

N-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

- ☑ Surface-mounted package
- ☑ Ultra-low $R_{DS(ON)}$
- ☑ Advanced trench cell design

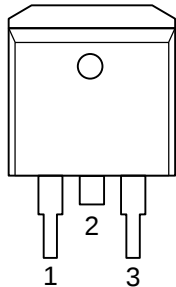
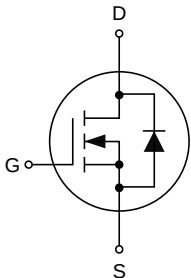
1.2 Applications

- ☑ Motor control and drive
- ☑ BMS appliances
- ☑ Uninterruptible Power Supplies

1.3 Quick reference

- ☑ $BV \geq 135\text{ V}$
- ☑ $P_D \leq 250\text{ W}$
- ☑ $I_D \leq 189\text{ A}$
- ☑ $R_{DS(ON)} \leq 3.8\text{ m}\Omega @ V_{GS} = 10\text{ V}$

2. Pin Description

Pin	Description	Simplified Outline	Symbol
1	Gate (G)	 Top View TO-263	
2	Drain (D)		
3	Source (S)		

3. Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
V_{DS}	Drain-Source Voltage	$T_C=25^{\circ}\text{C}$	135	-	V
V_{GS}	Gate-Source Voltage	$T_C=25^{\circ}\text{C}$	-	± 20	V
I_D^*	Drain Current (DC)	$T_C=25^{\circ}\text{C}, V_{GS}=10\text{ V}$	-	189	A
		$T_C=100^{\circ}\text{C}, V_{GS}=10\text{ V}$	-	119	A
I_{DM}^*	Drain Current (Pulsed)	$T_C=25^{\circ}\text{C}, V_{GS}=10\text{ V}$	-	756	A
P_D	Drain Power Dissipation	$T_C=25^{\circ}\text{C}$	-	250	W
E_{AS}^*	Single Pulsed Avalanche Energy	$V_{DD}=68\text{ V}, L=0.3\text{ mH}$	-	490	mJ
T_J, T_{stg}	Operating Junction and Storage Temperature Range		-55	150	$^{\circ}\text{C}$
$R_{\theta JA}^{**}$	Thermal Resistance-Junction to Ambient		-	58	$^{\circ}\text{C/W}$
$R_{\theta JC}^{**}$	Thermal Resistance-Junction to Case		-	0.5	$^{\circ}\text{C/W}$

Notes:

- * Pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
- ** Surface mounted on 1 in^2 pad area, $t \leq 10\text{ sec}$.
- *** Limited by bonding wire.

4. Marking Information

Product Name	Marking
KJ038N14D	KJ038N14D XXXXXX-X

5. Ordering Code

Product Name	Package	Reel size	Tape width	Quantity (pcs)
KJ038N14D	TO-263	13"	24 mm	800

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_A=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	135	-	-	V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250 μA	2	-	4	V
I _{DSS}	Drain Leakage Current	V _{DS} =135 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)} ^a	On-State Resistance	V _{GS} =10 V, I _{DS} =90 A	-	3.2	3.8	mΩ
g _{fs}	Transconductance	V _{DS} =5 V, I _D =90 A	-	190	-	S
R _G	Gate resistance	V _{GS} =0 V, V _{DS} =0 V, f=1 MHz	-	2.7	-	Ω
Diode Characteristics						
V _{SD} ^a	Diode Forward Voltage	I _{SD} =1 A, V _{GS} =0 V	-	-	1.4	V
t _{rr}	Reverse Recovery Time	I _{SD} =90 A, V _{GS} =0 V, dI _{SD} /dt=100 A/μs	-	115	-	ns
Q _{rr}	Reverse Recovery Charge		-	450	-	nC
Dynamic Characteristics ^b						
C _{iss}	Input Capacitance	V _{GS} =0 V, V _{DS} =68 V, Frequency=1 MHz	-	9400	-	pF
C _{oss}	Output Capacitance		-	740	-	
C _{rss}	Reverse Transfer Capacitance		-	30	-	
t _{d(on)}	Turn-on Delay Time	V _{DS} =68 V, V _{GEN} =10 V, R _G =2.7 Ω, I _{DS} =90 A	-	35	-	ns
t _r	Turn-on Rise Time		-	65	-	
t _{d(off)}	Turn-off Delay Time		-	86	-	
t _f	Turn-off Fall Time		-	34	-	
Gate Charge Characteristics ^b						
Q _g	Total Gate Charge	V _{DS} =68 V, V _{GS} =10 V, I _{DS} =90 A	-	150	-	nC
Q _{gs}	Gate-Source Charge		-	62	-	
Q _{gd}	Gate-Drain Charge		-	29	-	

