● General Description

It combines 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

■High GOX reliability

■Low Thermal resistance

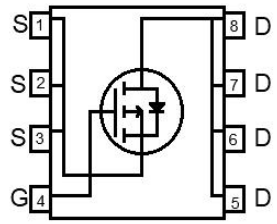
● Application

■BLDC Motor driver

■DC-DC

■Battery protection

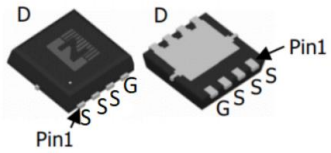
● Product Summary



V_{DS}= -40V

$R_{DS(ON)}$ = 26mΩ

I_D= -20A



DFN3*3

RoHS

● Ordering Information:

Part NO.	ZMA260P04M
Marking	260P04
Packing Information	REEL TAPE
Basic ordering unit (pcs)	5000

● 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℃	20	A
	I_D	T_C=75℃	18	A
	I_D	T_C=100℃	15	A
Pulsed Drain Current	I_{DM}	pulsed; t_p ≤ 10 μs; T_{mb} = 25 °C;	71	A
Total Power Dissipation	P_D	T_C=25℃	33	W
Total Power Dissipation	P_D	T_A=25℃	2.5	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, V_{GS}=-10V, Rg=25Ω,	24	mJ
		L=0.5mH, V_{GS}=-10V, Rg=25Ω,	50.4	mJ
ESD Level (HBM)	CLASS 1C			

●Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}		-	4.5	°C/W
Thermal resistance, junction-ambient②	R_{thJA}		-	60	°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	-1.3	-1.7	-2.5	V
Drain-Source Leakage Current	I_{DSS}	V_{GS}=0V, V_{DS}= -40V			1	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= -10A		26	34	mΩ
Diode Forward Voltage	V_{FSD}	V_{GS} =0V, I_{SD} = -10A			1.3	V

●Dynamic characteristics

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Input capacitance	Ciss	f = 1MHz, V_{DS}=-25V	-	1370		pF
Output capacitance	Coss		-	101	-	
Reverse transfer capacitance	Crss		-	67	-	
Gate Risistance	Rg	f = 1MHz	-	7.5		Ω
Total gate charge	Qg	V_{DD} = -15V, I_D = -20A V_{GS} = -10V	-	20.8	-	nC
Gate - Source charge	Qgs		-	3.5	-	
Gate - Drain charge	Qgd		-	3.6	-	
Turn-ON Delay time	$t_{D(on)}$	V_{GS}=-10V,V_{DS}=-15V, R_G =3.3Ω,I_D =-20A	-	21	-	ns
Turn-ON Rise time	t_r		-	53	-	ns
Turn-Off Delay time	$t_{D(off)}$		-	46	-	ns
Turn-Off Fall time	t_f		-	42	-	ns
Reverse Recovery Time	t_{RR}	V_{DD}=-20V,dI_S/dt = 100A/us,I_S=-50A	-	35	-	ns
Reverse Recovery Charge	Q_{RR}		-	42	-	nC

