

• General Description

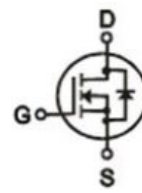
The ZM027N03P combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. This device is ideal for load switch and battery protection applications.

• 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

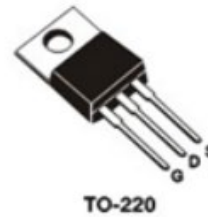
- MB/VGA Vcore
- SMPS 2nd Synchronous Rectifier
- POL application
- BLDC Motor driver

• Product Summary


$V_{DS} = 30V$

$R_{DS(ON)} = 3.4m\Omega$

$I_D = 140A$


• Ordering Information:

Part NO.	ZM027N03P
Marking	ZM027N03
Packing Information	Bulk Tube
Basic ordering unit (pcs)	500

• 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	$I_{D@T_C=25^\circ C}$	140	A
	$I_{D@T_C=75^\circ C}$	106	A
	$I_{D@T_C=100^\circ C}$	88	A
Pulsed Drain Current ^①	I_{DM}	280	A
Total Power Dissipation	$P_D@T_C=25^\circ C$	120	W
Total Power Dissipation	$P_D@T_A=25^\circ C$	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}	350	mJ
Avalanche Current	$I_{AS} I_{AR}$	60	A

●Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	-	-	0.86	$^{\circ}C/W$
Thermal resistance, junction - ambient	R_{thJA}	-	-	25	$^{\circ}C/W$
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		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	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 24A$		3.4	4.3	$m\Omega$
		$V_{GS} = 4.5V, I_D = 12A$		4.6	5.6	$m\Omega$
Forward Transconductance	g_{FS}	$V_{DS} = 25V, I_D = 10A$		30		S
Source-drain voltage	V_{SD}	$I_S = 24A$		0.8	1.2	V

●Dynamic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	C_{iss}	$f = 1MHz,$ $V_{DS} = 25V$	-	2800	-	pF
Output capacitance	C_{oss}		-	420	-	
Reverse transfer capacitance	C_{rss}		-	280	-	
Gate Resistance	R_g	$f = 1MHz$		2.5		Ω
Total gate charge	Q_g	$V_{DD} = 25V$ $I_D = 8A$ $V_{GS} = 10V$	-	27	-	nC
Gate - Source charge	Q_{gs}		-	8.6	-	
Gate - Drain charge	Q_{gd}		-	13.8	-	
Turn-ON Delay time	$t_{D(on)}$	$V_{GS} = 10V, V_{DS} = 15V$ $R_G = 3.3\Omega, I_D = 15A$		12		ns
Turn-ON Rise time	t_r			44		ns
Turn-Off Delay time	$t_{D(off)}$			50		ns
Turn-Off Fall time	t_f			15		ns
Reverse Recovery Time	t_{RR}			5.8		ns

Charge Time	t_a	VDD = 20 V, dIS/dt=100A/us, IS = 30 A	3.4	ns
Discharge Time	t_b		2.4	ns
Reverse Recovery Charge	Q_{RR}		1.6	nC

