

## P-Channel Enhancement Mode MOSFET

### 1. Product Information

#### 1.1 Features

- Advanced trench cell design
- Low Thermal Resistance

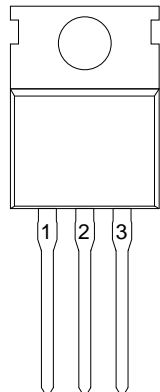
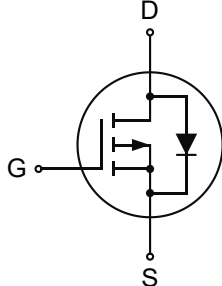
#### 1.2 Applications

- Motor drivers
- DC-DC Converter

#### 1.3 Quick reference

- $BV \geq -60V$
- $R_{DS(ON)} \leq 12m\Omega @ V_{GS} = -10V$
- $P_{tot} \leq 156W$
- $R_{DS(ON)} \leq 15m\Omega @ V_{GS} = -4.5V$
- $I_D \leq -90A$

### 2. Pin Description

Pin	Description	Simplified Outline	Symbol
1	Gate(G)		
2	Drain(D)		
3	Source(S)		

**Top View  
TO-220**

## 3. Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
$V_{DS}$	Drain-Source Voltage	$T_C=25^{\circ}C$	-60	-	V
$V_{GS}$	Gate-Source Voltage	$T_C=25^{\circ}C$	-	$\pm 20$	V
$I_{D^{*},**,**}$	Drain Current	$T_C=25^{\circ}C, V_{GS}=-10V$	-	-90	A
		$T_C=100^{\circ}C, V_{GS}=-10V$	-	-58	A
$I_{DM}^{*},**,**}$	Pulsed Source Current	$T_C=25^{\circ}C, V_{GS}=-10V$	-	-120	A
$P_{tot}^{*}$	Total Power Dissipation	$T_C=25^{\circ}C$	-	156	W
$T_{stg}$	Storage Temperature		-55	150	$^{\circ}C$
$T_J$	Junction Temperature		-	150	$^{\circ}C$
$I_S$	Diode Forward Current	$T_C=25^{\circ}C$	-	-90	A
$R_{\theta JA}^{**}$	Thermal Resistance-Junction to Ambient		-	62.5	$^{\circ}C/W$
$R_{\theta JC}^{**}$	Thermal Resistance-Junction to Case		-	0.8	

Notes:

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

## 4. Marking Information

Product Name	Marking
KJ90P06C	<div style="display: inline-block; border: 1px solid black; padding: 2px;"> <b>90P06</b>  <b>YWWXXX</b> </div> <b>YWW:</b> Date Code

## 5. Ordering Code

Product Name	Package	Reel Size	Tape width	Quantity	Note
KJ90P06C	TO-220			50	

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<sub>A</sub>=25°C Unless Otherwise Noted)

