

• 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

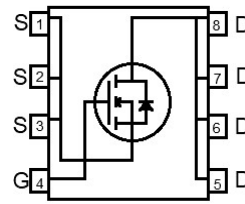
• Ordering Information:

Part NO.	ZMS010N04HNCD
Marking	ZMS010N04H
Packing Information	REEL TAPE
Basic ordering unit (pcs)	3000

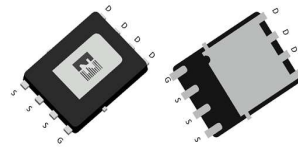
• Absolute Maximum Ratings ($T_C=25^\circ\text{C}$)

Parameter	Symbol	Conditions	Value	Unit
Drain-Source Voltage	V_{DS}		40	V
Gate-Source Voltage	V_{GS}		± 20	V
Continuous Drain Current	I_D	$T_C=25^\circ\text{C}$	270	A
	I_D	$T_C=75^\circ\text{C}$	221	A
	I_D	$T_C=100^\circ\text{C}$	192	A
Pulsed Drain Current	I_{DM}	Pulsed; $t_p \leq 10 \mu\text{s}$; $T_{mb} = 25^\circ\text{C}$;	810	A
Total Power Dissipation	P_D	$T_C=25^\circ\text{C}$	176	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}	$L=0.1\text{mH}$, $V_{GS}=10\text{V}$, $R_g=25\Omega$,	282	mJ
		$L=0.5\text{mH}$, $V_{GS}=10\text{V}$, $R_g=25\Omega$,	680	mJ
ESD Level (HBM)	CLASS 2			

• Product Summary



$V_{DS} = 40\text{V}$
 $R_{DS(ON)} = 0.9\text{m}\Omega$
 $I_D = 270\text{A}$



DSCQFN5*6



•Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}		-	0.85	°C/W
Thermal resistance, junction-ambient	R_{thJA}°		-	30	°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	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = 250\mu A$	2	2.7	4	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	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 40A$		0.9	1.2	m Ω
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}	$f = 1MHz, V_{DS} = 25V$	-	4220	-	pF
Output capacitance	C_{oss}		-	1160	-	
Reverse transfer capacitance	C_{rss}		-	61	-	
Gate Resistance	R_g	$f = 1MHz$	-	1.6		Ω
Total gate charge	Q_g	$V_{DD} = 15V,$ $I_D = 20A,$ $V_{GS} = 10V$	-	61	-	nC
Gate - Source charge	Q_{gs}		-	14.2	-	
Gate - Drain charge	Q_{gd}		-	14	-	
Turn-ON Delay time	$t_{D(on)}$	$V_{GS} = 10V, V_{DS} = 15V,$ $R_G = 3.3\Omega, I_D = 20A$	-	10	-	ns
Turn-ON Rise time	t_r		-	6	-	ns
Turn-Off Delay time	$t_{D(off)}$		-	25	-	ns
Turn-Off Fall time	t_f		-	15	-	ns
Reverse Recovery Time	t_{RR}	$V_{DD} = 20V, di_S/dt =$ $100A/\mu s, I_S = 50A$	-	59	-	ns
Reverse Recovery Charge	Q_{RR}		-	82	-	nC

