

P-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

- ☒ Surface-mounted package
- ☒ Low gate charge

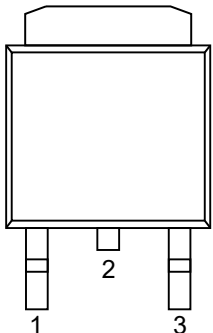
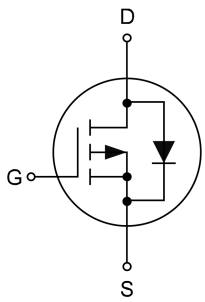
1.2 Applications

- ☒ Motor driver appliances
- ☒ High power inverter system
- ☒ Adapter appliances

1.3 Quick reference

- ☒ $BV \geq -100\text{ V}$
- ☒ $R_{DS(ON)} \leq 150\text{ m}\Omega @ V_{GS} = -10\text{ V}$
- ☒ $P_{tot} \leq 104\text{ W}$
- ☒ $R_{DS(ON)} \leq 180\text{ m}\Omega @ V_{GS} = -4.5\text{ V}$
- ☒ $I_D \leq -20\text{ A}$

2. Pin Description

Pin	Description	Simplified Outline	Symbol
1	Gate		
2	Drain		
3	Source		

Top View
TO-252

3. Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
V_{DS}	Drain-Source Voltage	$T_C=25^{\circ}\text{C}$	-100	-	V
V_{GS}	Gate-Source Voltage	$T_C=25^{\circ}\text{C}$	-	± 20	V
I_D^*	Drain Current	$T_C=25^{\circ}\text{C}, V_{GS}=10\text{ V}$	-	-20	A
$I_{DM}^{*,**,***}$	Pulsed Drain Current	$T_C=25^{\circ}\text{C}, V_{GS}=10\text{ V}$	-	-60	A
P_{tot}^*	Total Power Dissipation	$T_C=25^{\circ}\text{C}$	-	104	W
I_S	Diode Forward Current	$T_C=25^{\circ}\text{C}$	-	-20	A
E_{AS}	Single Pulse Avalanche Energy ($T_J=25^{\circ}\text{C}, V_{DD}=-50\text{ V}, V_{GS}=-10\text{ V}, L=0.5\text{ mH}, R_g=25\Omega$)		-	156	mJ
T_J, T_{stg}	Operating Junction and Storage Temperature Range		-55	150	$^{\circ}\text{C}$
$R_{\theta JA}^*$	Thermal Resistance-Junction to Ambient		-	62.5	$^{\circ}\text{C/W}$
$R_{\theta JC}^*$	Thermal Resistance-Junction to Case		-	1.2	$^{\circ}\text{C/W}$

Notes:

- * Pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
- ** Mounted on PCB of 1 in² pad area.
- *** Mounted on large heat sink.

4. Marking Information

Product Name	Marking
KJ20P10K	20P10 XXXXXX

5. Ordering Code

Product Name	Package	Reel size	Tape width	Quantity
KJ20P10K	TO-252	13"	16 mm	2500

Note: KUAJIEXIN 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_C=25°C unless otherwise noted)

