

• General Description

The ZM040N04S combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. This device is ideal for load switch and battery protection applications.

• 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

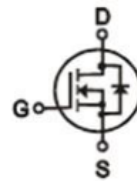
- MB/VGA Vcore
- SMPS 2nd Synchronous Rectifier
- POL application
- BLDC Motor driver

• Ordering Information:

Part NO.	ZM040N04S
Marking	ZM040N04
Packing Information	REEL TAPE
Basic ordering unit (pcs)	4000-TAP

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

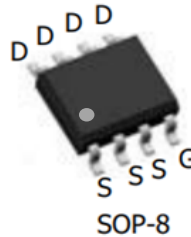
Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	$I_D @ T_C = 25^\circ\text{C}$	15	A
	$I_D @ T_C = 75^\circ\text{C}$	11	A
	$I_D @ T_C = 100^\circ\text{C}$	9.5	A
Pulsed Drain Current ^①	I_{DM}	40	A
Total Power Dissipation	$P_D @ T_C = 25^\circ\text{C}$	4.0	W
Total Power Dissipation	$P_D @ T_A = 25^\circ\text{C}$	0.75	W
Operating Junction Temperature	T_J	-55 to 150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55 to 150	$^\circ\text{C}$
Single Pulse Avalanche Energy	E_{AS}	180	mJ

• Product Summary


$V_{DS} = 40V$

$R_{DS(ON)} = 5.5m\Omega$

$I_D = 15A$



•Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R _{thJC}	-	-	32	° C/W
Thermal resistance, junction - ambient	R _{thJA}	-	-	170	° 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} =30V, 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		5.5	7.0	mΩ
		V _{GS} =4.5V, I _D =12A		7.2	9.0	mΩ
Forward Transconductance	g _{FS}	V _{DS} =25V, I _D =10A		12		s
Source-drain voltage	V _{SD}	I _S =24A			1.28	V

•Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	C _{iss}	f = 1MHz	-	2300	-	pF
Output capacitance	C _{oss}		-	300	-	
Reverse transfer capacitance	C _{rss}		-	160	-	

•Gate Charge characteristics(T_a = 25°C)

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Total gate charge	Q _g	V _{DD} = 25V	-	20	-	nC
Gate - Source charge	Q _{gs}	I _D = 8A	-	9	-	
Gate - Drain charge	Q _{gd}	V _{GS} = 10V	-	11	-	

