• General Description

The ZM020N04D combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$.

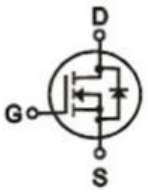
• Features

- ■ 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

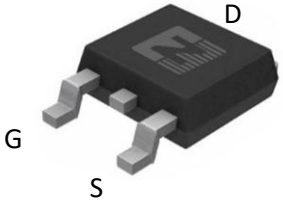
• Product Summary



V_{DS}=40V

$R_{DS(ON)}$ =2.4mΩ

I_D=120A



TO-252

•Ordering Information:

Part NO.	ZM020N04D
Marking	ZM020N04
Packing Information	REEL TAPE
Basic ordering unit (pcs)	2500

•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℃	120	A
	$I_{D@}$TC=75℃	91	A
	I_{D} @TC=100℃	75	A
Pulsed Drain Current①	I_{DM}	360	A
Total Power Dissipation(TC=25℃)	P_D@TC=25℃	85	W
Total Power Dissipation(TA=25℃)	P_D@TA=25℃	3.4	W
Operating Junction Temperature	T_J	150	℃
Storage Temperature	T_{STG}	150	℃
Single Pulse Avalanche Energy	E_{AS}	245	mJ
Avalanche Current	I_{AS}	70	A

●Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	-	-	1.5	°C/W
Thermal resistance, junction - ambient	R_{thJA}	-	-	37	°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	1.3		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		2.4	3.1	mΩ
		V_{GS}=4.5V, I_D=30A		3	4	mΩ
Diode Forward Voltage	V_{FSD}	I_{SD} =20A,V_{GS} =0V			1.3	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