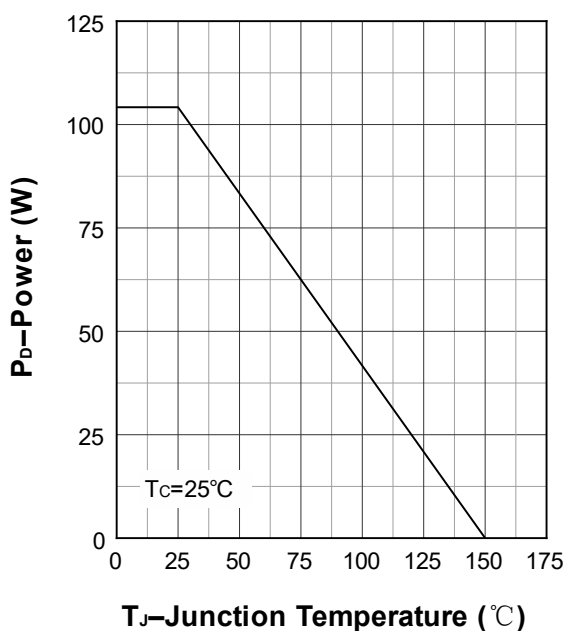
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0 V, I _{DS} =-250 μA	-100	-	-	V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =-250 μA	-1.0	-	-2.5	V
I _{DSS}	Drain Leakage Current	V _{DS} =-100 V, V _{GS} =0 V	-	-	-1.0	μA
I _{GSS}	Gate Leakage Current	V _{GS} =0 V, V _{GS} =±20 V	-	-	±100	nA
R _{DS(ON)} ^a	On-State Resistance	V _{GS} =-10 V, I _{DS} =-10 A	-	125	150	mΩ
		V _{GS} =-4.5 V, I _{DS} =-10 A	-	135	180	
Diode Characteristics						
V _{SD} ^a	Diode Forward Voltage	I _{SD} =-10 A, V _{GS} =0 V	-	-	-1.3	V
t _{rr}	Reverse Recovery Time	I _{SD} =-10 A, dI _{SD} /dt=100 A/μs	-	41	-	ns
Q _{rr}	Reverse Recovery Charge		-	22	-	nC
Dynamic Characteristics ^b						
C _{iss}	Input Capacitance	V _{GS} =0 V, V _{DS} =-50 V, Frequency=1 MHz	-	1230	-	pF
C _{oss}	Output Capacitance		-	55	-	
C _{rss}	Reverse Transfer Capacitance		-	40	-	
t _{d(on)}	Turn-on Delay Time	V _{DS} =-50 V, V _{GEN} =-10 V, R _G =25 Ω, I _{DS} =-10 A	-	54	-	ns
t _r	Turn-on Rise Time		-	88	-	
t _{d(off)}	Turn-off Delay Time		-	415	-	
t _f	Turn-off Fall Time		-	100	-	
Gate Charge Characteristics ^b						
Q _g	Total Gate Charge	V _{DS} =-50 V, V _{GS} =-10 V, I _{DS} =-2 A	-	80	-	nC
Q _{gs}	Gate-Source Charge		-	13	-	
Q _{gd}	Gate-Drain Charge		-	10	-	

Notes:

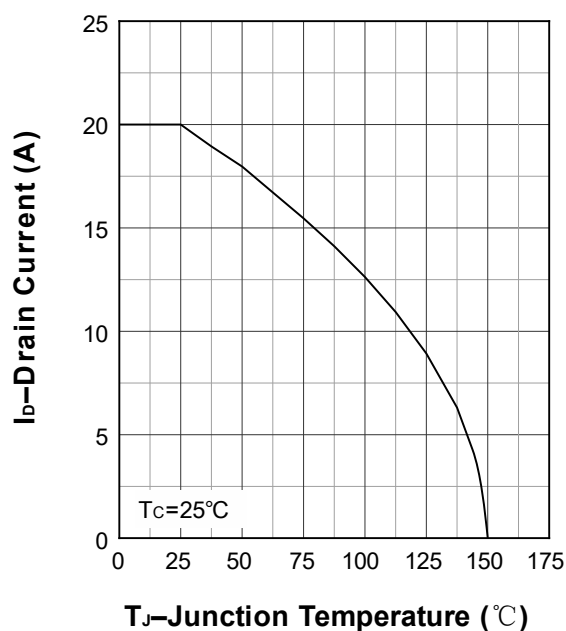
- Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
- Guaranteed by design, not subject to production testing.

