

## 1. Features

- $R_{DS(ON)}=80m\Omega(\text{typ.})@V_{GS}=20V, T_J=25^\circ C$
- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitances
- Avalanche Ruggednes

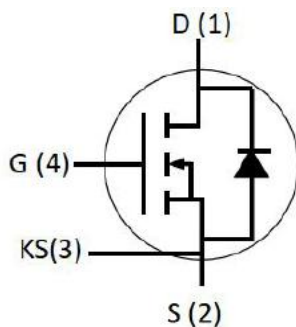
## 2. Applications

- Solar Inverters
- Switch Mode Power Supplies
- High Voltage DC-DC Converters
- Battery Chargers

## 3. Pin configuration



TO-247-4



Pin	Function
1	Drain
2	Source
3	KS
4	Gate

#### 4. Ordering Information

Part Number	Package	Brand
KSZ080N120A	TO-247-4	KIA

#### 5. Absolute maximum ratings

(T<sub>C</sub>= 25°C , unless otherwise specified)

Parameter	Symbol	Rating	Unit
Drain-to-Source Voltage	V <sub>DSS</sub>	1200	V
Gate-to-Source Operation Voltage	V <sub>GSS</sub>	-5~+20	V
Continuous Drain Current	I <sub>D</sub>	28	A
Continuous Drain Current @T <sub>C</sub> =100°C		20	A
Pulsed Drain Current (T <sub>C</sub> =25°C, tp limited by T <sub>Jmax</sub> )	I <sub>D</sub> pulse	60	A
Single Pulse Avalanche Energy(L=10mH)	E <sub>AS</sub>	720	mJ
Power Dissipation	P <sub>D</sub>	166	W
Operating and Storage Temperature Range	T <sub>J</sub> &T <sub>STG</sub>	-55 to 150	°C

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

#### 6. Thermal characteristics

Parameter	Symbol	Rating	Unit
Thermal Resistance, Junction-to-Case	R <sub>θJC</sub>	0.75	°C/W
Thermal Resistance, Junction-to-Ambient	R <sub>θJA</sub>	35	°C/W

## 7. Electrical characteristics

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Drain-source breakdown voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	1200	-	-	V
Drain-source leakage current	$I_{DSS}$	$V_{DS}=1200V, V_{GS}=0V, T_C=25^{\circ}\text{C}$	-	1	100	$\mu A$
		$V_{DS}=1200V, V_{GS}=0V, T_C=150^{\circ}\text{C}$	-	5	-	$\mu A$
Gate-source leakage current	$I_{GSS}$	$V_{GS}=20V, V_{DS}=0V$	-	20	200	nA
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS}=20V, I_D=20A, T_J=25^{\circ}\text{C}$	-	80	98	m $\Omega$
		$V_{GS}=20V, I_D=20A, T_J=150^{\circ}\text{C}$	-	120	-	m $\Omega$
Gate threshold voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=5mA$	2.0	2.4	4.0	V
Transconductance	$g_{FS}$	$V_{DS}=20V, I_D=20A$	-	7.0	-	S
Gate Resistance	$R_g$	$V_{GS}=0V, V_{AC}=25mV, f=1MHz,$	-	2.8	-	$\Omega$
Input capacitance	$C_{iss}$	$V_{DS}=1000V, V_{GS}=0V, f=1MHz, V_{AC}=25mV$	-	2025	-	pF
Reverse transfer capacitance	$C_{rSS}$		-	17.5	-	pF
Output capacitance	$C_{oss}$		-	71.9	-	pF
Total gate charge	$Q_g$	$V_{DD}=800V, I_D=20A, V_{GS}=-5 \text{ to } +20V$	-	86	-	nC
Gate-source charge	$Q_{gs}$		-	20	-	nC
Gate-drain charge	$Q_{gd}$		-	25	-	nC
Turn-on delay time	$t_{d(on)}$	$V_{DS}=800V, V_{GS}=-5 \text{ to } +20V, R_G=5\Omega, I_D=20A, T_J=25^{\circ}\text{C},$ inductive load	-	22	-	ns
Rise time	$t_r$		-	62	-	ns
Turn-off delay time	$t_{d(off)}$		-	18	-	ns
Fall time	$t_f$		-	12	-	ns
Turn-On Switching Energy	$E_{ON}$	$V_{DS}=800V, V_{GS}=-5 \text{ to } +20V, R_G=5\Omega, I_D=20A, T_J=25^{\circ}\text{C}, L=142\mu H$	-	180	-	$\mu J$
Turn-Off Switching Energy	$E_{OFF}$		-	70	-	$\mu J$
Diode forward voltage	$V_{SD}$	$I_{SD}=10A, V_{GS}=-5V, T_J=25^{\circ}\text{C}$	-	3.5	-	V
		$I_{SD}=10A, V_{GS}=-5V, T_J=150^{\circ}\text{C}$	-	3.3	-	V
Reverse Recovery Time	$t_{rr}$	$I_{SD}=20A, V_{GS}=-5V, di/dt=2000A/\mu s, V_{DS}=800V$	-	18	-	ns
Reverse Recovery Charge	$Q_{rr}$		-	80	-	nC
Peak Reverse Recovery Current	$I_{rrm}$		-	8	-	A

