

## 1. Description

KCX3010A the N-channel Enhanced Power MOSFETS, is obtained by advanced double trench technology which reduce the conduction loss, improve switching performance and enhance the avalanche energy. This is suitable device for motor drivers and high speed switching applications.

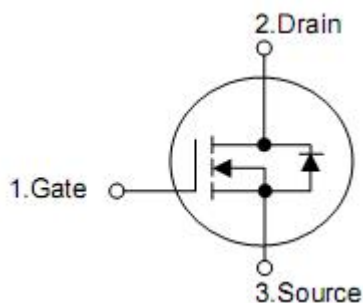
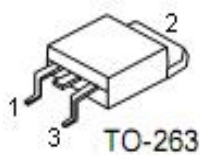
## 2. Features

- Fast Switching
- Low On-Resistance (typ.)  $R_{DS(on)}=4.0m\Omega$
- Low Gate Charge
- Uses advanced SGT technology
- Low Reverse transfer capacitances
- High avalanche ruggedness

## 3. Applications

- Switching applications
- Motor drivers

## 4. Symbol



Pin	Function
1	Gate
2	Drain
3	Source

## 5. Ordering Information

Part Number	Package	Brand
KCB3010A	TO-263	KIA

## 6. Absolute maximum ratings

Parameter	Symbol	Rating	Units
Drain-source voltage	$V_{DS}$	100	V
Gate-source voltage	$V_{GS}$	±20	V
Continuous drain current, Silicon Limited	$I_D$	163	A
Continuous drain current, Package Limited		120	A
Continuous drain current @ $T_C=100\text{ }^\circ\text{C}$ , Silicon Limited		103	A
Pulsed drain current <sup>(Note1)</sup>	$I_{DM}$	480	A
Single pulse avalanche energy <sup>(Note2)</sup>	$E_{AS}$	756.25	mJ
power dissipation	$P_D$	175	W
Derating Factor above 25°C		1.4	W/°C
Operation junction and temperature range	$T_J$ , $T_{STG}$	150, -55 to 150	°C
Maximum Temperature for Soldering	$T_L$	260	°C

## 7. Thermal characteristics

Symbol	Parameter	Max	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	0.71	°C /W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62.5	

## 7. Electrical characteristics

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

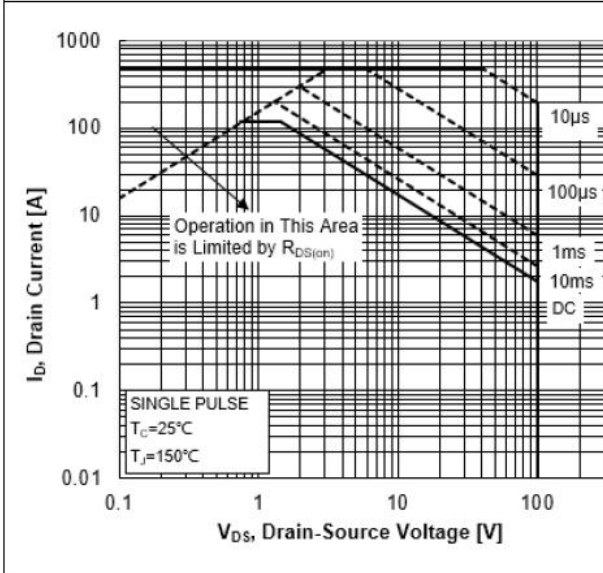
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Drain-source breakdown voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	100	-	-	V
Drain-source on-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =4.5V, I <sub>D</sub> =20A	-	4.0	4.5	mΩ
Gate threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	2.0	-	4.0	V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =100V, V <sub>GS</sub> =0V	-	-	1	μA
		V <sub>DS</sub> =80V, V <sub>GS</sub> =0V @T <sub>C</sub> =125 °C	-	-	100	μA
Gate-Source Forward Leakage	I <sub>GSS(F)</sub>	V <sub>GS</sub> =+20V	-	-	100	nA
Gate-Source Reverse Leakage	I <sub>GSS(R)</sub>	V <sub>GS</sub> =-20V	-	-	-100	nA
Total gate charge	Q <sub>g</sub>	V <sub>DD</sub> =50V, V <sub>GS</sub> =10V I <sub>D</sub> =100A	-	89.5	-	nC
Gate-source charge	Q <sub>gs</sub>		-	44.3	-	
Gate-drain charge	Q <sub>gd</sub>		-	13.2	-	
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> =50V, I <sub>D</sub> =55A, R <sub>GEN</sub> =4.7Ω, V <sub>GS</sub> =10V, Resistive Load	-	32	-	ns
Rise time	t <sub>r</sub>		-	55	-	
Turn-off delay time	t <sub>d(off)</sub>		-	68.5	-	
Fall time	t <sub>f</sub>		-	31	-	
Input capacitance	C <sub>iss</sub>	V <sub>DS</sub> =50V, V <sub>GS</sub> =0V, f=1MHz	-	6700	-	pF
Output capacitance	C <sub>oss</sub>		-	880	-	
Reverse transfer capacitance	C <sub>rss</sub>		-	145	-	
Continuous Source Current	I <sub>S</sub>		-	-	120	A
Maximum Pulsed Current	I <sub>SM</sub>		-	-	480	A
Diode Forward voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =55A	-	-	1.2	V
Body diode reverse recovery time	t <sub>rr</sub>	I <sub>S</sub> =55A, V <sub>DD</sub> =80V, T <sub>J</sub> =150°C di/dt=100A/us	-	75	-	ns
Body diode reverse recovery charge	Q <sub>rr</sub>		-	220	-	nC