Fig.1 Gate-Charge Characteristics

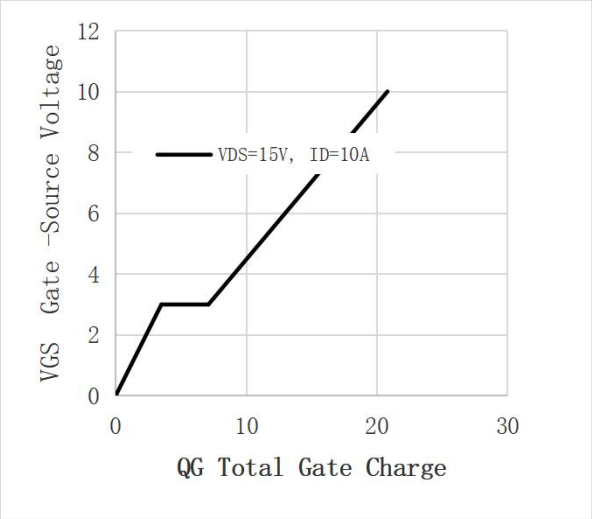


Fig.2 Capacitance Characteristics

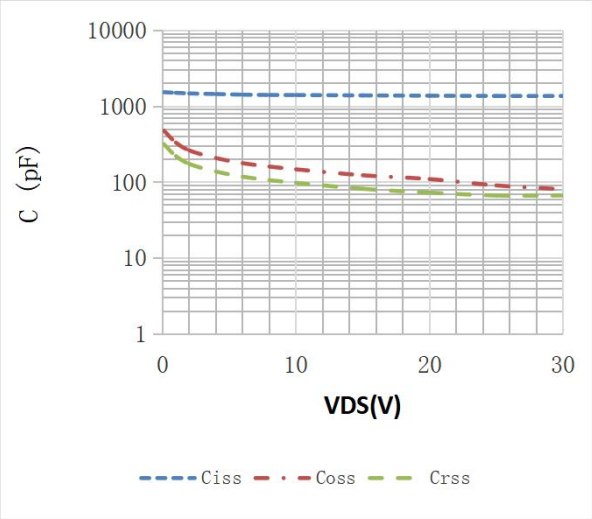


Fig.3 Power Dissipation

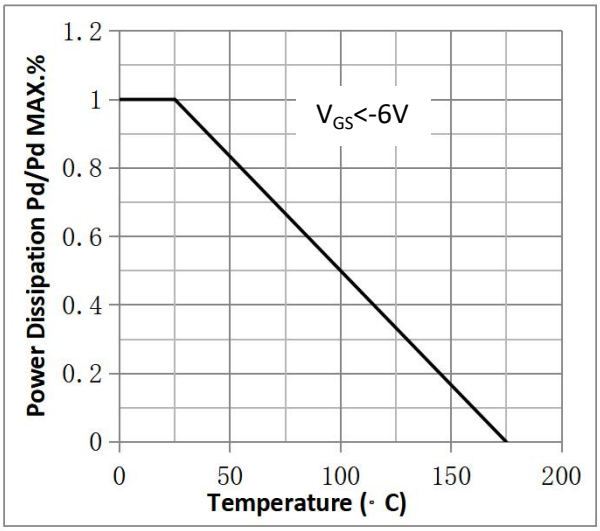


Fig.4 Typical output Characteristics

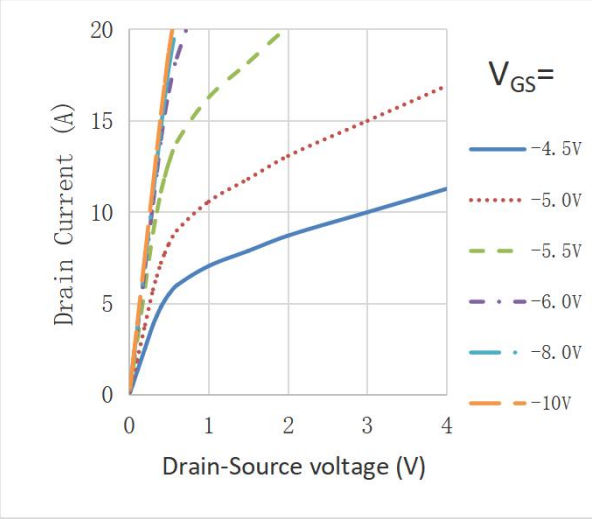


Fig.5 Threshold Voltage V.S Junction Temperature

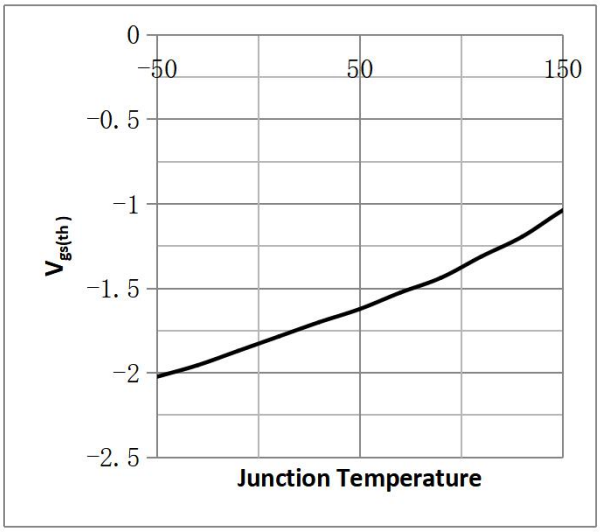


Fig.6 Resistance V.S Drain Current

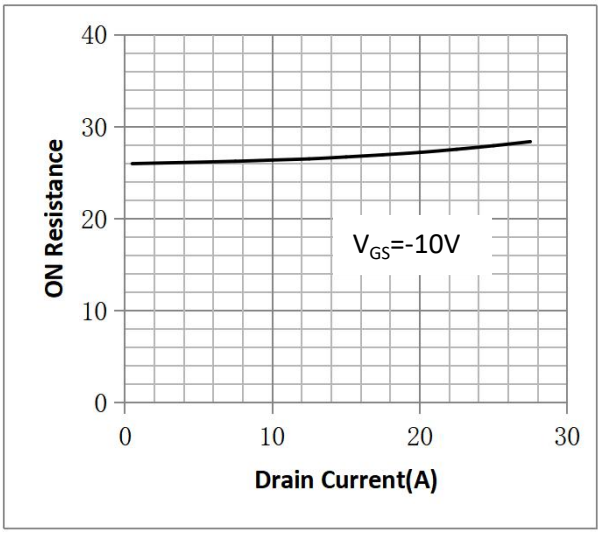


