

## P-Channel Enhancement Mode MOSFET

### 1. Product Information

#### 1.1 Features

- Advanced trench cell design
- Low Thermal Resistance

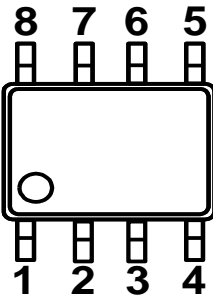
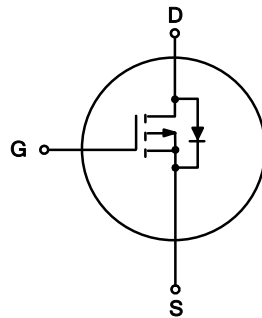
#### 1.2 Applications

- Motor drivers
- DC - DC Converter

#### 1.3 Quick reference

- $BV \geq -20\text{ V}$
- $R_{DS(ON)} \leq 7\text{ m}\Omega @ V_{GS} = -10\text{ V}$
- $P_{tot} \leq 20\text{ W}$
- $R_{DS(ON)} \leq 8\text{ m}\Omega @ V_{GS} = -4.5\text{ V}$
- $I_D \leq -15\text{ A}$
- $R_{DS(ON)} \leq 11\text{ m}\Omega @ V_{GS} = -2.5\text{ V}$

### 2. Pin Description

Pin	Description	Simplified Outline	Symbol
1,2,3	Source(S)		
4	Gate(G)		
5,6,7,8	Drain(D)		
		<p>Top View SOP8-8L</p>	



## 3. Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
V <sub>DS</sub>	Drain-Source Voltage	T <sub>C</sub> = 25 °C	-20	-	V
V <sub>GS</sub>	Gate-Source Voltage	T <sub>C</sub> = 25 °C	-	± 12	V
I <sub>D</sub> *	Drain Current	T <sub>C</sub> = 25 °C, V <sub>GS</sub> = -4.5 V	-	-15	A
I <sub>DM</sub> *,**,***	Pulsed Source Current	T <sub>C</sub> = 25 °C, V <sub>GS</sub> = -4.5 V	-	-35	A
P <sub>tot</sub> *	Total Power Dissipation	T <sub>C</sub> = 25 °C	-	2	W
T <sub>stg</sub>	Storage Temperature		- 55	150	°C
T <sub>J</sub>	Junction Temperature		-	150	°C
I <sub>S</sub>	Diode Forward Current	T <sub>C</sub> = 25 °C	-	-15	A
R <sub>θJC</sub> *	Thermal Resistance- Junction to Ambient		-	6	°C / W

Notes :

- \* Surface Mounted on 1 in<sup>2</sup> pad area, t ≤ 10 sec
- \*\* Pulse width ≤ 10 μs, duty cycle ≤ 1 %
- \*\*\* Limited by bonding wire

## 4. Marking Information

Product Name	Marking
KJ12P02S	<div style="display: inline-block; border: 1px solid black; padding: 2px;">12P02 YWWXXX</div> <span style="margin-left: 20px;">YWW: Date Code</span>

## 5. Ordering Code

Product Name	Package	Reel Size	Tape width	Quantity	Note
KJ12P02S	SOP8			3000	

Note: KUAJIJEXIN 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<sub>C</sub> = 25 °C Unless Otherwise Noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> = 0 V, I <sub>D</sub> = -250 μA	-20	-	-	V
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>DS</sub> = -250 μA	-0.3	-	-1.2	V
I <sub>DSS</sub>	Zero Gate Voltage Source Current	V <sub>DS</sub> = -16V, V <sub>GS</sub> = 0 V	-	-	-10	μA
		T <sub>J</sub> = 85 °C	-	-	-30	μA
I <sub>GSS</sub>	Gate Leakage Current	V <sub>GS</sub> = ± 12 V, V <sub>DS</sub> = 0 V	-	-	± 100	nA
R <sub>DS(ON)</sub> <sup>a</sup>	Drain-Source On-State Resistance	V <sub>GS</sub> = -10 V, I <sub>D</sub> = -13A	-	6	7	mΩ
		V <sub>GS</sub> = -4.5 V, I <sub>D</sub> = -10 A	-	7	8	mΩ
		V <sub>GS</sub> = -2.5 V, I <sub>D</sub> = -6 A	-	10	11	mΩ
<b>Diode Characteristics</b>						
V <sub>SD</sub> <sup>a</sup>	Diode Forward Voltage	I <sub>SD</sub> = -2.6 A, V <sub>GS</sub> = 0 V	-	-	-1.2	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>SD</sub> = -10 A, dI <sub>SD</sub> /dt = 100 A/μs	-	36	-	nS
Q <sub>rr</sub>	Reverse Recovery Charge		-	20	-	nC
<b>Dynamic Characteristics<sup>b</sup></b>						
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = -10 V Frequency = 1 MHz	-	6200	-	pF
C <sub>oss</sub>	Output Capacitance		-	700	-	
C <sub>rss</sub>	Reverse Transfer Capacitance		-	380	-	
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DS</sub> = -10 V, V <sub>GEN</sub> = -5 V, R <sub>G</sub> = 3.3 Ω, I <sub>D</sub> = -1 A	-	27	-	nS
t <sub>r</sub>	Turn-on Rise Time		-	21	-	
t <sub>d(off)</sub>	Turn-off Delay Time		-	240	-	
t <sub>f</sub>	Turn-off Fall Time		-	110	-	
<b>Gate Charge Characteristics<sup>b</sup></b>						
Q <sub>g</sub>	Total Gate Charge	V <sub>GS</sub> = -4.5 V, V <sub>DS</sub> = -10 V, I <sub>DS</sub> = -10 A	-	60	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	10	-	
Q <sub>gd</sub>	Gate-Drain Charge		-	13.5	-	

