

• General Description

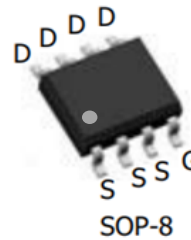
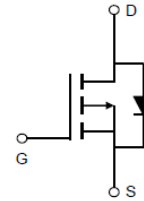
The ZM038P03S combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$.

• 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

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

• Product Summary
 $V_{DS} = -30V$
 $R_{DS(ON)} = 3.8m\Omega$
 $I_D = -24A$

• Ordering Information:

Part NO.	ZM038P03S
Marking	ZM038P03
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}	-30	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	$I_D @ T_C = 25^\circ C$	-24	A
	$I_D @ T_C = 75^\circ C$	-18	A
	$I_D @ T_C = 100^\circ C$	-15	A
Pulsed Drain Current ^①	I_{DM}	-55	A
Total Power Dissipation ^②	$P_D @ T_C = 25^\circ C$	4.0	W
Total Power Dissipation	$P_D @ T_A = 25^\circ C$	0.75	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}	180	mJ

•Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case ^②	R _{thJC}	-	-	32	° C/W
Thermal resistance, junction - ambient	R _{thJA}	-	-	170	° 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	-30			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 =-9A		3.8	6	mΩ
		V _{GS} =-4.5V, I _D =-8A		5.8	8	mΩ
Forward Transconductance	g _{FS}	V _{DS} =-10V, I _D =-5A		32		s
Diode Forward Voltage	V _{SD}	I _S =-1A, V _{GS} =0V		-0.69	-0.9	V
Maximum Body-Diode Continuous Current	I _S				-10	A

•Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	C _{iss}	V _{GS} =0V, V _{DS} =-15V, f=1MHz	-	4650	-	pF
Output capacitance	C _{oss}		-	460	-	
Reverse transfer capacitance	C _{rss}		-	320	-	
Gate resistance	R _g	V _{GS} =0V, V _{DS} =0V, f=1MHz	-	4.5	-	Ω

•Switching Parameters (T_a = 25°C)

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Total gate charge	Q _g	V _{GS} =-10V, V _{DS} =-15V, I _D =-20A	-	75	-	nC
Gate - Source charge	Q _{gs}		-	14	-	
Gate - Drain charge	Q _{gd}		-	25	-	
Turn-ON Delay time	t _{D(on)}	V _{GS} =-10V,		15		nS



Turn-ON Rise time	t_r	VDS=-15V, R =0.75Ω, R =3Ω		17		
Turn-Off Delay time	$t_{D(off)}$			96		
Turn-Off Fall time	t_f			76		
Body Diode Reverse Recovery Time	t_{rr}	IF=-20A, dI/dt=500A/μs		36		nS
Body Diode Reverse Recovery Charge	Q_{rr}	IF=-20A, dI/dt=500A/μs		75		nC

