

N-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

- ☑ Advanced Trench Technology
- ☑ Low Thermal Resistance

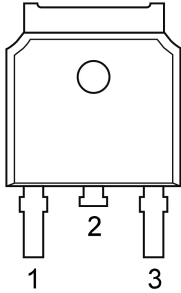
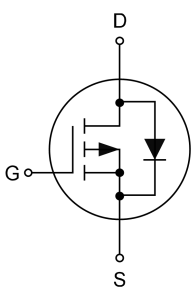
1.2 Applications

- ☑ Motor drivers
- ☑ DC-DC Converter

1.3 Quick reference

- ☑ $BV \geq 40\text{ V}$
- ☑ $R_{DS(ON)} \leq 7\text{ m}\Omega @ V_{GS} = 10\text{ V}$
- ☑ $P_{tot} \leq 20.8\text{ W}$
- ☑ $R_{DS(ON)} \leq 11\text{ m}\Omega @ V_{GS} = 4.5\text{ V}$
- ☑ $I_D \leq 40\text{ A}$

2. Pin Description

Pin	Description	Simplified Outline	Symbol
1	Gate (G)	 Top View TO-252	
2	Drain (D)		
3	Source (S)		

3. Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
V_{DS}	Drain-Source Voltage	$T_C=25^{\circ}\text{C}$	40	-	V
V_{GS}	Gate-Source Voltage	$T_C=25^{\circ}\text{C}$	-	± 20	V
I_D	Drain Current (DC)	$T_C=25^{\circ}\text{C}, V_{GS}=10\text{ V}$	-	40	A
		$T_C=100^{\circ}\text{C}, V_{GS}=10\text{ V}$	-	26	A
I_{DM}^*	Pulsed Source Current	$T_C=25^{\circ}\text{C}, V_{GS}=10\text{ V}$	-	120	A
P_{tot}	Total Power Dissipation	$T_C=25^{\circ}\text{C}$	-	20.8	W
T_J, T_{stg}	Operating Junction and Storage Temperature Range		-55	150	$^{\circ}\text{C}$
E_{AS}	Single Pulsed Avalanche Energy	$V_{DD}=40\text{ V}, L=0.3\text{ mH}$	-	60	mJ
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient		-	62.5	$^{\circ}\text{C/W}$
$R_{\theta JC}$	Thermal Resistance, Junction to Case		-	6	

Notes:

- * Pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
- ** Surface mounted on 1 in² pad area, $t \leq 10\text{ sec}$.
- *** Limited by maximum junction temperature.

4. Marking Information

Product Name	Marking
KJ0604K	KJ0604K XXXXXX

5. Ordering Code

Product Name	Package	Reel size	Tape width	Quantity (pcs)
KJ0604K	TO-252	13"	16 mm	2500

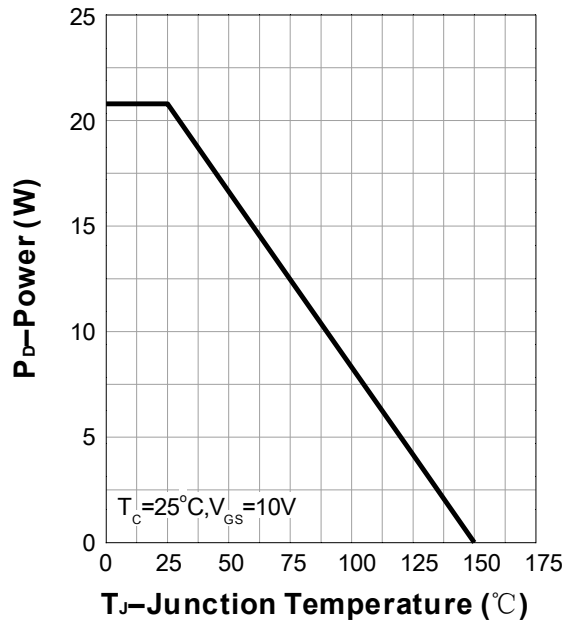
Note: KUAIJIE XIN defines "Green" as lead-free (RoHS compliant) and halogen free (Br or Cl does not exceed 900 ppm by weight in homogeneous material and total of Br and Cl does not exceed 1500 ppm by weight; Follow IEC 61249-2-21 and IPC/JEDEC J-STD-020C).