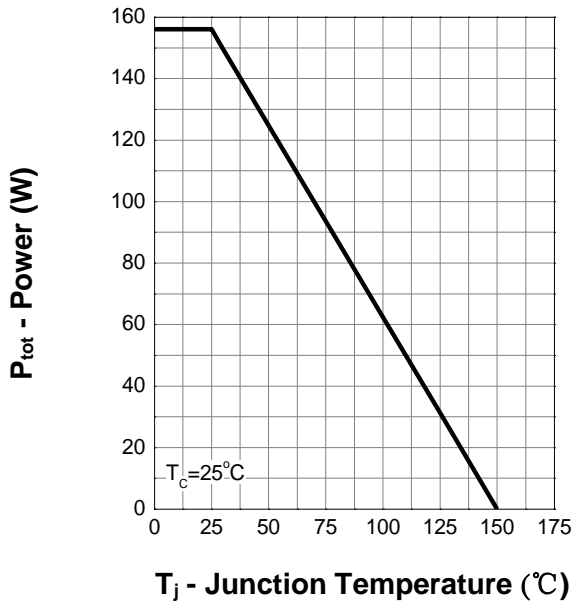
Notes :

a : Pulse test ; pulse width ≤ 300 μs, duty cycle ≤ 2 %

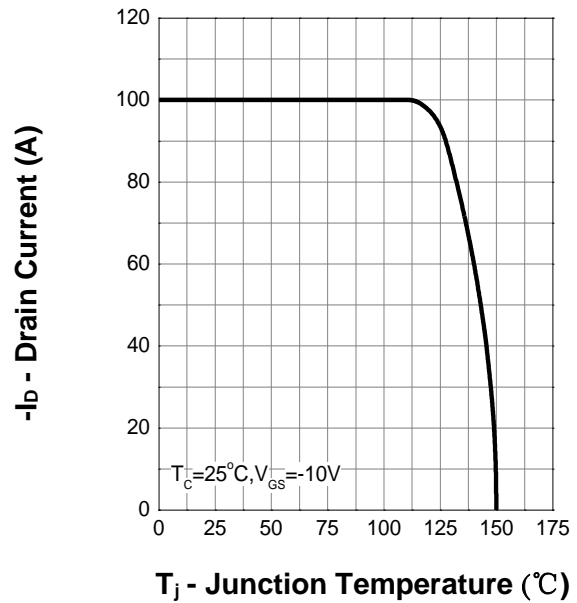
b : Guaranteed by design, not subject to production testing