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

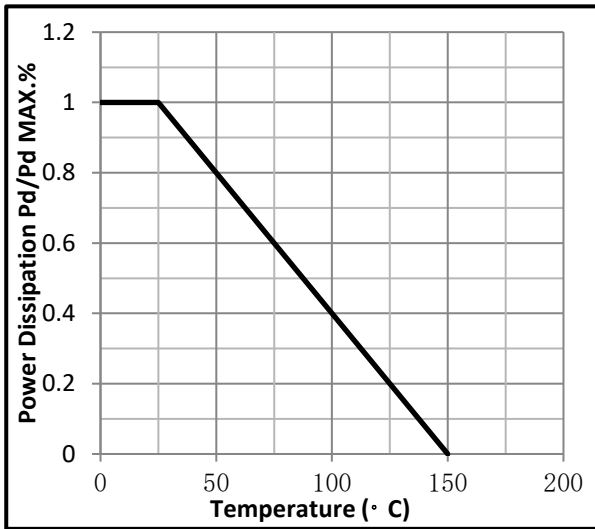


Fig.2 Typical output Characteristics

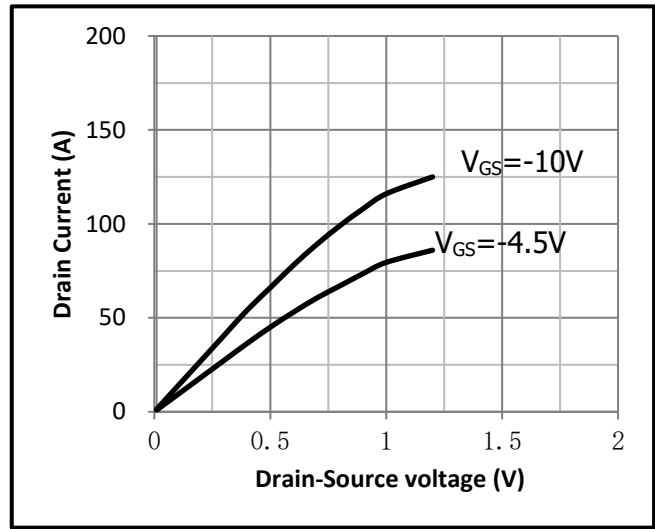


Fig.3 Threshold Voltage V.S Junction Temperature

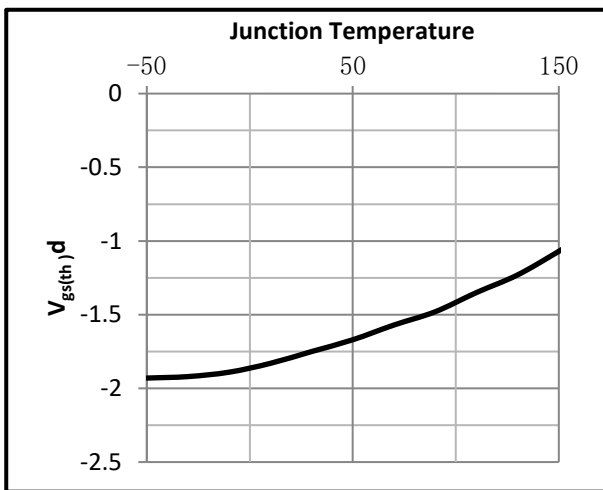


Fig.4 Resistance V.S Drain Current

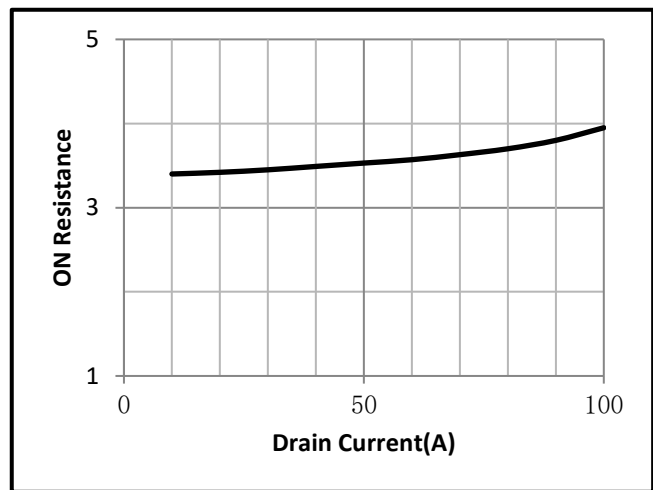


Fig.5 On-Resistance VS Gate Source Voltage

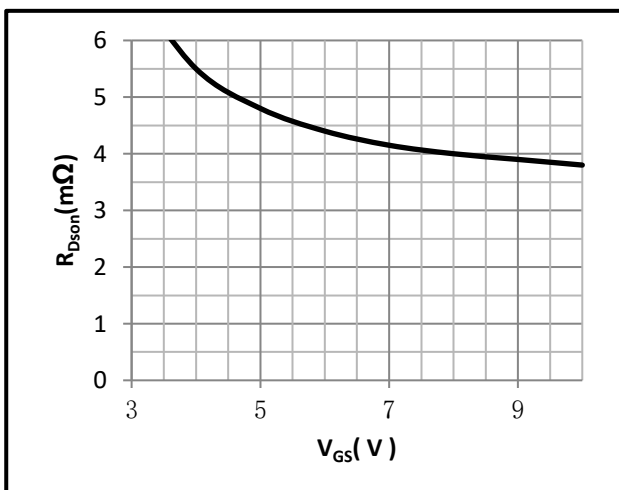


Fig.6 On-Resistance V.S Junction Temperature

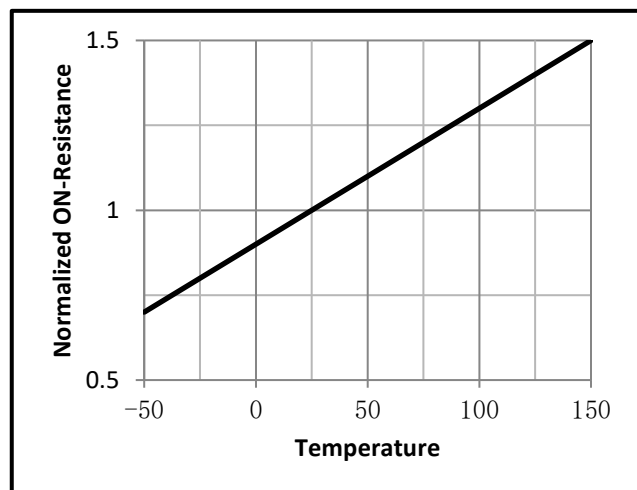


