

**• General Description**

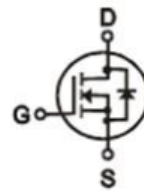
The ZM042N04P combines advanced trench MOSFET technology with a low resistance package to provide extremely low  $R_{DS(ON)}$ . This device is ideal for load switch and battery protection applications.

**• 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**

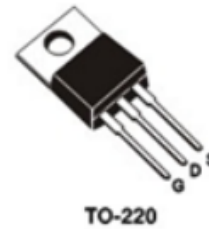
- MB/VGA Vcore
- SMPS 2<sup>nd</sup> Synchronous Rectifier
- POL application
- BLDC Motor driver

**• Product Summary**


$V_{DS} = 40V$

$R_{DS(ON)} = 5.5m\Omega$

$I_D = 100A$


**• Ordering Information:**

Part NO.	ZM042N04P
Marking	ZM042N04
Packing Information	REEL TAPE
Basic ordering unit (pcs)	500

**• Absolute Maximum Ratings ( $T_C = 25^\circ C$ )**

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	40	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$I_D @ TC=25^\circ C$	100	A
	$I_D @ TC=75^\circ C$	76	A
	$I_D @ TC=100^\circ C$	63	A
Pulsed Drain Current ①	$I_{DM}$	220	A
Total Power Dissipation( $TC=25^\circ C$ )	$P_D @ TC=25^\circ C$	100	W
Total Power Dissipation( $TA=25^\circ C$ )	$P_D @ TA=25^\circ C$	3.5	W
Operating Junction Temperature	$T_J$	-55 to 150	$^\circ C$
Storage Temperature	$T_{STG}$	-55 to 150	$^\circ C$
Single Pulse Avalanche Energy	$E_{AS}$	150	mJ

**●Thermal resistance**

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R <sub>thJC</sub>	-	-	2.1	° C/W
Thermal resistance, junction - ambient	R <sub>thJA</sub>	-	-	65	° C/W
Soldering temperature, wave soldering 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	40			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> =40V, 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> =24A		5.5	7	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =12A		8	10	mΩ
Forward Trans conductance	g <sub>FS</sub>	V <sub>DS</sub> =25V, I <sub>D</sub> =10A		16		s
Source-drain voltage	V <sub>SD</sub>	I <sub>S</sub> =24A		0.8	1.2	V

**●Electronic Characteristics**

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	C <sub>iss</sub>	f = 1MHz	-	2800	-	pF
Output capacitance	C <sub>oss</sub>		-	350	-	
Reverse transfer capacitance	C <sub>rss</sub>		-	260	-	

**●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	-	22	-	nC
Gate - Source charge	Q <sub>gs</sub>	I <sub>D</sub> = 8A	-	8	-	
Gate - Drain charge	Q <sub>gd</sub>	V <sub>GS</sub> = 10V	-	11	-	

