

General Description

The ZM120P04M combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$.

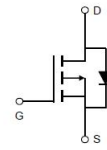
Features

- 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

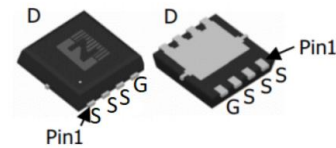
Product Summary



$$V_{DS} = -40V$$

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

$$I_D = -40A$$



DFN3 x 3

Ordering Information:

Part NO.	ZM120P04M
Marking	120P04
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}	-40	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	$I_{D@TC=25^\circ C}$	-40	A
	$I_{D@TC=75^\circ C}$	-30	A
	$I_{D@TC=100^\circ C}$	-25	A
Pulsed Drain Current ^①	I_{DM}	-120	A
Total Power Dissipation ^②	P_D	18	W
Total Power Dissipation($T_A=25^\circ C$)	$P_{D@T_A=25^\circ C}$	0.9	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

•Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case ^②	R_{thJC}	-	-	7.1	°C/W
Thermal resistance, junction - ambient	R_{thJA}	-	-	140	°C/W
Soldering temperature, wave soldering for 10s	T_{sold}	-	-	265	°C

•Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=-250\mu A$	-40			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}	$V_{DS}=-40V, V_{GS}=0V$			-1.0	μA
Gate- Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$			± 100	nA
Static Drain-source On Resistance	$R_{DS(ON)}$	$V_{GS}=-10V, I_D=-15A$		12	16	m Ω
		$V_{GS}=-4.5V, I_D=-10A$		17	21	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=-10V, I_D=-5A$		18		s
Source-drain voltage	VSD	$I_S=-15A$			1.28	V

•Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=-25V$ $f = 1MHz$	-	2750	-	pF
Output capacitance	C_{oss}		-	185	-	
Reverse transfer capacitance	C_{rss}		-	135	-	

•Gate Charge characteristics($T_a = 25^\circ C$)

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Total gate charge	Qg	$V_{DD}=-15V$ $I_D=-8A$ $V_{GS}=-4.5V$	-	30	-	nC
Gate - Source charge	Qgs		-	9	-	
Gate - Drain charge	Qgd		-	15	-	

