

**• General Description**

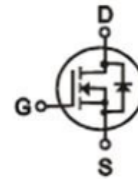
It combines advanced SGT MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$.

• 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

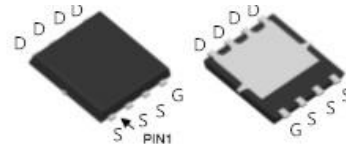
- MB/VGA Vcore
- SMPS 2nd Synchronous Rectifier
- POL application
- BLDC Motor driver

• Product Summary

$V_{DS} = 30V$

$R_{DS(ON)} = 5.3m\Omega$

$I_D = 36A$



DFN3 x 3

• Ordering Information:

Part NO.	ZMS053N03M
Marking	053N03
Packing Information	REEL TAPE
Basic ordering unit (pcs)	5000

• Absolute Maximum Ratings (TC=25°C)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	$I_D @ TC=25^\circ C$	36	A
	$I_D @ TC=75^\circ C$	27	A
	$I_D @ TC=100^\circ C$	23	A
Pulsed Drain Current ①	I_{DM}	108	A
Total Power Dissipation(TC=25°C)	$P_D @ TC=25^\circ C$	20	W
Total Power Dissipation(TA=25°C)	$P_D @ TA=25^\circ C$	1.7	W
Operating Junction Temperature	T_J	-55 to 150	°C
Storage Temperature	T_{STG}	-55 to 150	°C
Single Pulse Avalanche Energy	E_{AS}	40	mJ



•Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	-	-	6.0	$^{\circ}C/W$
Thermal resistance, junction - ambient	R_{thJA}	-	-	70	$^{\circ}C/W$
Soldering temperature, wave soldering for 10s	T_{sold}	-	-	265	$^{\circ}C$

•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	1.7	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	$R_{DS(ON)}$	$V_{GS}=10V, I_D=20A$		5.3	6.8	$m\Omega$
		$V_{GS}=4.5V, I_D=10A$		6.7	8.7	$m\Omega$
Forward Transconductance	g_{FS}	$V_{DS}=25V, I_D=4A$		5		S
Source-drain voltage	V_{SD}	$I_S=20A$			1.28	V

•Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	C_{iss}	$f = 1MHz$	-	675	-	pF
Output capacitance	C_{oss}		-	186	-	
Reverse transfer capacitance	C_{rss}		-	16	-	

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

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Total gate charge	Q_g	$V_{DD}=15V$	-	12	-	nC
Gate - Source charge	Q_{gs}	$I_D=20A$	-	2.6	-	
Gate - Drain charge	Q_{gd}	$V_{GS}=10V$	-	1.4	-	
Turn-ON Delay time	$t_{D(on)}$	$V_{DD}=15V$		7.9		
Turn-ON Rise time	t_r	$I_D=20A$		6.3		
Turn-Off Delay time	$t_{D(off)}$	$V_{GS}=4.5V$		11.2		
Turn-Off Fall time	t_f	$R_{G,ext}=2\Omega$		5.9		



Body Diode Reverse Recovery Time	trr	IF=20A, dI/dt=100A/μs		12	
Body Diode Reverse Recovery Charge	Qrr			21	

