●General Description

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

●Features

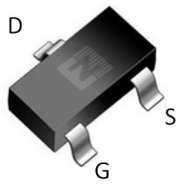
- ■Low $R_{DS(ON)}$ to minimize conductive loss
- ■High GOX reliability
- ■Low thermal resistance
- ■AEC-Q101 qualified

●Application

- ■BLDC motor driver
- ■DC-DC
- ■Load switch

ZMJSEMI Automotive

●Product Summary



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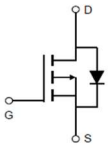


V_{DS}=-60V

$R_{DS(ON)}$ =190mR

I_D=-1.8A

RoHS REACH COMPLIANT HF

●Ordering Information

Part NO.	ZMA019KP06T
Marking	019KP06
Packing information	REEL TAPE
Basic ordering unit (pcs)	3000

●Absolute Maximum Ratings（T_A=25℃,unless otherwise specified）

Parameter	Symbol	Conditions	Min.	Max.	Unit
Drain-source voltage	V_{DS}		-	-60	V
Gate-source voltage①	V_{GS}		-20	20	V
Continuous drain current	I_D	V_{GS}=-10V, T_C=25℃	-	-1.8	A
	I_D	V_{GS}=-10V, T_C=75℃	-	-1.4	A
	I_D	V_{GS}=-10V, T_C=100℃	-	-1.14	A
Pulsed drain current	I_{DM}	Pulsed; t_p ≤ 10 μs; T_C = 25 °C;	-	-7.2	A
Total power dissipation	P_D	T_C=25℃	-	1.6	W
Total power dissipation	P_D	T_A=25℃	-	0.7	W
Operating junction temperature	T_J		-55	150	℃
Storage temperature	T_{STG}		-55	150	℃
Single pulse avalanche energy	E_{AS}	L=0.1mH, V_{GS}=-10V, R_g=25Ω,	-	1	mJ
		L=0.5mH, V_{GS}=-10V, R_g=25Ω,	-	2.1	mJ
ESD level (HBM)			CLASS 1B		

●Thermal Resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	-	-	80	°C/W
Thermal resistance, junction - ambient①	R_{thJA}	-	-	180	°C/W
Soldering temperature(total time<10s)	T_{sold}	-	-	260	°C

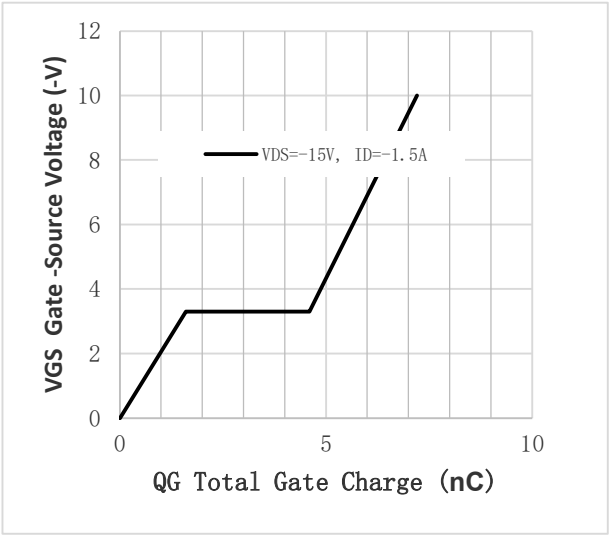
●Electronic Characteristics (T_j=25°C, unless otherwise specified)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Drain-source breakdown voltage	BV_{DSS}	V_{GS} =0V, I_D =-250uA	-60	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{GS}=V_{DS}, I_D=-250uA	-1.3	-1.8	-2.5	V
Drain-source leakage current	I_{DSS}	V_{GS}=0V, V_{DS}=-60V	-	-	-1	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=-1.5A, T_j=25℃	-	190	250	mΩ
		V_{GS}=-4.5V, I_D=-1A, T_j=25℃	-	230	310	mΩ
Forward transconductance	g_{FS}	V_{DS} =-5V, I_{SD} = -1A	-	1.9	-	S
Diode forward voltage	V_{FSD}	V_{GS} =0V, I_{SD} = -1.5A	-	-	-1.3	V