Note

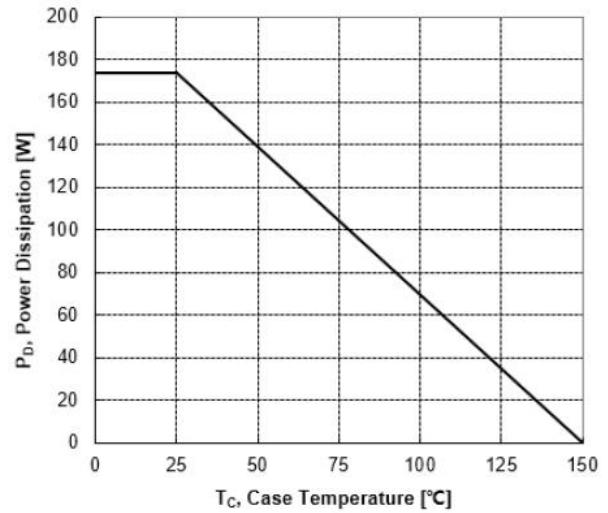
- 1: Repetitive Rating: Pulse width limited by maximum junction temperature
- 2: L=0.5mH, I<sub>as</sub>=55A, Start T<sub>J</sub> =25°C.

**8. Test circuits**

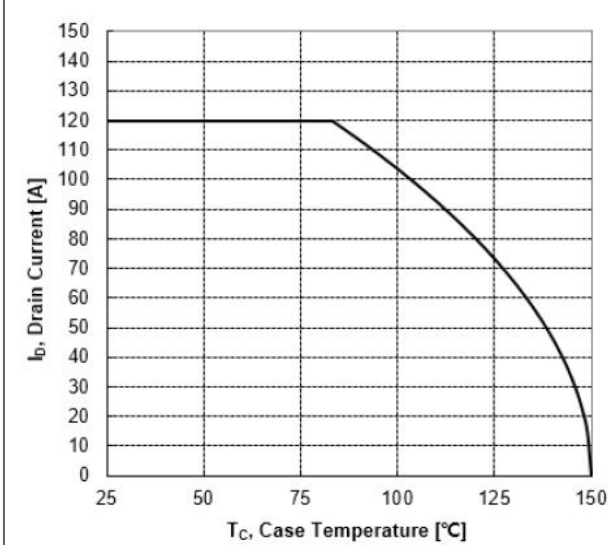
**Figure 1. Safe Operating Area**



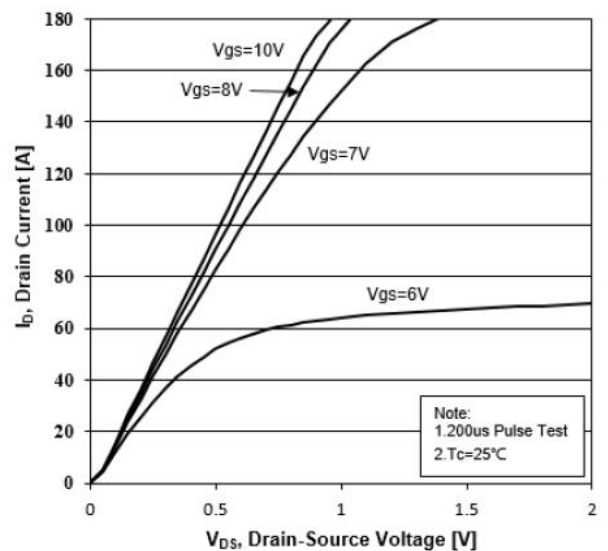
**Figure 2. Maximum Power Dissipation vs Case Temperature**



