

• General Description

The ZM390P04S 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.

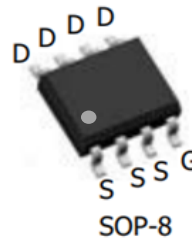
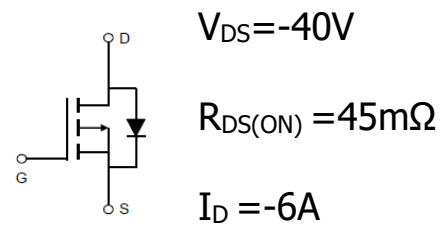
• Features

- Advance high cell density Trench technology
- Low $R_{DS(ON)}$ to minimize conductive loss
- Low Gate Charge for fast switching
- Low Thermal resistance

• Application

- SMPS 2nd Synchronous Rectifier
- BLDC Motor driver

• Product Summary



• Ordering Information:

Part NO.	ZM390P04S
Marking	ZM390P04
Packing Information	REEL TAPE
Basic ordering unit (pcs)	4000

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

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	-40	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ^②	$I_D @ T_C = 25^\circ C$	-6	A
	$I_D @ T_C = 75^\circ C$	-4.6	A
	$I_D @ T_C = 100^\circ C$	-3.8	A
Pulsed Drain Current ^①	I_{DM}	-36	A
Total Power Dissipation ^②	$P_D @ T_C = 25^\circ C$	3.4	W
Total Power Dissipation	$P_D @ T_A = 25^\circ C$	0.69	W
Operating Junction Temperature	T_J	-55 to 150	$^\circ C$
Storage Temperature	T_{STG}	-55 to 150	$^\circ C$
Single Pulse Avalanche Energy	E_{AS}	30	mJ

•Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case ^②	R _{thJC}	-	-	24	° C/W
Thermal resistance, junction - ambient	R _{thJA}	-	-	75	° C/W
Soldering temperature, wavesoldering 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} =-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 =-6A		45	58	mΩ
		V _{GS} =-4.5V, I _D =-5A		70	91	mΩ
Forward Transconductance	g _{FS}	V _{DS} =-10V, I _D =-5A		5		s
Source-drain voltage	V _{SD}	I _S =-6A		0.8	1.2	V

•Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Gate Resistance	R _G	f = 1MHz		9		Ω
Input capacitance	C _{iss}		-	750	-	pF
Output capacitance	C _{oss}		-	105	-	
Reverse transfer capacitance	C _{rss}		-	64	-	

•Gate Charge characteristics(T_a= 25°C)

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Total gate charge	Q _g	V _{DD} =-25V	-	12	-	nC
Gate - Source charge	Q _{gs}	I _D = -8A	-	2.4	-	
Gate - Drain charge	Q _{gd}	V _{GS} = -10V	-	2.8	-	

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

② Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate;

