

**• General Description**

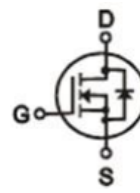
The ZM027N03F combines advanced trench MOSFET technology with a low resistance package to provide extremely low  $R_{DS(ON)}$ . This device is ideal for load switch and battery protection applications.

**• 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**

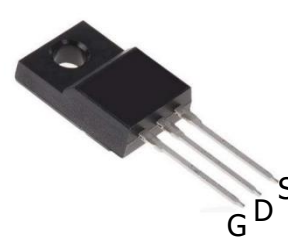
- MB/VGA Vcore
- SMPS 2<sup>nd</sup> Synchronous Rectifier
- POL application
- BLDC Motor driver

**• Product Summary**


$V_{DS} = 30V$

$R_{DS(ON)} = 2.7m\Omega$

$I_D = 80A$



TO-220F

**• Ordering Information:**

Part NO.	ZM027N03F
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	$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$I_D @ TC=25^\circ C$	80	A
	$I_D @ TC=75^\circ C$	61	A
	$I_D @ TC=100^\circ C$	50	A
Pulsed Drain Current <sup>①</sup>	$I_{DM}$	210	A
Total Power Dissipation	$P_D @ TC=25^\circ C$	120	W
Total Power Dissipation	$P_D @ TA=25^\circ C$	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	$E_{AS}$	180	mJ
Avalanche Current	$I_{AS} I_{AR}$	60	A

**●Thermal resistance**

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	$R_{thJC}$	-	-	1.1	$^{\circ}C/W$
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	$\mu A$
Gate- Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$			$\pm 100$	nA
Static Drain-source On Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=24A$		2.7	3.6	m $\Omega$
		$V_{GS}=4.5V, I_D=12A$		4.1	5.5	m $\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=25V, I_D=10A$		30		S
Source-drain voltage	$V_{SD}$	$I_S=24A$			1.28	V

**●Electronic Characteristics**

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	$C_{iss}$	$f = 1MHz,$ $V_{DS}=25V$	-	2800	-	$\mu F$
Output capacitance	$C_{oss}$		-	420	-	
Reverse transfer capacitance	$C_{rss}$		-	280	-	

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

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Gate Resistance	$R_g$	$f = 1MHz$		2.5		$\Omega$
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	$t_{D(on)}$	$V_{GS}=10V, V_{DS}=15V$		12		ns
Turn-ON Rise time	$t_r$	$R_G = 3.3\Omega, I_D = 15A$		44		ns

Turn-Off Delay time	$t_{D(off)}$	VDD = 20 V, dIS/dt = 100 A/s, IS = 30 A	50	ns
Turn-Off Fall time	$t_f$		15	ns
Reverse Recovery Time	$t_{RR}$		5.8	ns
Charge Time	$t_a$		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

