

• 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

- 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

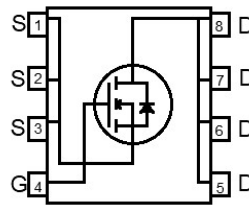
• Ordering Information:

Part NO.	ZMSA032N04HMC
Marking	032N04H
Packing Information	REEL TAPE
Basic ordering unit (pcs)	5000

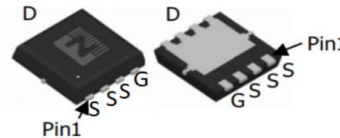
• Absolute Maximum Ratings ($T_C=25^{\circ}C$)

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	$T_C=25^{\circ}C$	88	A
	I_D	$T_C=75^{\circ}C$	72	A
	I_D	$T_C=100^{\circ}C$	63	A
Pulsed Drain Current	I_{DM}	Pulsed; $t_p \leq 10 \mu s$; $T_{mb} = 25^{\circ}C$;	352	A
Total Power Dissipation	P_D	$T_C=25^{\circ}C$	58	W
Total Power Dissipation	P_D	$T_A=25^{\circ}C$	2.5	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, $V_{GS}=10V$, $R_g=25\Omega$,	64	mJ
		L=0.5mH, $V_{GS}=10V$, $R_g=25\Omega$,	134.4	mJ
ESD Level (HBM)	CLASS 1C			

• Product Summary



$V_{DS} = 40V$
 $R_{DS(ON)} = 3m\Omega$
 $I_D = 88A$



DFN3*3



•Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}		-	2.6	$^{\circ}C/W$
Thermal resistance, junction-ambient	$R_{thJA}^{\textcircled{2}}$		-	60	$^{\circ}C/W$
Soldering temperature (total time<10s)	T_{sold}		-	260	$^{\circ}C$

•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	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = 250\mu A$	2.0	2.7	4.0	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	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 24A$		3.0	4.0	m Ω
Forward Transconductance	g_{FS}	$V_{GS} = 5V, I_{SD} = 5A$		15.0		S
Diode Forward Voltage	V_{FSD}	$V_{GS} = 0V, I_{SD} = 24A$			1.3	V

•Dynamic characteristics

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Input capacitance	C_{iss}	$f = 1MHz, V_{DS} = 25V$	-	1320	-	μF
Output capacitance	C_{oss}		-	365	-	
Reverse transfer capacitance	C_{rss}		-	23	-	
Gate Resistance	R_g	$f = 1MHz$	-	1.1		Ω
Total gate charge	Q_g	$V_{DD} = 15V,$ $I_D = 24A,$ $V_{GS} = 10V$	-	15	-	nC
Gate - Source charge	Q_{gs}		-	3.4	-	
Gate - Drain charge	Q_{gd}		-	4.5	-	
Turn-ON Delay time	$t_{D(on)}$	$V_{GS} = 10V, V_{DS} = 15V,$ $R_G = 3.3\Omega, I_D = 20A$	-	3	-	ns
Turn-ON Rise time	t_r		-	4	-	ns
Turn-Off Delay time	$t_{D(off)}$		-	16	-	ns
Turn-Off Fall time	t_f		-	5	-	ns
Reverse Recovery Time	t_{RR}	$V_{DD} = 20V, dI_S/dt =$ $100A/\mu s, I_S = 50A$	-	25	-	ns
Reverse Recovery Charge	Q_{RR}		-	12	-	nC

