

**• General Description**

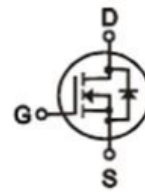
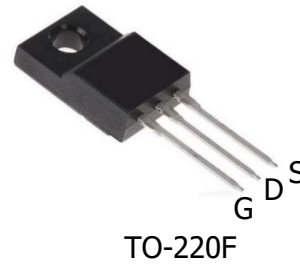
It combines advanced trench MOSFET technology with a low resistance package to provide extremely low  $R_{DS(ON)}$ .

**• 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**

 $V_{DS}=40V$ 
 $R_{DS(ON)} = 3.1m\Omega$ 
 $I_D=100A$ 

**• Ordering Information:**

Part NO.	ZM031N04F
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	$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$I_{D@TC=25^\circ C}$	100	A
	$I_{D@TC=75^\circ C}$	76	A
	$I_{D@TC=100^\circ C}$	63	A
Pulsed Drain Current ①	$I_{DM}$	300	A
Total Power Dissipation	$P_D@TC=25^\circ C$	110	W
Total Power Dissipation	$P_D@TA=25^\circ C$	2.1	W
Operating Junction Temperature	$T_J$	-55 to 150	$^\circ C$
Storage Temperature	$T_{STG}$	-55 to 150	$^\circ C$
Single Pulse Avalanche Energy	$E_{AS}$	310	mJ

**●Thermal resistance**

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	$R_{thJC}$	-	-	1.1	$^{\circ}C/W$
Thermal resistance, junction - ambient	$R_{thJA}$	-	-	60	$^{\circ}C/W$
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	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 24A$		3.1	4	m $\Omega$
		$V_{GS} = 4.5V, I_D = 12A$		4.5	5.8	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	$C_{oss}$		-	500	-	
Reverse transfer capacitance	$C_{rss}$		-	300	-	