Fig.7 On-Resistance VS Gate Source Voltage

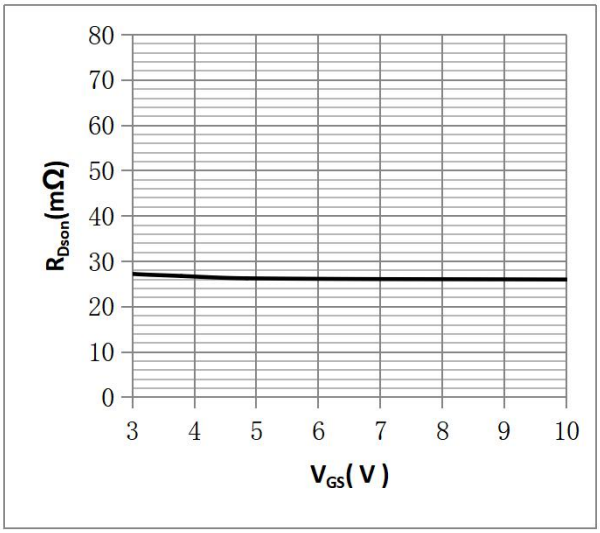


Fig.8 On-Resistance V.S Junction Temperature

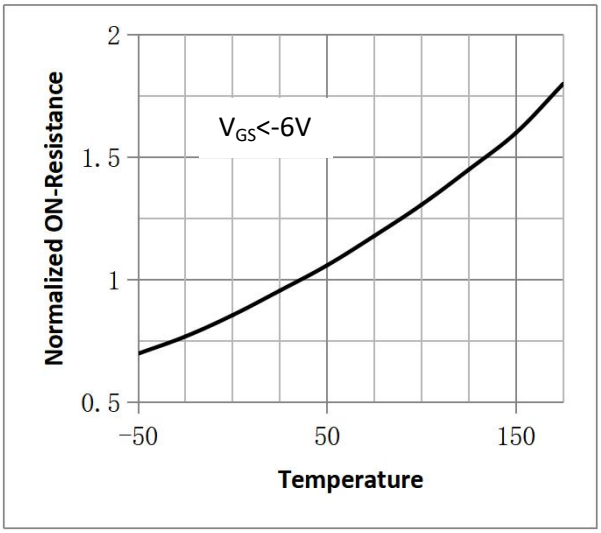


Figure 9. Diode Forward Voltage vs. Current

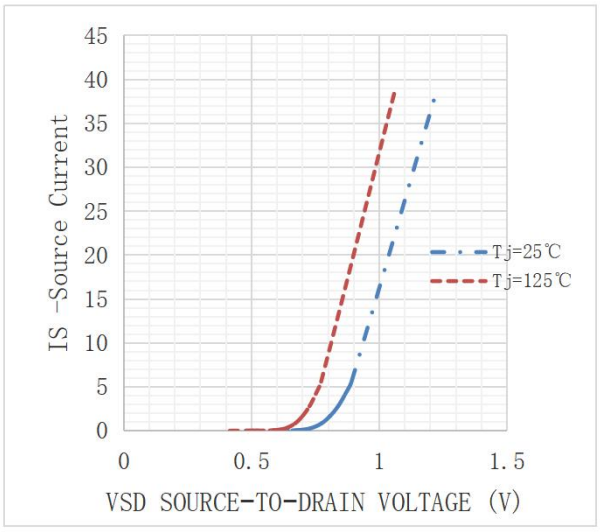


Figure 10. Transfer Characteristics

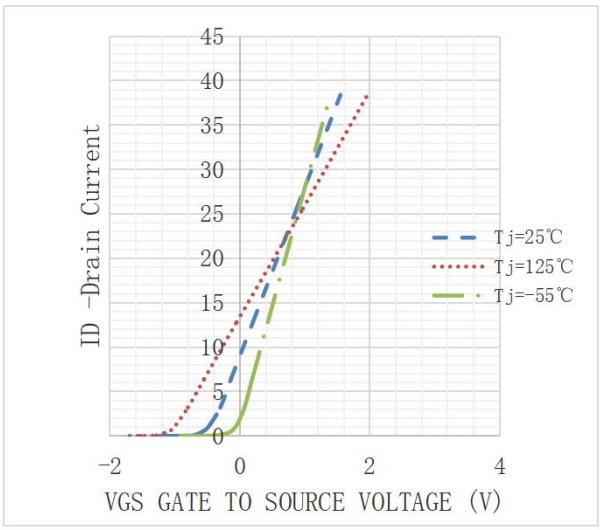


Fig.11 Safe Operating Area

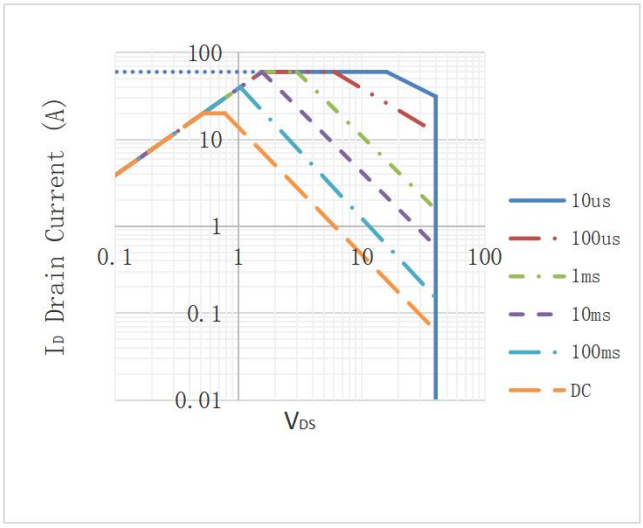
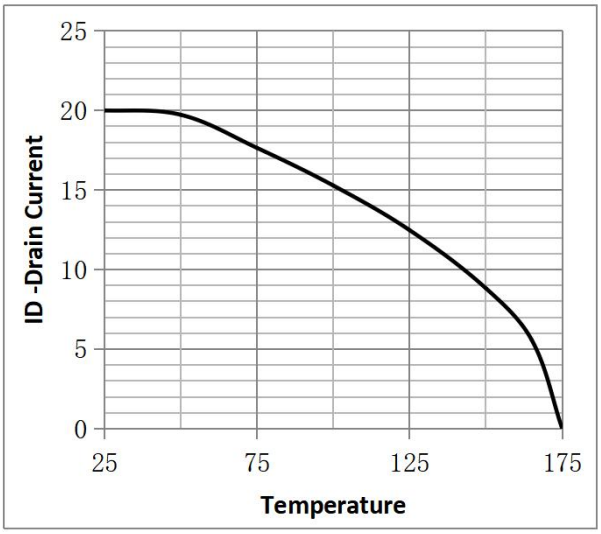
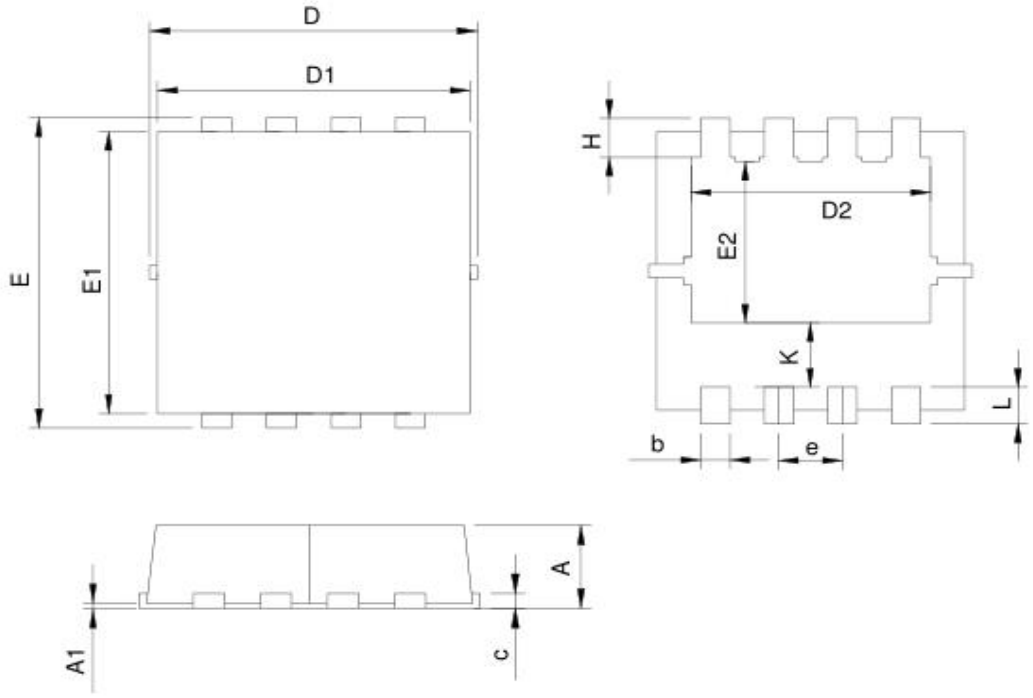


Fig.12 ID vs. Junction Temperature

