

**• General Description**

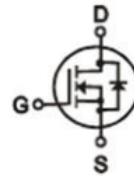
The ZM094N03M combines advanced trench MOSFET technology with a low resistance package to provide extremely low  $R_{DS(ON)}$ . This device is ideal for load switch and battery protection applications.

**• 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**

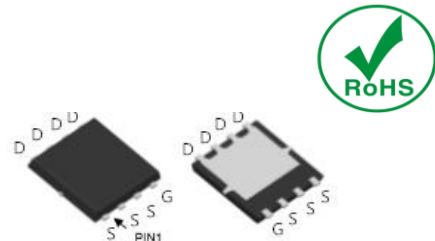
- MB/VGA Vcore
- SMPS 2<sup>nd</sup> Synchronous Rectifier
- POL application
- BLDC Motor driver

**• 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	$V_{GS}$	$\pm 20$	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
	$I_{D@TA=25^\circ C}$	10.3	A
	$I_{D@TA=70^\circ C}$	8.2	A
Pulsed Drain Current <sup>①</sup>	$I_{DM}$	70	A
Total Power Dissipation <sup>②</sup>	$P_D@TC=25^\circ C$	40	W
Total Power Dissipation	$P_D@TA=25^\circ C$	2.0	W
Operating Junction Temperature	$T_J$	-55 to 150	$^\circ C$

Storage Temperature	$T_{STG}$	-55 to 150	°C
Single Pulse Avalanche Energy	$E_{AS}$	30	mJ

**•Thermal resistance**

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case <sup>②</sup>	$R_{thJC}$	-	-	3.1	° C/W
Thermal resistance, junction - ambient	$R_{thJA}$	-	-	60	° 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	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	30			V
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	1.2		2.5	V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=30V, V_{GS}=0V$			1.0	$\mu A$
Gate- Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 12V, V_{DS}=0V$			$\pm 100$	nA
Static Drain-source On Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=8A$		9.4	12	m $\Omega$
		$V_{GS}=4.5V, I_D=6A$		13	18	m $\Omega$
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	$C_{iss}$	$f = 1MHz$	-	850	-	pF
Output capacitance	$C_{oss}$		-	190	-	
Reverse transfer capacitance	$C_{rss}$		-	100	-	

**•Gate Charge characteristics ( $T_a = 25^\circ C$ )**

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Gate Resistance	$R_g$	$f = 1MHz$		2		$\Omega$
Total gate charge	$Q_g$	$V_{DD}=25V$	-	10	-	nC

Gate - Source charge	$Q_{gs}$	$I_D = 8A$ $V_{GS} = 10V$	-	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	$t_r$	$I_D = 8A$		3		ns
Turn-off Delay Time	$t_{d(off)}$	$V_{GS} = 10V$		18		ns
Turn-off Fall Time	$t_f$	$R_{GEN} = 3\Omega$		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

