

• General Description

The ZM045N03M 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.

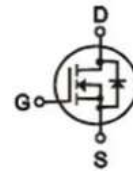
• Features

- 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

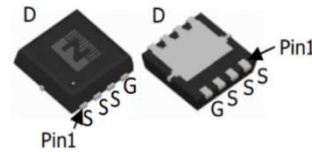
• Product Summary



$V_{DS} = 30V$

$R_{DS(ON)} = 4.5m\Omega$

$I_D = 60A$



DFN3 x 3

• Ordering Information:

Part NO.	ZM045N03M
Marking	045N03
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	$I_{D@TC=25^\circ C}$	60	A
	$I_{D@TC=75^\circ C}$	45	A
	$I_{D@TC=100^\circ C}$	38	A
Pulsed Drain Current ^①	I_{DM}	150	A
Total Power Dissipation($TC=25^\circ C$)	$P_{D@TC=25^\circ C}$	19	W
Total Power Dissipation($TA=25^\circ C$)	$P_{D@TA=25^\circ C}$	0.9	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}	260	mJ

•Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	-	-	6.5	° C/W
Thermal resistance, junction - ambient	R_{thJA}	-	-	130	° 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}	$V_{GS}=0V, I_D=250\mu A$	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	μA
Gate- Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$			± 100	nA
Static Drain-source On Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=20A$		4.5	6.0	m Ω
		$V_{GS}=4.5V, I_D=10A$		7.0	9.0	m Ω
Forward Trans conductance	g_{FS}	$V_{DS}=25V, I_D=10A$		16		S
Source-drain voltage	V_{SD}	$I_S=20A$		0.8	1.28	V

•Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	C_{iss}	$V_{DS}=25V$ $f = 1MHz$	-	1500	-	pF
Output capacitance	C_{oss}		-	280	-	
Reverse transfer capacitance	C_{rss}		-	140	-	

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

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Total gate charge	Q_g	$V_{DD}=15V$ $I_D=20A$ $V_{GS}=10V$	-	16	-	nC
Gate - Source charge	Q_{gs}		-	5	-	
Gate - Drain charge	Q_{gd}		-	8	-	
Turn-ON Delay time	$t_{D(on)}$	$V_{GS}=10V, V_{DS}=15V$ $R_G=3.3\Omega, I_D=15A$		7.5		ns
Turn-ON Rise time	t_r			14		ns
Turn-Off Delay time	$t_{D(off)}$			35		ns
Turn-Off Fall time	t_f			10		ns

