

• General Description

The ZM031N04P combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$.

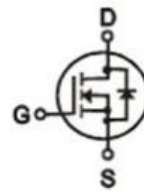
• Features

- 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 2nd Synchronous Rectifier
- POL application
- BLDC Motor driver

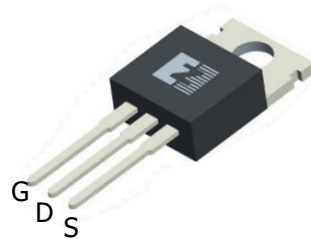
• Product Summary



$$V_{DS}=40V$$

$$R_{DS(ON)}=2.5m\Omega$$

$$I_D=150A$$



TO-220

• Ordering Information:

Part NO.	ZM031N04P
Marking	ZM031N04
Packing Information	Bulk Tube
Basic ordering unit (pcs)	1000

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

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	$I_{D@TC=25^{\circ}C}$	150	A
	$I_{D@TC=75^{\circ}C}$	114	A
	$I_{D@TC=100^{\circ}C}$	94.5	A
Pulsed Drain Current ^①	I_{DM}	320	A
Total Power Dissipation($TC=25^{\circ}C$)	$P_{D@TC=25^{\circ}C}$	100	W
Total Power Dissipation($TA=25^{\circ}C$)	$P_{D@TA=25^{\circ}C}$	3.5	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

●Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	-	-	2.1	°C/W
Thermal resistance, junction - ambient	R_{thJA}	-	-	65	°C/W
Soldering temperature, wave soldering for 10s	T_{sold}	-	-	265	°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	μA
Gate- Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$			± 100	nA
Static Drain-source On Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=24A$		2.5	4	m Ω
		$V_{GS}=4.5V, I_D=12A$		4.5	6	m Ω
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 V _{DS} =25V	-	4800	-	pF
Output capacitance	C_{oss}		-	500	-	
Reverse transfer capacitance	C_{rss}		-	300	-	

●Gate Charge characteristics(T_a = 25°C)

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Total gate charge	Q_g	$V_{DD}=25V$ $I_D=20A$ $V_{GS}=10V$	-	20	-	nC
Gate - Source charge	Q_{gs}		-	9	-	
Gate - Drain charge	Q_{gd}		-	11	-	