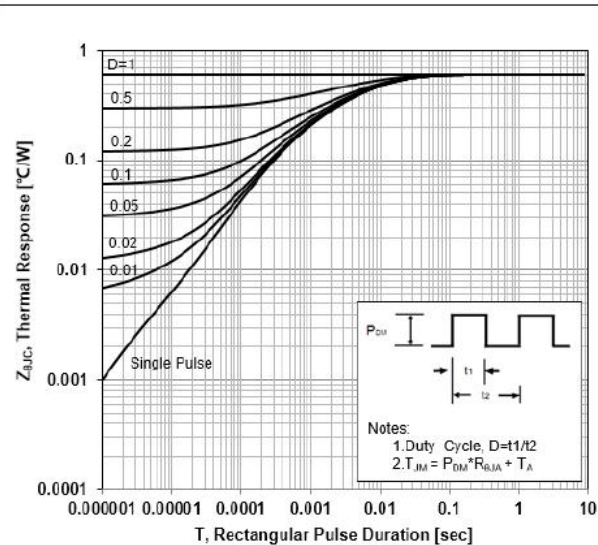
**Figure 3. Maximum Continuous Drain Current vs Case Temperature**



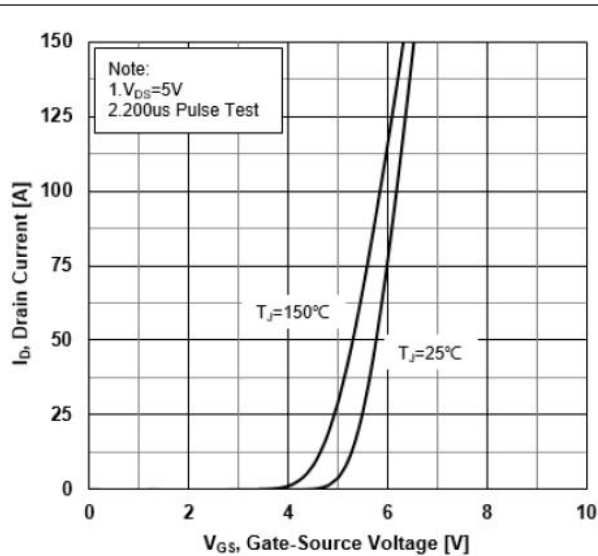
**Figure 4. Typical Output Characteristics**



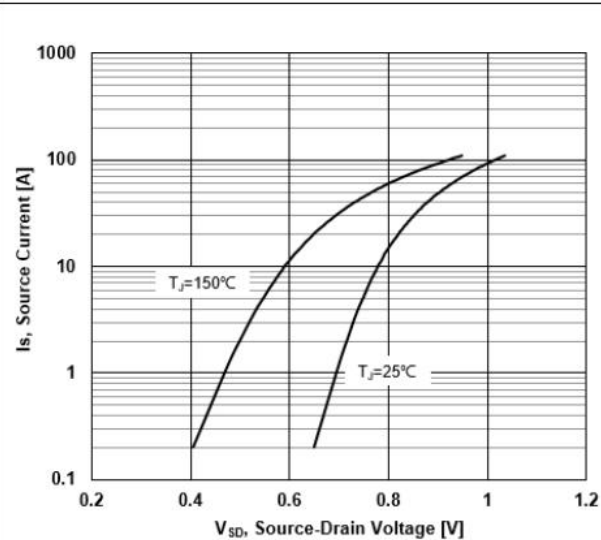
**Figure 5. Transient Thermal Impedance**