Fig.1 Gate-Charge Characteristics

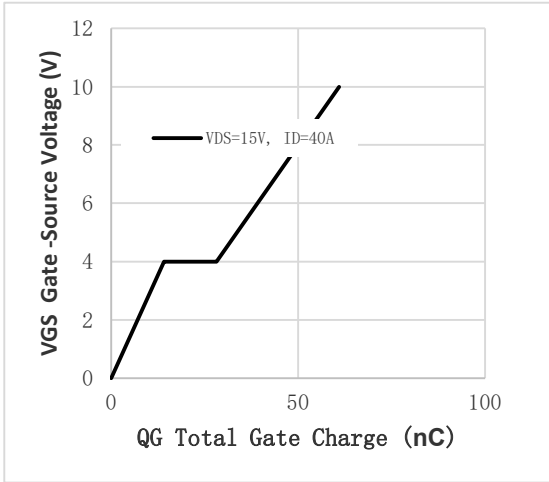


Fig.2 Capacitance Characteristics

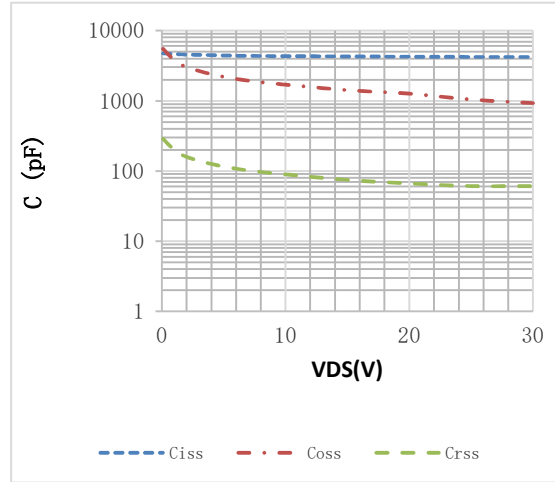


Fig.3 Power Dissipation

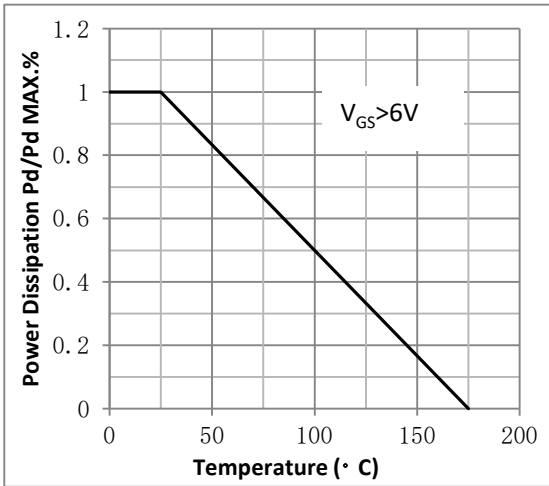


Fig.4 Typical output Characteristics

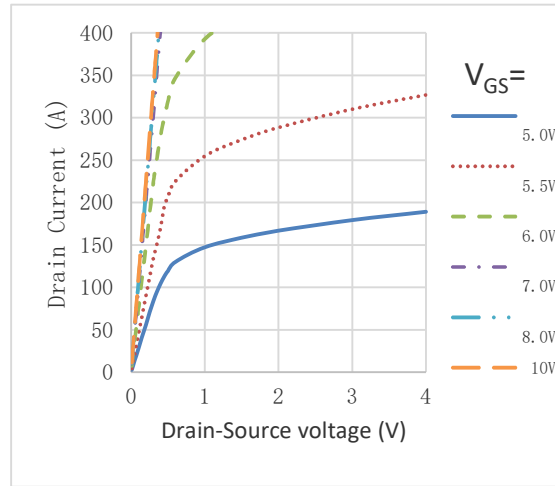


Fig.5 Threshold Voltage V.S Junction Temperature

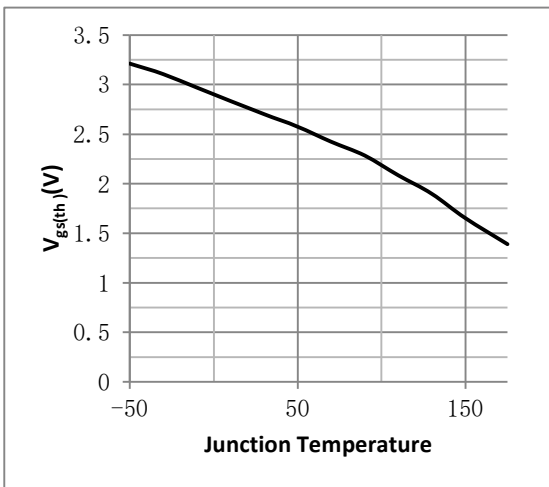


Fig.6 Resistance V.S Drain Current

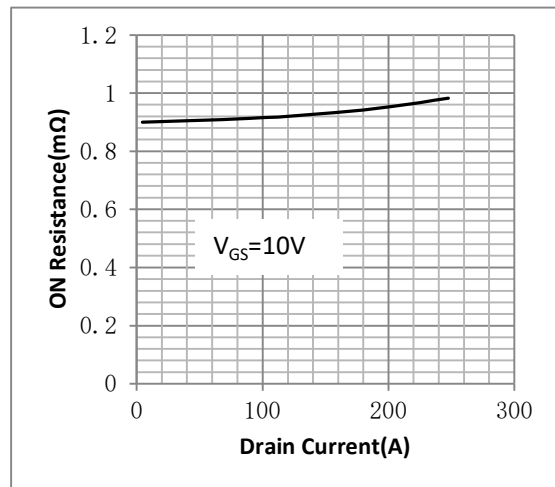


Fig.7 On-Resistance VS Gate Source Voltage

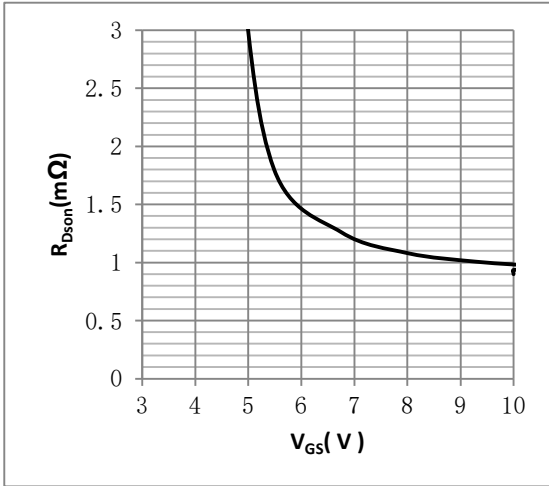