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

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

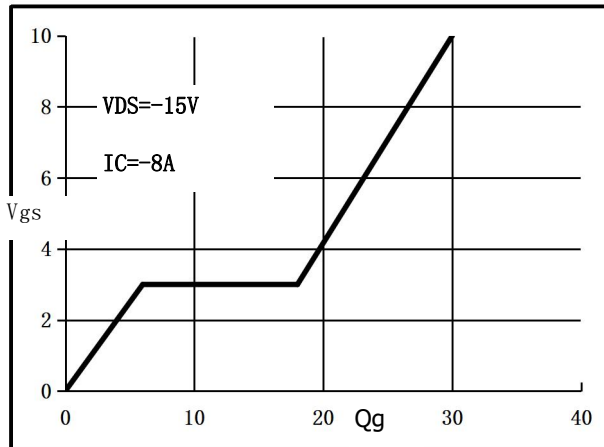


Fig.2 Capacitance Characteristics

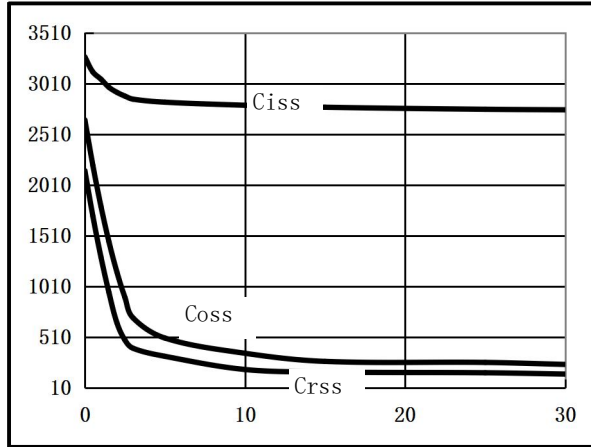


Fig.3 Power Dissipation Derating Curve

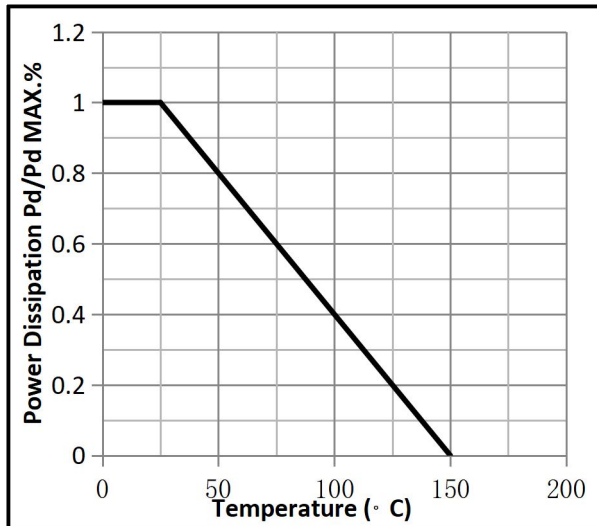


Fig.4 Typical output Characteristics

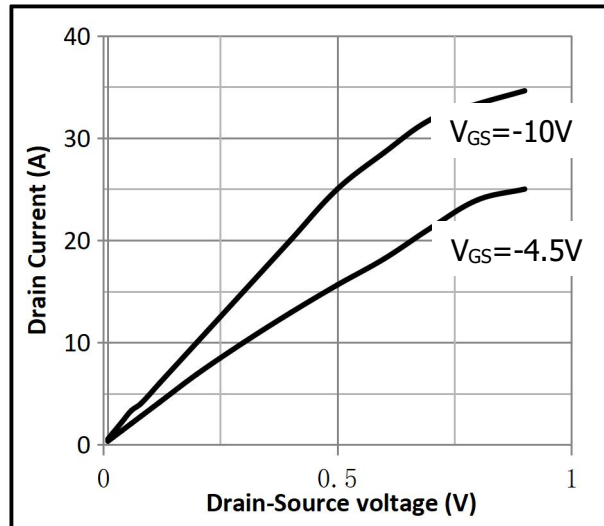


