

• General Description

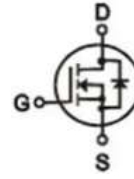
The ZM094N03M combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. This device is ideal for load switch and battery protection applications.

• 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

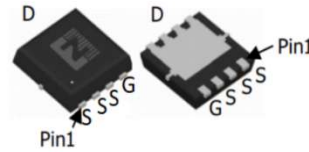
- MB/VGA Vcore
- SMPS 2nd Synchronous Rectifier
- POL application
- BLDC Motor driver

• Product Summary


$V_{DS} = 30V$

$R_{DS(ON)} = 9.4m\Omega$

$I_D = 35A$


DFN3 x 3
• Ordering Information:

Part NO.	ZM094N03M
Marking	094N03
Packing Information	REEL TAPE
Basic ordering unit (pcs)	5000

• 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	$I_{D@TC=25^\circ C}$	35	A
	$I_{D@TC=75^\circ C}$	26	A
	$I_{D@TC=100^\circ C}$	22	A
Pulsed Drain Current ^①	I_{DM}	70	A
Total Power Dissipation ^②	$P_D@TC=25^\circ C$	22	W
Total Power Dissipation	$P_D@TA=25^\circ C$	1	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}	-	-	5.6	° C/W
Thermal resistance, junction - ambient	R _{thJA}	-	-	125	° 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	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 = 8A		9.4	12	mΩ
		V _{GS} = 4.5V, I _D = 6A		13	18	mΩ
Forward Transconductance	g _{FS}	V _{DS} = 10V, I _D = 5A		9		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}	V _{DS} = 25V f = 1MHz	-	850	-	pF
Output capacitance	C _{oss}		-	190	-	
Reverse transfer capacitance	C _{rss}		-	100	-	

●Gate Charge characteristics(T_a = 25°C)

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Gate Resistance	R _g	f = 1MHz		2		Ω
Total gate charge	Q _g	V _{DD} = 15V I _D = 8A V _{GS} = 10V	-	10	-	nC
Gate - Source charge	Q _{gs}		-	4	-	
Gate - Drain charge	Q _{gd}		-	6	-	
Turn-on Delay Time	t _{d(on)}	V _{DS} = 25V		5		ns



Turn-on Rise time Rise Time	t_r	$I_D = 8A$ $V_{GS}=10V$ $R_{GEN}=3\Omega$	3	ns
Turn-off Delay Time	$t_{d(off)}$		18	ns
Turn-off Fall Time	t_f		3	ns

Note: ① Pulse Test : Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$;

