• General Description

The ZM020N04F combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$.

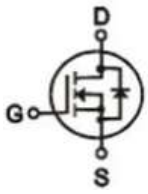
• Features

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

•Application

- ■Synchronous Rectification
- ■Power Management in Inverter System
- ■POL application
- ■BLDC Motor driver

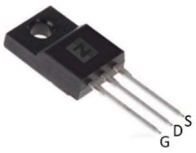
• Product Summary



V_{DS}=40V

$R_{DS(ON)}$ =2.2mΩ

I_D=130A



RoHS

TO-220F

•Ordering Information:

Part NO.	ZM020N04F
Marking	ZM020N04
Packing Information	Bulk Tube
Basic ordering unit (pcs)	1000

•Absolute Maximum Ratings (T_C =25℃)

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℃	130	A
	$I_{D@}$TC=75℃	103	A
	$I_{D@}$TC=100℃	82	A
Pulsed Drain Current①	I_{DM}	420	A
Total Power Dissipation(TC=25℃)	P_D@TC=25℃	135	W
Total Power Dissipation(TA=25℃)	P_D@TA=25℃	3	W
Operating Junction Temperature	T_J	150	℃
Storage Temperature	T_{STG}	150	℃
Single Pulse Avalanche Energy	E_{AS}	1245	mJ

●Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	-	-	0.9	° C/W
Thermal resistance, junction - ambient	R_{thJA}	-	-	42	° 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 =250uA	40			V
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} =V_{DS}, I_D =250uA	1.2		2.5	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=40V, V_{GS} =0V			1.0	uA
Gate- Source Leakage Current	I_{GSS}	V_{GS}=±20V ,V_{DS} =0V			100	nA
Static Drain-source On Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=70A		2.2	3	mΩ
		V_{GS}=4.5V, I_D=30A		3	4	mΩ
Diode Forward Voltage	V_{SD}	I_S =70A			1.28	V

●Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	C_{iss}	V_{GS} = 0V	-	5580	-	pF
Output capacitance	C_{oss}	V_{DS} = 25V	-	480	-	
Reverse transfer capacitance	C_{rss}	f = 1MHz	-	275	-	

●Gate Charge characteristics(T_a = 25℃)

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Total gate charge	Q_g	V_{DD} = 20V	-	70	-	nC
Gate - Source charge	Q_{gs}	I_D = 20A	-	17	-	
Gate - Drain charge	Q_{gd}	V_{GS} = 10V	-	12	-	

Note: ① Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2% ;

