• General Description

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

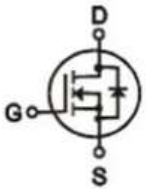
• Features

- ■ 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 2nd Synchronous Rectifier
- ■POL application
- ■BLDC Motor driver

• Product Summary



V_{DS}=40V

$R_{DS(ON)}$ =2.5mΩ

I_D=100A

TO-251

•Ordering Information:

Part NO.	ZM025N04HI
Marking	ZM025N04H
Packing Information	TUBE
Basic ordering unit (pcs)	3600

•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℃	100	A
	$I_{D@}$TC=75℃	76	A
	$I_{D@}$TC=100℃	63	A
Pulsed Drain Current ①	I_{DM}	300	A
Total Power Dissipation	P_D@TC=25℃	80	W
Total Power Dissipation	P_D@TA=25℃	2.4	W
Operating Junction Temperature	T_J	-55 to 150	℃
Storage Temperature	T_{STG}	-55 to 150	℃
Single Pulse Avalanche Energy (L=0.5mH,V_{GS}=10V,R_g=25Ω,T_J=25℃)	E_{AS}	860	mJ
Single Pulse Avalanche Energy (L=0.1mH,V_{GS}=10V,R_g=25Ω,T_J=25℃)	E_{AS}	350	mJ

●Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	-	-	1.55	° C/W
Thermal resistance, junction - ambient	R_{thJA}	-	-	52	° 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	2.0		4.0	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=24A		2.5	3.2	mΩ
Forward Trans conductance	g_{FS}	V_{DS} =10V, I_D=10A		32		s
Source-drain voltage	V_{SD}	Is=24A			1.28	V

●Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	C_{iss}	f =1MHZ V_{DS}=25V	-	9300	-	pF
Output capacitance	C_{oss}		-	760	-	
Reverse transfer capacitance	C_{rss}		-	550	-	

●Gate Charge characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Gate Risistance	Rg	f = 1MHz		2.5		Ω
Total gate charge	Q_g	V_{DD} =25V I_D = 8A V_{GS} = 10V	-	130	-	nC
Gate - Source charge	Q_{gs}		-	19	-	
Gate - Drain charge	Q_{gd}		-	34	-	
Turn-ON Delay time	$t_{D(on)}$	V_{GS}=10V, V_{DS}=15V R_G =3.3Ω, I_D =25A		14		ns
Turn-ON Rise time	t_r			15		ns
Turn-Off Delay time	$t_{D(off)}$			91		ns

Turn-Off Fall time	t_f			34		ns
Reverse Recovery Time	t_{RR}	VDD = 20 V, dIS/dt = 100 A/us, IS = 30 A		25		ns
Charge Time	t_a			14		ns
Discharge Time	t_b			11		ns
Reverse Recovery Charge	Q_{RR}			16		ns

