

• General Description

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

• Features

- 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

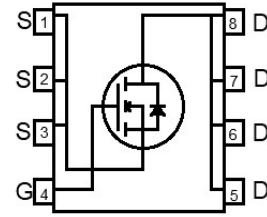
• Ordering Information:

Part NO.	ZMS018N04HNC
Marking	ZMS018N04
Packing Information	REEL TAPE
Basic ordering unit (pcs)	3000

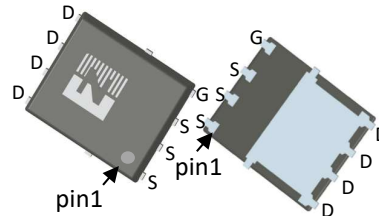
• Absolute Maximum Ratings ( $T_C=25^\circ\text{C}$ )

Parameter	Symbol	Conditions	Value	Unit
Drain-Source Voltage	$V_{DS}$	$25^\circ\text{C} \leq T_J \leq 175^\circ\text{C}$	40	V
Gate-Source Voltage <sup>①</sup>	$V_{GS}$		$\pm 20$	V
Continuous Drain Current	$I_D$	$T_C=25^\circ\text{C}$	140	A
	$I_D$	$T_C=75^\circ\text{C}$	140	A
	$I_D$	$T_C=100^\circ\text{C}$	138	A
Pulsed Drain Current <sup>①</sup>	$I_{DM}$	Pulsed; $t_p \leq 10 \mu\text{s}$ ; $T_{mb} = 25^\circ\text{C}$ ;	560	A
Total Power Dissipation	$P_D$	$T_C=25^\circ\text{C}$	115	W
Total Power Dissipation	$P_D$	$T_A=25^\circ\text{C}$	4.2	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=0.1mH, VGS=10V, Rg=25 $\Omega$ ,	140	mJ
		L=0.5mH, VGS=10V, Rg=25 $\Omega$ ,	260	mJ
ESD Level (HBM)			CLASS 2	

• Product Summary



$V_{DS} = 40\text{V}$   
 $r_{DS(ON)} = 1.7\text{m}\Omega$   
 $I_D = 140\text{A}$



DFN5\*6



**•Thermal resistance**

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	RthJC		-	1.3	°C/W
Thermal resistance, junction-ambient	RthJA <sup>②</sup>		-	36	°C/W
Soldering temperature (total time<10s)	Tsold		-	260	°C

**•Electronic Characteristics**

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	40			V
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	2	2.6	4	V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> = 40V			1.0	uA
Gate- Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> = 0V			100	nA
Static Drain-source On Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> = 24A		1.7	2.1	mΩ
Forward Transconductance	g <sub>FS</sub>	V <sub>GS</sub> =5V, I <sub>SD</sub> = 10A		30		s
Diode Forward Voltage	V <sub>FSD</sub>	V <sub>GS</sub> =0V, I <sub>SD</sub> = 24A			1.3	V

**•Dynamic characteristics**

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Input capacitance	Ciss	f = 1MHz, V <sub>DS</sub> =25V	-	2340	-	pF
Output capacitance	Coss		-	603	-	
Reverse transfer capacitance	Crss		-	46	-	
Gate Resistance	Rg	f = 1MHz	-	1.6		Ω
Total gate charge	Qg	V <sub>DD</sub> = 15V, I <sub>D</sub> = 24A, V <sub>GS</sub> = 10V	-	49	-	nC
Gate - Source charge	Qgs		-	6.3	-	
Gate - Drain charge	Qgd		-	7.5	-	
Turn-ON Delay time	t <sub>D(on)</sub>	V <sub>GS</sub> =10V, V <sub>DS</sub> =15V, R <sub>G</sub> =3.3Ω, I <sub>D</sub> =20A	-	11	-	ns
Turn-ON Rise time	t <sub>r</sub>		-	27	-	ns
Turn-Off Delay time	t <sub>D(off)</sub>		-	24	-	ns
Turn-Off Fall time	t <sub>f</sub>		-	12	-	ns
Reverse Recovery Time	t <sub>RR</sub>	V <sub>DD</sub> =20V, dI <sub>S</sub> /dt = 100A/us, I <sub>S</sub> =50A	-	23	-	ns
Reverse Recovery Charge	Q <sub>RR</sub>		-	24	-	nC