**8. Test circuits and waveforms**

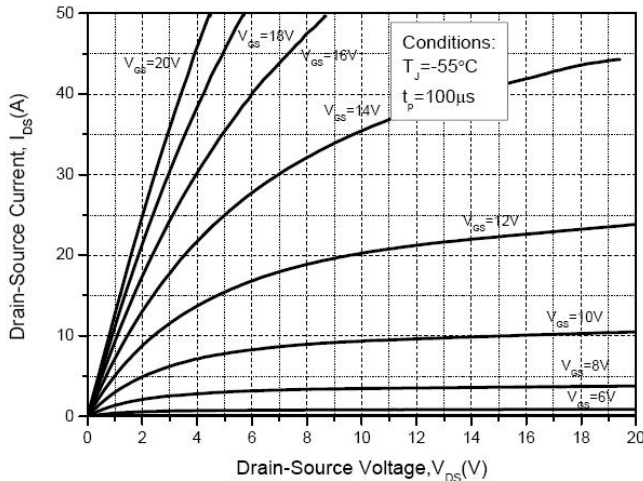


Figure 1. Output Characteristics  $T_J = -55^\circ\text{C}$

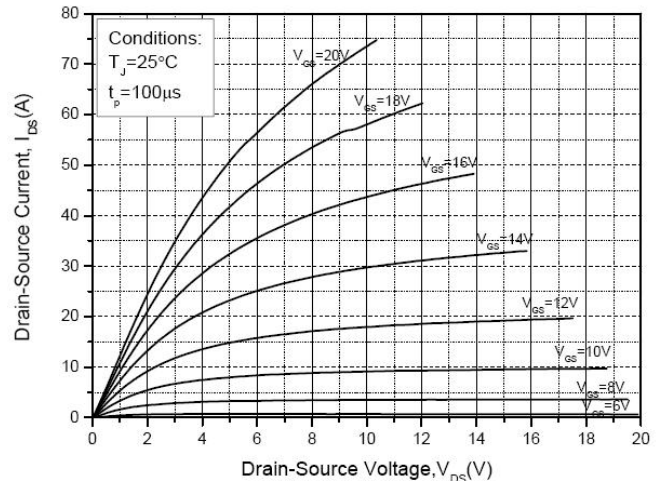


Figure 2. Output Characteristics  $T_J = 25^\circ\text{C}$

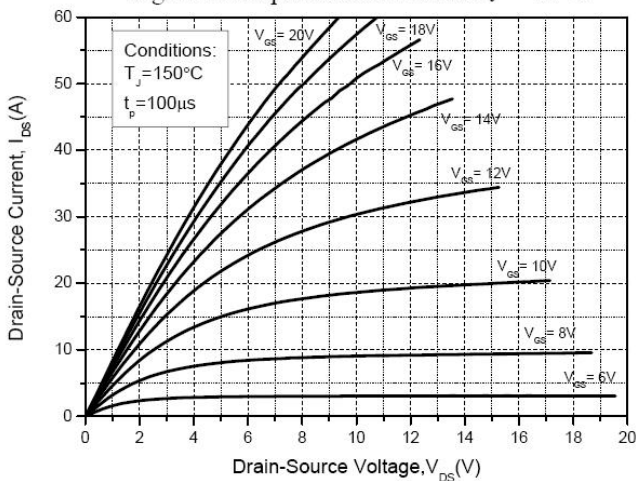


Figure 3. Output Characteristics  $T_J = 150^\circ\text{C}$

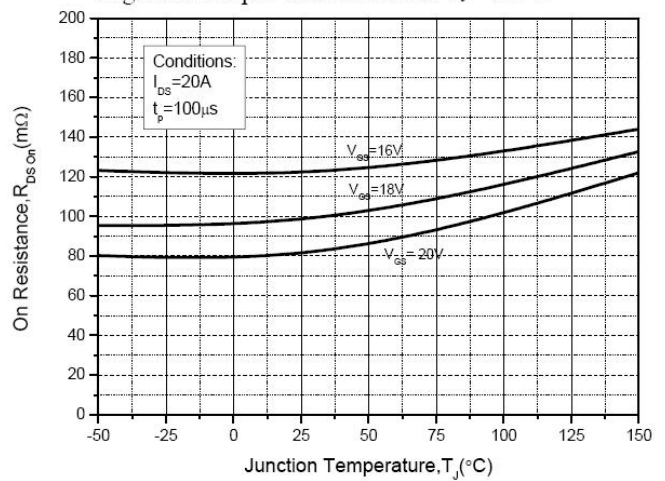