Fig.5 Threshold Voltage V.S Junction Temperature

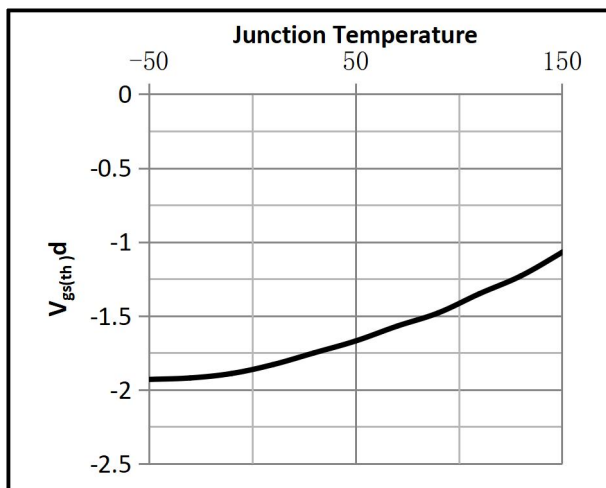


Fig.6 Resistance V.S Drain Current

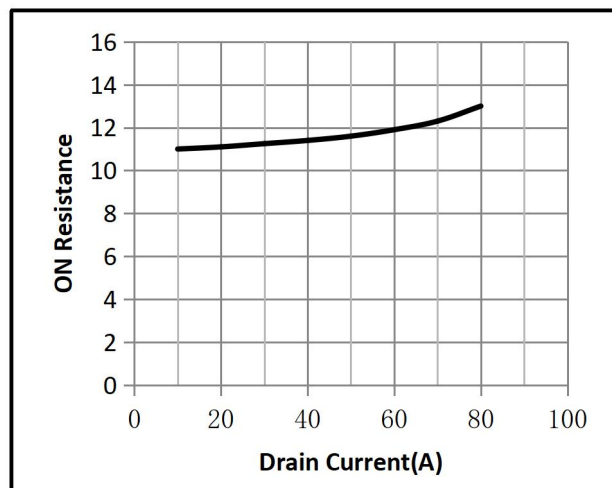


Fig.7 On-Resistance VS Gate Source Voltage

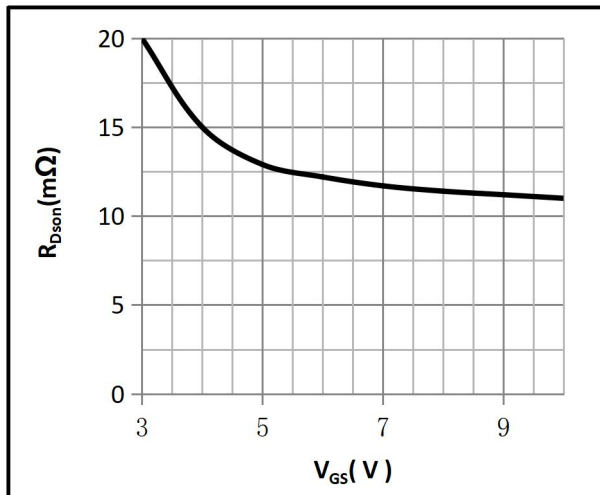


Fig.8 On-Resistance V.S Junction Temperature

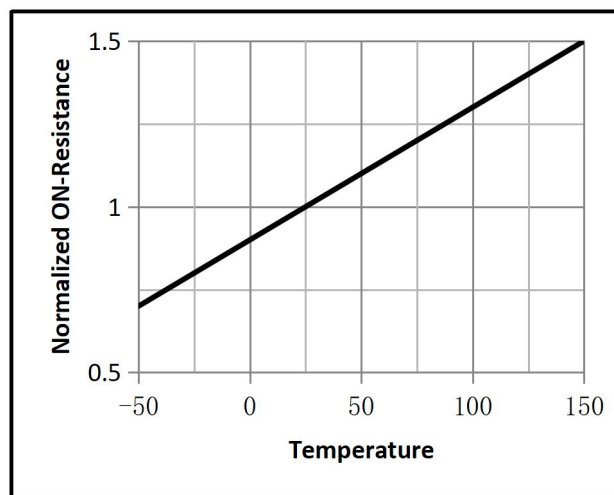


Fig.9 Switching Time Measurement Circuit

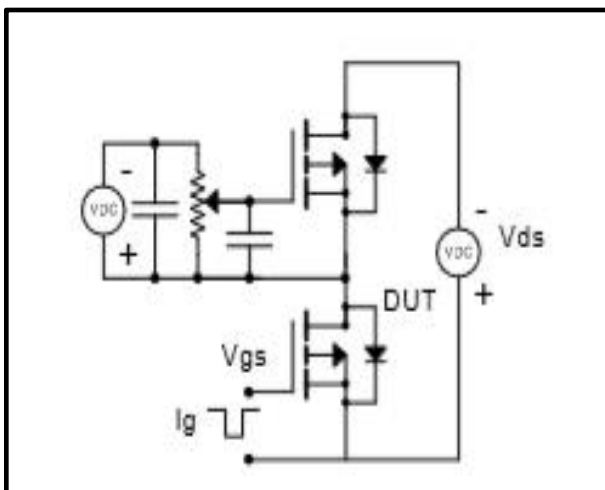


