

### General Description

The ZM500N06T 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

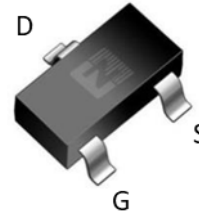
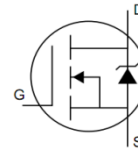
- MB/VGA Vcore
- SMPS 2<sup>nd</sup> Synchronous Rectifier
- POL application
- BLDC Motor driver

### Product Summary

$V_{DS} = 60V$

$R_{DS(ON)} = 50m\Omega$

$I_D = 4A$



SOT23-3



### Ordering Information:

Part NO.	ZM500N06T
Marking	500N06
Packing Information	REEL TAPE
Basic ordering unit (pcs)	3000

### Absolute Maximum Ratings ( $T_c = 25^\circ C$ )

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	60	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$I_D @ T_C = 25^\circ C$	4.0	A
	$I_D @ T_C = 75^\circ C$	3.0	A
	$I_D @ T_C = 100^\circ C$	2.5	A
Pulsed Drain Current <sup>①</sup>	$I_{DM}$	12	A
Total Power Dissipation <sup>②</sup>	$P_D$	1.4	W
Total Power Dissipation ( $T_A = 25^\circ C$ )	$P_D @ T_A = 25^\circ C$	0.7	W
Operating Junction Temperature	$T_J$	-55 to 150	$^\circ C$
Storage Temperature	$T_{STG}$	-55 to 150	$^\circ C$

**•Thermal resistance**

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case <sup>②</sup>	R <sub>thJC</sub>	-	-	80	° C/W
Thermal resistance, junction - ambient	R <sub>thJA</sub>	-	-	180	° C/W
Soldering temperature, wavesoldering for 10s	T <sub>sold</sub>	-	-	265	° C

**•Electronic Characteristics**

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =-250uA	60			V
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	1.2		2.5	V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V			1.0	uA
Gate- Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V			±100	nA
Static Drain-source On Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =4A		50	65	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =3A		70	90	mΩ
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =4A		10		s
Source-drain voltage	V <sub>SD</sub>	I <sub>s</sub> =4A			1.28	V

**•Electronic Characteristics**

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	C <sub>iss</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =25V f = 1MHz	-	700	-	pF
Output capacitance	C <sub>oss</sub>		-	110	-	
Reverse transfer capacitance	C <sub>rss</sub>		-	115	-	

**•Gate Charge characteristics(T<sub>a</sub> = 25°C)**

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Total gate charge	Q <sub>g</sub>	V <sub>DD</sub> =25V I <sub>D</sub> = 4A V <sub>GS</sub> = 10V	-	12	-	nC
Gate - Source charge	Q <sub>gs</sub>		-	5	-	
Gate - Drain charge	Q <sub>gd</sub>		-	4	-	

