100V N-Channel Power SpeedFET

● Features

■AEC-Q101 Qualified

■Low $R_{DS(ON)}$ to minimize conductive loss

■Low Gate Charge for fast switching

■Low Thermal resistance

●Application

■SMPS 2nd Synchronous Rectifier

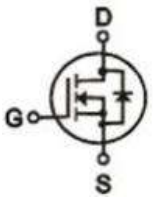
■Load switch

■BLDC Motor driver

● General Description

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

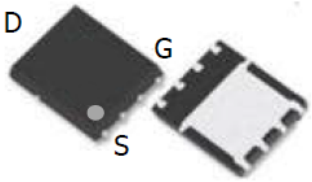
● Product Summary



V_{DS} =100V

$R_{DS(ON)}$ =25mΩ

I_D =31A



DFN5 x 6

●Ordering Information:

Part NO.	KPRA250N10N-V
Marking	ZMS250N10
Packing Information	REEL TAPE
Basic ordering unit (pcs)	3000

●Absolute Maximum Ratings (T_C =25℃)

Parameter	Symbol	Conditions	Rating	Unit
Drain-Source Voltage	V_{DS}	25 °C ≤ T_j ≤ 175 °C	100	V
Gate-Source Voltage	V_{GS}	Pulsed ①	+20/-20	V
	V_{GS}	DC;T_j ≤ 175 °C	+15/-5	V
Continuous Drain Current	I_D	T_C=25℃	31	A
	I_D	T_C=75℃	23	A
	I_D	T_C=100℃	19	A
Pulsed Drain Current	I_{DM}	pulsed; t_p ≤ 10 μs; T_{mb} = 25 °C;	93	A
Total Power Dissipation	P_D	T_C=25℃	65	W
Total Power Dissipation	P_D	T_A=25℃	3.0	W
Operating Junction Temperature	T_J		-55 to 175	℃
Storage Temperature	T_{STG}		-55 to 175	℃
Single Pulse Avalanche Energy	E_{AS}	L=0.1mH, VGS=10V, Rg=25Ω, T_J=25℃	18	mJ
ESD Level (HBM)			CLASS 1C	

●Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	-	-	1.7	°C/W
Thermal resistance, junction - ambient②	R_{thJA}	-	-	50	°C/W
Soldering temperature, wavesoldering for 10s	T_{sold}	-	-	260	°C

●Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} =0V, I_D =250uA	100			V
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} =V_{DS}, I_D =250uA	1.3		2.5	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=100V, V_{GS} =0V			1.0	uA
Gate- Source Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS} =0V			±100	nA
Static Drain-source On Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=9A		25	32	mΩ
	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=6A③		32	41	mΩ
Forward Transconductance	g_{FS}	V_{DS} =10V, I_D=4A		5		s

●Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Gate Risistance	R_g	f = 1MHz		0.4		Ω
Input capacitance	Ciss	f = 1MHz V_{DS}=25V	-	550	-	pF
Output capacitance	Coss		-	292	-	
Reverse transfer capacitance	Crss		-	7.4	-	

● Gate Charge characteristics(Ta= 25℃)

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Total gate charge	Qg	V_{DD} =25V I_D = 8A V_{GS} = 10V	-	13	-	nC
	Qg(4.5v)			6.0		
Gate - Source charge	Qgs		-	2.0	-	
Gate - Drain charge	Qgd		-	3.2	-	