Fig.1 Power Dissipation Derating Curve

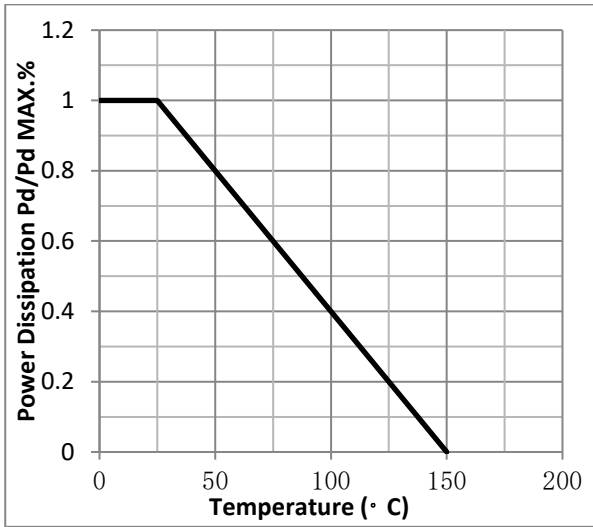


Fig.2 Typical output Characteristics

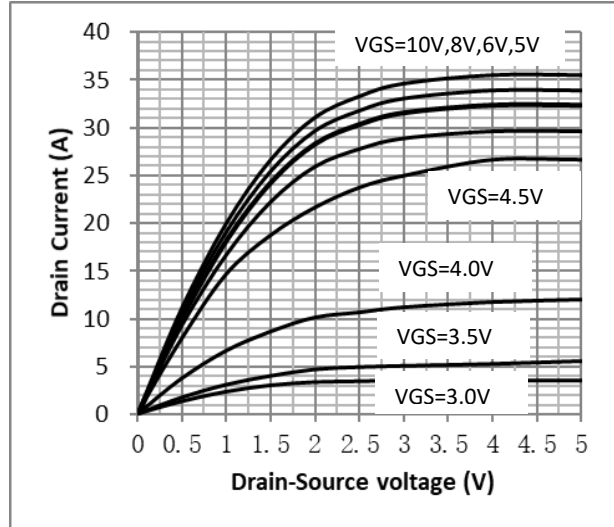


Fig.3 Threshold Voltage V.S Junction Temperature

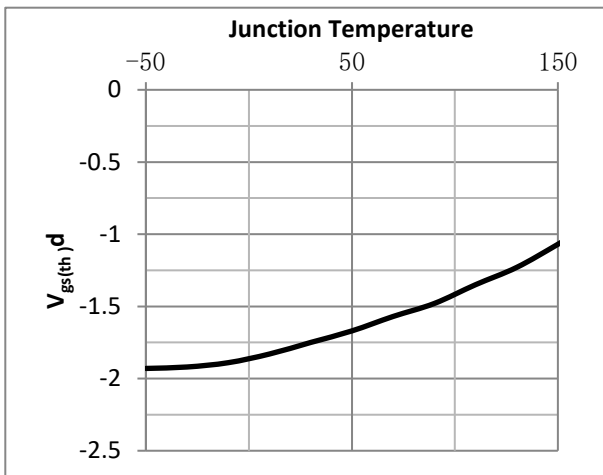


Fig.4 Resistance V.S Drain Current

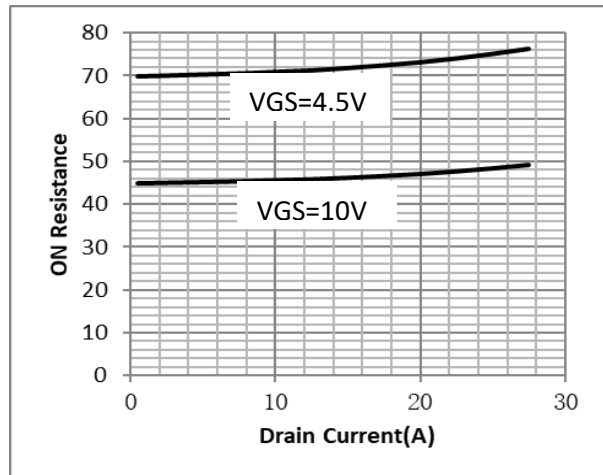


Fig.5 On-Resistance VS Gate Source Voltage

