

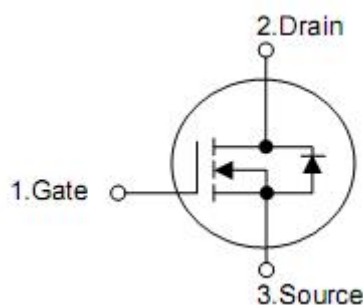
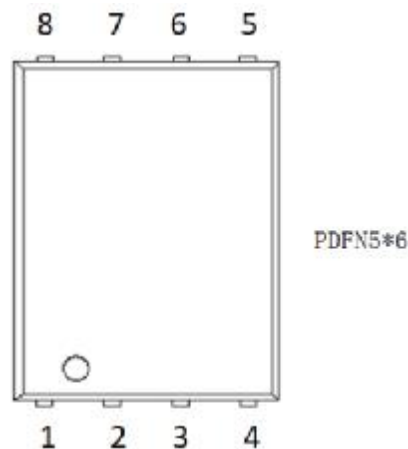
1. Features

- n $R_{DS(on)}=1.9m\Omega$ (typ.) @ $V_{GS}=10V$
- n Low On-Resistance
- n Fast Switching
- n 100% Avalanche Tested
- n Repetitive Avalanche Allowed up to T_{jmax}
- n Lead-Free, RoHS Compliant

2. Features

KIA3103A designed by the trench processing techniques to achieve extremely low on-resistance. Additional features of this design are a 150°C junction operating temperature, fast switching speed and improved repetitive avalanche rating. These features combine to make this design an extremely efficient and reliable device for use in Motor applications and a wide variety of other applications.

3. Pin configuration



Pin	Function
4	Gate
5,6,7,8	Drain
1,2,3	Source

4. Absolute maximum ratings

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

Parameter	Symbol	Ratings	Units	
Drain-source voltage	V_{DSS}	30	V	
Gate-source voltage	V_{GSS}	± 20	V	
Continuous drain current @ $V_{GS}=10\text{V}$	$T_C=25\text{ }^\circ\text{C}$	I_D	110	A
	$T_C=100\text{ }^\circ\text{C}$	I_D	70	A
Pulsed drain current tested $T_C=25\text{ }^\circ\text{C}^1$	I_{DM}	440	A	
Avalanche energy single pulse ²	E_{AS}	361	mJ	
Maximum Power dissipation $T_C=25\text{ }^\circ\text{C}$	P_D	62.5	W	
Maximum junction temperature	T_J	150	$^\circ\text{C}$	
Storage temperature range	T_{STG}	-55~+150	$^\circ\text{C}$	
Diode continuous forward current $T_C=25\text{ }^\circ\text{C}^1$	I_S	110	A	

5. Thermal characteristics

Parameter	Symbol	Rating	Unit
Thermal resistance, Junction-to-case	θ_{JC}	2.0	$^\circ\text{C/W}$

6. Electrical characteristics

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

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Off Characteristics						
Drain-source breakdown voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
Drain-to-source leakage current	I_{DSS}	$V_{DS}=24V, V_{GS}=0V$	-	-	1	μA
		$T_C=125^\circ\text{C}$	-	-	100	μA
Gate-to-source leakage current	I_{GSS}	$V_{GS}=20V, V_{DS}=0V$	-	-	100	nA
		$V_{GS}=-20V, V_{DS}=0V$	-	-	-100	nA
On characteristics						
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	1.8	2.5	V
Static drain-source on-resistance ³	$R_{DS(on)}$	$V_{GS}=10V, I_D=30A$	-	1.9	2.6	m Ω
Static drain-source on-resistance ³	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=20A$	-	3.2	3.6	m Ω
Dynamic characteristics						
Input capacitance	C_{iss}	$V_{DS}=20V, V_{GS}=0V, f=1.0\text{MHz}$	-	3600	-	pF
Output capacitance	C_{oss}		-	480	-	
Reverse transfer capacitance	C_{rss}		-	43	-	
Gate resistance	R_G	$V_{GS}=0V, V_{DS}=0V, f=1\text{MHz}$	-	1	-	Ω
Total gate charge	Q_g	$V_{DS}=15V, I_D=20A, V_{GS}=10V$	-	63	-	nC
Gate-source charge	Q_{gs}		-	13	-	
Gate-drain (Miller) charge	Q_{gd}		-	16	-	
Resistive switching characteristics						
Turn-on delay time	$T_{d(ON)}$	$V_{DD}=15V, I_D=20A, V_{GS}=10V, R_G=3\Omega$	-	15	-	nS
Rise time	t_{rise}		-	18	-	
Turn-off delay time	$T_{d(OFF)}$		-	99	-	
Fall time	t_{fall}		-	45	-	
Source-drain body diode characteristics $T_J=25^\circ\text{C}$, unless otherwise notes						
Diode forward voltage	V_{SD}	$V_{GS}=0V, I_{SD}=20A$	-	0.8	1.3	V
Reverse recovery time	t_{rr}	$I_{SD}=20A, di_F/dt=100A/\mu s,$	-	32	-	ns
Reverse recovery charge	Q_{rr}	$T_J=25^\circ\text{C}, V_{GS}=0V$	-	33	-	nC

