KIA
SEMICONDUCTORS

40A，500V
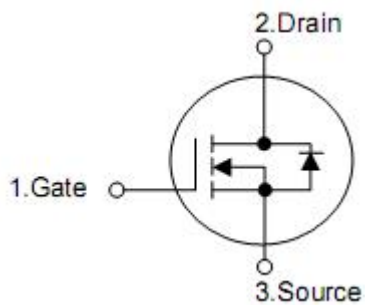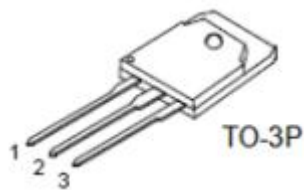**N-CHANNEL MOSFET**

KNX9150A

1. Features

- Advanced Planar Process
- $R_{DS(ON),typ.}=88m\Omega@V_{GS}=10V$
- Low Gate Charge Minimize Switching Loss
- Rugged Poly silicon Gate Structure

2. Features

- BLDC Motor Driver
- Electric Welder
- High Efficiency SMPS

3. Pin configuration

TO-3P

2.Drain

1.Gate

3.Source

Pin	Function
1	Gate
2	Drain
3	Source

4. Ordering Information

Part Number	Package	Brand
KNH9150A	TO-3P	KIA

5. Absolute maximum ratings

TC=25 $^{\circ}$C unless otherwise specified

Parameter	Symbol	Ratings	Unit
Drain-to-Source Voltage	V_{DSS}	500	V
Gate-to-Source Voltage	V_{GSS}	±30	
Continuous Drain Current	I_D	40	A
Continuous Drain Current @ Tc=100 $^{\circ}$C		28	
Pulsed Drain Current at V_{GS}=10V [2,4]	I_{DM}	160	
Single Pulse Avalanche Energy	E_{AS}	4000	mJ
Peak Diode Recovery dv/dt[3]	dv/dt	5.0	V/ns
Power Dissipation	P_D	540	W
Derating Factor above 25 $^{\circ}$C		4.32	W/ $^{\circ}$C
Maximum Temperature for Soldering Leads at 0.063in (1.6mm) from Case for 10 seconds, Package Body for 10 seconds	T_L T_{PAK}	300 260	$^{\circ}$C
Operating and Storage Temperature Range	T_J& T_{STG}	-55 to 150	

Caution: Stresses greater than those listed in the "Absolute Maximum Ratings" may cause permanent damage to the device.

6. Thermal characteristics

Parameter	Symbol	Ratings	Units
Thermal resistance, junction-ambient	$R_{\theta JA}$	50	$^{\circ}$C/W
Thermal resistance, Junction-case	$R_{\theta JC}$	0.23	