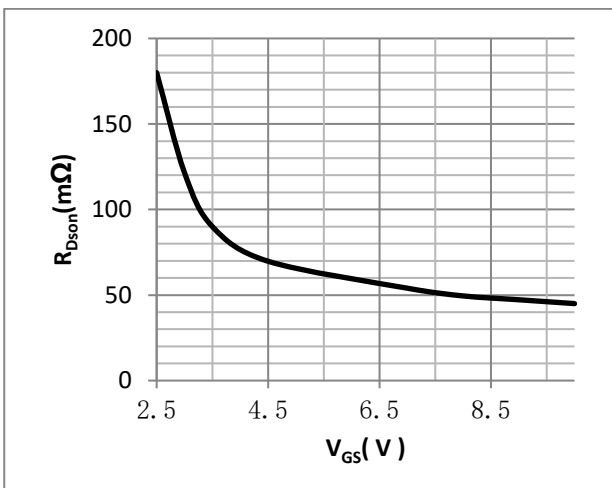


Fig.6 On-Resistance V.S Junction Temperature

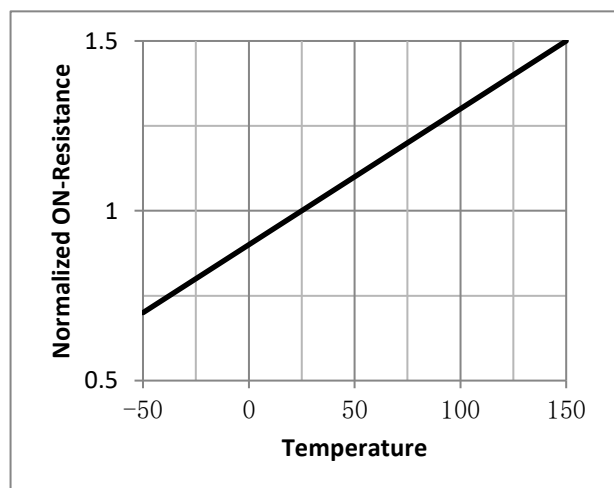


Fig.7 SOA Maximum Safe Operating Area

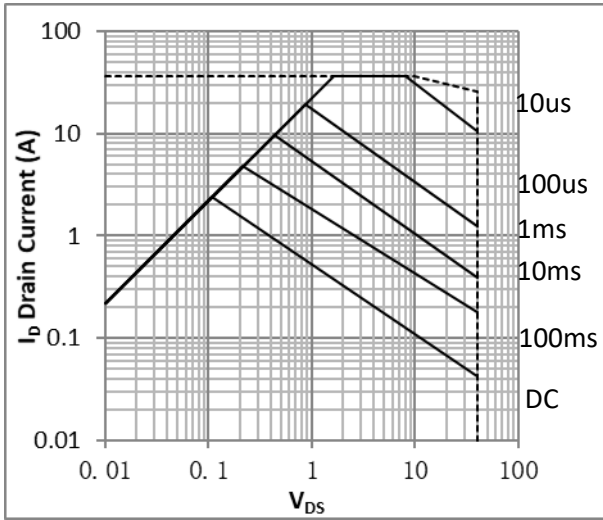


Fig.8 ID-Junction Temperature

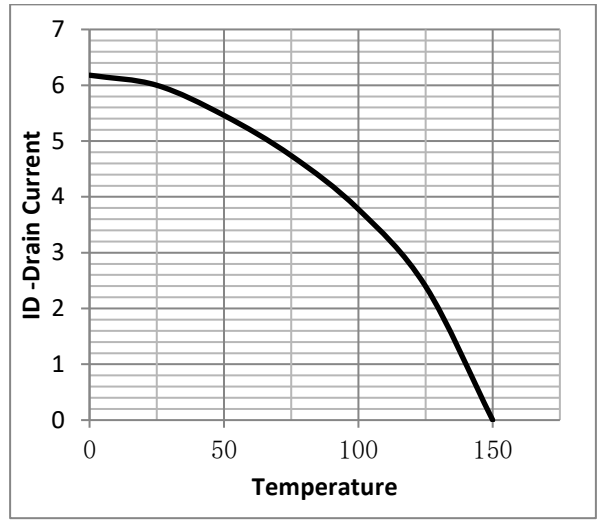


Figure 9. Gate-to-Source and Drain-to-Source Voltage vs. Total Charge