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

Fig.1 Power Dissipation

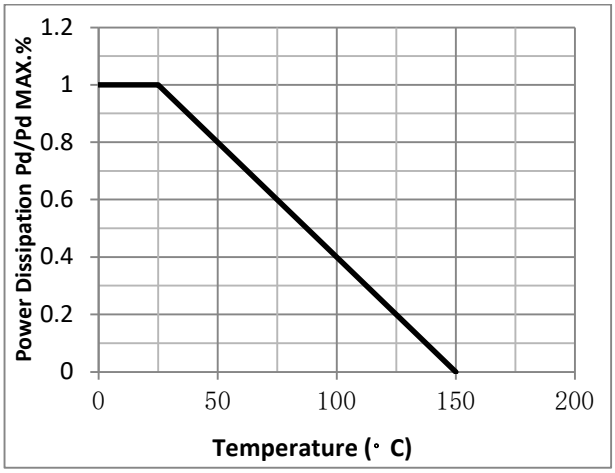


Fig.2 Typical output Characteristics

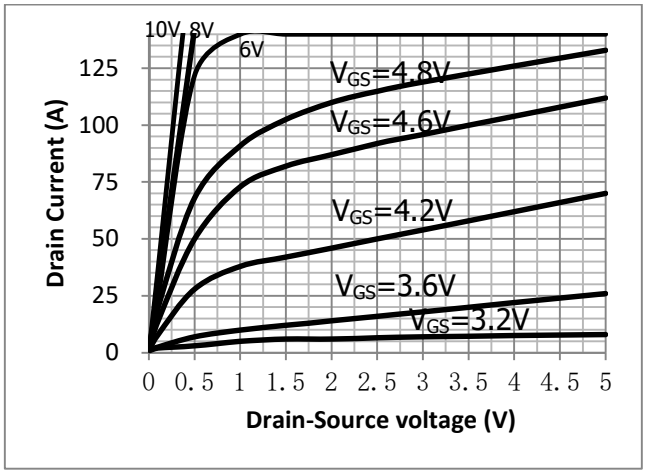


Fig.3 Threshold Voltage V.S Junction Temperature

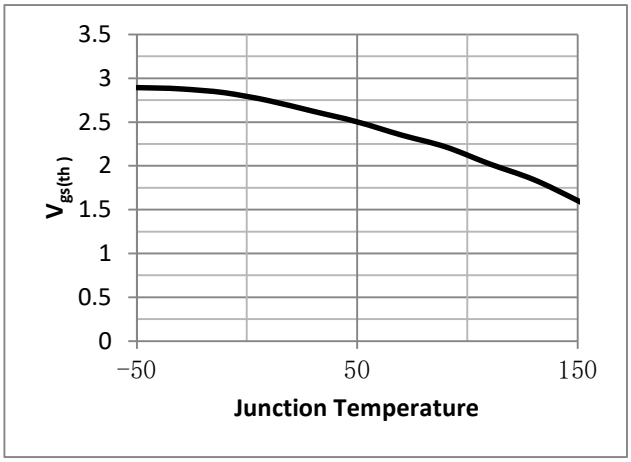


Fig.4 Resistance V.S Drain Current

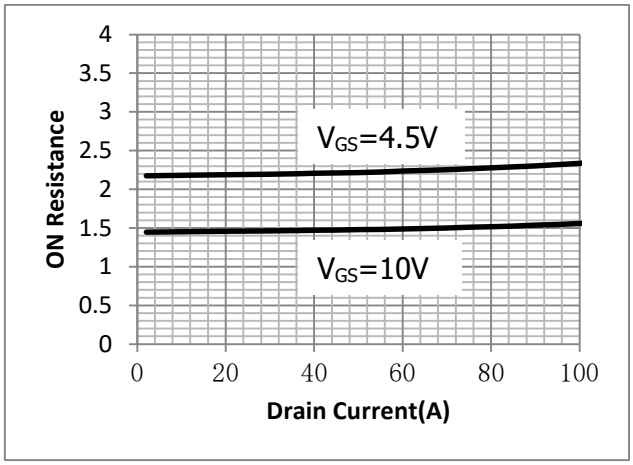


Fig.5 On-Resistance VS Gate Source Voltage