Fig.1 Gate-Charge Characteristics

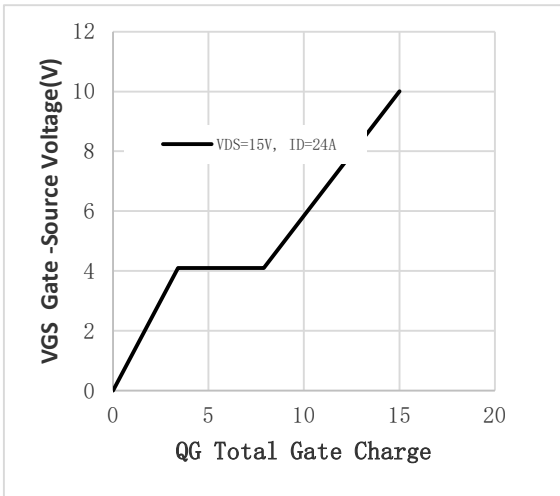


Fig.2 Capacitance Characteristics

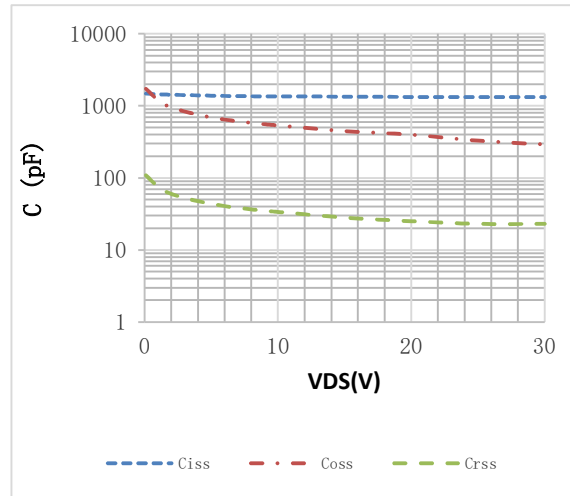


Fig.3 Power Dissipation

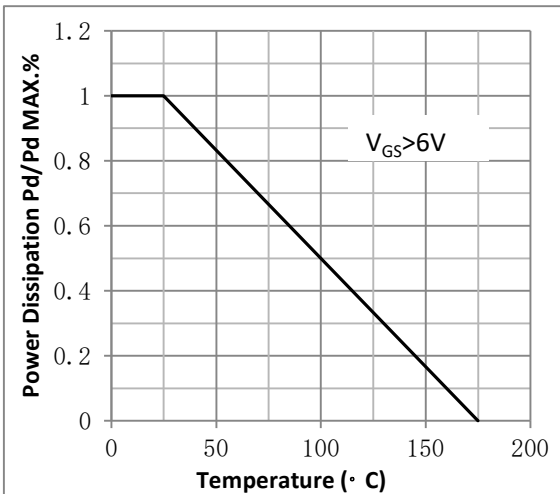


Fig.4 Typical output Characteristics

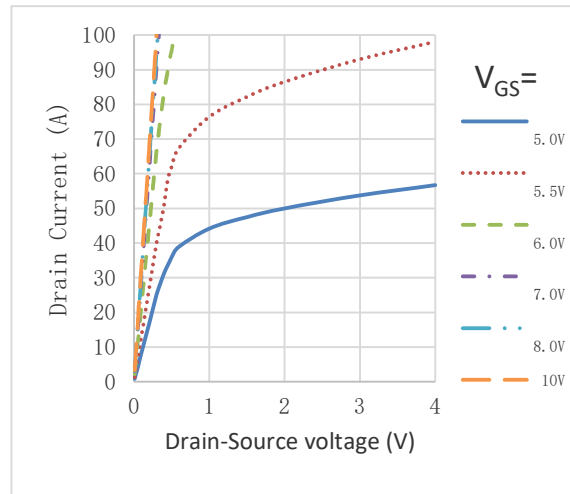


Fig.5 Threshold Voltage V.S Junction Temperature