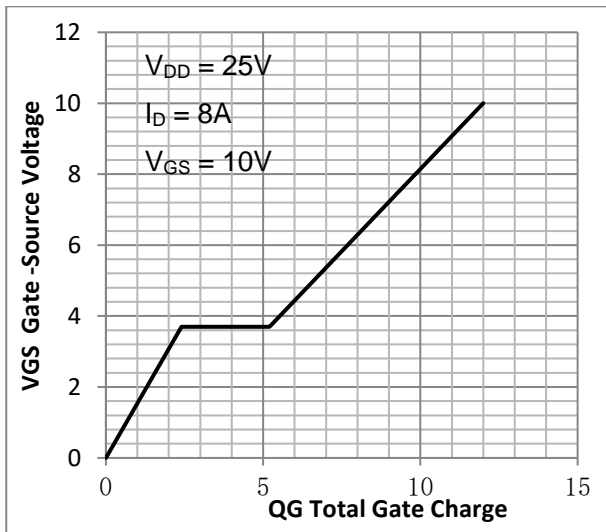


Fig.10 Capacitance Variation

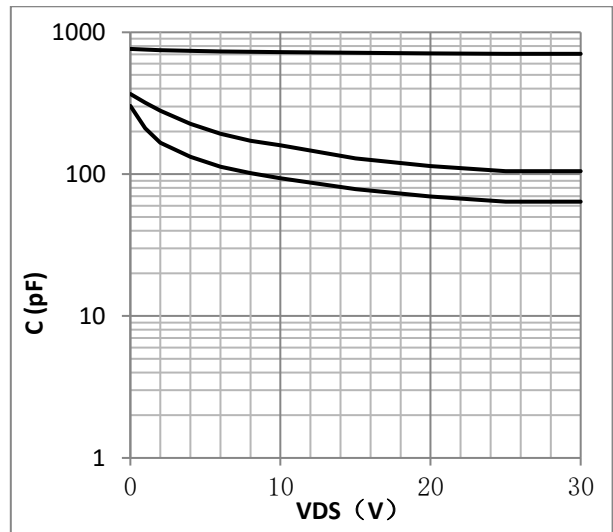


Fig.11 Normalized Maximum Transient Thermal Impedance

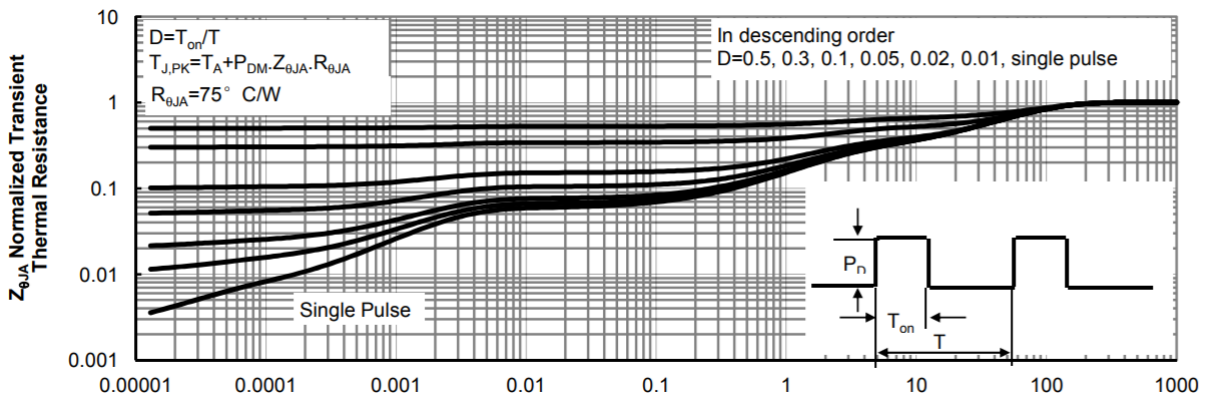


Fig.12 Switching Time Measurement Circuit

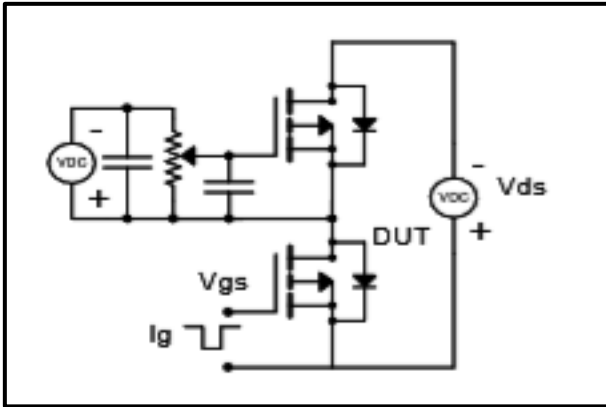


Fig.13 Gate Charge Waveform

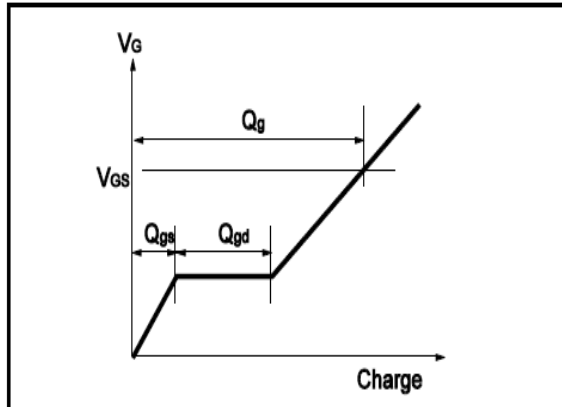


