

N-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

- ☒ Advanced trench cell design
- ☒ Low Thermal Resistance
- ☒ Super Trench

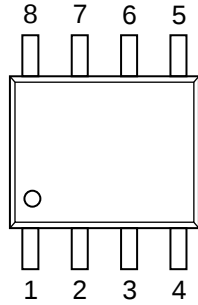
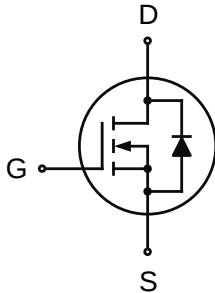
1.2 Applications

- ☒ Motor drivers
- ☒ DC - DC Converter

1.3 Quick reference

- ☒ $BV \geq 100\text{ V}$
- ☒ $R_{DS(ON)} \leq 12\text{ m}\Omega @ V_{GS} = 10\text{ V}$
- ☒ $P_{tot} \leq 2\text{ W}$
- ☒ $R_{DS(ON)} \leq 18\text{ m}\Omega @ V_{GS} = 4.5\text{ V}$
- ☒ $I_D \leq 12\text{ A}$

2. Pin Description

Pin	Description	Simplified Outline	Symbol
1,2,3	Source	 Top View SOP8	
4	Gate		
5,6,7,8	Drain		

3. Limiting Values

Symbol	Parameter		Conditions	Min	Max	Unit
V_{DS}	Drain-Source Voltage		$T_C = 25\text{ }^{\circ}\text{C}$	100	-	V
V_{GS}	Gate-Source Voltage		$T_C = 25\text{ }^{\circ}\text{C}$	-	± 20	V
I_D^*	Drain Current		$T_C = 25\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$	-	12	A
I_D^*	Drain Current		$T_C = 100\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$	-	9	A
$I_{DM}^{*,**}$	Pulsed Source Current		$T_C = 25\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$	-	40	A
P_{tot}^*	Total Power Dissipation		$T_C = 25\text{ }^{\circ}\text{C}$	-	2	W
T_{stg}	Storage Temperature			- 55	150	$^{\circ}\text{C}$
T_J	Junction Temperature			-	150	$^{\circ}\text{C}$
I_S	Diode Forward Current		$T_C = 25\text{ }^{\circ}\text{C}$	-	12	A
I_{AS}	Avalanche Current			-	20	A
E_{AS}^*	Single Pulsed Avalanche Energy		$V_{DD} = 50\text{ V}, L = 1.0\text{ mH}$	-	55	mJ
V_{spike}	V_{DS} Spike	10us	$V_{DD} = 50\text{ V}, L = 0.1\text{ mH}$	-	120	V
$R_{\theta JA}^*$	Thermal Resistance- Junction to Ambient			-	56	$^{\circ}\text{C} / \text{W}$

Notes:

- * Surface Mounted on 1 in² pad area, $t \leq 10\text{ sec}$
- ** Pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$
- *** Limited by bonding wire

4. Marking Information

Product Name	Marking
KJ12N10SM	1210M YWWXXX YWWXXX: Date Code

5. Ordering Code

Product Name	Package	Reel Size	Tape width	Quantity	Note
KJ12N10SM	SOP8	-	-	3000	

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 _D = 250 μA	100	-	-	V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _{DS} = 250 μA	1	-	3	V
I _{DSS}	Zero Gate Voltage Source Current	V _{DS} = 80 V, V _{GS} = 0 V	-	-	1	μA
I _{GSS}	Gate Leakage Current	V _{GS} = ± 20 V, V _{DS} = 0 V	-	-	± 100	nA
R _{DS(ON)} ^a	Drain-Source On-State Resistance	V _{GS} = 10 V, I _D = 10 A	-	11	12	mΩ
		V _{GS} = 4.5 V, I _D = 10 A	-	16	18	
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	-	47	-	nS
Q _{rr}	Reverse Recovery Charge		-	50	-	nC
Dynamic Characteristics ^b						
C _{iss}	Input Capacitance	V _{GS} = 0 V, V _{DS} = 50 V Frequency = 1 MHz	-	1313	-	pF
C _{oss}	Output Capacitance		-	251	-	
C _{rss}	Reverse Transfer Capacitance		-	30	-	
t _{d(on)}	Turn-on Delay Time	V _{DS} = 50 V, V _{GEN} = 10 V, R _G = 3.9 Ω, R _L = 2.5 Ω, I _D = 10 A	-	7.1	-	nS
t _r	Turn-on Rise Time		-	20	-	
t _{d(off)}	Turn-off Delay Time		-	26	-	
t _f	Turn-off Fall Time		-	17	-	
Gate Charge Characteristics ^b						
Q _g	Total Gate Charge	V _{GS} = 10 V, V _{DS} = 50 V, I _{DS} = 10 A	-	32	-	nC
Q _{gs}	Gate-Source Charge		-	7.2	-	
Q _{gd}	Gate-Drain Charge		-	8.3	-	

