

General Description

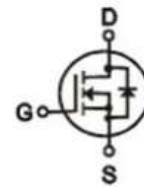
The ZM027N03P combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. This device is ideal for load switch and battery protection applications.

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

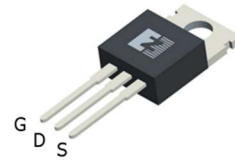
- MB/VGA Vcore
- SMPS 2nd Synchronous Rectifier
- POL application
- BLDC Motor driver

Product Summary


$V_{DS} = 30V$

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

$I_D = 140A$



TO-220

Ordering Information:

Part NO.	ZM027N03P
Marking	ZM027N03
Packing Information	Bulk Tube
Basic ordering unit (pcs)	1000

Absolute Maximum Ratings (T_C = 25°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	$P_D@T_A=25^\circ C$	2	W
Operating Junction Temperature	T_J	-55 to 150	°C
Storage Temperature	T_{STG}	-55 to 150	°C
Single Pulse Avalanche Energy	E_{AS}	350	mJ

●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}	-	-	62	$^{\circ}C/W$
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 Ω
		$V_{GS} = 4.5V, I_D = 12A$		4.6	5.6	m Ω
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	$V_{DD} = 15V$ $I_D = 24A$ $V_{GS} = 10V$	-	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 = 100 A/s, 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

