

• General Description

The ZM060N06F 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

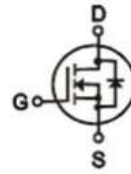
• Ordering Information:

Part NO.	ZM060N06F
Marking	ZM060N06
Packing Information	Bulk Tube
Basic ordering unit (pcs)	1000

• Absolute Maximum Ratings ($T_C = 25^\circ\text{C}$)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	$I_{D@TC=25^\circ\text{C}}$	50	A
	$I_{D@TC=75^\circ\text{C}}$	38	A
	$I_{D@TC=100^\circ\text{C}}$	31	A
Pulsed Drain Current ^①	I_{DM}	160	A
Total Power Dissipation($TC=25^\circ\text{C}$)	$P_{D@TC=25^\circ\text{C}}$	75	W
Total Power Dissipation($TA=25^\circ\text{C}$)	$P_{D@TA=25^\circ\text{C}}$	2	W
Operating Junction Temperature	T_J	-55 to 150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55 to 150	$^\circ\text{C}$

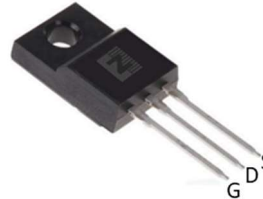
• Product Summary



$V_{DS} = 60\text{V}$

$R_{DS(ON)} = 6\text{m}\Omega$

$I_D = 50\text{A}$



TO-220F



•Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	-	-	1.7	$^{\circ}C/W$
Thermal resistance, junction - ambient	R_{thJA}	-	-	62.5	$^{\circ}C/W$
Soldering temperature, wavesoldering for 10s	T_{sold}	-	-	265	$^{\circ}C$

•Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	60			V
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	1.2	1.7	2.5	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=60V, V_{GS}=0V$			1.0	μA
Gate- Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$			± 100	nA
Static Drain-source On Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=16A$		6.0	7.8	m Ω
		$V_{GS}=4.5V, I_D=10A$		7.5	8.5	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=25V, I_D=8A$		28		S
Source-drain voltage	V_{SD}	$I_S=16A$			1.28	V

•Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	C_{iss}	f = 1MHz V _{DS} =25V	-	4200	-	pF
Output capacitance	C_{oss}		-	290	-	
Reverse transfer capacitance	C_{rss}		-	130	-	

•Switching Parameters(T_a = 25°C)

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Total gate charge	Q_g	$V_{DD}=30V$	-	56	-	nC
Gate - Source charge	Q_{gs}	$I_D=15A$	-	16	-	
Gate - Drain charge	Q_{gd}	$V_{GS}=10V$	-	26	-	
Body Diode Reverse Recovery Time	t_{rr}	$I_F=20A,$ $di/dt=100A/\mu s$		27		nS
Body Diode Reverse Recovery Charge	Q_{rr}	$I_F=20A,$ $di/dt=100A/\mu s$		65		nC