## 7. Typical Characteristics

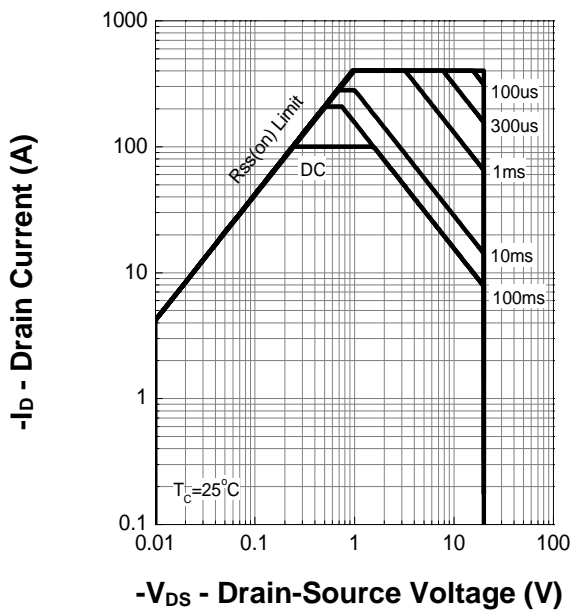
Power Capability



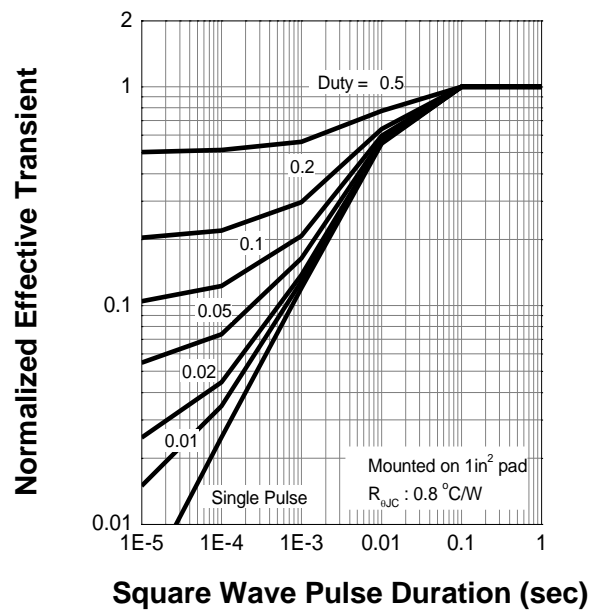
Current Capability



Safe Operatic. Area



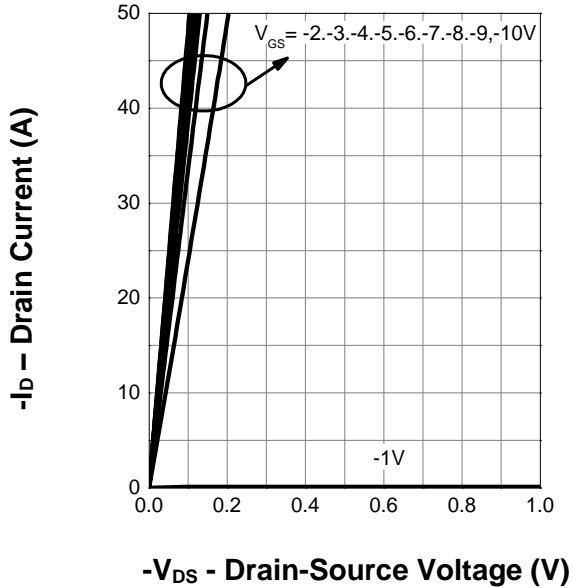
Thermal Transient Impedance



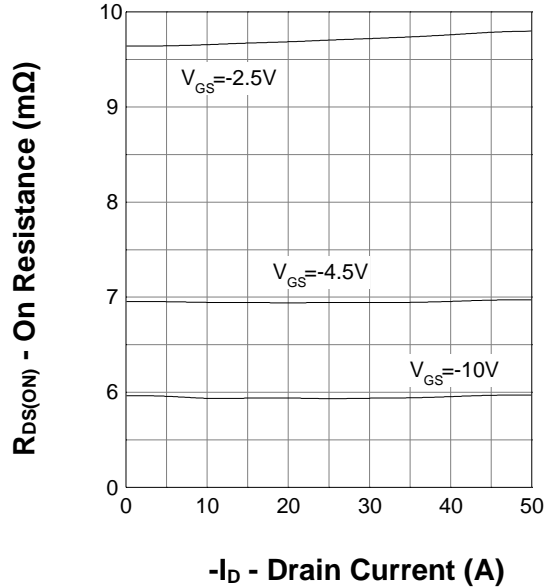