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

Fig.1 Power Dissipation

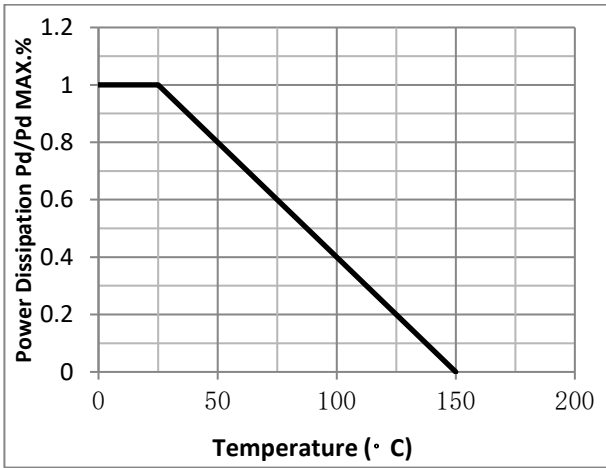


Fig.2 Typical output Characteristics

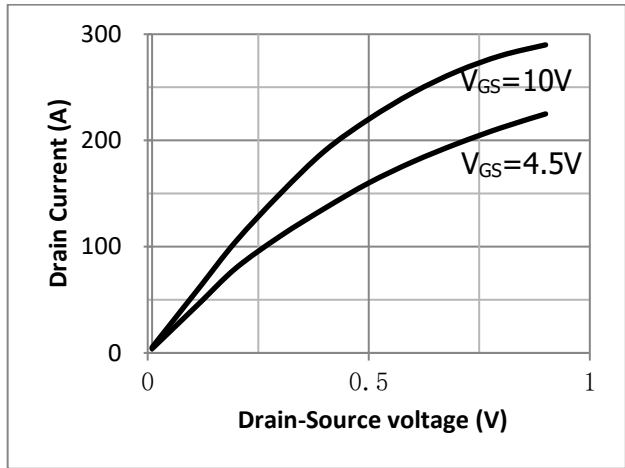


Fig.3 Threshold Voltage V.S Junction Temperature

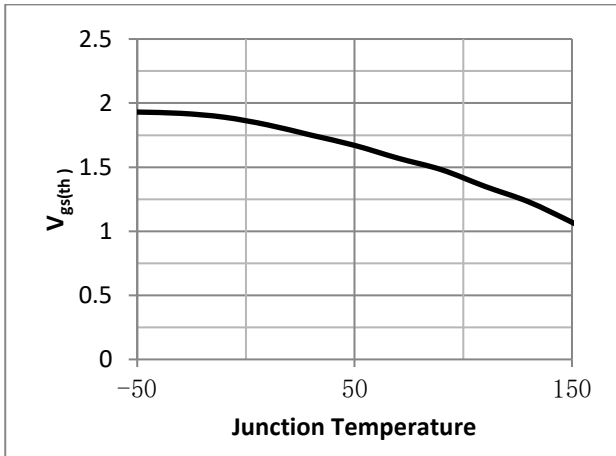


Fig.4 Resistance V.S Drain Current

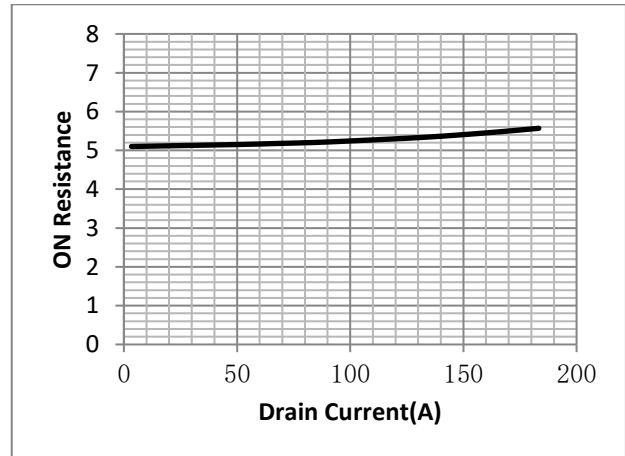