**Figure 6. Typical Transfer Characteristics**



**Figure 7. Source-Drain Diode Forward Characteristics**



**Figure 8. Drain-Source On-Resistance vs Drain Current**

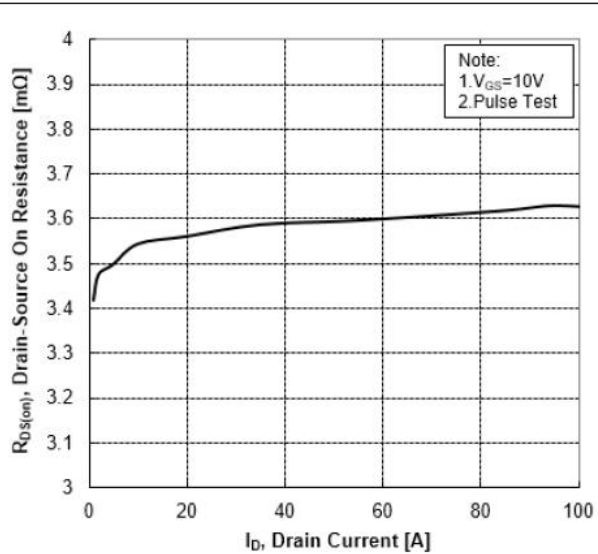


Figure 9. Normalized On-Resistance vs Junction Temperature

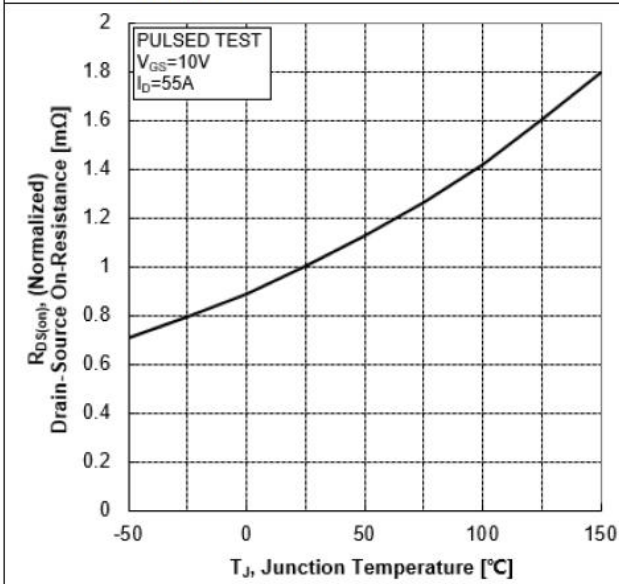


Figure 10. Normalized Threshold Voltage vs Junction Temperature