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

Fig.1 Power Dissipation

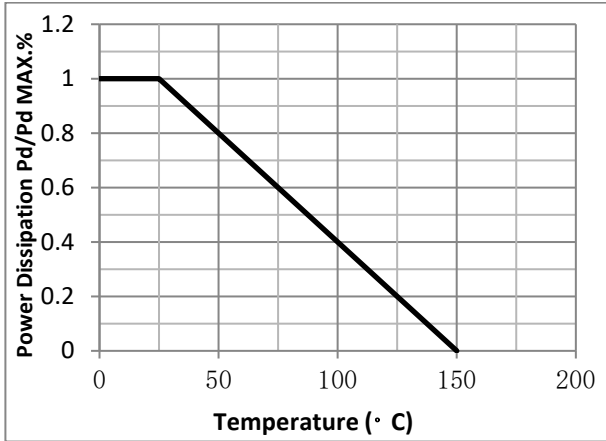


Fig.2 Typical output Characteristics

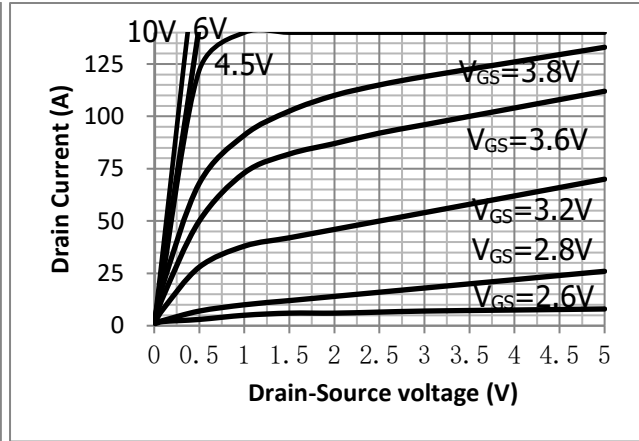


Fig.3 Threshold Voltage V.S Junction Temperature

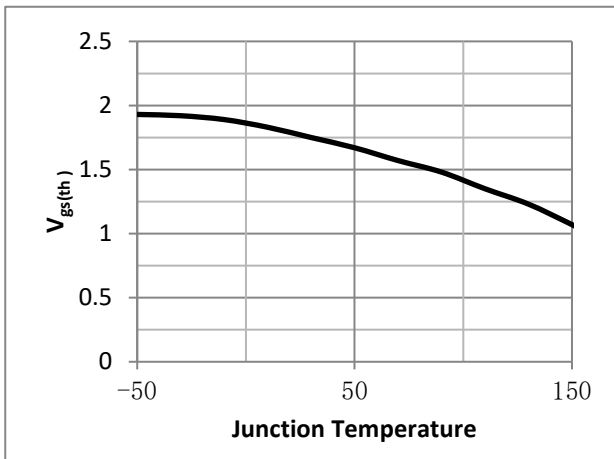


Fig.4 Resistance V.S Drain Current

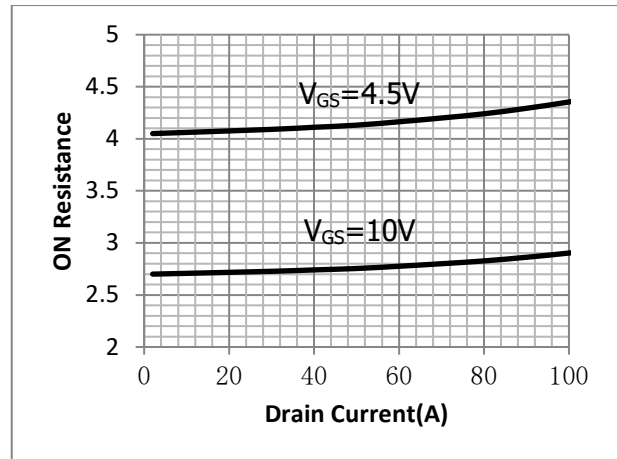