Fig.1 Gate-Charge Characteristics

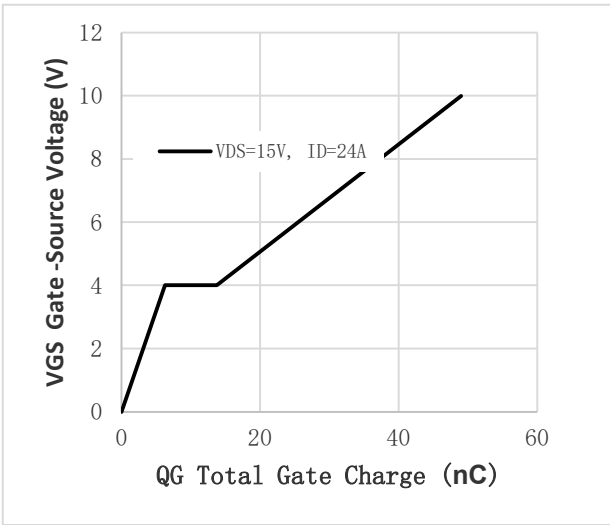


Fig.2 Capacitance Characteristics

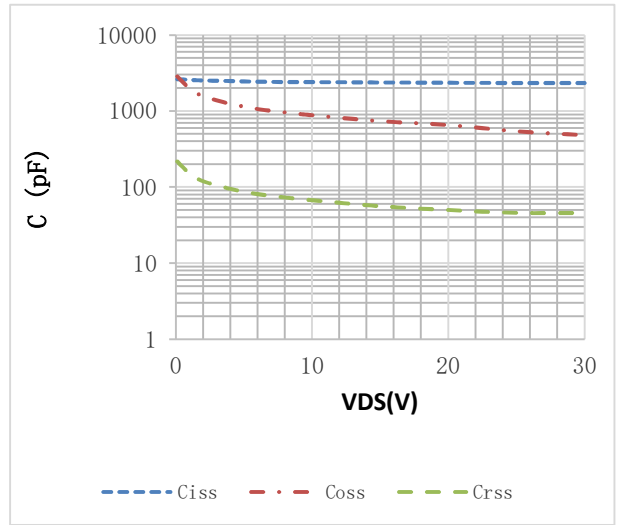


Fig.3 Power Dissipation

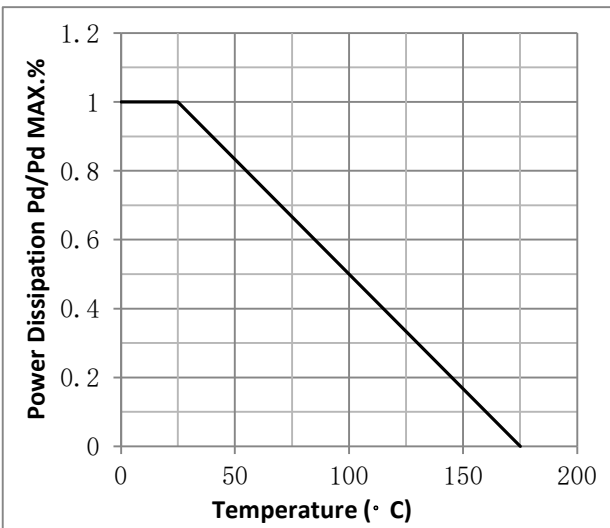


Fig.4 Typical output Characteristics

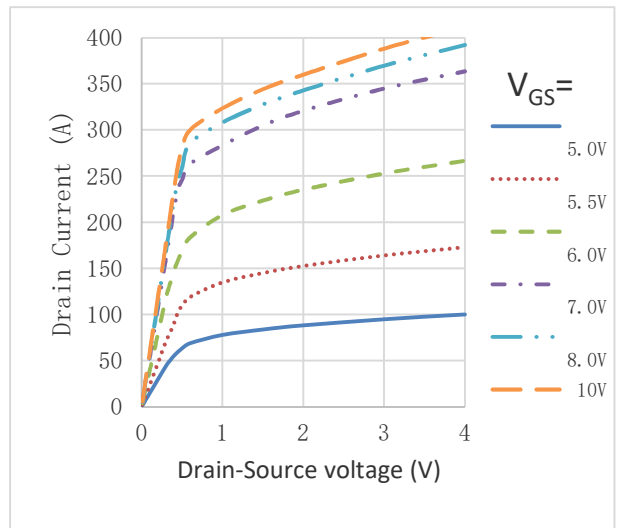


Fig.5 Threshold Voltage V.S Junction Temperature

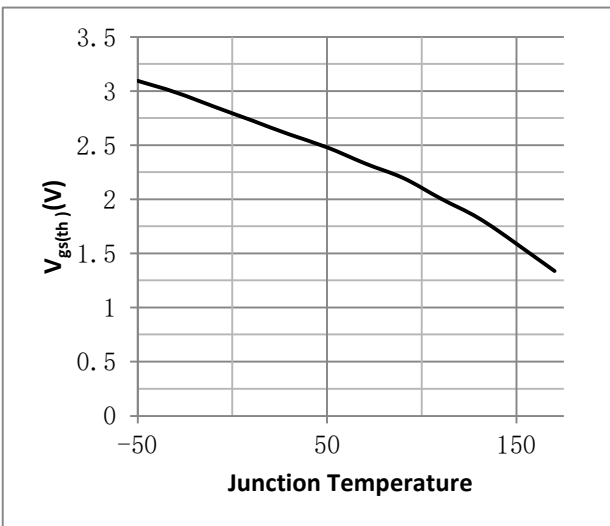


Fig.6 Resistance V.S Drain Current

