

• General Description

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

• 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

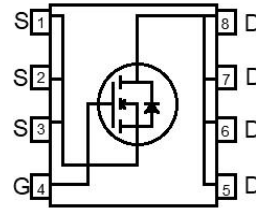
• Ordering Information:

Part NO.	ZMS007N04NC
Marking	ZMS007N04
Packing Information	REEL TAPE
Basic ordering unit (pcs)	3000

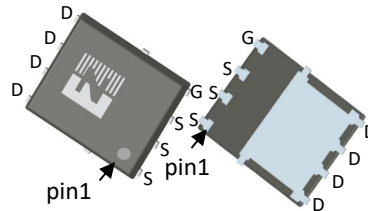
• Absolute Maximum Ratings ($T_C=25^\circ C$)

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	$T_C=25^\circ C$	310	A
	I_D	$T_C=75^\circ C$	253	A
	I_D	$T_C=100^\circ C$	219	A
Pulsed Drain Current	I_{DM}	Pulsed; $t_p \leq 10 \mu s$; $T_{mb} = 25^\circ C$;	930	A
Total Power Dissipation	P_D	$T_C=25^\circ C$	158	W
Total Power Dissipation	P_D	$T_A=25^\circ C$	4.2	W
Operating Junction Temperature	T_J		-55 to +175	°C
Storage Temperature	T_{STG}		-55 to +175	°C
Single Pulse Avalanche Energy	E_{AS}	L=0.1mH, $V_{GS}=10V$, $R_g=25\Omega$,	325	mJ
		L=0.5mH, $V_{GS}=10V$, $R_g=25\Omega$,	680	mJ
ESD Level (HBM)	CLASS 2			

• Product Summary



$V_{DS} = 40V$
 $R_{DS(ON)} = 0.7m\Omega$
 $I_D = 310A$



DFN5*6



•Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}		-	0.95	°C/W
Thermal resistance, junction-ambient	$R_{thJA}^{②}$		-	36	°C/W
Soldering temperature	Tsold		-	260	°C

•Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0V, I_D = 250\mu A$	40			V
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = 250\mu A$	1.6	1.9	2.5	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	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 40A$		0.7	0.9	m Ω
		$V_{GS} = 4.5V, I_D = 30A$		1.0	1.8	
Forward Transconductance	g_{FS}	$V_{DS} = 5V, I_{SD} = 10A$		30		S
Diode Forward Voltage	V_{FSD}	$V_{GS} = 0V, I_{SD} = 40A$			1.3	V

•Dynamic characteristics

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Input capacitance	C_{iss}	$f = 1MHz, V_{DS} = 25V$	-	5600	-	pF
Output capacitance	C_{oss}		-	1640	-	
Reverse transfer capacitance	C_{rss}		-	98	-	
Gate Resistance	R_g	$f = 1MHz$	-	1.6	-	Ω
Total gate charge	Q_g	$V_{DD} = 15V, I_D = 20A, V_{GS} = 10V$	-	63	-	nC
Gate - Source charge	Q_{gs}		-	13	-	
Gate - Drain charge	Q_{gd}		-	18	-	
Turn-ON Delay time	$t_{D(on)}$	$V_{GS} = 10V, V_{DS} = 15V, R_G = 3.3\Omega, I_D = 20A$	-	16	-	ns
Turn-ON Rise time	t_r		-	11	-	ns
Turn-Off Delay time	$t_{D(off)}$		-	26	-	ns
Turn-Off Fall time	t_f		-	18	-	ns
Reverse Recovery Time	t_{RR}	$V_{DD} = 20V, di_S/dt = 100A/\mu s, I_S = 50A$	-	66	-	ns
Reverse Recovery Charge	Q_{RR}		-	97	-	nC