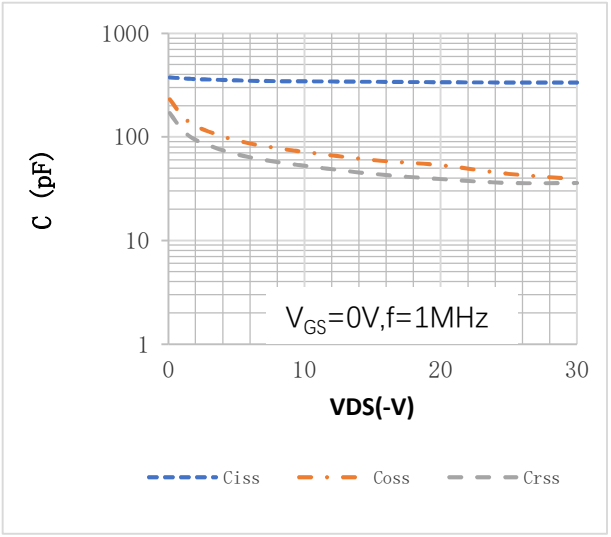
●Dynamic Characteristics (T_j=25°C, unless otherwise specified)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Input capacitance	C_{iss}	f = 1MHz, V_{DS}=-25V, V_{GS}=0V	-	336	-	pF
Output capacitance	C_{oss}		-	49	-	pF
Reverse transfer capacitance	C_{rss}		-	36	-	pF
Gate resistance	R_g	f = 1MHz	-	7	-	Ω
Total gate charge	Q_g	V_{DD} = -15V, I_D = -1A, V_{GS} = -10V	-	7.2	-	nC
	Q_g(-4.5V)		-	21	-	nC
Gate-source charge	Q_{gs}		-	1.6	-	nC
Gate-drain charge	Q_{gd}		-	3	-	nC
Turn-on delay time	$t_{D(on)}$	V_{GS}=-10V, V_{DS}=-15V, R_G =3.3Ω, I_D =-1A	-	6.5	-	ns
Turn-on rise time	t_r		-	8	-	ns
Turn-off delay time	$t_{D(off)}$		-	16.5	-	ns
Turn-off fall time	t_f		-	4	-	ns
Reverse recovery time	t_{rr}	V_{DD}=-20V, dIs/dt = -100A/us, I_S=-1A	-	41	-	ns
Reverse recovery charge	Q_{rr}		-	81	-	nC

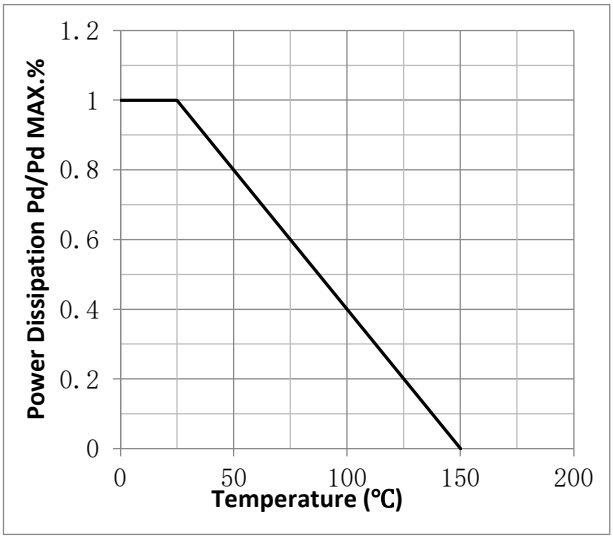
●Fig.1 Gate-source voltage as a function of gate charge; Typical values; T_j=25℃



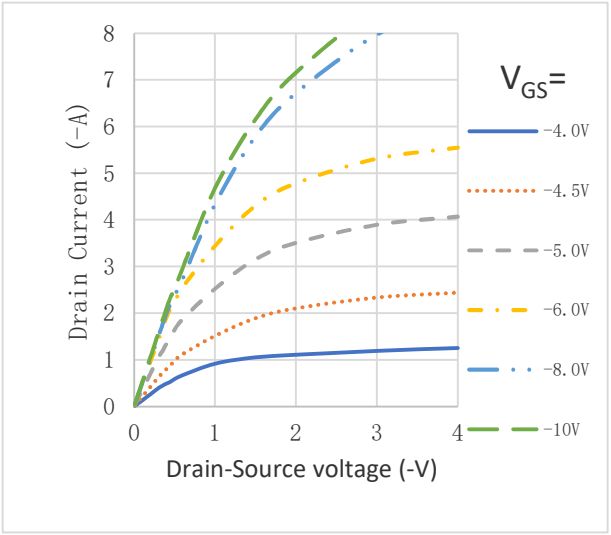
●Fig.2 Input, output and reverse transfer capacitances as a function of drain-source voltage; Typical values; T_j=25℃