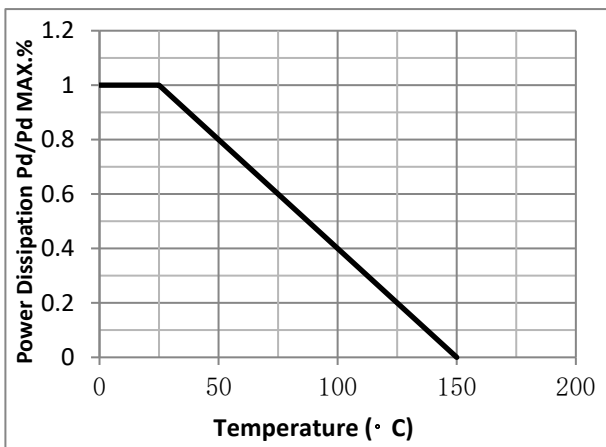


Fig.2 Typical output Characteristics

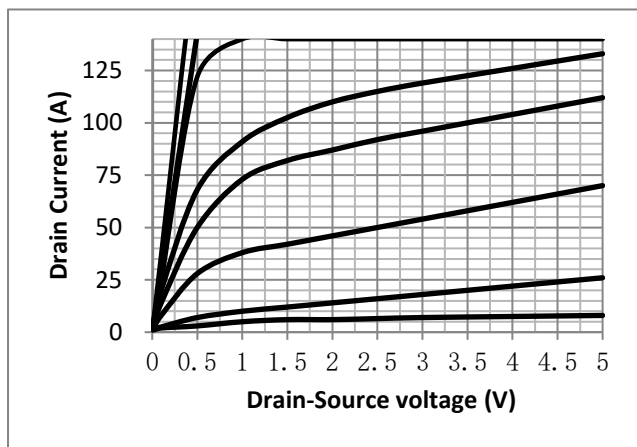


Fig.3 Threshold Voltage V.S Junction Temperature

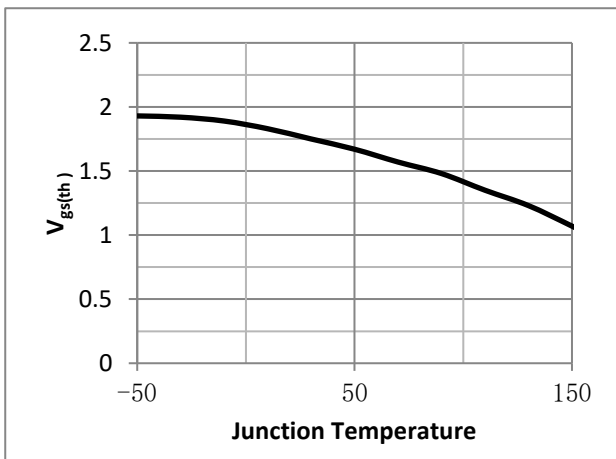


Fig.4 Resistance V.S Drain Current

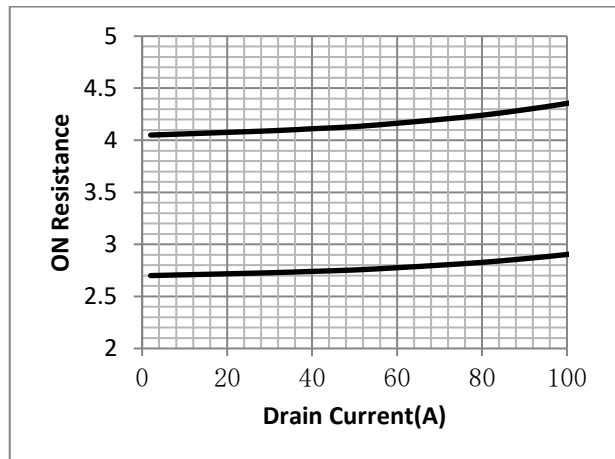


Fig.5 On-Resistance VS Gate Source Voltage

Fig.6 On-Resistance V.S Junction Temperature

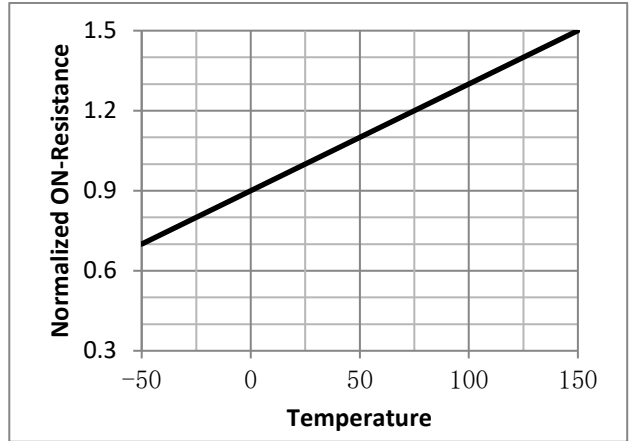
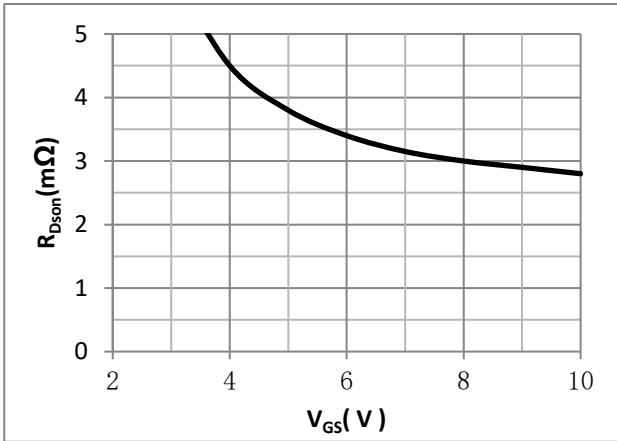