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

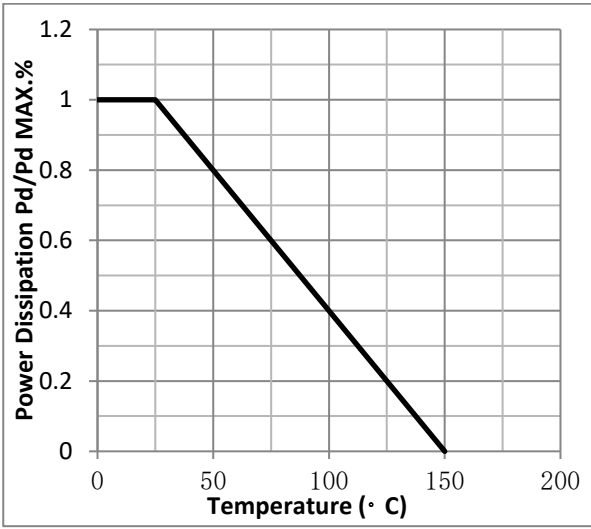


Fig.2 Typical output Characteristics

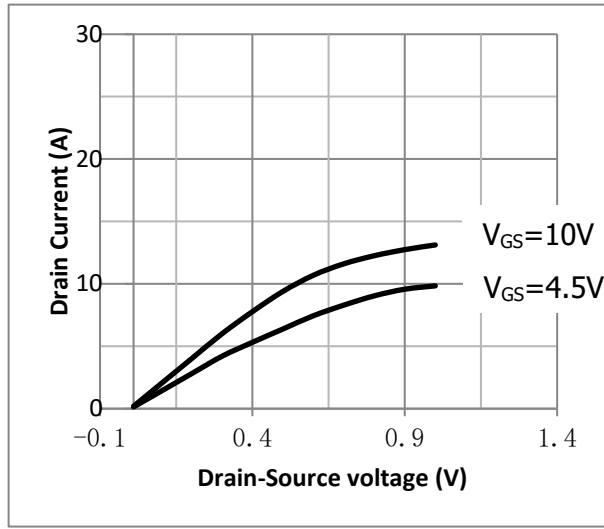


Fig.3 Threshold Voltage V.S Junction Temperature

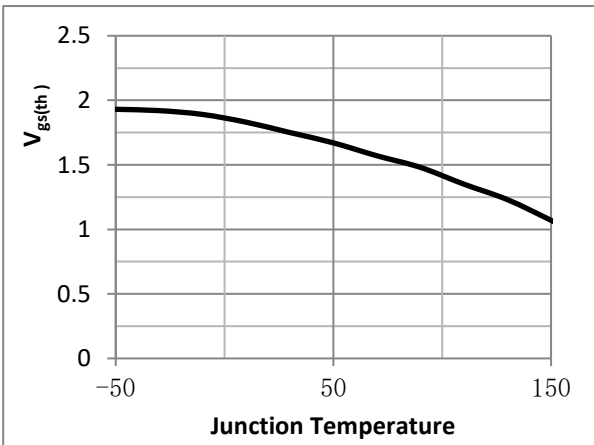


Fig.4 Resistance V.S Drain Current

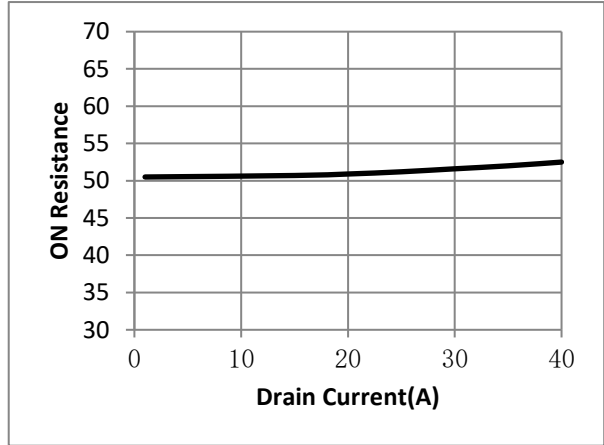


Fig.5 On-Resistance VS Gate Source Voltage

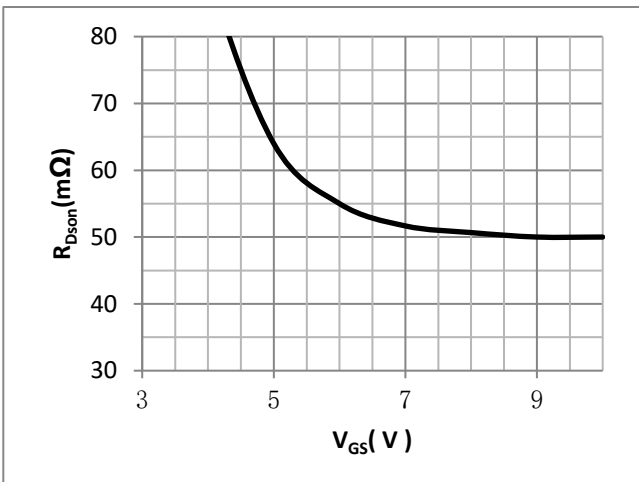