Fig.5 On-Resistance VS Gate Source Voltage

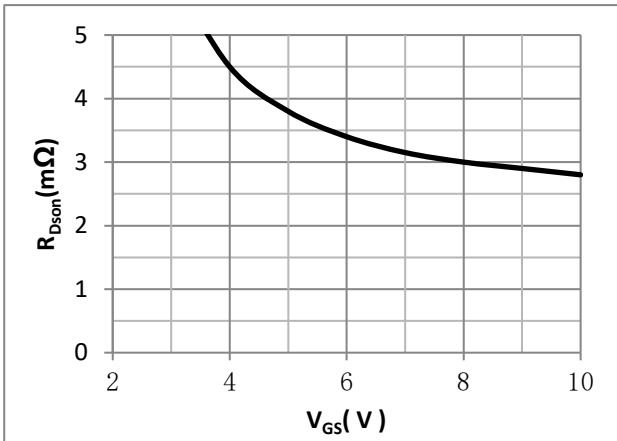


Fig.6 On-Resistance V.S Junction Temperature

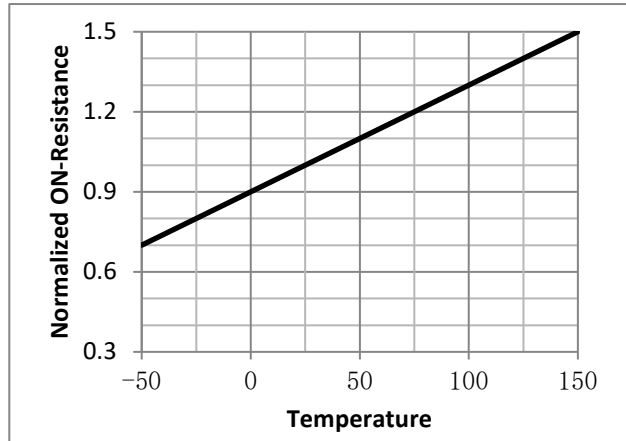


Fig.7 SOA Maximum Safe Operating Area

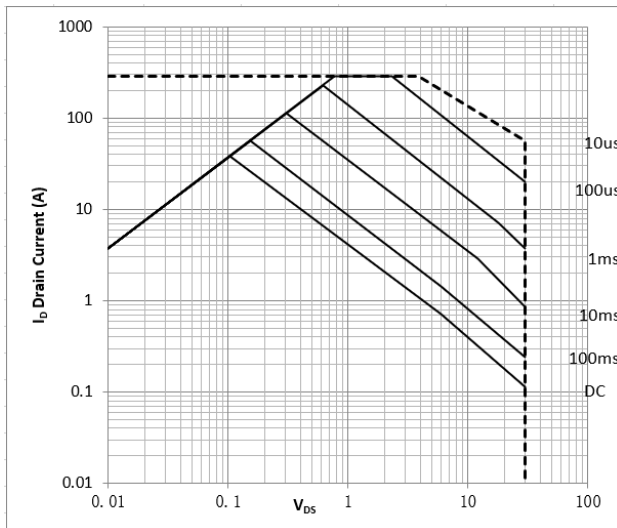


Fig.8 ID-Junction Temperature

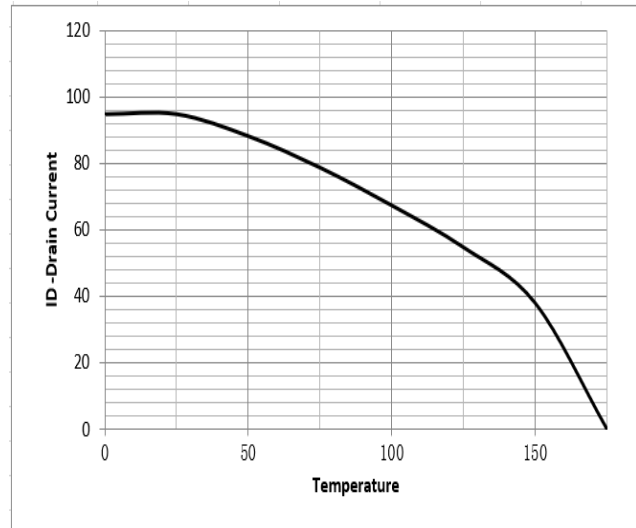


Figure 9. Diode Forward Voltage vs. Current

