

**• General Description**

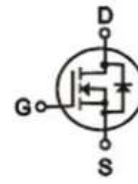
It combines advanced SGT MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$.

• 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

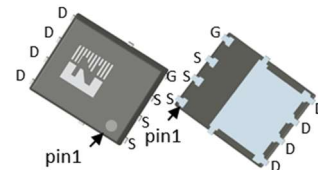
- MB/VGA Vcore
- SMPS 2nd Synchronous Rectifier
- POL application
- BLDC Motor driver

• Product Summary

$$V_{DS} = 30V$$

$$R_{DS(ON)} = 5.1m\Omega$$

$$I_D = 55A$$



DFN5 x 6

• Ordering Information:

Part NO.	ZMS051N03N
Marking	ZMS051N03
Packing Information	REEL TAPE
Basic ordering unit (pcs)	3000

• 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	$I_D @ T_C=25^\circ C$	55	A
	$I_D @ T_C=75^\circ C$	42	A
	$I_D @ T_C=100^\circ C$	34	A
Pulsed Drain Current ^①	I_{DM}	165	A
Total Power Dissipation($T_C=25^\circ C$)	$P_D @ T_C=25^\circ C$	27	W
Total Power Dissipation($T_A=25^\circ C$)	$P_D @ T_A=25^\circ C$	2.5	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}	20	mJ



●Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	-	-	4.5	° C/W
Thermal resistance, junction - ambient	R_{thJA}	-	-	50	° 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	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	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 20A$		5.1	6.6	m Ω
		$V_{GS} = 4.5V, I_D = 10A$		6.5	8.5	m Ω
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}	$V_{DS} = 25V$ $f = 1MHz$	-	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	$V_{DD} = 15V$ $I_D = 20A$ $V_{GS} = 10V$	-	12	-	nC
Gate - Source charge	Q_{gs}		-	2.6	-	
Gate - Drain charge	Q_{gd}		-	1.4	-	
Turn-ON Delay time	$t_{D(on)}$	$V_{DD} = 15V$ $I_D = 20A$ $V_{GS} = 4.5V$ $R_{G,ext} = 2\Omega$		7.9		ns
Turn-ON Rise time	t_r			6.3		
Turn-Off Delay time	$t_{D(off)}$			11.2		
Turn-Off Fall time	t_f			5.9		



Body Diode Reverse Recovery Time	t_{rr}	$I_F=20A,$ $dI/dt=100A/\mu s$	12	ns
Body Diode Reverse Recovery Charge	Q_{rr}		21	nC