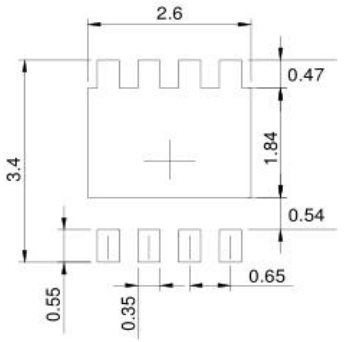


●DFN3*3 Package Outline



SYMBOL	DFN3.3x3.3-8			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	0.70	1.00	0.028	0.039
A1	0.00	0.05	0.000	0.002
b	0.25	0.35	0.010	0.014
c	0.14	0.20	0.006	0.008
D	3.10	3.50	0.122	0.138
D1	3.05	3.25	0.120	0.128
D2	2.35	2.55	0.093	0.100
E	3.10	3.50	0.122	0.138
E1	2.90	3.10	0.114	0.122
E2	1.64	1.84	0.065	0.072
e	0.65 BSC		0.026 BSC	
H	0.32	0.52	0.013	0.020
K	0.59	0.79	0.023	0.031
L	0.25	0.55	0.010	0.022

RECOMMENDED LAND PATTERN



UNIT: mm

Note:

① Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%, Accumulation time ≤50 hours; For DC， the following test conditions can be passed: VGS=-20V/+5V, Tj=175℃, t=1000 hours；

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

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Revision History

Version	Date	Change
A	2021.2.3	NEW
B	2021.11.7	1.Modified Typical output Characteristics curve
C	2022.5.6	1.Add Reach,HF figure 2.Modified ID curve