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

Fig.1 Power Dissipation

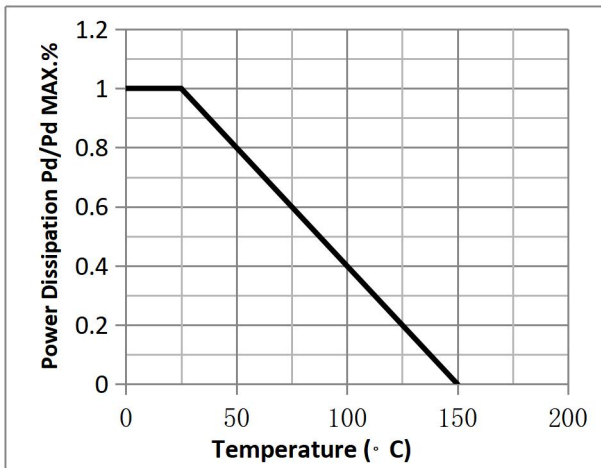


Fig.2 Typical output Characteristics

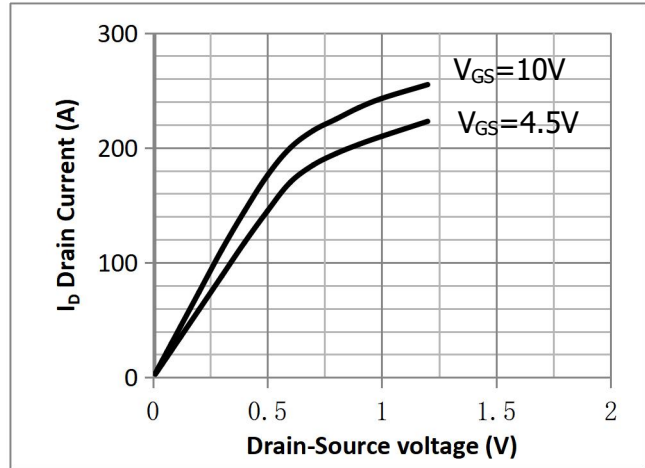


Fig.3 Threshold Voltage V.S Junction Temperature

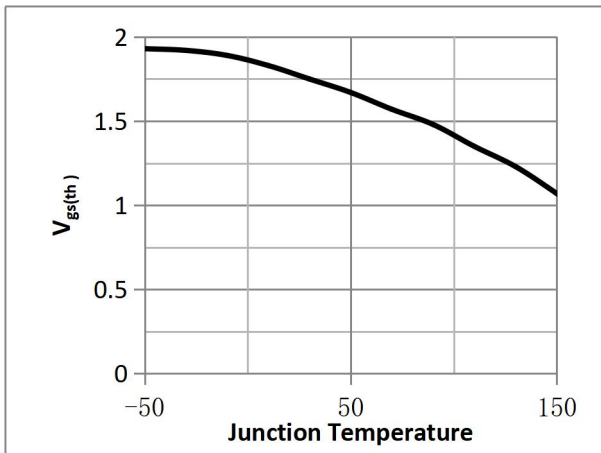


Fig.4 Resistance V.S Drain Current

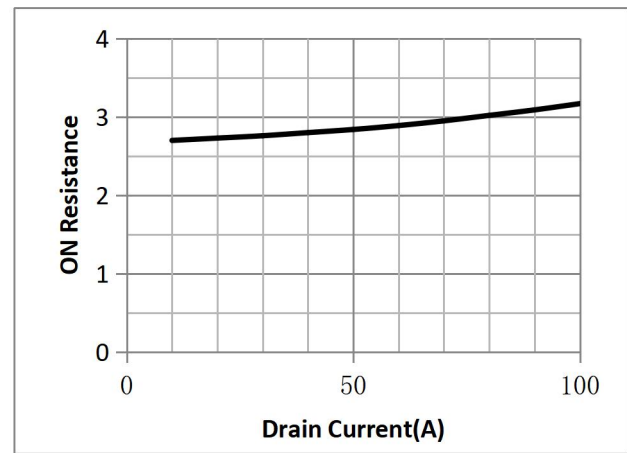


Fig.5 On-Resistance VS Gate Source Voltage

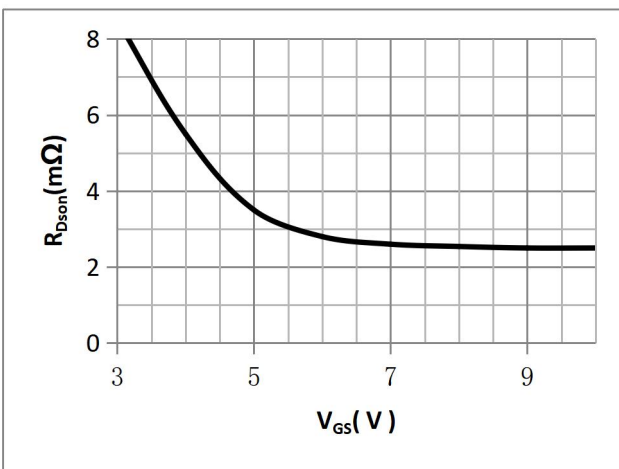


Fig.6 On-Resistance V.S Junction Temperature

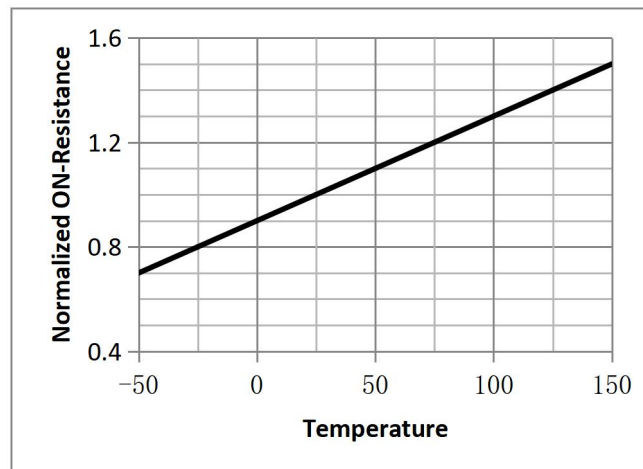


Fig.7 Switching Time Measurement Circuit

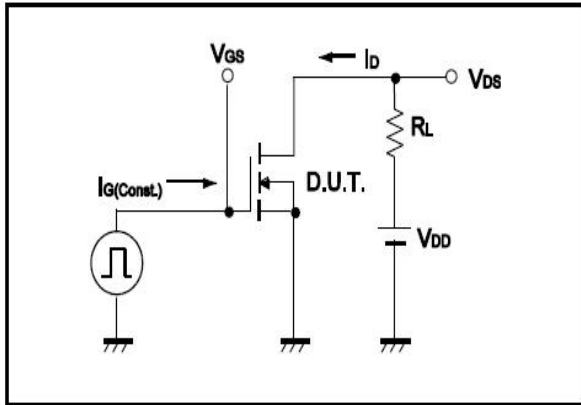