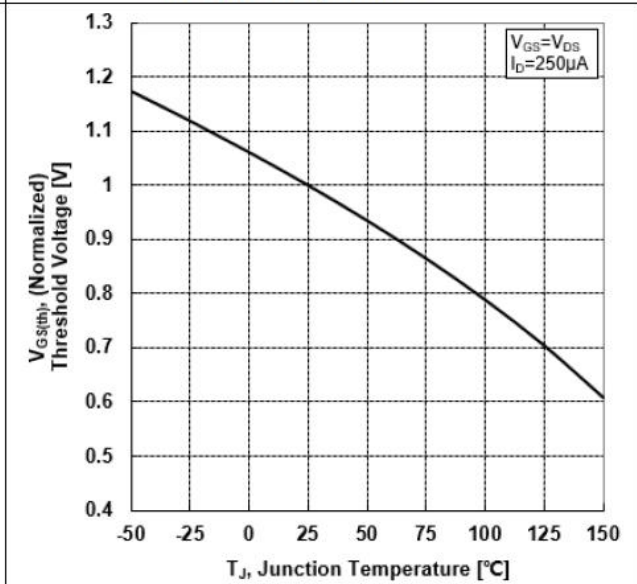


Figure 11. Normalized Breakdown Voltage vs Junction Temperature

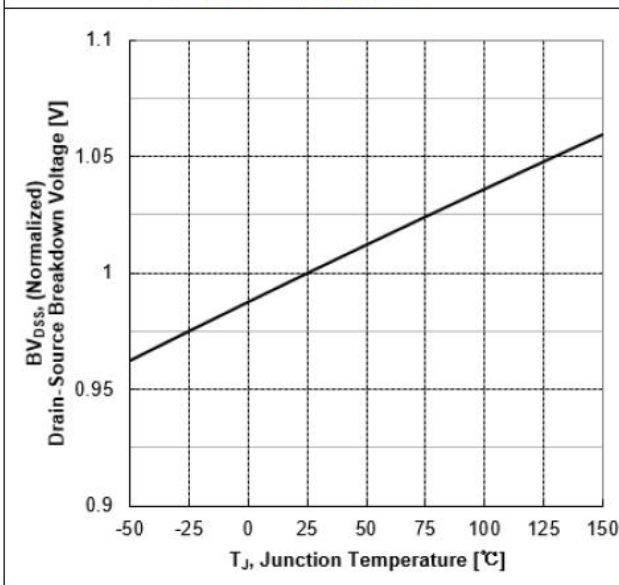


Figure 12. Capacitance Characteristics

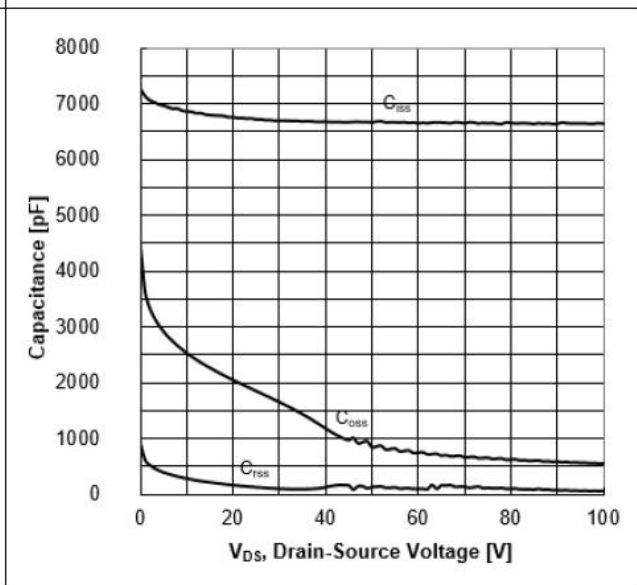
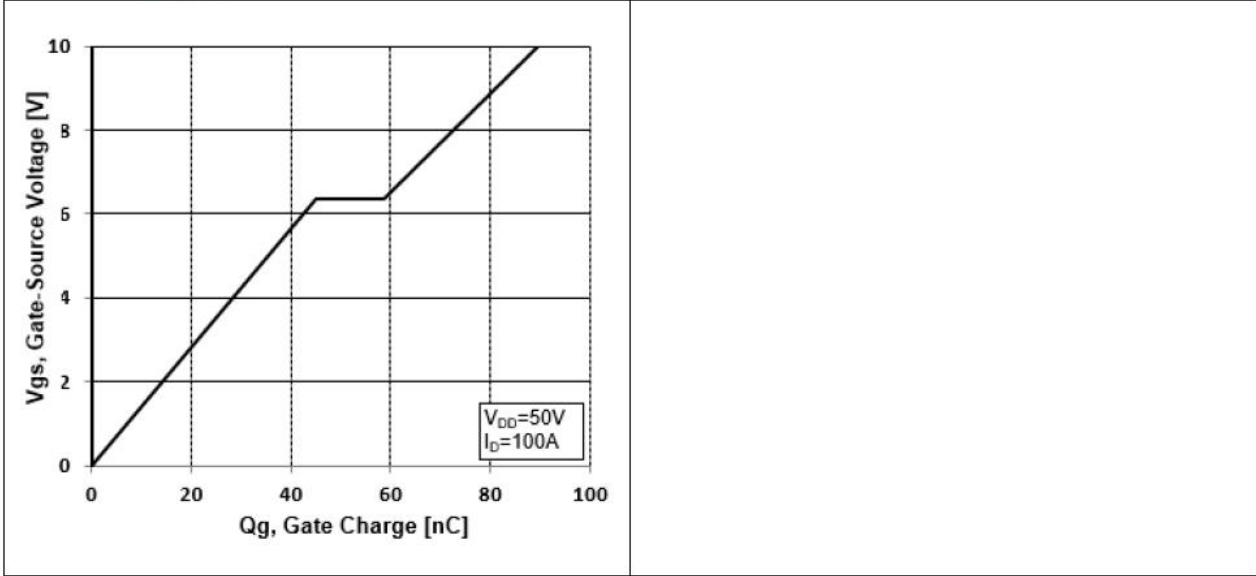


Figure 13. Typical Gate Charge vs Gate-Source Voltage





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