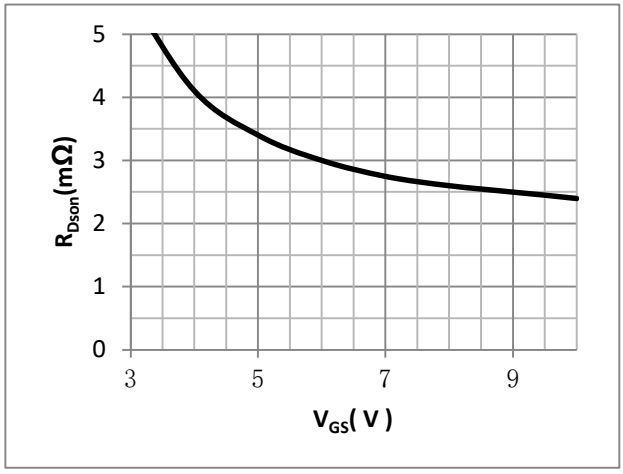


Fig.6 On-Resistance V.S Junction Temperature

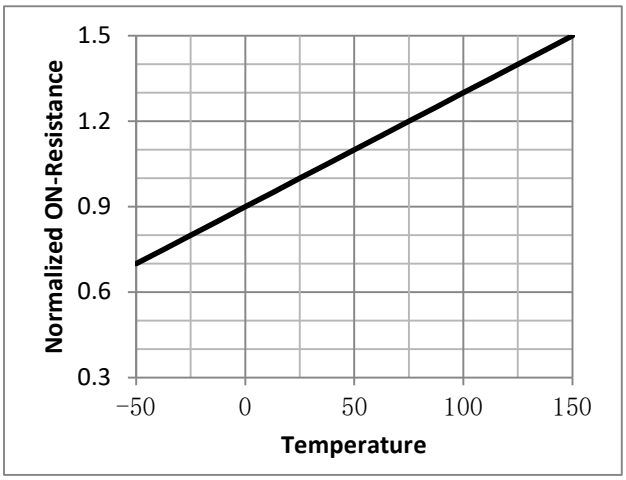


Fig.7 Gate Charge Characteristics

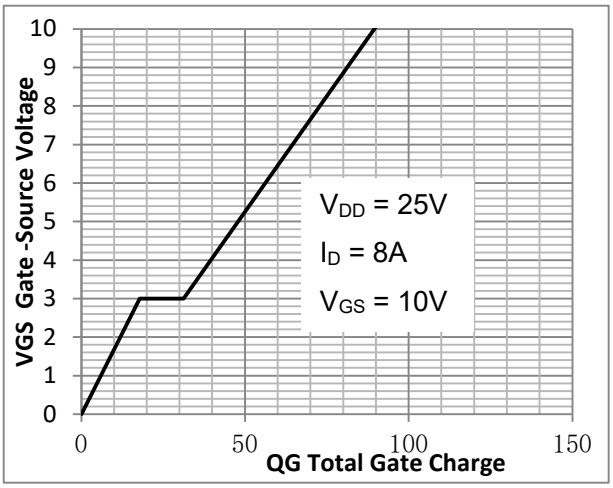


Fig.8 Capacitance vs V_{DS}

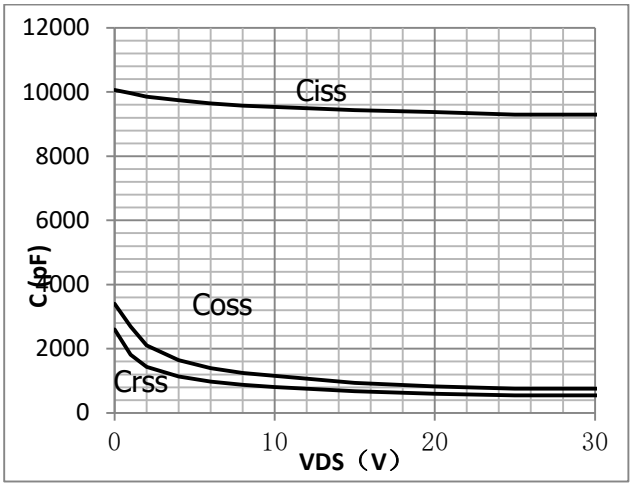


Fig.9 SOA Maximum Safe Operating Area

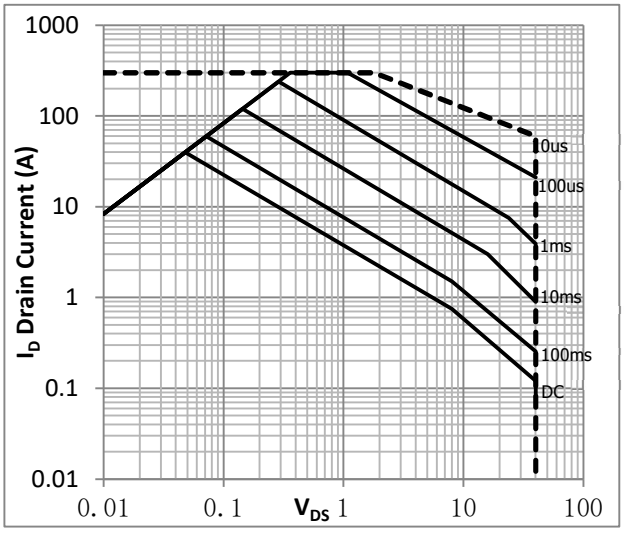


Fig.10 ID-Junction Temperature

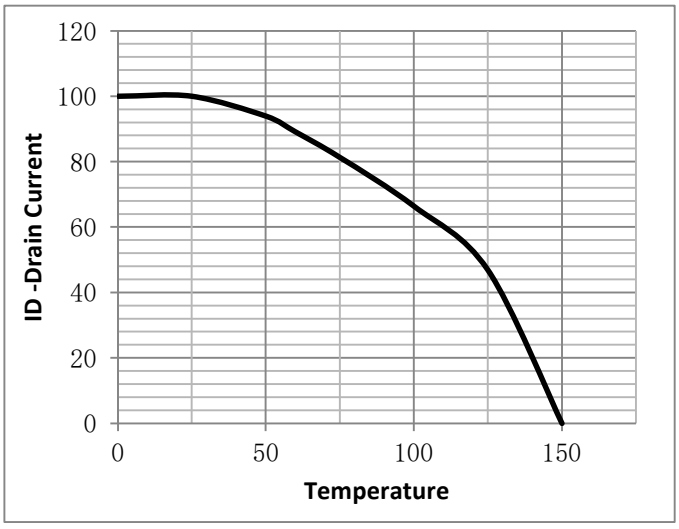