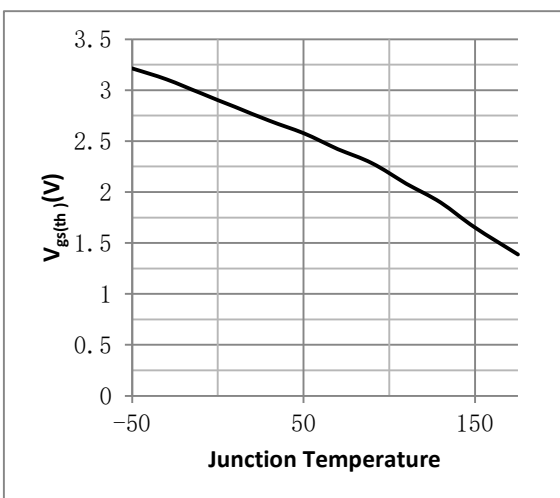


Fig.6 Resistance V.S Drain Current

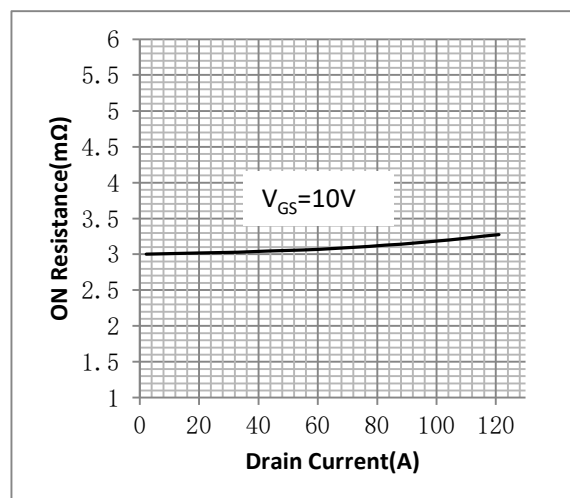


Fig.7 On-Resistance VS Gate Source Voltage

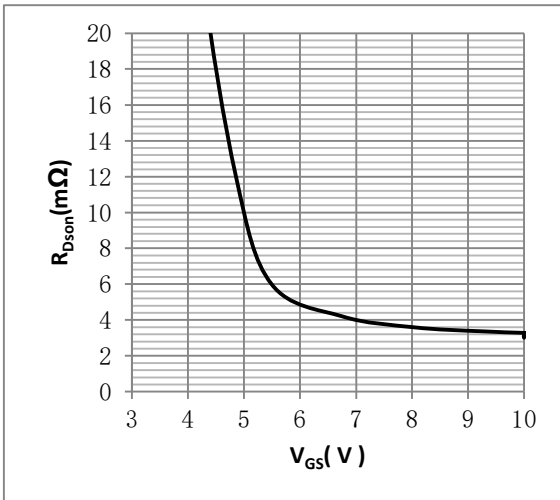


Fig.8 On-Resistance V.S Junction Temperature

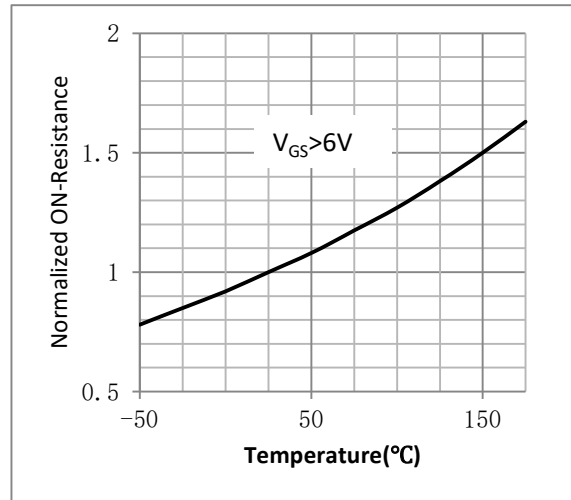


Figure 9. Diode Forward Voltage vs. Current

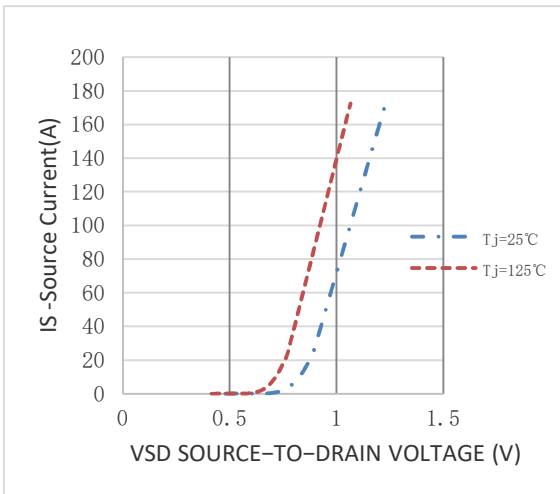