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

Fig.1 SOA Maximum Safe Operating Area

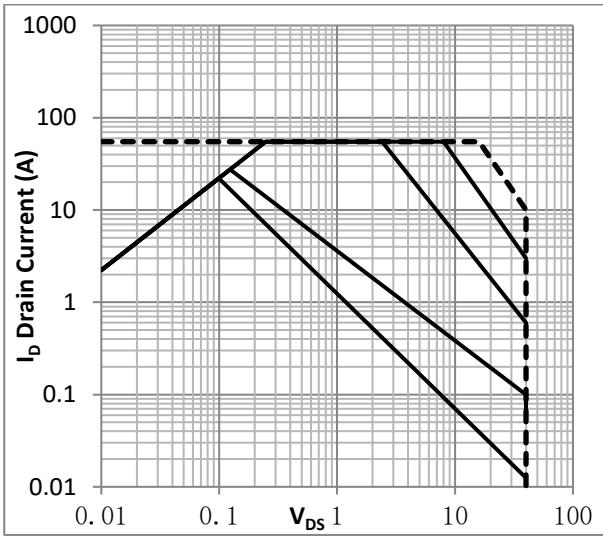


Fig.2  $I_D$ -Junction Temperature

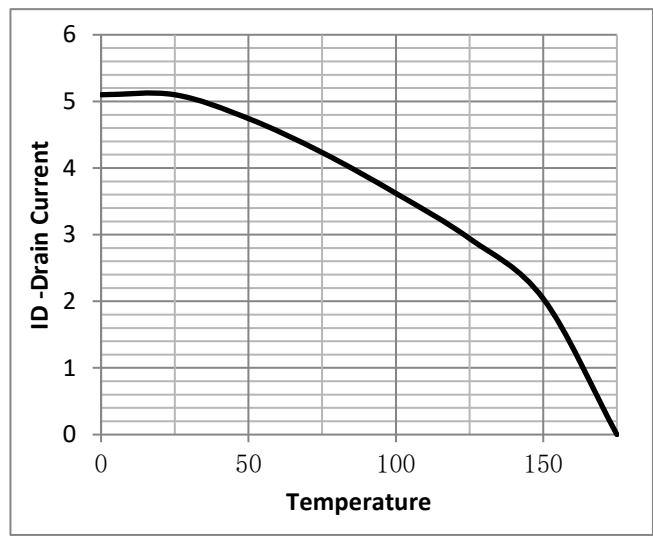


Fig.3 Gate-Charge Characteristics

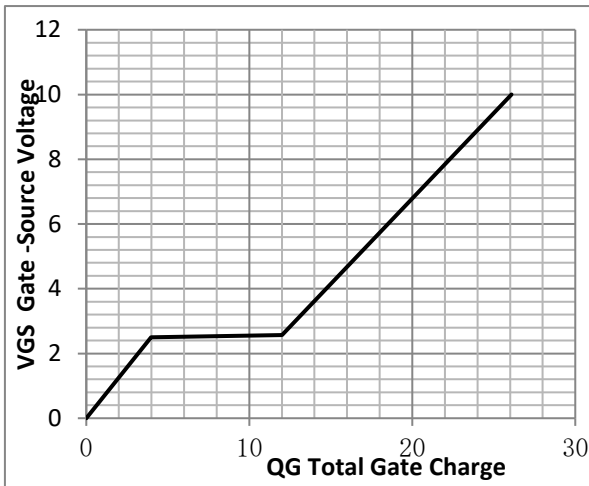


Fig.4 Capacitance Characteristics

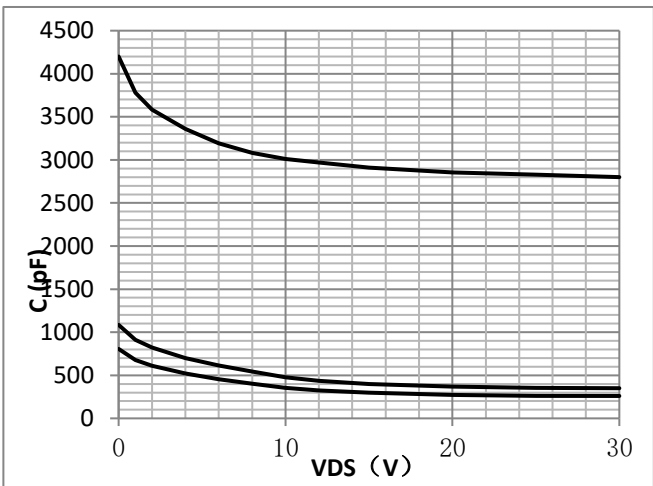


Fig.5 Power Dissipation

