

**• General Description**

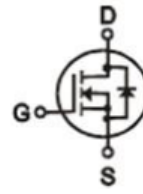
The ZM020N04HD combines advanced trench MOSFET technology with a low resistance package to provide extremely low  $R_{DS(ON)}$ .

**• 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**

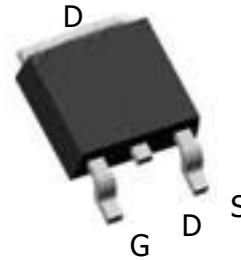
- Synchronous Rectification
- Power Management in Inverter System
- POL application
- BLDC Motor driver

**• Product Summary**


$V_{DS} = 40V$

$R_{DS(ON)} = 2.6m\Omega$

$I_D = 120A$



TO-252

**• Ordering Information:**

Part NO.	ZM020N04HD
Marking	ZM020N04H
Packing Information	Bulk Tube
Basic ordering unit (pcs)	2500

**• Absolute Maximum Ratings (T<sub>C</sub> = 25°C)**

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	40	V
Gate-Source Voltage	$V_{GS}$	±20	V
Continuous Drain Current	$I_D @ TC=25^\circ C$	120	A
	$I_D @ TC=75^\circ C$	91	A
	$I_D @ TC=100^\circ C$	75	A
Pulsed Drain Current <sup>①</sup>	$I_{DM}$	360	A
Total Power Dissipation(TC=25°C)	$P_D @ TC=25^\circ C$	60	W
Total Power Dissipation(TA=25°C)	$P_D @ TA=25^\circ C$	2.0	W
Operating Junction Temperature	$T_J$	150	°C
Storage Temperature	$T_{STG}$	150	°C
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	$R_{thJC}$	-	-	2.1	$^{\circ}C/W$
Thermal resistance, junction - ambient	$R_{thJA}$	-	-	62.5	$^{\circ}C/W$
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		4	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	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 70A$		2.6	3.5	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

