• 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

■AEC-Q101 Qualified

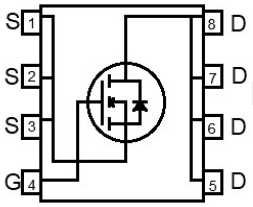
•Application

■BLDC Motor driver

■DC-DC

■Load Switch

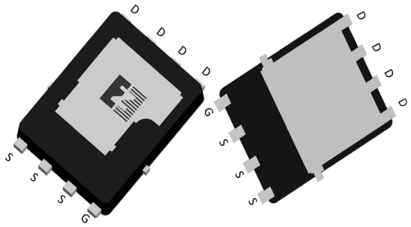
• Product Summary



V_{DS}= 40V

$R_{DS(ON)}$ = 0.55mΩ

I_D= 365A



DSCPPAK

RoHS

REACH COMPLIANT

HF

•Ordering Information:

Part NO.	ZMSA006N04HNCP
Marking	ZMS006N04H
Packing Information	REEL TAPE
Basic ordering unit (pcs)	3000

•Absolute Maximum Ratings (T_C=25℃)

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℃	365	A
	I_D	T_C=75℃	298	A
	I_D	T_C=100℃	258	A
Pulsed Drain Current ①	I_{DM}	Pulsed; t_p ≤ 10 μs; T_{mb} = 25 °C;	1460	A
Total Power Dissipation	P_D	T_C=25℃	188	W
Total Power Dissipation	P_D	T_A=25℃	5.0	W
Operating Junction Temperature	T_J		-55 to +175	℃
Storage Temperature	T_{STG}		-55 to +175	℃
Single Pulse Avalanche Energy	E_{AS}	L=0.1mH, VGS=10V, Rg=25Ω,	470	mJ
		L=0.5mH, VGS=10V, Rg=25Ω,	847	mJ
ESD Level (HBM)	CLASS 2			

•Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}		-	0.8	°C/W
Thermal resistance, junction-ambient	$R_{thJA①}$		-	30	°C/W
Soldering temperature（total time<10s)	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	2.8	4	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= 30A		0.55	0.7	mΩ
Forward Transconductance	g_{FS}	V_{GS} =5V, I_{SD} = 10A		37		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	Ciss	f = 1MHz, V_{DS}=25V	-	7356	-	pF
Output capacitance	Coss		-	2153	-	
Reverse transfer capacitance	Crss		-	124	-	
Gate Risistance	Rg	f = 1MHz	-	1.5		Ω
Total gate charge	Qg	V_{DD} = 15V,I_D = 30A, V_{GS} = 10V	-	106	-	nC
Gate - Source charge	Qgs		-	30	-	
Gate - Drain charge	Qgd		-	21	-	
Turn-ON Delay time	$t_{D(on)}$	V_{GS}=10V,V_{DS}=15V, R_G =3.3Ω, I_D =20A	-	15	-	ns
Turn-ON Rise time	t_r		-	12	-	ns
Turn-Off Delay time	$t_{D(off)}$		-	41	-	ns
Turn-Off Fall time	t_f		-	18	-	ns
Reverse Recovery Time	t_{rr}	V_{DD}=20V, dI_S/dt = 100A/us, I_S=20A	-	70	-	ns
Reverse Recovery Charge	Q_{rr}		-	130	-	nC

