

**• General Description**

The ZM020N04HB 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**

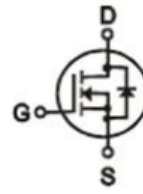
- Synchronous Rectification
- Power Management in Inverter System
- POL application
- BLDC Motor driver

**• Ordering Information:**

Part NO.	ZM020N04HB
Marking	ZM020N04H
Packing Information	Bulk Tube
Basic ordering unit (pcs)	500

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

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	40	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$I_D @ T_C = 25^\circ\text{C}$	180	A
	$I_D @ T_C = 75^\circ\text{C}$	136	A
	$I_D @ T_C = 100^\circ\text{C}$	113	A
Pulsed Drain Current <sup>①</sup>	$I_{DM}$	540	A
Total Power Dissipation	$P_D @ T_C = 25^\circ\text{C}$	100	W
Total Power Dissipation	$P_D @ T_A = 25^\circ\text{C}$	5	W
Operating Junction Temperature	$T_J$	150	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	150	$^\circ\text{C}$
Single Pulse Avalanche Energy	$E_{AS}$	245	mJ
Avalanche Current	$I_{AS}$	70	A

**• Product Summary**


$V_{DS} = 40\text{V}$

$R_{DS(ON)} = 2.2\text{m}\Omega$

$I_D = 180\text{A}$



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**●Thermal resistance**

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	$R_{thJC}$	-	-	1.25	$^{\circ}C/W$
Thermal resistance, junction - ambient	$R_{thJA}$	-	-	32	$^{\circ}C/W$
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	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = 250\mu A$	2.0		4.0	V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS} = 40V, V_{GS} = 0V$			1.0	$\mu A$
Gate- Source Leakage Current	$I_{GSS}$	$V_{GS} = \pm 20V, V_{DS} = 0V$			100	nA
Static Drain-source On Resistance	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 70A$		2.2	3	m $\Omega$
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	$C_{oss}$	$V_{DS} = 20V$	-	480	-	
Reverse transfer capacitance	$C_{rss}$	$f = 1MHz$	-	275	-	

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

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  $\leq 300\mu s$ , Duty cycle  $\leq 2\%$  ;