Fig.8 On-Resistance V.S Junction Temperature

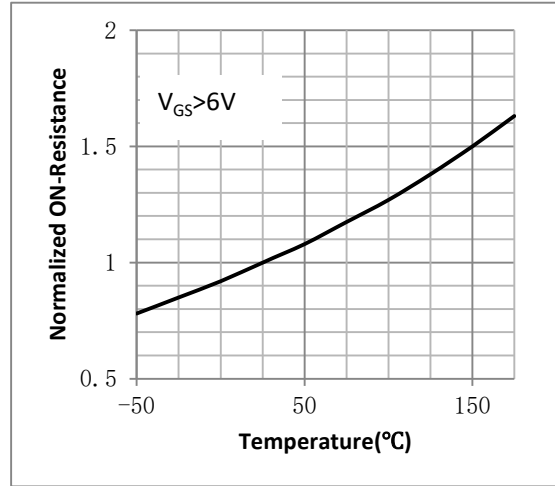


Figure 9. Diode Forward Voltage vs. Current

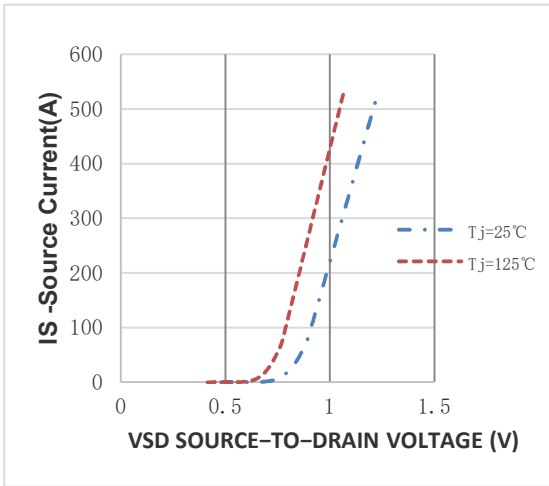


Figure 10. Transfer Characteristics

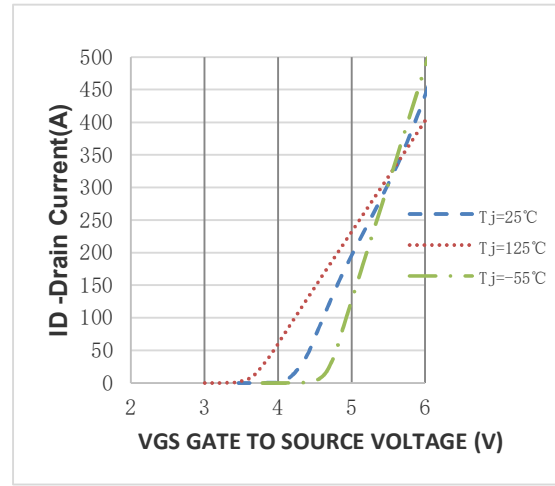


Fig.11 Safe Operating Area

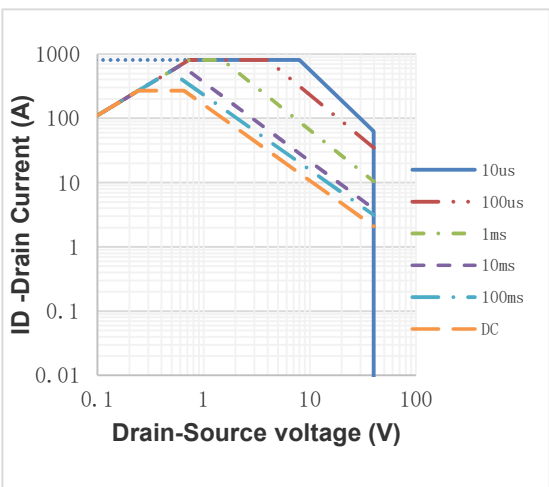
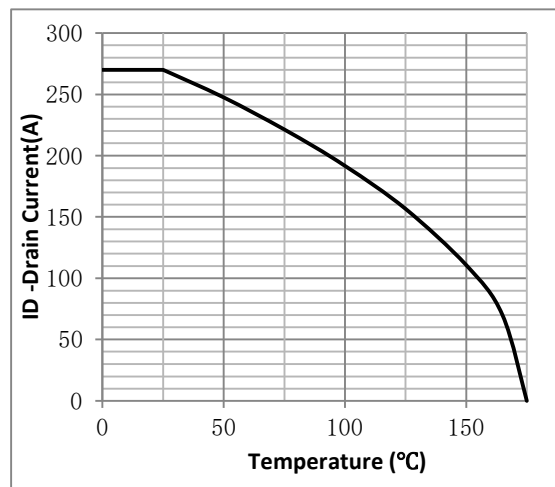
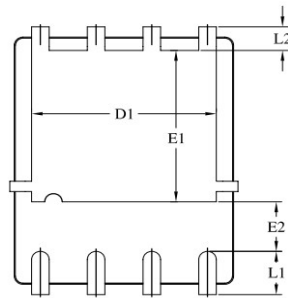
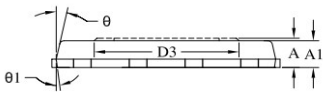
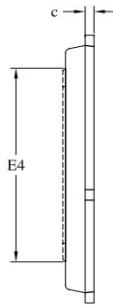
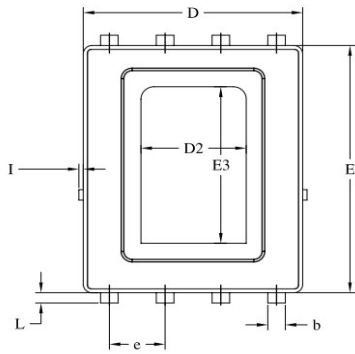


Fig.12 ID vs. Junction Temperature



•DSCQFN5*6 Package Outline



SYMBOL	COMMON		
	MIN.	Nom.	MAX.
A	0.660	0.710	0.760
A1	0.600	-----	0.750
b	0.330	0.430	0.530
c	0.150	0.203	0.300
D	5.00 Bsc.		
D1	4.060	4.210	4.360
D2	2.400 Bsc.		
D3	2.800	3.300	3.800
E	6.00 Bsc.		
E1	3.525	3.675	3.825
E2	1.050	1.200	1.350
E3	3.800 Bsc.		
E4	4.200	4.700	5.200
e	1.270 Bsc.		
I	-----	-----	0.150
L	0.150	0.250	0.350
L1	0.925	1.050	1.175
L2	0.450	0.575	0.700
theta	12° Bsc.		
theta 1	7° Bsc.		

Note:

- ① Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate;
- ② 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	2023.3.15	new
B	2025.7.14	Correct package outline picture