Fig.6 On-Resistance V.S Junction Temperature

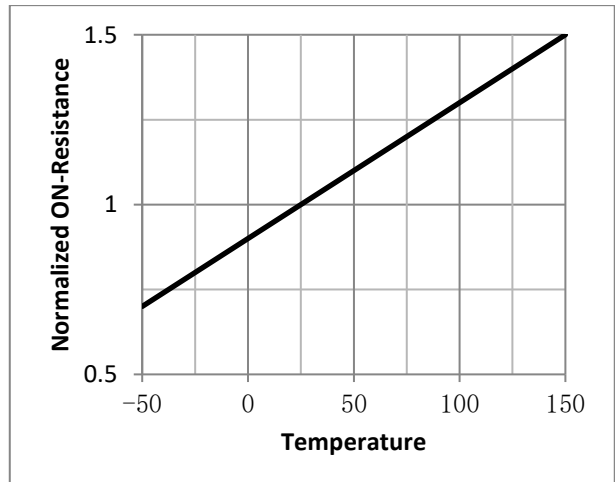


Fig.7 Gate Charge Measurement Circuit

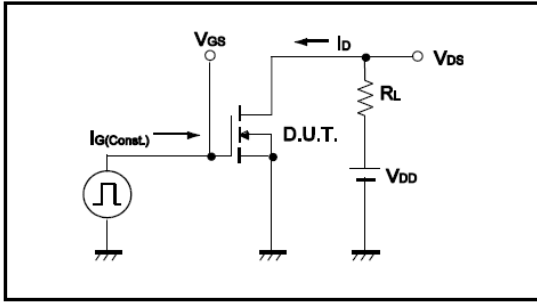


Fig.8 Gate Charge Waveform

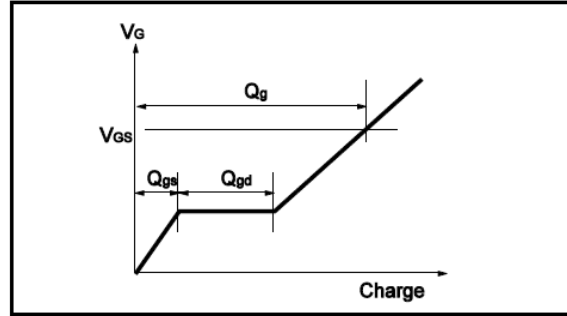


Fig.9 Switching Time Measurement Circuit

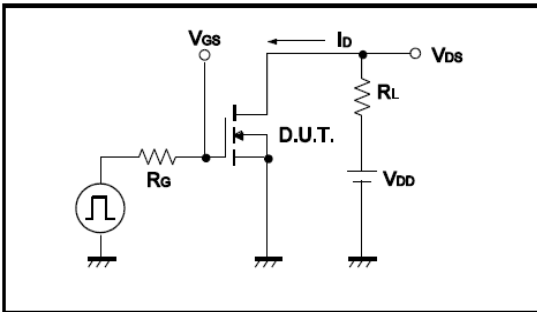


Fig.10 Switching Time Waveform

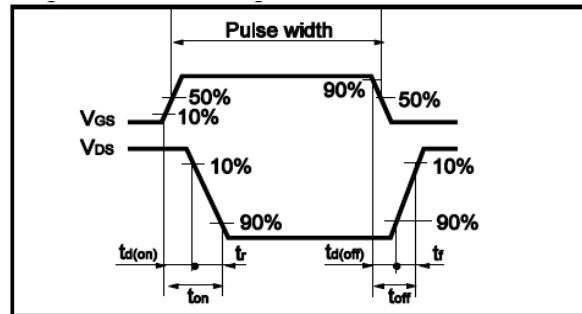