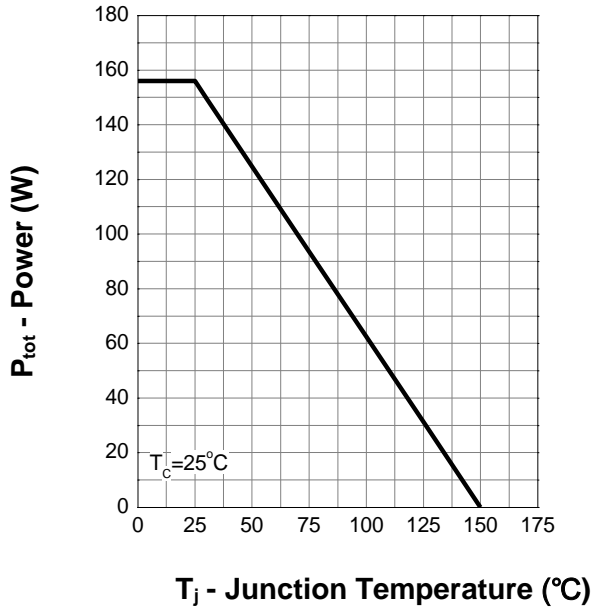
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
B <sub>V</sub> DSS	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =-250μA	-60	-	-	V
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =-250μA	-1	-	-2.5	V
I <sub>DSS</sub>	Zero Gate Voltage Source Current	V <sub>DS</sub> =-48V, V <sub>GS</sub> =0V	-	-	-1	μA
		T <sub>J</sub> =85°C	-	-	-30	μA
I <sub>GSS</sub>	Gate Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±100	nA
R <sub>DS(ON)</sub> <sup>a</sup>	Drain-Source On-State Resistance	V <sub>GS</sub> =-10V, I <sub>D</sub> =-20A	-	10	12	mΩ
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-10A	-	12	15	mΩ
<b>Diode Characteristics</b>						
V <sub>SD</sub> <sup>a</sup>	Diode Forward Voltage	I <sub>SD</sub> =-20A, V <sub>GS</sub> =0V	-	-	-1.3	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>SD</sub> =-20A, dI <sub>SD</sub> /dt=100A/μs	-	40	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge		-	47	-	nC
<b>Dynamic Characteristics<sup>b</sup></b>						
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =-30V Frequency=1MHz	-	8038	-	pF
C <sub>oss</sub>	Output Capacitance		-	335	-	
C <sub>rss</sub>	Reverse Transfer Capacitance		-	144	-	
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DS</sub> =-30V, V <sub>GEN</sub> =-10V, R <sub>G</sub> =4.5Ω, R <sub>L</sub> =1.5Ω, I <sub>D</sub> =-20A	-	81	-	ns
t <sub>r</sub>	Turn-on Rise Time		-	130	-	
t <sub>d(off)</sub>	Turn-off Delay Time		-	685	-	
t <sub>f</sub>	Turn-off Fall Time		-	255	-	
<b>Gate Charge Characteristics<sup>b</sup></b>						
Q <sub>g</sub>	Total Gate Charge	V <sub>GS</sub> =-10V, V <sub>DS</sub> =-30V, I <sub>DS</sub> =-20A	-	121	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	29	-	
Q <sub>gd</sub>	Gate-Drain Charge		-	13	-	

Notes:

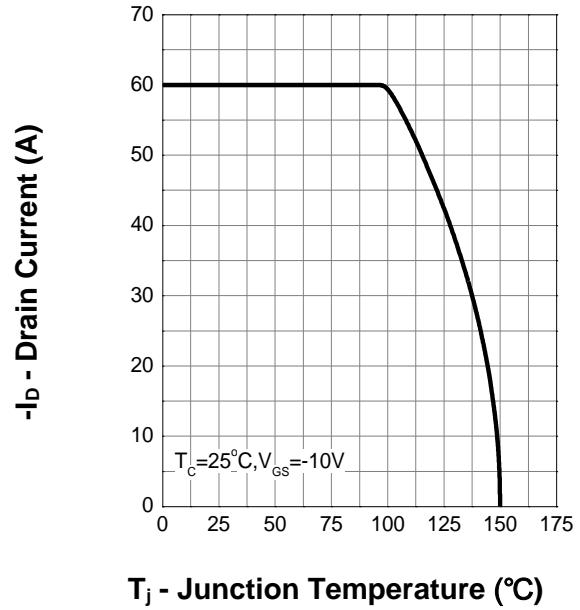
- a: Pulse test ; pulse width ≤ 300μs, duty cycle ≤ 2%
- b: Guaranteed by design, not subject to production testing