Fig.7 Switching Time Measurement Circuit

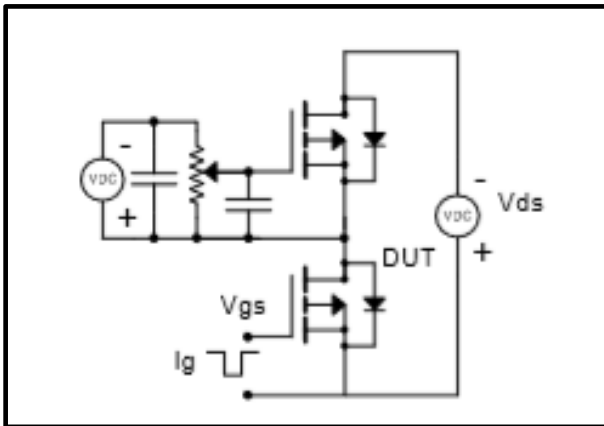


Fig.8 Gate Charge Waveform

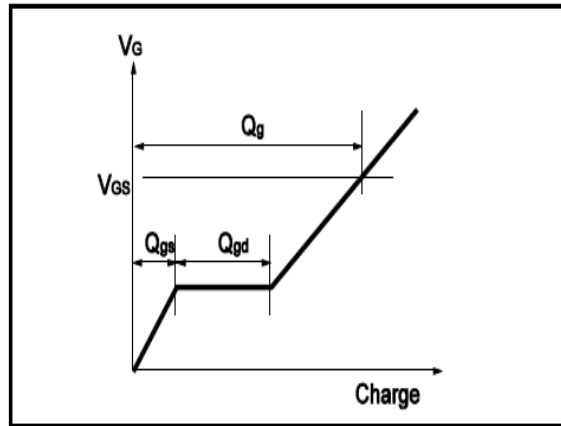


Fig.9 Switching Time Measurement Circuit

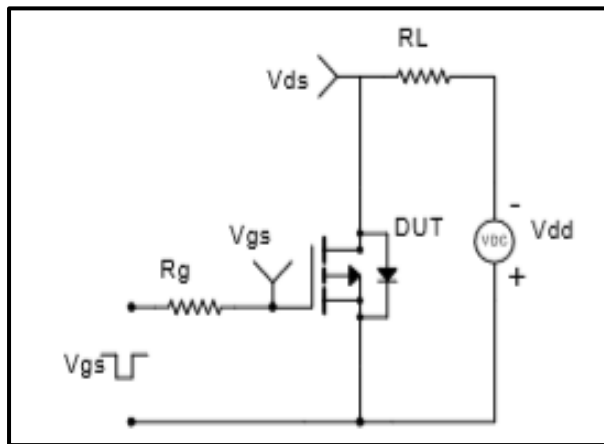


Fig.10 Gate Charge Waveform

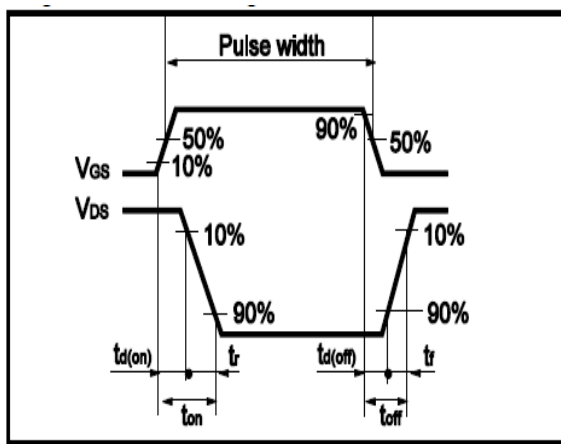


Fig.11 Avalanche Measurement Circuit

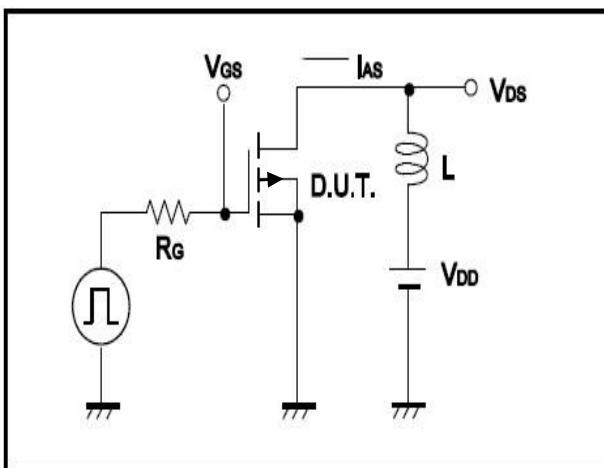
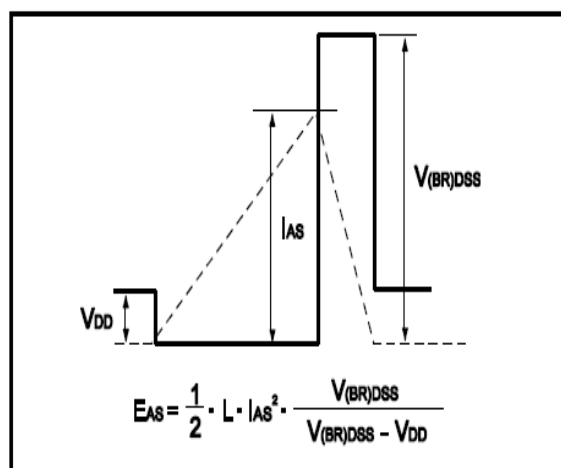


Fig.12 Avalanche Waveform



●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