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

Fig.1 Power Dissipation

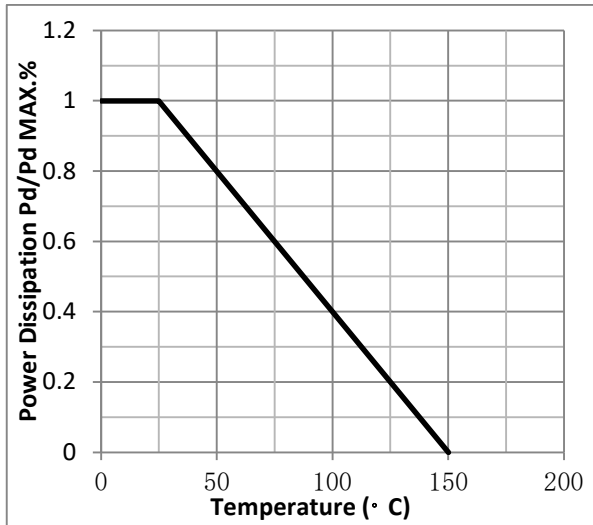


Fig.2 Typical output Characteristics

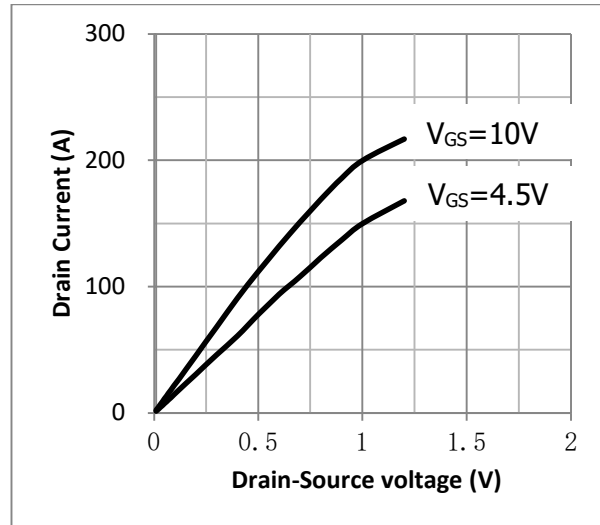


Fig.3 Threshold Voltage V.S Junction Temperature

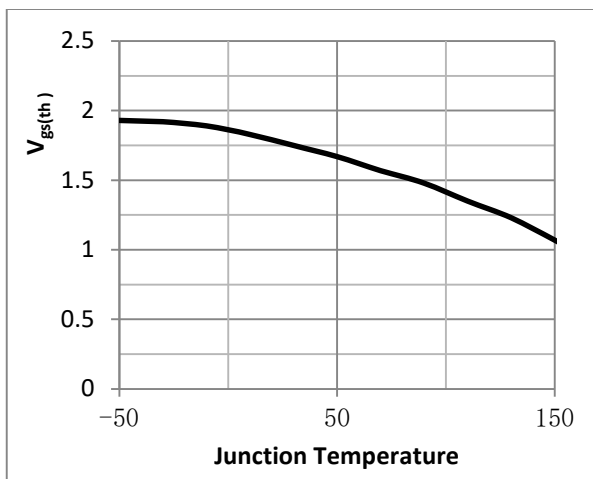


Fig.4 Resistance V.S Drain Current

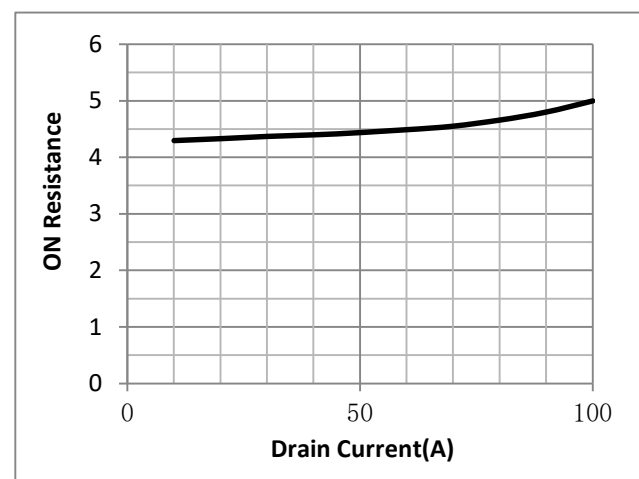


Fig.5 On-Resistance VS Gate Source Voltage