6. Electrical Characteristics (T_J=25°C unless otherwise noted)

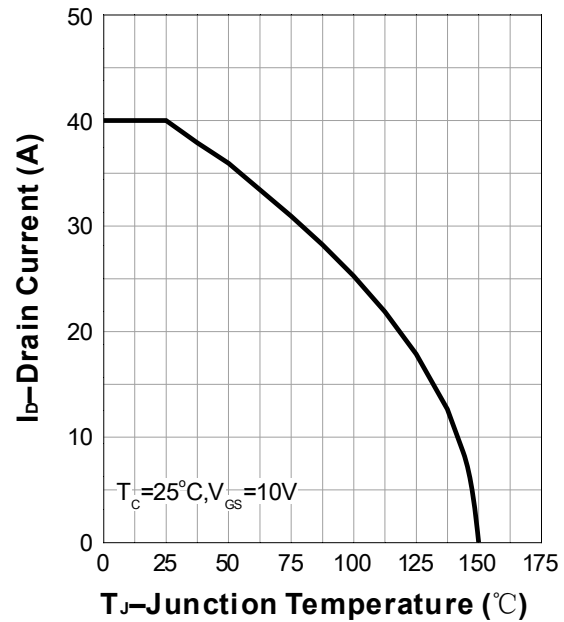
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0 V, I _{DS} =250 μA	40	-	-	V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250 μA	1.0	-	2.2	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =40 V, V _{GS} =0 V	-	-	1	μA
I _{GSS}	Gate Leakage Current	V _{DS} =0 V, V _{GS} =±20 V	-	-	±100	nA
R _{DS(ON)}	On-State Resistance	V _{GS} =10 V, I _{DS} =12 A	-	5.8	7	mΩ
		V _{GS} =4.5 V, I _{DS} =10 A	-	8.5	11	
Diode Characteristics						
V _{SD}	Diode Forward Voltage	I _{SD} =12 A, V _{GS} =0 V	-	0.8	1.2	V
t _{rr}	Reverse Recovery Time	I _{DS} =12 A, V _{GS} =0V, dI _{SD} /dt=100 A/μs	-	21	-	ns
Q _{rr}	Reverse Recovery Charge		-	7	-	nC
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{GS} =0 V, V _{DS} =20 V, Frequency=1.0 MHz	-	630	-	pF
C _{oss}	Output Capacitance		-	330	-	
C _{rss}	Reverse Transfer Capacitance		-	23	-	
R _g	Gate resistance		-	4	-	Ω
t _{d(on)}	Turn-on Delay Time	V _{DS} =20 V, V _{GEN} =10 V, R _G =3 Ω, I _{DS} =12 A	-	12	-	ns
t _r	Turn-on Rise Time		-	32	-	
t _{d(off)}	Turn-off Delay Time		-	20	-	
t _f	Turn-off Fall Time		-	8	-	
Gate Charge Characteristics						
Q _g	Total Gate Charge	V _{DS} =20 V, V _{GS} =10 V, I _{DS} =12 A	-	17	-	nC
Q _{gs}	Gate-Source Charge		-	8	-	
Q _{gd}	Gate-Drain Charge		-	3	-	