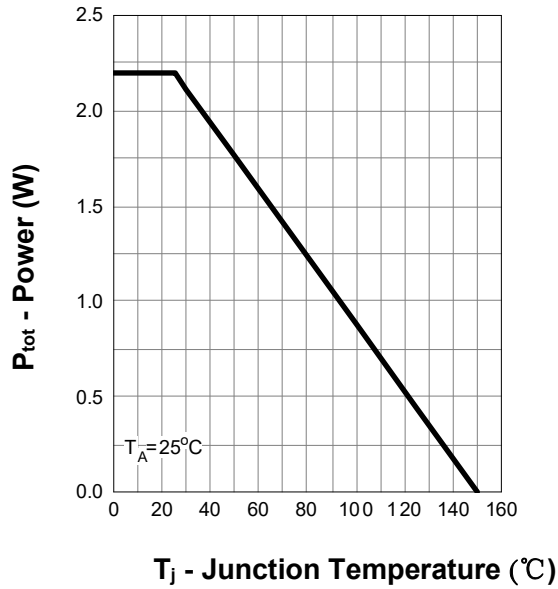
Notes :

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

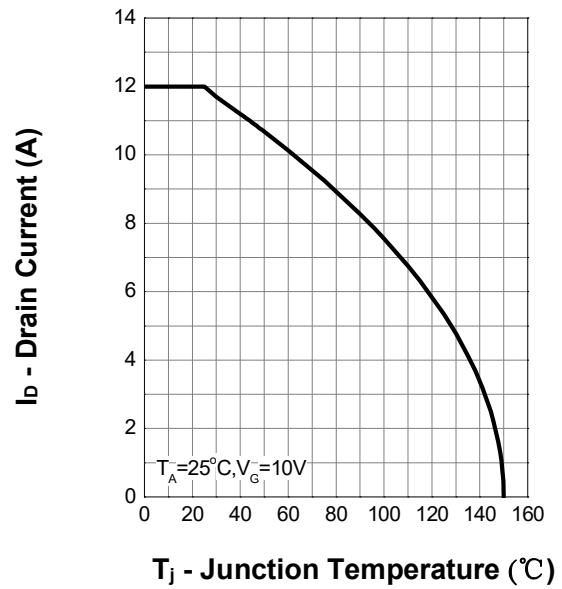
b : Guaranteed by design, not subject to production testing