Fig.1 Gate-Charge Characteristics

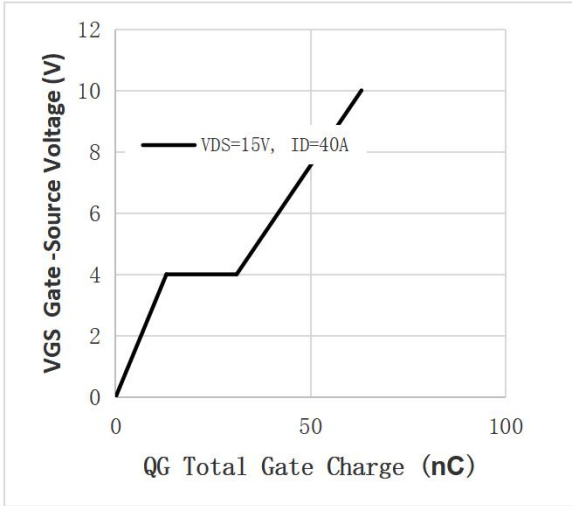


Fig.2 Capacitance Characteristics

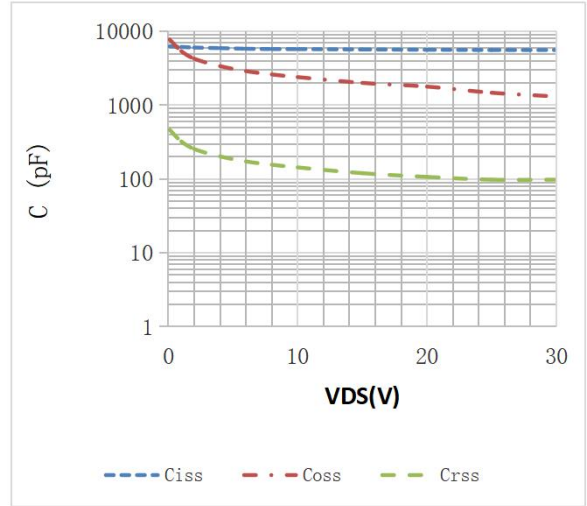


Fig.3 Power Dissipation

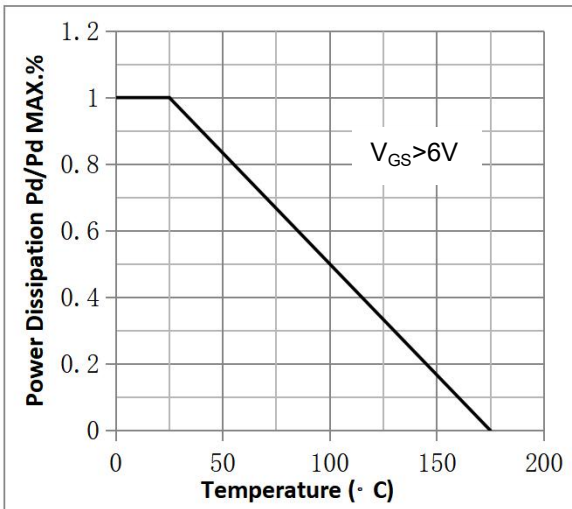


Fig.4 Typical output Characteristics

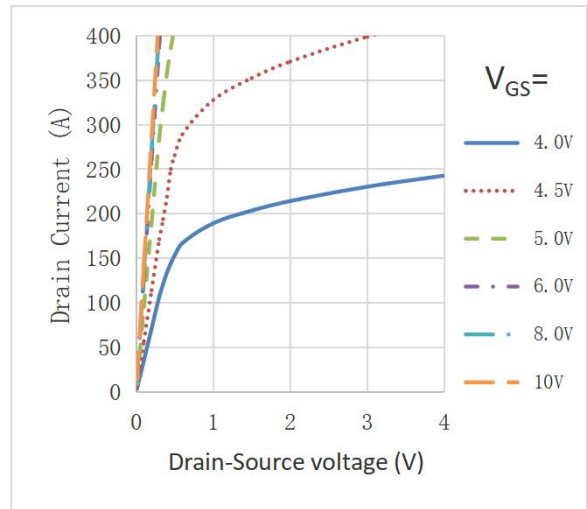


Fig.5 Threshold Voltage V.S Junction Temperature