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

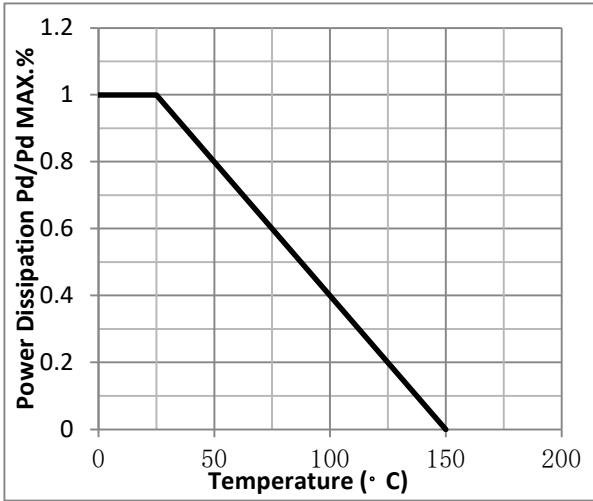


Fig.2 Typical output Characteristics

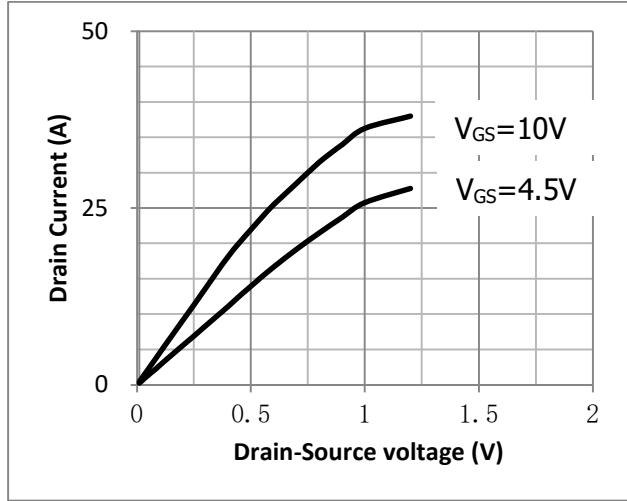


Fig.3 Threshold Voltage V.S Junction Temperature

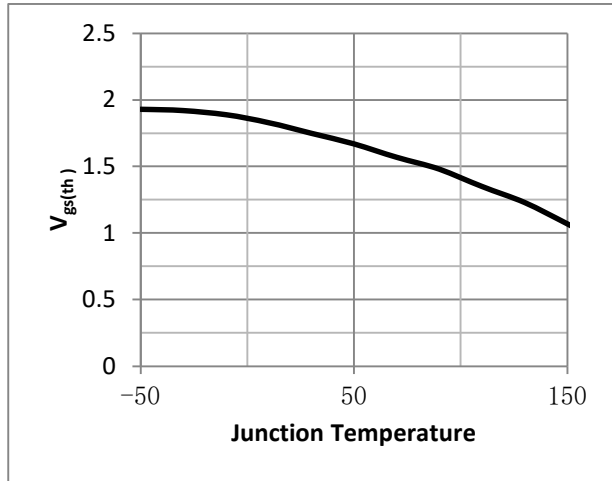


Fig.4 Resistance V.S Drain Current

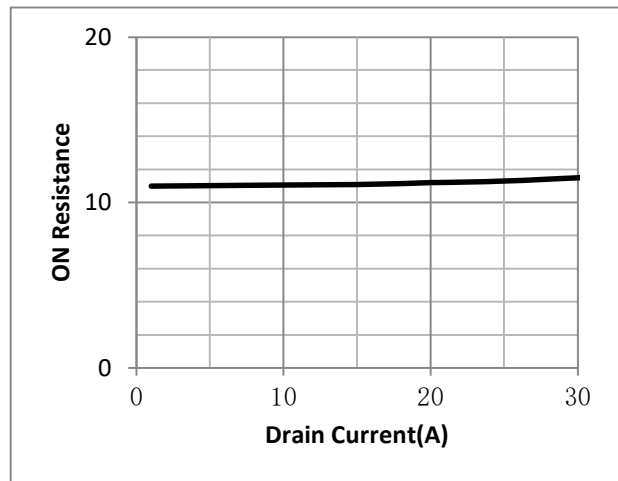


Fig.5 On-Resistance VS Gate Source Voltage

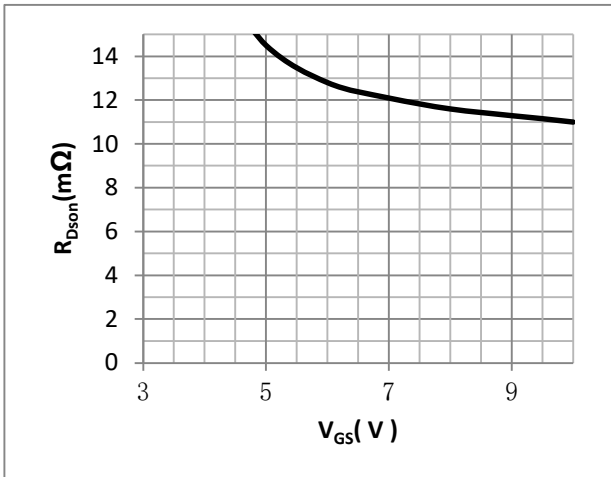


Fig.6 On-Resistance V.S Junction Temperature