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

Fig.1 Power Dissipation

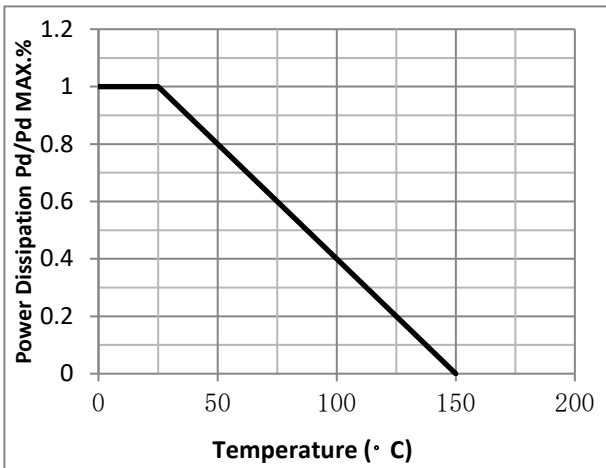


Fig.2 Typical output Characteristics

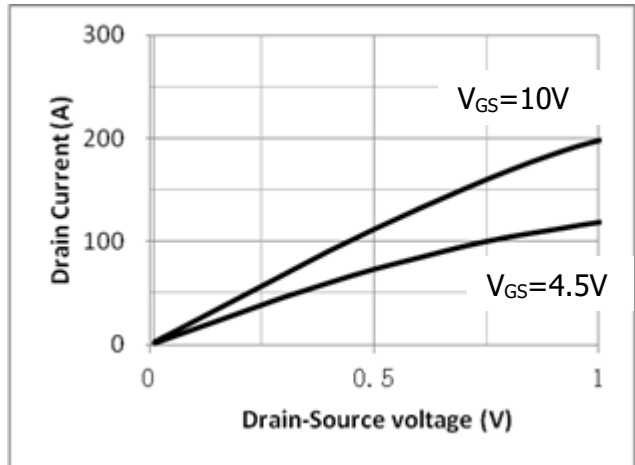


Fig.3 Threshold Voltage V.S Junction Temperature

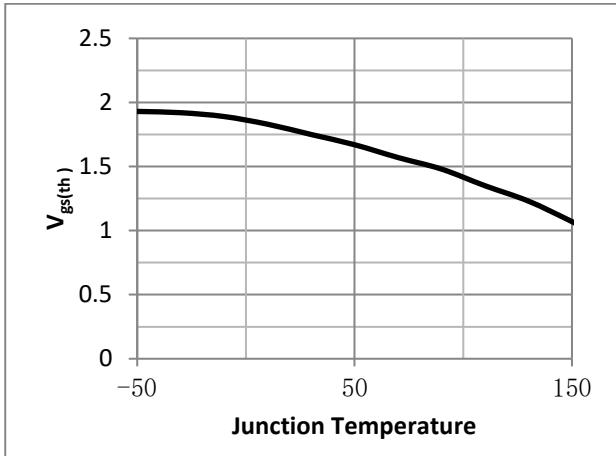


Fig.4 Resistance V.S Drain Current

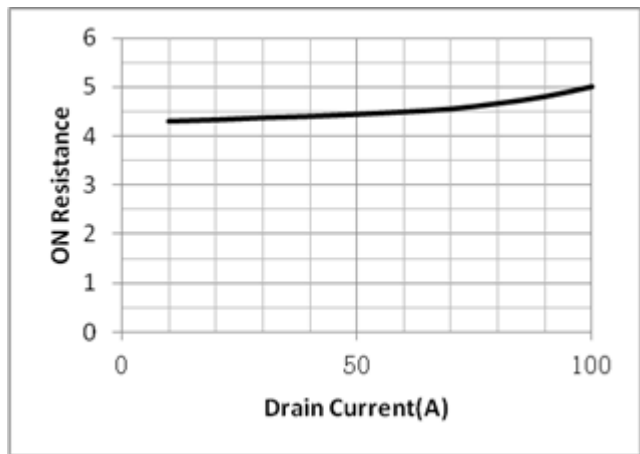


Fig.5 On-Resistance VS Gate Source Voltage

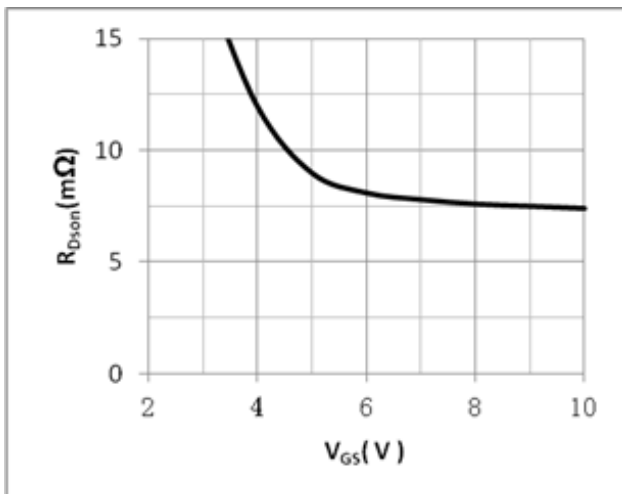


Fig.6 On-Resistance V.S Junction Temperature

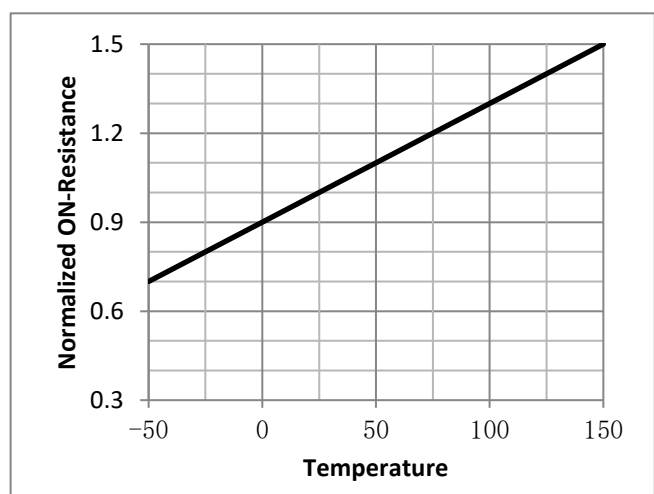


Fig.7 Switching Time Measurement Circuit

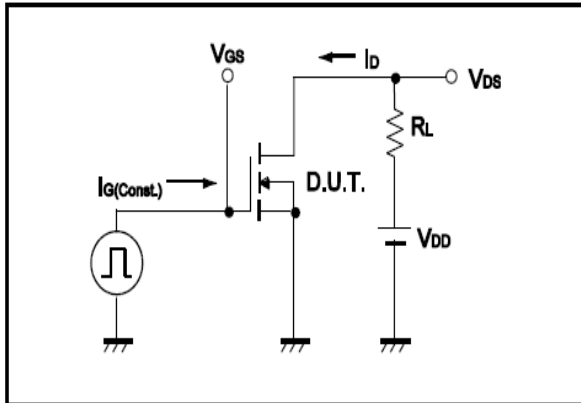