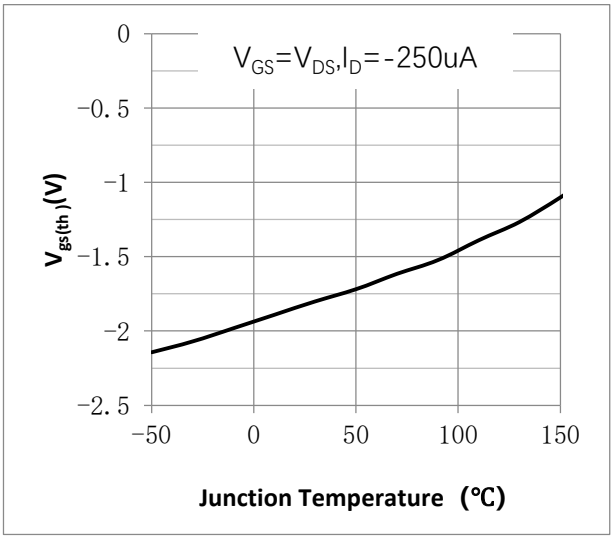
●Fig.3 Normalized total power dissipation as a function of case temperature; Calculative values Normalized Power Dissipation =P_d/P_d(25℃)



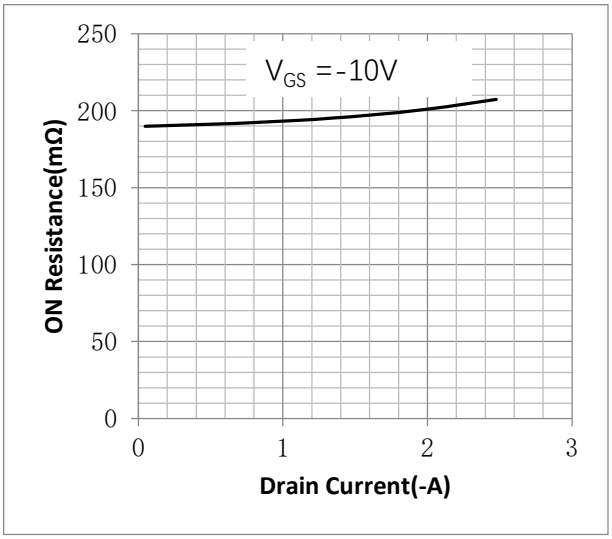
●Fig.4 Output characteristics: drain current as a function of drain-source voltage; Typical values: T_j=25℃



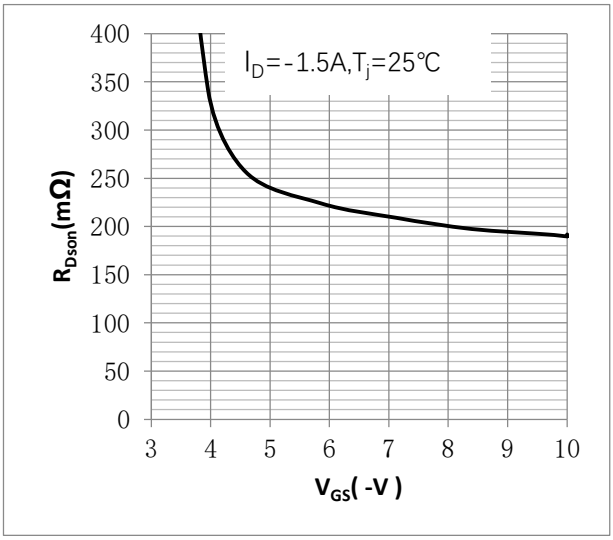
●Fig.5 Gate-source threshold voltage as a function of junction temperature; Typical values



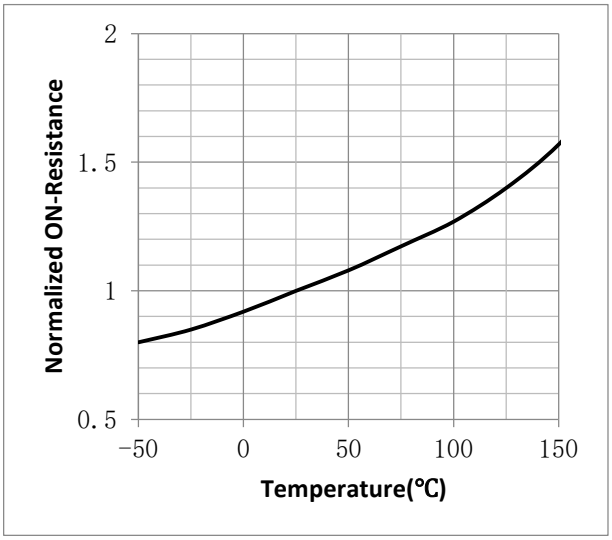
●Fig.6 Drain-source on-state resistance as a function of drain current; Typical values; Tj=25℃



