

P-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

- Surface-mounted package
- Advanced trench cell design
- Extremely low threshold voltage

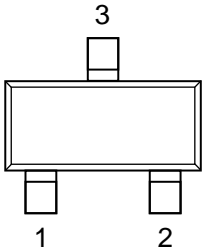
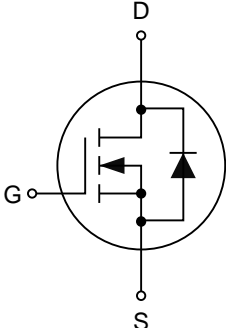
1.2 Applications

- Portable appliances
- Battery management

1.3 Quick reference

- $BV \geq -20\text{ V}$
- $P_{\text{tot}} \cong 1.1\text{ W}$
- $I_D \cong -2.2\text{ A}$
- $R_{\text{DS(ON)}} \cong 100\text{ m}\Omega @ V_{\text{GS}} = -4.5\text{ V}$
- $R_{\text{DS(ON)}} \cong 150\text{ m}\Omega @ V_{\text{GS}} = -2.5\text{ V}$

2. Pin Description

Pin	Description	Simplified Outline	Symbol
1	Gate(G)	 <p>Top View SOT23</p>	
2	Source(S)		
3	Drain(D)		

3. Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
V _{DS}	Drain-Source Voltage	T _A =25°C	-20	-	V
V _{GS}	Gate-Source Voltage	T _A =25°C	-	±12	V
I _D *	Drain Current	T _A =25°C, V _{GS} =4.5 V	-	-2.2	A
I _{DM} **	Pulsed Drain Current	T _A =25°C, V _{GS} =4.5 V	-	-8	A
P _{tot} *	Total Power Dissipation	T _A =25°C	-	1.7	W
		T _A =100°C	-	1.1	
T _{stg}	Storage Temperature		-55	150	°C
T _J	Junction Temperature		-	150	°C
I _S *	Diode Forward Current	T _A =25°C	-	-2.2	A
R _{θJA} *	Thermal Resistance-Junction to Ambient		-	150	°C/W

Notes:

- * Surface Mounted on 1 in² pad area, t ≤ 10 sec
- ** Pulse width ≤ 300 μs, duty cycle ≤ 2%

4. Marking Information

Product Name	Marking
KJ2301F	2301

5. Ordering Code

Product Name	Package	Reel Size	Tape width	Quantity	Note
KJ2301F	SOT23			3000	

Note: KUIJIEXIN defines "Green" as lead-free (RoHS compliant) and halogen free (Br or Cl does not exceed 900 ppm by weight in homogeneous material and total of Br and Cl does not exceed 1500 ppm by weight; Follow IEC 61249-2-21 and IPC/JEDEC J-STD-020C)

6. Electrical Characteristics (T_A=25°C Unless Otherwise Noted)

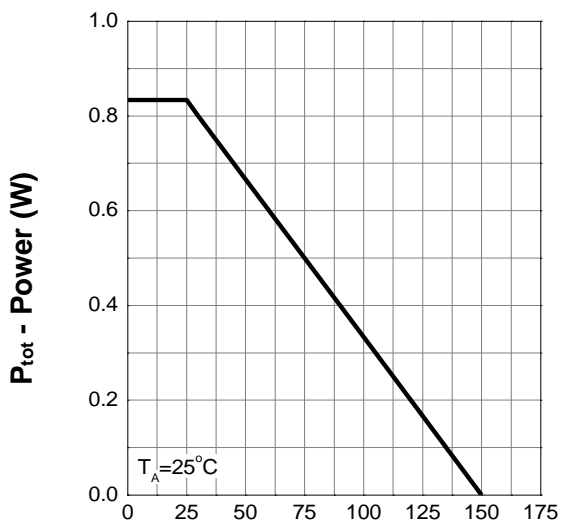
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static Characteristics						
B _V DSS	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	-20	-	-	V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	-0.5	-0.65	-1.0	V
I _{DSS}	Drain Leakage Current	V _{DS} =-20 V, V _{GS} =0 V	-	-	-1	μA
		T _J =85°C	-	-	-30	μA
I _{GSS}	Gate Leakage Current	V _{GS} =±12 V, V _{DS} =0 V	-	-	± 100	nA
R _{DS(ON)} ^a	On-State Resistance	V _{GS} =-4.5 V, I _{DS} =-2 A	-	95	120	mΩ
		V _{GS} =-2.5 V, I _{DS} =-1.8 A	-	130	150	
Diode Characteristics						
V _{SD} ^a	Diode Forward Voltage	I _{SD} =-2 A, V _{GS} =0 V	-	0.81	1.2	V
t _{rr}	Reverse Recovery Time	I _{SD} =-2 A, dI _{SD} /dt=100 A/μs	-	21	-	ns
Q _{rr}	Reverse Recovery Charge		-	13	-	nC
Dynamic Characteristics^b						
C _{iss}	Input Capacitance	V _{GS} =0 V, V _{DS} =-10 V, Frequency=1 MHz	-	280	-	pF
C _{oss}	Output Capacitance		-	60	-	
C _{rss}	Reverse Transfer Capacitance		-	48	-	
t _{d(on)}	Turn-on Delay Time	V _{DS} =-10 V, V _{GEN} =4.5 V, R _G =4.5 Ω, R _L =3.3 Ω, I _{DS} =-2 A	-	12	-	ns
t _r	Turn-on Rise Time		-	21	-	
t _{d(off)}	Turn-off Delay Time		-	23	-	
t _f	Turn-off Fall Time		-	9	-	
Gate Charge Characteristics^b						
Q _g	Total Gate Charge	V _{DS} =-10 V, V _{GS} =-4.5 V, I _{DS} =-2 A	-	4.8	-	nC
Q _{gs}	Gate-Source Charge		-	0.8	-	
Q _{gd}	Gate-Drain Charge		-	1.2	-	