Fig.7 SOA Maximum Safe Operating Area

Fig.8 ID-Junction Temperature

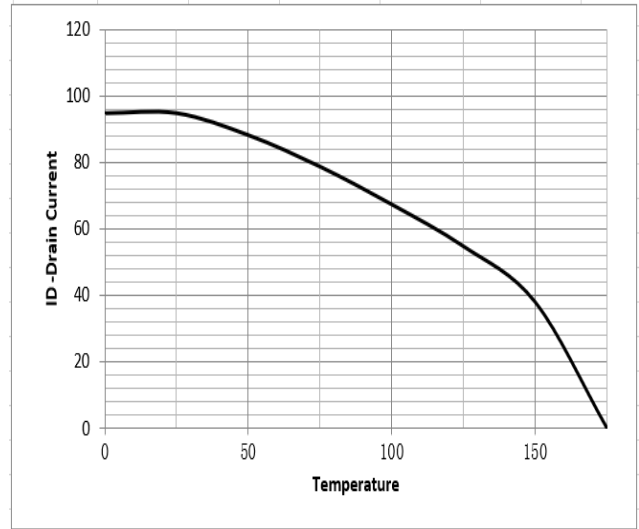
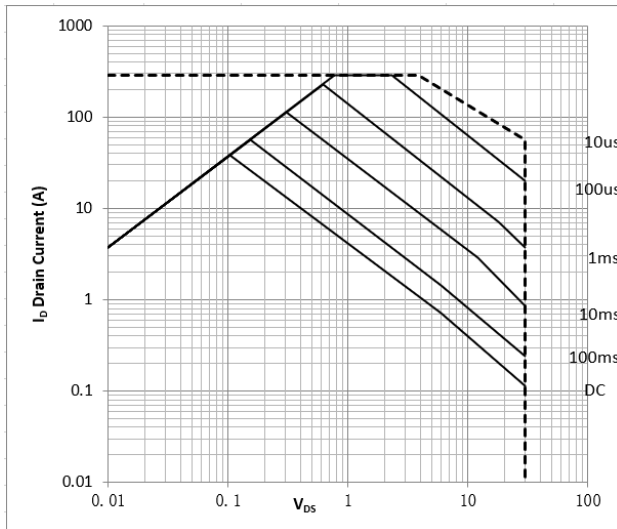


Figure 9. Diode Forward Voltage vs. Current

Figure 10. Transfer Characteristics

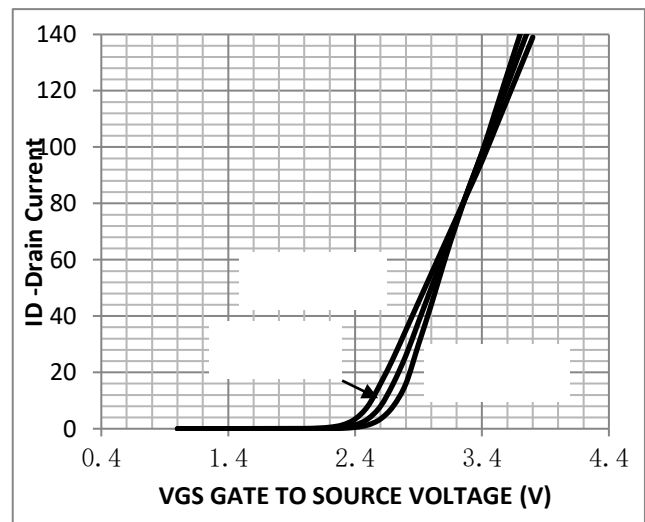
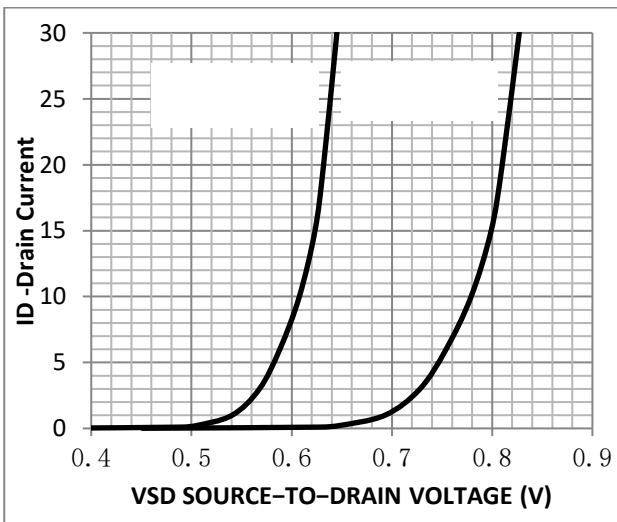