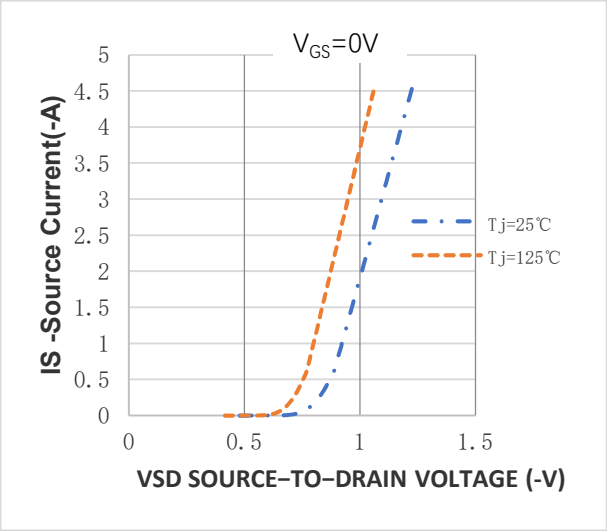
●Fig.7 Drain-source on-state resistance as a function of gate-source voltage; Typical values



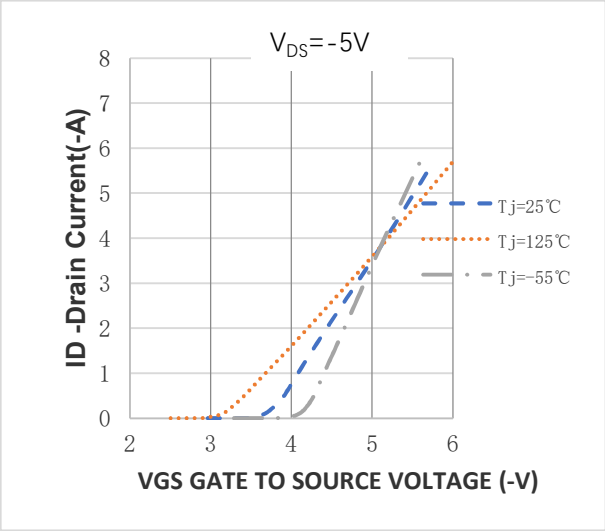
●Fig.8 Normalized drain-source on-state resistance factor as a function of junction temperature; Typical values Normalized On-Resistance=R_{DSon}/R_{DSon}(25℃)



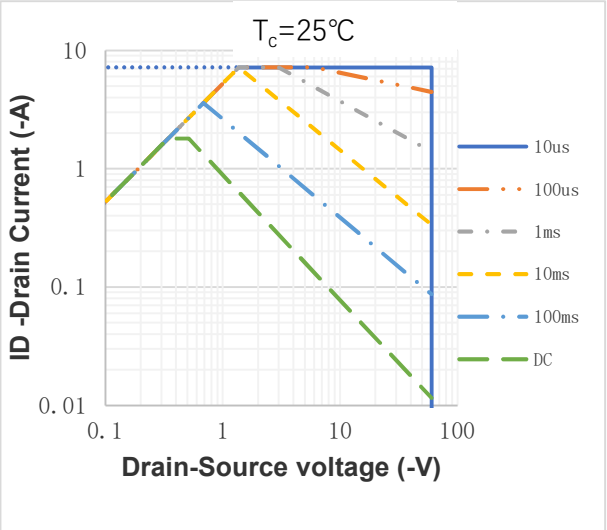
●Figure 9. Source (diode forward) current as a function of source-drain (diode forward) voltage; Typical values



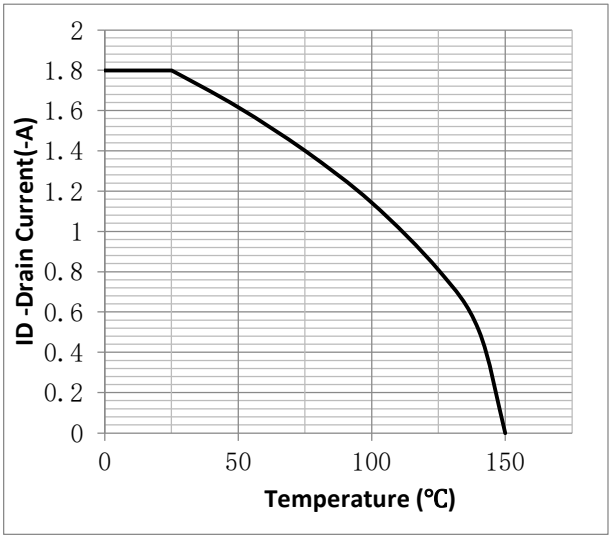
●Figure 10. Transfer characteristics: drain current as a function of gate-source voltage; Typical values