Note:

- 1.Repetitive rating; pulse width limited by max. junction temperature.
- 2.Limited by T_{Jmax} , starting $T_{Jmax}=25^\circ\text{C}$, $L=0.5\text{mH}$, $R_G=25\Omega$, $I_{AS}=38A$, $V_{GS}=10V$. Part not recommended for use above this value.
- 3.Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$.

7. Typical characteristics

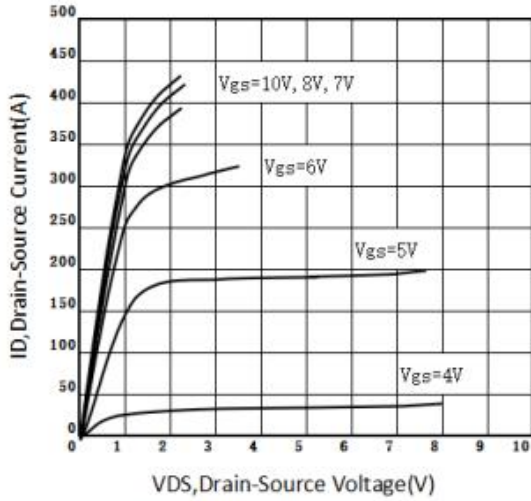


Fig1. Typical Output Characteristics