Notes:

- Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%
- Guaranteed by design, not subject to production testing

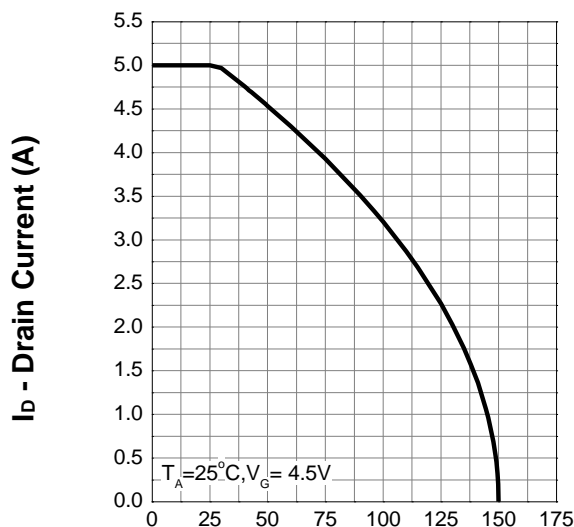
7. Typical Characteristics

Power Capability



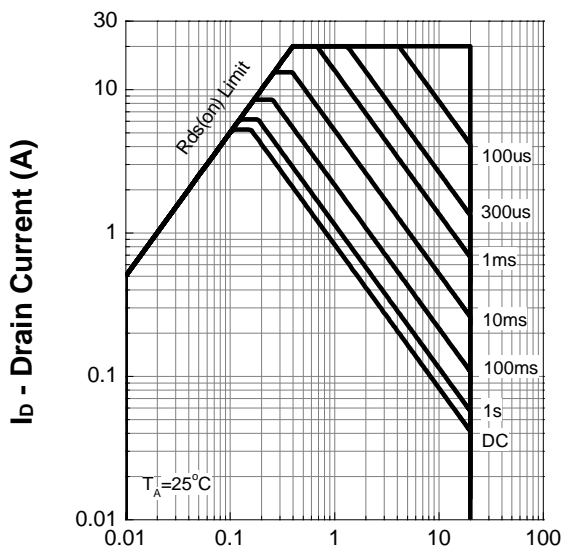
T_j - Junction Temperature (°C)

Current Capability



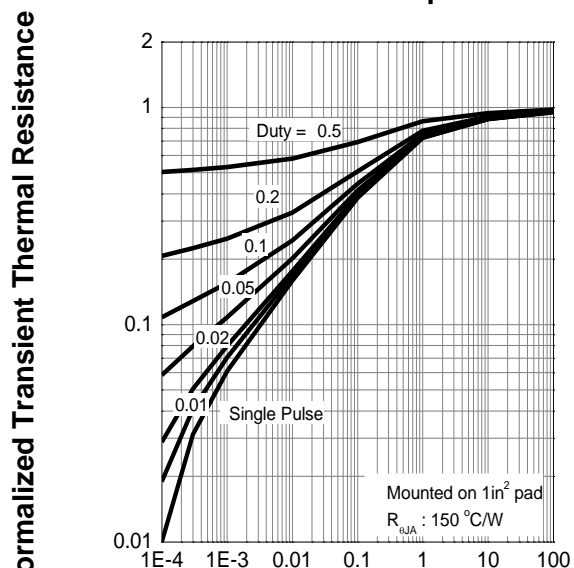
T_j - Junction Temperature (°C)