Fig.5 On-Resistance VS Gate Source Voltage

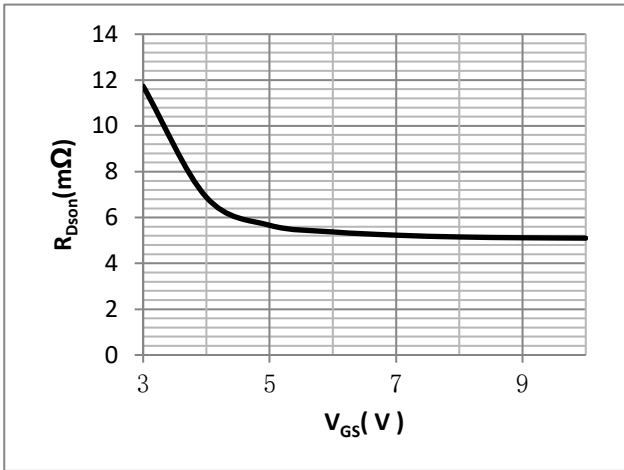


Fig.6 On-Resistance V.S Junction Temperature

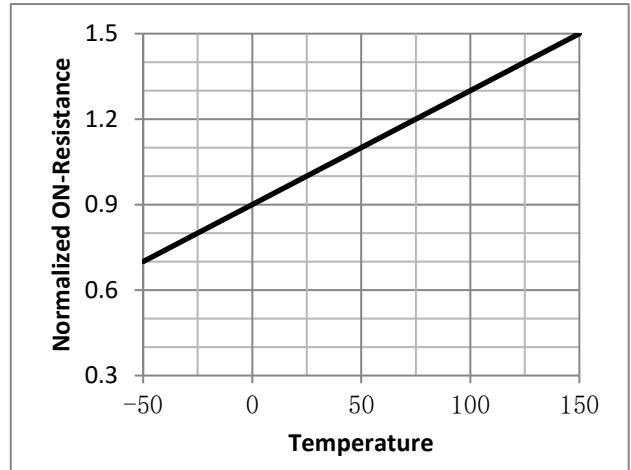


Fig.7 Gate Charge Characteristics

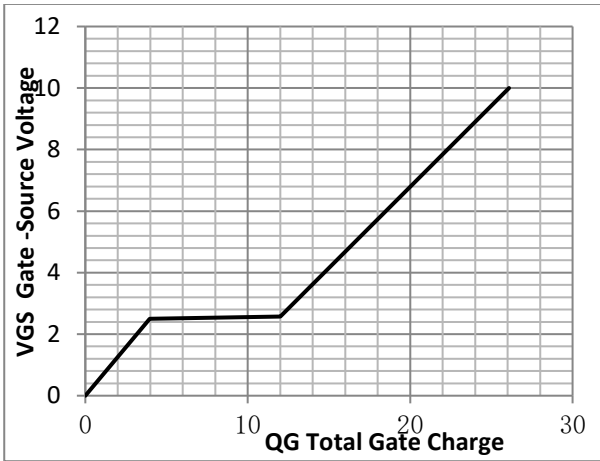


Fig.8 Capacitance vs Vds

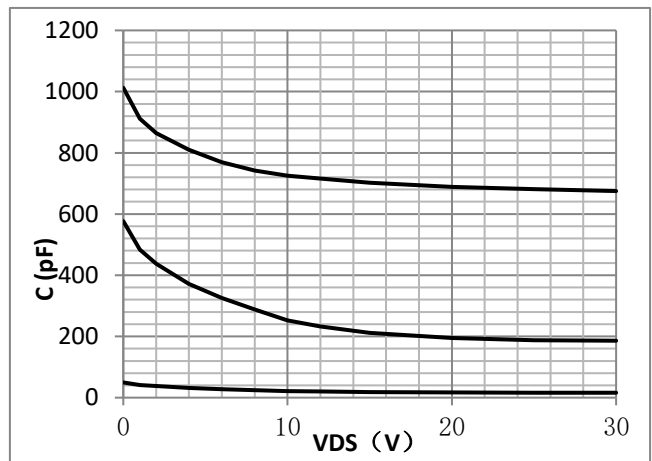


Fig.9 SOA Maximum Safe Operating Area