7. Typical Characteristics

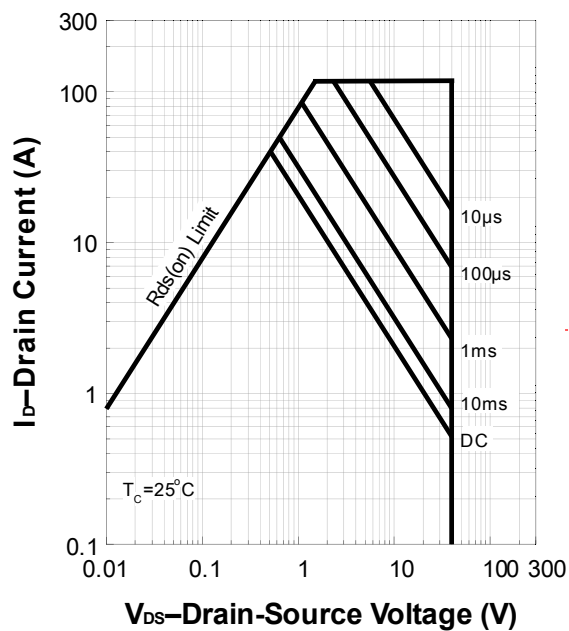
Power Capability



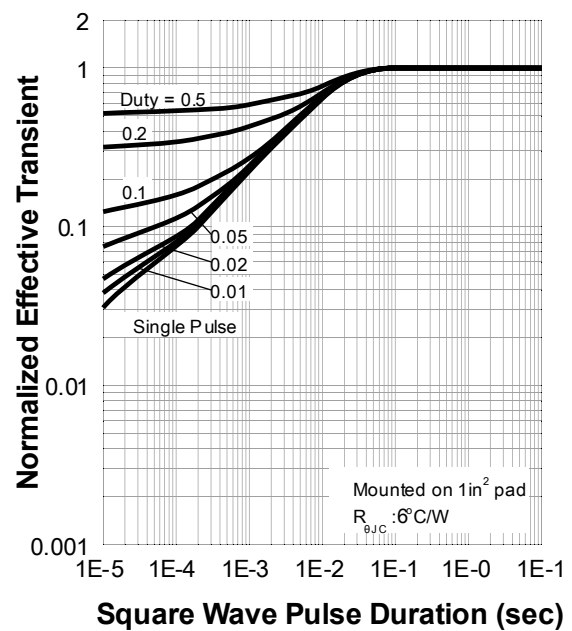
Current Capability



Safe Operating Area

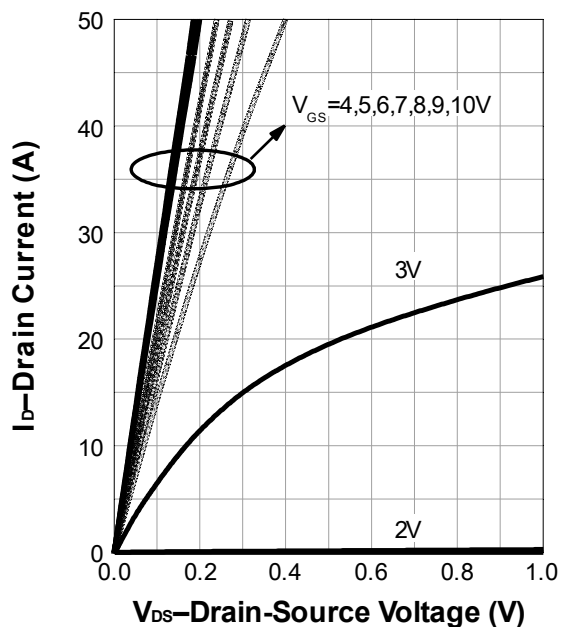


Transient Thermal Impedance

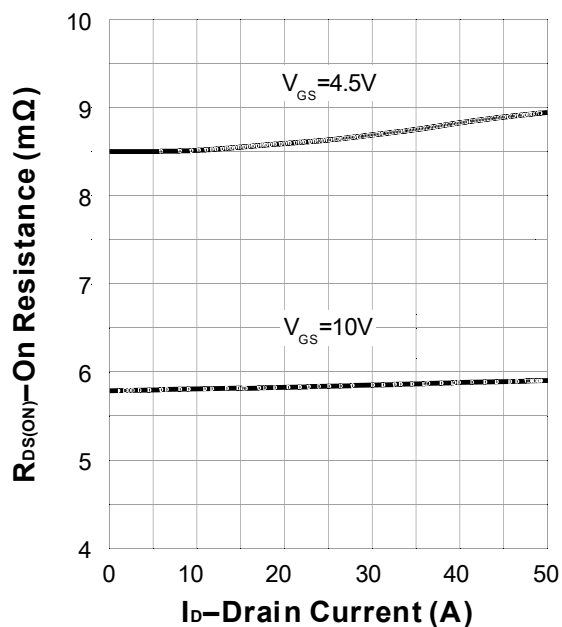


7. Typical Characteristics (cont.)