Fig.1 Gate-Charge Characteristics

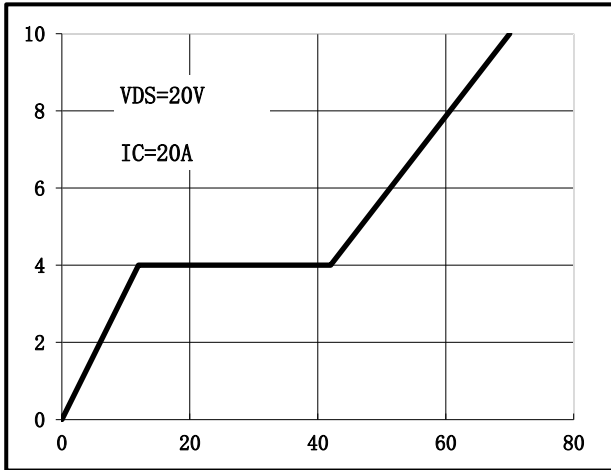


Fig.2 Capacitance Characteristics

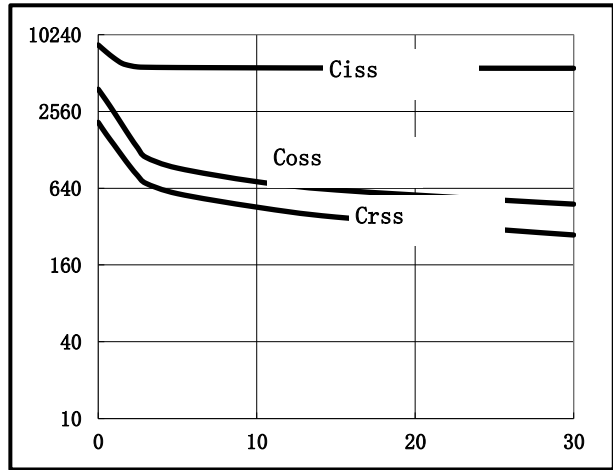


Fig.3 Power Dissipation

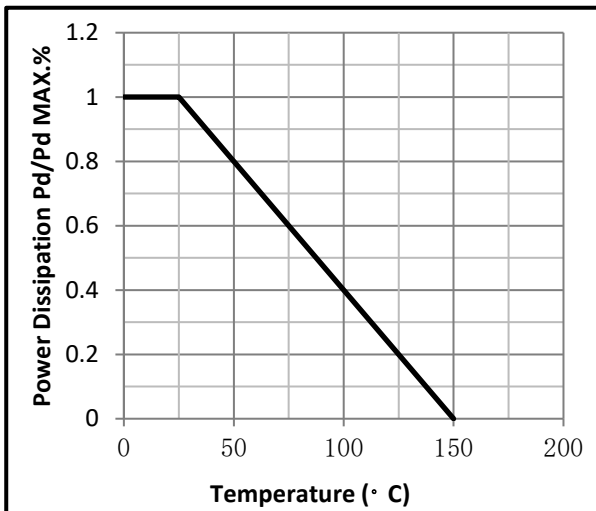


Fig.4 Typical output Characteristics

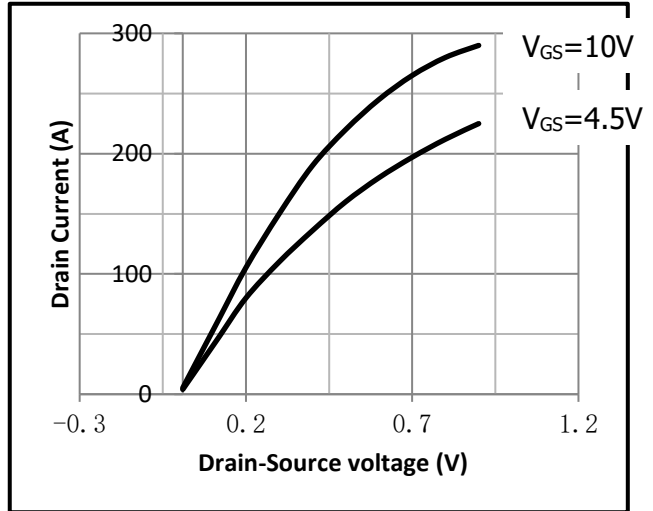


Fig.5 Threshold Voltage V.S Junction Temperature

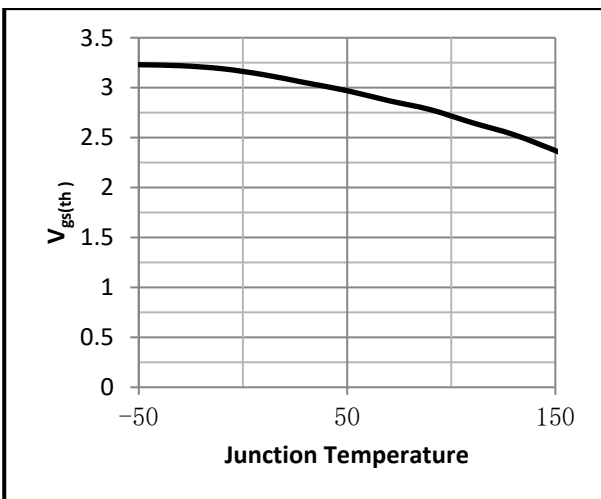