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

Fig.1 Power Dissipation

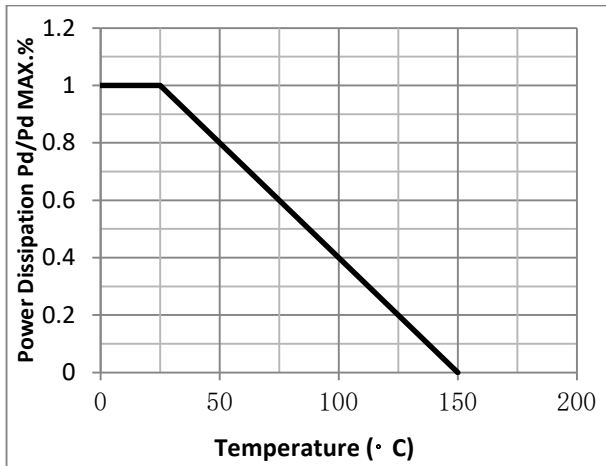


Fig.2 Typical output Characteristics

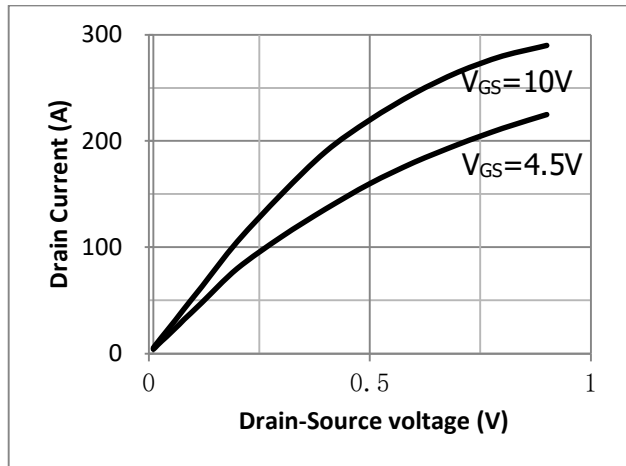


Fig.3 Threshold Voltage V.S Junction Temperature

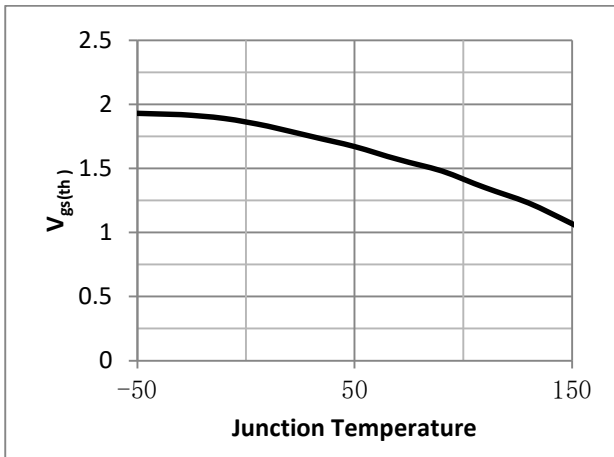


Fig.4 Resistance V.S Drain Current

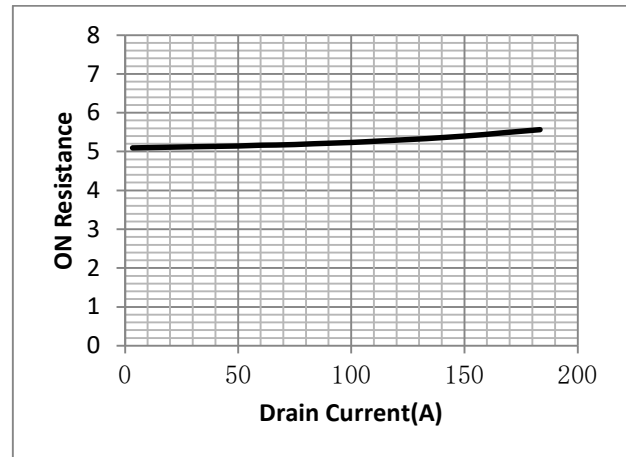




Fig.5 On-Resistance VS Gate Source Voltage