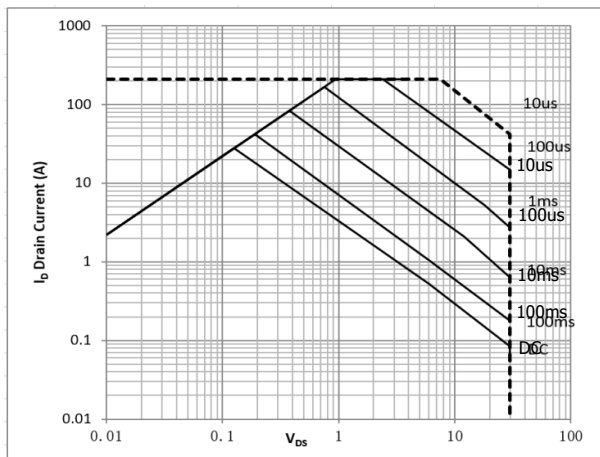


Fig.10 ID-Junction Temperature

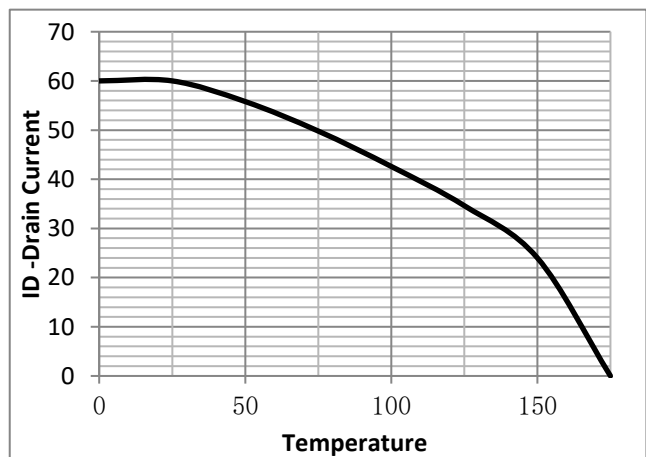


Fig.11 Switching Time Measurement Circuit

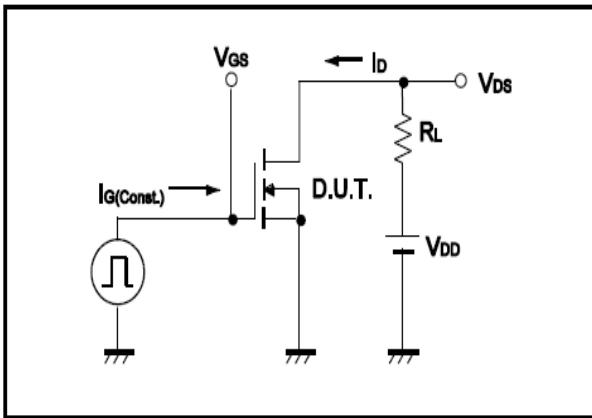


Fig.12 Gate Charge Waveform

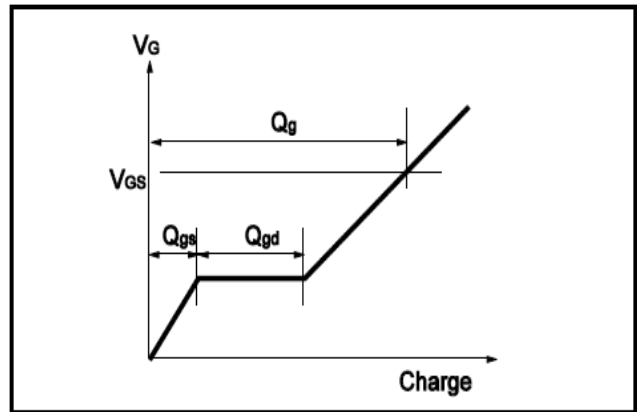


Fig.13 Resistive Switching Test Circuit

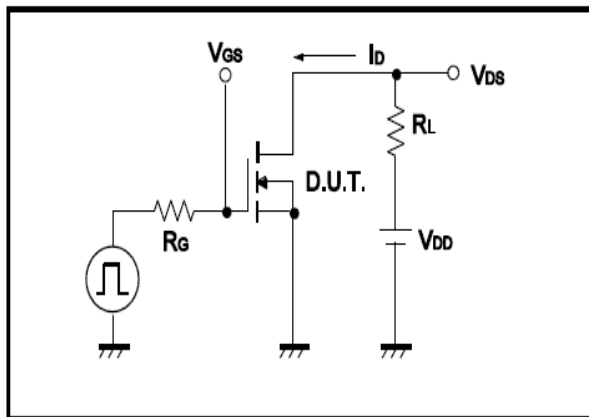