Fig.14 Switching Time Measurement Circuit

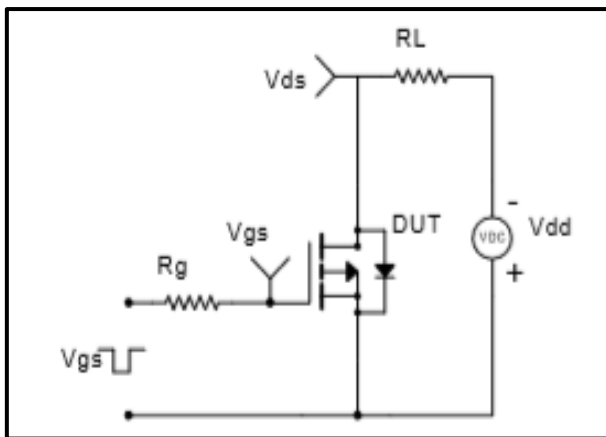


Fig.15 Gate Charge Waveform

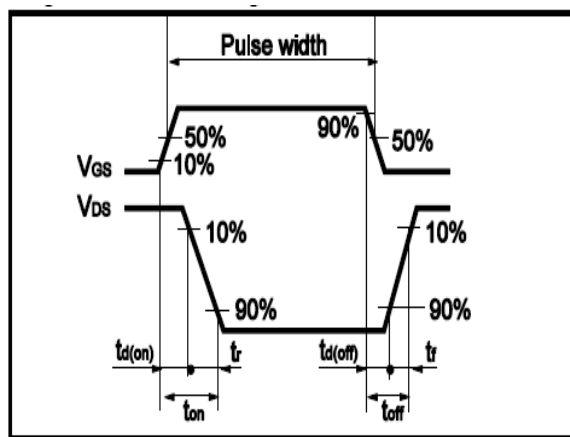


Fig.16 Avalanche Measurement Circuit

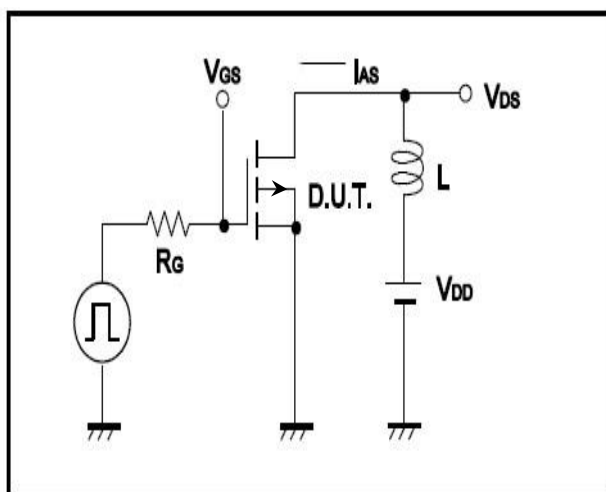
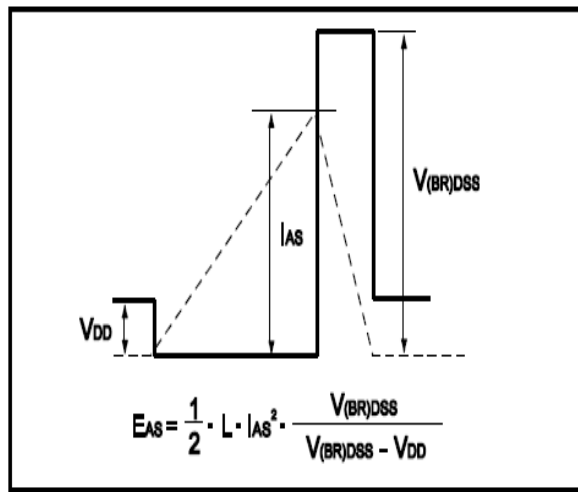


Fig.17 Avalanche Waveform



●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