Safe Operation Area



V_{DS} - Drain-Source Voltage (V)

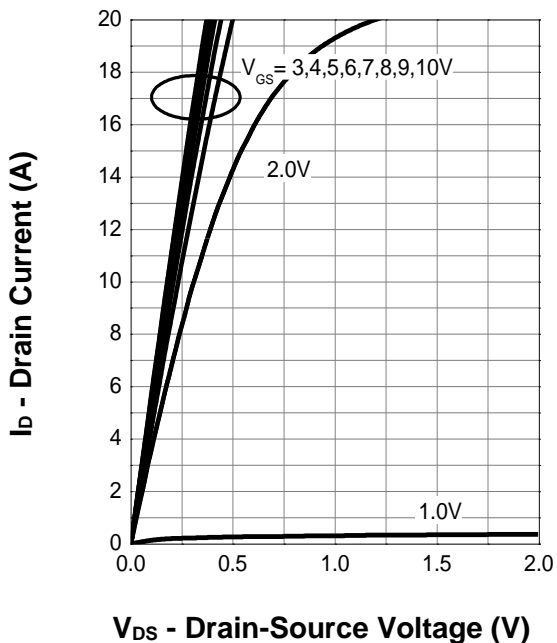
Transient Thermal Impedance



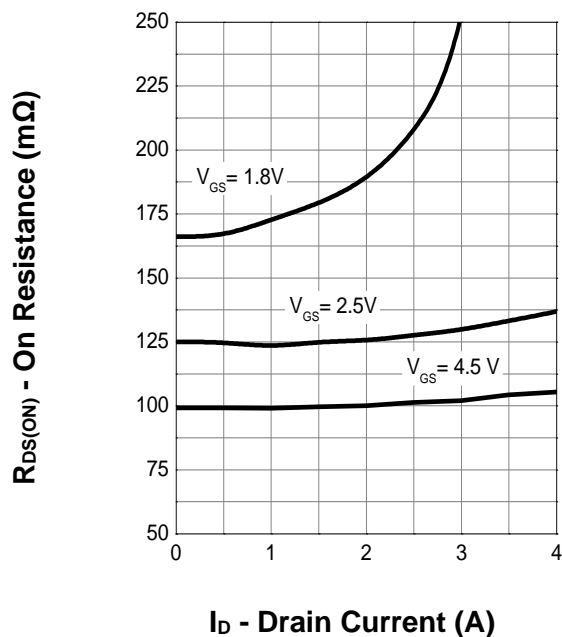
Square Wave Pulse Duration (sec)