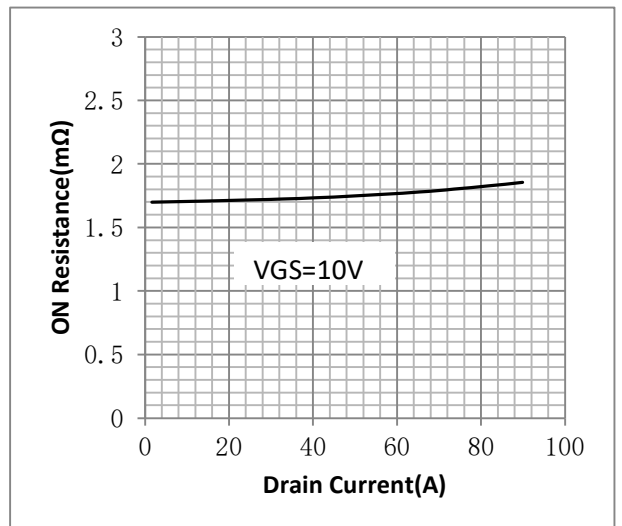


Fig.7 On-Resistance VS Gate Source Voltage

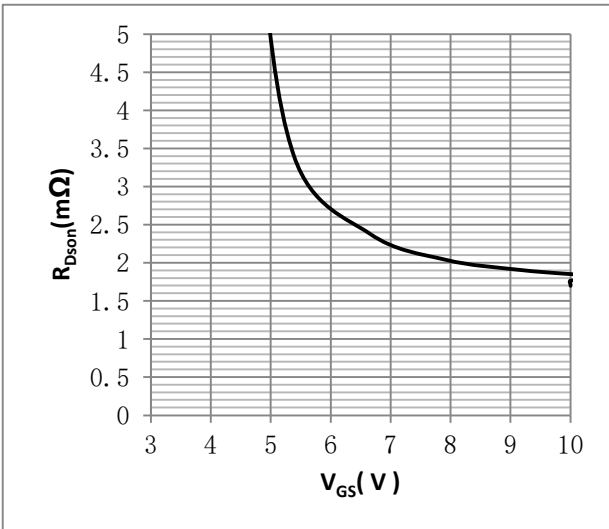


Fig.8 On-Resistance V.S Junction Temperature

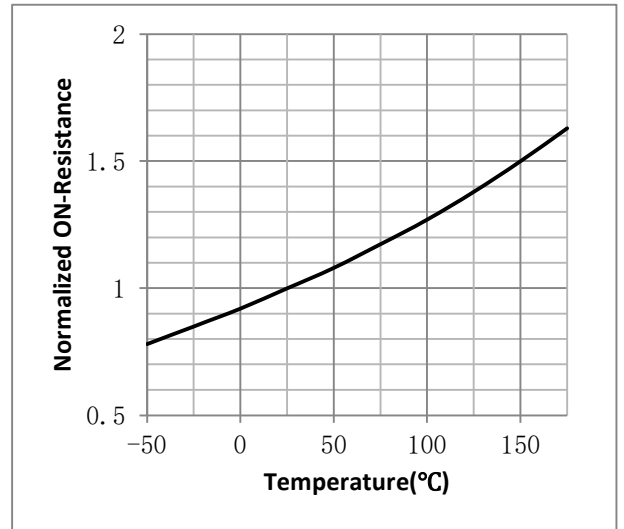


Figure 9. Diode Forward Voltage vs. Current

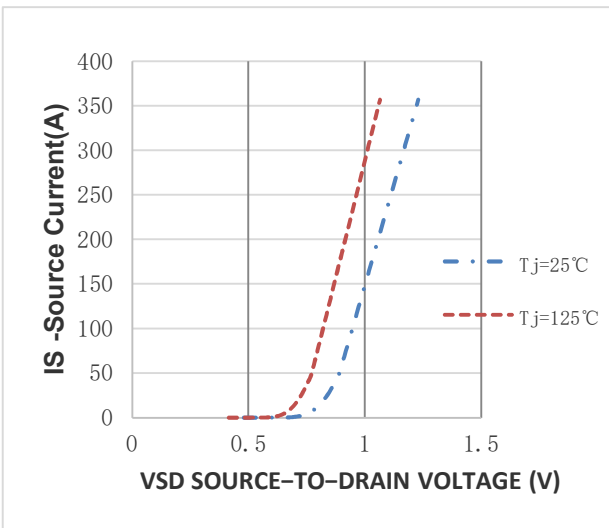


Figure 10. Transfer Characteristics

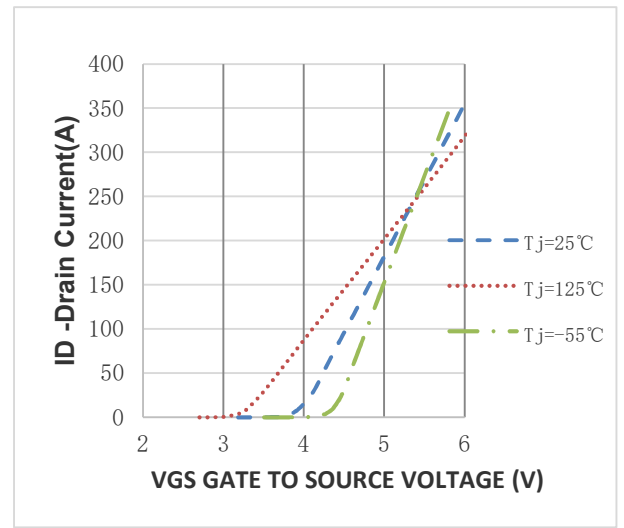


Fig.11 SOA Maximum Safe Operating Area