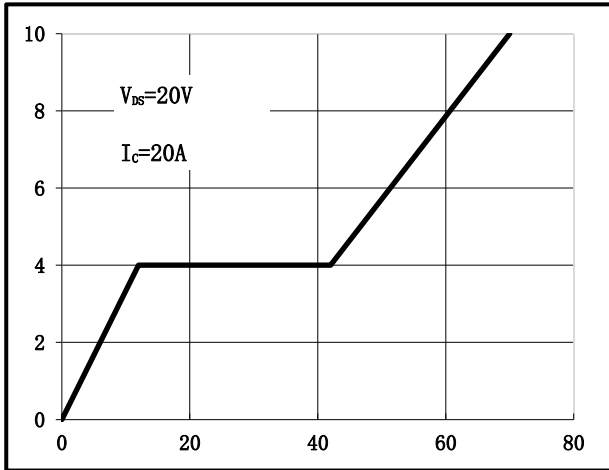


Fig.2 Capacitance Characteristics

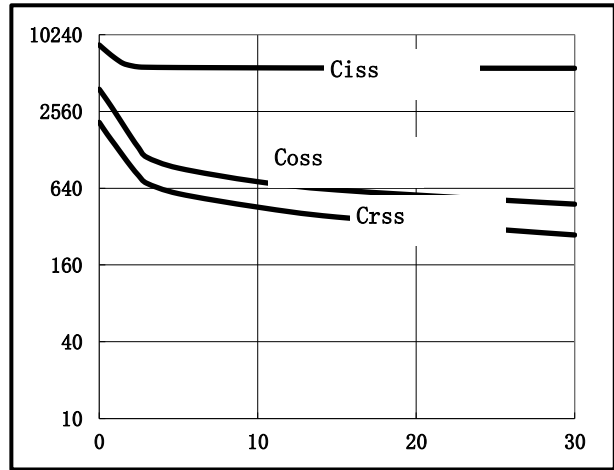


Fig.3 Power Dissipation

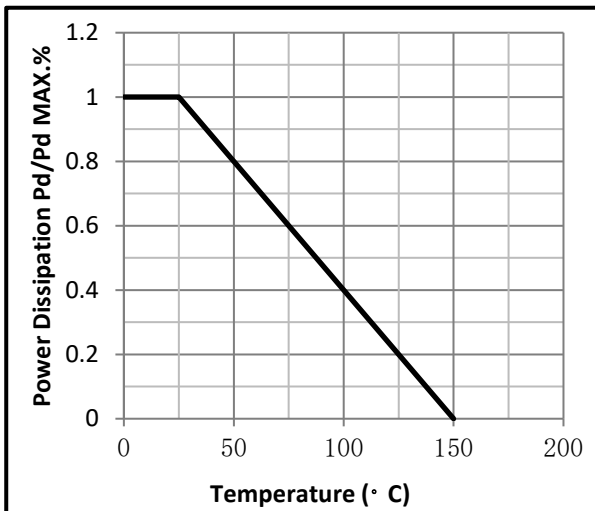


Fig.4 Typical output Characteristics

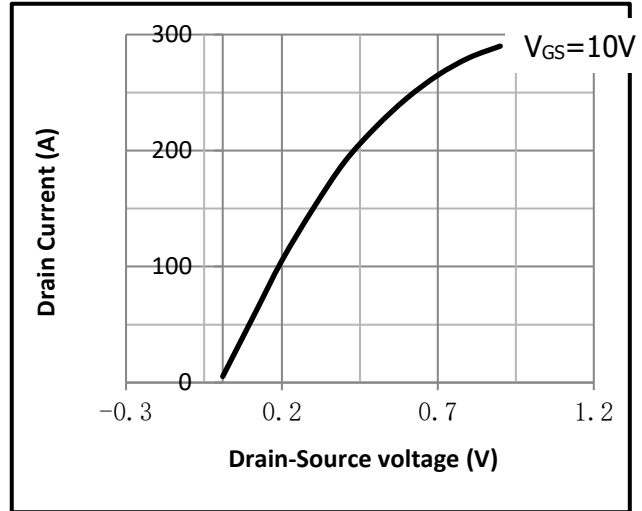


Fig.5 Threshold Voltage V.S Junction Temperature

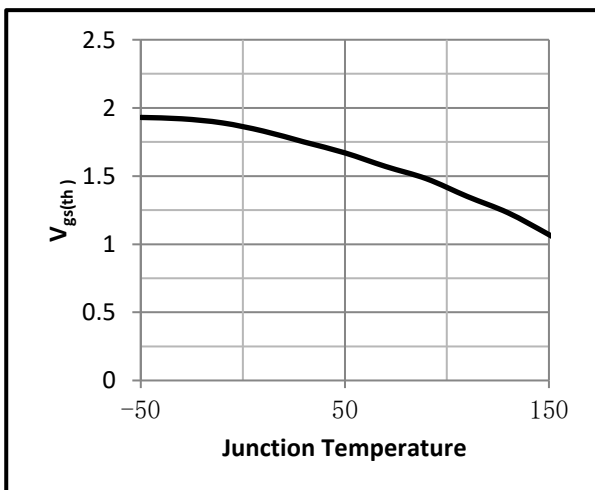


Fig.6 Resistance V.S Drain Current

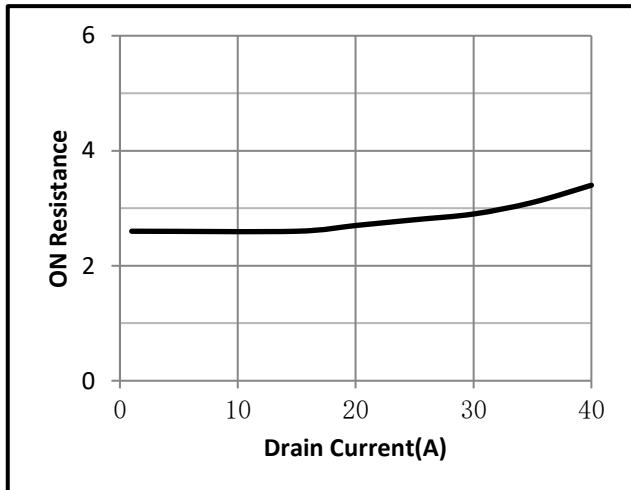


Fig.7 On-Resistance VS Gate Source Voltage