7. Typical Characteristics (cont.)

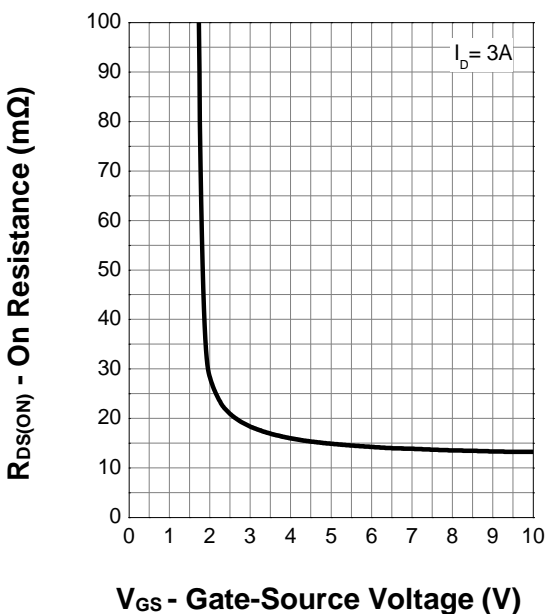
Output Characteristics



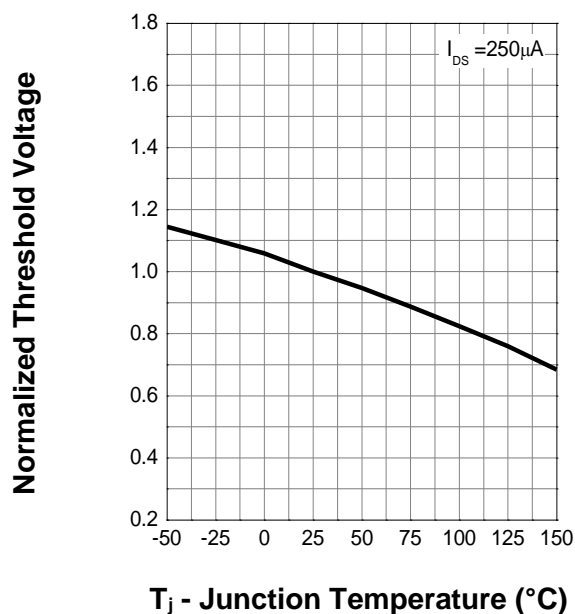
On Resistance



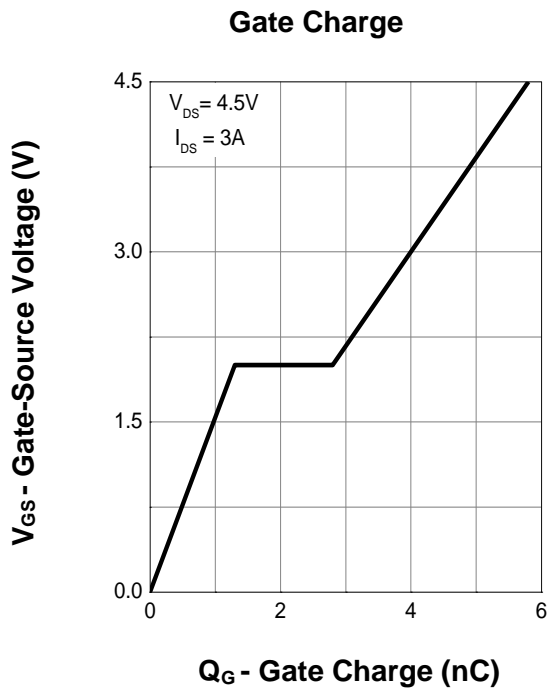
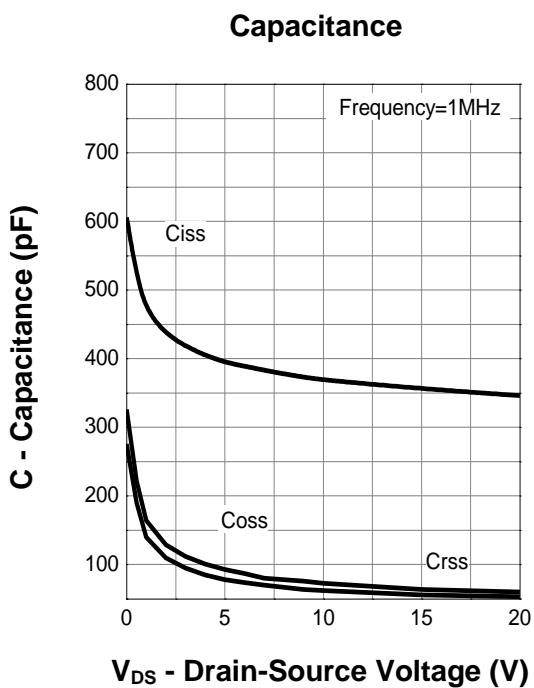
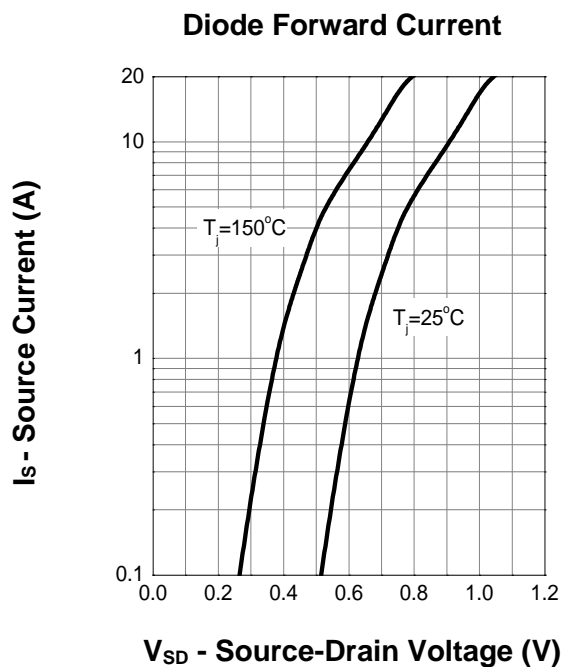
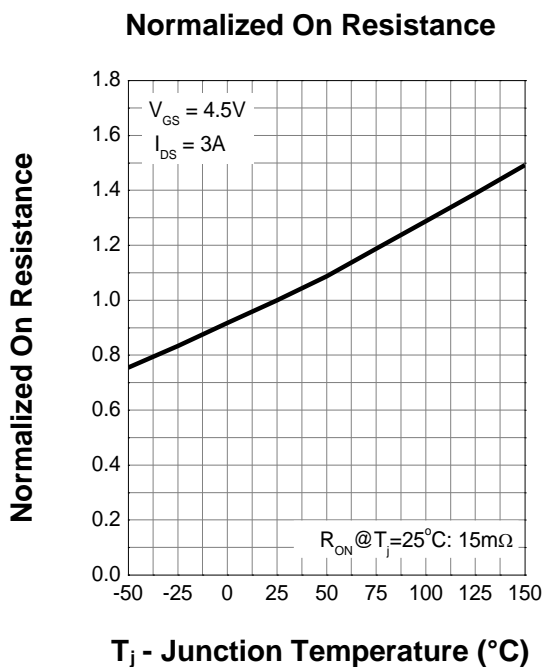
Transfer Characteristics



