

**• General Description**

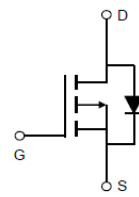
The ZM120P02M combines advanced trench MOSFET technology with a low resistance package to provide extremely low  $R_{DS(ON)}$ .

**• 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**

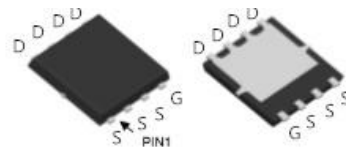
- Load Switches
- DC/DC
- BLDC Motor driver

**• Product Summary**


$V_{DS} = -20V$

$R_{DS(ON)} = 12.0m\Omega$

$I_D = -26A$



DFN3 x 3

**• Ordering Information:**

Part NO.	ZM120P02M
Marking	120P02
Packing Information	REEL TAPE
Basic ordering unit (pcs)	5000

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

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	-20	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Continuous Drain Current	$I_{D@TC=25^\circ C}$	-26	A
	$I_{D@TC=75^\circ C}$	-20	A
	$I_{D@TC=100^\circ C}$	-16	A
Pulsed Drain Current <sup>①</sup>	$I_{DM}$	-88	A
Total Power Dissipation <sup>②</sup>	$P_D@T_C=25^\circ C$	46	W
Total Power Dissipation	$P_D@T_A=25^\circ C$	2.3	W
Operating Junction Temperature	$T_J$	-55 to 150	$^\circ C$
Storage Temperature	$T_{STG}$	-55 to 150	$^\circ C$
Single Pulse Avalanche Energy@L=0.1mH	$E_{AS}$	125	mJ
Avalanche Current@L=0.1mH	$I_{AS}$	-50	A

**•Thermal resistance**

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case <sup>②</sup>	R <sub>thJC</sub>	-	-	2.7	° C/W
Thermal resistance, junction - ambient	R <sub>thJA</sub>	-	-	53	° 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	-20			V
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> = -250uA	-0.3		-1.2	V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> = -20V, V <sub>GS</sub> = 0V			-1.0	uA
Gate- Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±12V, V <sub>DS</sub> = 0V			±100	nA
Static Drain-source On Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -15A		12	15	mΩ
		V <sub>GS</sub> = -2.5V, I <sub>D</sub> = -10A		15	20	mΩ
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> = -4.5V, I <sub>D</sub> = -5A		18		s
Source-drain voltage	V <sub>SD</sub>	I <sub>S</sub> = -15A			1.28	V

**•Electronic Characteristics**

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	C <sub>iss</sub>	V <sub>GS</sub> = 0V, V <sub>DS</sub> = -15V f = 1MHz	-	1650	-	pF
Output capacitance	C <sub>oss</sub>		-	330	-	
Reverse transfer capacitance	C <sub>rss</sub>		-	220	-	

**•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> = -15V	-	18	-	nC
Gate - Source charge	Q <sub>gs</sub>	I <sub>D</sub> = -10A	-	6	-	
Gate - Drain charge	Q <sub>gd</sub>	V <sub>GS</sub> = -4.5V	-	7	-	

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

② Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate;