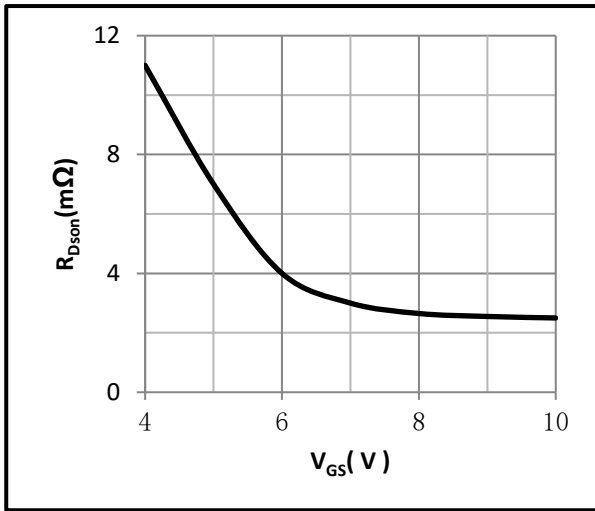


Fig.8 On-Resistance V.S Junction Temperature

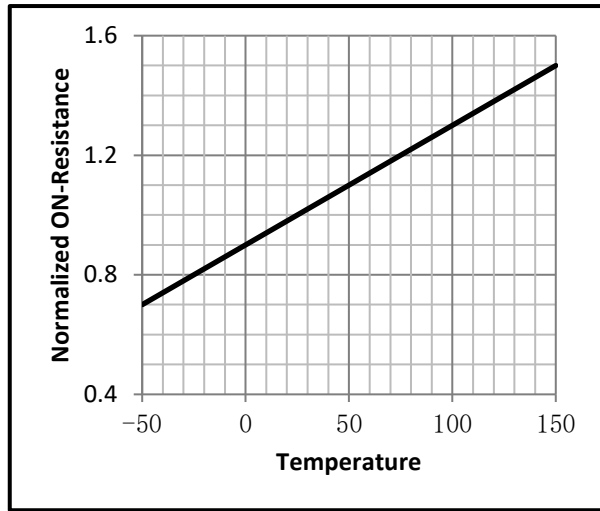


Fig.9 Switching Time Measurement Circuit

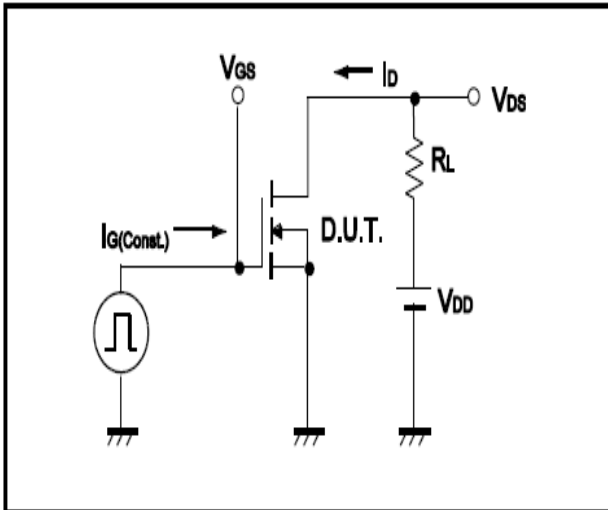


Fig.10 Gate Charge Waveform

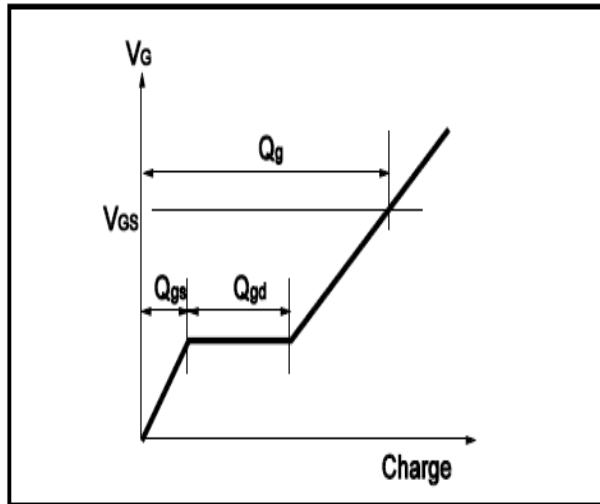


Fig.11 Switching Time Measurement Circuit

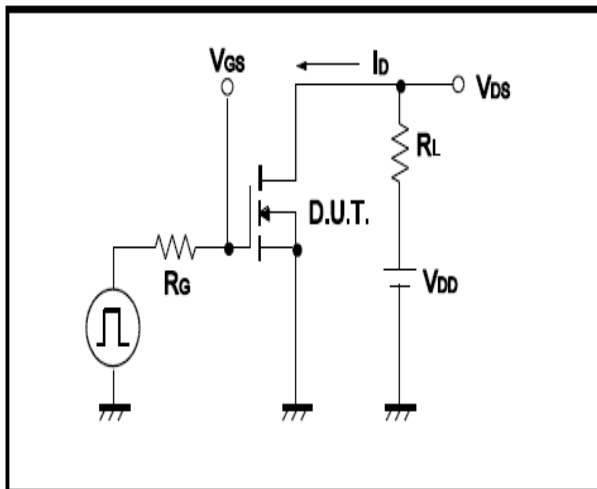
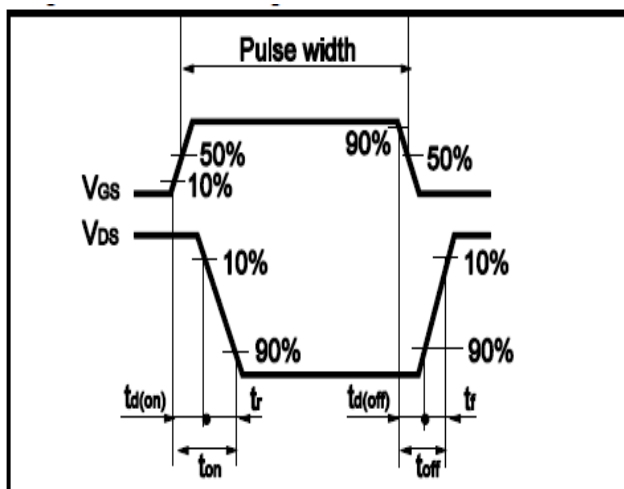


Fig.12 Gate Charge Waveform





•Dimensions (TO-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			