Figure 4. On-Resistance For Various Gate Voltage

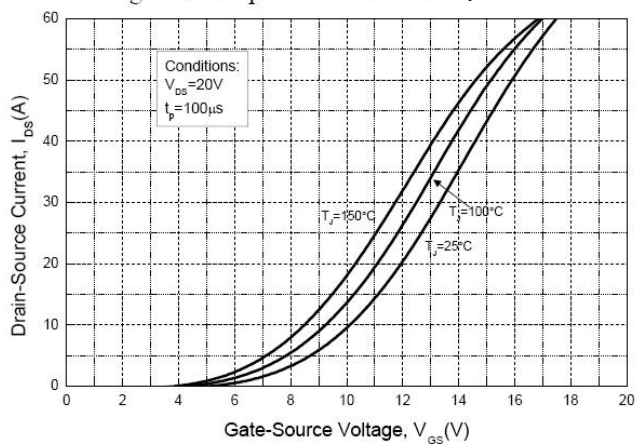


Figure 5. Transfer Characteristic for Various Junction Temperatures

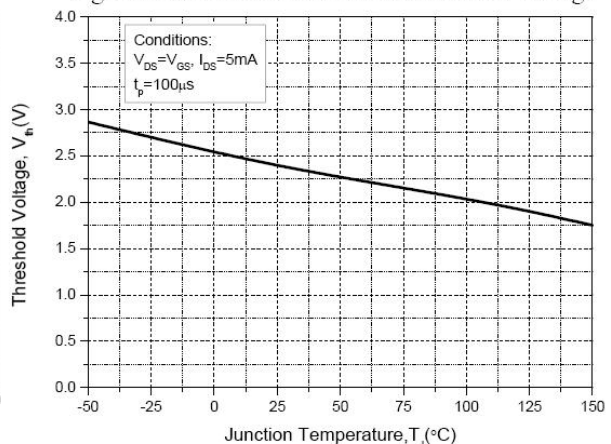


Figure 6. Threshold Voltage vs. Temperature

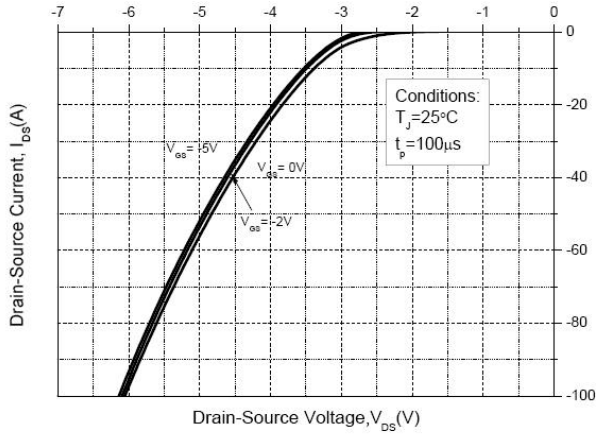


Figure 7. Body Diode Characteristics

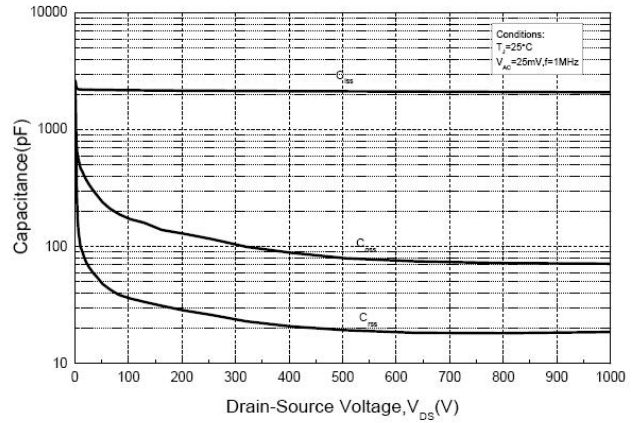


Figure 8. Capacitances vs. Drain-Source Voltage