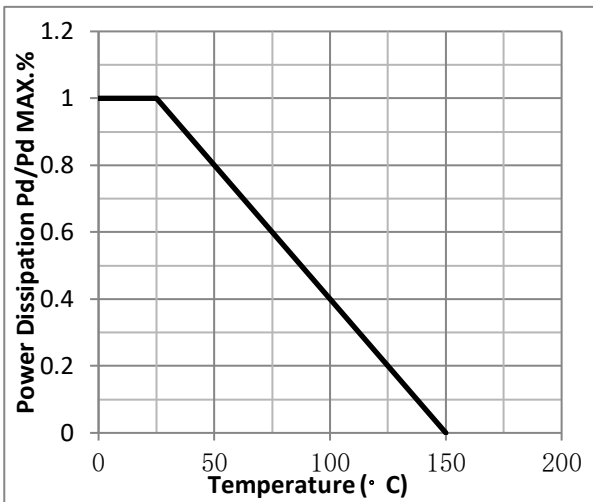


Fig.2 Typical output Characteristics

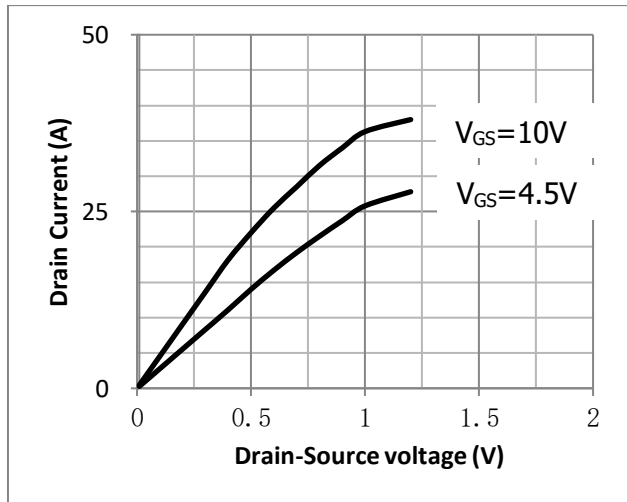


Fig.3 Threshold Voltage V.S Junction Temperature

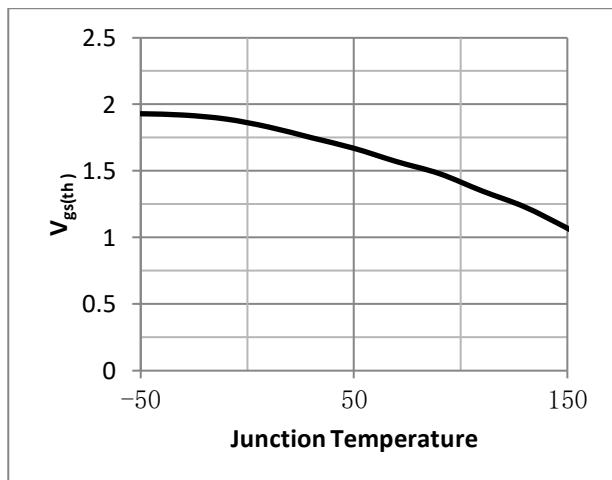


Fig.4 Resistance V.S Drain Current

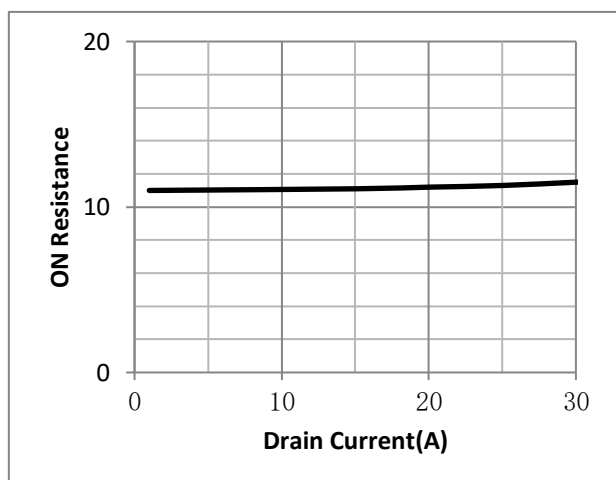


Fig.5 On-Resistance VS Gate Source Voltage

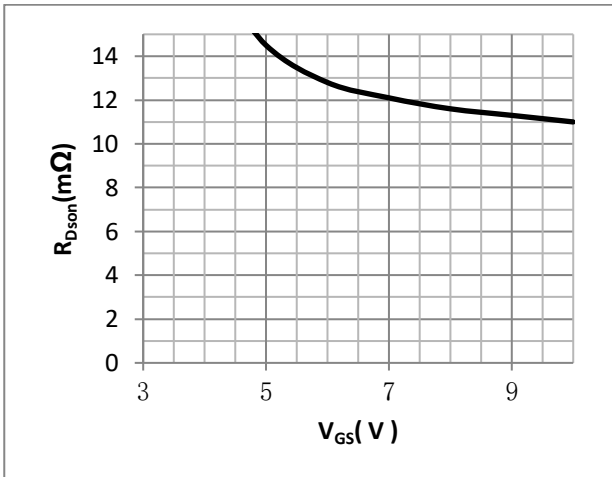