Fig.10 Gate Charge Waveform

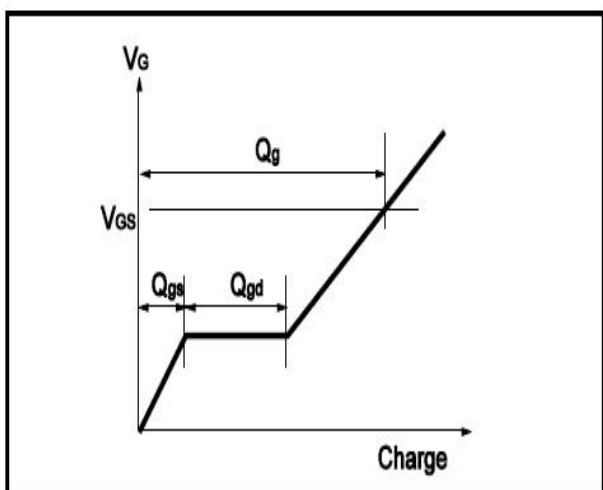


Fig.11 Switching Time Measurement Circuit

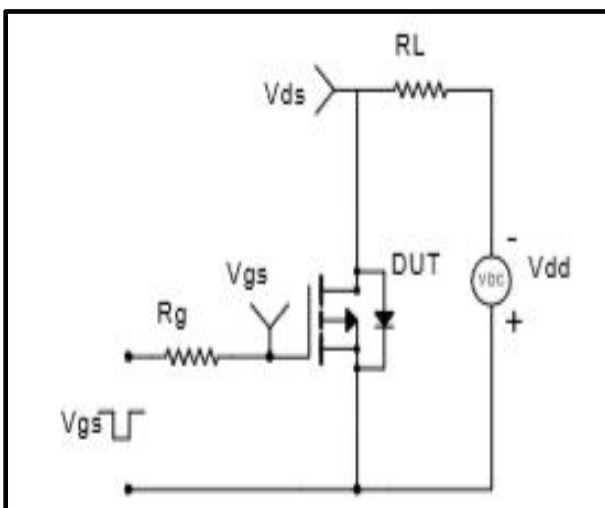
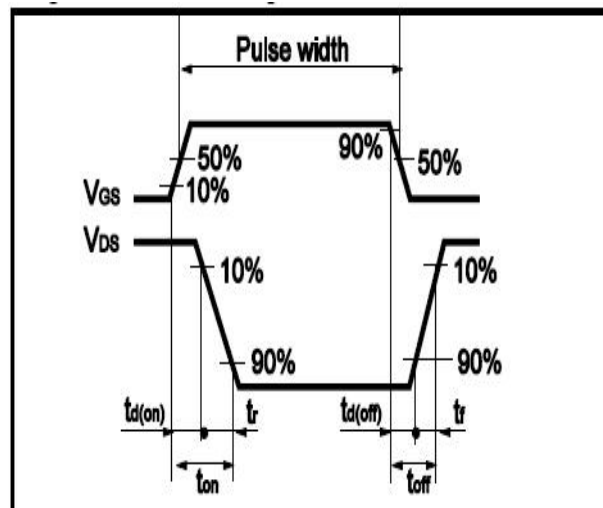


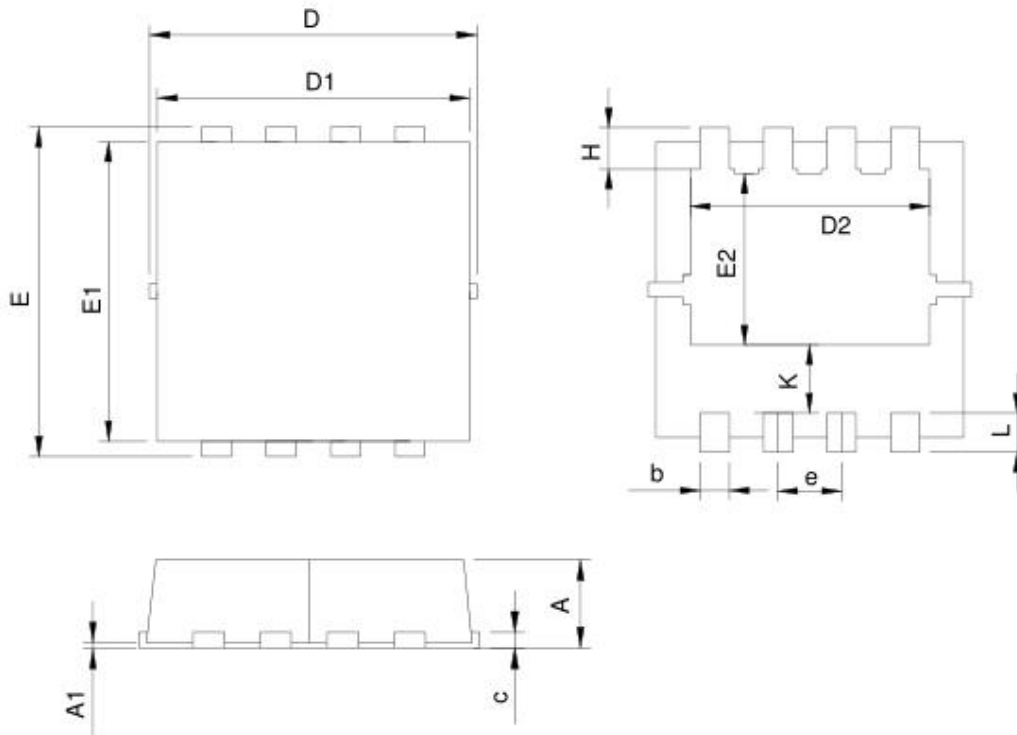
Fig.12 Gate Charge Waveform





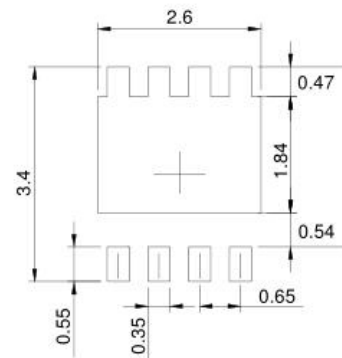
●Dimensions(DFN3×3)

Unit: mm



SYMBOL	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