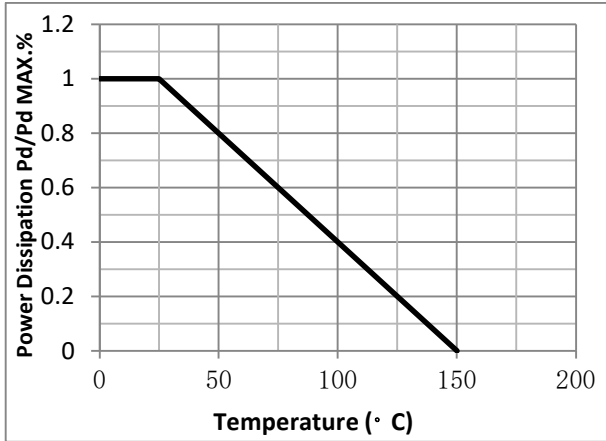


Fig.2 Typical output Characteristics

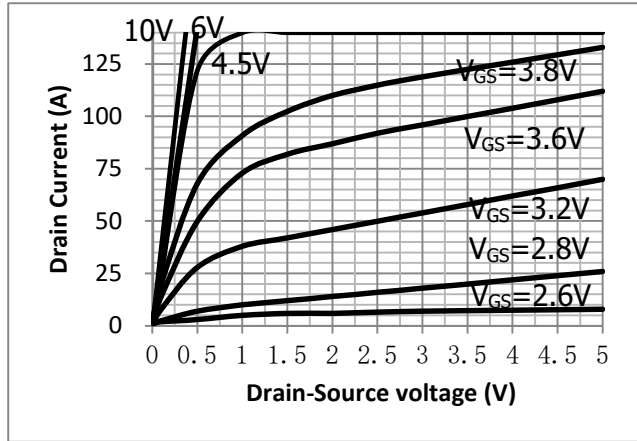


Fig.3 Threshold Voltage V.S Junction Temperature

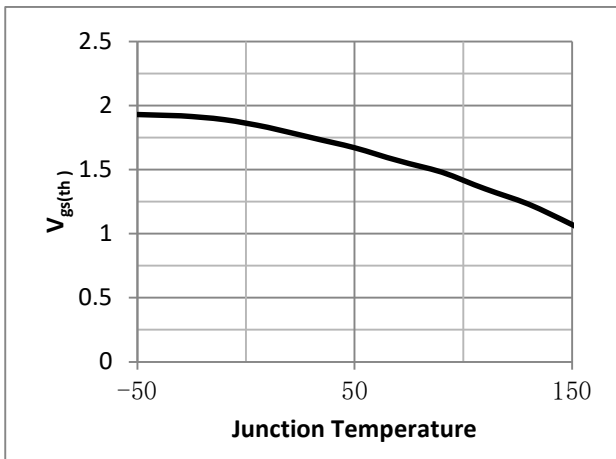


Fig.4 Resistance V.S Drain Current

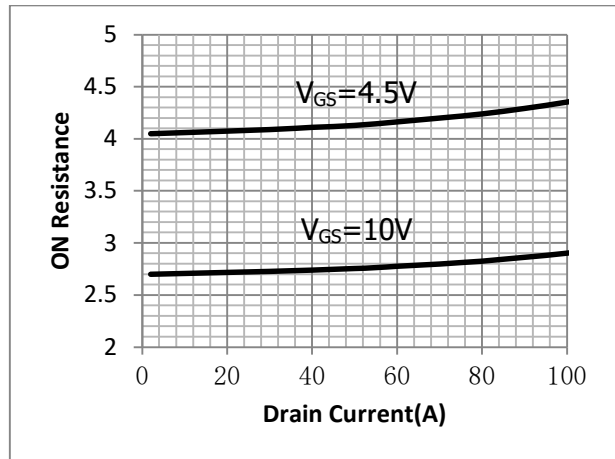


Fig.5 On-Resistance VS Gate Source Voltage

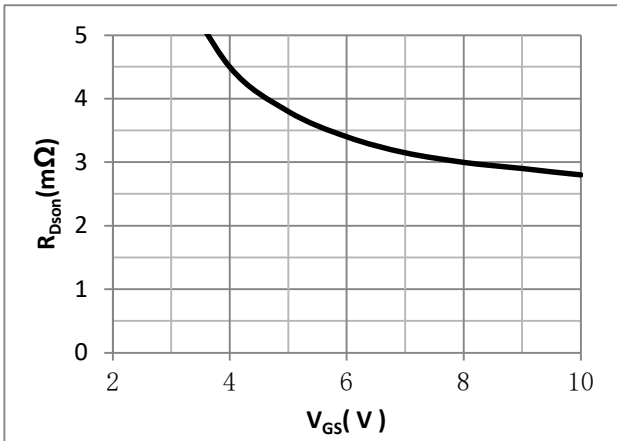


Fig.6 On-Resistance V.S Junction Temperature

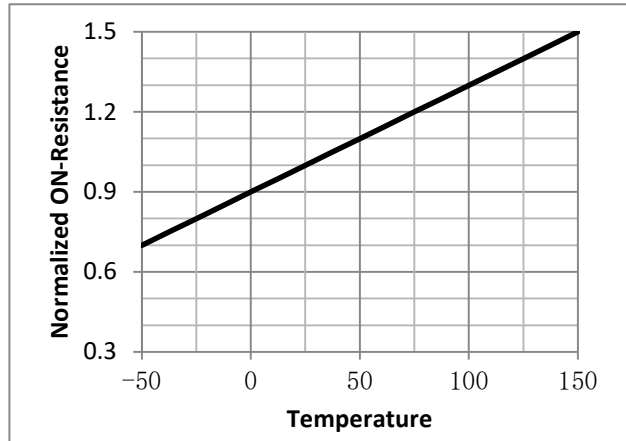