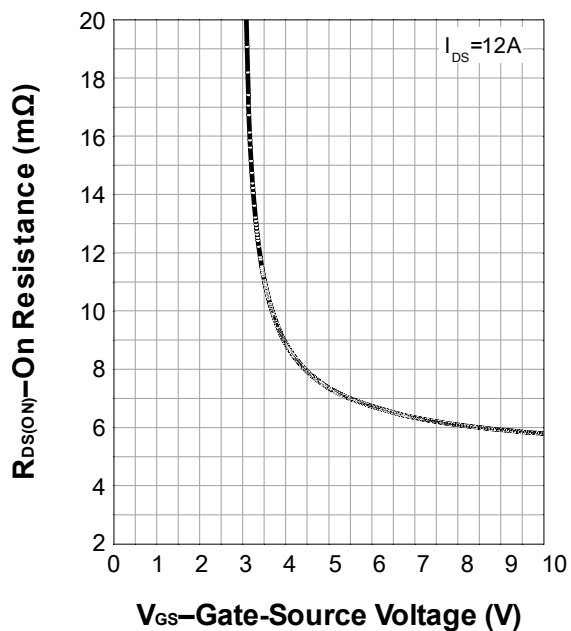
Output Characteristics



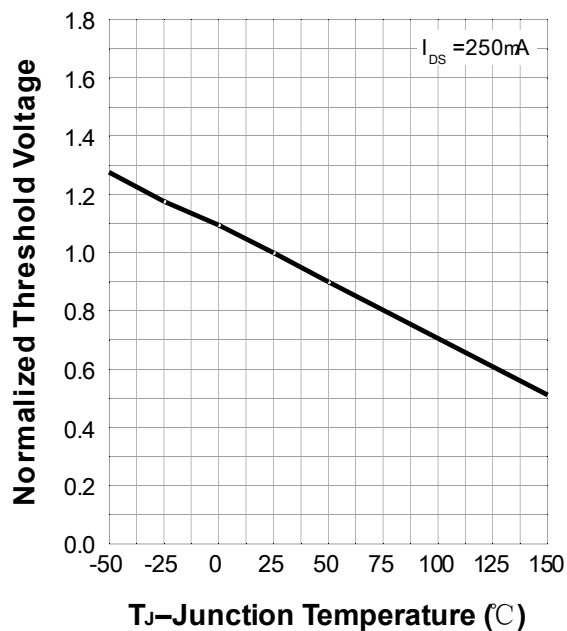
On Resistance



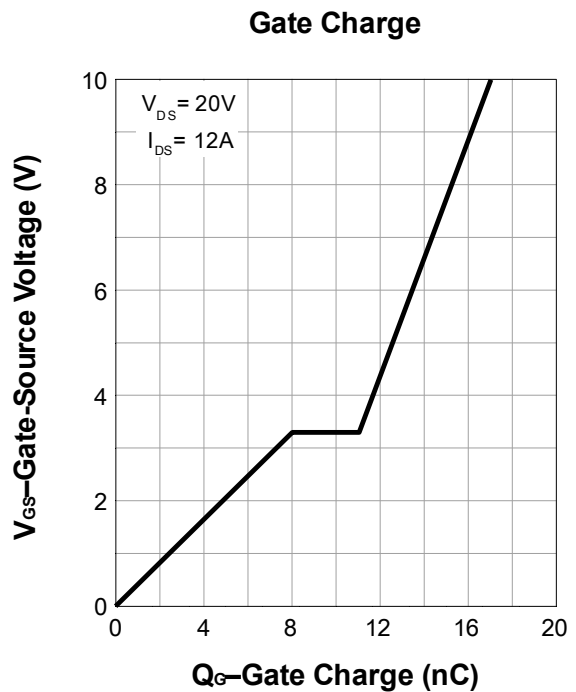
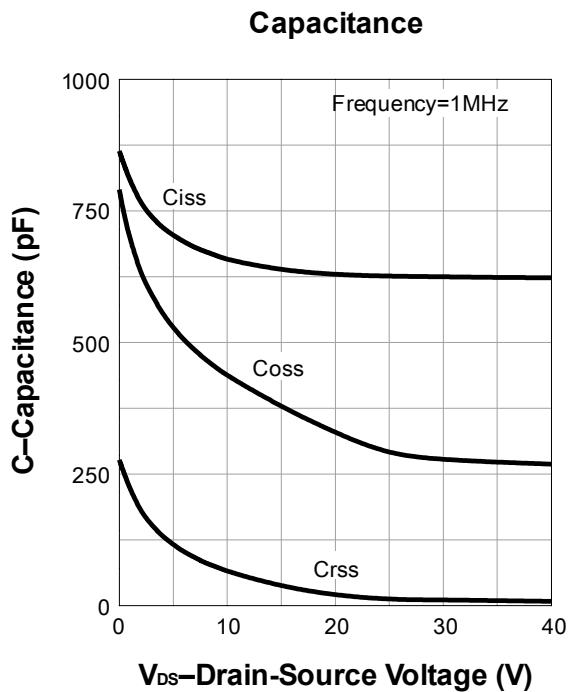
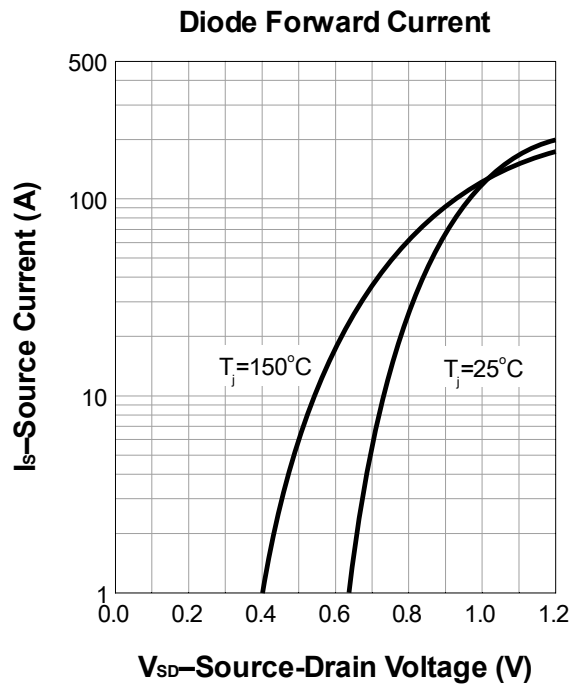
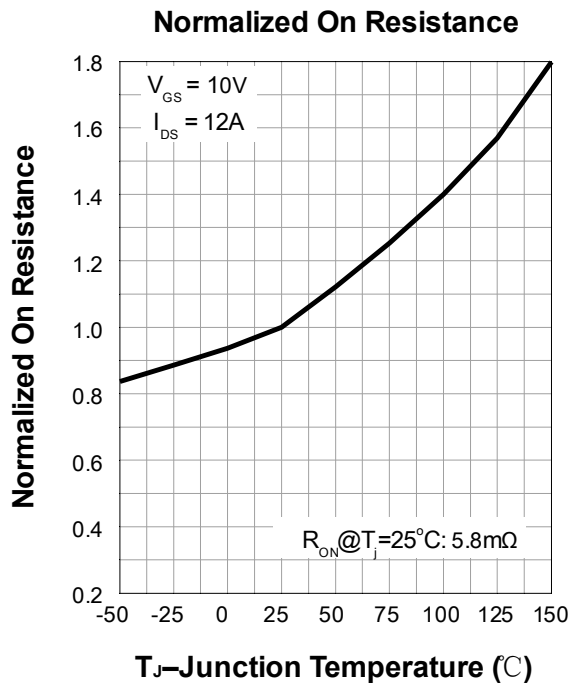
Transfer Characteristics