Fig.1 Gate-Charge Characteristics

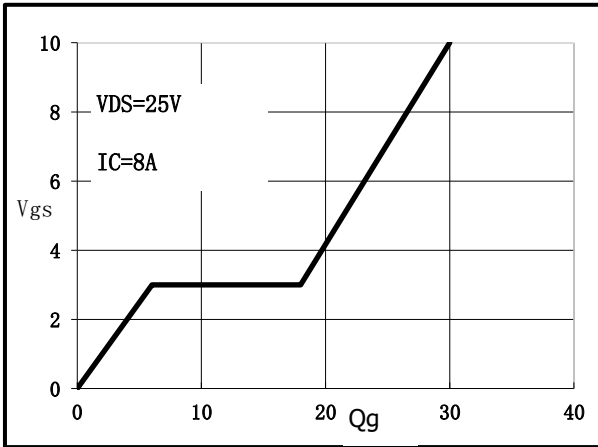


Fig.2 Capacitance Characteristics

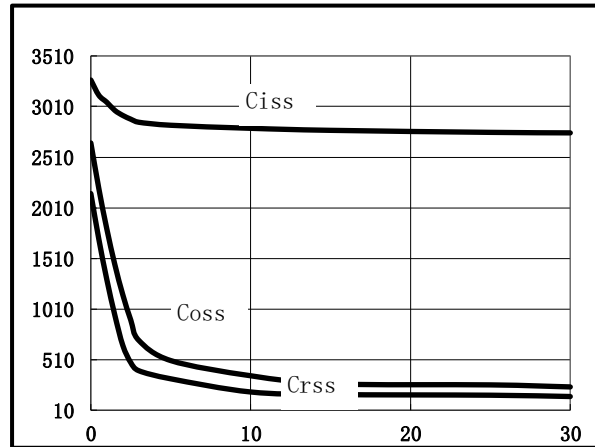


Fig.3 Power Dissipation Derating Curve

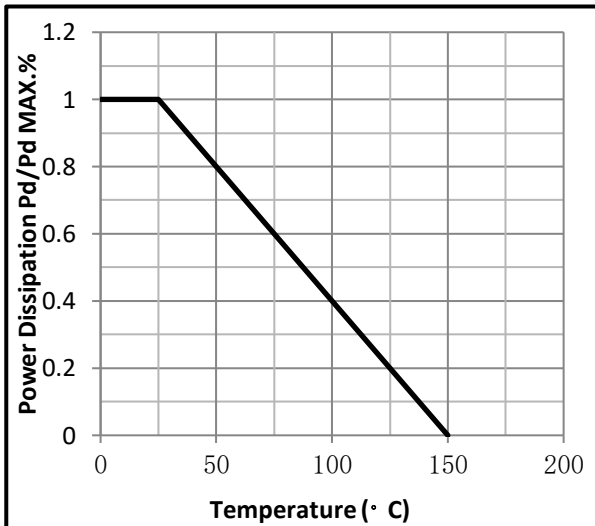


Fig.4 Typical output Characteristics

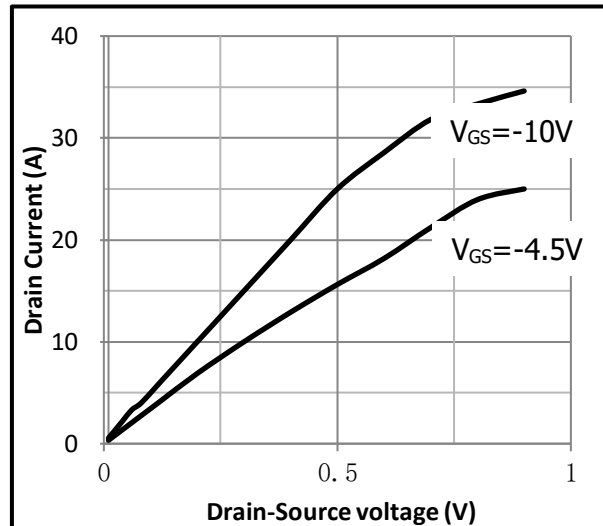