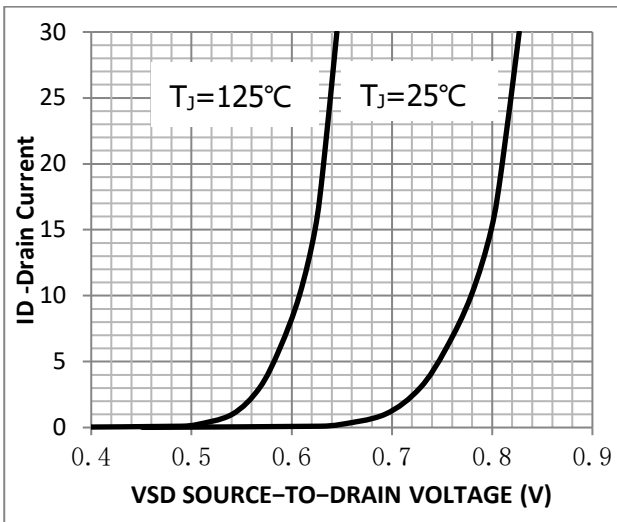


Figure 10. Transfer Characteristics

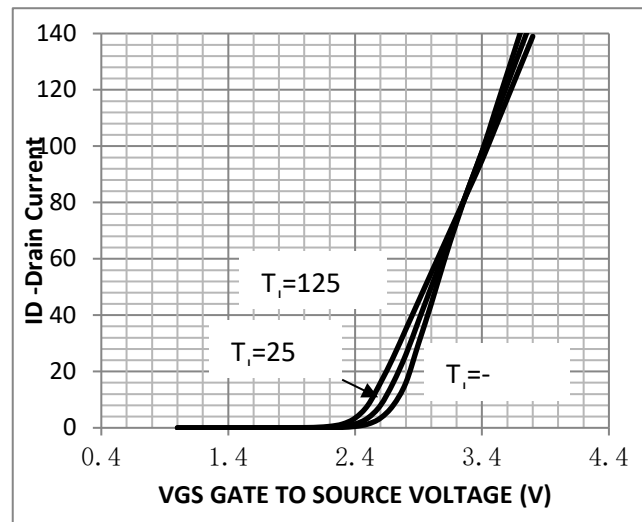


Figure 11. Gate-to-Source and Drain-to-Source Voltage vs. Total Charge

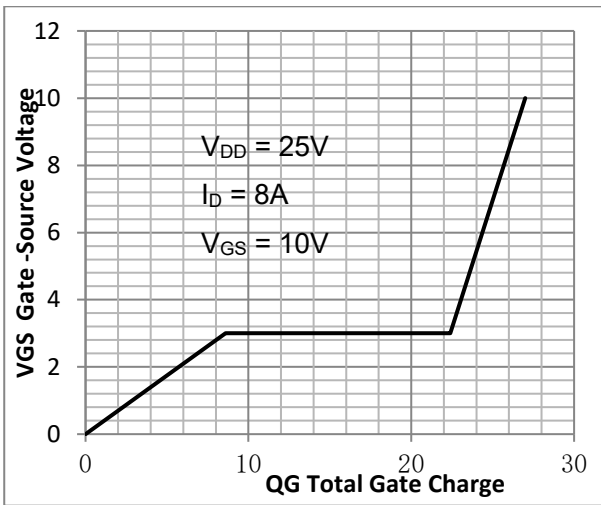


Fig.13 Switching Time Measurement Circuit

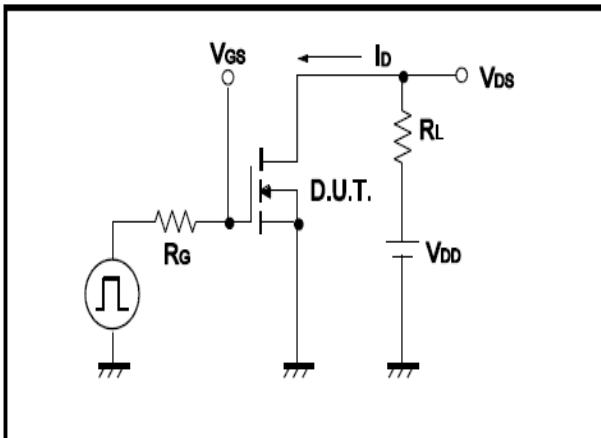


Fig.15 Avalanche Measurement Circuit