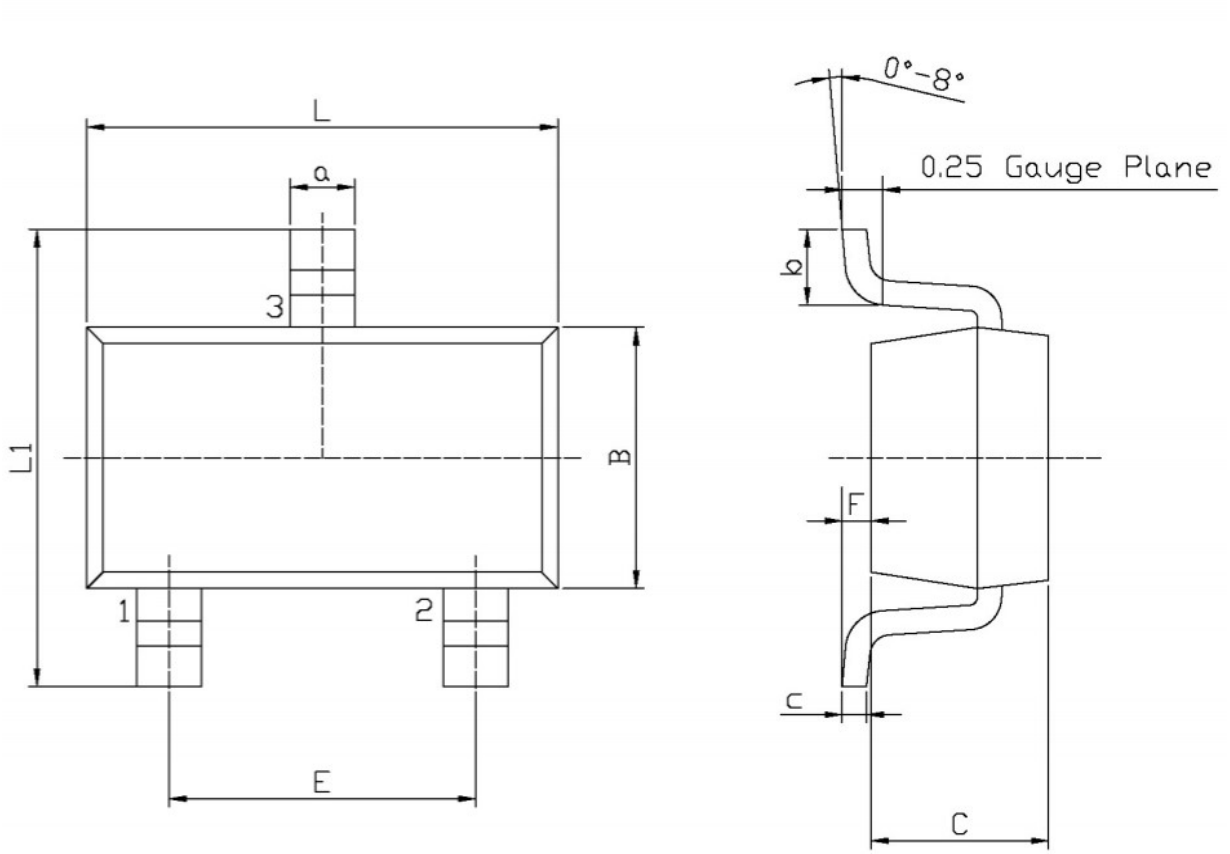
●Fig.11 Safe operating area: continuous and peak drain currents as a function of drain-source voltage; Calculative values



●Fig.12 Continuous drain current as a function of case temperature[2] ;Calculative values



●Package Outline



Unit: mm

Symbol	Dimensions In Millimeters		Symbol	Dimensions In Millimeters	
	Min	Max		Min	Max
L	2.82	3.02	a	0.35	0.50
B	1.50	1.70	c	0.10	0.20
C	0.90	1.30	b	0.35	0.55
L1	2.60	3.00	F	0	0.15
E	1.80	2.00			

Note:

1. Refer to JEDEC MO-178.

●Note

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

②Practically the current will be limited by PCB, thermal design and operating temperature. V_{GS}=-10V.

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●Revision History

Version	Date	Change
A	2022/10/16	New
B	2023/12/7	Add Reach, HF figure
B1	2025/1/3	Add JEDEC reference document number in POD
C1	2025/7/28	Apply new datasheet format.