Fig.5 Threshold Voltage V.S Junction Temperature

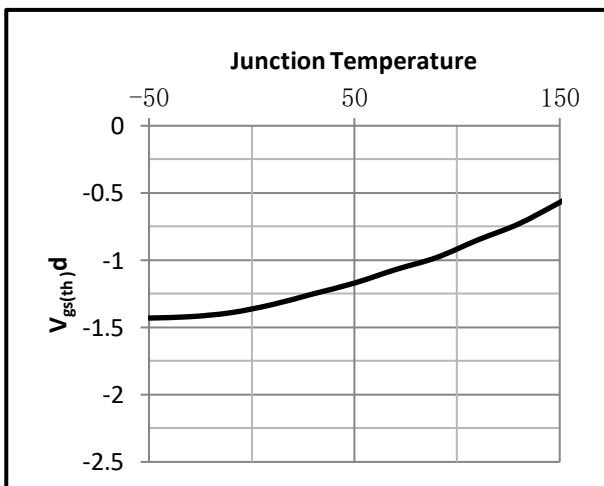


Fig.6 Resistance V.S Drain Current

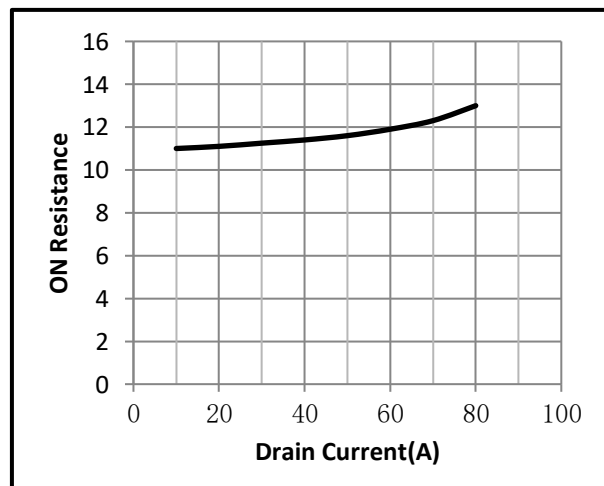


Fig.7 On-Resistance VS Gate Source Voltage

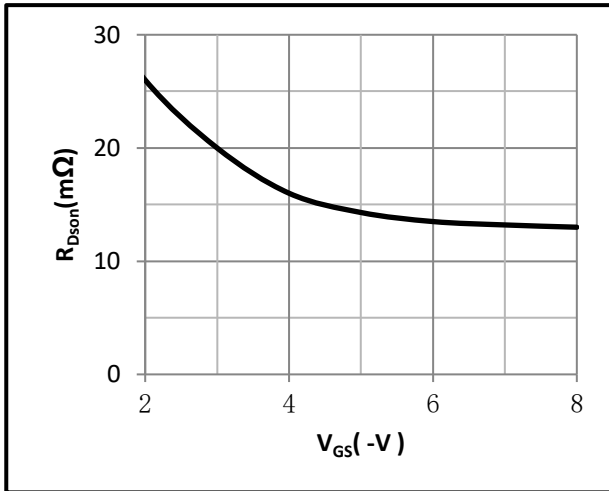


Fig.8 On-Resistance V.S Junction Temperature