7. Typical Characteristics

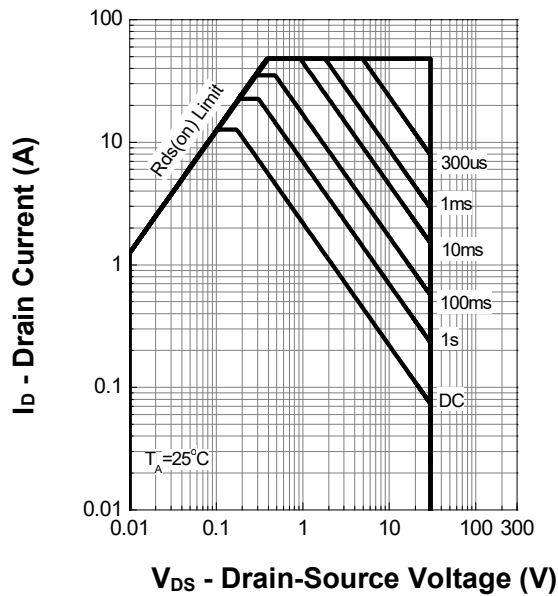
Power Dissipation



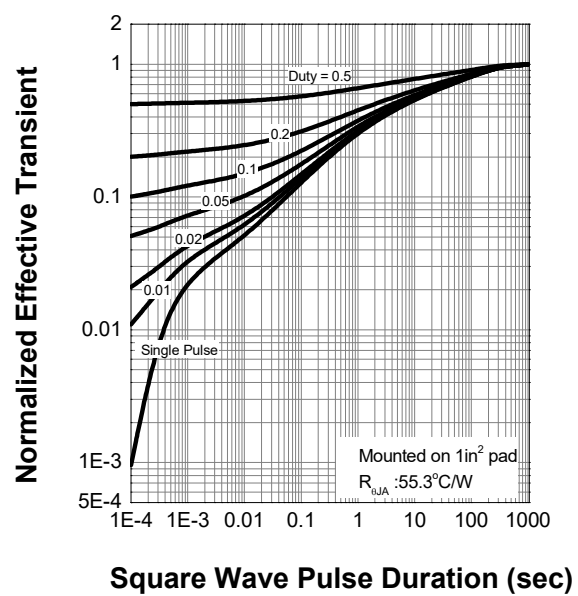
Drain Current



Safe Operation Area

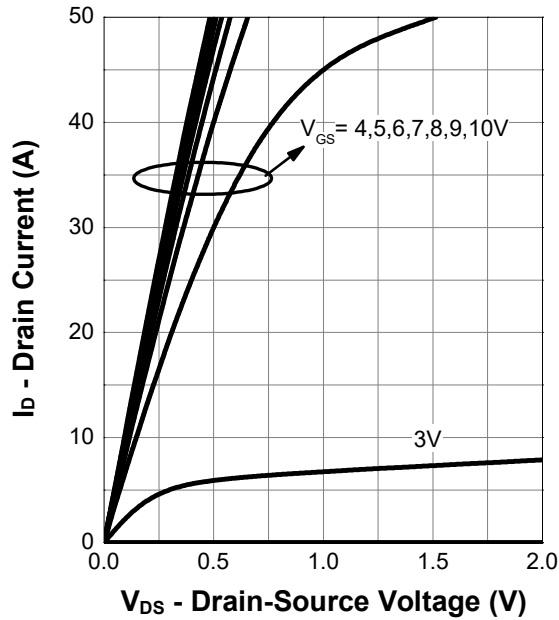


Thermal Transient Impedance

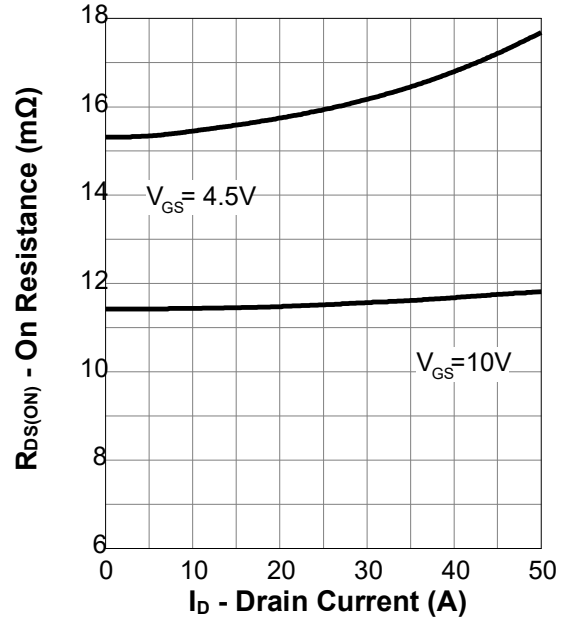


7. Typical Characteristics (Cont.)