Normalized Threshold Voltage

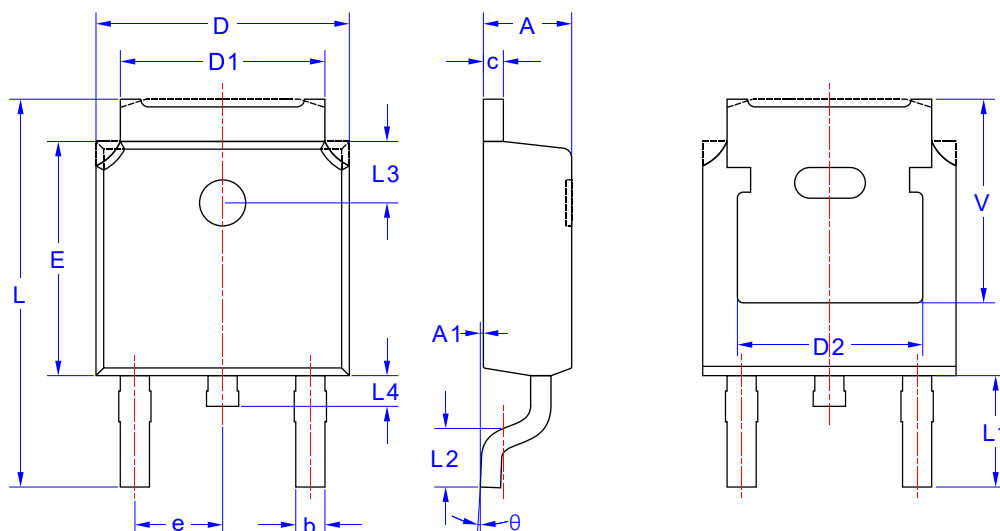


7. Typical Characteristics (cont.)



8. Package Dimensions

TO-252 Package



Note: There are two possible shapes for the dashed area.

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	1.386
L	9.800	10.400
L1	2.900 REF.	
L2	1.400	1.700
L3	1.600 REF.	
L4	0.600	1.000
V	5.350 REF.	
θ	0°	8°