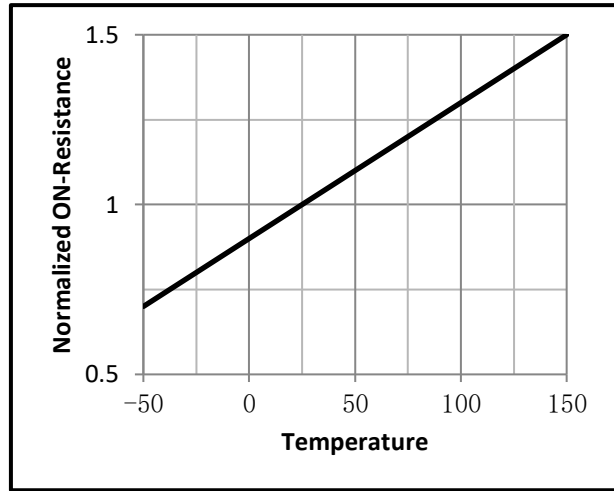


Fig.9 Switching Time Measurement Circuit

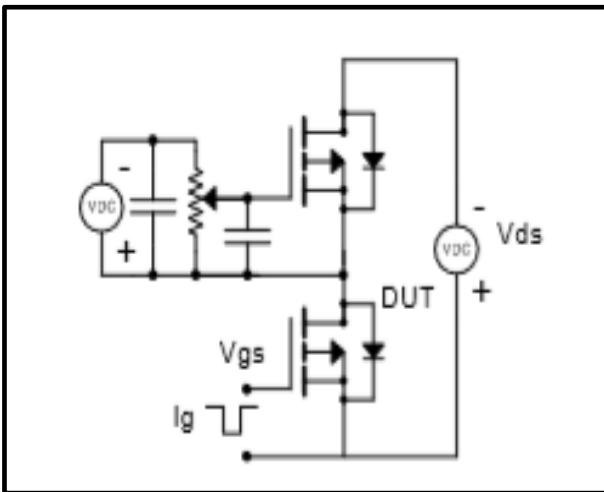


Fig.10 Gate Charge Waveform

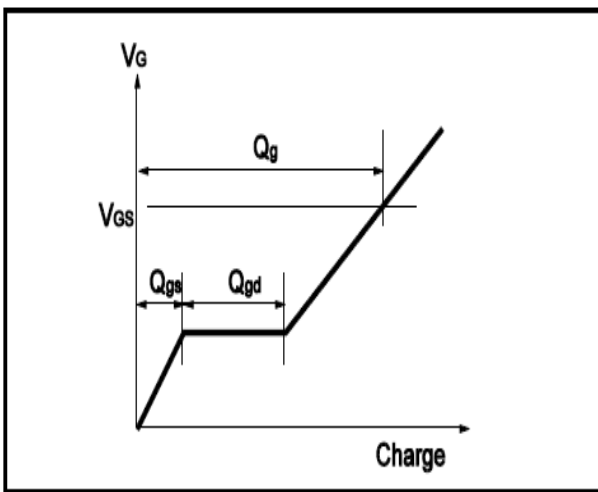


Fig.11 Switching Time Measurement Circuit

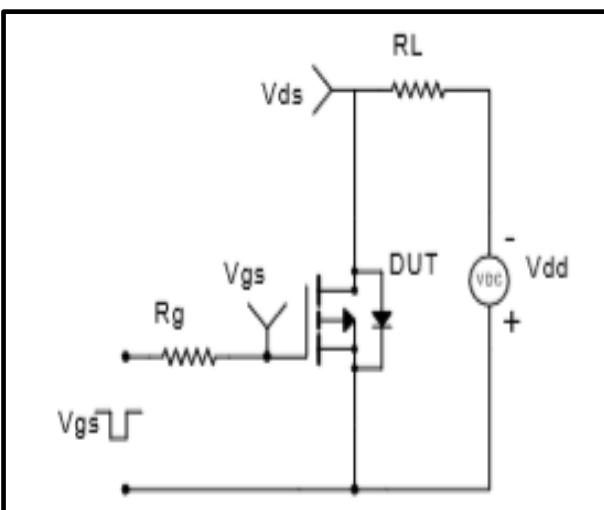
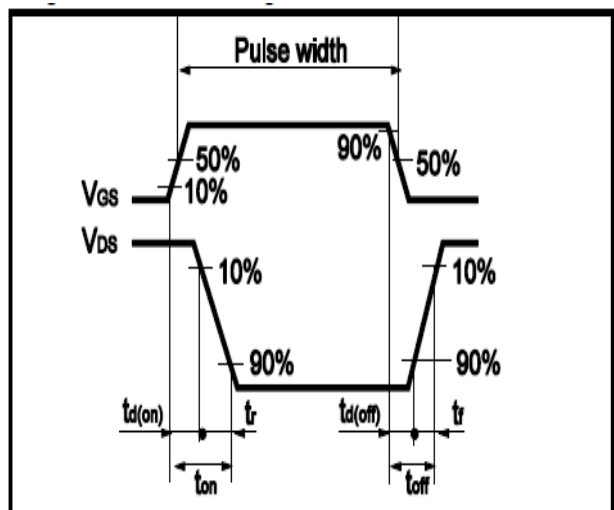