7. Typical Characteristics

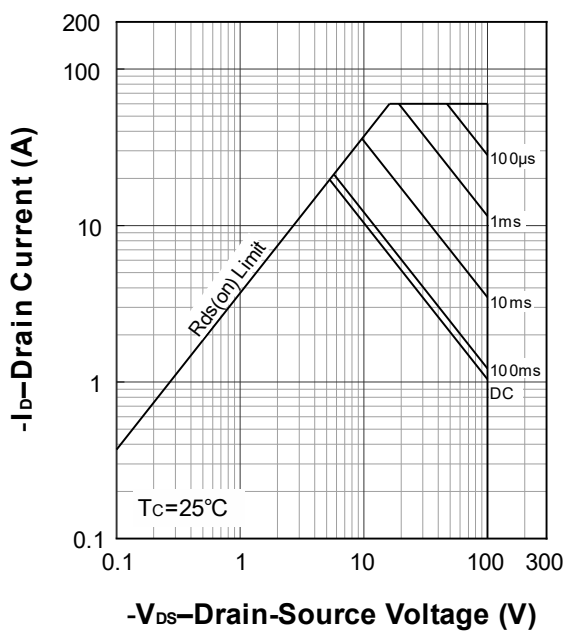
Power Capability



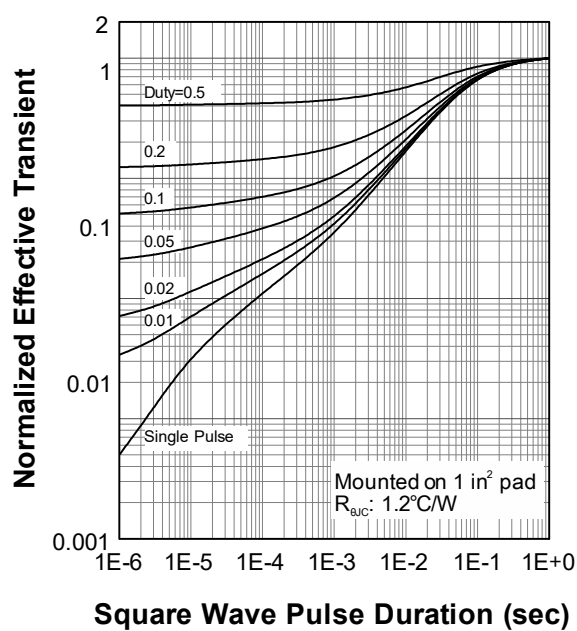
Current Capability



Safe Operating Area

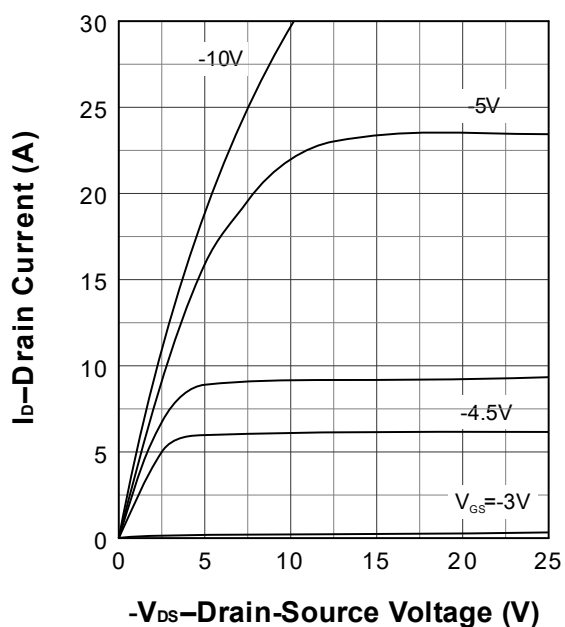


Transient Thermal Impedance

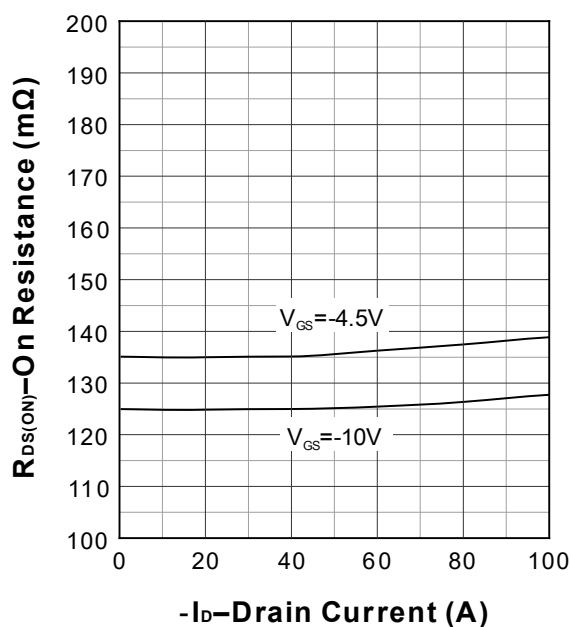


8. Typical Characteristics (cont.)

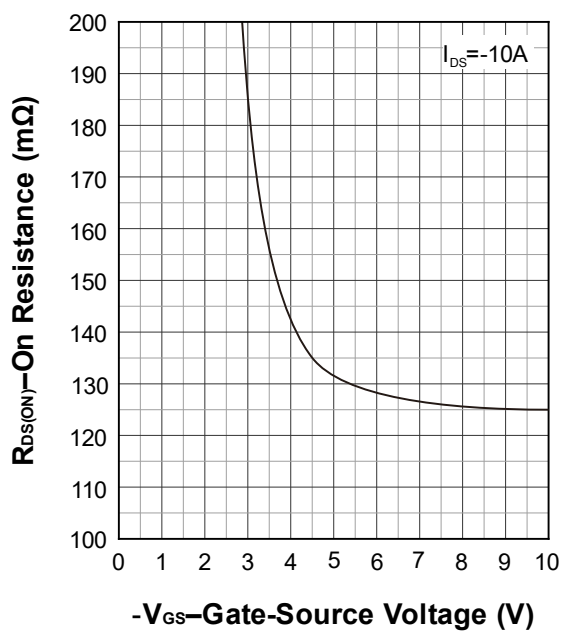
Output Characteristics