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

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

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

Fig.1 Power Dissipation

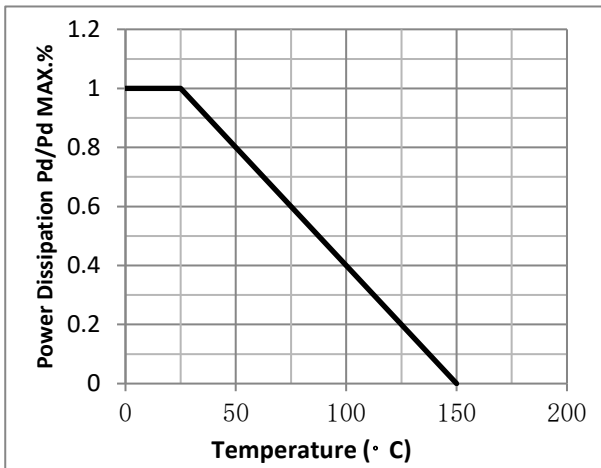


Fig.2 Typical output Characteristics

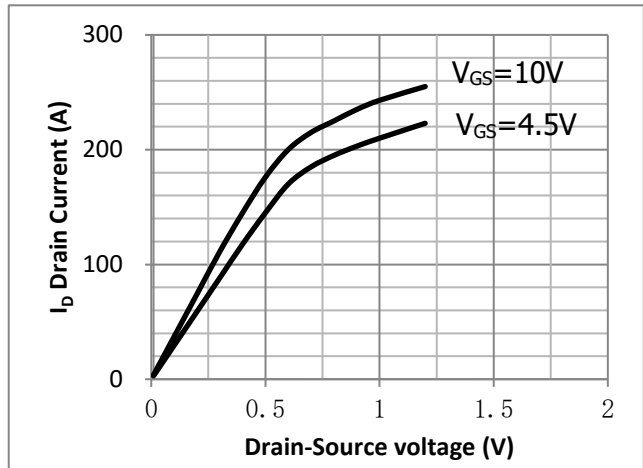


Fig.3 Threshold Voltage V.S Junction Temperature

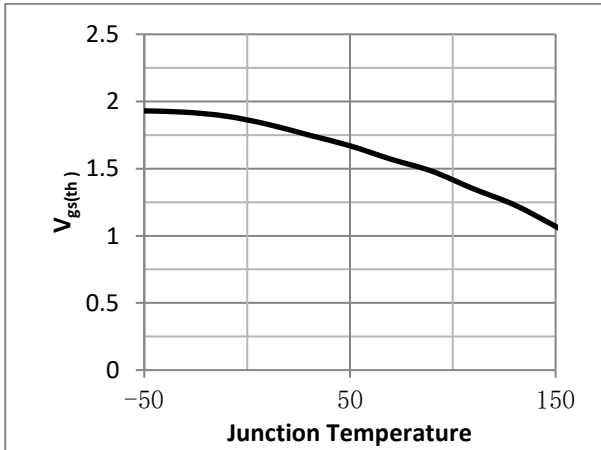


Fig.4 Resistance V.S Drain Current

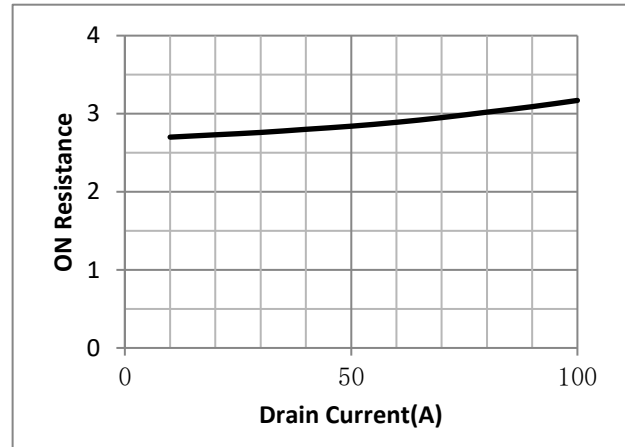


Fig.5 On-Resistance VS Gate Source Voltage

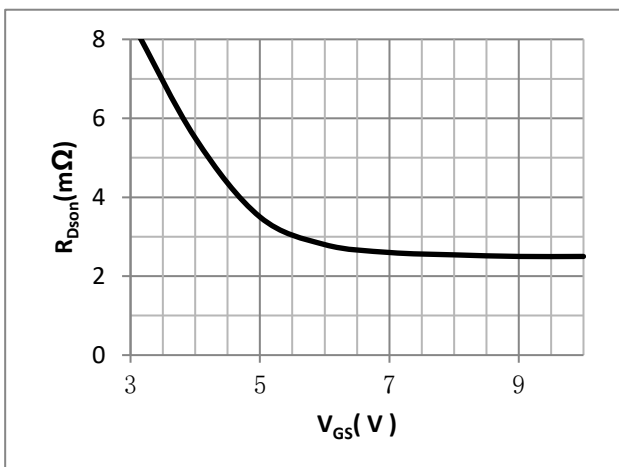


Fig.6 On-Resistance V.S Junction Temperature

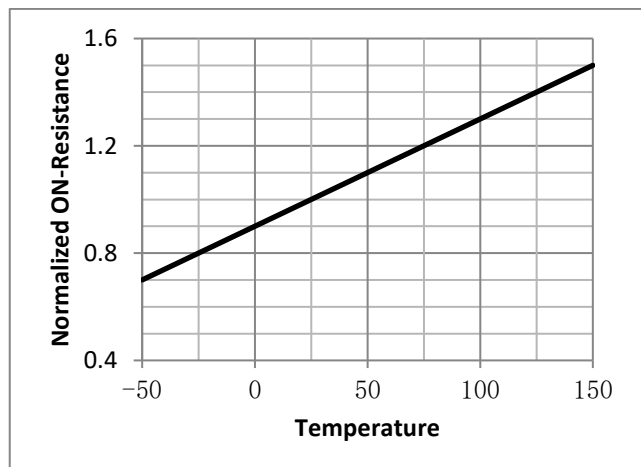


Fig.7 Switching Time Measurement Circuit

