.38	3.58	3.78
e	1.27 BSC		
H	0.41	0.51	0.61
K	1.10	-	-
L	0.51	0.61	0.71
L1	0.06	0.13	0.20
α	0°	-	12°

Note:

- ① Pulse : $V_{GS}=+20V/-20V$, Duty cycle=50%, $T_j=175^{\circ}C$, $t=1000$ hours; For DC , the following test conditions can be passed: $V_{GS}=+20V/-10V$, $T_j=175^{\circ}C$, $t=1000$ hours;
- ② Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate;
- ③ 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	2022.1.6	
B	2022.2.26	1.Add Dynamic characteristic t_f , t_r etc.
C	2022.9.5	1.Add Reach, HF figure, 2.ID modify 2.temperature 265- $\rightarrow$ 260 $^{\circ}$ C
D	2022.11.30	temperature change to Case temperature