Normalized Threshold Voltage

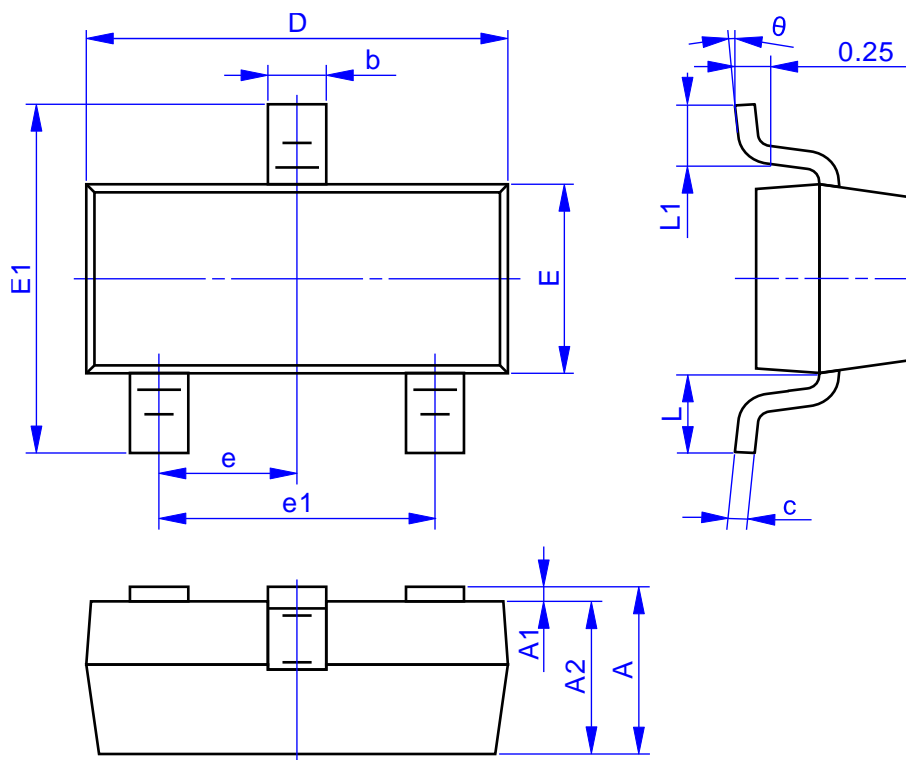


7. Typical Characteristics (cont.)



8. Package Dimensions

SOT23 Package



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.90	1.15	0.035	0.045
A1	0	0.10	0	0.004
A2	0.90	1.05	0.035	0.041
b	0.30	0.50	0.012	0.020
c	0.08	0.15	0.003	0.006
D	2.80	3.00	0.110	0.118
E	1.20	1.40	0.047	0.055
E1	2.25	2.55	0.089	0.100
e	0.95 TYP		0.037 TYP	
e1	1.80	2.00	0.071	0.079
L	0.55 REF		0.022 REF	
L1	0.30	0.50	0.012	0.020
θ	0°	8°	0°	8°