Figure 10. Transfer Characteristics

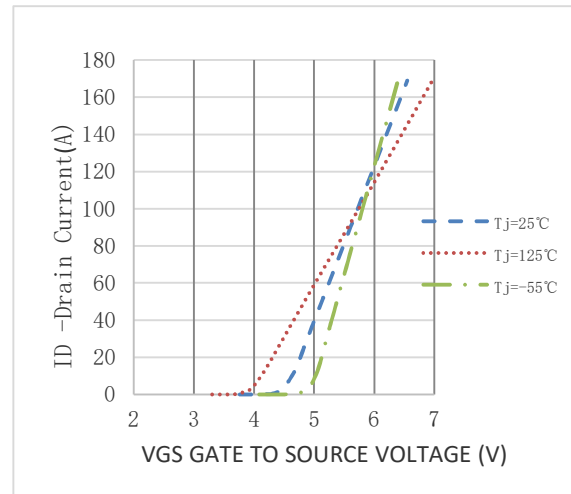


Fig.11 Safe Operating Area

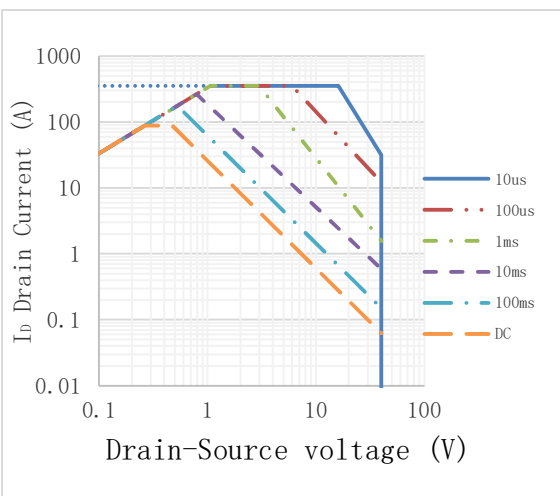
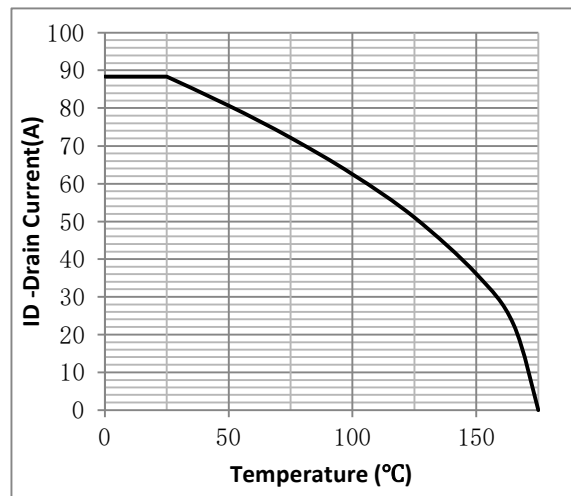
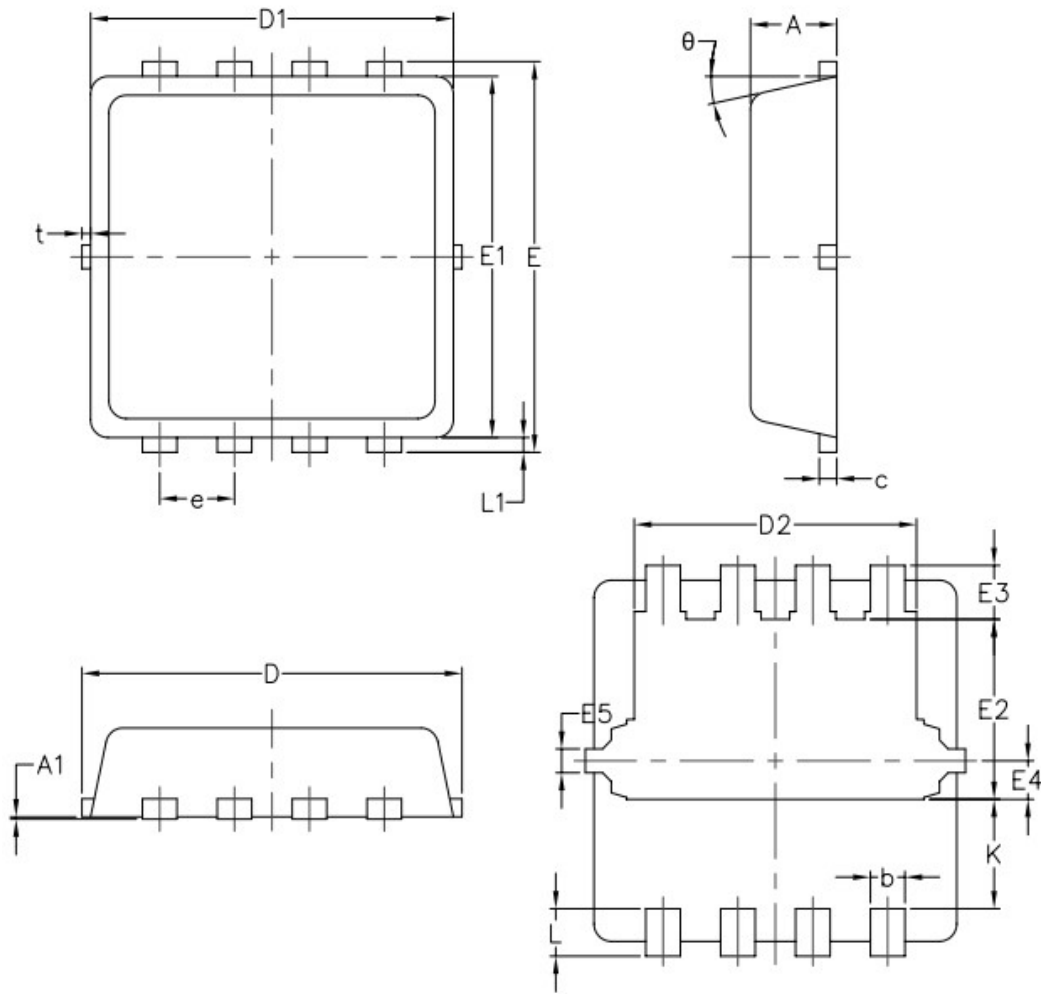


Fig.12 ID vs. Junction Temperature^③



•DFN3*3 Package Outline



SYMBOL	COMMON		
	MM		
	MIN	NOM	MAX
A	0.70	0.75	0.85
A1	/	/	0.05
b	0.20	0.30	0.40
c	0.10	0.152	0.25
D	3.15	3.30	3.45
D1	3.00	3.15	3.25
D2	2.29	2.45	2.65
E	3.15	3.30	3.45
E1	2.90	3.05	3.20
E2	1.32	1.52	1.72
E3	0.28	0.46	0.65
E4	0.18	0.33	0.48
E5	0.10	0.20	0.30
e	0.60	0.65	0.70
K	0.78	0.93	1.13
L	0.30	0.40	0.50
L1	0.06	0.125	0.20
t	0	0.075	0.13
theta	10°	12°	14°

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	2024.2.26	New
B	2025.1.7	POD modified.