Fig.8 Gate Charge Waveform

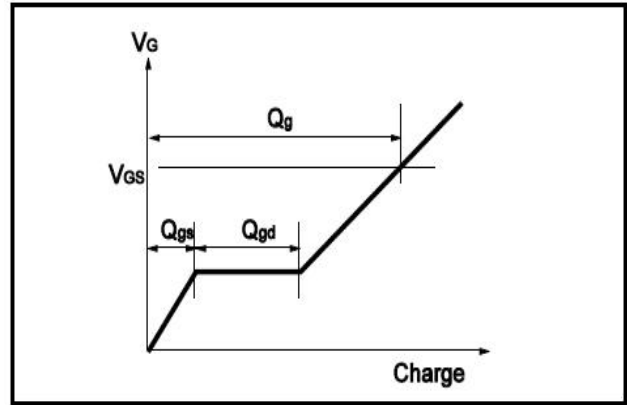


Fig.9 Switching Time Measurement Circuit

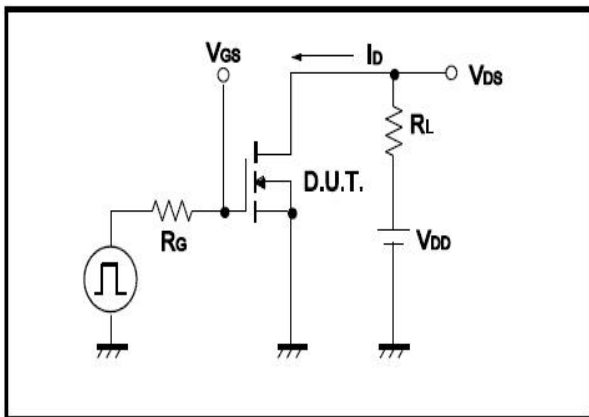


Fig.10 Gate Charge Waveform

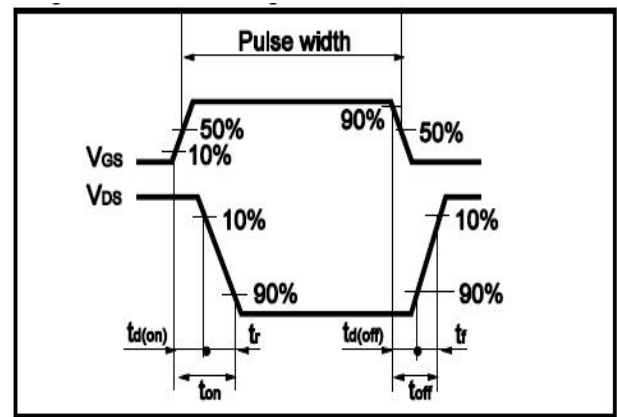


Fig.11 Avalanche Measurement Circuit

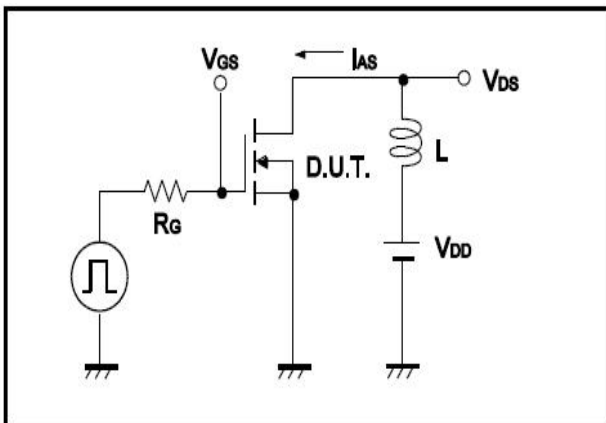
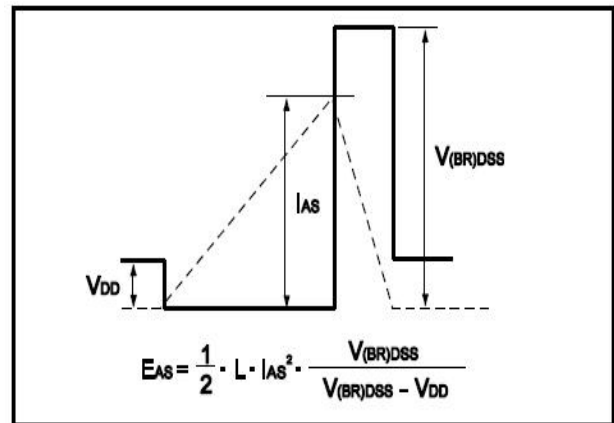


Fig.12 Avalanche Waveform





●Dimensions (TO-220)

Unit: mm

SYMBOL	min	nom	max	SYMBOL	min	nom	max
A	4.00		4.80	E	9.90		10.70
B	1.20		1.50	e		2.54	
B1	1.00		1.40	F	1.10		1.45
b1	0.65		1.00	L	12.50		14.50
c	0.35		0.75	L1	3.00	3.50	4.00
D	15.00		16.50	Q	2.50		3.00
D1	5.90		6.90	Q1	2.00		3.00
				ΦP	3.60		3.90