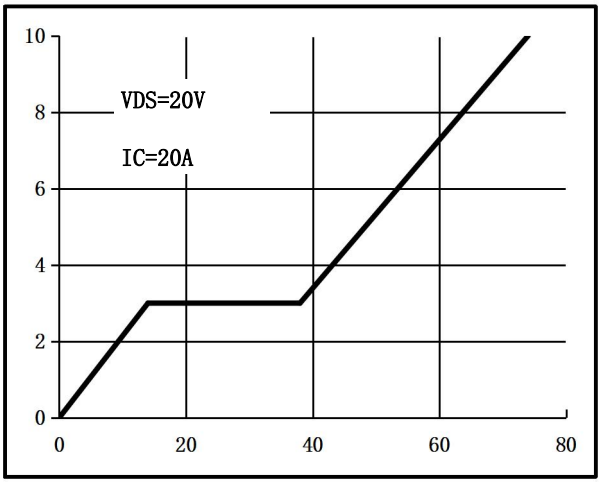


Fig.2 Capacitance Characteristics

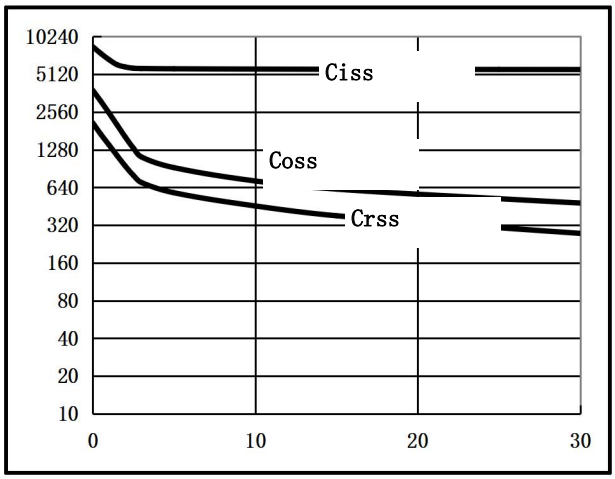


Fig.3 Power Dissipation

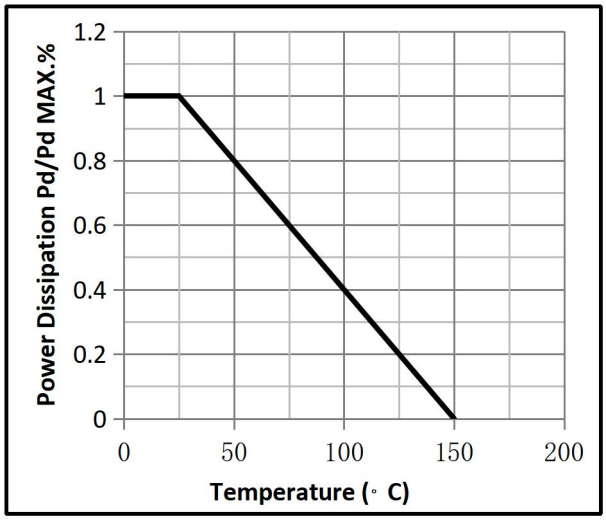


Fig.4 Typical output Characteristics

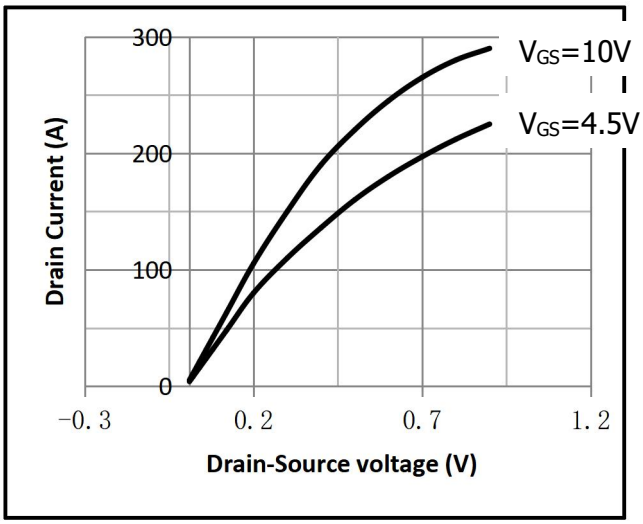


Fig.5 Threshold Voltage V.S Junction Temperature

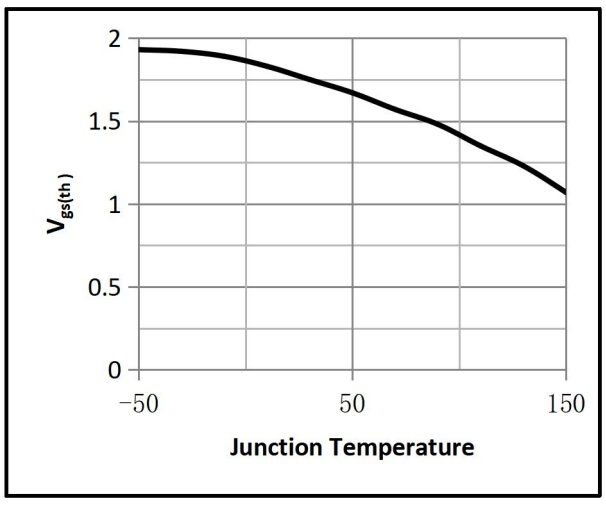


Fig.6 Resistance V.S Drain Current