KIA
SEMICONDUCTORS

7. Electrical characteristics

$(T_J=25°C$, unless otherwise notes$)$

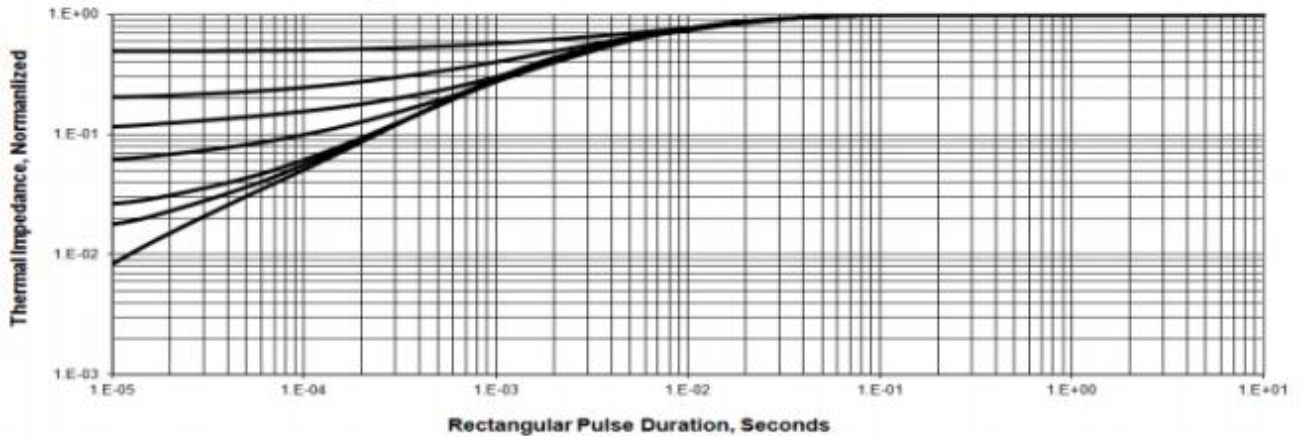| Parameter	Symbol	Conditions	Min	Typ	Max	Units
Off characteristics						
Drain-source breakdown voltage	BV_{DSS}	$V_{GS}=0V, I_D=250μA$	500	-	-	V
Drain-to-source Leakage Current	I_{DSS}	$V_{DS}=500V , V_{GS}=0V$	-	-	10	μA
		$V_{DS}=400V , V_{GS}=0V$ $T_C=125°C,$	-	-	500	μA
Gate-to-Source leakage current	I_{GSS}	$V_{GS}=30V, V_{DS}=0V$	-	-	+100	nA
		$V_{GS}=-30V, V_{DS}=0V$	-	-	-100	nA
On characteristics						
Static drain-source on-resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$	-	88	100	mΩ
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250μA$	2.0	-	4.0	V
Forward Transconductance	gfs	$V_{DS}=25V, I_D=14A$	-	28	-	S
Dynamic characteristics						
Input capacitance	C_{iss}	$V_{DS}=25V, V_{GS}=0V,$ f=1MHz	-	7150	-	pF
Output capacitance	C_{oss}		-	815	-	pF
Reverse transfer capacitance	C_{rss}		-	105	-	pF
Total gate charge						
Turn-on delay time	$t_{d(on)}$	$V_{DD}=250V, I_D=23A,$ $V_{GS}=10V, R_G=10Ω$	-	27	-	ns
Rise time	t_r		-	40	-	ns
Turn-off delay time	$t_{d(off)}$		-	104	-	ns
Fall time	t_f		-	40	-	ns
Total gate charge	Q_g	$V_{DS}=250V, I_D=23A ,$ $V_{GS}=0$ to10V	-	146	-	nC
Gate-source charge	Q_{gs}		-	40	-	nC
Gate-drain charge	Q_{gd}		-	27	-	nC
Drain-source diode characteristics						
Drain-source diode forward voltage	V_{SD}	$V_{GS}=0V, I_{sd}=23A$	-	-	1.4	V
Continuous drain-source current [2]	I_{SD}	Integral pn-diode In MOSFET	-	-	40	A
Pulsed drain-source current[2]	I_{SM}		-	-	160	A
Reverse recovery time	t_{rr}	$V_{GS}=0V, I_F=40A$ $DI_F/dt=100A/μs$	-	730	-	ns
Reverse recovery charge	Q_{rr}		-	3.2	-	μC

Note: 1.$T_J=+25°C$ to $+150°C$
2.Silicon limited current only.
3.Package limited current
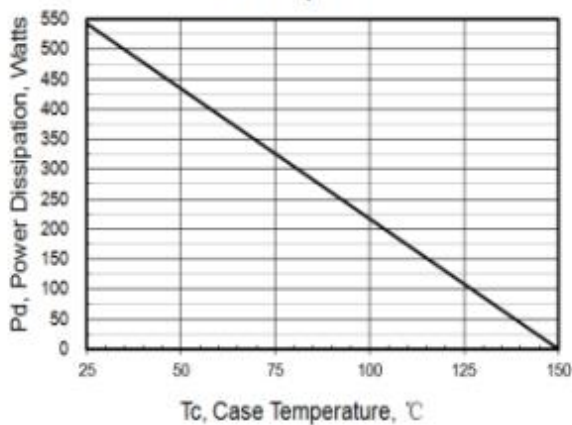4.Repetitive rating; pulse width limited by maximum junction temperature
5.Pulse width≤380μs; duty cycle≤2%
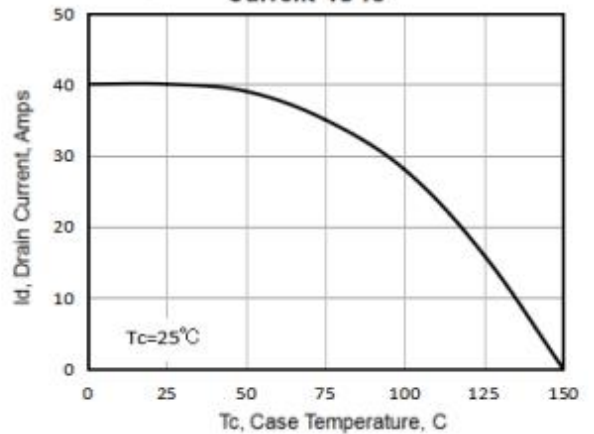
8. Typical Characteristics