Notes:

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

7. Typical Characteristics

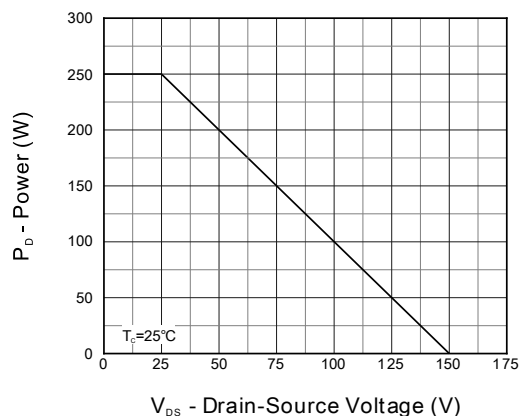


Figure 1. Output Characteristics

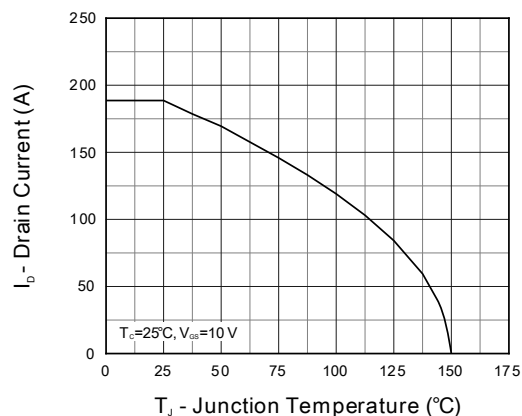


Figure 2. Current Capability

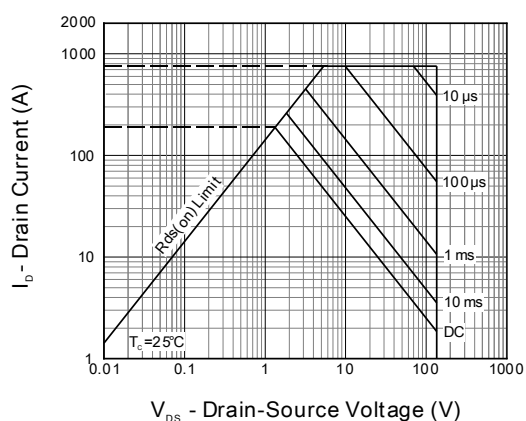


Figure 3. Safe Operation Area

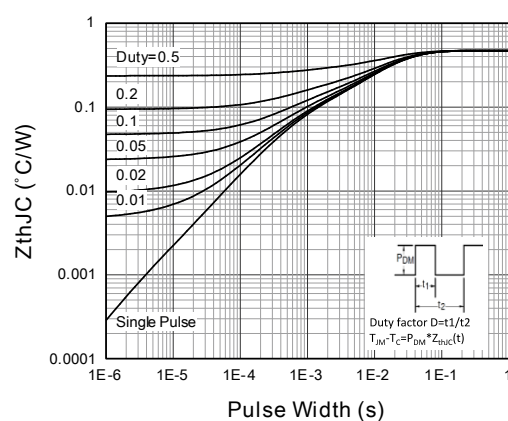


Figure 4. Transient Thermal Impedance

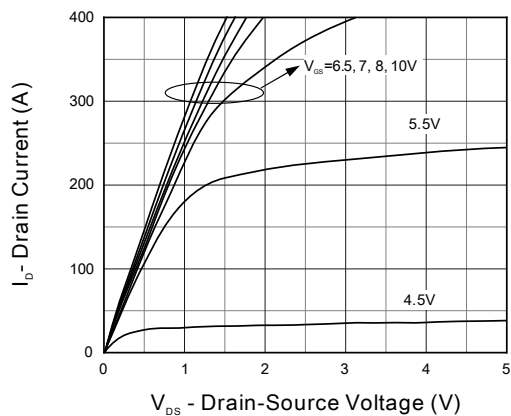


Figure 5. Output Characteristics

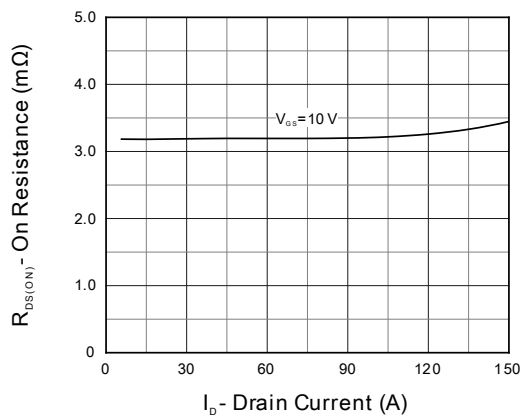


Figure 6. On Resistance

