

**• General Description**

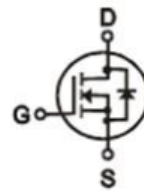
The ZM031N04D combines advanced trench MOSFET technology with a low resistance package to provide extremely low  $R_{DS(ON)}$ .

**• Features**

- Advance high cell density Trench technology
- Low  $R_{DS(ON)}$  to minimize conductive loss
- Low Gate Charge for fast switching
- Low Thermal resistance

**• Application**

- MB/VGA Vcore
- SMPS 2<sup>nd</sup> Synchronous Rectifier
- POL application
- BLDC Motor driver

**• Product Summary**

 $V_{DS}=40V$ 
 $R_{DS(ON)} = 2.9m\Omega$ 
 $I_D=120A$ 

**• Ordering Information:**

Part NO.	ZM031N04D
Marking	ZM031N04
Packing Information	REEL TAPE
Basic ordering unit (pcs)	2500

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

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	40	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$I_D@TC=25^\circ C$	120	A
	$I_D@TC=75^\circ C$	91.2	A
	$I_D@TC=100^\circ C$	75.6	A
Pulsed Drain Current ①	$I_{DM}$	280	A
Total Power Dissipation( $TC=25^\circ C$ )	$P_D@TC=25^\circ C$	70	W
Total Power Dissipation( $TA=25^\circ C$ )	$P_D@TA=25^\circ C$	2.5	W
Operating Junction Temperature	$T_J$	-55 to 150	$^\circ C$
Storage Temperature	$T_{STG}$	-55 to 150	$^\circ C$
Single Pulse Avalanche Energy@ $L=0.1mH$	$E_{AS}$	180	mJ
Avalanche Current@ $L=0.1mH$	$I_{AS}$	60	A

**●Thermal resistance**

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	$R_{thJC}$	-	-	2.1	$^{\circ}C/W$
Thermal resistance, junction - ambient	$R_{thJA}$	-	-	65	$^{\circ}C/W$
Soldering temperature, wave soldering for 10s	$T_{sold}$	-	-	265	$^{\circ}C$

**●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	$V_{GS(TH)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	1.2		2.5	V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=40V, V_{GS}=0V$			1.0	$\mu A$
Gate- Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$			$\pm 100$	nA
Static Drain-source On Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=24A$		2.9	4	m $\Omega$
		$V_{GS}=4.5V, I_D=12A$		3.9	5.5	m $\Omega$
Forward Trans conductance	$g_{FS}$	$V_{DS}=25V, I_D=10A$		16		s
Source-drain voltage	$V_{SD}$	$I_S=24A$			1.28	V

**●Electronic Characteristics**

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	$C_{iss}$	f = 1MHz	-	4800	-	pF
Output capacitance	$C_{oss}$		-	460	-	
Reverse transfer capacitance	$C_{rss}$		-	240	-	

**●Gate Charge characteristics( $T_a = 25^{\circ}C$ )**

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Total gate charge	$Q_g$	$V_{DD}=25V$	-	55	-	nC
Gate - Source charge	$Q_{gs}$	$I_D=20A$	-	12	-	
Gate - Drain charge	$Q_{gd}$	$V_{GS}=10V$	-	15	-	

Note: ① Pulse Test : Pulse width  $\leq 300\mu s$ , Duty cycle  $\leq 2\%$  ;

