

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.

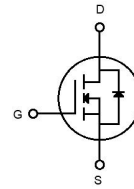
Features

- 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
- Load Switch

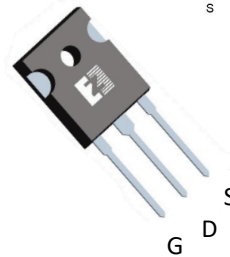
Product Summary



$$V_{DS} = 150V$$

$$R_{DS(ON)} = 6.3m\Omega$$

$$I_D = 130A$$



TO-247



Ordering Information:

Part NO.	ZMSA055N15HC
Marking	ZMS055N15H
Packing Information	TUBE
Basic ordering unit (pcs)	400

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

Parameter	Symbol	Conditions	Value	Unit
Drain-Source Voltage	V_{DS}		150	V
Gate-Source Voltage ^①	V_{GS}		± 20	V
Continuous Drain Current	I_D	$T_C=25^\circ\text{C}$	130	A
	I_D	$T_C=75^\circ\text{C}$	108	A
	I_D	$T_C=100^\circ\text{C}$	93	A
Pulsed Drain Current	I_{DM}	Pulsed; $t_p \leq 10 \mu\text{s}$; $T_{mb} = 25^\circ\text{C}$;	520	A
Total Power Dissipation	P_D	$T_C=25^\circ\text{C}$	300	W
Total Power Dissipation	P_D	$T_A=25^\circ\text{C}$	5.0	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}	$L=0.1\text{mH}$, $V_{GS}=10\text{V}$, $R_g=25\Omega$,	390	mJ
		$L=0.5\text{mH}$, $V_{GS}=10\text{V}$, $R_g=25\Omega$,	702	mJ
ESD Level (HBM)	CLASS 2			

•Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}		-	0.5	°C/W
Thermal resistance, junction-ambient	$R_{thJA}^{②}$		-	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}	$V_{GS}=0V, I_D=250\mu A$	150			V
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	2.0	3.3	4.0	V
Drain-Source Leakage Current	I_{DSS}	$V_{GS}=0V, V_{DS}=150V$			1.0	μA
Gate- Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$			100	nA
Static Drain-source On Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=30A$		6.3	8.2	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_{SD}=20A$		45		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}	$f=1MHz, V_{DS}=25V$	-	6600	-	pF
Output capacitance	C_{oss}		-	2750	-	
Reverse transfer capacitance	C_{rss}		-	256	-	
Gate Resistance	R_g	$f=1MHz$	-	1.2		Ω
Total gate charge	Q_g	$V_{DD}=15V,$ $I_D=20A,$ $V_{GS}=10V$	-	98	-	nC
Gate - Source charge	Q_{gs}		-	28	-	
Gate - Drain charge	Q_{gd}		-	25	-	
Turn-ON Delay time	$t_{D(on)}$	$V_{GS}=10V, V_{DS}=15V,$ $R_g=3.3\Omega, I_D=20A$	-	30	-	ns
Turn-ON Rise time	t_r		-	12	-	ns
Turn-Off Delay time	$t_{D(off)}$		-	65	-	ns
Turn-Off Fall time	t_f		-	14	-	ns
Reverse Recovery Time	t_{RR}	$V_{DD}=20V, dI_S/dt=$ $100A/\mu s, I_S=50A$	-	72	-	ns
Reverse Recovery Charge	Q_{RR}		-	98	-	nC