Fig.1 Gate-Charge Characteristics

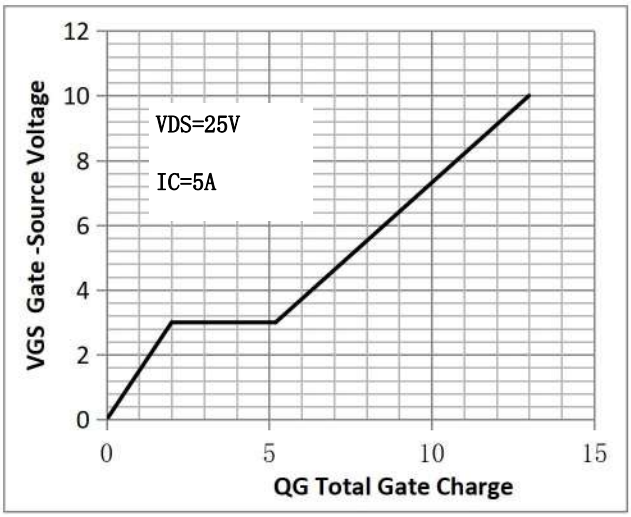


Fig.2 Capacitance Characteristics

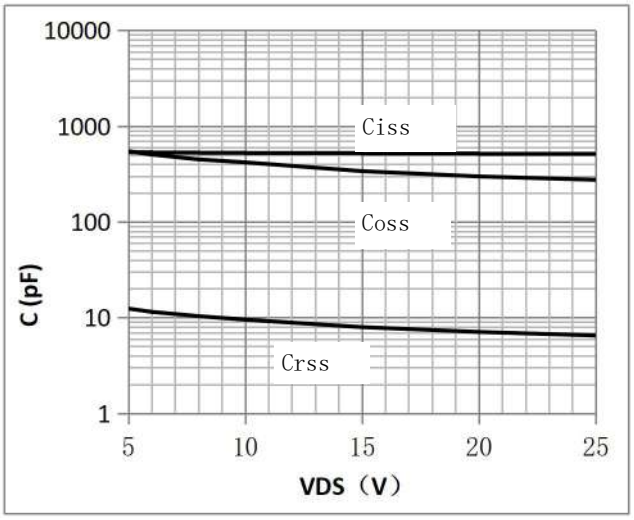


Fig.3 Power Dissipation

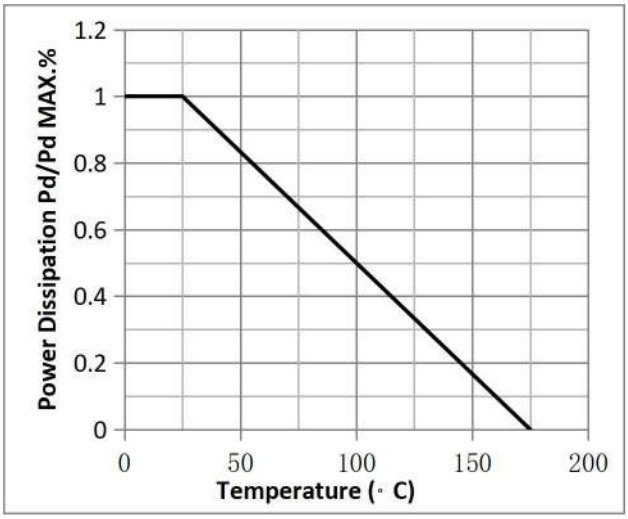


Fig.4 Typical output Characteristics

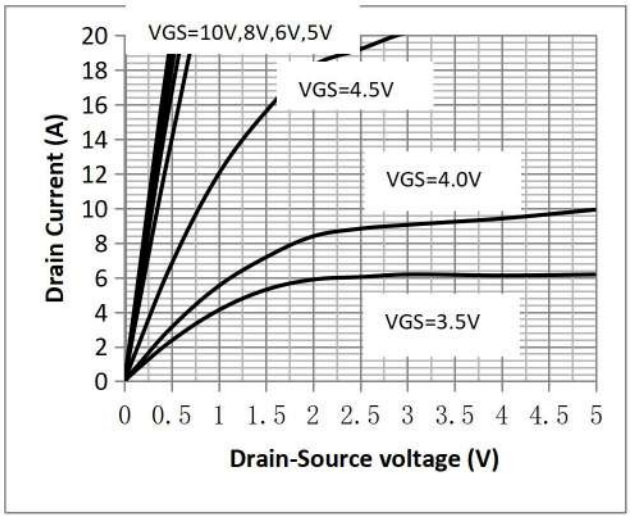


Fig.5 Threshold Voltage V.S Junction Temperature

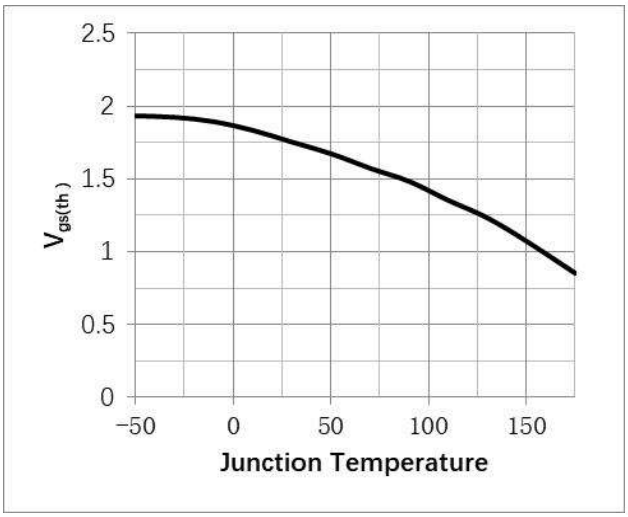