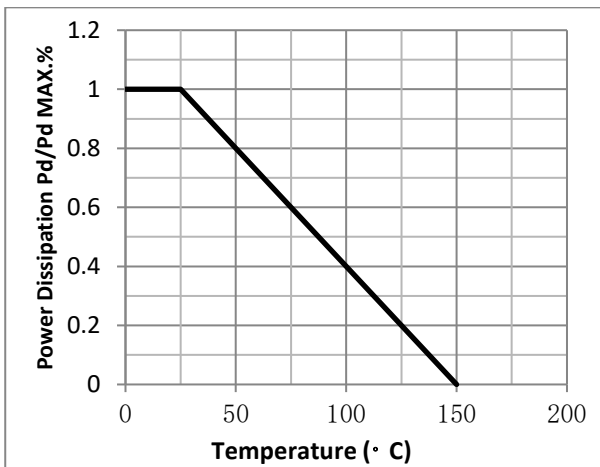


Fig.6 Typical output Characteristics

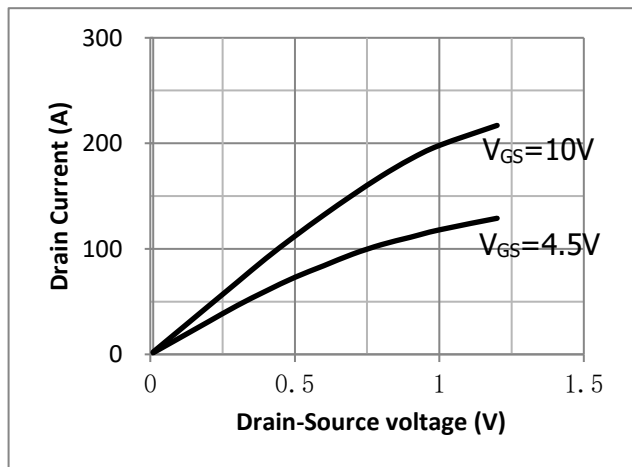


Fig.7 Threshold Voltage V.S Junction Temperature

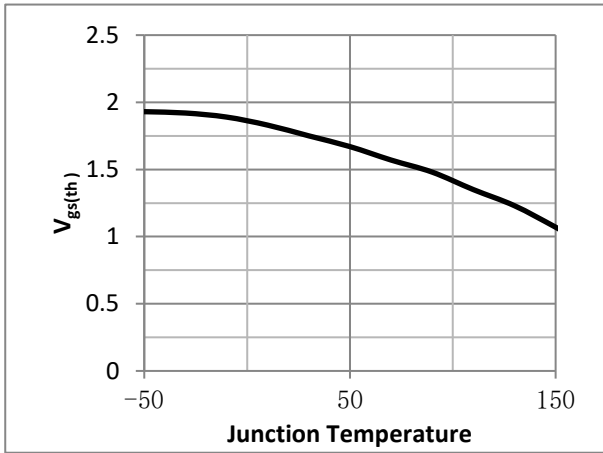


Fig.8 Resistance V.S Drain Current

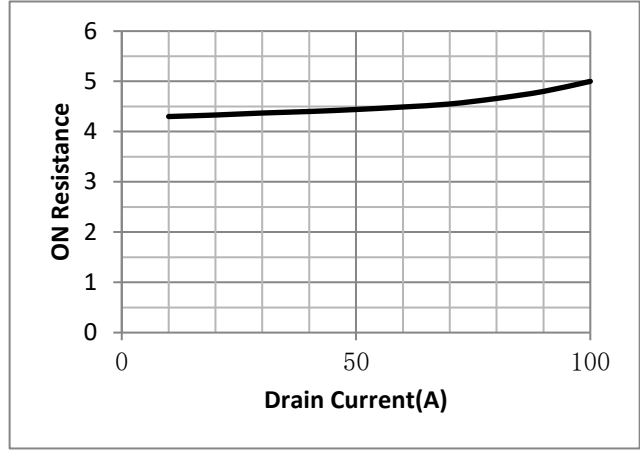


Fig.9 On-Resistance VS Gate Source Voltage

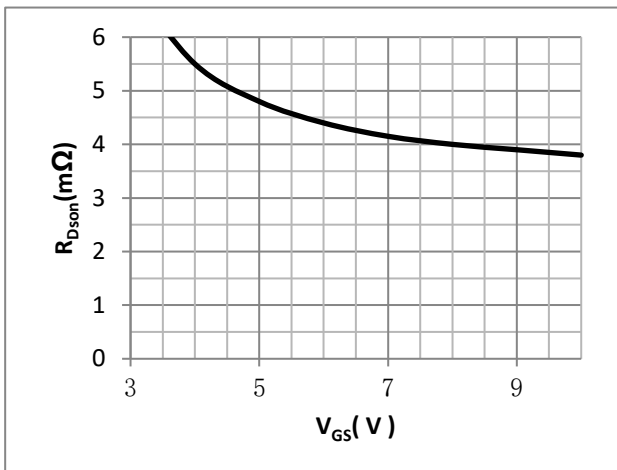


Fig.10 On-Resistance V.S Junction Temperature