Fig.1 Gate-Charge Characteristics

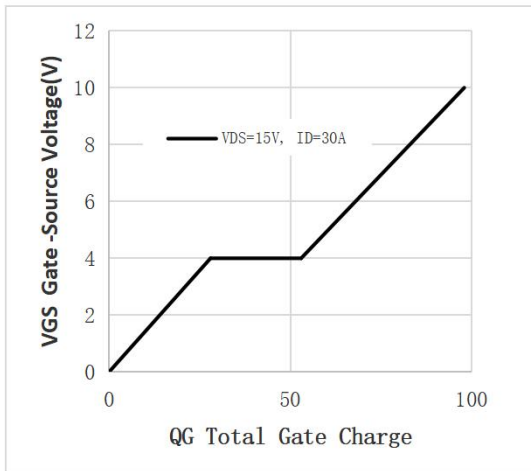


Fig.2 Capacitance Characteristics

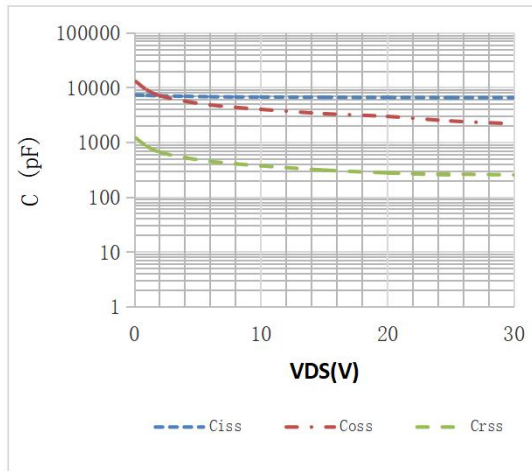


Fig.3 Power Dissipation

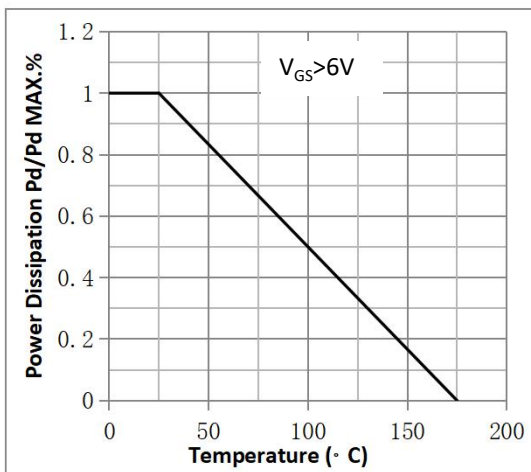


Fig.4 Typical output Characteristics

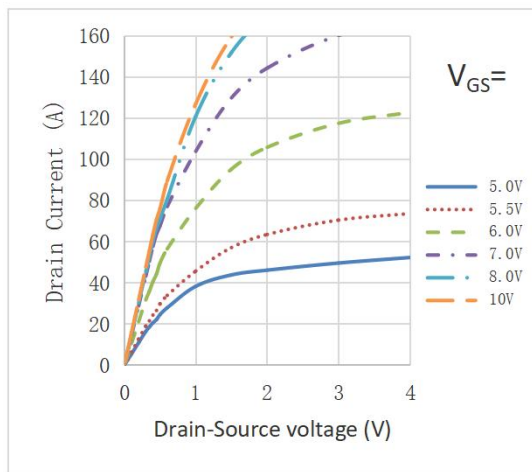


Fig.5 Threshold Voltage V.S Junction Temperature

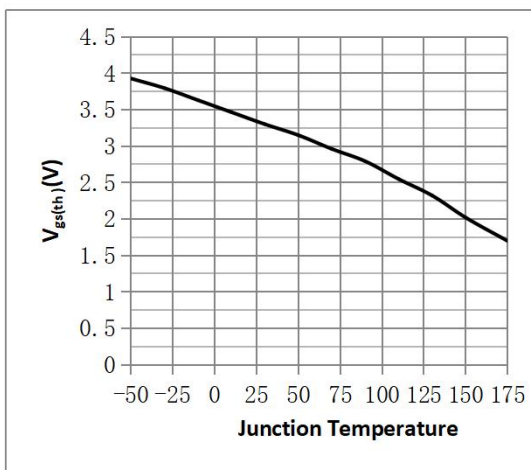


Fig.6 Resistance V.S Drain Current

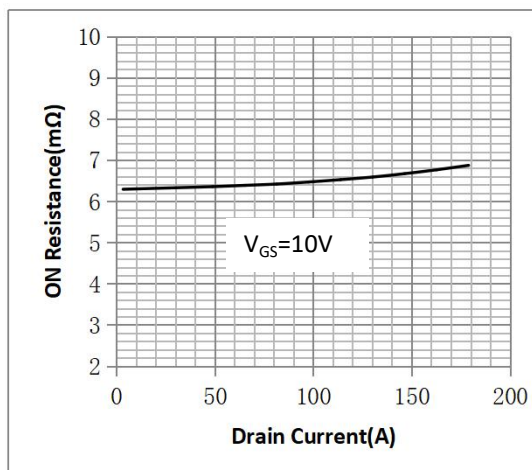


Fig.7 On-Resistance VS Gate Source Voltage

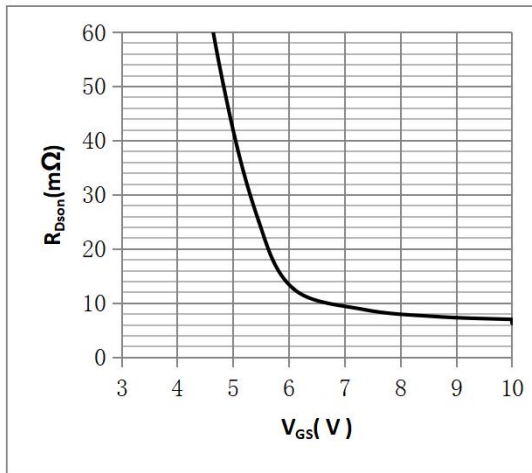


Fig.8 On-Resistance V.S Junction Temperature