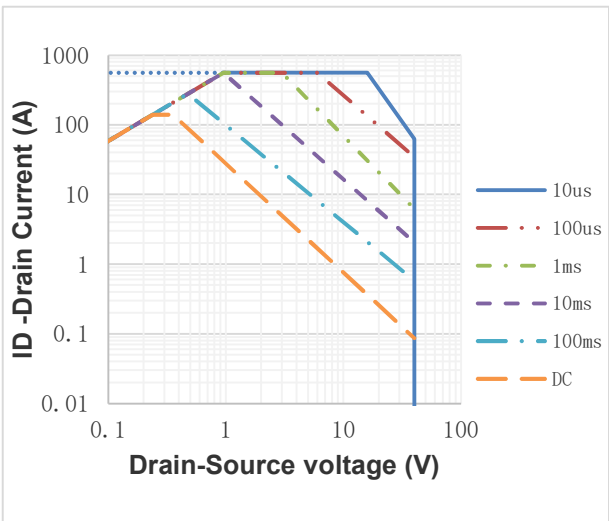
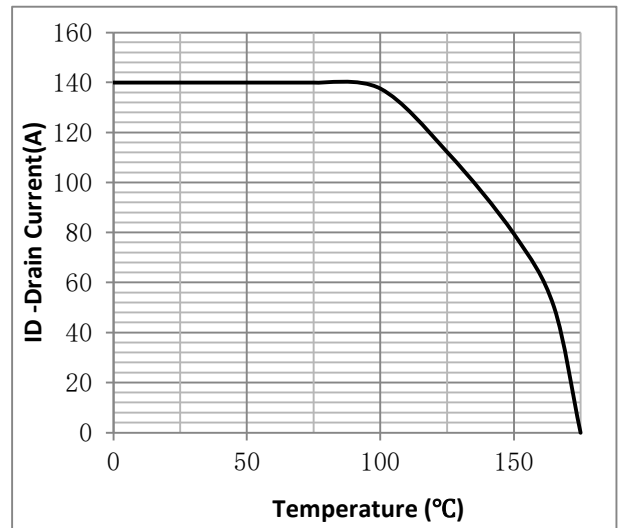
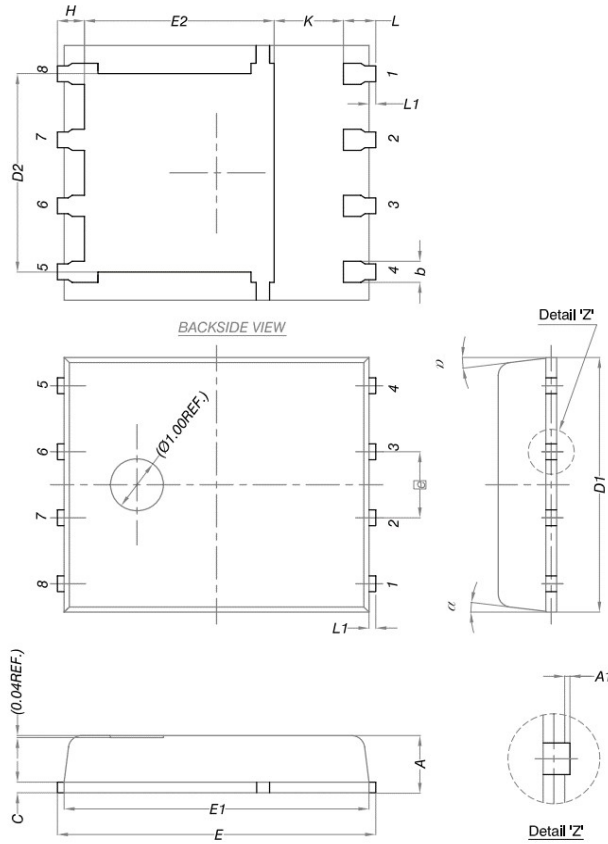


Fig.12 ID vs. Junction Temperature<sup>③</sup>



•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
$\phi$	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
$\alpha$	0°	-	12°

**Note:**

- ① Pulse : VGS=+20V/-20V, Duty cycle=50%, Tj=175°C, t=1000 hours; For DC , the following test conditions can be passed: VGS=+20V/-10V, Tj=175°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. VGS=10V.

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## Revision History

Version	Date	Change
A	2022. 1. 15	New
B	2022. 2. 20	1. Add Dynamic characteristic tf, tr etc.
C	2022. 9. 3	1. Add Reach, HF figure, 2. ID modify 3. temperature 265→260 °C
D	2023. 4. 28	1. Dynamic characteristics 2. RTHJC 3. SYMBOL figure