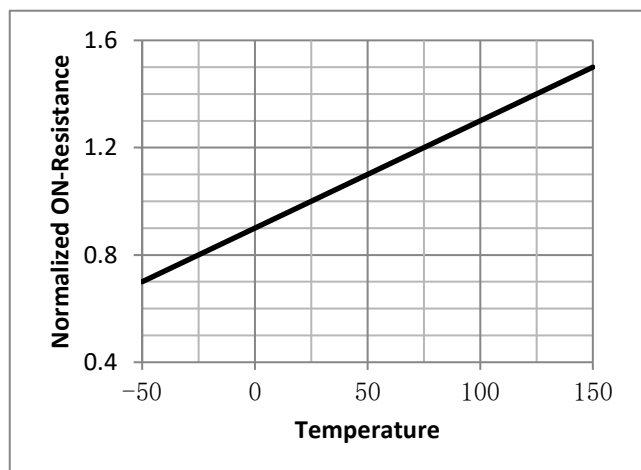


Fig.11 Switching Time Measurement Circuit

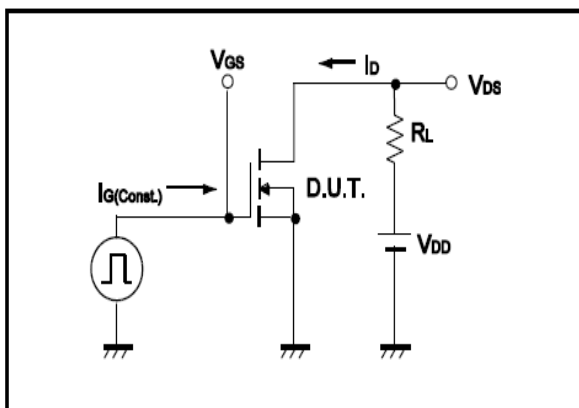


Fig.12 Gate Charge Waveform

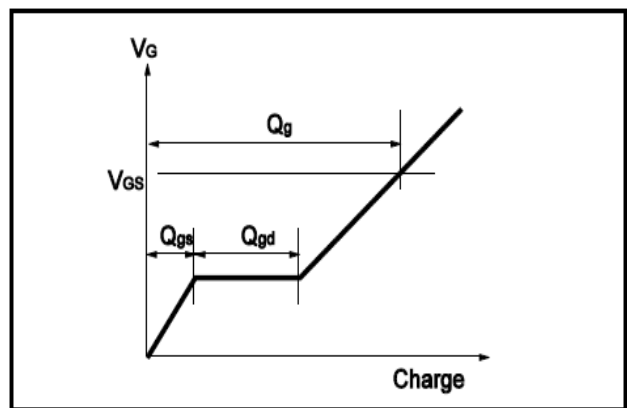


Fig.9 Switching Time Measurement Circuit

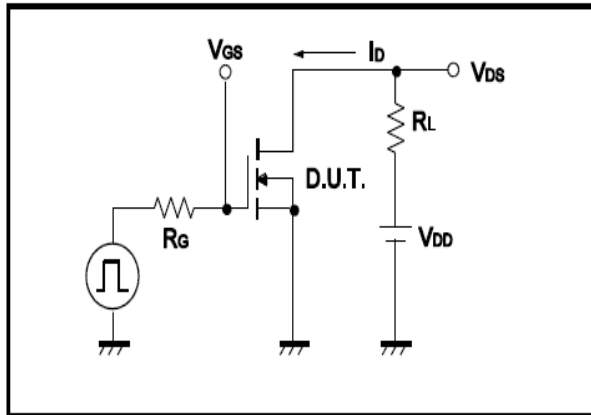


Fig.10 Gate Charge Waveform

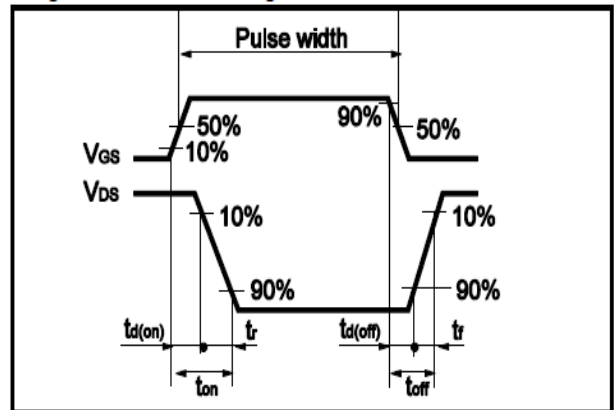


Fig.11 Avalanche Measurement Circuit