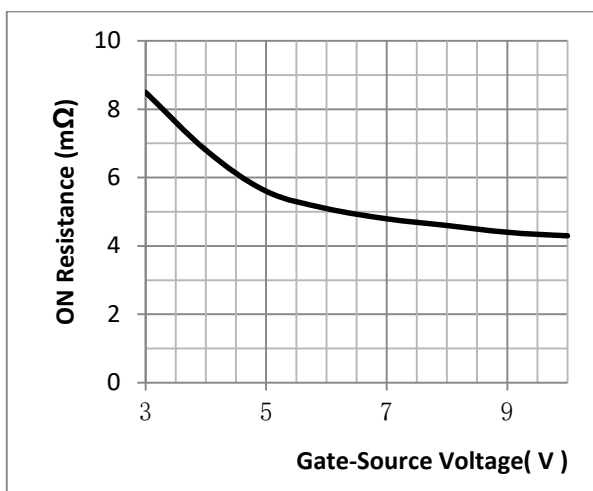


Fig.6 On-Resistance V.S Junction Temperature

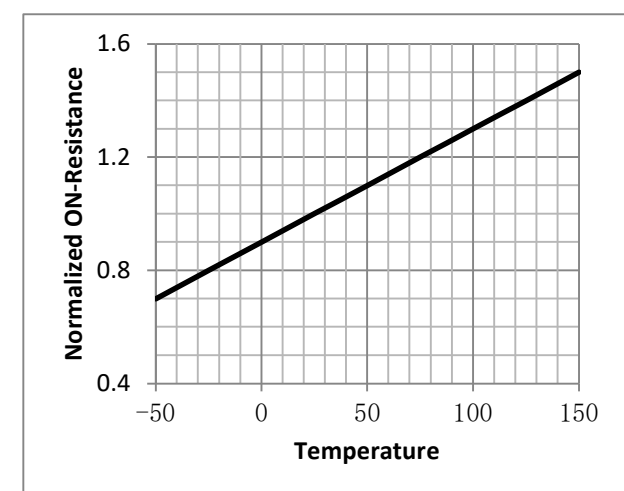


Fig.7 ID V.S Junction Temperature

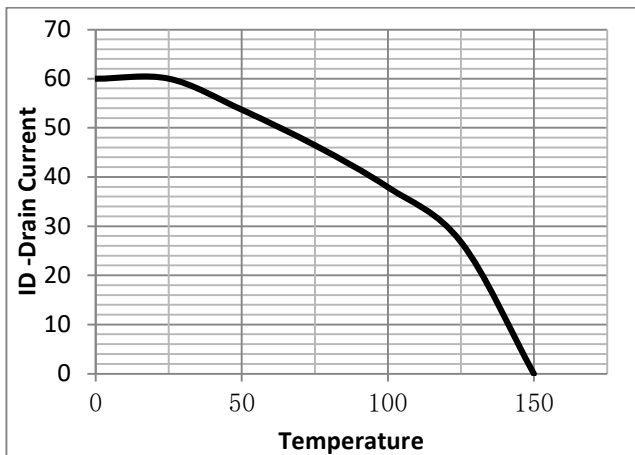


Fig.8 Gate Charge Measurement Circuit

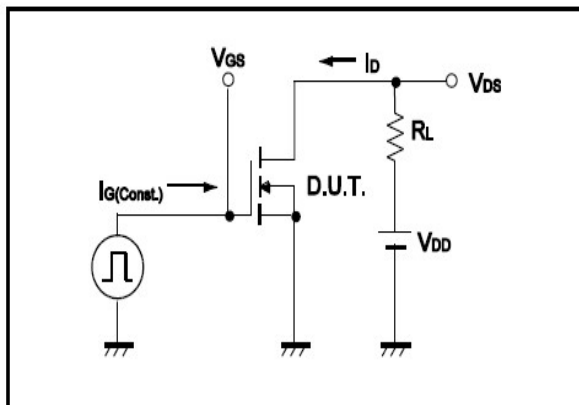


Fig.9 Gate Charge Waveform

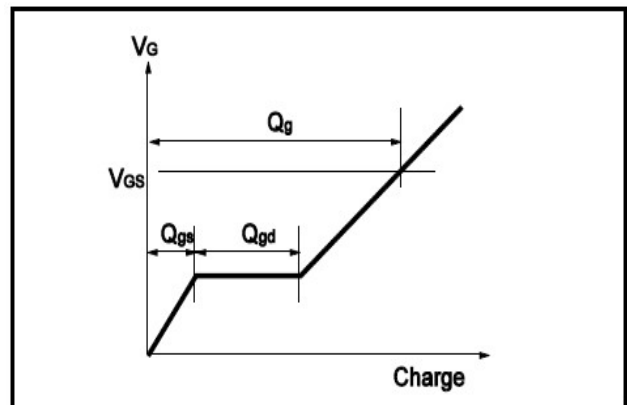


Fig.10 Switching Time Measurement Circuit