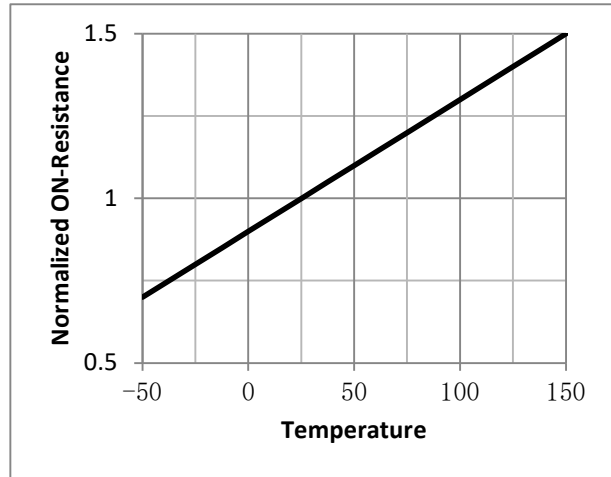


Fig.7 Gate Charge Measurement Circuit

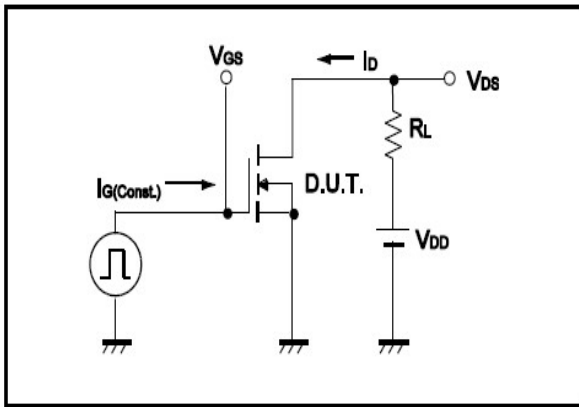


Fig.8 Gate Charge Waveform

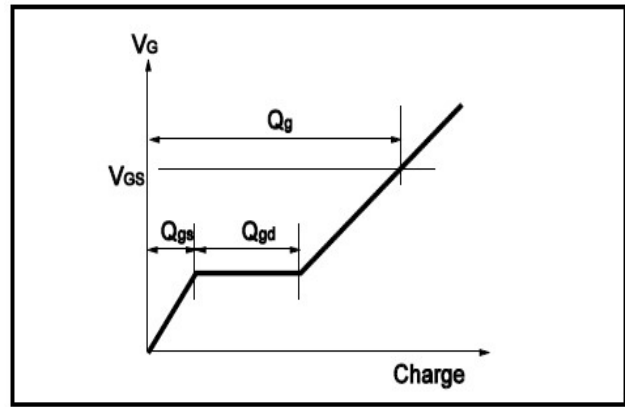


Fig.9 Switching Time Measurement Circuit

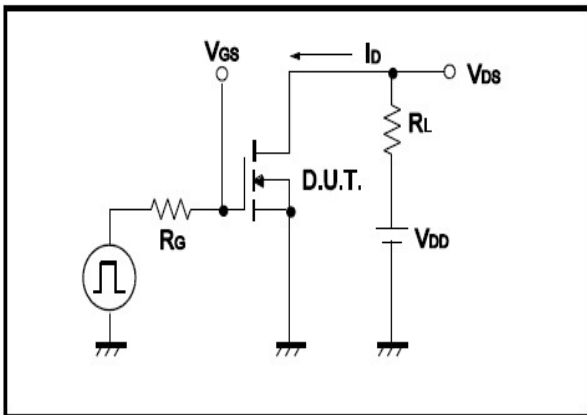


Fig.10 Switching Time Waveform

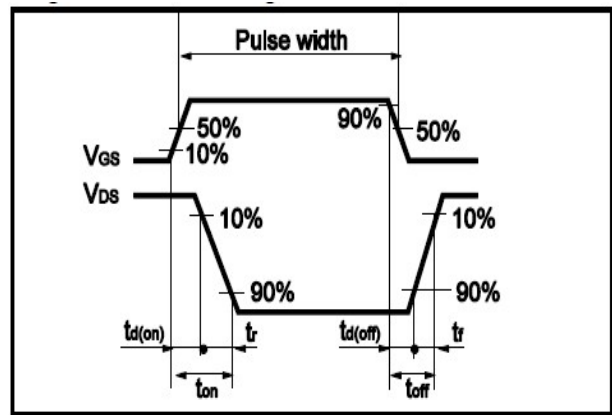


Fig.11 Avalanche Measurement Circuit

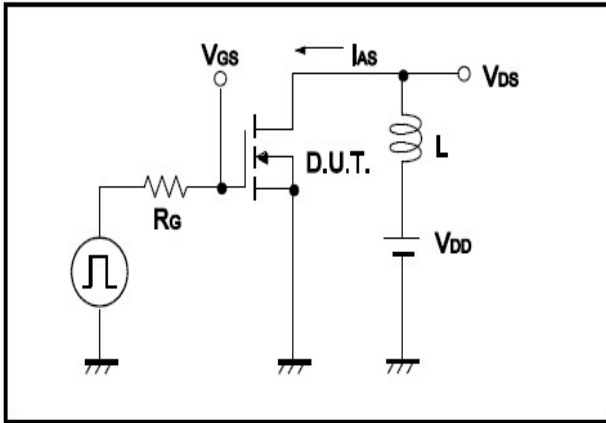
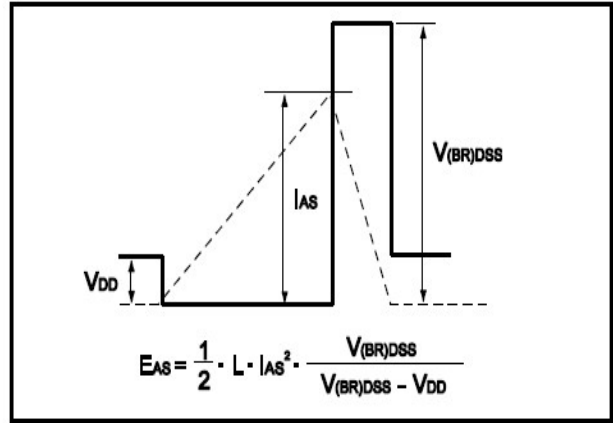