Fig.1 Power Dissipation

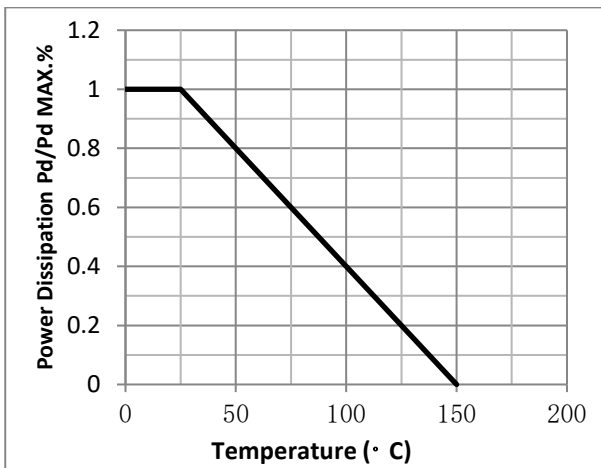


Fig.2 Typical output Characteristics

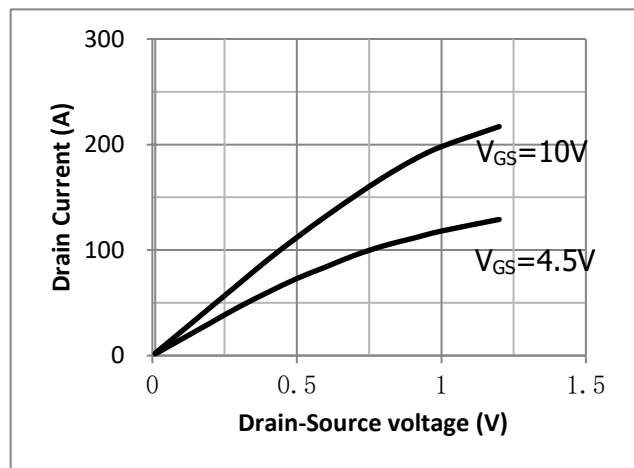


Fig.3 Threshold Voltage V.S Junction Temperature

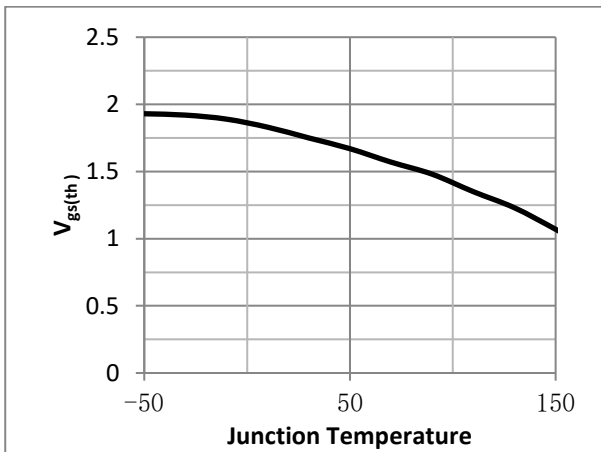


Fig.4 Resistance V.S Drain Current

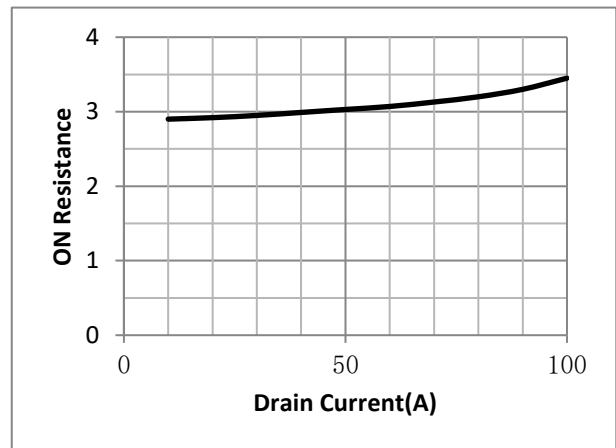


Fig.5 On-Resistance VS Gate Source Voltage

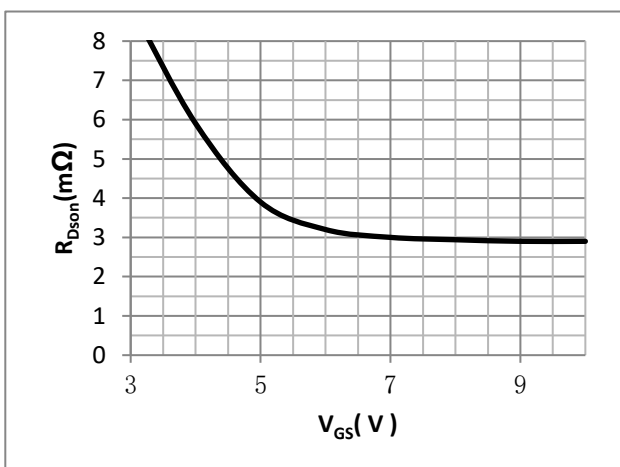


Fig.6 On-Resistance V.S Junction Temperature

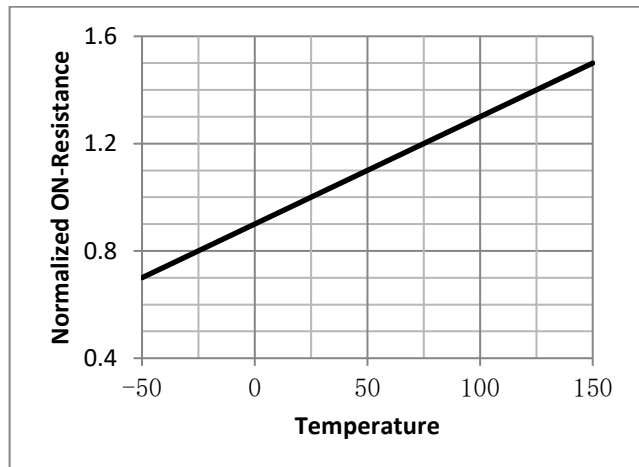


Fig.7 Switching Time Measurement Circuit

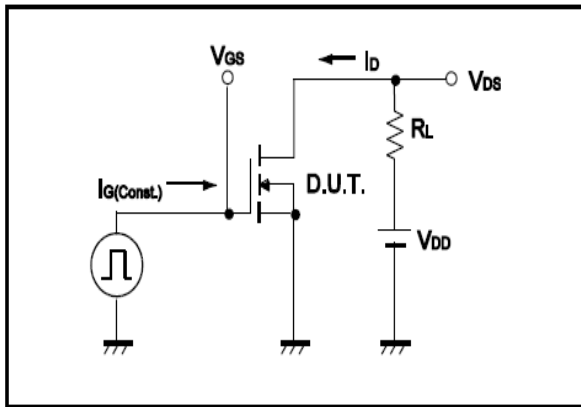


Fig.8 Gate Charge Waveform