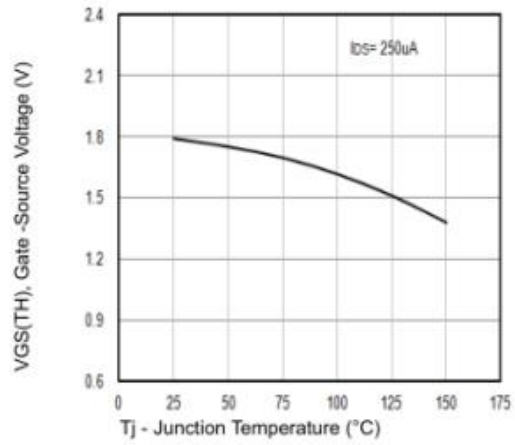


Fig2. $V_{GS(TH)}$ Gate -Source Voltage Vs. T_j

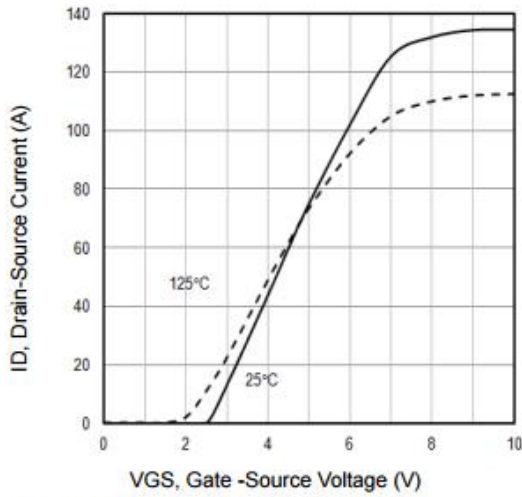


Fig3. Typical Transfer Characteristics

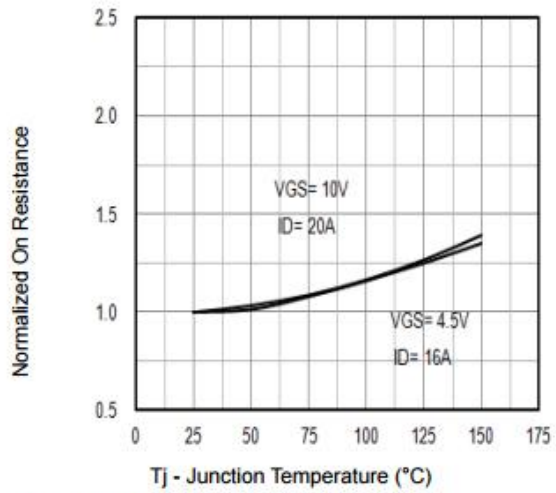


Fig4. Normalized On-Resistance Vs. T_j

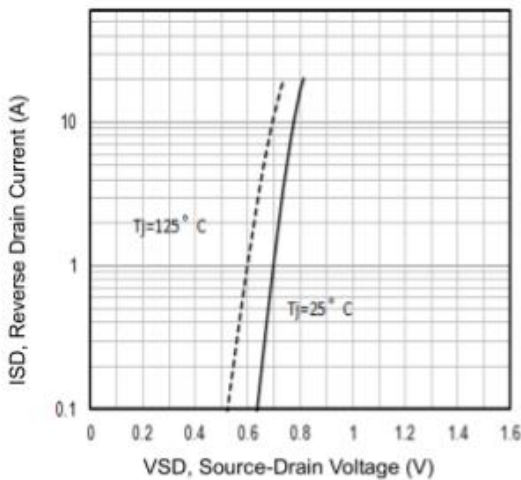


Fig5. Typical Source-Drain Diode Forward Voltage

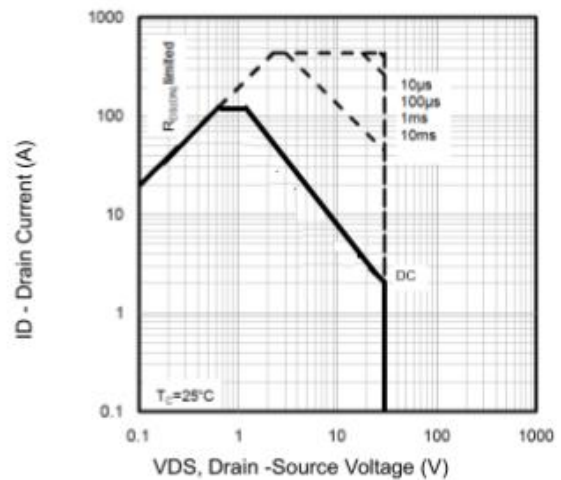


Fig6. Maximum Safe Operating Area

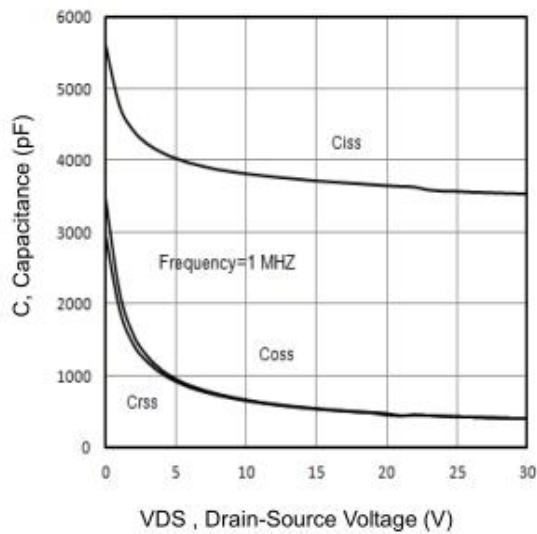