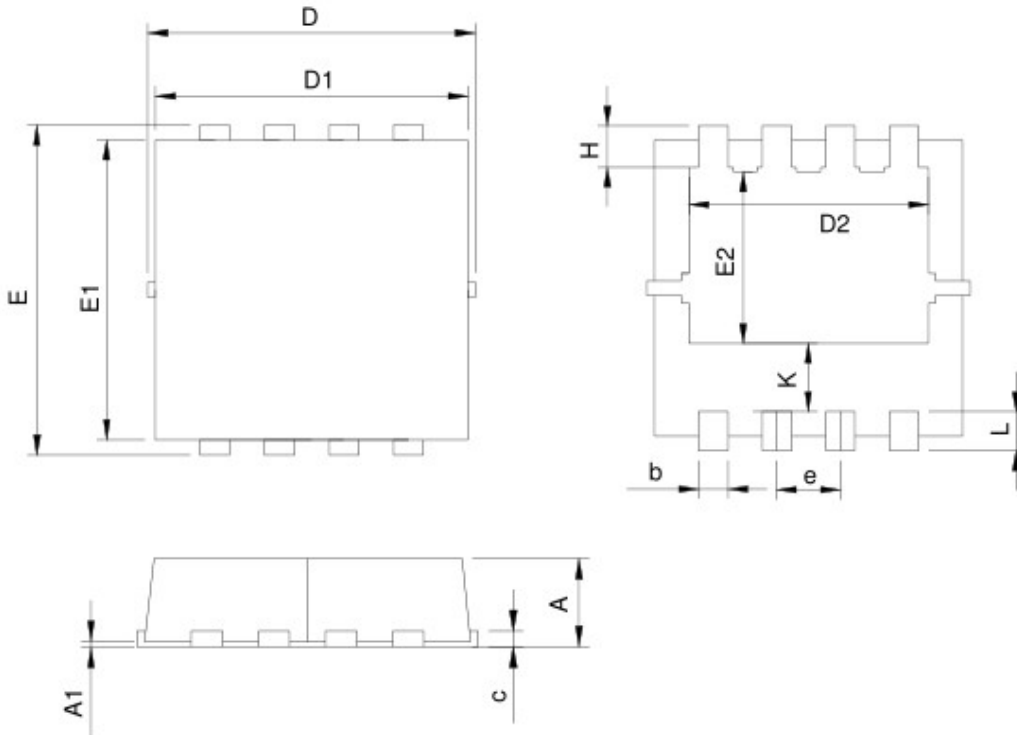
Fig.12 Avalanche Waveform





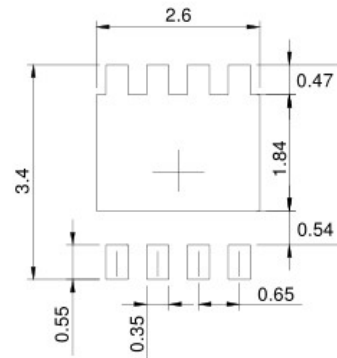
•Dimensions(DFN3×3)

Unit: mm



SYMBOL	DFN3.3x3.3-8			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	0.70	1.00	0.028	0.039
A1	0.00	0.05	0.000	0.002
b	0.25	0.35	0.010	0.014
c	0.14	0.20	0.006	0.008
D	3.10	3.50	0.122	0.138
D1	3.05	3.25	0.120	0.128
D2	2.35	2.55	0.093	0.100
E	3.10	3.50	0.122	0.138
E1	2.90	3.10	0.114	0.122
E2	1.64	1.84	0.065	0.072
e	0.65 BSC		0.026 BSC	
H	0.32	0.52	0.013	0.020
K	0.59	0.79	0.023	0.031
L	0.25	0.55	0.010	0.022

RECOMMENDED LAND PATTERN



UNIT: mm