Fig.6 Resistance V.S Drain Current

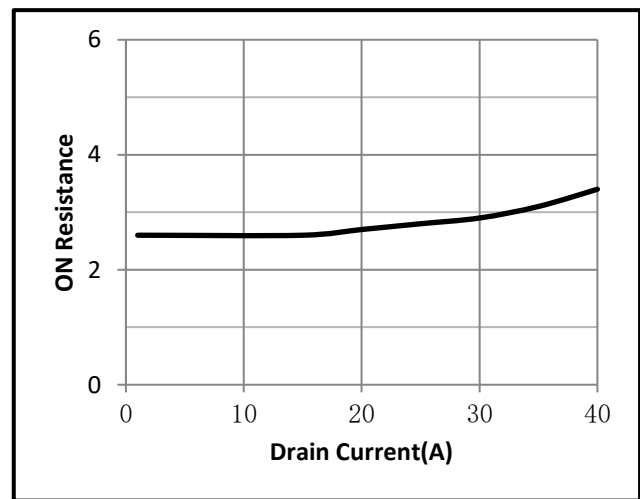


Fig.7 On-Resistance VS Gate Source Voltage

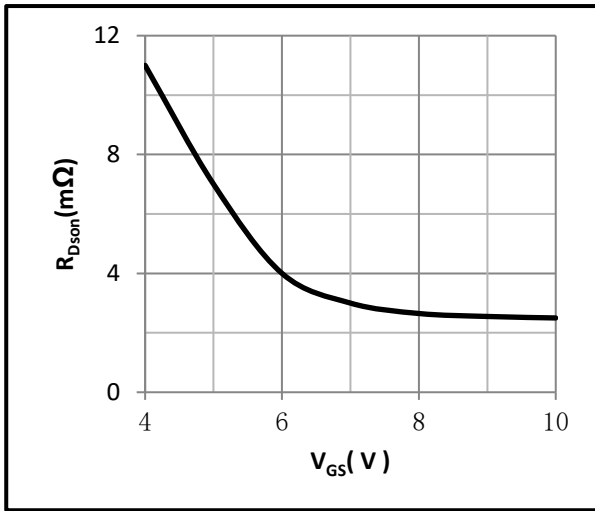


Fig.8 On-Resistance V.S Junction Temperature

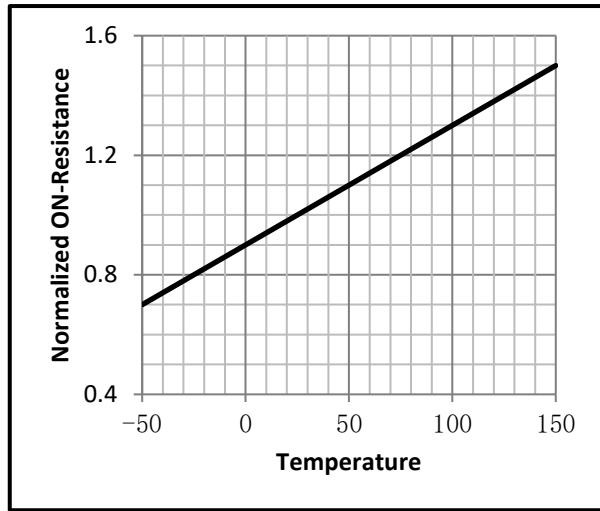


Fig.9 Switching Time Measurement Circuit

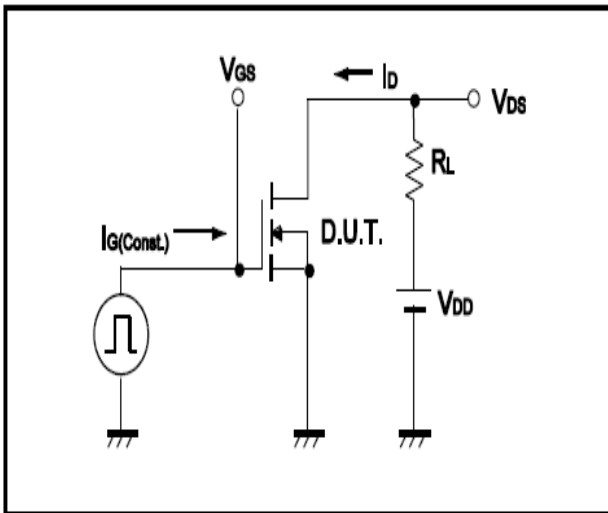


Fig.10 Gate Charge Waveform

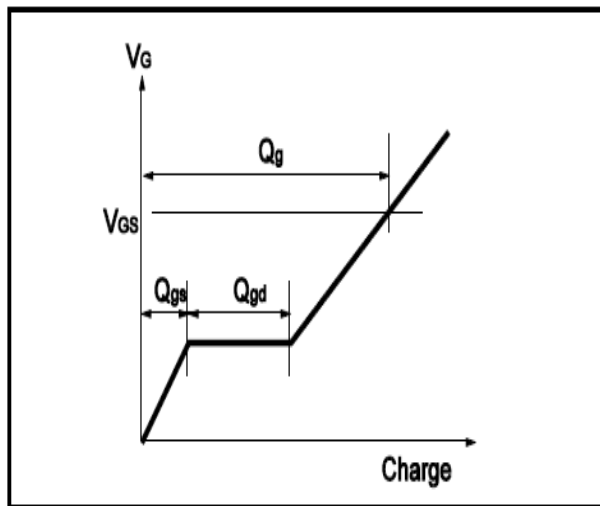