Fig.7 SOA Maximum Safe Operating Area

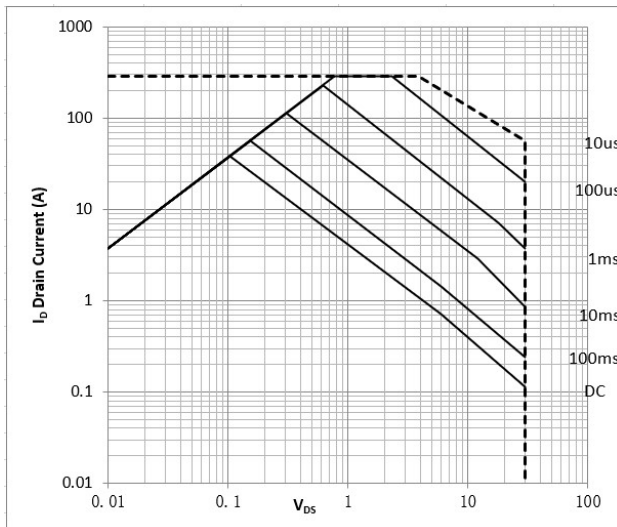


Fig.8 ID-Junction Temperature

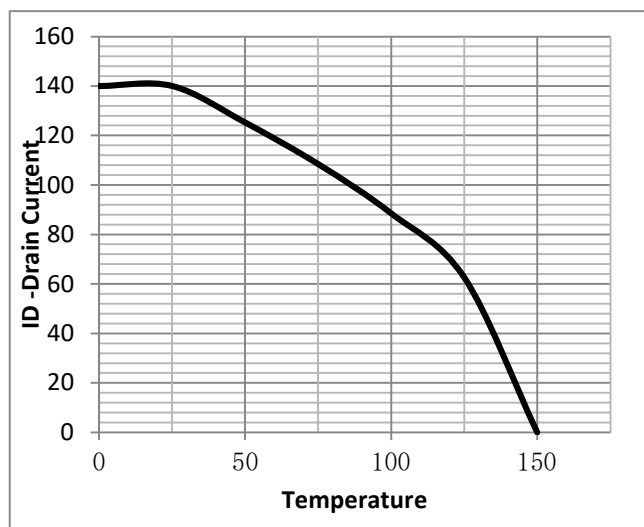


Figure 9. Diode Forward Voltage vs. Current

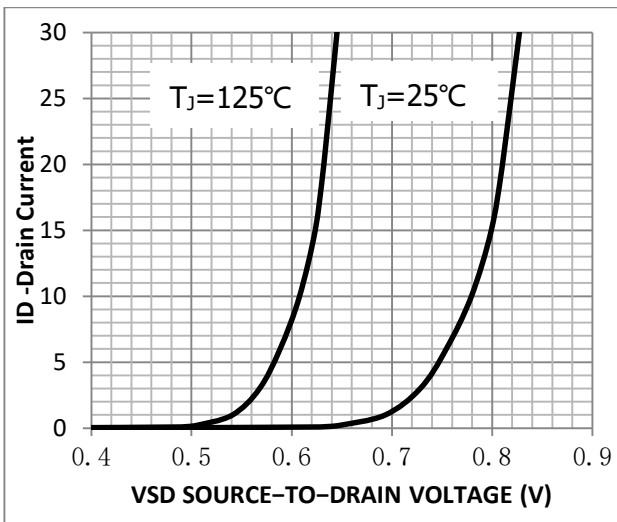


Figure 10. Transfer Characteristics

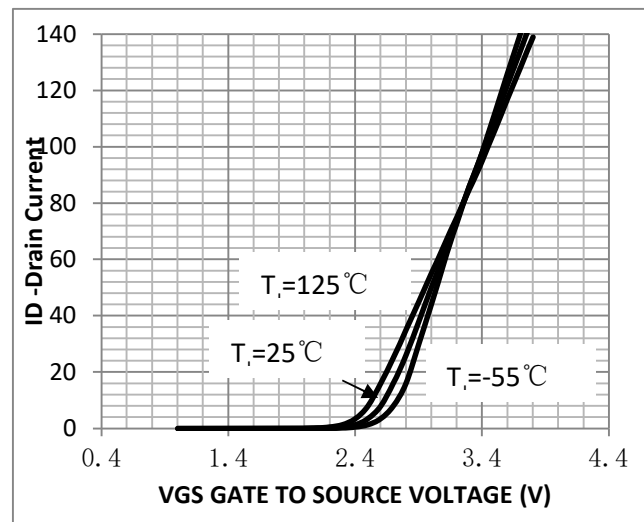


Figure 11. Gate Charge

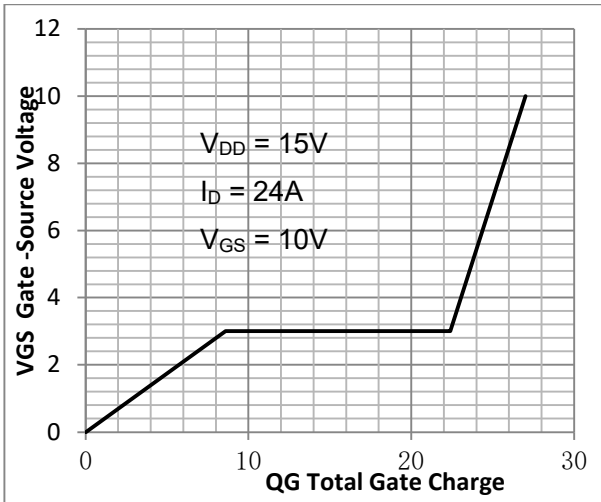


Fig.12 Capacitance Variation

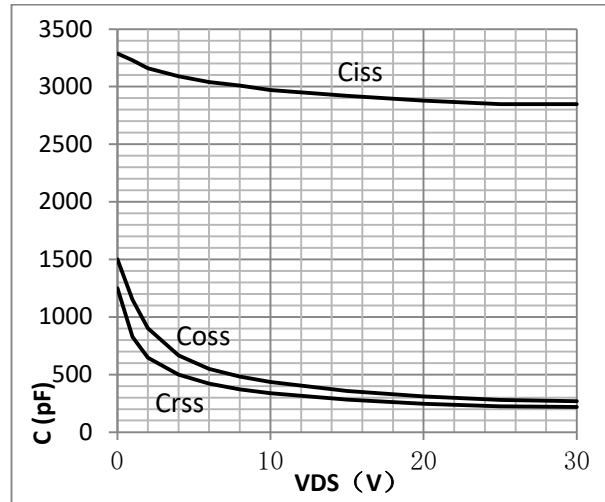