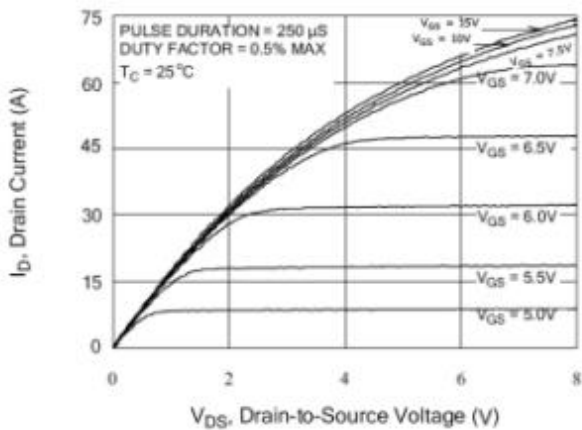**Figure 1. Maximum Transient Thermal Impedance**

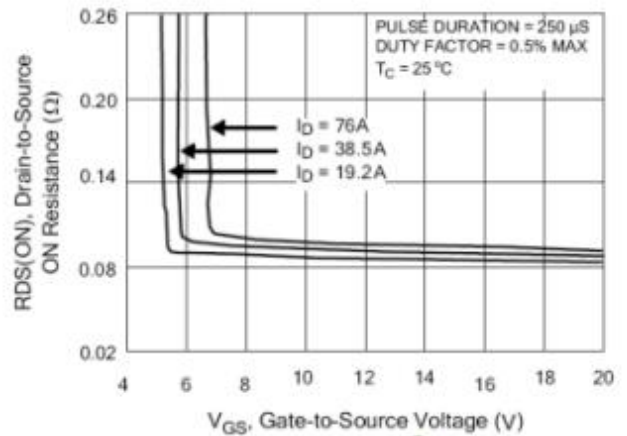**Figure 2 . Max. Power Dissipation vs Case Temperature**
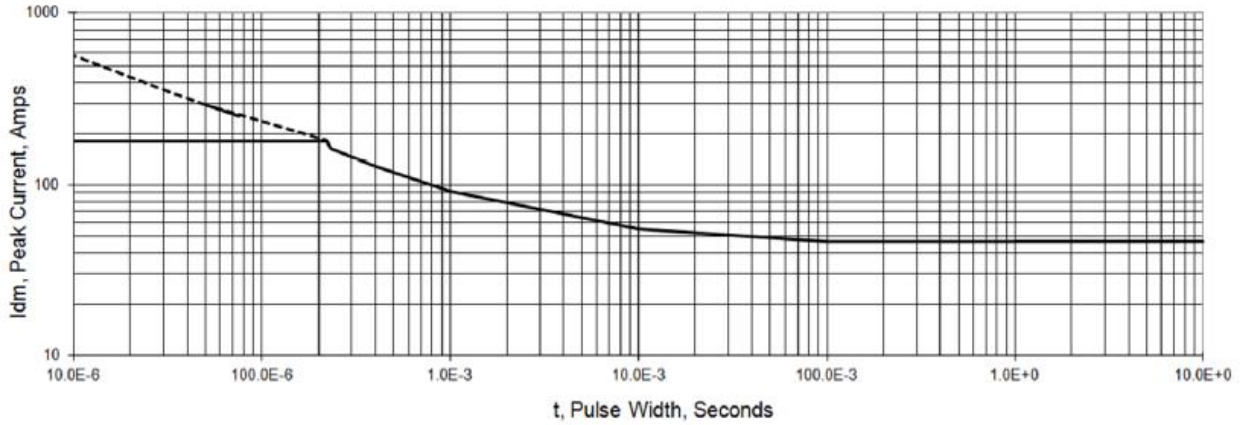