Fig.1 Gate-Charge Characteristics

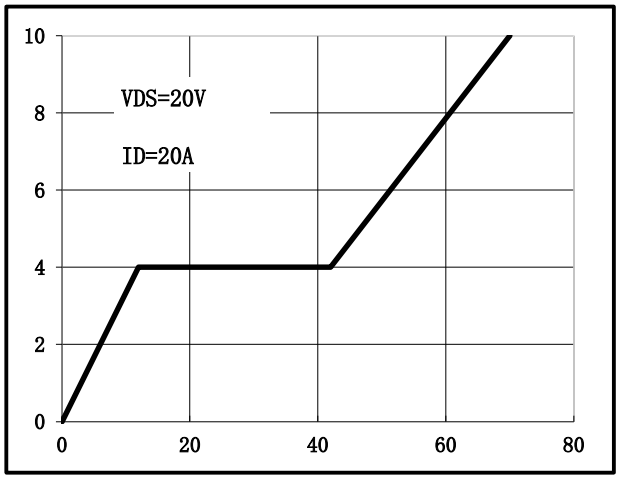


Fig.2 Capacitance Characteristics

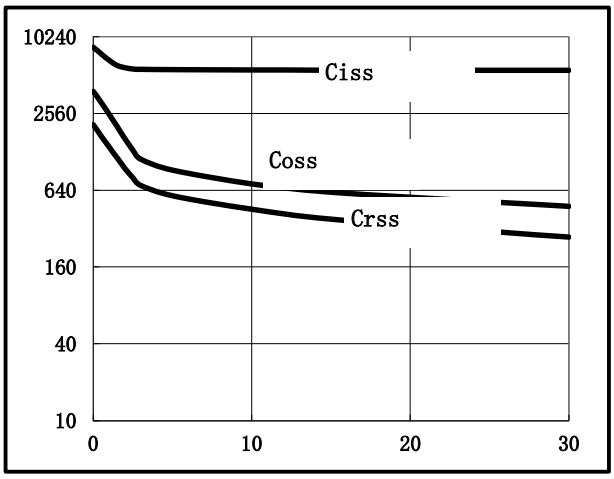


Fig.3 Power Dissipation

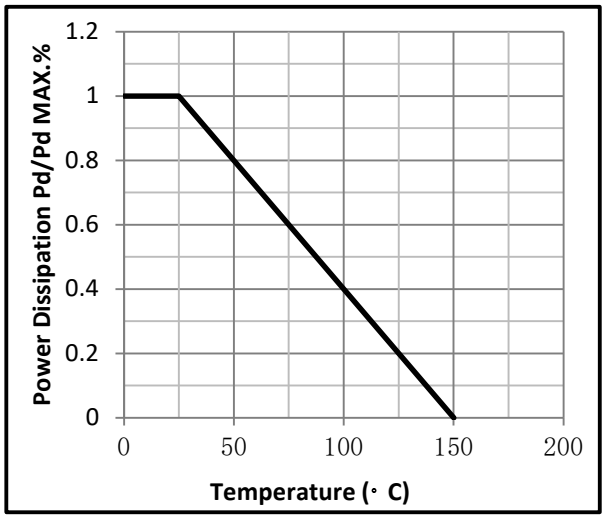


Fig.4 Typical output Characteristics

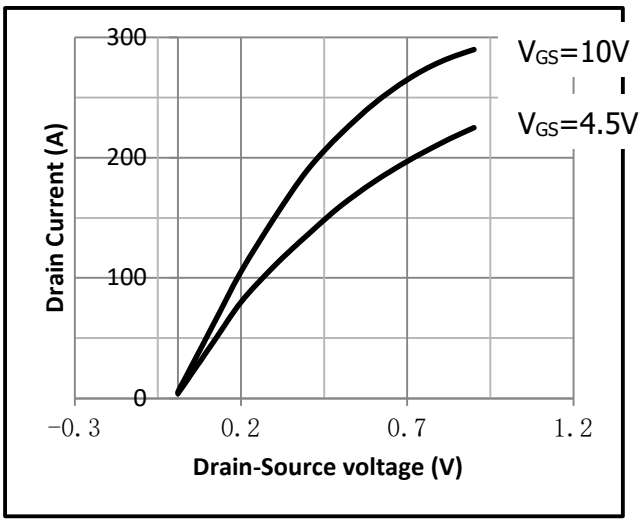


Fig.5 Threshold Voltage V.S Junction Temperature