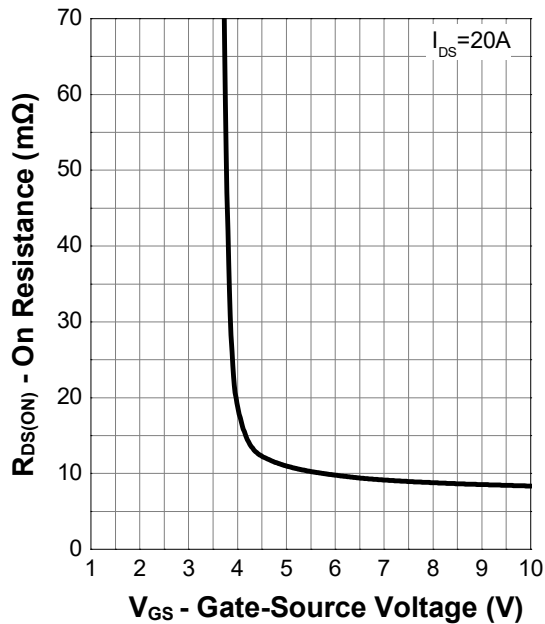
Output Characteristics



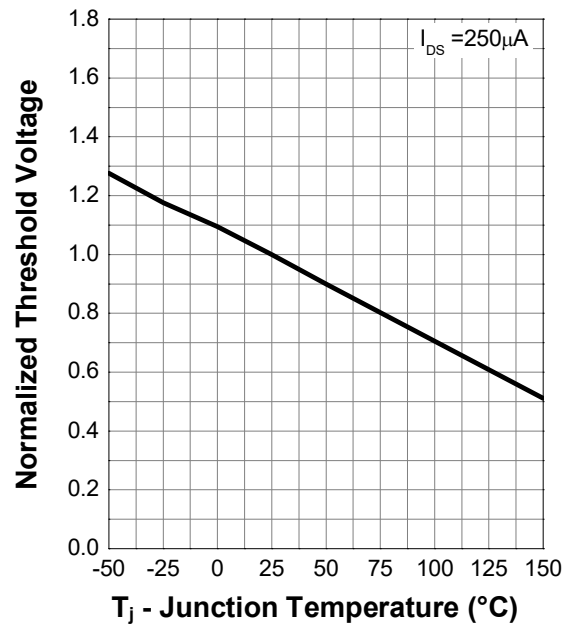
On Resistance



Transfer Characteristics

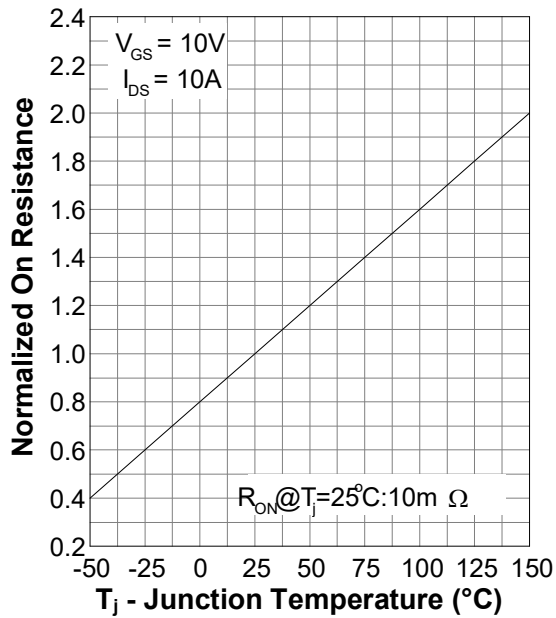


Normalized Threshold Voltage

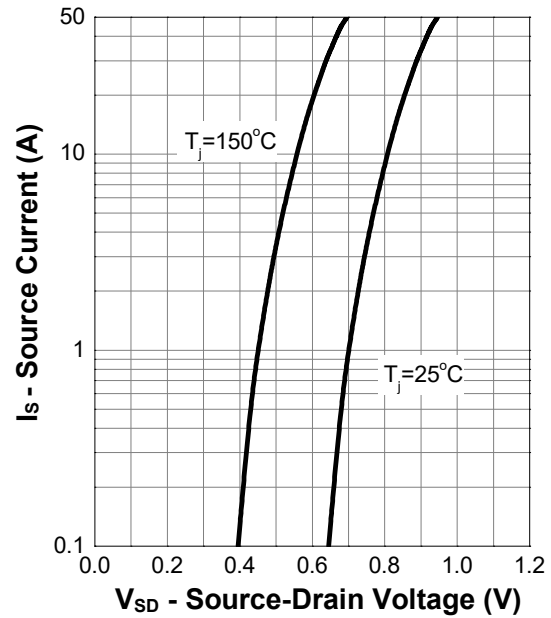


7. Typical Characteristics (Cont.)

