

N-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

- Surface-mounted package
- Low thermal impedance
- Low $R_{DS(ON)}$
- 100% avalanche tested
- T_J max 175°C
- MSL1

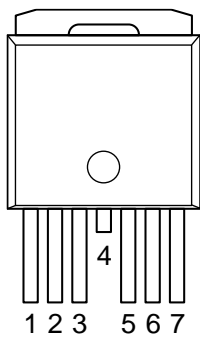
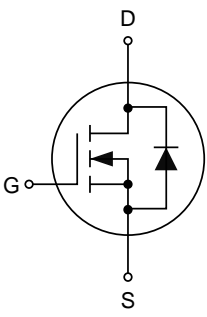
1.2 Applications

- Motor drives
- DC/DC conversion
- Power switch
- Light electric vehicles

1.3 Quick reference

- $BV \geq 40\text{ V}$
- $R_{DS(ON)} \leq 0.7\text{ m}\Omega @V_{GS} = 10\text{ V}$
- $P_D \leq 416\text{ W}$
- $I_D \leq 420\text{ A}$

2. Pin Description

Pin	Description	Simplified Outline	Symbol
1	Gate (G)	 <p style="text-align: center;">Top View TO263-7L</p>	
2, 3	Source (S)		
4	Drain (D)		
5, 6, 7	Source (S)		

3. Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
V _{DS}	Drain-Source Voltage	T _C =25°C	-	40	V
V _{GS}	Gate-Source Voltage	T _C =25°C	-	±20	V
I _D *	Drain Current (DC)	T _C =25°C, V _{GS} =10 V	-	420	A
		T _C =100°C, V _{GS} =10 V	-	280	A
		T _A =25°C	-	50	A
I _{DM} *, **	Drain Current (Pulsed)	T _C =25°C, V _{GS} =10 V	-	1155	A
P _D	Drain Power Dissipation	T _C =25°C	-	416	W
I _S	Continuous-Source Current	T _C =25°C	-	420	A
E _{AS}	Single Pulsed Avalanche Energy	V _{DD} =20 V, L=0.5 mH	-	1900	mJ
T _J , T _{stg}	Operating Junction and Storage Temperature Range		-55	175	°C
R _{θJA} *	Thermal Resistance-Junction to Ambient		-	40	°C/W
R _{θJC}	Thermal Resistance-Junction to Case		-	0.36	°C/W

Notes:

* Surface mounted on minimum footprint pad area.

** Pulse width ≤ 300 μs, duty cycle ≤ 2%.

*** Limited by bonding wire.

4. Marking Information

Product Name	Marking
KJ006N04D7H	<div style="background-color: black; color: white; padding: 5px; text-align: center;"> KJ006N04D7H AYWWXX XXXXXX </div>

5. Ordering Code

Product Name	Package	Reel size	Tape width	Quantity (pcs)
KJ006N04D7H	TO263-7L	13"	24 mm	800

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_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	40	-	-	V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250 μA	2.5	3.5	4.5	V
I _{DSS}	Drain Leakage 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)} ^a	On-State Resistance	V _{GS} =10 V, I _{DS} =90 A	-	0.55	0.70	mΩ
R _g	Gate resistance	f=1 MHz, open drain	-	1	-	Ω
Diode Characteristics						
V _{SD} ^a	Diode Forward Voltage	V _{GS} =0 V, I _{SD} =90 A	-	-	1.1	V
t _{rr}	Reverse Recovery Time	V _{DS} =20 V, I _{SD} =180 A,	-	109	-	ns
Q _{rr}	Reverse Recovery Charge	dI _{SD} /dt=100 A/μs	-	342	-	nC
Dynamic Characteristics^b						
C _{iss}	Input Capacitance	V _{GS} =0 V, V _{DS} =25 V, f=1 MHz	-	14100	-	pF
C _{oss}	Output Capacitance		-	4315	-	
C _{rss}	Reverse Transfer Capacitance		-	410	-	
t _{d(on)}	Turn-on Delay Time	V _{DS} =20 V, V _{GEN} =10 V, R _G =6 Ω, I _{DS} =90 A	-	41	-	ns
t _r	Turn-on Rise Time		-	67	-	
t _{d(off)}	Turn-off Delay Time		-	101	-	
t _f	Turn-off Fall Time		-	37	-	
Gate Charge Characteristics^b						
Q _g	Total Gate Charge	V _{DS} =20 V, V _{GS} =10 V, I _{DS} =180 A	-	240	-	nC
Q _{gs}	Gate-Source Charge		-	72	-	
Q _{gd}	Gate-Drain Charge		-	81	-	