Figure 11. Diode Forward Voltage vs. Current

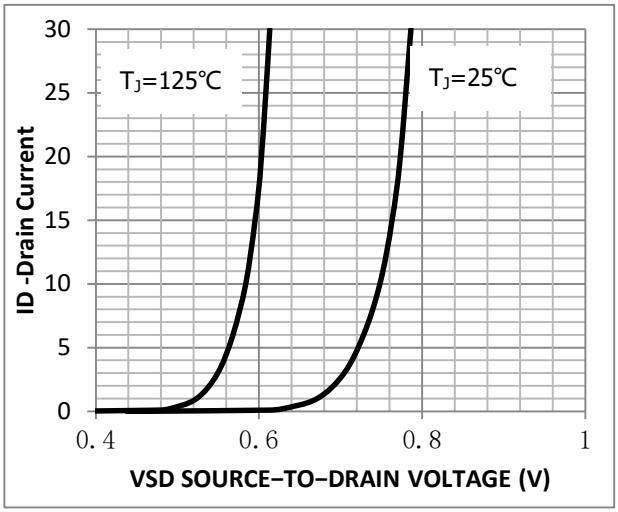


Figure 12. Transfer Characteristics

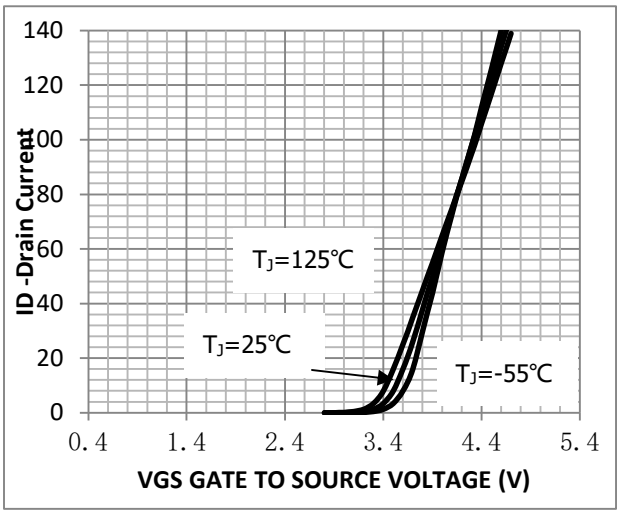


Fig.13 Gate Charge Measurement Circuit

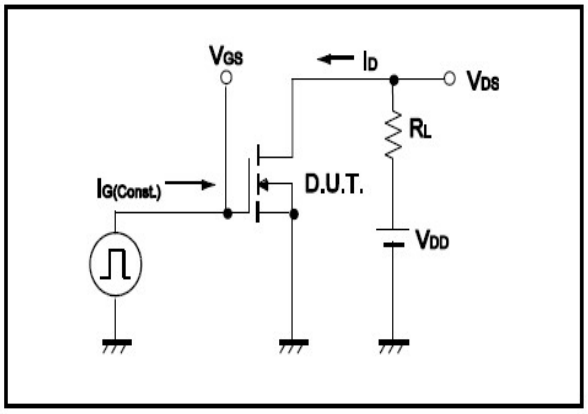


Fig.14 Gate Charge Waveform

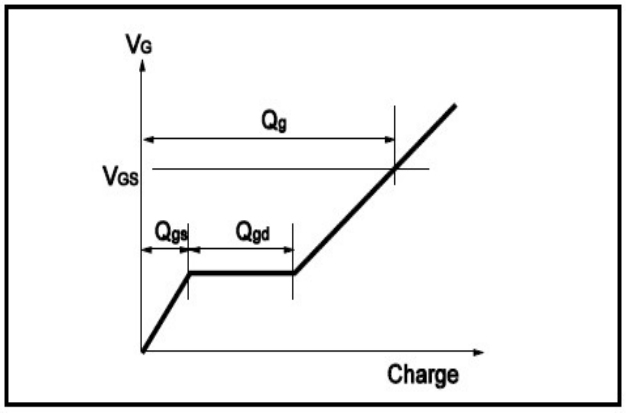


Fig.15 Switching Time Measurement Circuit

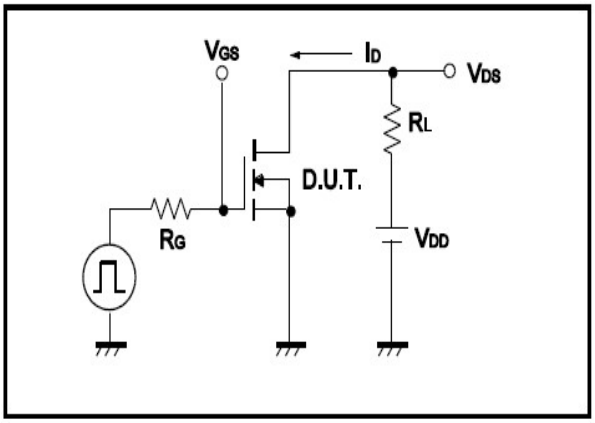


Fig.16 Switching Time Waveform