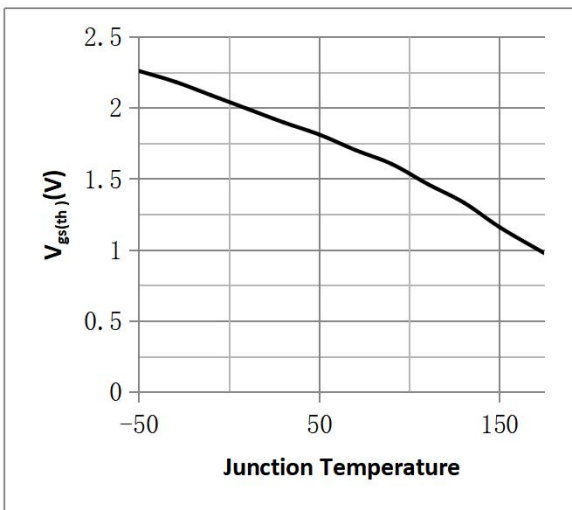


Fig.6 Resistance V.S Drain Current

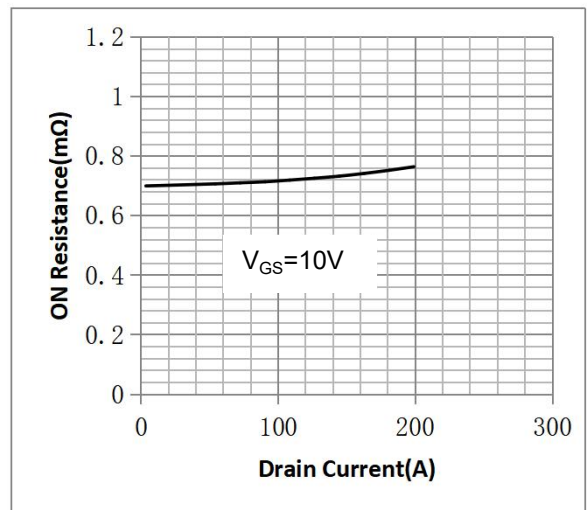


Fig.7 On-Resistance VS Gate Source Voltage

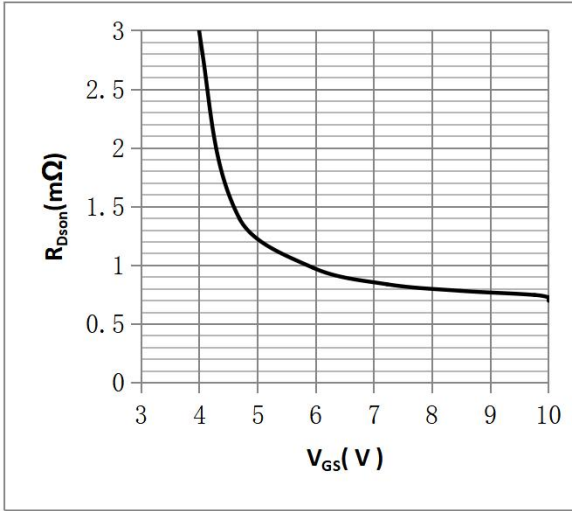


Fig.8 On-Resistance V.S Junction Temperature

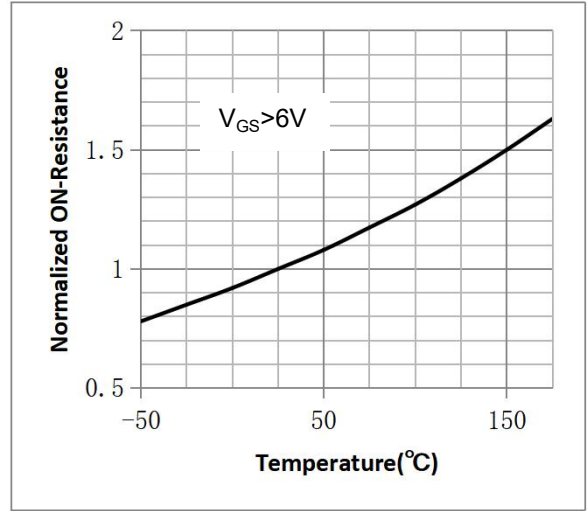


Figure 9. Diode Forward Voltage vs. Current

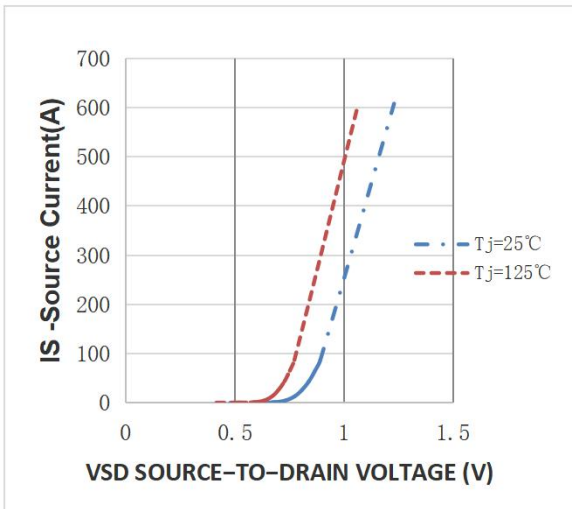