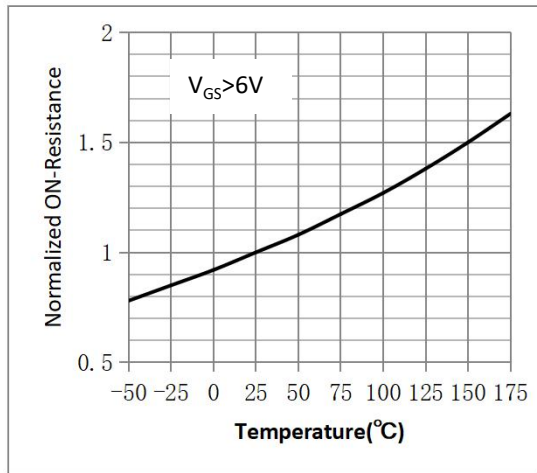


Figure 9. Diode Forward Voltage vs. Current

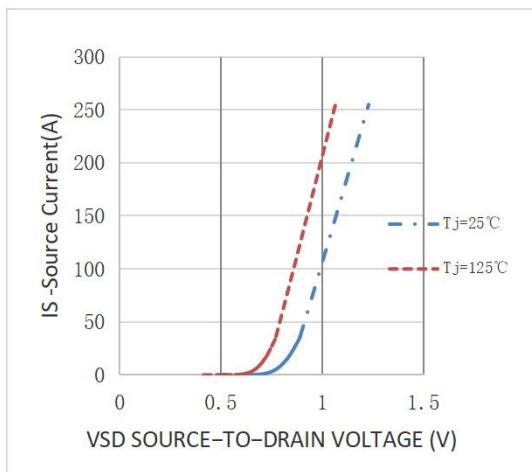


Figure 10. Transfer Characteristics

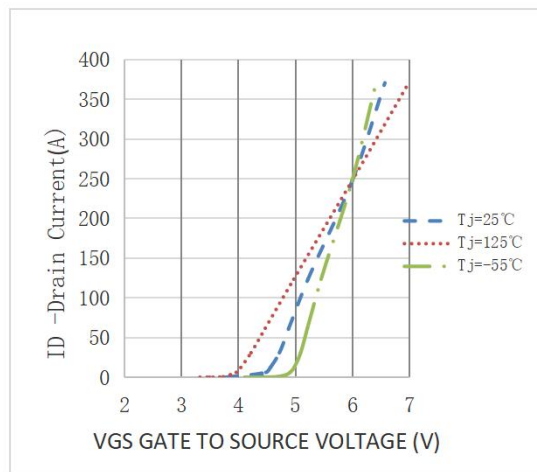


Fig.11 Safe Operating Area

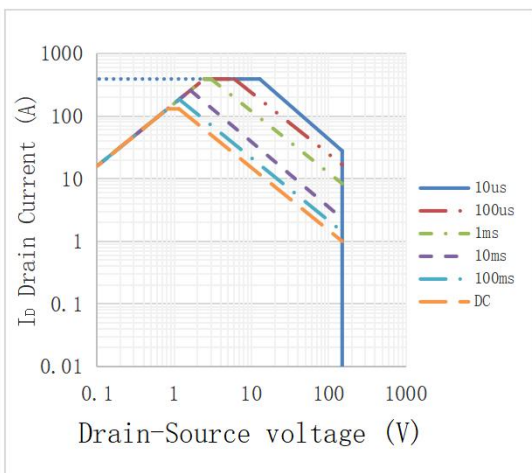
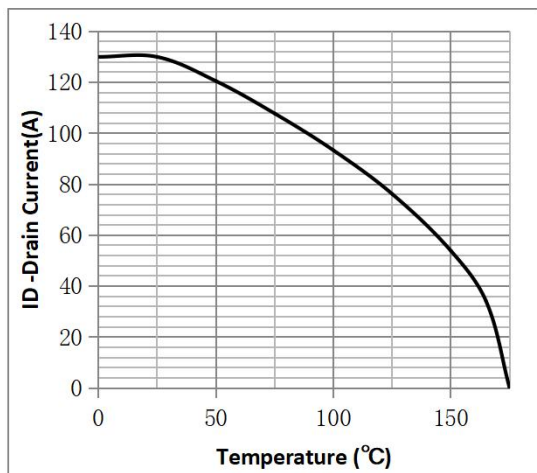
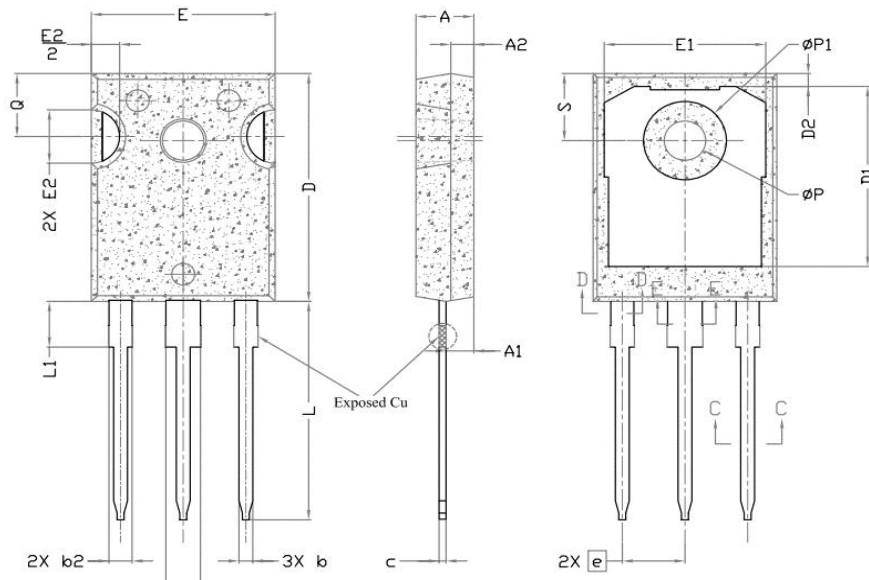


Fig.12 ID vs. Junction Temperature^③



•TO-247 Package Outline



SYMBOL	DIMENSIONS			NOTES
	MIN.	NOM.	MAX.	
A	4.83	5.02	5.21	
A1	2.29	2.41	2.55	
A2	1.50	2.00	2.49	
b	1.12	1.20	1.33	
b1	1.12	1.20	1.28	
b2	1.91	2.00	2.39	6
b3	1.91	2.00	2.34	
b4	2.87	3.00	3.22	6, 8
b5	2.87	3.00	3.18	
c	0.55	0.60	0.69	6
c1	0.55	0.60	0.65	
D	20.80	20.95	21.10	4
D1	16.25	16.55	17.65	5
D2	0.51	1.19	1.35	
E	15.75	15.94	16.13	4
E1	13.46	14.02	14.16	5
E2	4.32	4.91	5.49	3
e	5.44BSC			
L	19.81	20.07	20.32	
L1	4.10	4.19	4.40	6
ØP	3.56	3.61	3.65	7
ØP1	7.19REF.			
Q	5.39	5.79	6.20	
S	6.04	6.17	6.30	

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	2022.4.6	New
B	2022.10.21	1.Fig.1~Fig11 modify 2.Idm corrected 3.Add Reach,HF figure 4.add "It is suitable for automotive application." 5.modify as "total time<10s)"
C	2024.1.10	Correct 100°C ID