Fig.1 Gate-Charge Characteristics

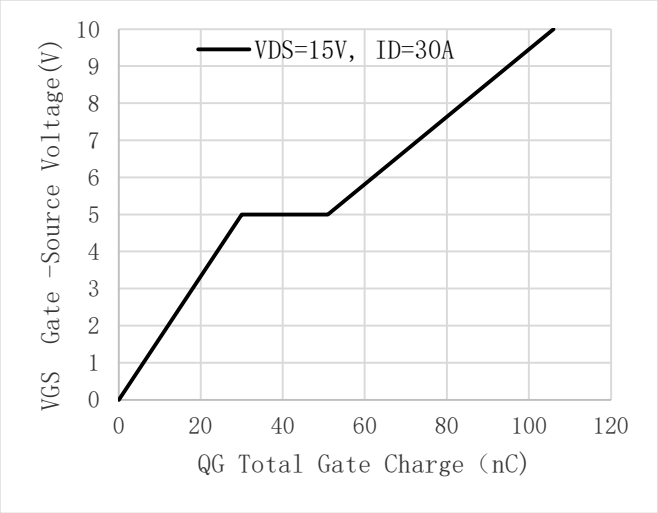


Fig.2 Capacitance Characteristics

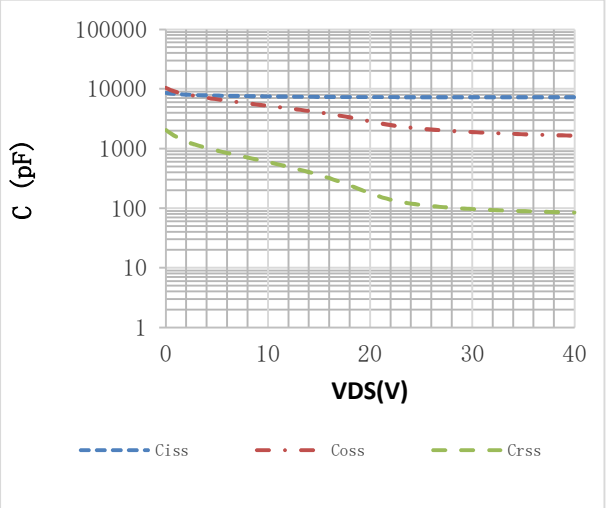


Fig.3 Power Dissipation

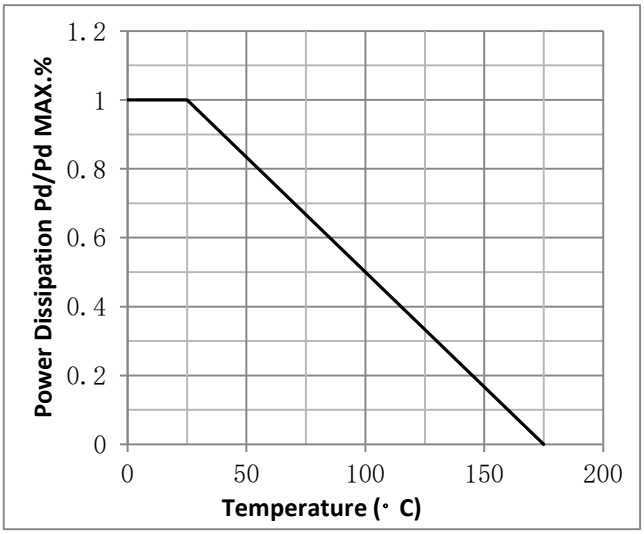


Fig.4 Typical output Characteristics

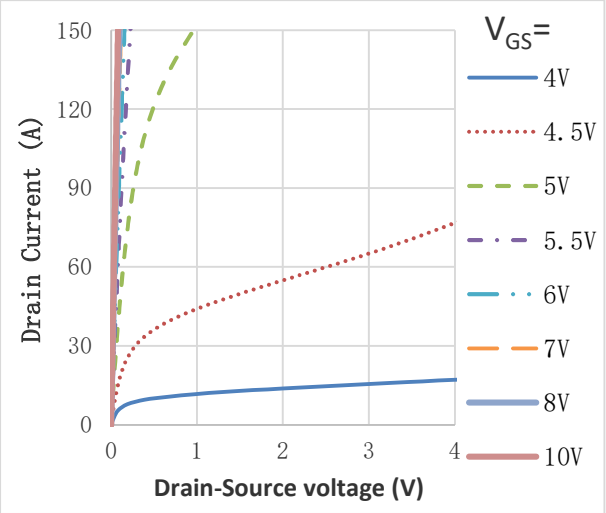


Fig.5 Threshold Voltage V.S Junction Temperature

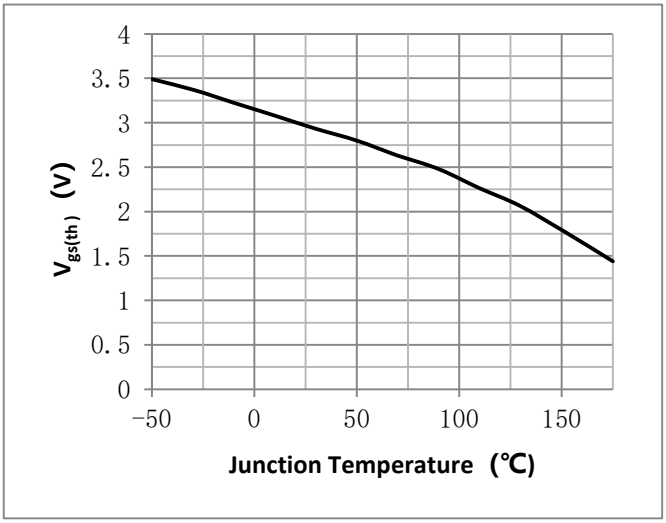


Fig.6 Resistance V.S Drain Current