Fig.13 Switching Time Measurement Circuit

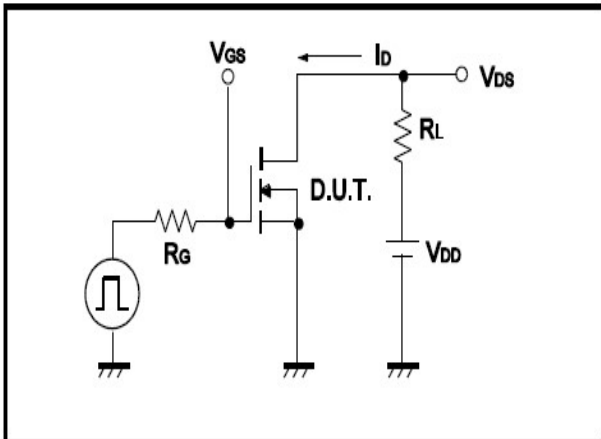


Fig.14 Gate Charge Measurement Circuit

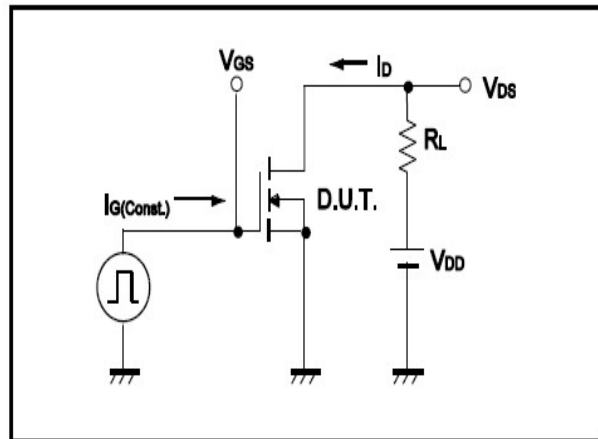


Fig.15 Avalanche Measurement Circuit

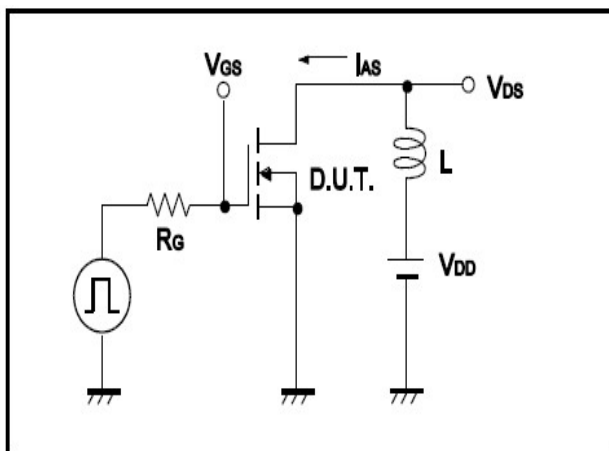


Fig.16 Avalanche Waveform

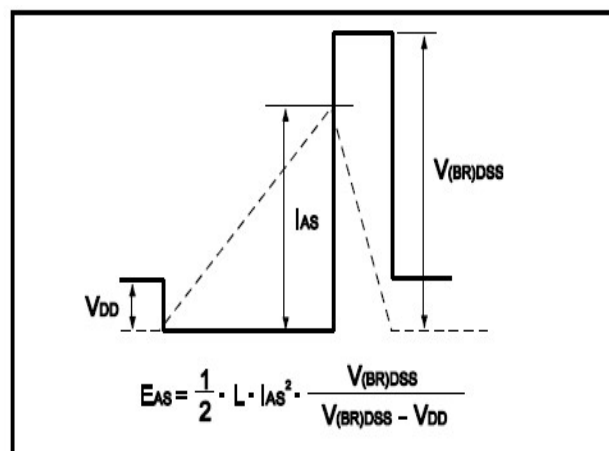
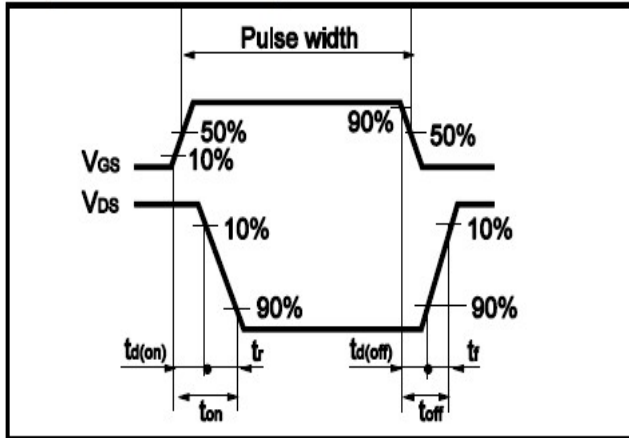


Fig.17 Switching Time Waveform





•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