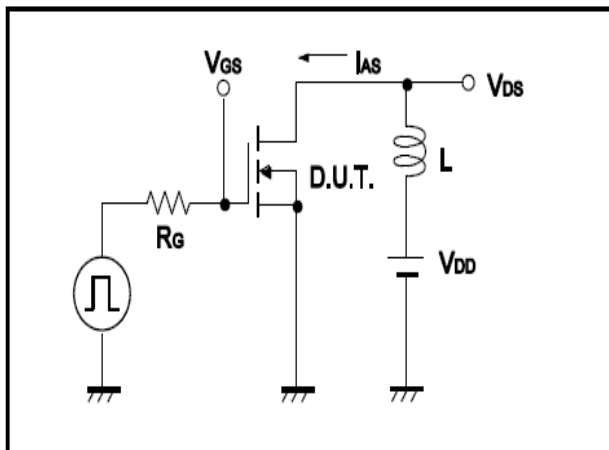


Fig.12 Capacitance Variation

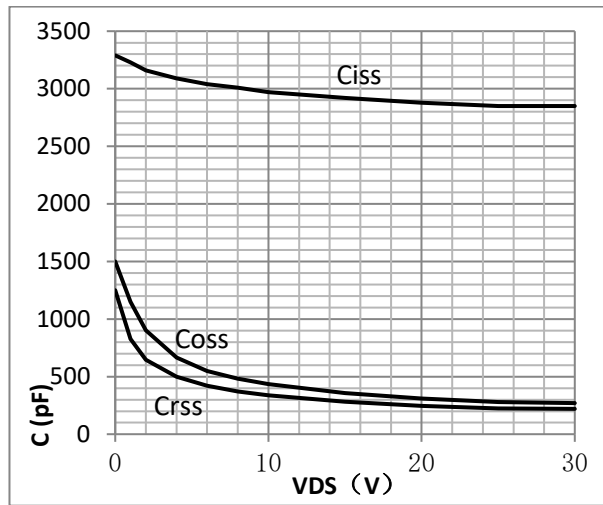


Fig.14 Gate Charge Waveform

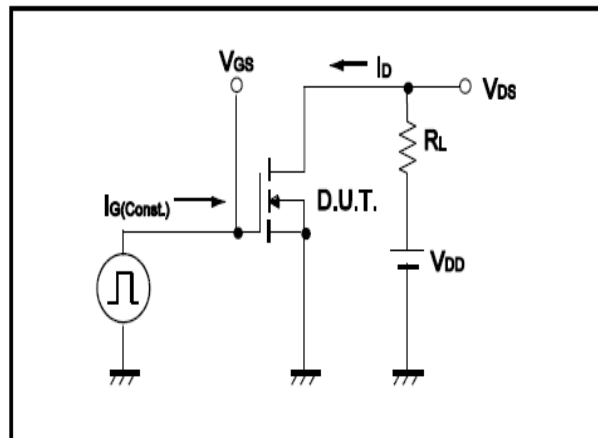


Fig.16 Avalanche Waveform

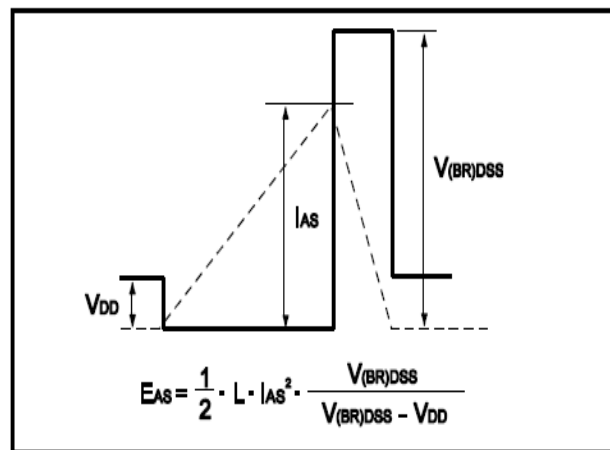
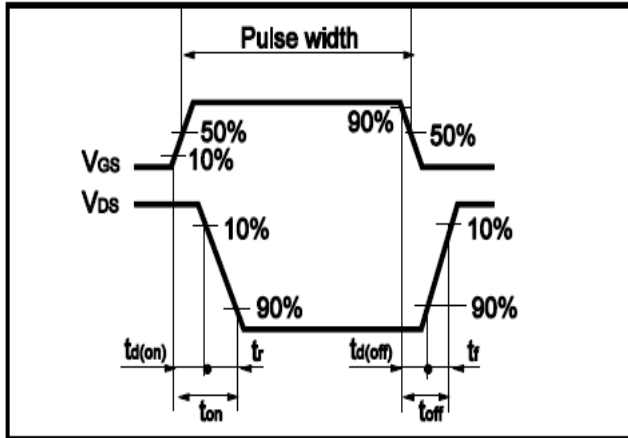


Fig.17 Gate Charge Waveform





•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