Fig7. Typical Capacitance Vs. Drain-Source Voltage

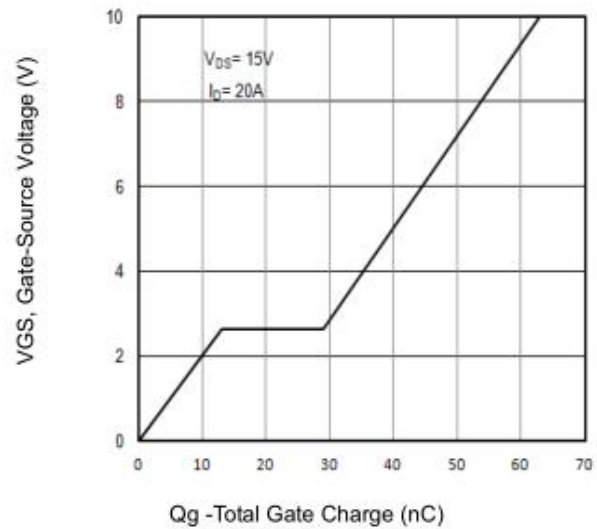


Fig8. Typical Gate Charge Vs. Gate-Source Voltage

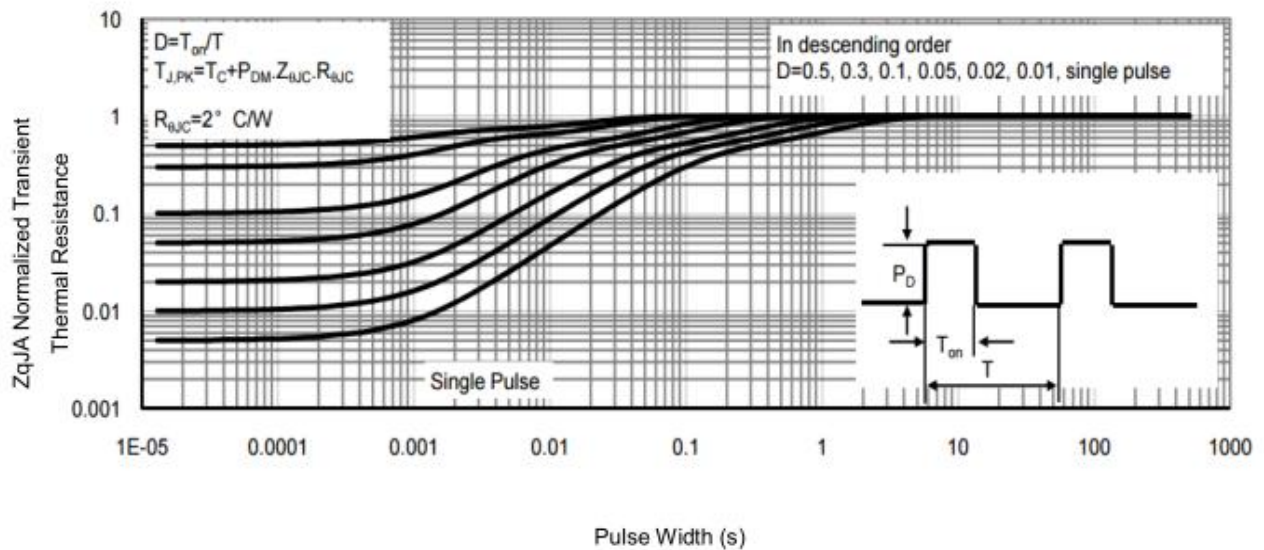


Fig9. Normalized Maximum Transient Thermal Impedance

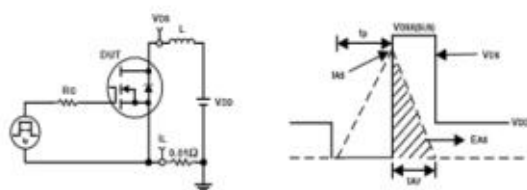


Fig10. Unclamped Inductive Test Circuit and waveforms

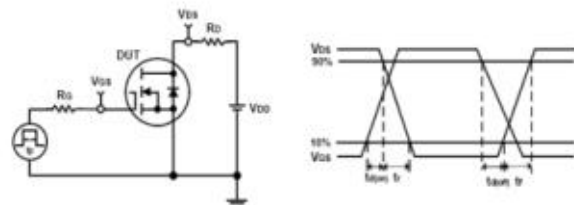


Fig11. Switching Time Test Circuit and waveforms