Notes:

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

7. Typical Characteristics

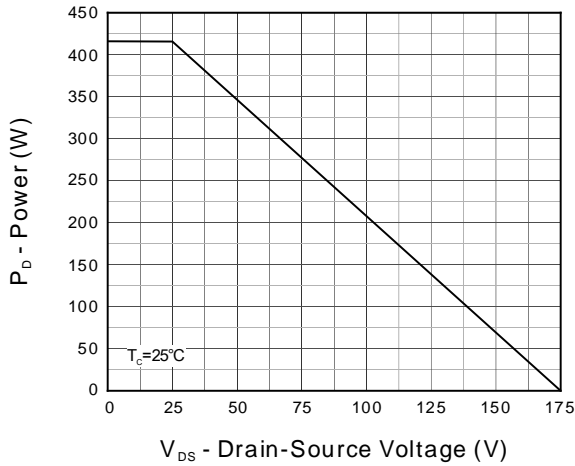


Figure 1. Output Characteristics

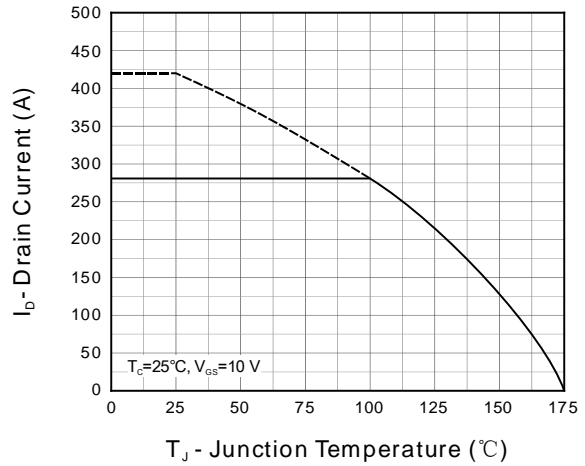


Figure 2. Current Capability

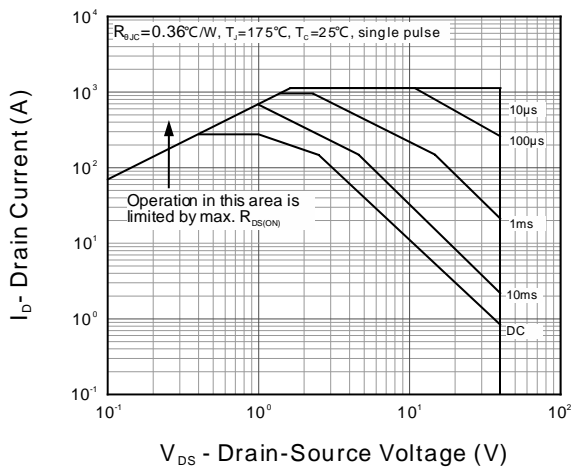


Figure 3. Safe Operation Area

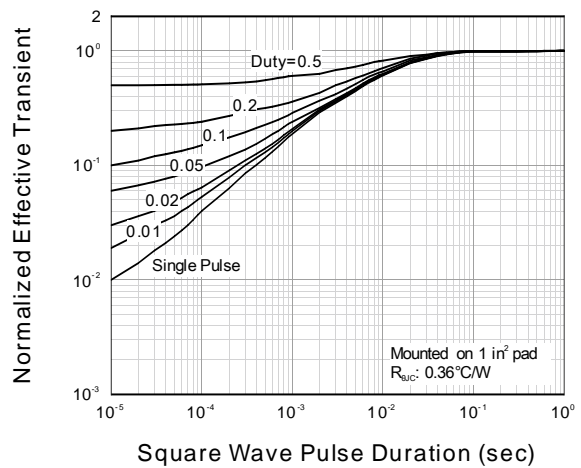


Figure 4. Transient Thermal Impedance