Fig.11 Switching Time Measurement Circuit

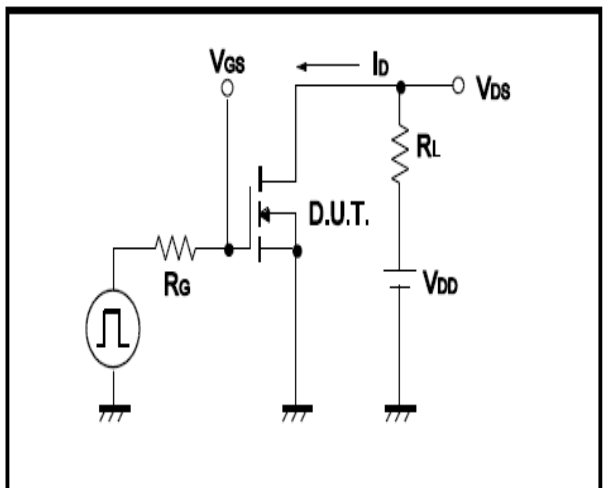
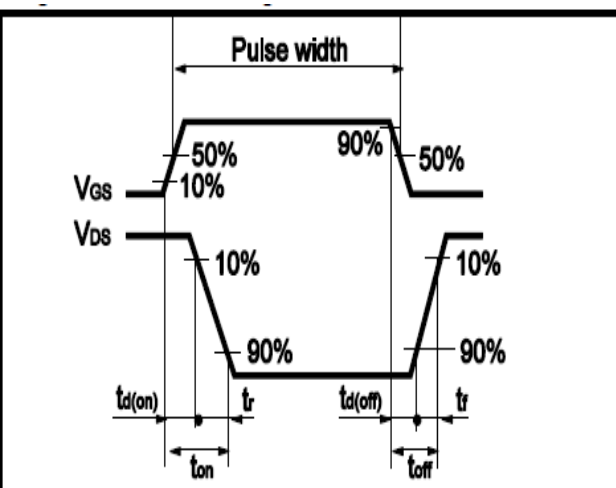


Fig.12 Gate Charge Waveform



•Dimensions (TO-263)

Unit: mm

SYMBOL	MIN	TYP	MAX	SYMBOL	MIN	TYP	MAX
A	4.42		4.72	E	8.99		9.29
B	1.22		1.32	e1	2.44		2.64
b	0.76		0.86	e2	4.98		5.18
b1	1.22		1.32	L1	15.19		15.79
b2	0.33		0.43	L2	2.29		2.79
C	1.22		1.32	L3	1.3		1.75
D	9.95		10.25				