### 7. Typical Characteristics (cont.)

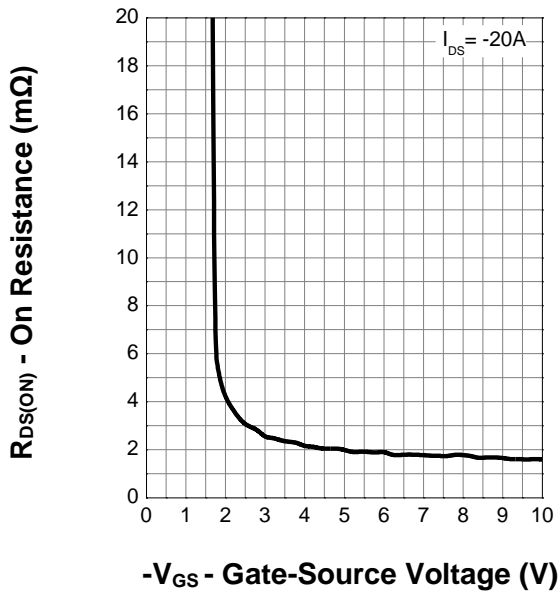
Output Characteristics



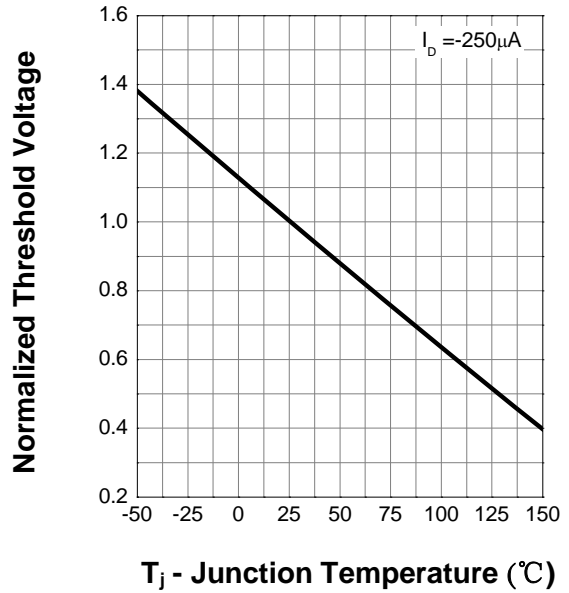
Drain-Source On Resistance



Transfer Characteristics



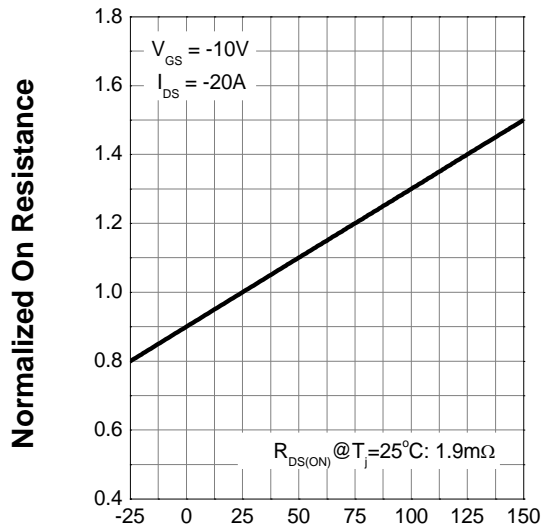
Gate Threshold Voltage





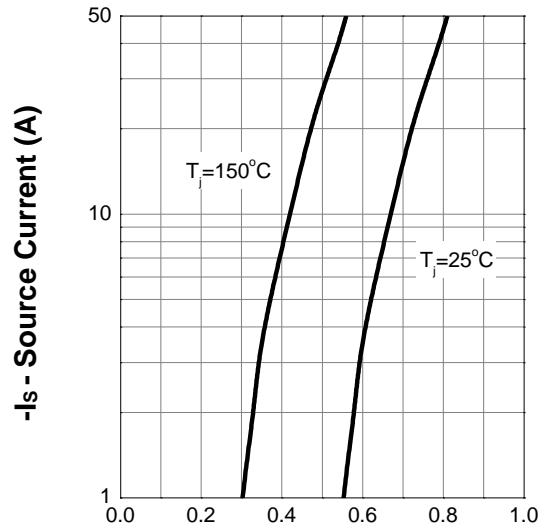
## 7. Typical Characteristics (cont.)