Fig.8 Gate Charge Waveform

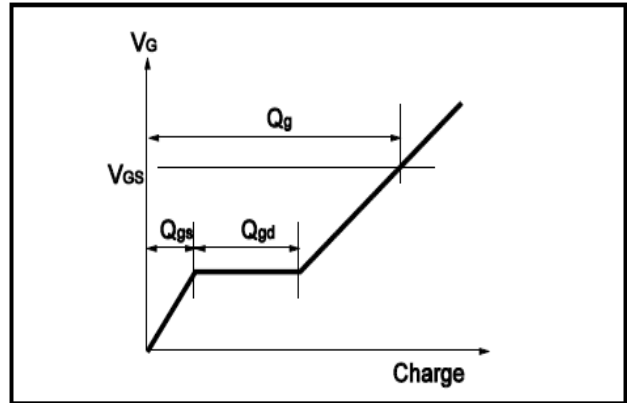


Fig.9 Switching Time Measurement Circuit

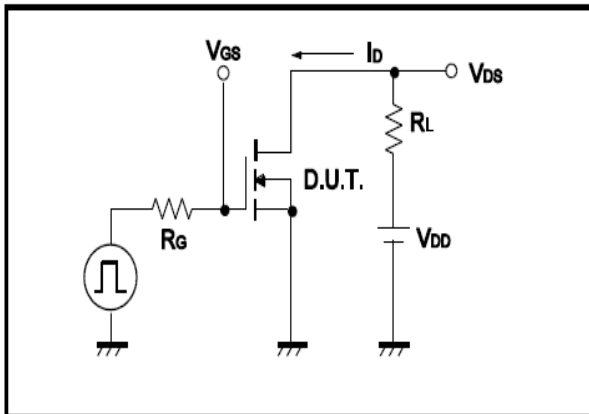


Fig.10 Gate Charge Waveform

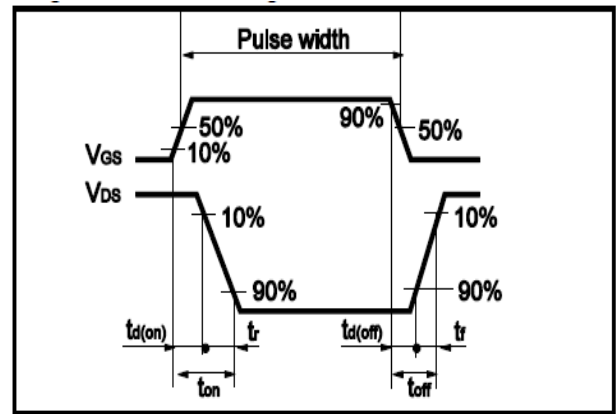


Fig.11 Avalanche Measurement Circuit

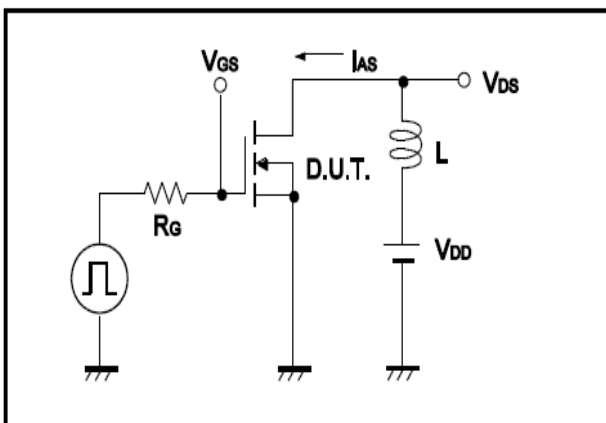
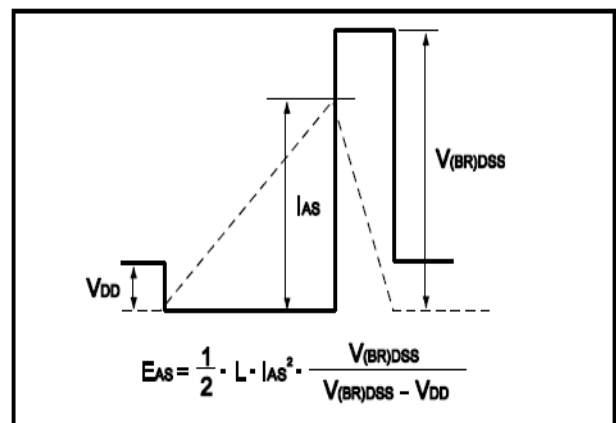


Fig.12 Avalanche Waveform



●Dimensions(SOP8)

Unit: mm

SYMBOL	min	TYP	max	SYMBOL	min		max
A	4.80		5.25	C	1.30		1.75
A1	0.37		0.49	C1	0.55		0.75
A2		1.27		C2	0.55		0.65
A3		0.41		C3	0.05		0.20
B	5.80		6.20	C4	0.10	0.20	0.23
B1	3.80		4.10	D		1.05	
B2		5.00		D1	0.40		0.62