Figure 10. Transfer Characteristics

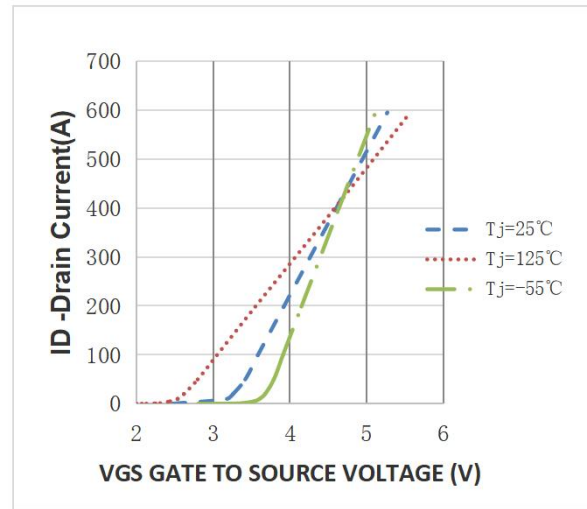


Fig.11 Safe Operating Area

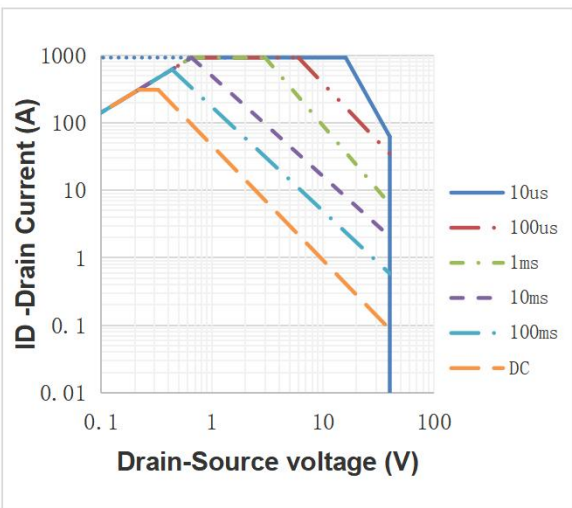
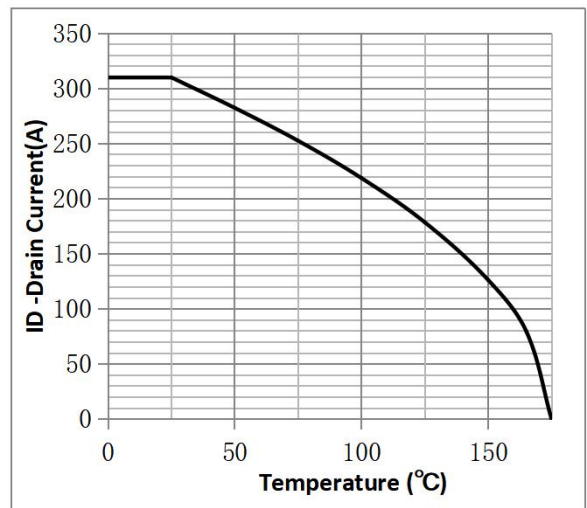
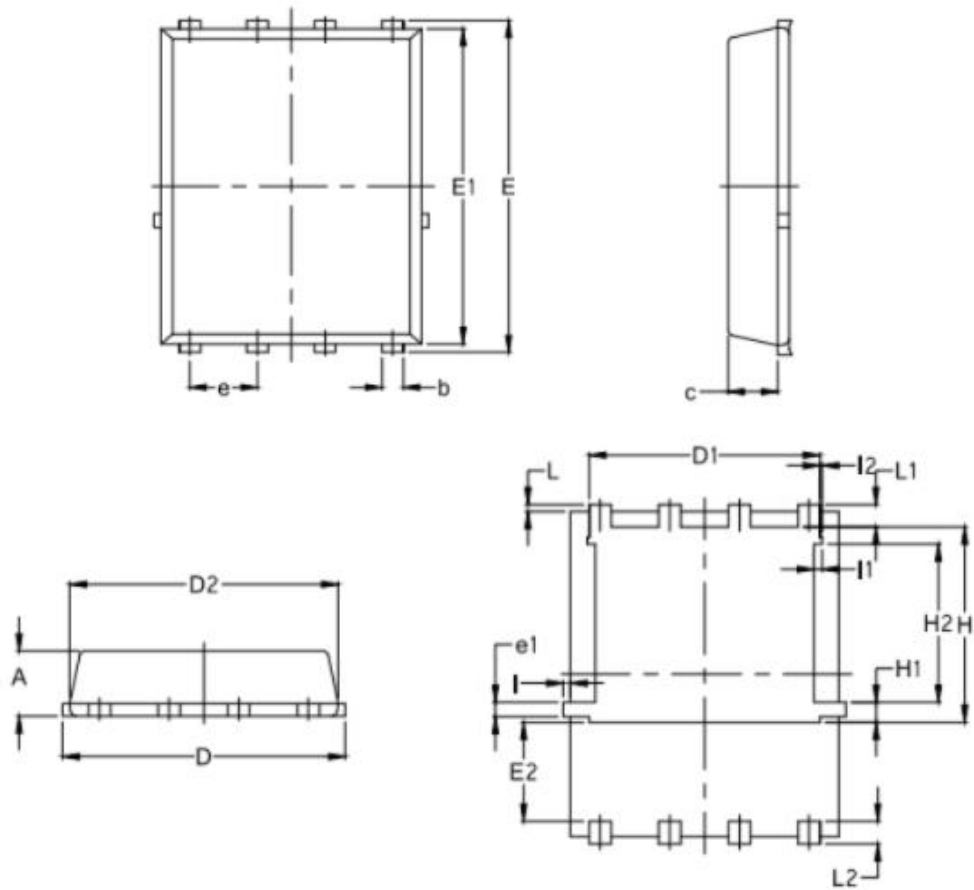


Fig.12 ID vs. Case Temperature[®]



•DFN5*6 Package Outline



DIM	MILLIMETERS		
	MIN.	MOM.	MAX.
A	0.90	1.00	1.10
b	0.34	0.41	0.48
c	0.82	0.89	0.97
D	4.80	5.10	5.40
D1	4.10	4.20	4.31
D2	4.80	4.90	5.00
E	5.95	6.05	6.15
E1	5.65	5.75	5.85
E2	1.10		-
e	1.27 BSC		
L	0.05	0.15	0.25
L1	0.38	0.44	0.50
L2	0.38	0.44	0.50
H	3.30	3.40	3.50
l	-		0.18
I1	-		0.15
I2	-		0.038
H1	0.33	0.34	0.35
H2	2.75	2.80	2.85
e1	0.25 BSC		

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	2024.4.11	