Fig.6 Resistance V.S Drain Current

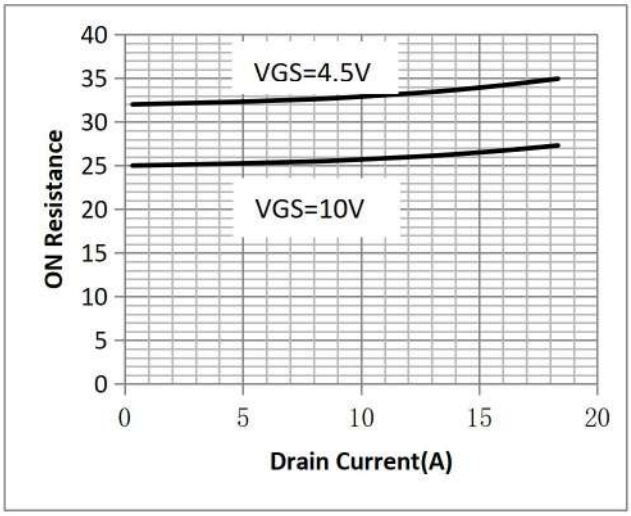


Fig.7 On-Resistance VS Gate Source Voltage

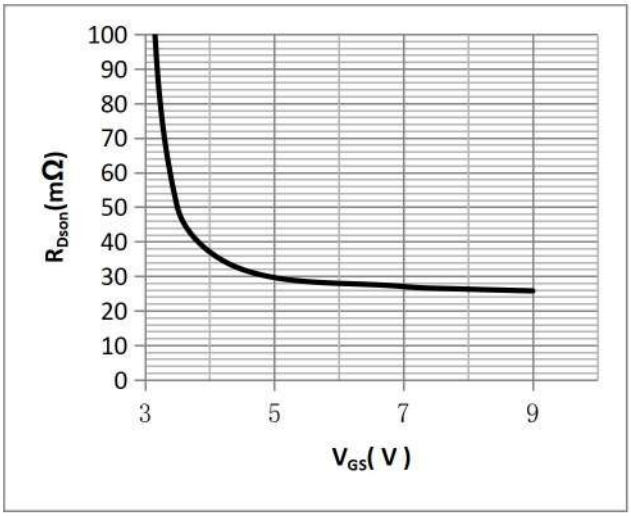


Fig.8 On-Resistance V.S Junction Temperature

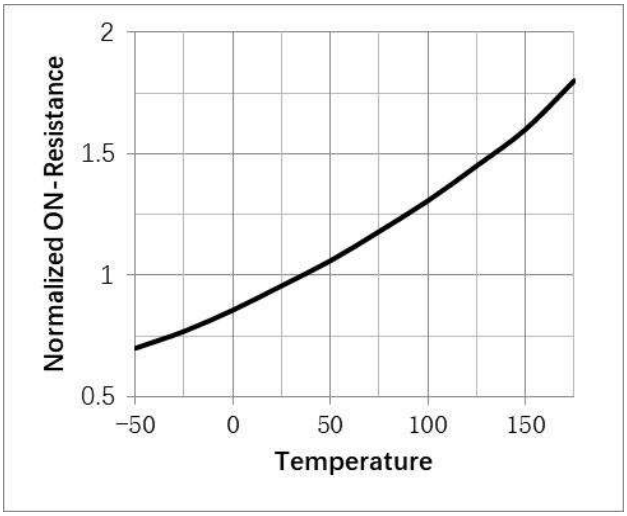


Fig.9 SOA Maximum Safe Operating Area

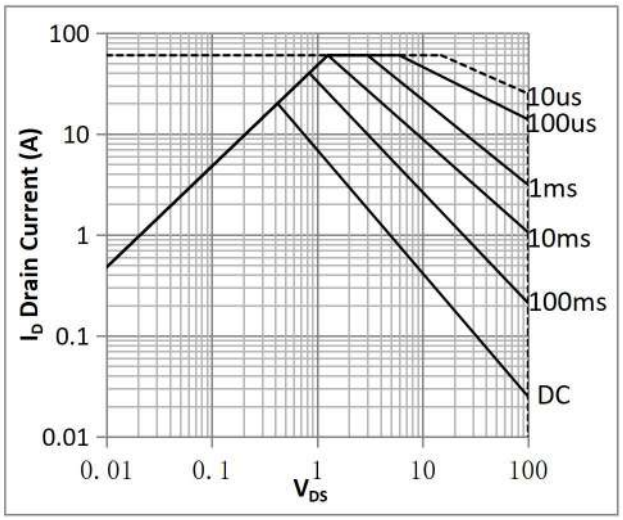


Fig.10 ID-Junction Temperature

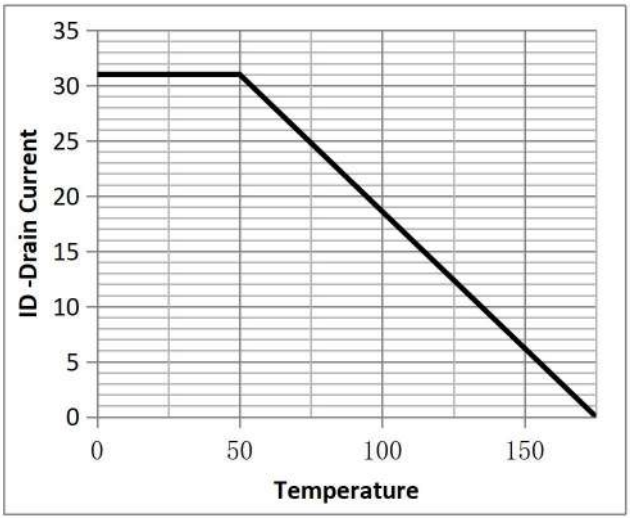