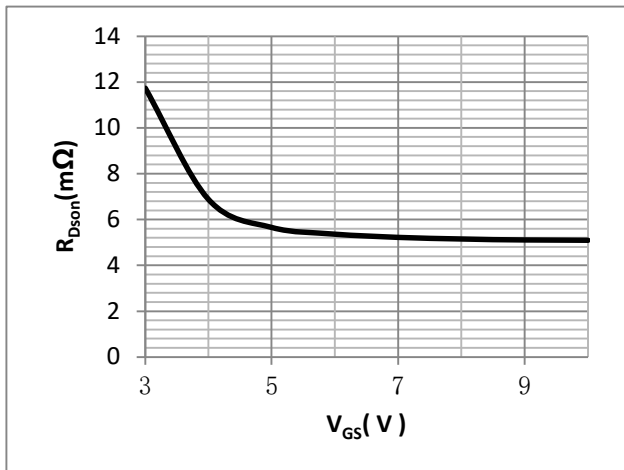


Fig.6 On-Resistance V.S Junction Temperature

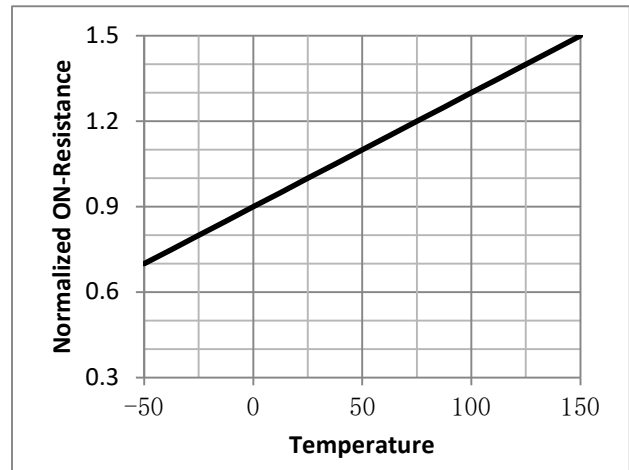


Fig.7 Gate Charge Characteristics

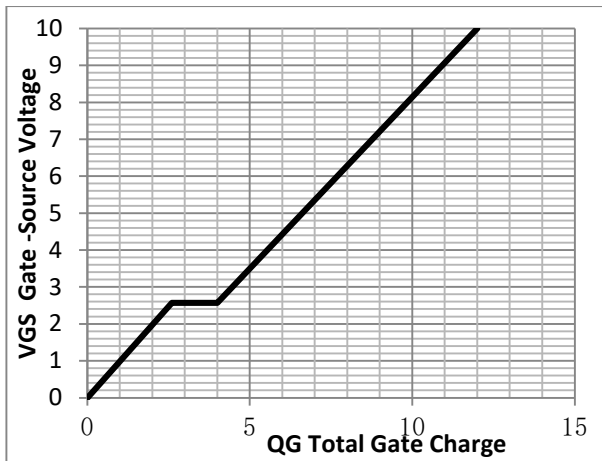


Fig.8 Capacitance vs V_{DS}

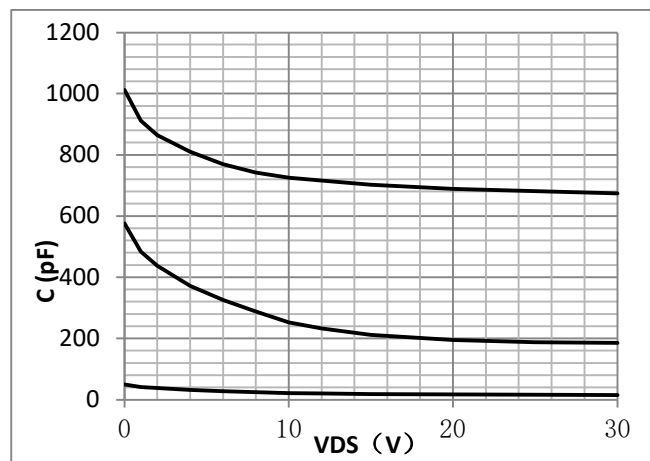


Fig.9 SOA Maximum Safe Operating Area

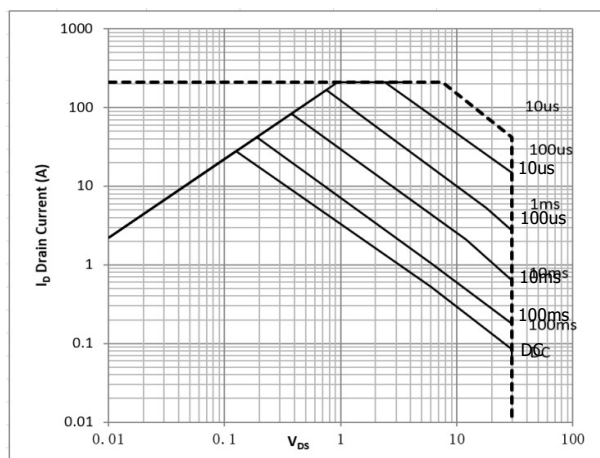


Fig.10 I_D-Junction Temperature

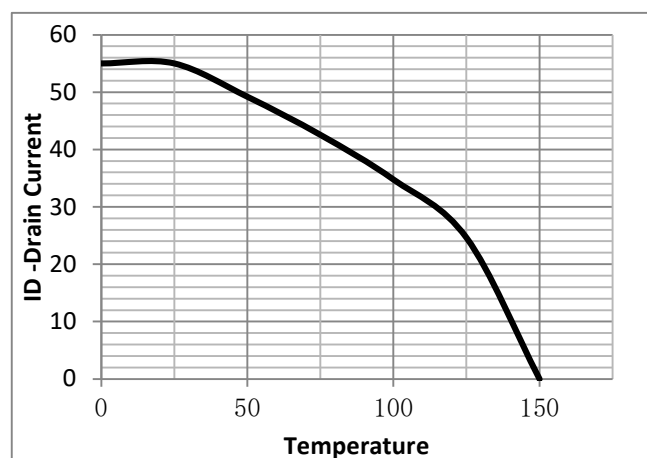