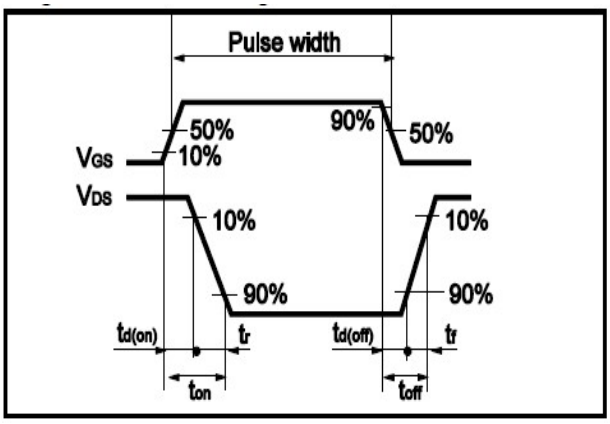


Fig.17 Avalanche Measurement Circuit

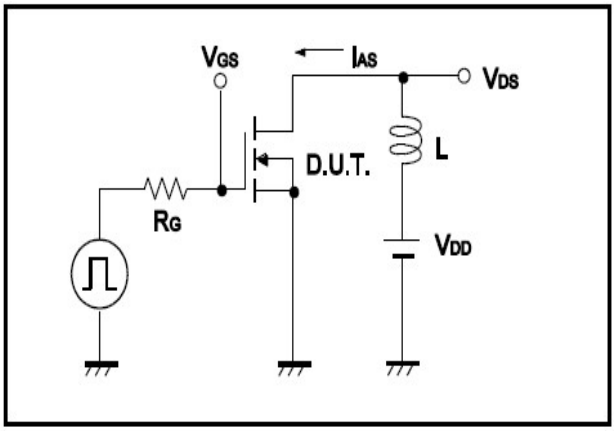
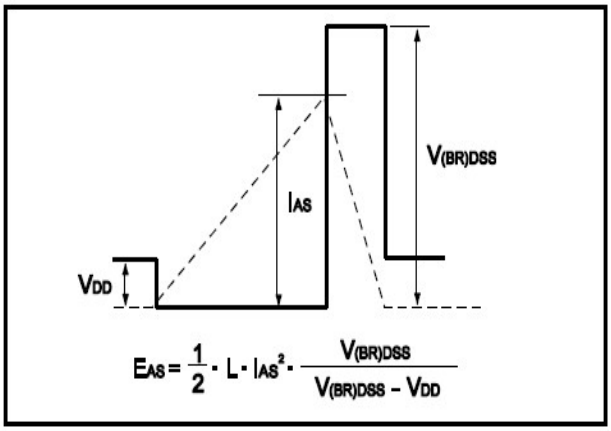


Fig.18 Avalanche Waveform



●Dimensions(TO-251)

Unit：mm

SYMBOL	min	max	SYMBOL	min	max
A	2.10	2.50	D	6.35	6.80
A1	0.95	1.30	D1	5.10	5.50
B	0.80	1.25	E	5.30	6.30
b	0.50	0.80	e	2.24	2.35
b1	0.70	0.90	E1	4.43	4.73
c	0.45	0.60	L	7.00	9.40
c1	0.45	0.60