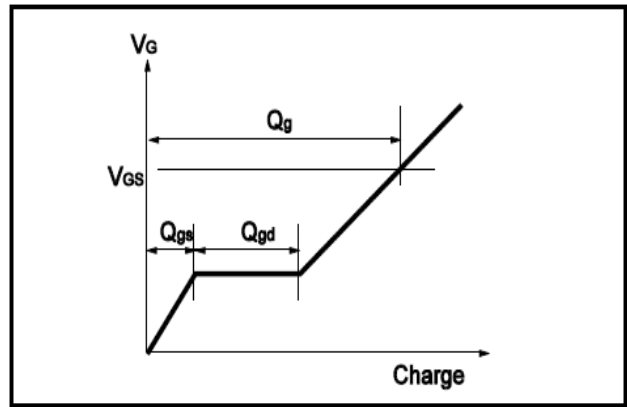


Fig.9 Switching Time Measurement Circuit

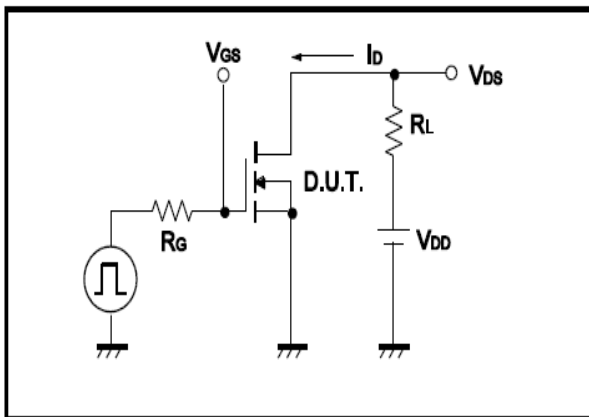


Fig.10 Gate Charge Waveform

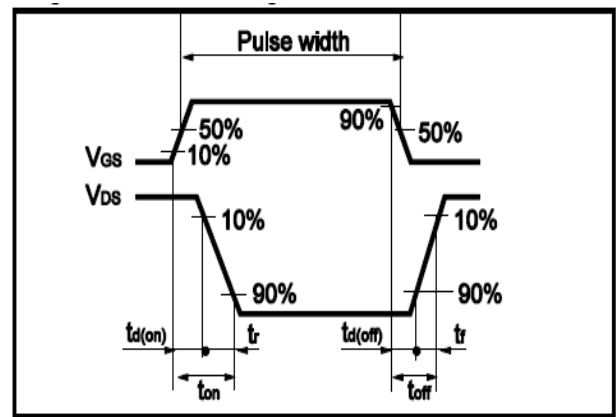


Fig.11 Avalanche Measurement Circuit

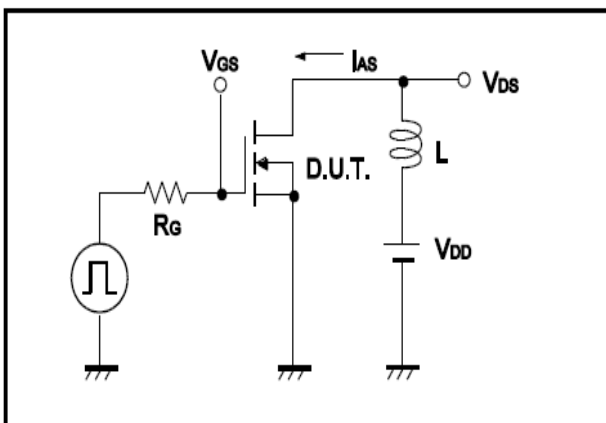
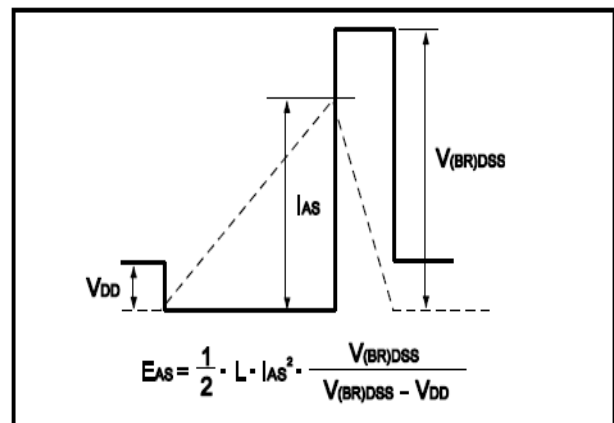


Fig.12 Avalanche Waveform



•Dimensions (TO-252)

Unit: mm

SYMBOL	min	max	SYMBOL	min	max
A	2.10	2.50	B	0.85	1.25
b	0.50	0.80	b1	0.50	0.90
b2	0.45	0.70	C	0.45	0.70
D	6.30	6.75	D1	5.10	5.50
E	5.30	6.30	e1	2.25	2.35
L1	9.20	10.60	e2	4.45	4.75
L2	0.90	1.75	L3	0.60	1.10
K	0.00	0.23			

