

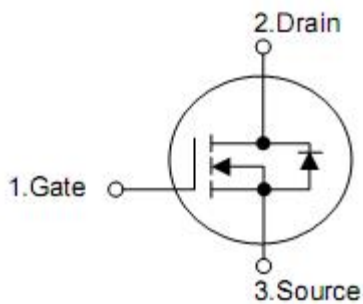
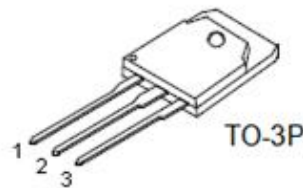
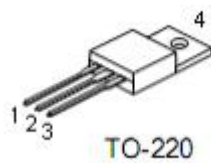
1. Applications

- n Power supply
- n DC-DC converters

2. Features

- n $R_{DS(on)} = 7m\Omega(\text{typ.}) @V_{GS} = 10V$
- n Lead free and Green device available
- n Low $R_{DS(on)}$ to minimize conductive loss
- n High avalanche current

3. Pin configuration



Pin	Function
1	Gate
2	Drain
3	Source
4	Drain

4. Ordering Information

Part Number	Package	Brand
KNP3306A	TO-220	KIA
KNH3306A	TO-3P	KIA

5. Absolute maximum ratings

($T_C = 25^\circ\text{C}$, unless otherwise specified)

Parameter	Symbol	Rating		Units
		TO-220	TO-3P	
Drain-source voltage	V_{DSS}	60		V
Gate-source voltage	V_{GSS}	± 25		V
Continuous Drain Current	I_D^3	$T_C = 25^\circ\text{C}$	80	A
		$T_C = 100^\circ\text{C}$	60	
Pulsed Drain Current	I_{DP}^4	$T_C = 25^\circ\text{C}$ 300		
Avalanche Current	I_{AS}^5	21.5		
Avalanche Energy	E_{AS}^5	462.25		mJ
Maximum Power Dissipation	P_D	$T_C = 25^\circ\text{C}$	183	215
		$T_C = 100^\circ\text{C}$	92	107.5
Junction & Storage Temperature Range	T_L, T_{STG}	-55~+175		$^\circ\text{C}$

6. Thermal characteristics

Symbol	Parameter	Typical		Unit
		TO-220	TO-3P	
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	0.68	0.58	$^\circ\text{C} / \text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62.5		

7. Electrical characteristics

(T_J=25°C, unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	V _{(BR)DSS}	V _{GS} =0V, I _D =250μA	60	-	-	V
Zero gate voltage drain current	I _{DSS}	V _{DS} =48V, V _{GS} =0V T _J =125 °C	-	-	1	μA
			-	-	100	μA
Gate-body leakage current	I _{GSS}	V _{GS} =+25V, V _{DS} =0V	-	-	+100	nA
		V _{GS} =-25V, V _{DS} =0V	-	-	-100	nA
On characteristics						
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	2.0	3.0	4.0	V
Drain-source on resistance	R _{DS(on)} ¹	V _{GS} =10V, I _D =30A	-	7	8.5	mΩ
Dynamic Characteristics²						
Input capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V, f=1MHz	-	3390	-	pF
Output capacitance	C _{oss}		-	371	-	
Reverse transfer capacitance	C _{rss}		-	258	-	
Gate Repacitance	R _G	V _{GS} =0V, V _{DS} =0V, F=1.0MHz	-	1.8	-	Ω
Total gate charge	Q _g	V _{DS} =30V, I _D =30A, V _{GS} =10V,	-	73	-	nC
Gate-source charge	Q _{gs}		-	18	-	
Gate-drain charge	Q _{gd}		-	22	-	
Resistive switching characteristics²						
Turn-on delay time	t _{d(ON)}	V _{DD} =30V, I _D =30A, V _{GS} =10V R _G =6.8Ω	-	18	-	ns
Rise time	t _{rise}		-	120	-	
Turn-off delay time	t _{d(OFF)}		-	55	-	
Fall time	t _{fall}		-	68	-	
Diode Characteristics						
Diode Forward Voltage	V _{SD} ¹	V _{GS} =0V, I _{SD} =20A	-	-	1.3	V
Diode Continuous Forward current	I _S ³		-	-	114	A
Reverse recovery time	t _{rr}	I _F =30A, di/dt=100A/μs	-	45	-	ns
Reverse recovery charge	Q _{rr}		-	76	-	nC

Note:

1: Pulse test; pulse width ≦ 300us, duty cycle ≦ 2%.