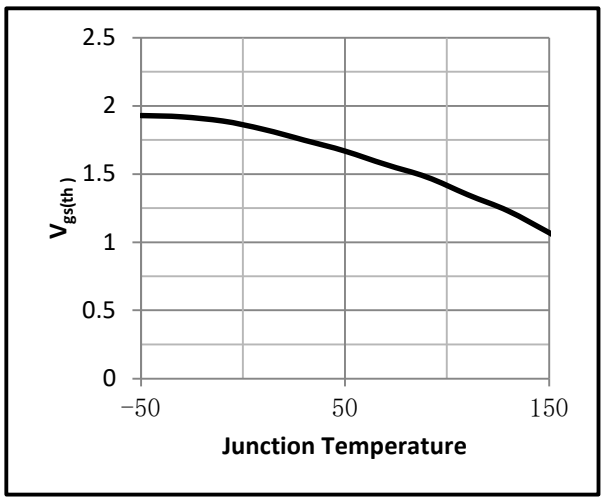


Fig.6 Resistance V.S Drain Current

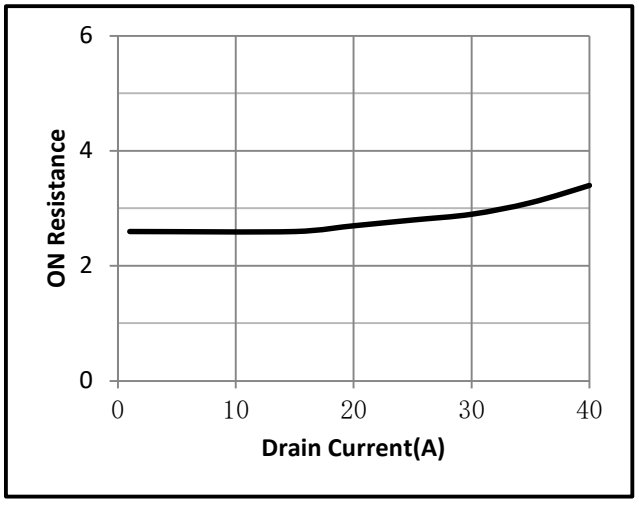


Fig.7 On-Resistance VS Gate Source Voltage

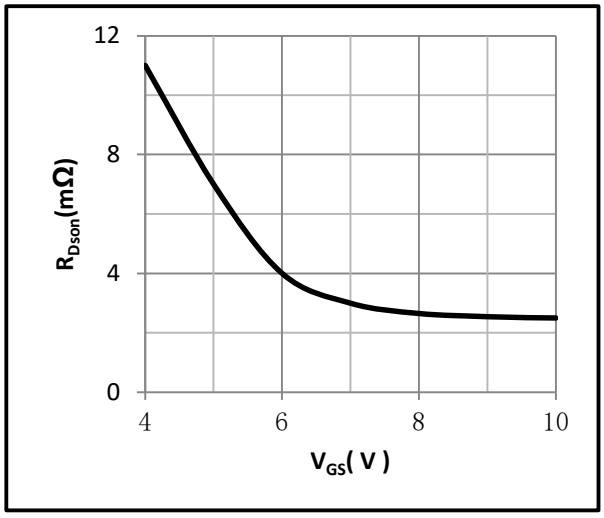


Fig.8 On-Resistance V.S Junction Temperature

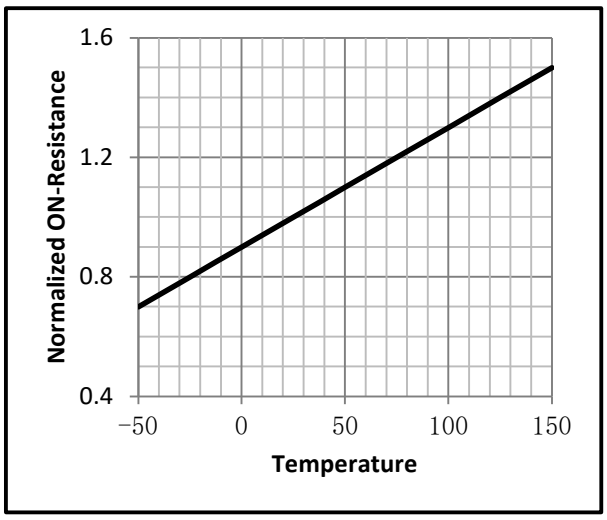


Fig.9 Gate Charge Measurement Circuit