Fig.6 On-Resistance V.S Junction Temperature

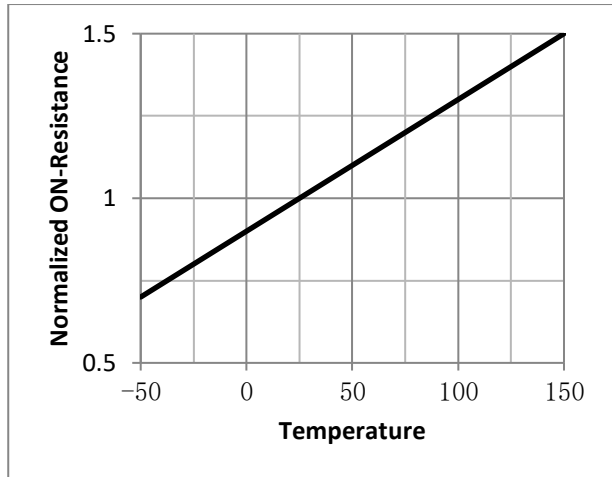


Fig.7 Switching Time Measurement Circuit

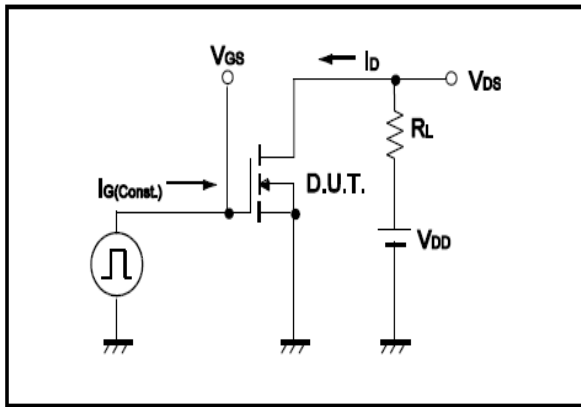


Fig.8 Gate Charge Waveform

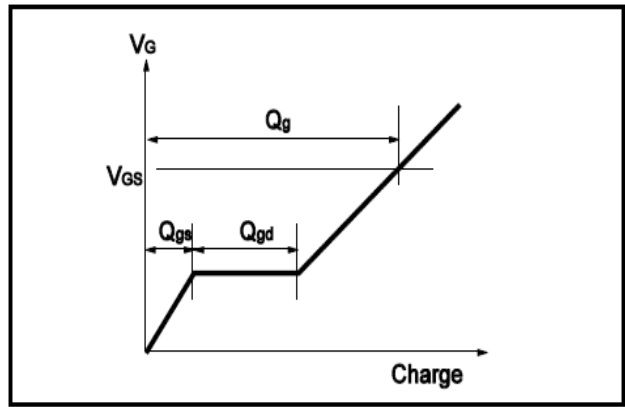


Fig.9 Switching Time Measurement Circuit

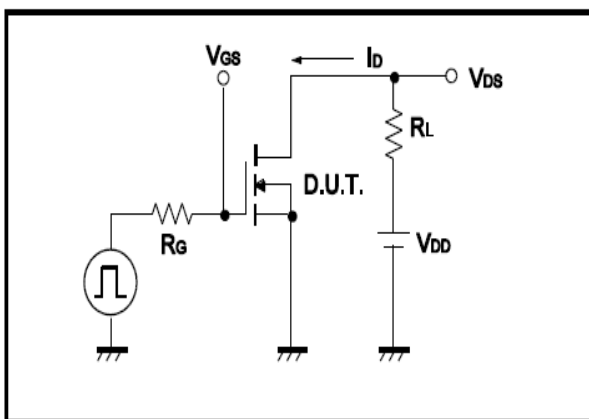


Fig.10 Gate Charge Waveform