Figure 11. Gate-to-Source and

Fig.12 Capacitance Variation

Drain-to-Source Voltage vs. Total Charge

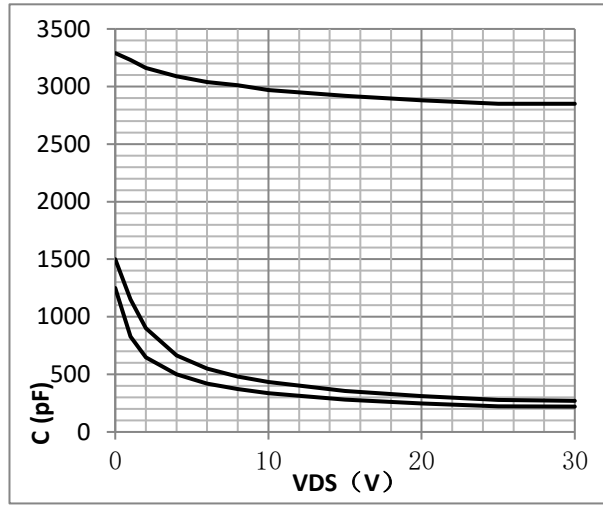
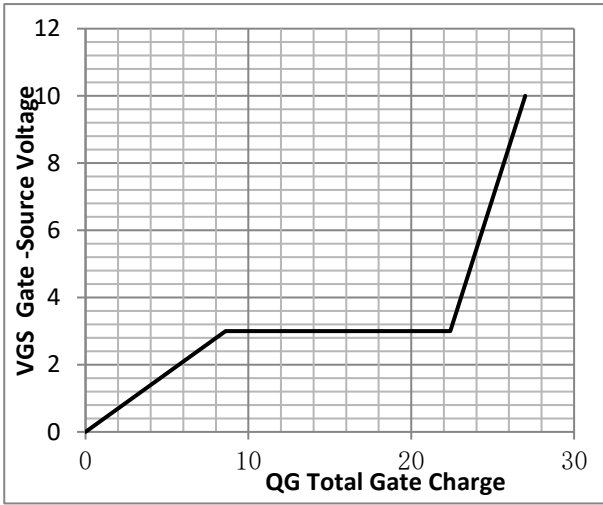