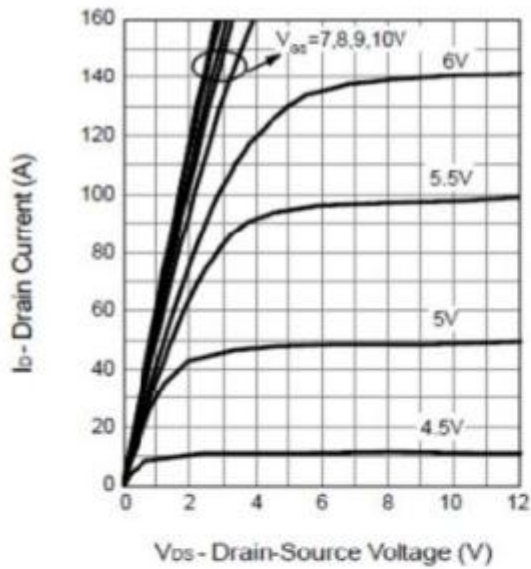
2: Guaranteed by design, not subject to production testing.

3: Calculated continuous current based on maximum allowable junction temperature. Package limitation current is 55A.

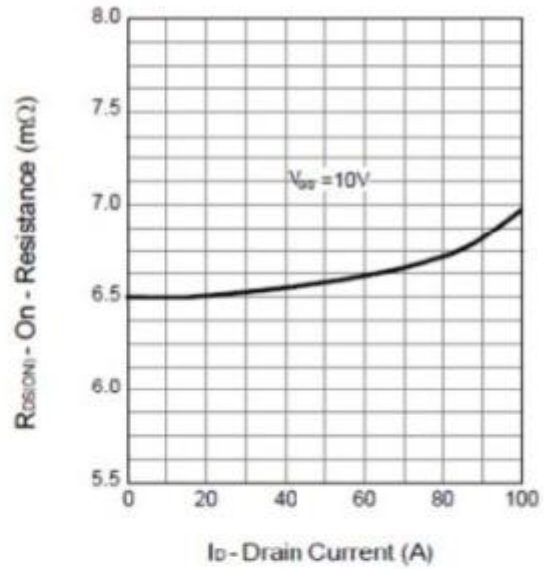
4: Repetitive rating, pulse width limited by max junction temperature.

5: Starting T_J=25 °C, V_D=50V, L=0.5mH, I_{AS}=43A.