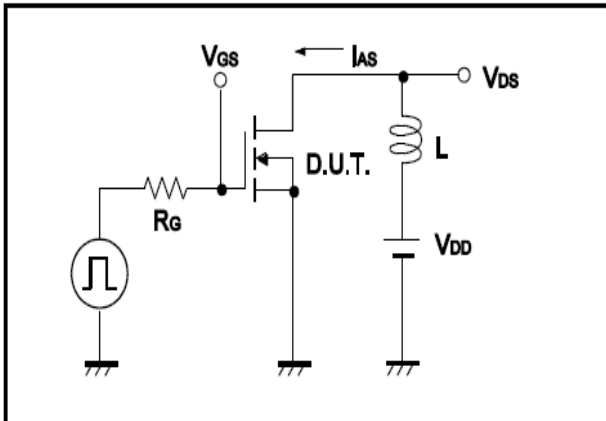
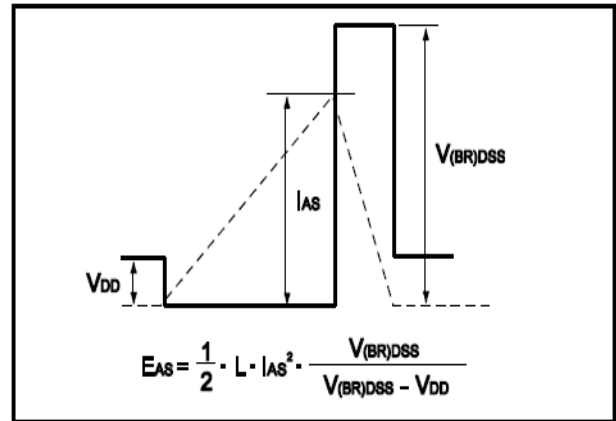


Fig.12 Avalanche Waveform



• Dimensions (TO-220)

Unit: mm

SYMBOL	min	nom	max	SYMBOL	min	nom	max
A	4.00		4.80	E	9.90		10.70
B	1.20		1.50	e		2.54	
B1	1.00		1.40	F	1.10		1.45
b1	0.65		1.00	L	12.50		14.50
c	0.35		0.75	L1	3.00	3.50	4.00
D	15.00		16.50	Q	2.50		3.00
D1	5.90		6.90	Q1	2.00		3.00
				ΦP	3.60		3.90