Fig.13 Switching Time Measurement Circuit

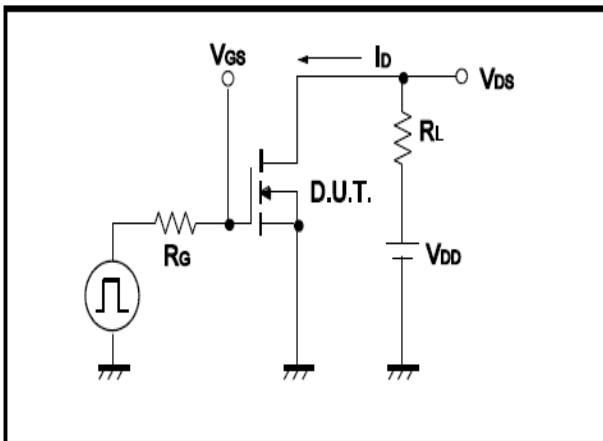


Fig.14 Gate Charge Waveform

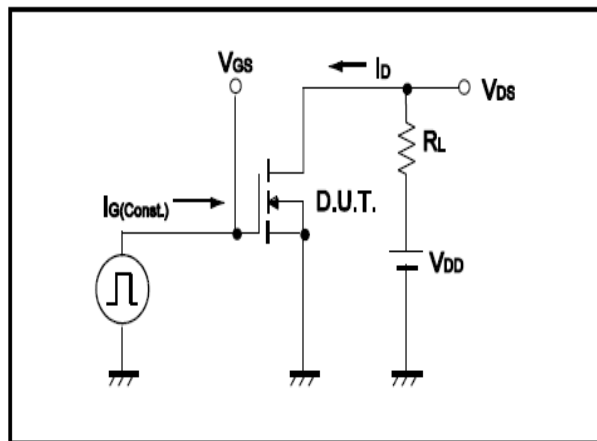


Fig.15 Avalanche Measurement Circuit

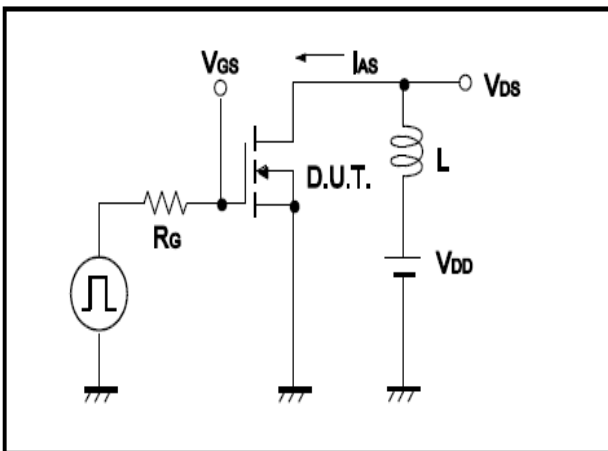


Fig.16 Avalanche Waveform

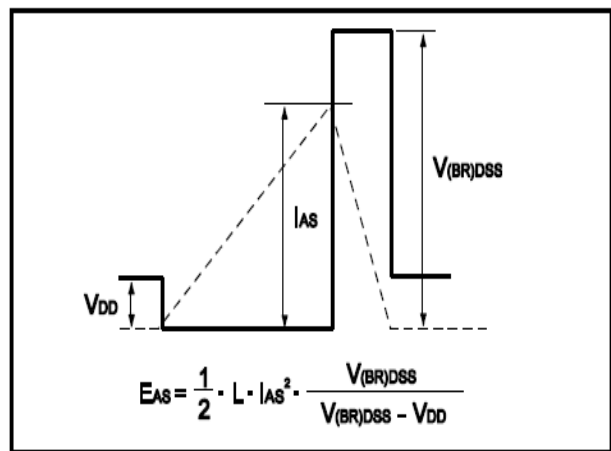
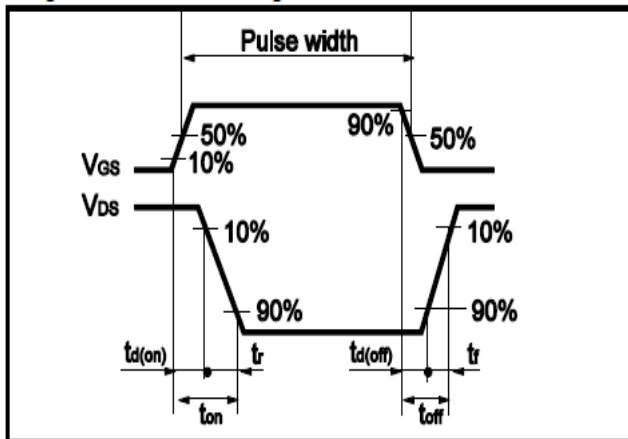


Fig.17 Gate Charge Waveform



**Dimensions (TO-220F)**

Unit: mm

SYMBOL	min	nom	max	SYMBOL	min	nom	max
C	4.50	4.70	4.90	b1	2.90	3.40	3.90
c	0.40	0.50	0.6	a	1.08	1.28	1.48
A	9.96	10.16	10.36	a1	0.70	0.80	0.9
B	15.67	15.87	16.07	E	2.34	2.54	2.74
B1	3.30	3.40	3.50	E1	2.34	2.54	2.74
R	3.08	3.18	3.28	C1	2.34	2.54	2.74
b	12.48	12.98	13.48	C2	2.56	2.76	2.96