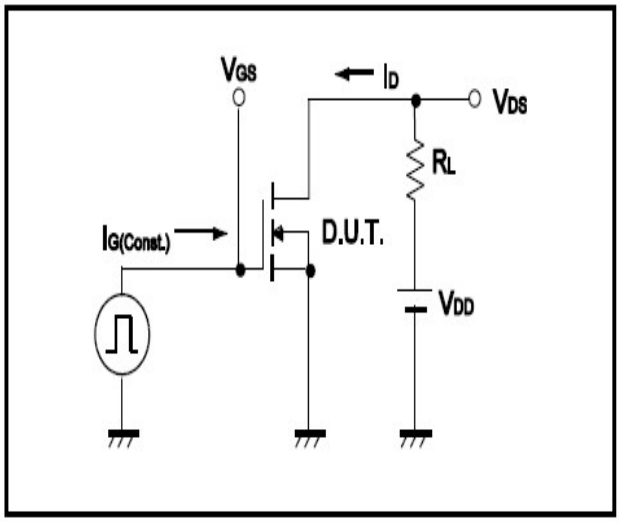


Fig.10 Gate Charge Waveform

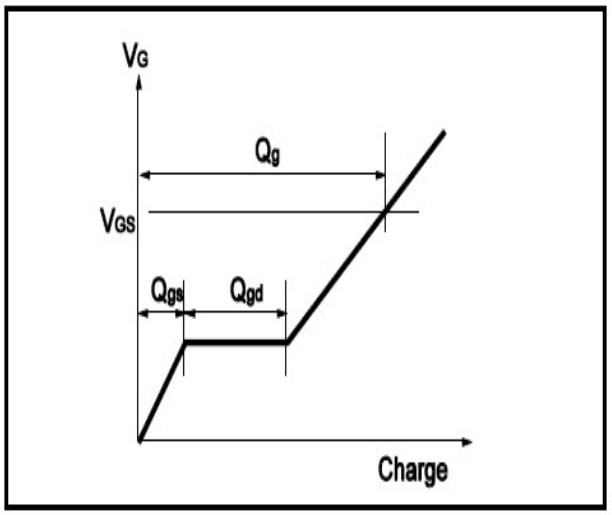


Fig.11 Switching Time Measurement Circuit

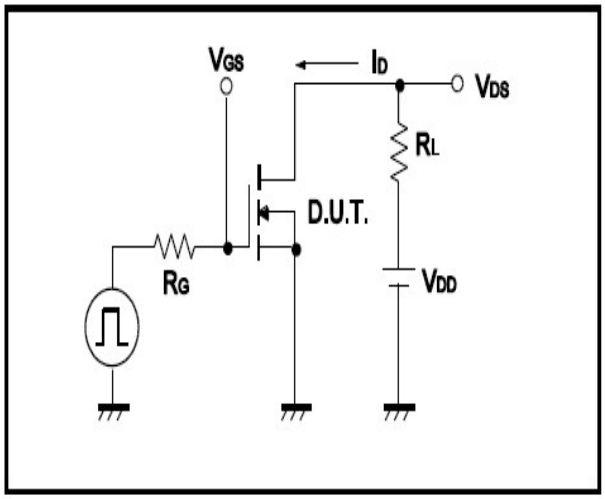
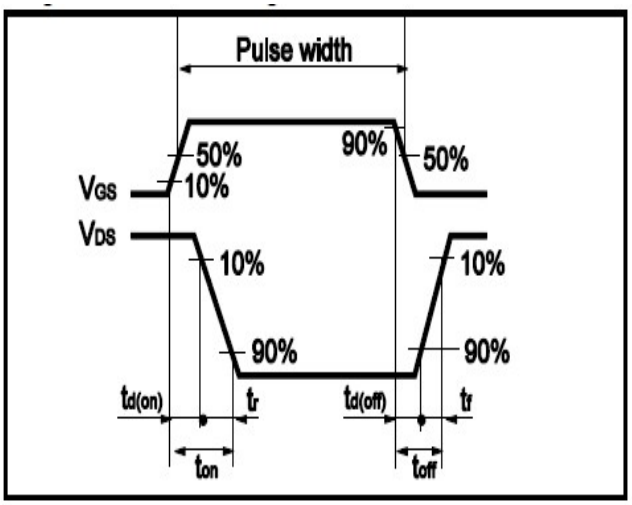


Fig.12 Switching Time Waveform



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