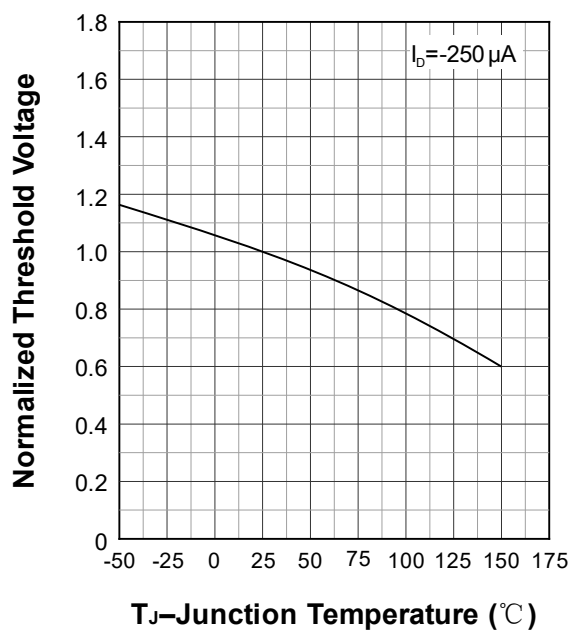
On Resistance



Transfer Characteristics

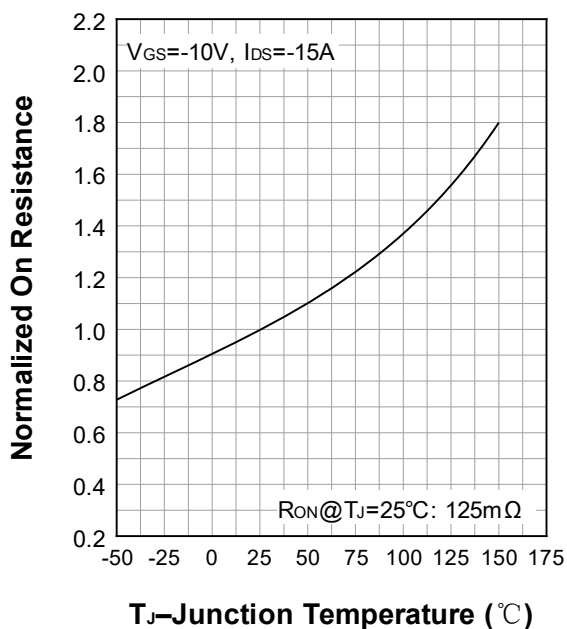


Normalized Threshold Voltage

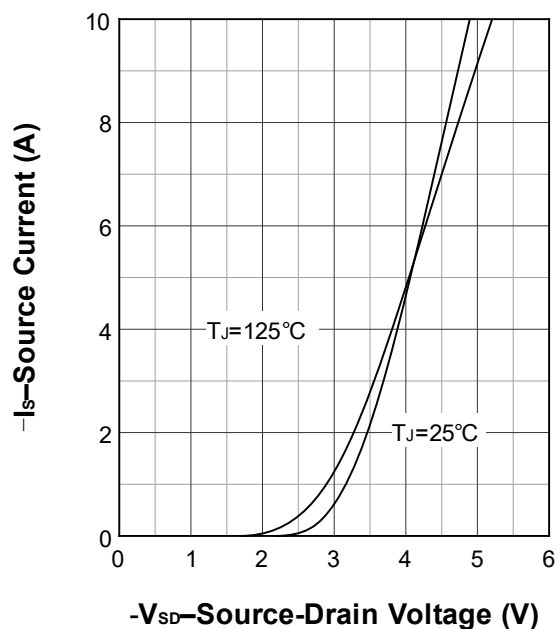


7. Typical Characteristics (cont.)

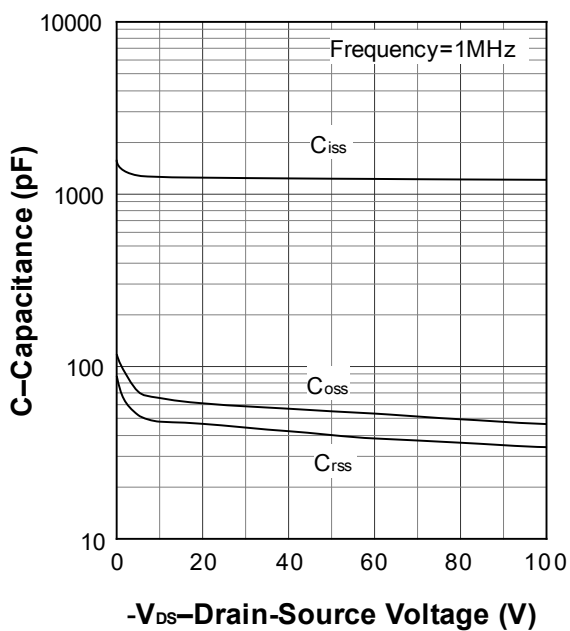
Normalized On Resistance



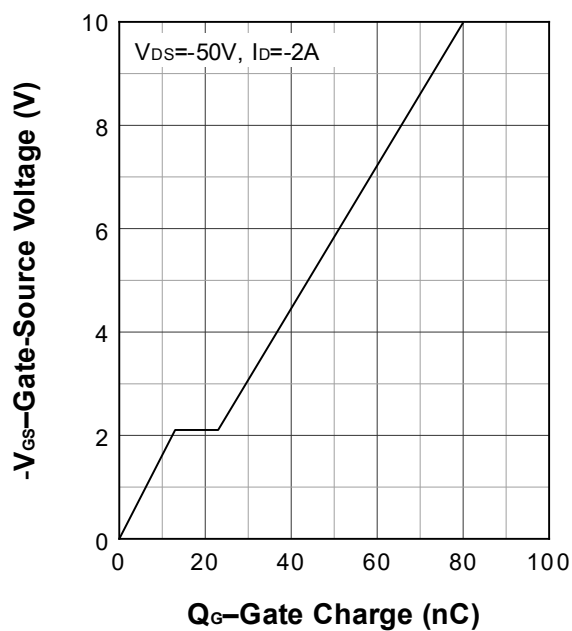
Diode Forward Current