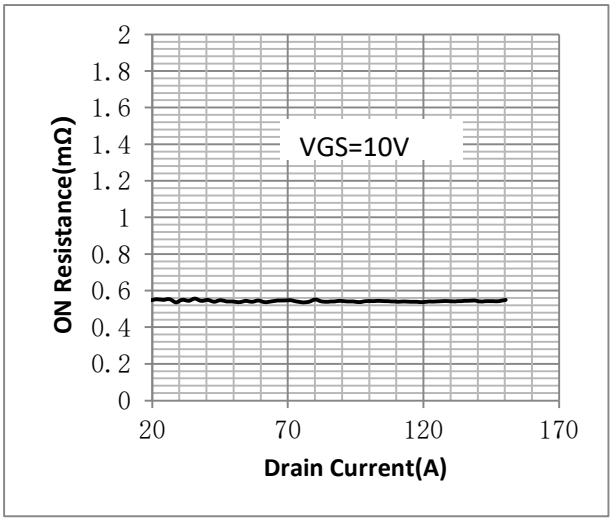


Fig.7 On-Resistance VS Gate Source Voltage

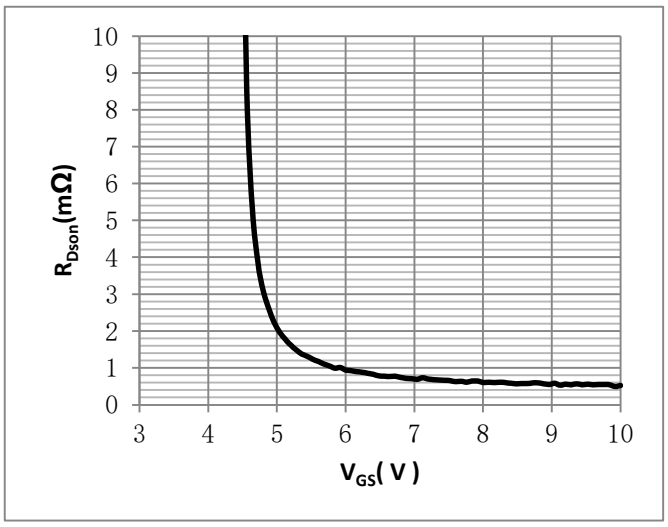


Fig.8 On-Resistance V.S Junction Temperature

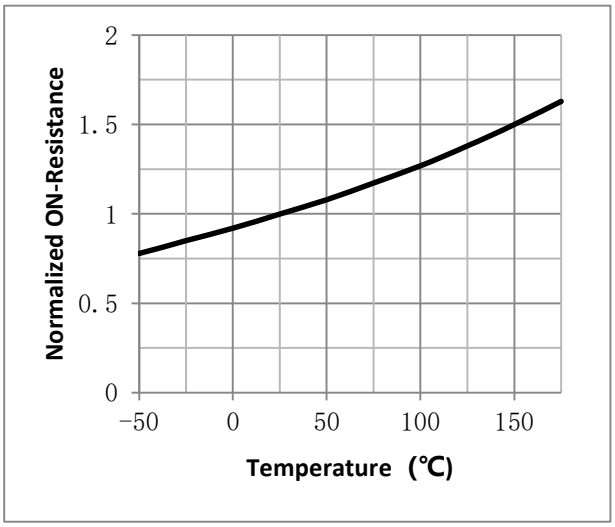


Figure 9. Diode Forward Voltage vs. Current

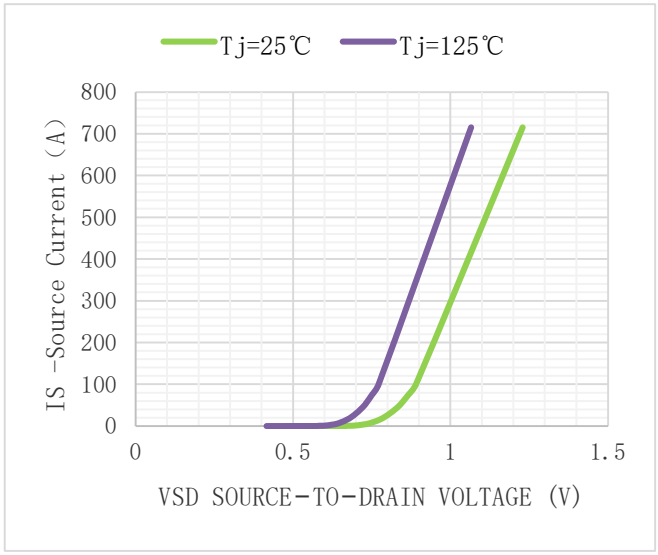


Figure 10. Transfer Characteristics

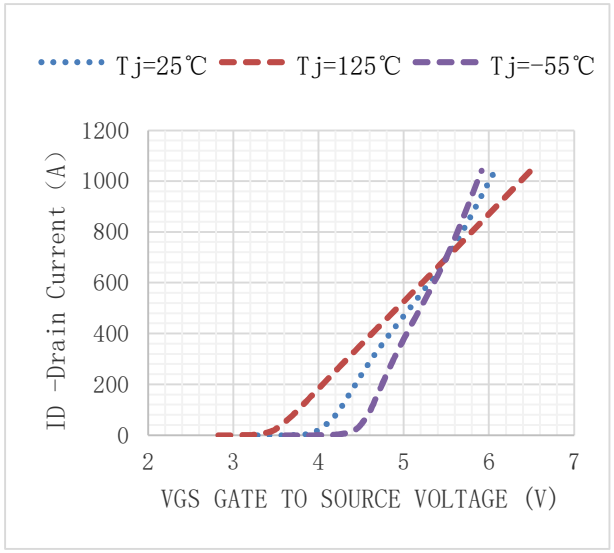


Fig.11 SOA Maximum Safe Operating Area

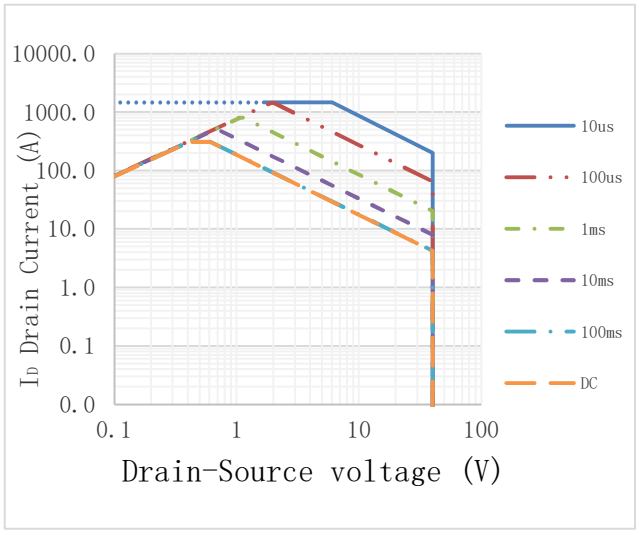