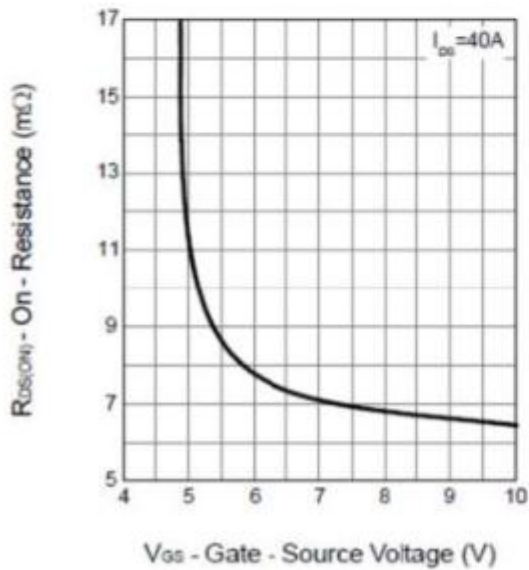
Output Characteristics



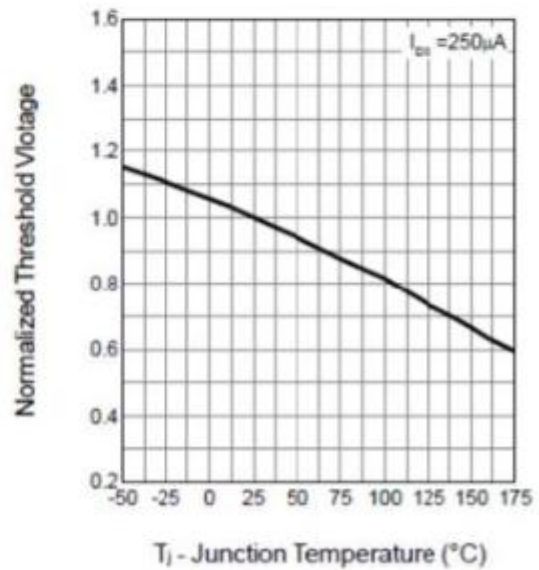
Drain-Source On Resistance



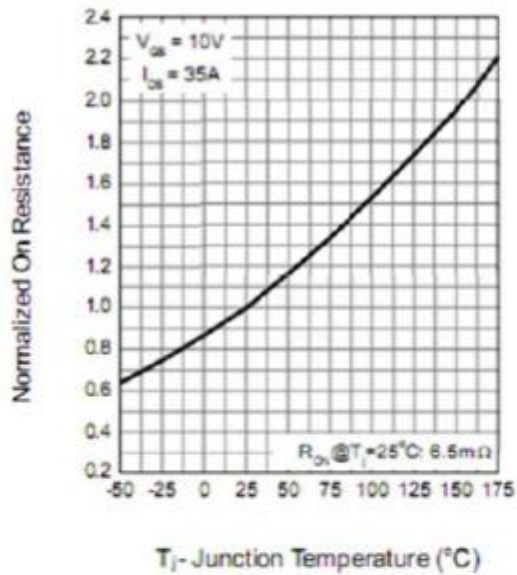
Drain-Source On Resistance



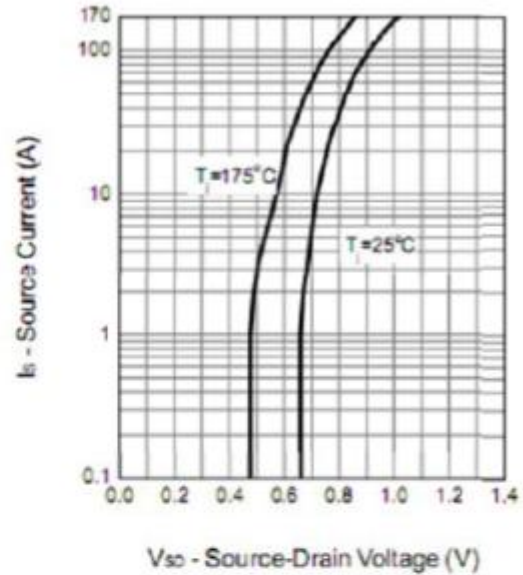
Gate Threshold Voltage



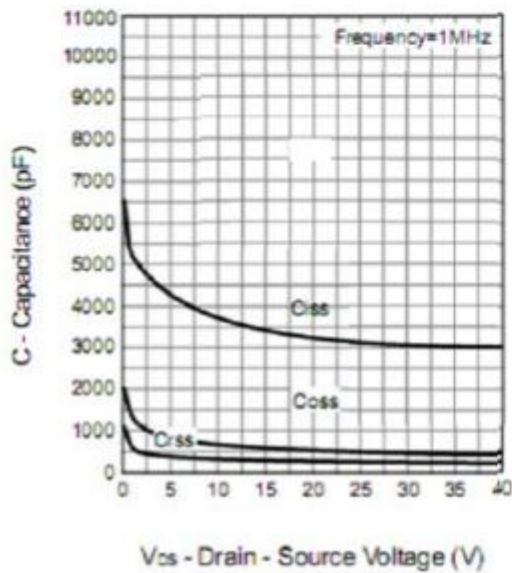
Drain-Source On Resistance



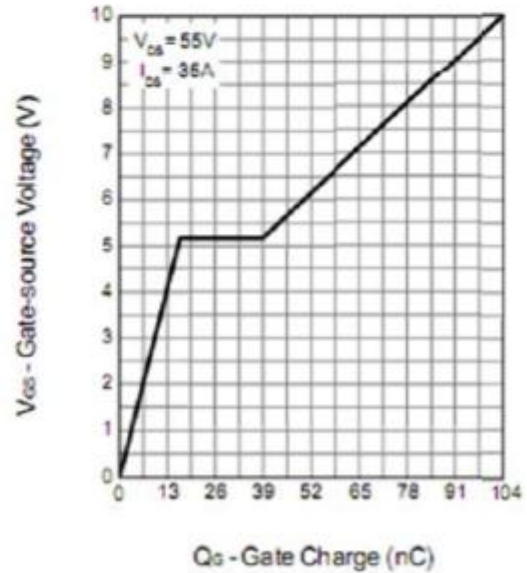