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

Fig.1 Power Dissipation

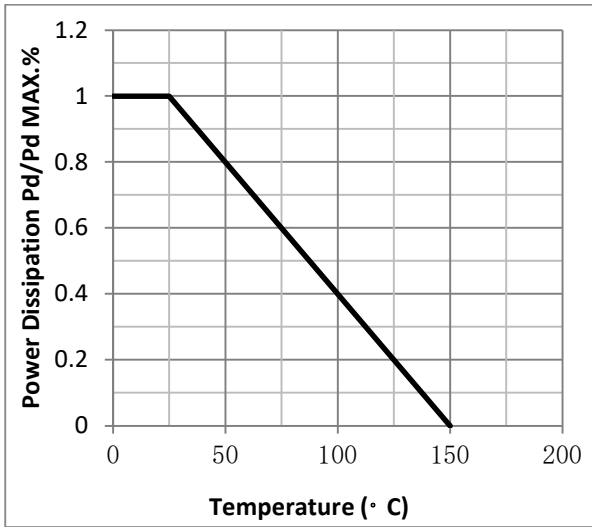


Fig.2 Typical output Characteristics

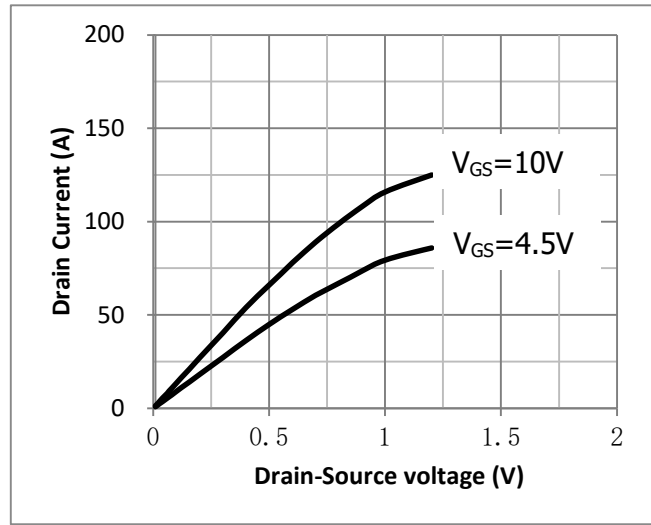


Fig.3 Threshold Voltage V.S Junction Temperature

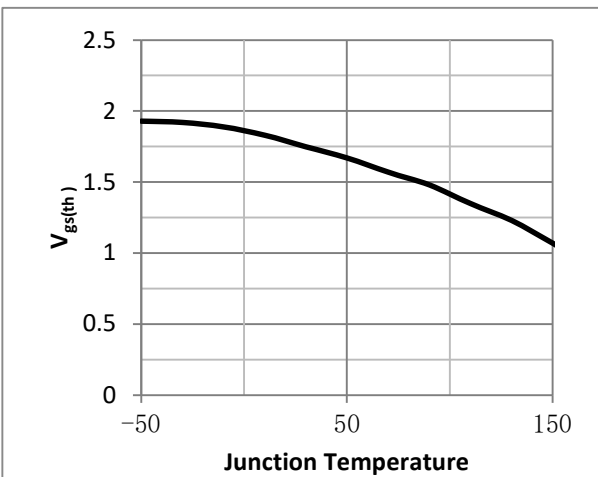


Fig.4 Resistance V.S Drain Current

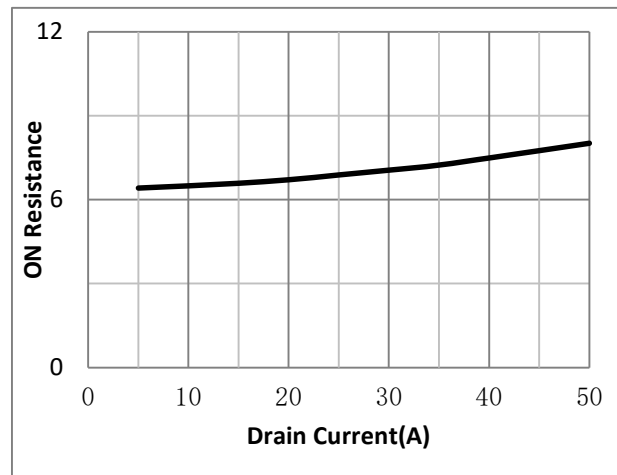


Fig.5 On-Resistance VS Gate Source Voltage

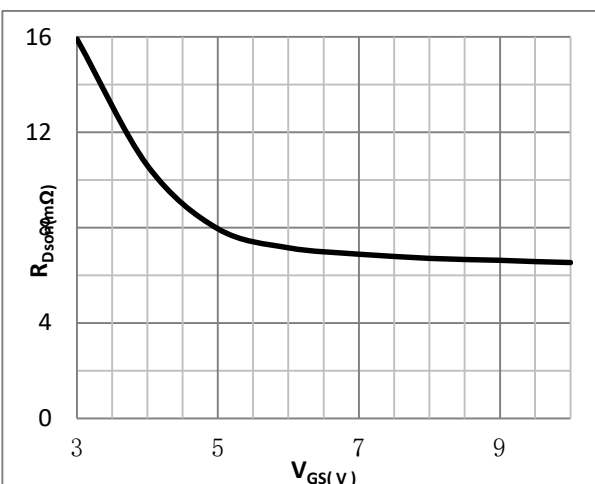


Fig.6 On-Resistance V.S Junction Temperature

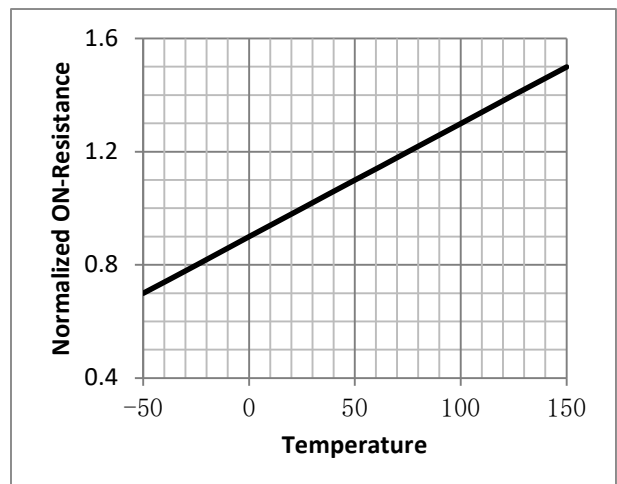


Fig.7 Switching Time Measurement Circuit

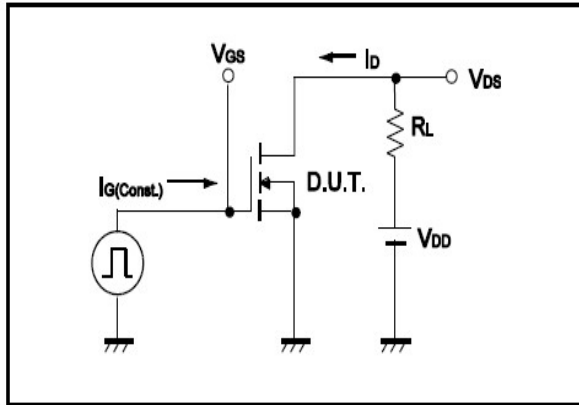


Fig.8 Gate Charge Waveform