Fig.14 Resistive Switching Test Waveform

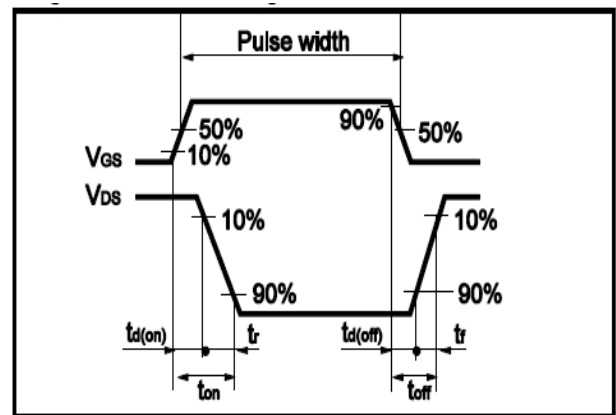


Fig.15 Avalanche Measurement Circuit

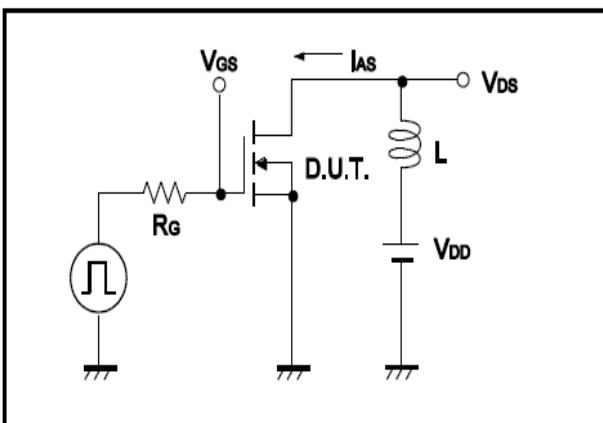
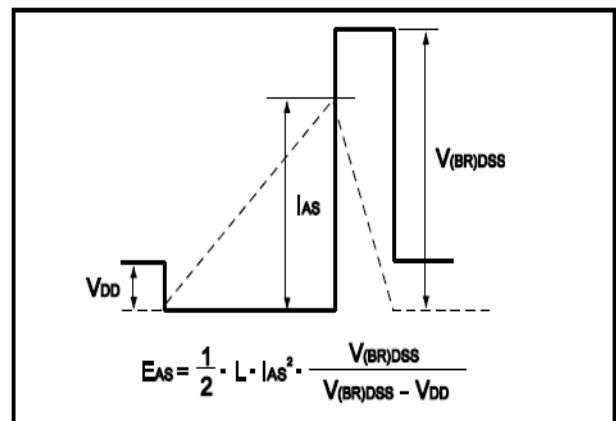


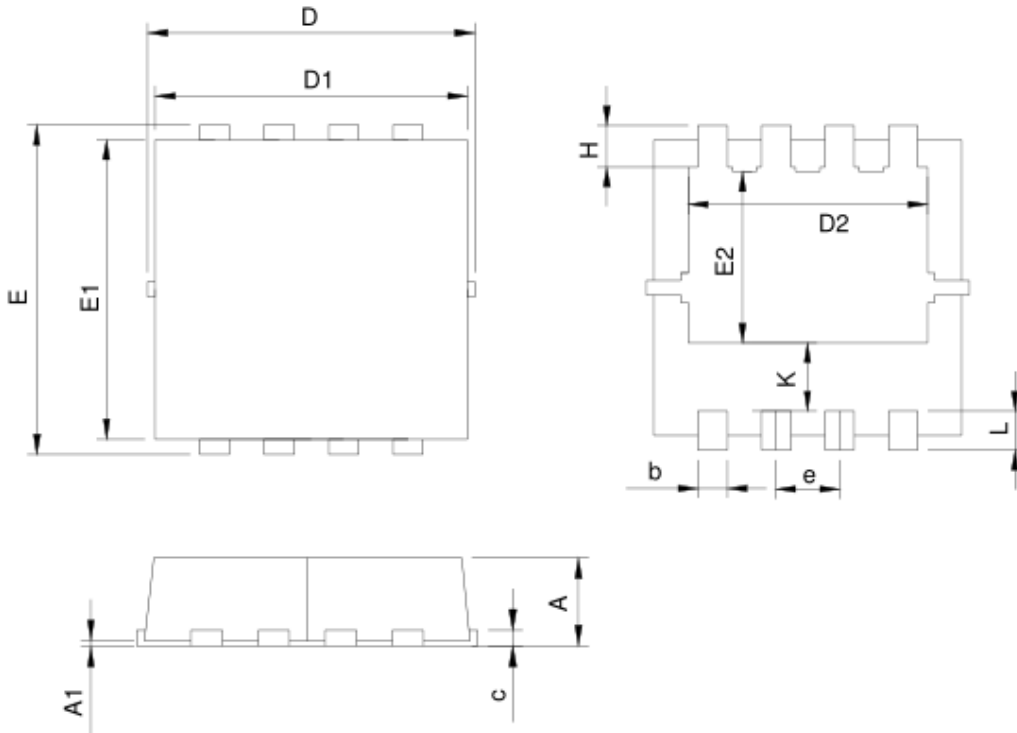
Fig.16 Avalanche Waveform





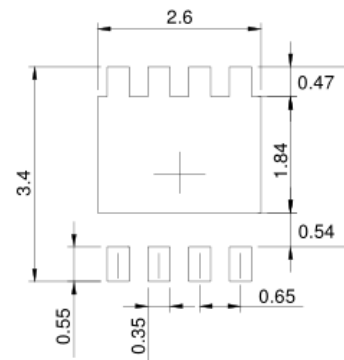
•Dimensions(DFN3x3)

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