Figure 3 .Maximum Continuous Drain Current vs Tc

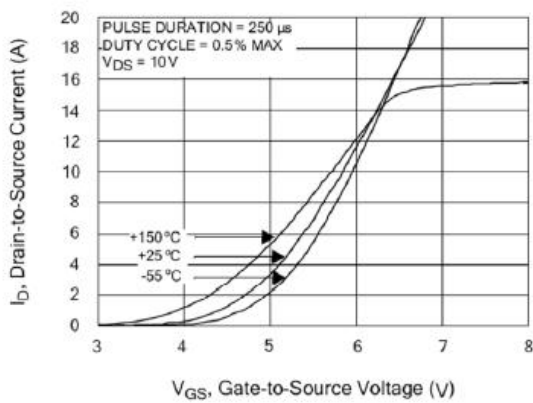**Figure 4. Typical Output Characteristics**

Figure5. Typical Drain-to-Source ON Resistance vs Gate Voltage and Drain Current
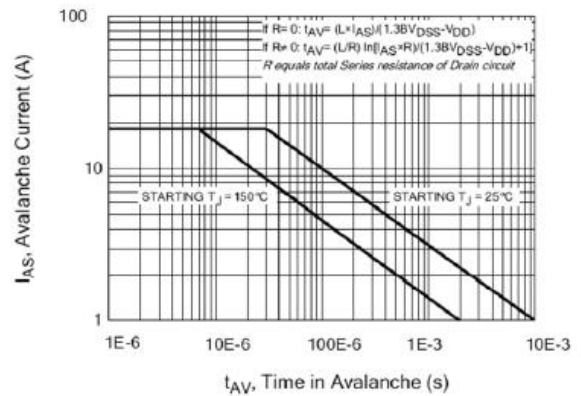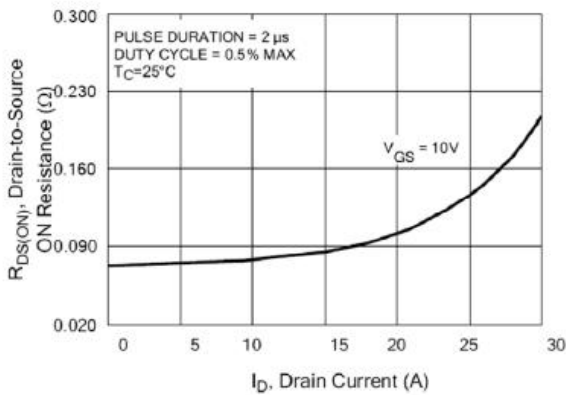
Figure 6. Peak Current Capability
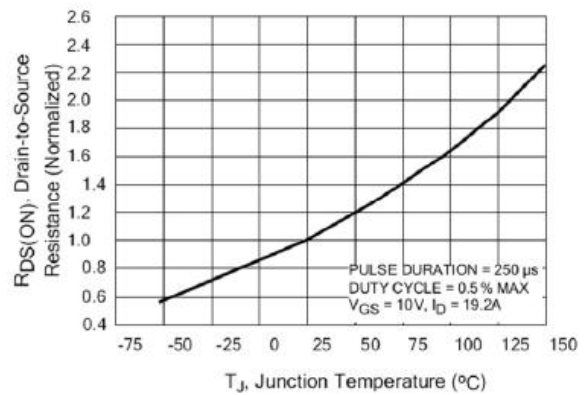