### Drain-Source On Resistance



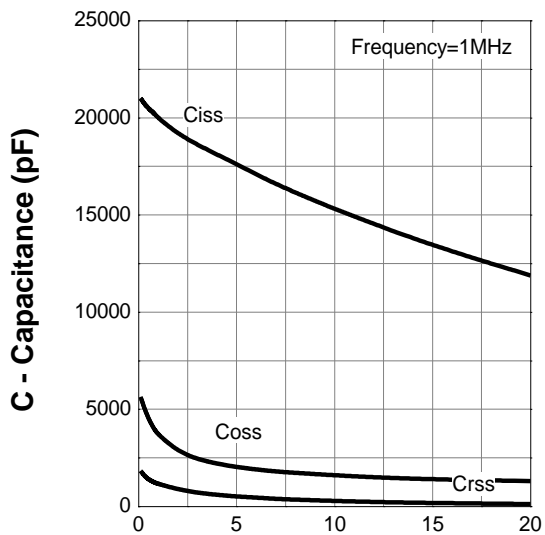
$T_j$  - Junction Temperature ( $^\circ C$ )

### Body Diode Characteristics



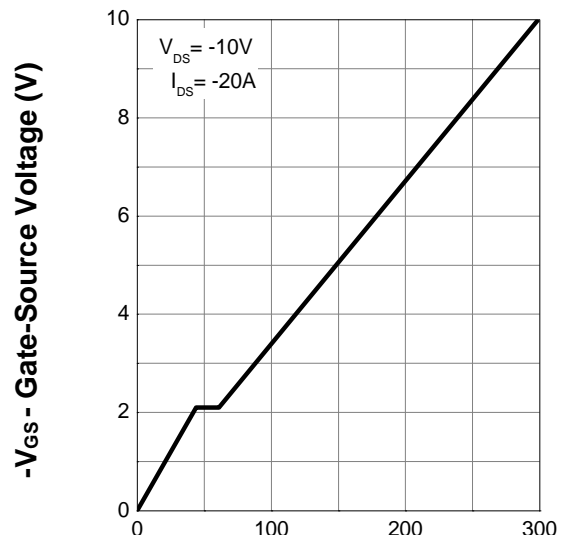
- $V_{SD}$  - Source-Drain Voltage (V)

### Capacitance



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

### Gate Charge

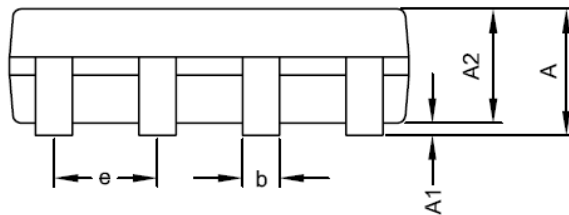
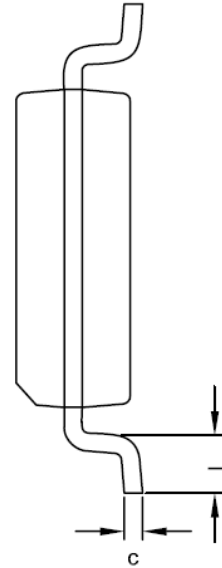
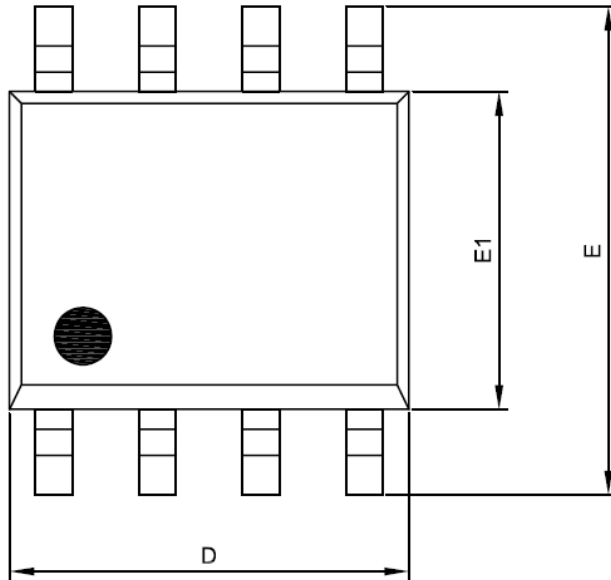


$Q_G$  - Gate Charge (nC)



## 8. Package Dimensions

SOP-8L



Symbol	Dimensions In Millimeters	
	MIN.	MAX.
A	1.35	1.75
A1	0.00	0.25
A2	1.15	1.50
D	4.80	5.00
E	5.80	6.20
E1	3.80	4.00
c	0.19	0.27
b	0.33	0.53
e	1.27 BSC	
L	0.40	1.27

Notes :

1. Jedec outline : MS-012AA
2. Dimensions " D " does not include mold flash, protrusions and gate burrs shall not exceed .15 mm (.006 in) per side .
3. Dimensions " E1 " does not include inter-lead flash, or protrusions. Inter-lead flash and protrusions shall not exceed .25 mm (.010 in) per side.