Source-Drain Diode Forward



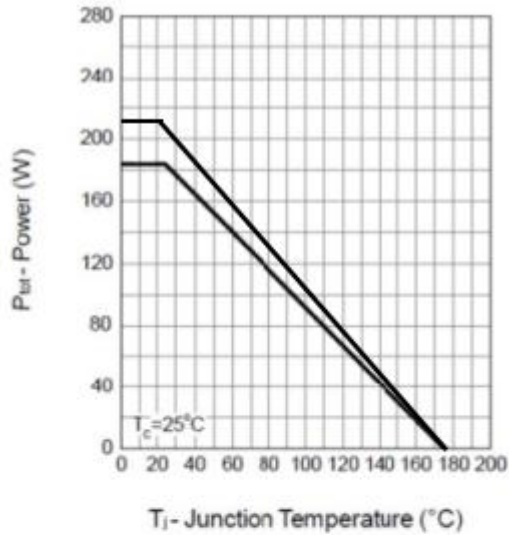
Capacitance



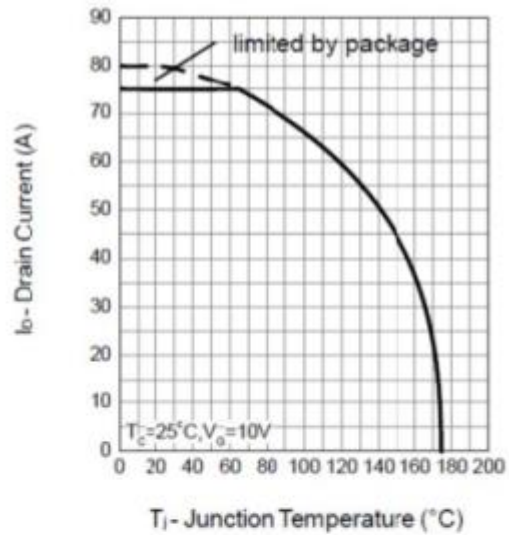
Gate Charge



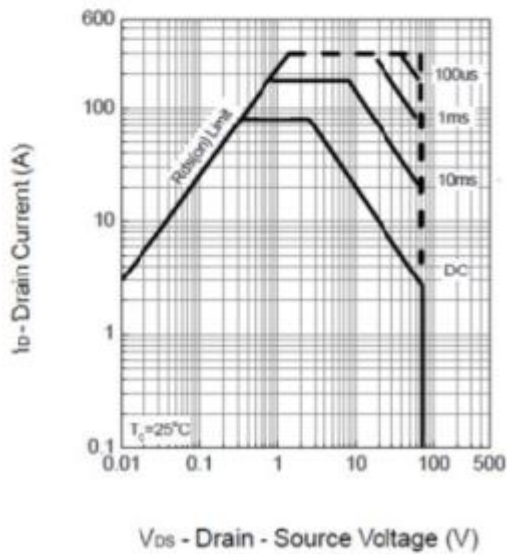
Power Dissipation



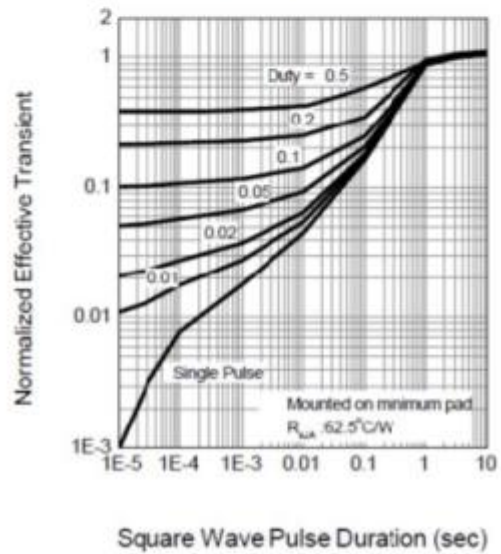
Drain Current



Safe Operation Area



Thermal Transient Impedance



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