Fig.11 Gate Charge Measurement Circuit

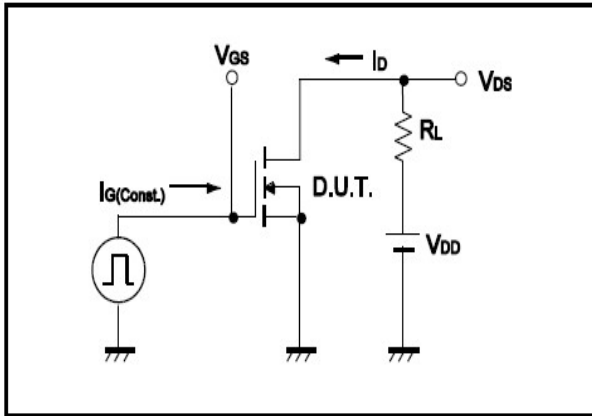


Fig.12 Gate Charge Waveform

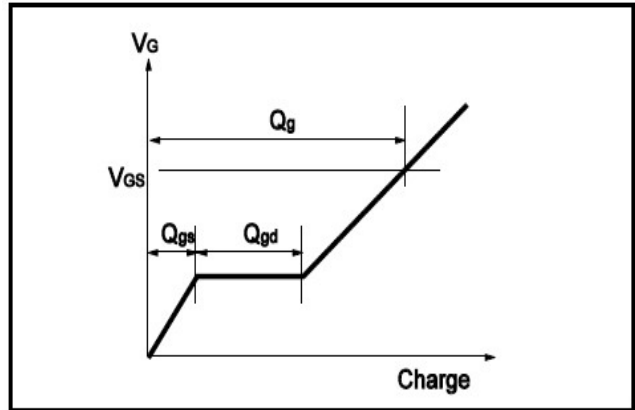


Fig.13 Resistive Switching Test Circuit

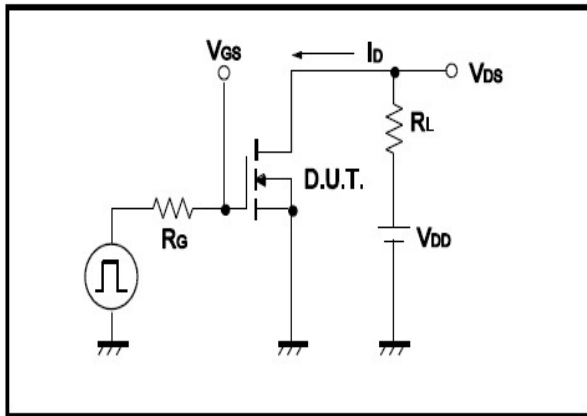


Fig.14 Resistive Switching Test Waveform

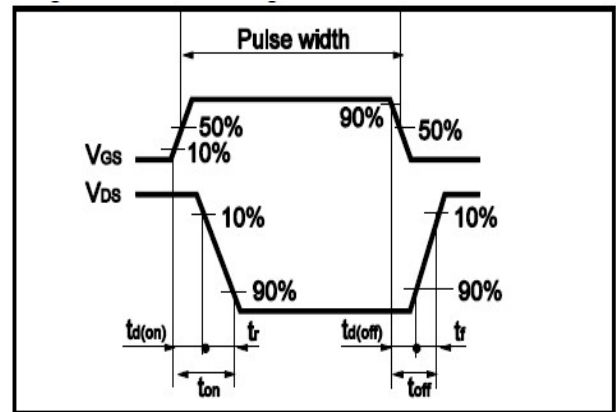


Fig.15 Avalanche Measurement Circuit

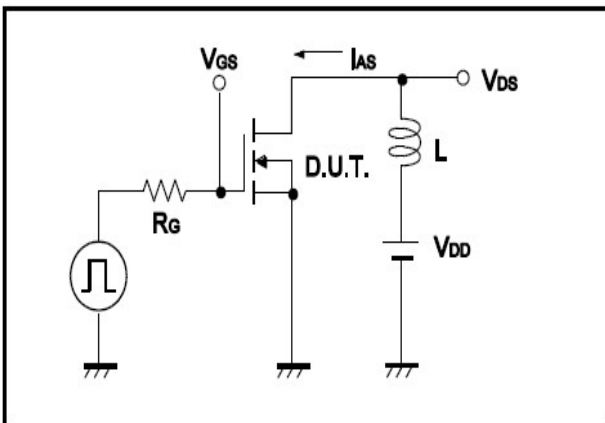