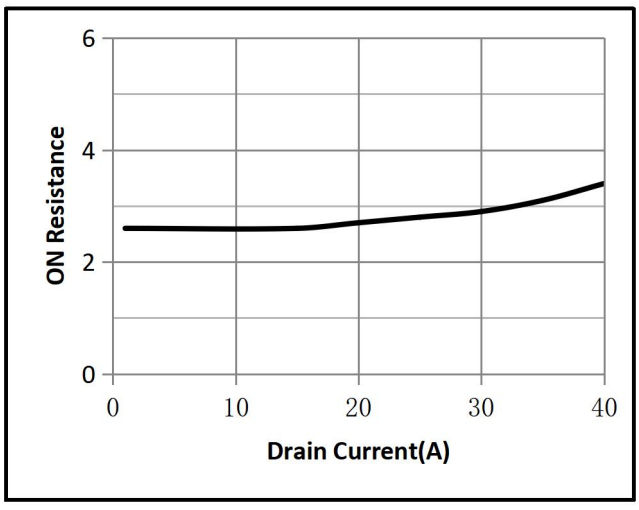


Fig.7 On-Resistance VS Gate Source Voltage

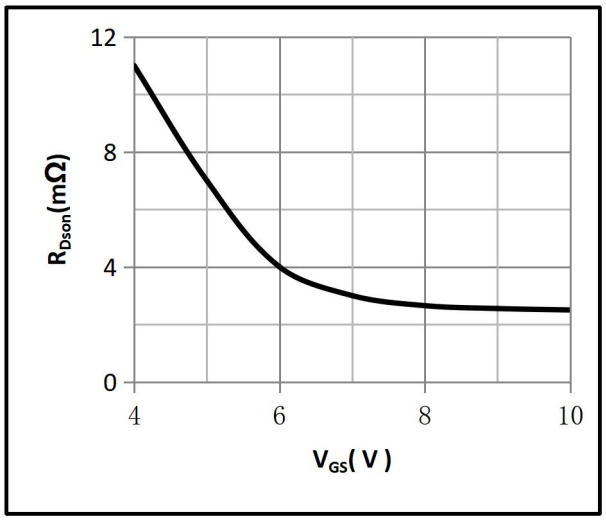


Fig.8 On-Resistance V.S Junction Temperature

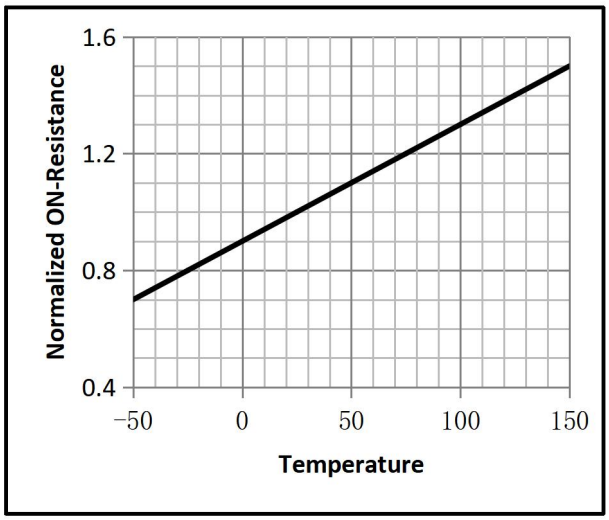


Fig.9 SOA Maximum Safe Operating Area

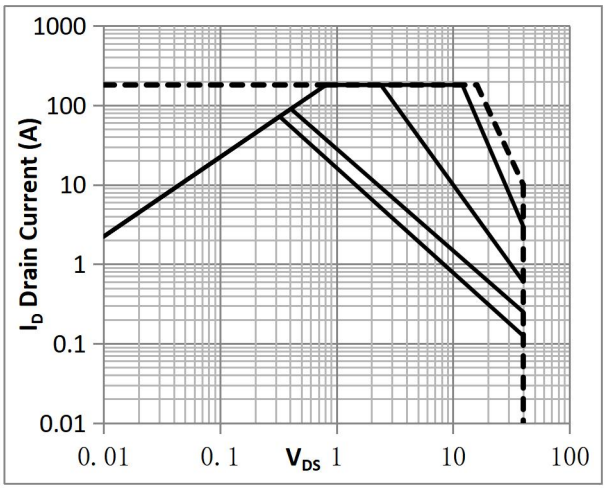


Fig.10 ID-Junction Temperature

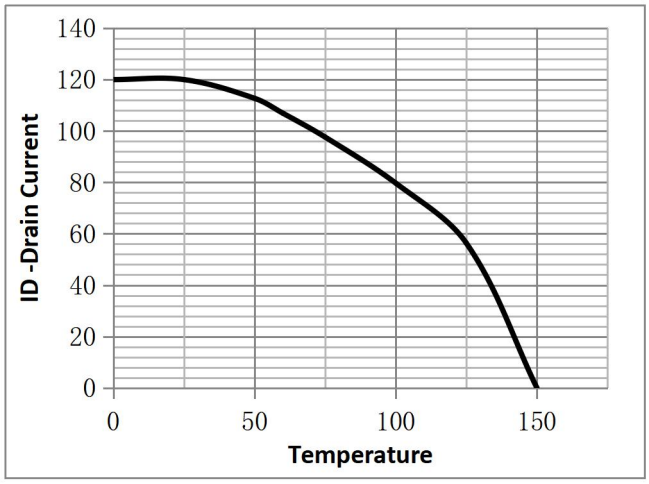