Fig.11 Avalanche Measurement Circuit

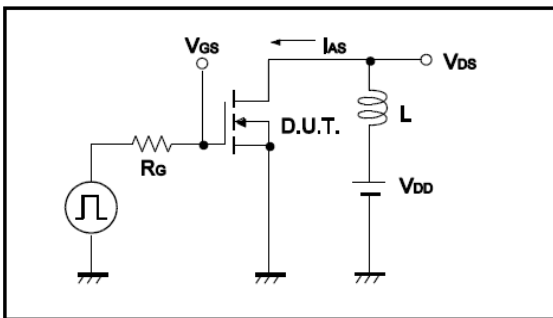
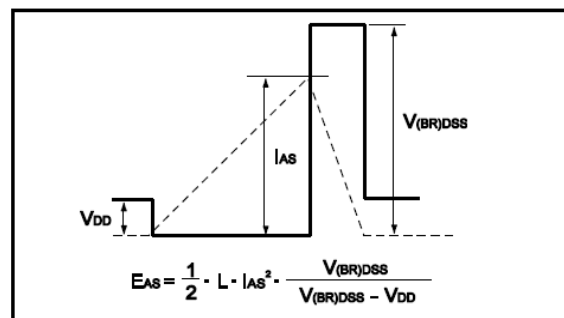


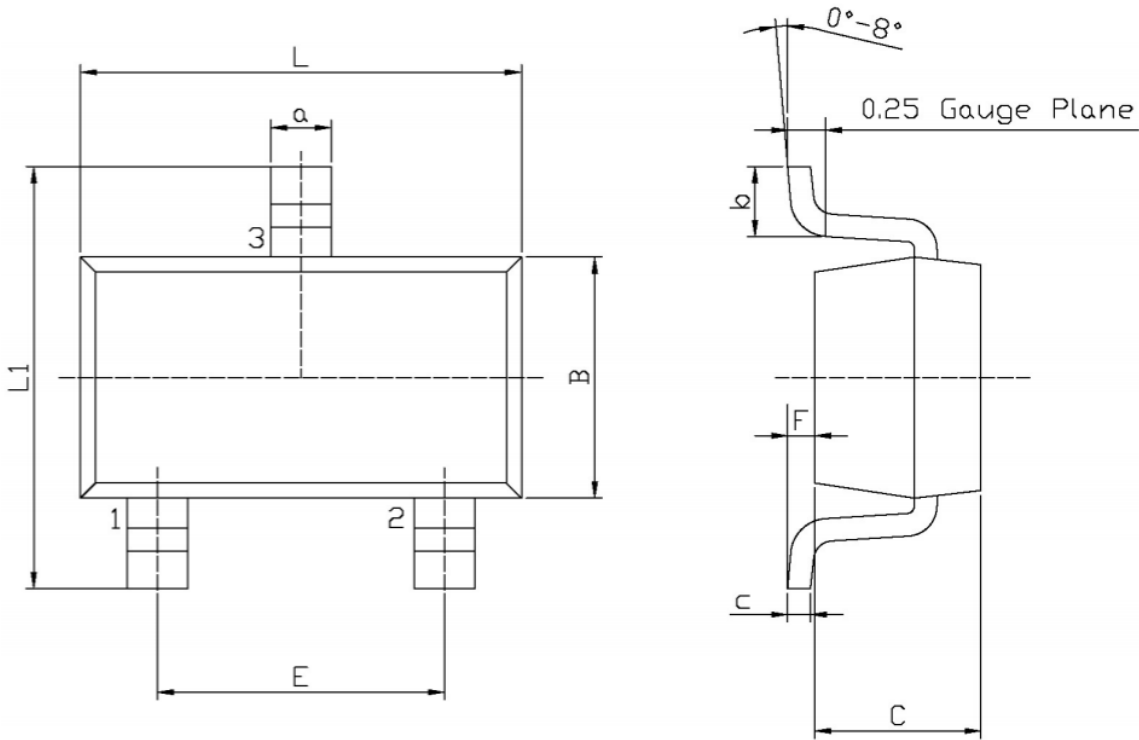
Fig.12 Avalanche Waveform





•Dimensions(SOT23-3)

Unit: mm



Unit: mm

Symbol	Dimensions In Millimeters		Symbol	Dimensions In Millimeters	
	Min	Max		Min	Max
L	2.82	3.02	a	0.35	0.50
B	1.50	1.70	c	0.10	0.20
C	0.90	1.30	b	0.35	0.55
L1	2.60	3.00	F	0	0.15
E	1.80	2.00			