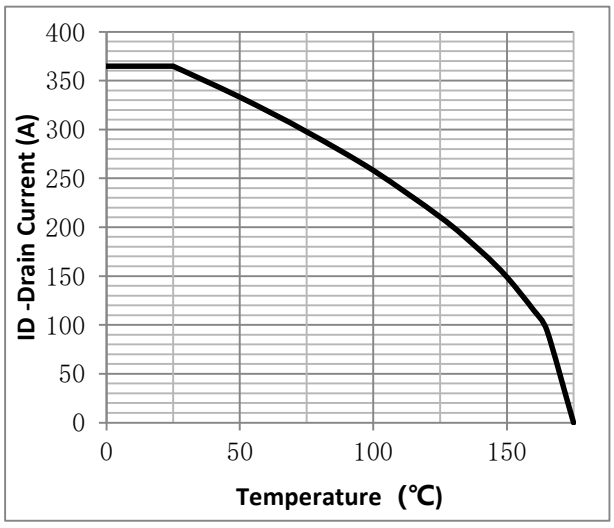
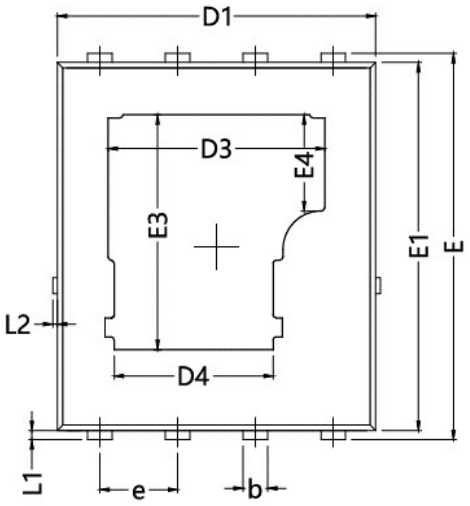
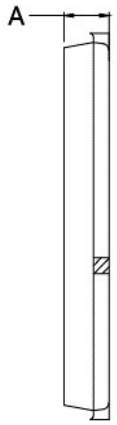


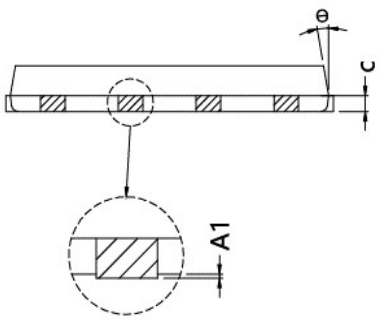
Fig.12 ID vs. Junction Temperature②

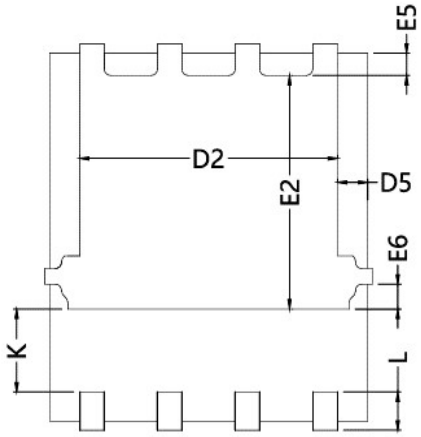


●DSCPPAK Package Outline









DIM.	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.60	0.73	0.83
A1	0	---	0.05
b	0.30	0.40	0.50
c	0.20	0.25	0.30
D1	5.10	5.20	5.30
D2	4.06	4.21	4.36
D3	3.39	3.54	3.69
D4	2.445	2.595	2.745
D5	0.345	0.495	0.645
E	6.00	6.15	6.30
E1	5.76	5.86	5.96
E2	3.57	3.72	3.87
E3	3.588	3.738	3.888
E4	1.382	1.532	1.682
E5	0.205	0.355	0.505
E6	0.245	0.395	0.545
e	1.27 BSC		
L	0.50	0.61	0.71
L1	0.05	0.15	0.25
L2	0.02	0.08	0.15
K	1.10	---	---
θ	8°	10°	12°

Note:

① Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate；

②Practically 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	2024/10/8	New