Figure 7. Typical Transfer Characteristics

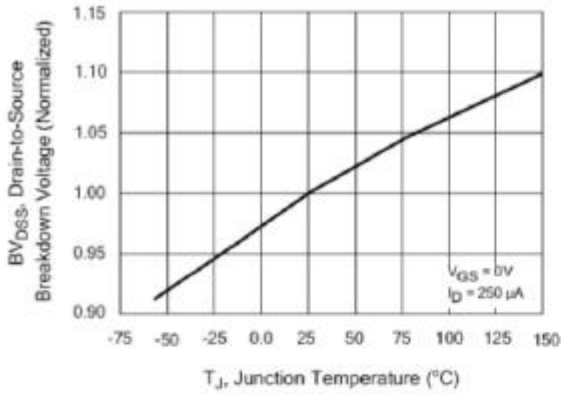

Figure 8. Unclamped Inductive Switching Capability

Figure 9. Typical Drain-to-Source ON Resistance vs Drain Current

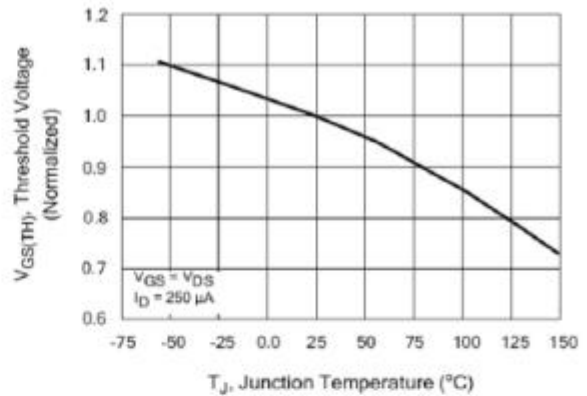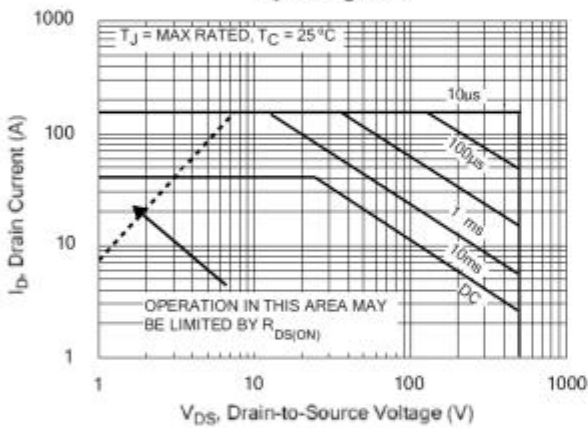## Figure 10. Typical Drain-to-Source ON Resistance vs Junction Temperature

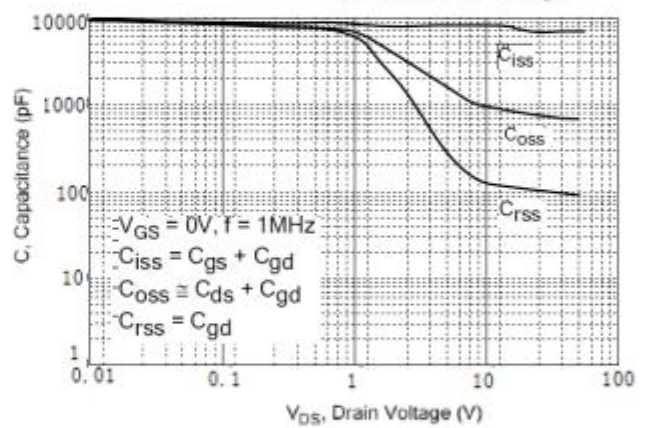Figure 11. Typical Breakdown Voltage vs Junction Temperature

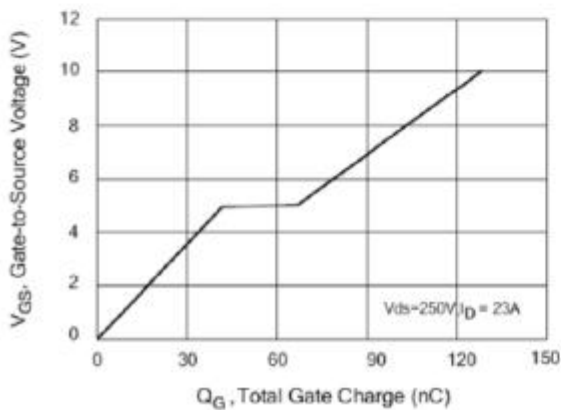Figure 12. Typical Threshold Voltage vs Junction Temperature

Figure 13. Maximum Forward Bias Safe Operating Area

Figure 14. Typical Capacitance vs Drain-to-Source Voltage

Figure 15. Typical Gate Charge vs Gate-to-Source Voltage

Figure 16. Typical Body Diode Transfer Characteristics