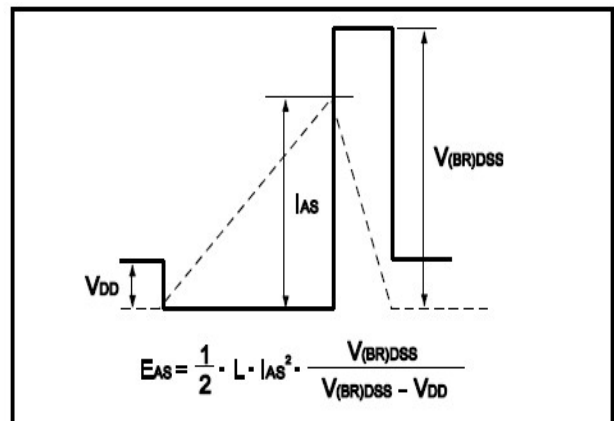


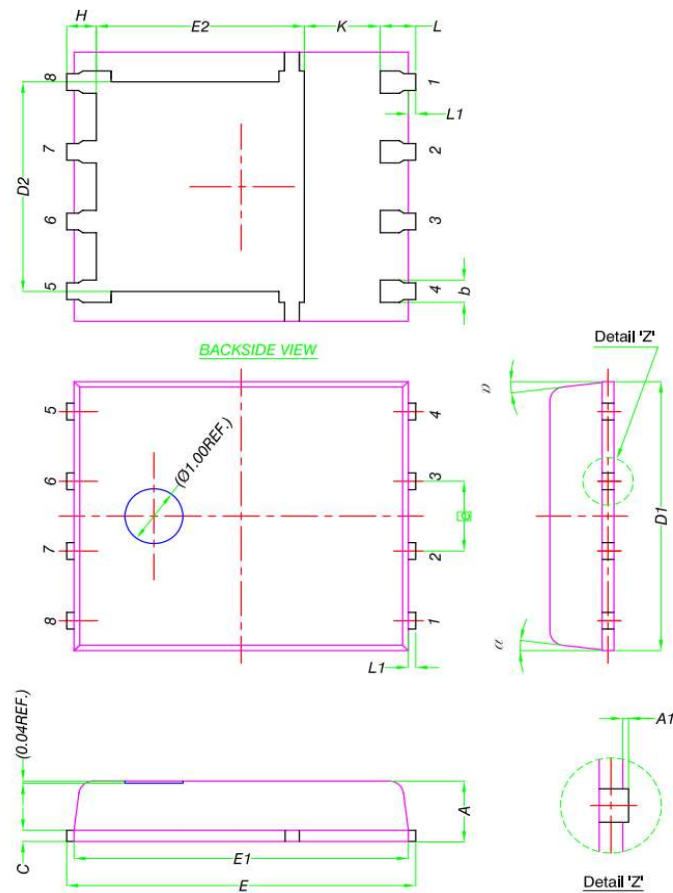
Fig.16 Avalanche Waveform





●Dimensions (DFN5×6)

Unit: mm



DIM.	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
A1	0	-	0.05
b	0.33	0.41	0.51
C	0.20	0.25	0.30
D1	4.80	4.90	5.00
D2	3.61	3.81	3.96
E	5.90	6.00	6.10
E1	5.70	5.75	5.80
E2	3.38	3.58	3.78
e	1.27 BSC		
H	0.41	0.51	0.61
K	1.10	-	-
L	0.51	0.61	0.71
L1	0.06	0.13	0.20
α	0°	-	12°