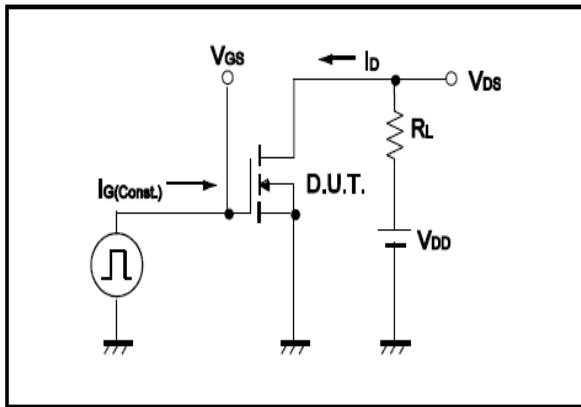


Fig.8 Gate Charge Waveform

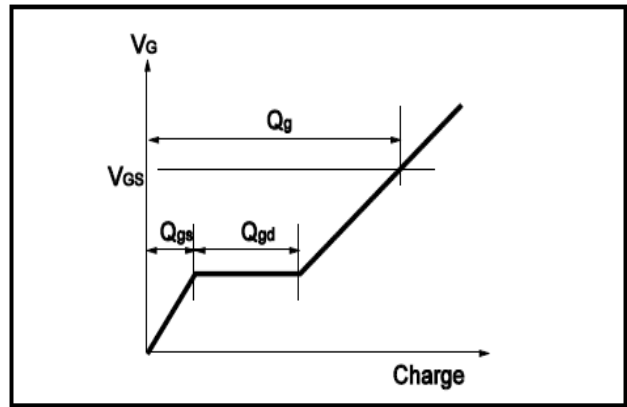


Fig.9 Switching Time Measurement Circuit

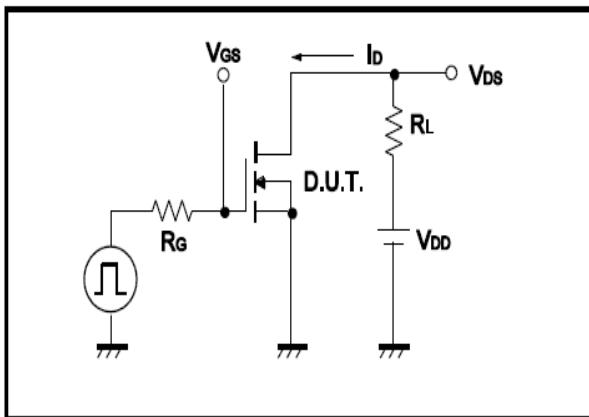


Fig.10 Gate Charge Waveform

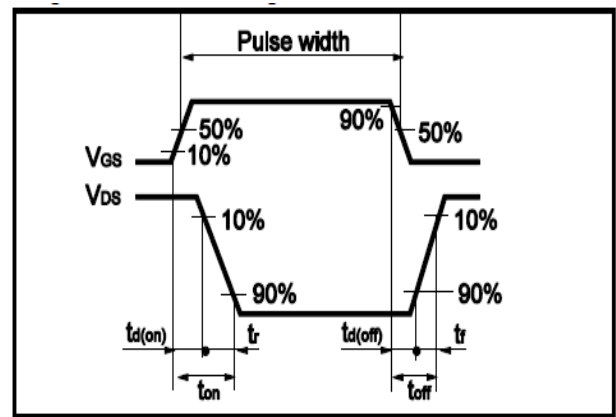


Fig.11 Avalanche Measurement Circuit

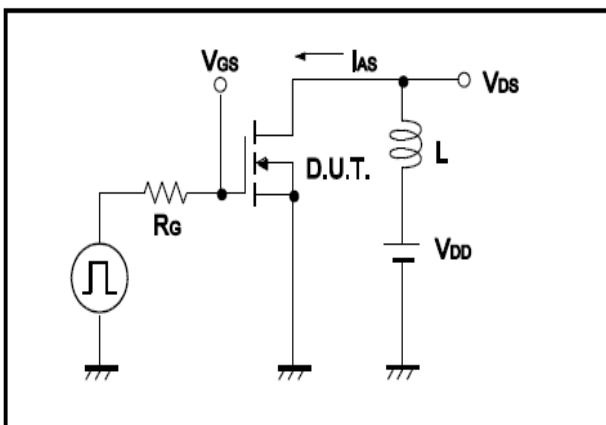
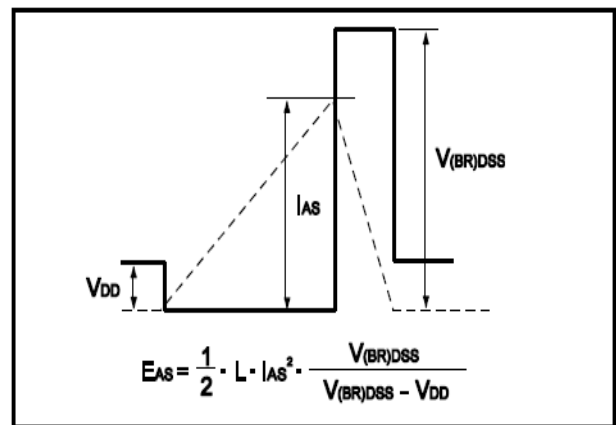


Fig.12 Avalanche Waveform



**Dimensions (TO-220F)**

Unit: mm

SYMBOL	min	nom	max	SYMBOL	min	nom	max
C	4.50	4.70	4.90	b1	2.90	3.40	3.90
c	0.40	0.50	0.6	a	1.08	1.28	1.48
A	9.96	10.16	10.36	a1	0.70	0.80	0.9
B	15.67	15.87	16.07	E	2.34	2.54	2.74
B1	3.30	3.40	3.50	E1	2.34	2.54	2.74
R	3.08	3.18	3.28	C1	2.34	2.54	2.74
b	12.48	12.98	13.48	C2	2.56	2.76	2.96