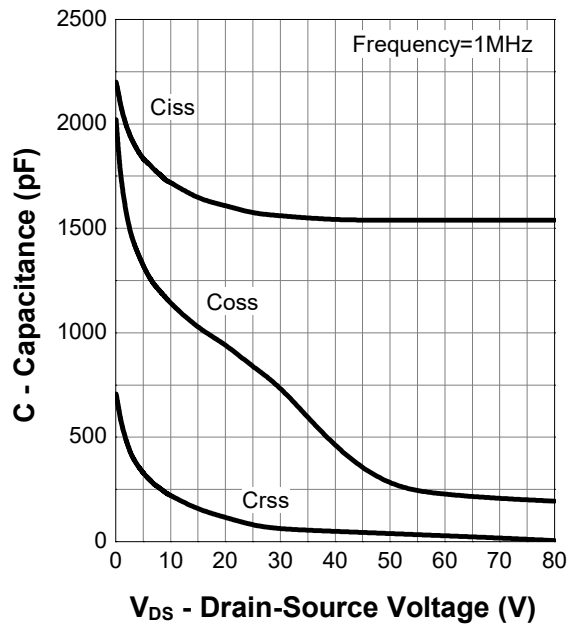
Normalized On Resistance



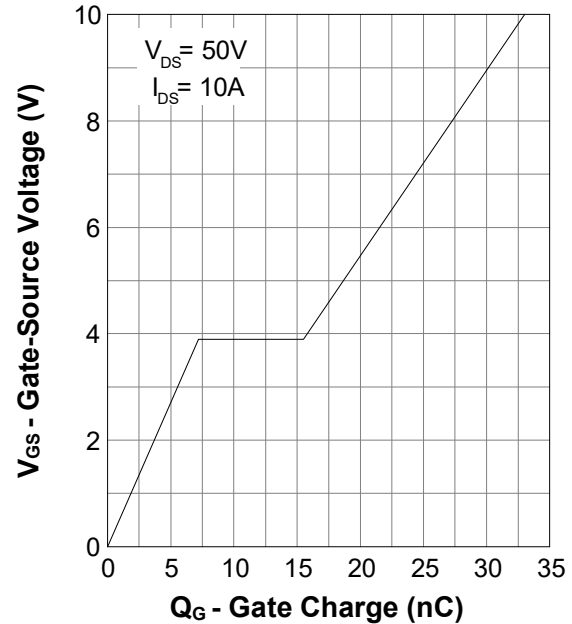
Diode Forward Current



Capacitance

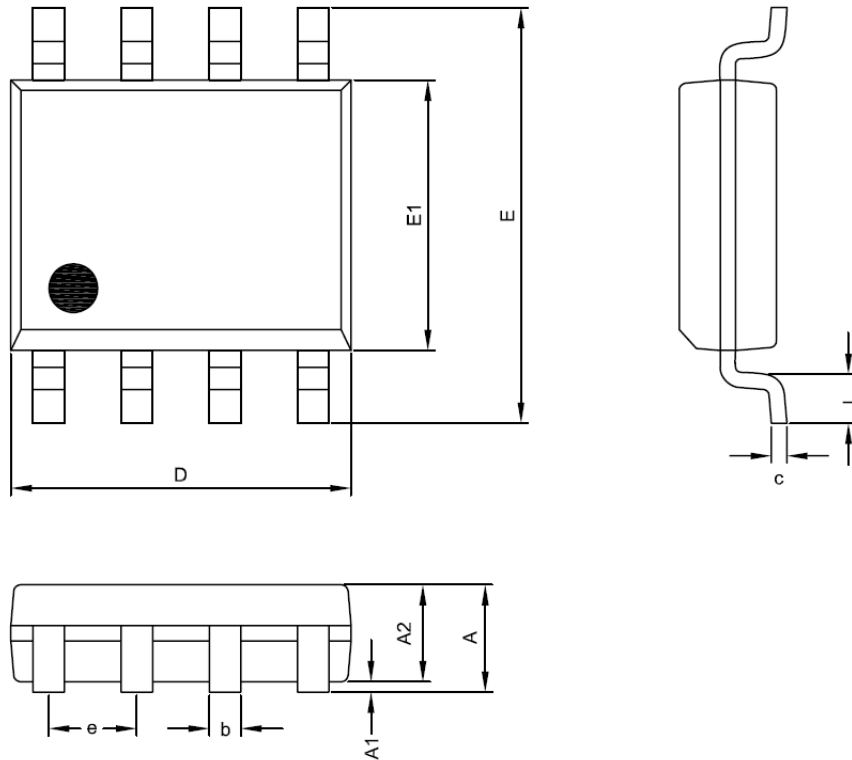


Gate Charge



8. Package Dimensions

SOP8 Package



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