Fig.11 Switching Time Measurement Circuit

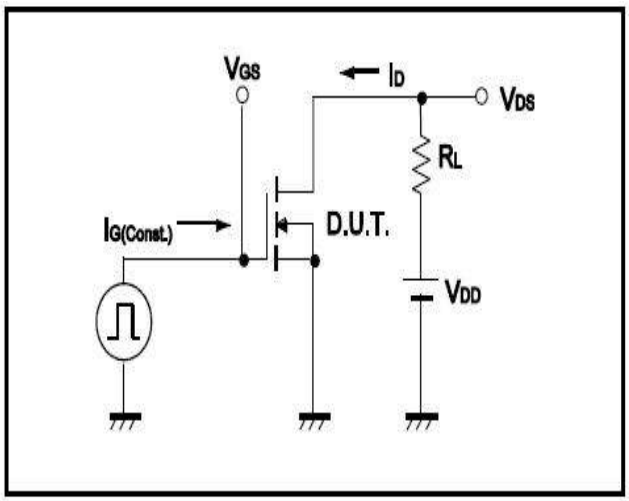


Fig.12 Gate Charge Waveform

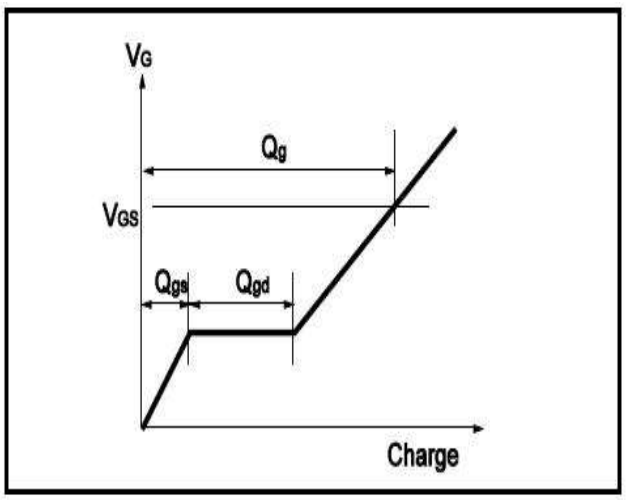


Fig.13 Switching Time Measurement Circuit

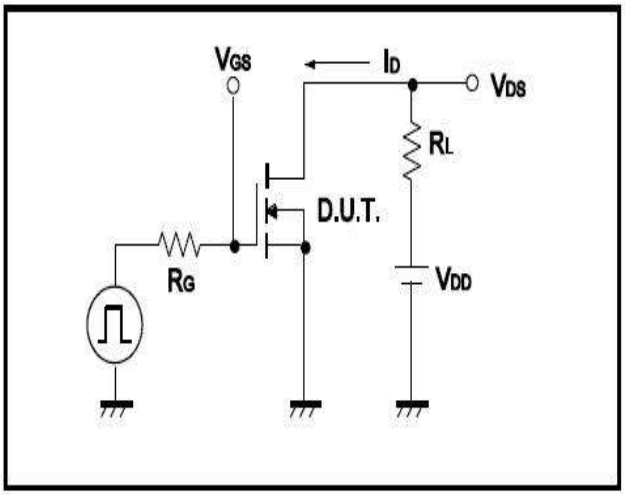
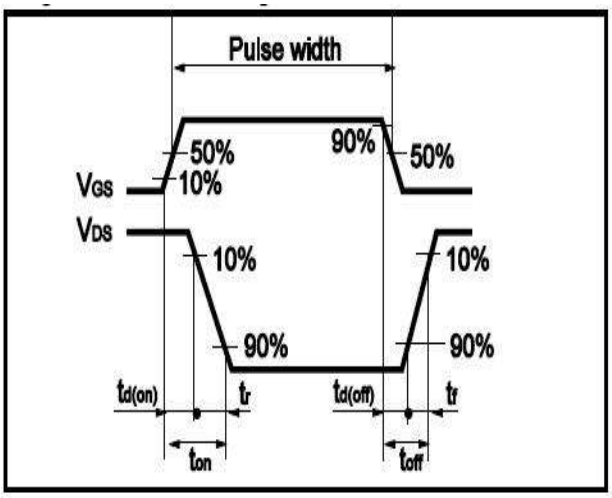
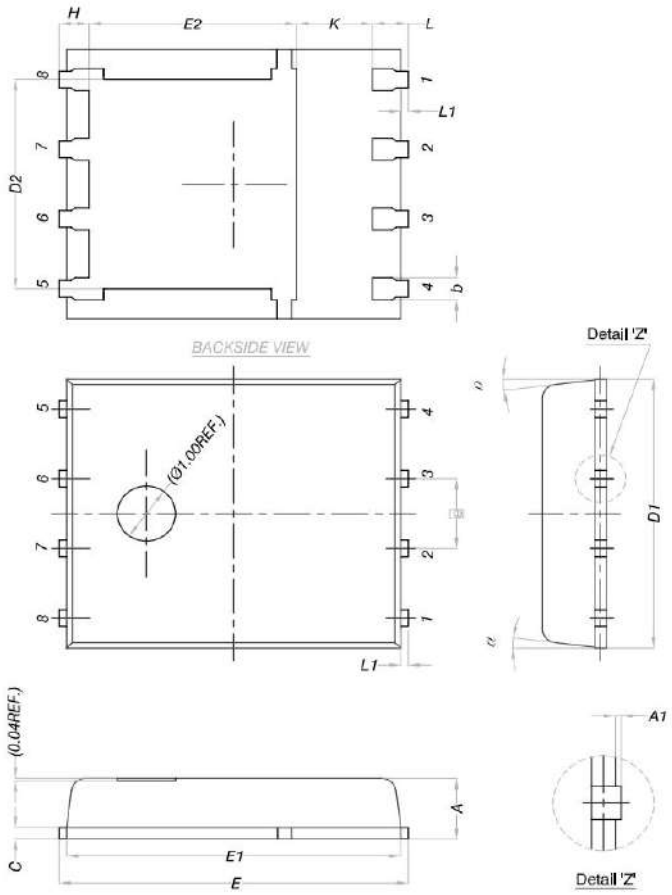


Fig.14 Gate Charge Waveform



- **Dimensions（DFN5×6）**

Unit：mm



DIM.	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
A1	0	-	0.05
b	0.33	0.41	0.51
C	0.20	0.25	0.30
D1	4.80	4.90	5.00
D2	3.61	3.81	3.96
E	5.90	6.00	6.10
E1	5.70	5.75	5.80
E2	3.38	3.58	3.78
e	1.27 BSC		
H	0.41	0.51	0.61
K	1.10	-	-
L	0.51	0.61	0.71
L1	0.06	0.13	0.20
α	0°	-	12°

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;

③ Vgs≥4.5V is required for practical application.