7. Typical Characteristics (cont.)

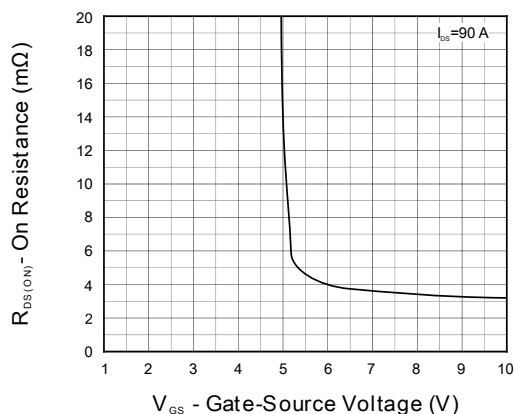


Figure 7. Transfer Characteristics

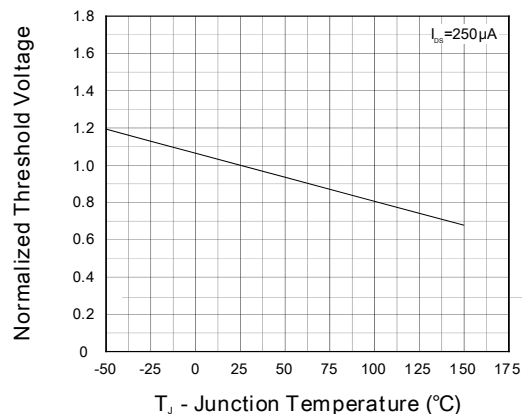


Figure 8. Normalized Threshold Voltage

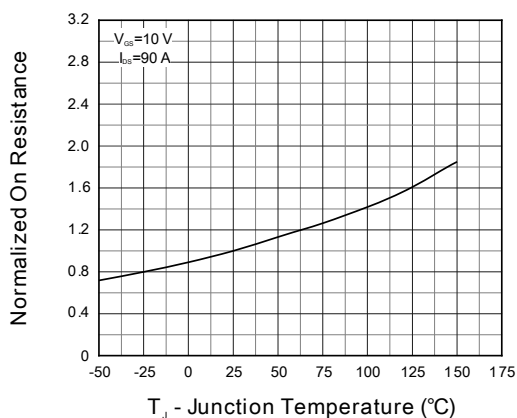


Figure 9. Normalized On Resistance

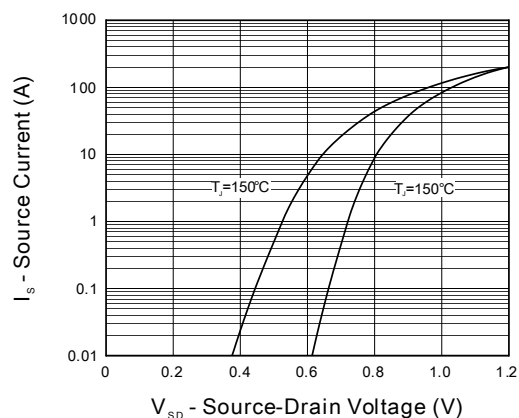


Figure 10. Diode Forward Current

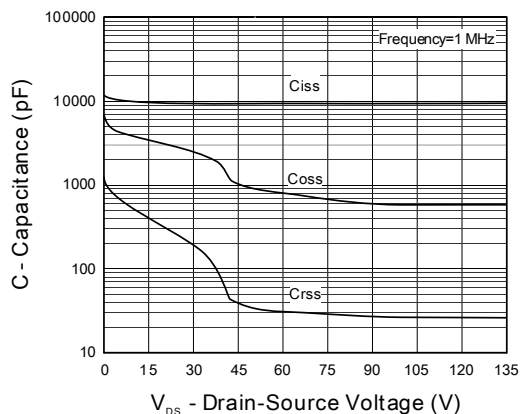


Figure 11. Capacitance

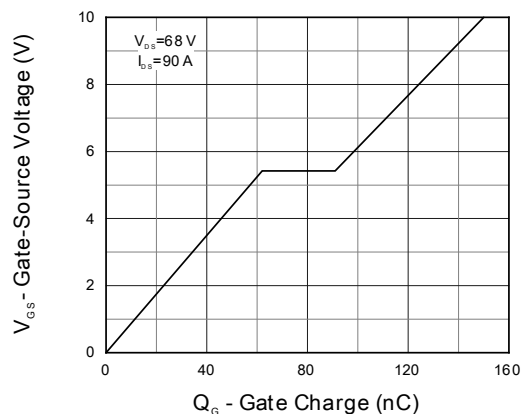
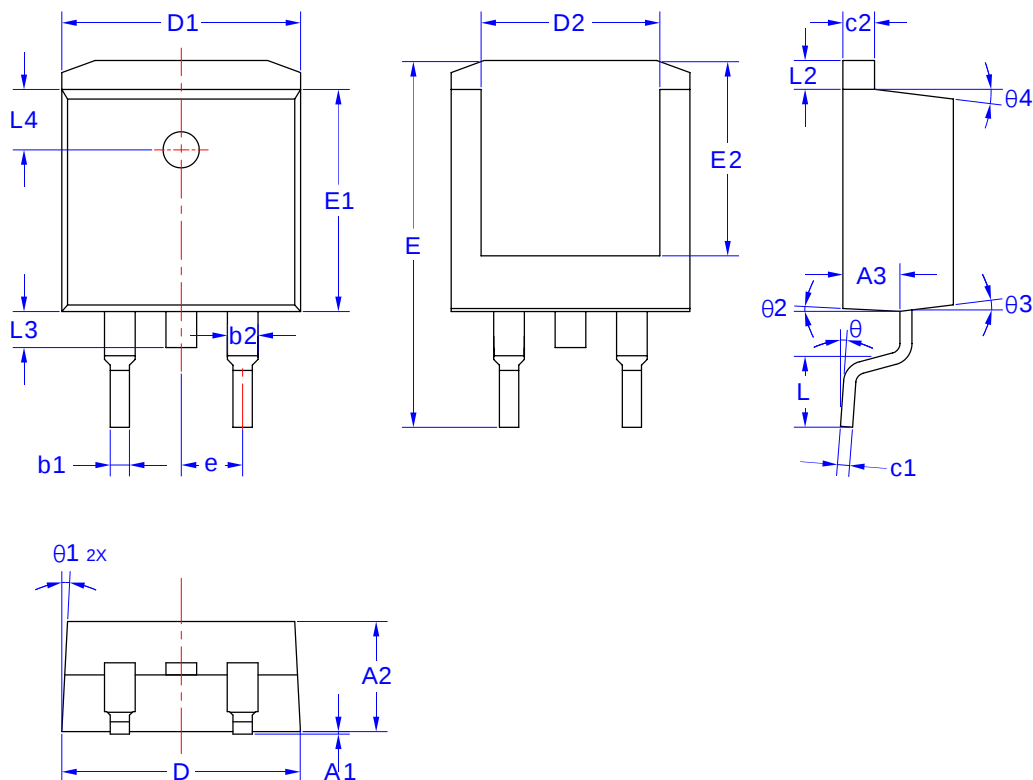


Figure 12. Gate Charge

8. Package Dimensions

TO-263 Package



Symbol	Dimensions in Millimeters		
	MIN	NOM	MAX
A1	0.020	-	0.200
A2	4.470	4.570	4.670
A3	2.300	2.350	2.400
b1	0.750	-	0.850
b2	1.220	-	1.320
c1	0.500	-	0.550
c2	1.300	-	1.350
D	9.780	9.880	9.980
D1		9.880 REF	
D2		7.400 REF	
E	14.900	15.100	15.300
E1	9.100	9.200	9.300

Symbol	Dimensions in Millimeters		
	MIN	NOM	MAX
E2		8.100 REF	
e		5.540 REF	
L	2.100	2.300	2.500
L2	1.025	-	1.375
L3	1.300	1.500	1.700
L4	2.400	2.500	2.600
θ		0~8°	
$\theta 1$		3°	
$\theta 2$		3°	
$\theta 3$		7°	
$\theta 4$		7°	