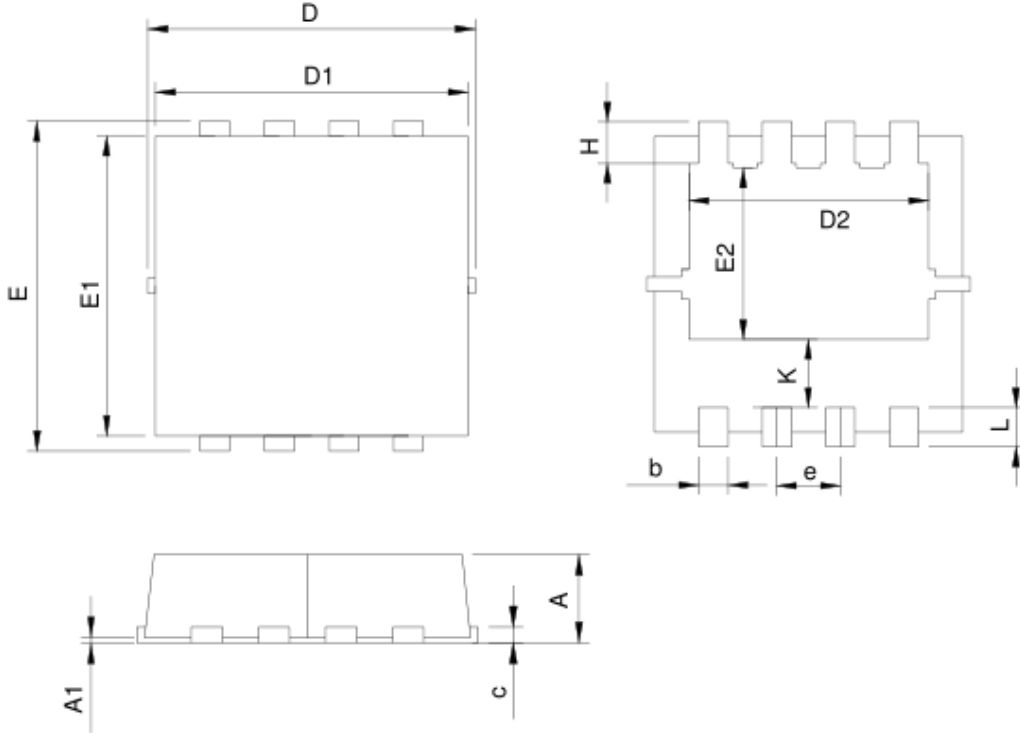
Fig.12 Gate Charge Waveform





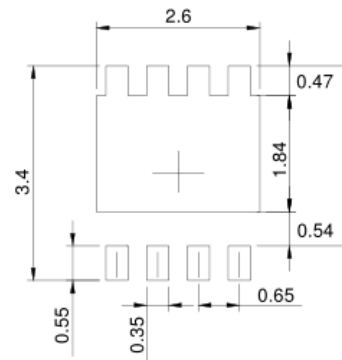
•Dimensions(DFN3x3)

Unit: mm



L C O M M E N T S	DFN3.3x3.3-8			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	0.70	1.00	0.028	0.039
A1	0.00	0.05	0.000	0.002
b	0.25	0.35	0.010	0.014
c	0.14	0.20	0.006	0.008
D	3.10	3.50	0.122	0.138
D1	3.05	3.25	0.120	0.128
D2	2.35	2.55	0.093	0.100
E	3.10	3.50	0.122	0.138
E1	2.90	3.10	0.114	0.122
E2	1.64	1.84	0.065	0.072
e	0.65 BSC		0.026 BSC	
H	0.32	0.52	0.013	0.020
K	0.59	0.79	0.023	0.031
L	0.25	0.55	0.010	0.022

RECOMMENDED LAND PATTERN



UNIT: mm