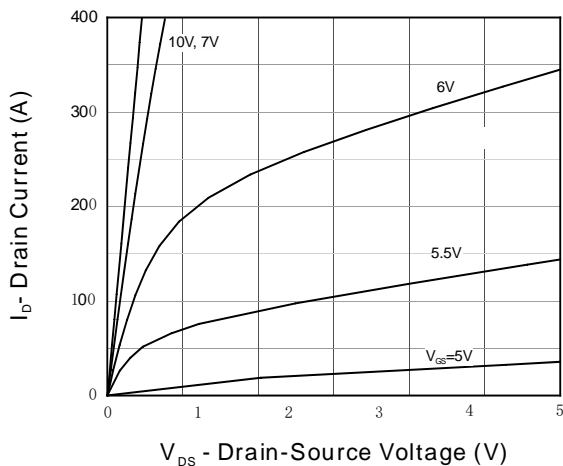


Figure 5. Output Characteristics

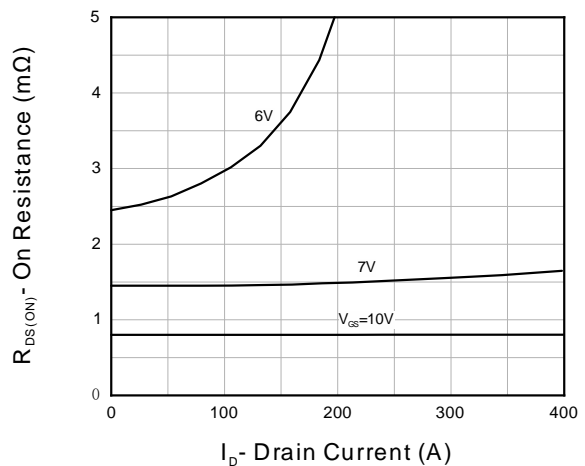


Figure 6. On Resistance

7. Typical Characteristics (cont.)

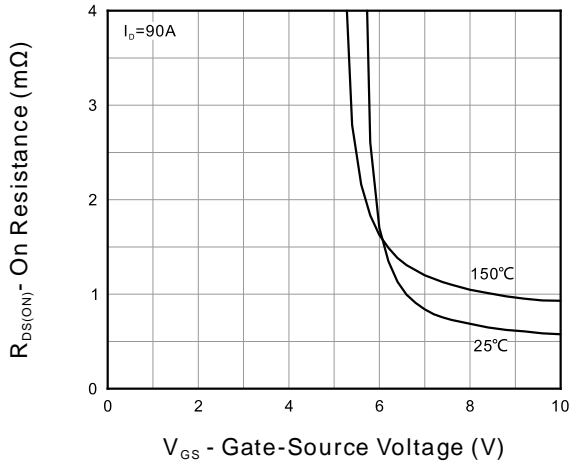


Fig 7. Transfer Characteristics

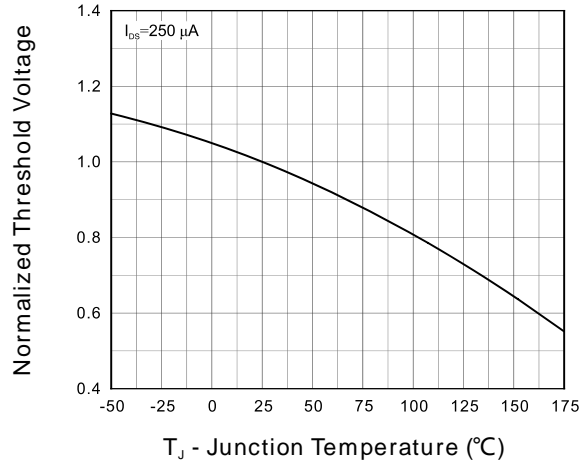


Fig 8. Normalized Threshold Voltage

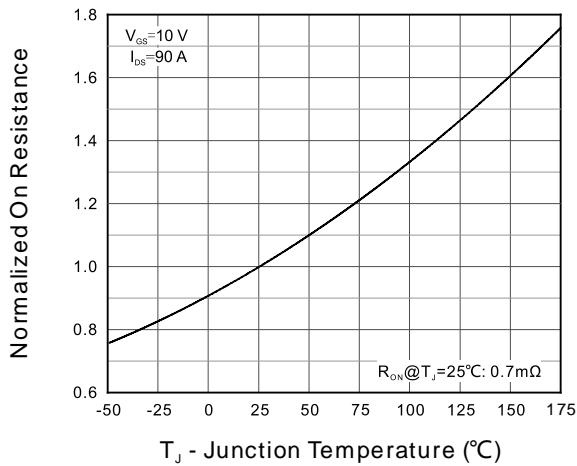