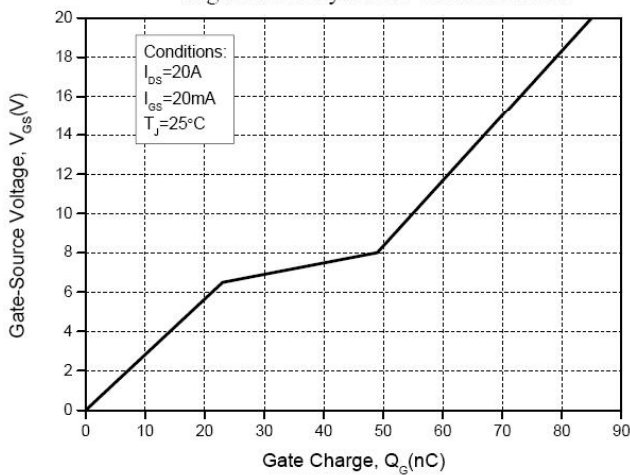


Figure 9. Gate Charge Characteristics

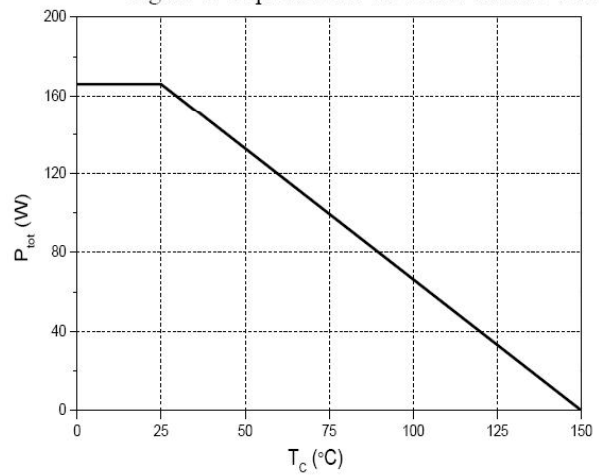


Figure 10. Power Dissipation Derating

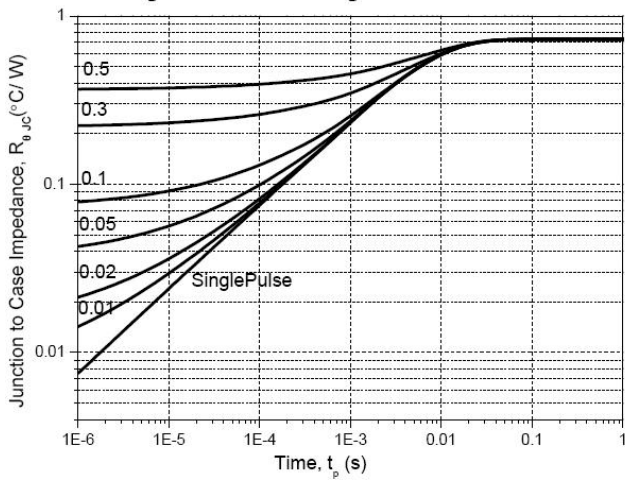
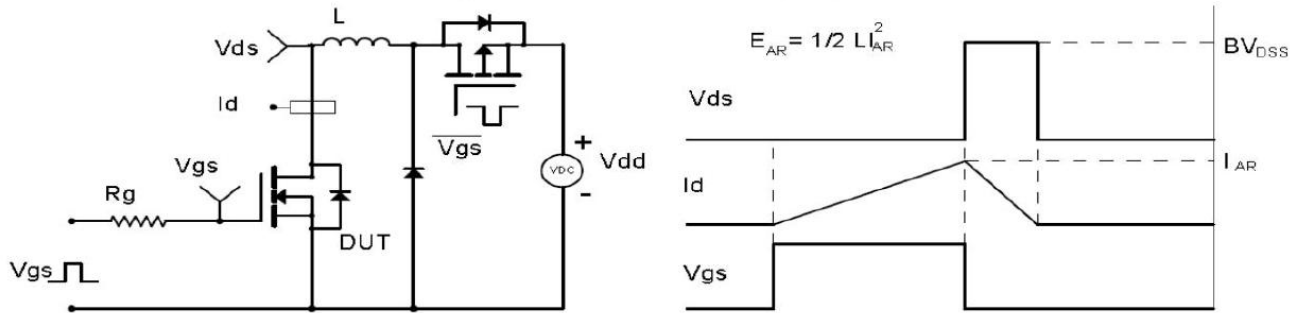


Figure 11. Transient Thermal Impedance

## 9. Test Circuits and Waveform

Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