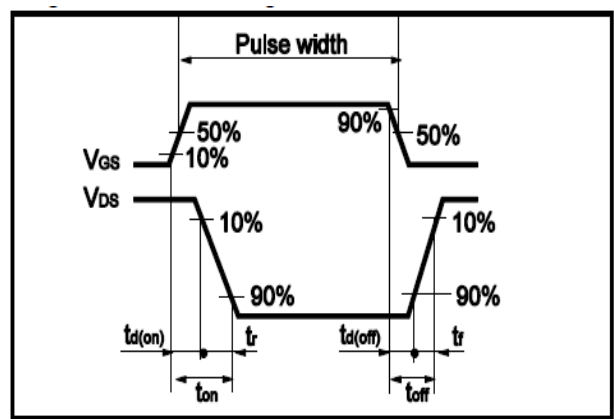


Fig.11 Avalanche Measurement Circuit

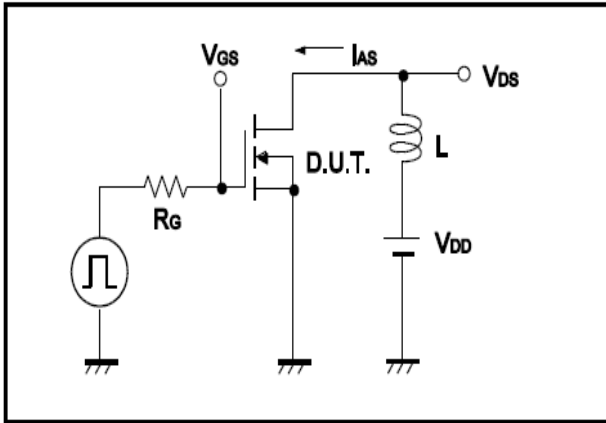
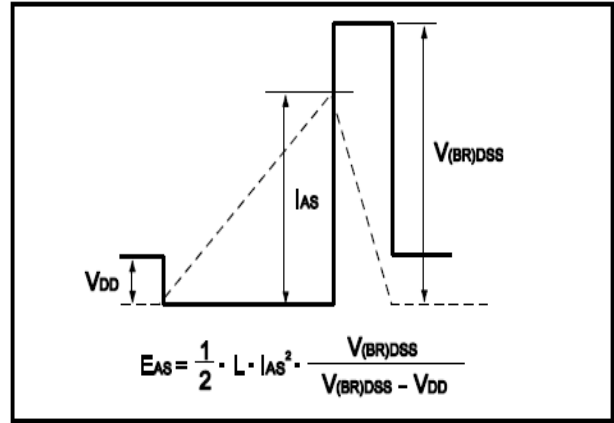


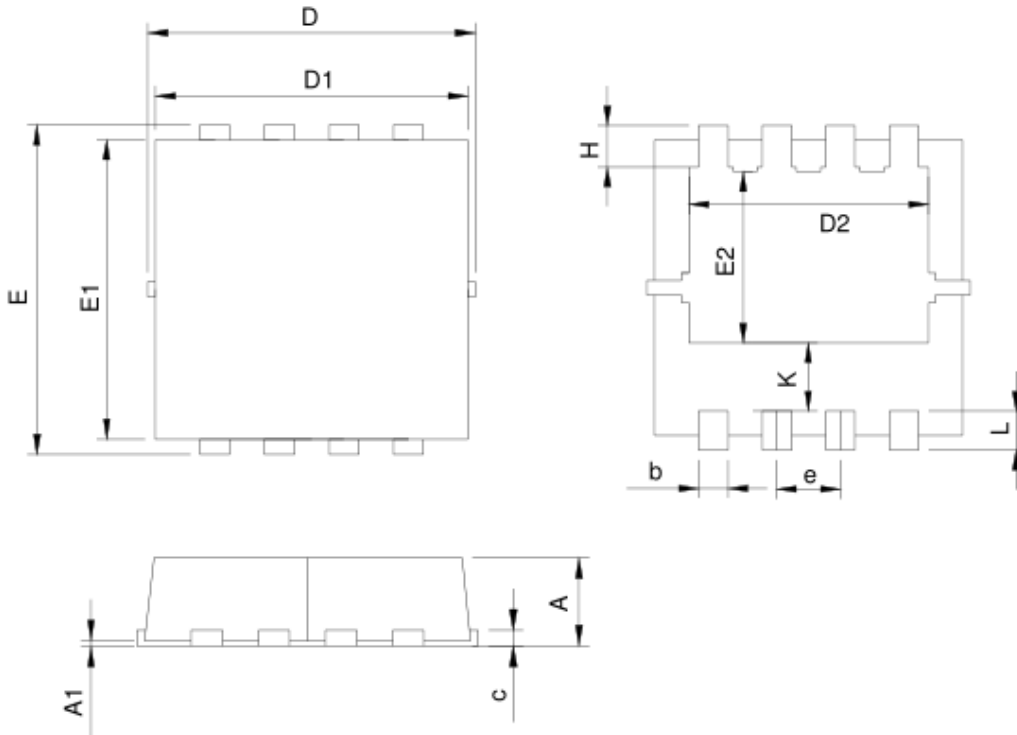
Fig.12 Avalanche Waveform





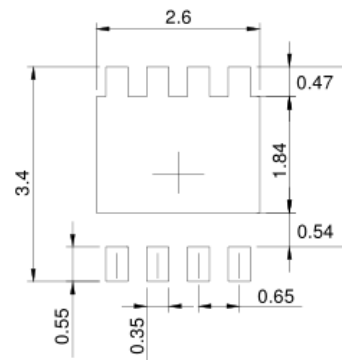
•Dimensions(DFN3x3)

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