Fig 9. Normalized On Resistance

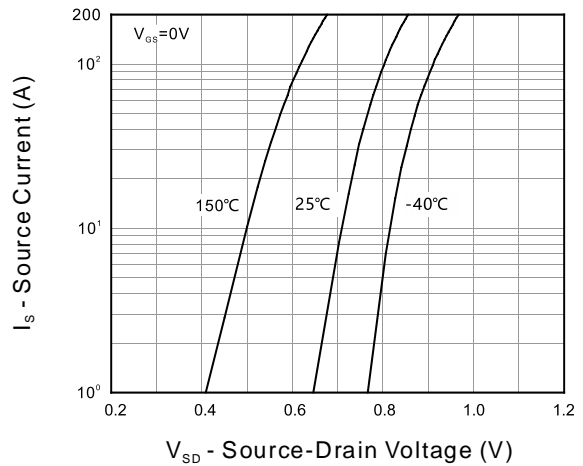


Fig 10. Diode Forward Current

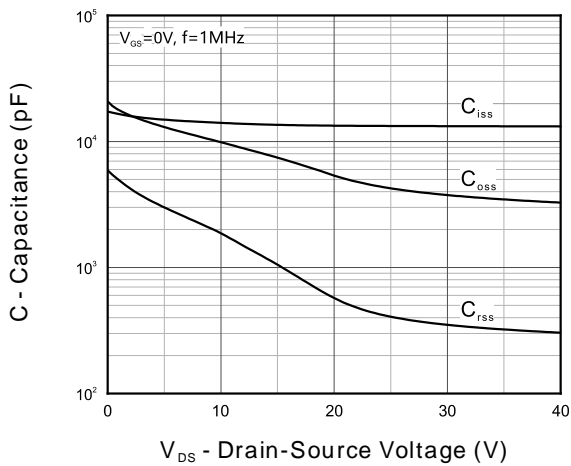


Fig 11. Capacitance

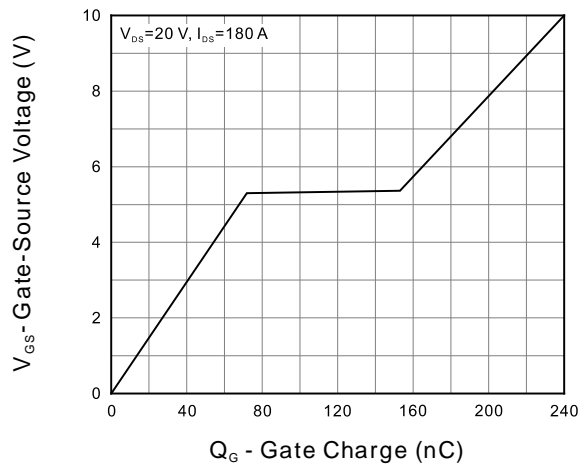
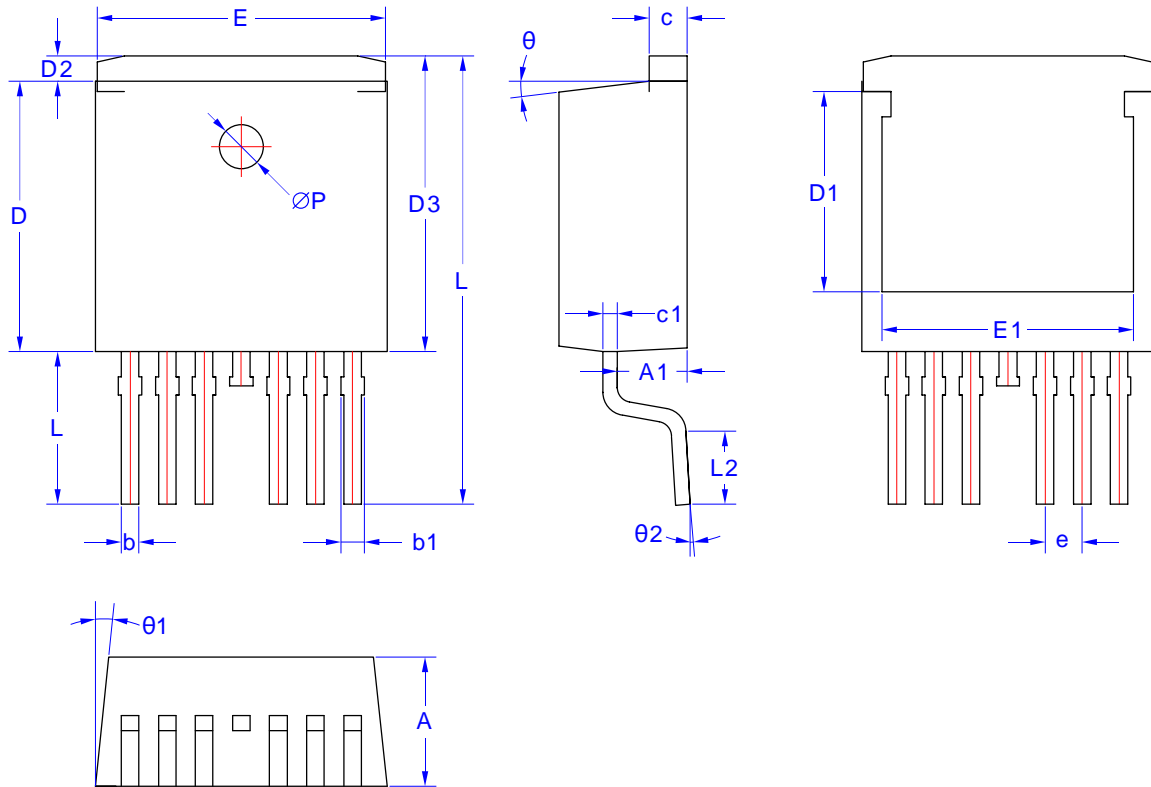


Fig 12. Gate Charge

8. Package Dimensions

TO263-7L Package



Symbol	Dimensions in Millimeters		
	MIN	NOM	MAX
A	4.20	4.40	4.60
A1	2.30	2.40	2.50
b	0.50	0.60	0.70
b1	0.60	0.70	0.80
c	1.25	1.30	1.35
c1	0.45	0.50	0.55
D	9.05	9.25	9.45
D1	6.65	6.85	7.05
D2	0.65	0.85	1.05
D3	9.90	10.10	10.30

Symbol	Dimensions in Millimeters		
	MIN	NOM	MAX
E	9.80	10.00	10.20
E1	8.50	8.60	8.70
e	-	1.27 BSC	-
L	14.90	15.10	15.40
L1	4.80	5.00	5.20
L2	2.30	2.50	2.70
θ	5°	7°	10°
θ_1	3°	5°	8°
θ_2	0°	-	8°
ΦP	-	1.50	-