## 7. Typical Characteristics

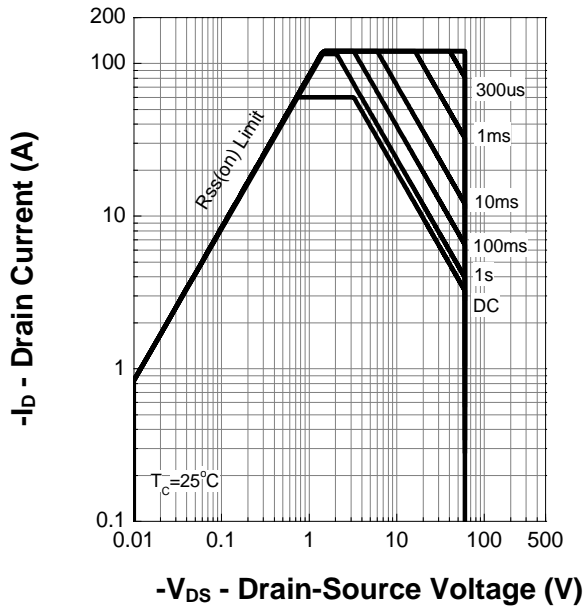
**Power Capability**



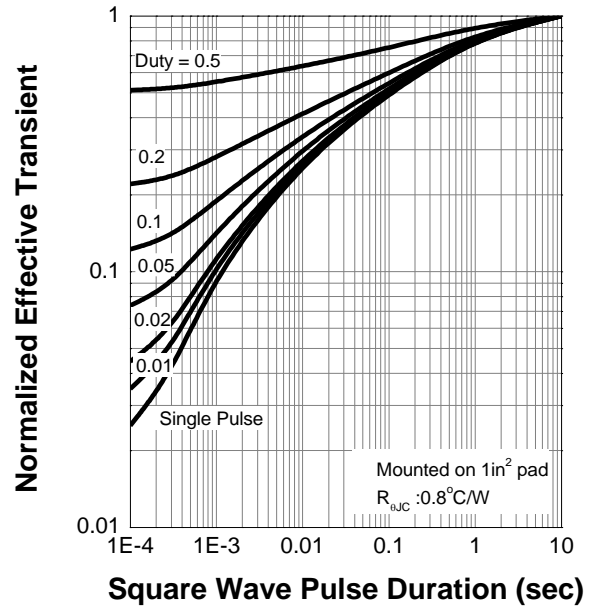
**Current Capability**



**Safe Operatio. Area**

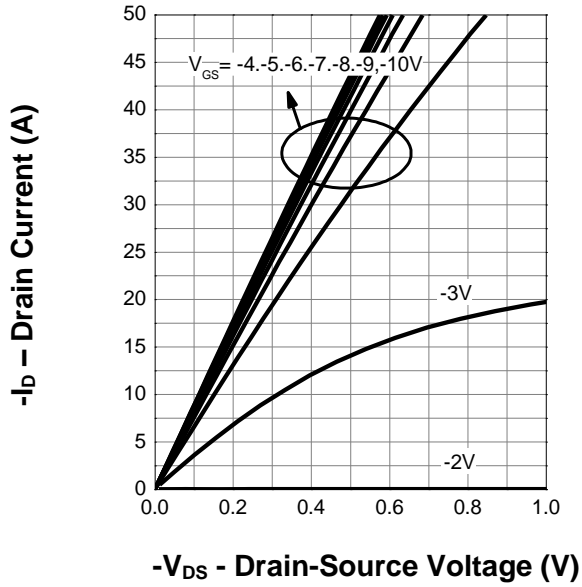


**Thermal Transient Impedance**

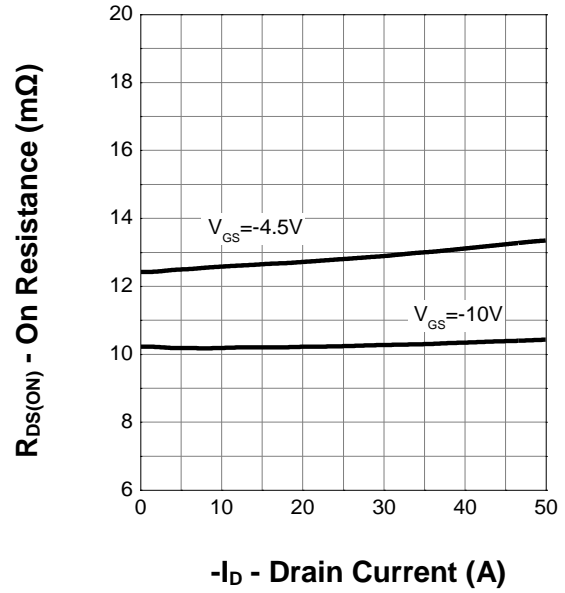


## 7. Typical Characteristics (cont.)

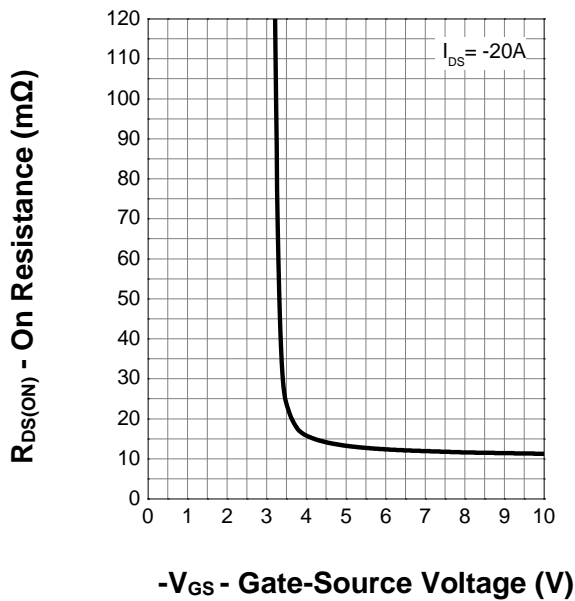