Fig.11 Switching Time Measurement Circuit

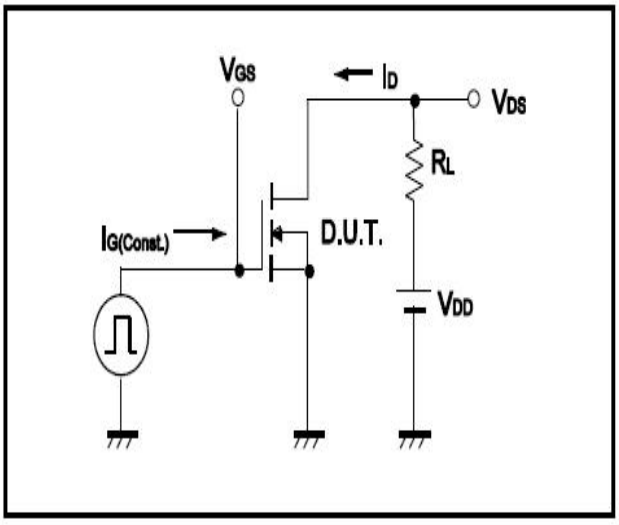


Fig.12 Gate Charge Waveform

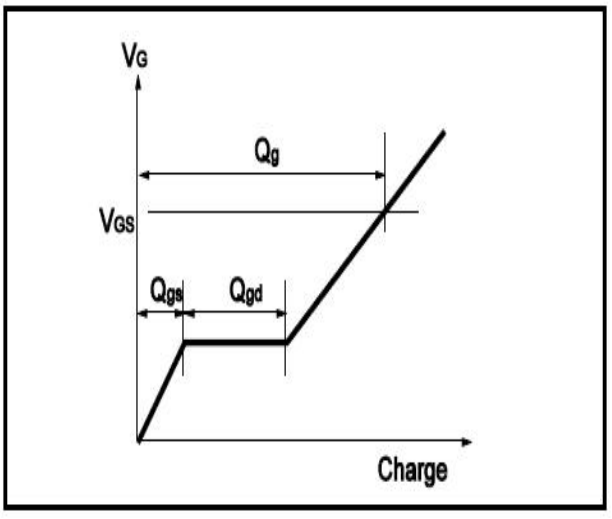


Fig.13 Resistive Switching Test Circuit

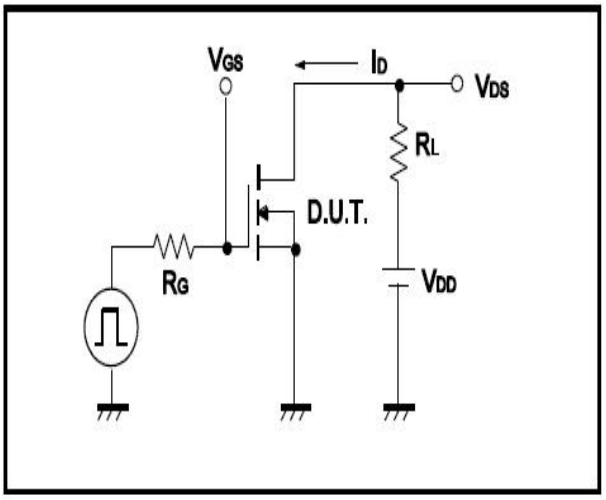
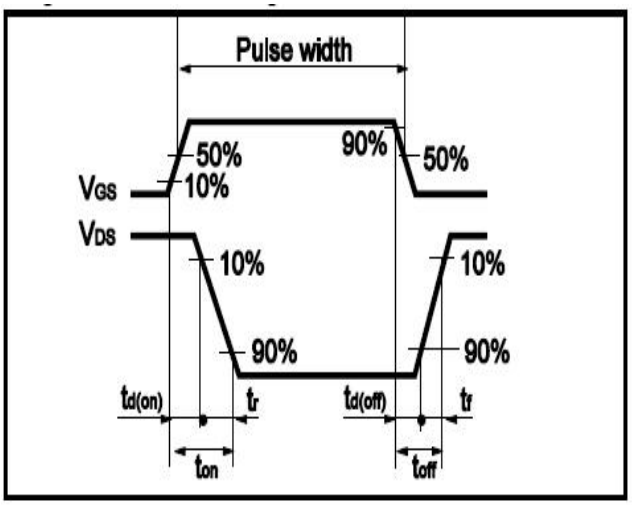


Fig.14 Resistive Switching Test Waveform



●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