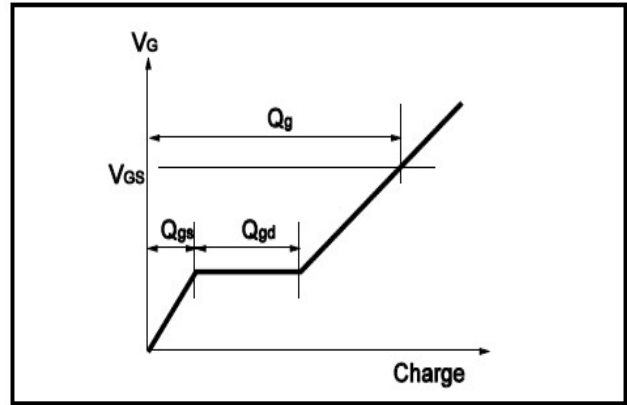


Fig.9 Switching Time Measurement Circuit

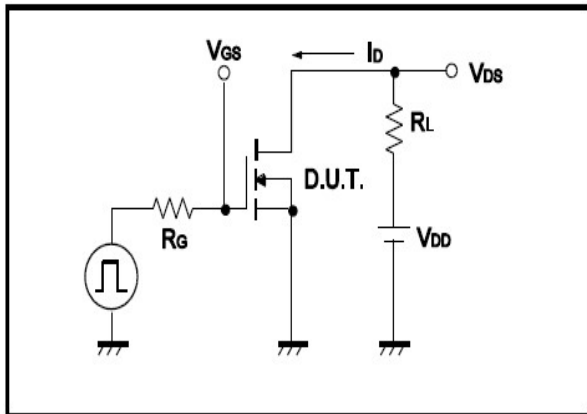


Fig.10 Gate Charge Waveform

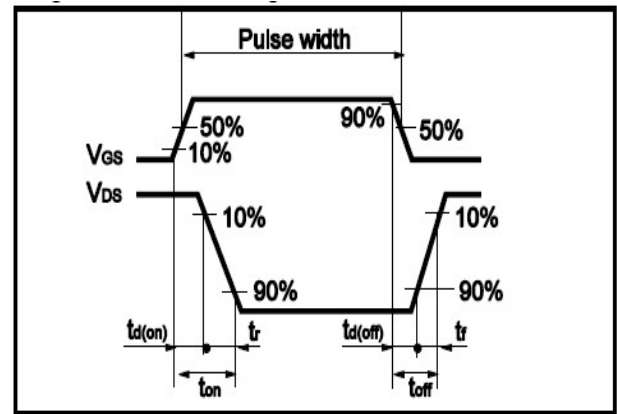


Fig.11 Avalanche Measurement Circuit

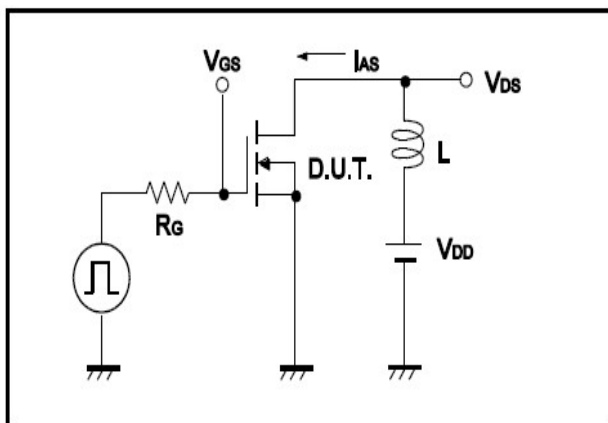
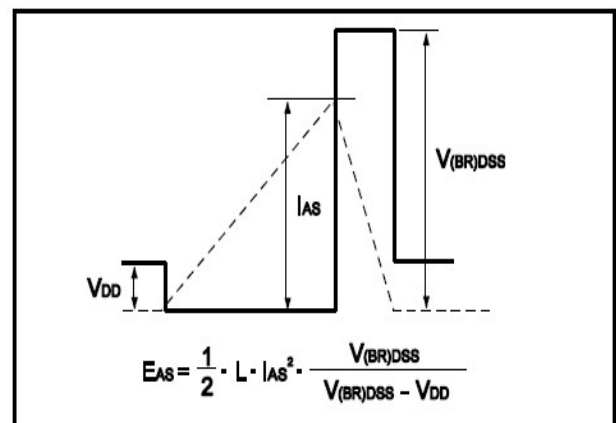


Fig.12 Avalanche Waveform





●Dimensions (TO-220F)

Unit: mm

Symbol	Dimensions In Millimeters		Symbol	Dimensions In Millimeters	
	Min	Max		Min	Max
C	4.5	4.9	b1	2.90	3.90
c	0.4	0.6	a	1.08	1.48
A	9.96	10.36	a1	0.70	0.90
B	15.67	16.07	E	2.34	2.74
B1	3.30	3.50	E1	2.34	2.74
R	3.08	3.28	C1	2.34	2.74
b	12.48	13.48	C2	2.56	2.96