### Output Characteristics



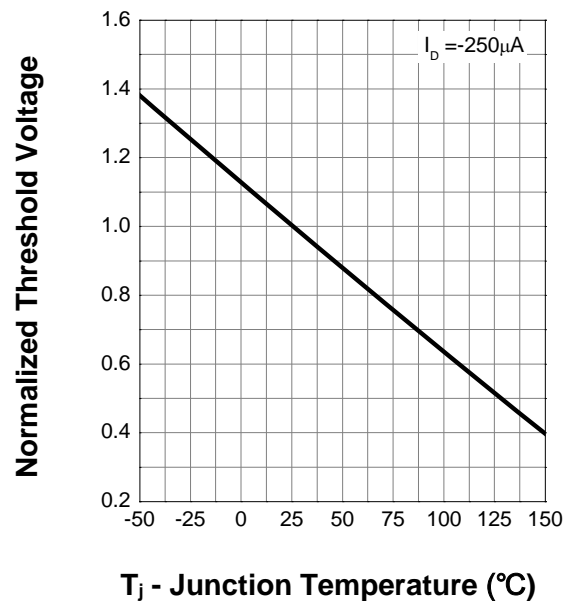
### Drain-Source On Resistance



### Transfer Characteristics

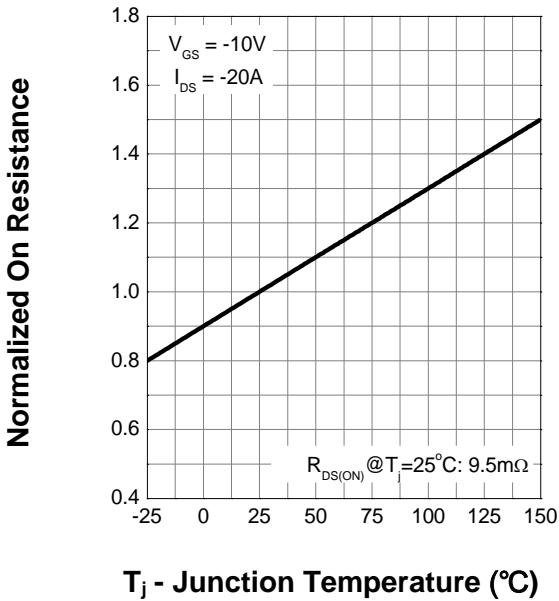


### Gate Threshold Voltage

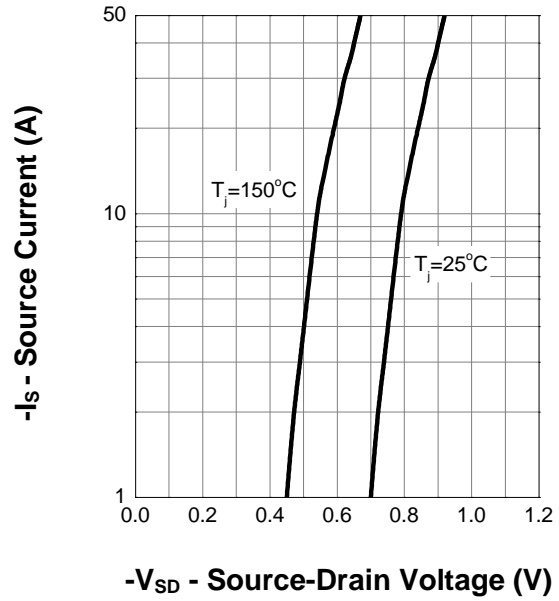


## 7. Typical Characteristics (cont.)

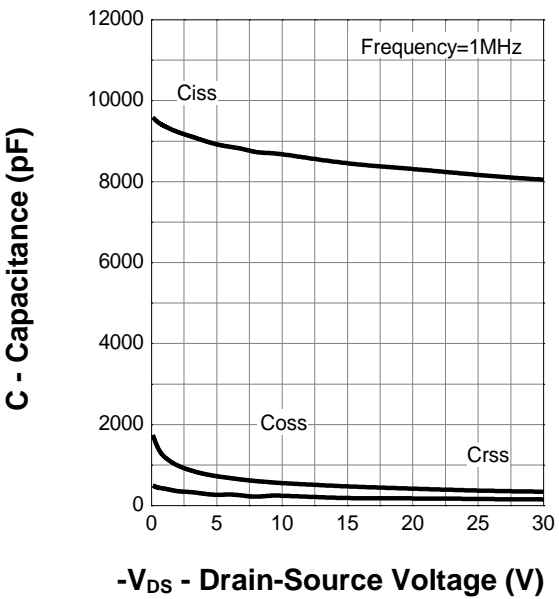
### Drain-Source On Resistance



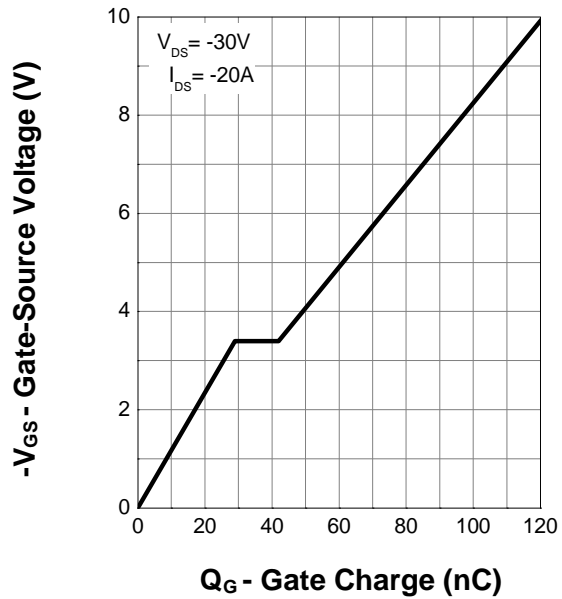