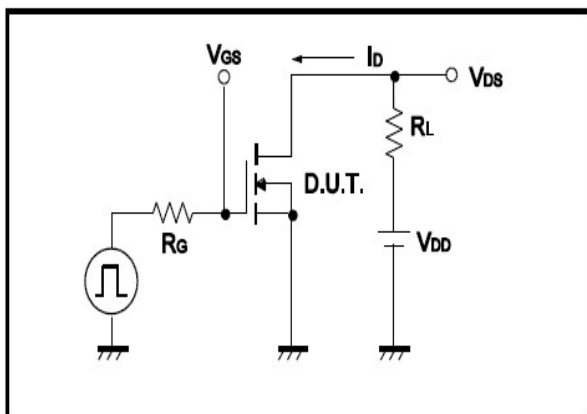


Fig.11 Switching Time Waveform

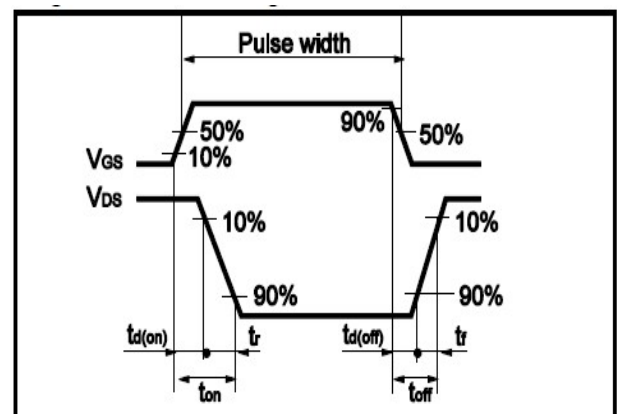


Fig.12 Avalanche Measurement Circuit

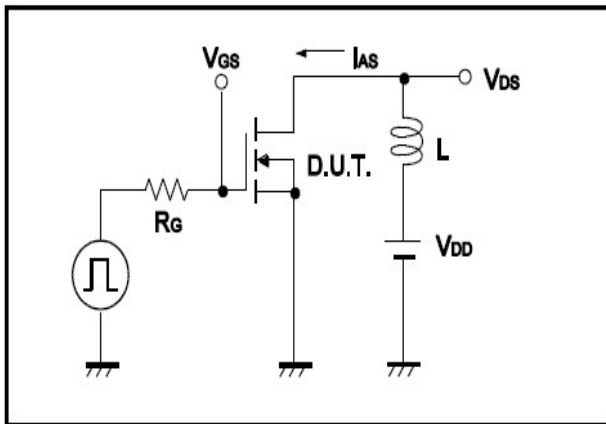
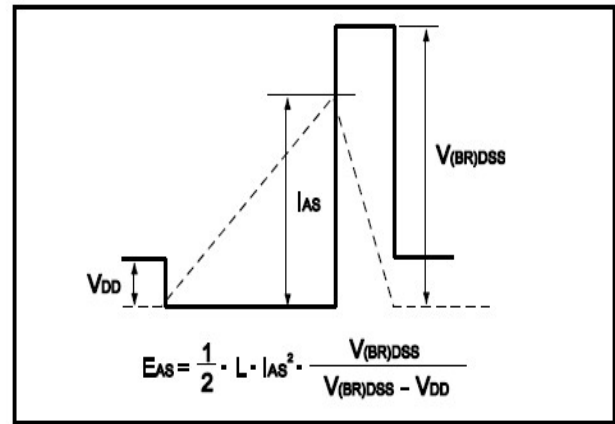


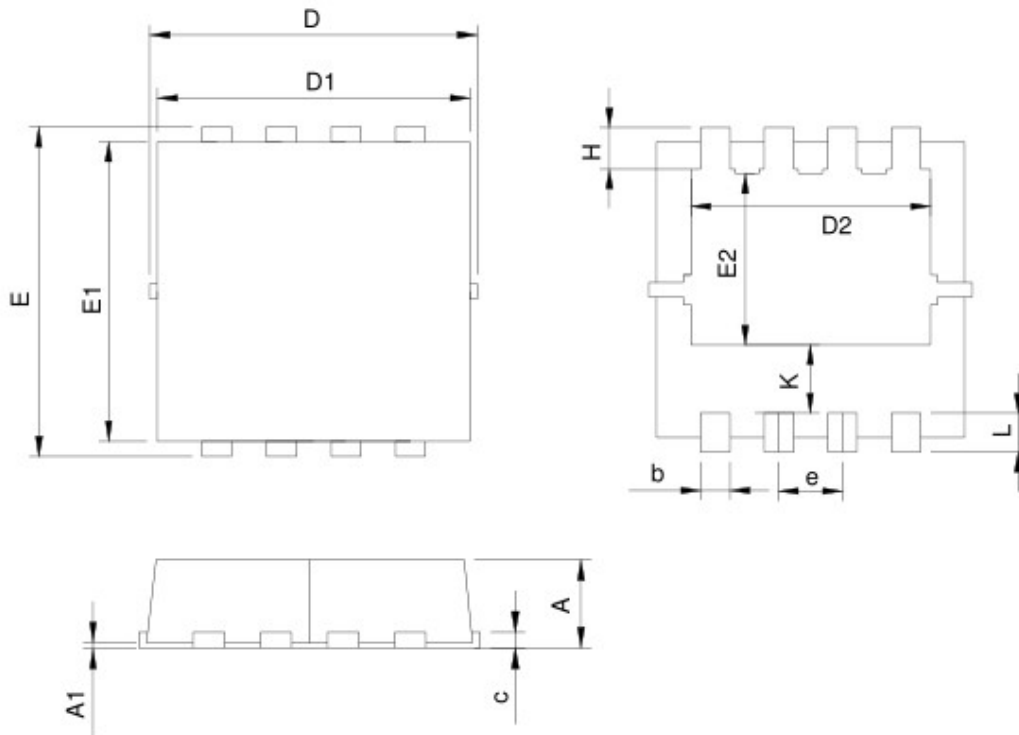
Fig.13 Avalanche Waveform





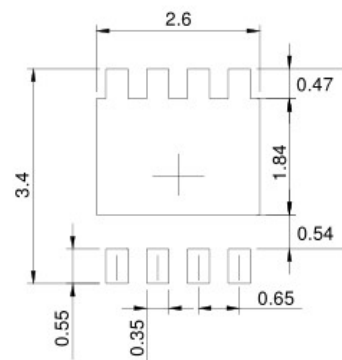
●Dimensions(DFN3×3)

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