Capacitance

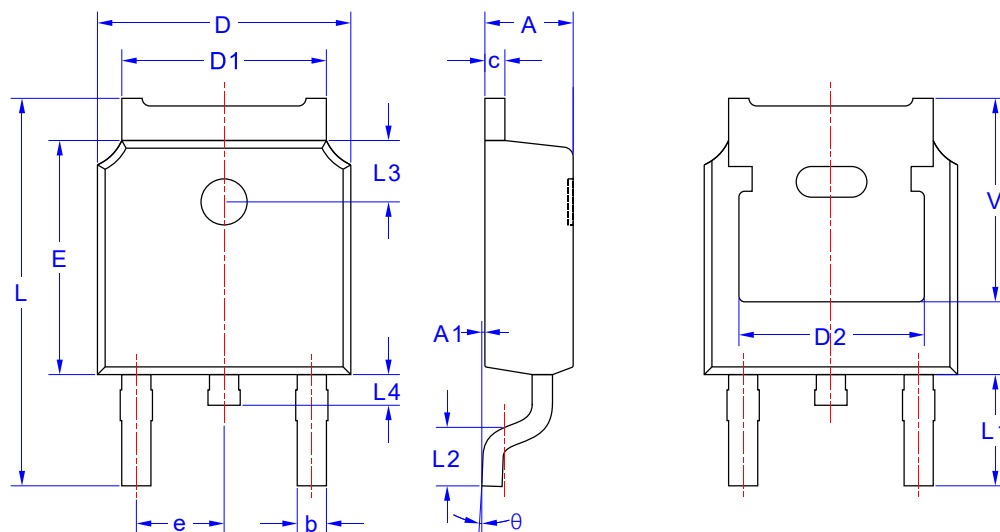


Gate Charge



8. Package Dimensions

TO-252 Package



Symbol	Dimensions in Millimeters	
	MIN	MAX
A	2.200	2.400
A1	0	0.127
b	0.660	0.860
c	0.460	0.580
D	6.500	6.700
D1	5.100	5.460
D2	4.830 REF.	
E	6.000	6.200
e	2.186	2.386
L	9.800	10.400
L1	2.900 REF.	
L2	1.400	1.700
L3	1.800 REF.	
L4	0.600	1.000
θ	0°	8°
V	5.600 REF.	