### Body Diode Characteristics



### Capacitance

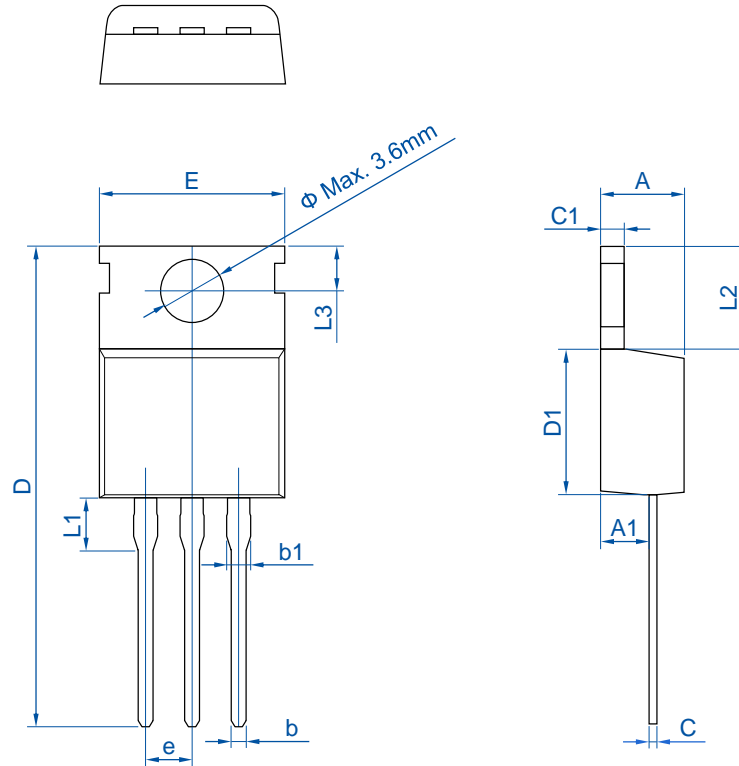


### Gate Charge



## 8. Package Dimensions

### TO-220 Package



DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	4.24		4.70
A1	2.20		3.00
b	0.70		0.95
b1	1.14		1.70
C	0.40		0.60
C1	1.15		1.40
D	28.00		29.80
D1	8.80		9.90
E	9.70		10.50
L1			3.80
L2	6.25		6.90
L3	2.40		3.00
e	2.54 BSC		