

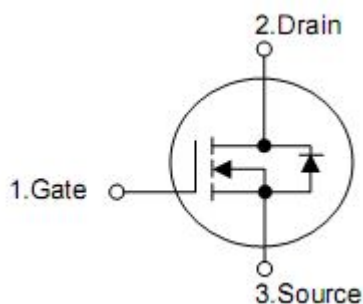
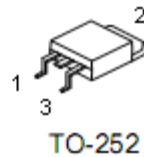
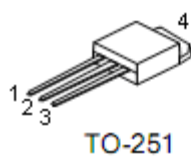
## 1. Description

This Power MOSFET is produced using KIA advanced planar stripe DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency switched mode power supplies, active power factor correction based on half bridge topology.

## 2. Features

- $R_{DS(on)} = 4.3\Omega @ V_{GS} = 10V$
- Low gate charge (typical 6.5nC)
- High ruggedness
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability

## 3. Pin configuration



Pin	Function
1	Gate
2	Drain
3	Source
4	Drain

#### 4. Absolutemaximum ratings

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

Parameter	Symbol	Rating	Units
Drain-source voltage	V <sub>DSS</sub>	650	V
Drain current continuous	I <sub>D</sub>	T <sub>C</sub> =25°C	A
		T <sub>C</sub> =100°C	A
Drain current pulsed (note1)	I <sub>DM</sub>	7.5	A
Gate-source voltage	V <sub>GSS</sub>	±30	V
Single Pulse avalanche energy (note2)	E <sub>AS</sub>	100	mJ
Repetitive avalanche energy (note1)	E <sub>AR</sub>	4.2	mJ
Peak diode recovery dv/dt (note3)	dv/dt	4.5	V/ns
Power dissipation	P <sub>D</sub>	T <sub>C</sub> =25°C	W
		Derate above 25°C	W/°C
Operating and storage temperature range	T <sub>J</sub> , T <sub>STG</sub>	-55~+150	°C
Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	T <sub>L</sub>	300	°C

#### 5. Thermal characteristics

Parameter	Symbol	Rating	Unit
Thermal resistance junction-case	R <sub>thJC</sub>	3.0	°C/W
Thermal resistance, case-to-sink typ.	R <sub>thJS</sub>	50	
Thermal resistance junction-ambient	R <sub>thJA</sub>	110	

## 6. Electrical characteristics

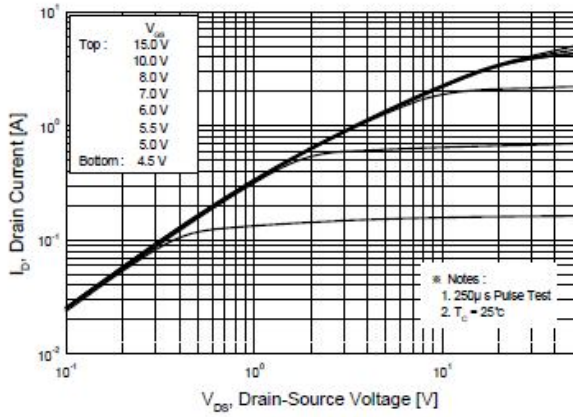
( $T_J=25^{\circ}\text{C}$ , unless otherwise noted)

Parameter		Symbol	Test Conditions	Min	Typ	Max	Units
Off characteristics							
Drain-source breakdown voltage		$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	650	-	-	V
Breakdown voltage temperature coefficient		$\frac{\Delta BV_{DSS}}{\Delta T_J}$	$I_D=250\mu A$ , Referenced to $25^{\circ}\text{C}$	-	0.6	-	$V/^{\circ}\text{C}$
Zero gate voltage drain current		$I_{DSS}$	$V_{DS}=650V, V_{GS}=0V$	-	-	1	$\mu A$
			$V_{DS}=520V, T_C=125^{\circ}\text{C}$	-	-	10	$\mu A$
Gate-body leakage current	Forward	$I_{GSS}$	$V_{GS}=20V, V_{DS}=0V$	-	-	10	$\mu A$
	Reverse		$V_{GS}=-20V, V_{DS}=0V$	-	-	-10	$\mu A$
On characteristics							
Gate threshold voltage		$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0	-	4.0	V
Static drain-source on-resistance		$R_{DS(ON)}$	$V_{GS}=10V, I_D=0.95A$	-	4.3	5.3	$\Omega$
Dynamic characteristics							
Input capacitance		$C_{ISS}$	$V_{DS}=25V, V_{GS}=0V$ , $f=1\text{MHz}$	-	275	-	pF
Output capacitance		$C_{OSS}$		-	30	-	pF
Reverse transfer capacitance		$C_{RSS}$		-	2	-	pF
Switching characteristics							
Turn-on delay time		$t_{D(ON)}$	$V_{DD}=325V, I_D=2.0A$ $R_G=25\Omega$ , (note4,5)	-	10	-	ns
Rise time		$t_R$		-	30	-	ns
Turn-off delay time		$t_{D(OFF)}$		-	40	-	ns
Fall time		$t_F$		-	40	-	ns
Total gate charge		$Q_G$	$V_{DS}=520V, I_D=2.0A$ $V_{GS}=10V$ (note4,5)	-	6.5	-	nC
Gate-source charge		$Q_{GS}$		-	2.2	-	nC
Gate-drain charge		$Q_{GD}$		-	2.5	-	nC
Drain-source diode characteristics							
Continuous drain-source current		$I_S$		-	-	2.0	A
Pulsed drain-source current		$I_{SM}$				7.5	A
Drain-source diode forward voltage		$V_{SD}$	$V_{GS}=0V, I_S=2.0A$	-	-	1.4	V
Reverse recovery time		$t_{RR}$	$V_{GS}=0V, di_F/dt=100A/\mu s$ $I_S=2.0A$ ,	-	200	-	ns
Reverse recovery charge		$Q_{RR}$		-	0.75	-	$\mu C$

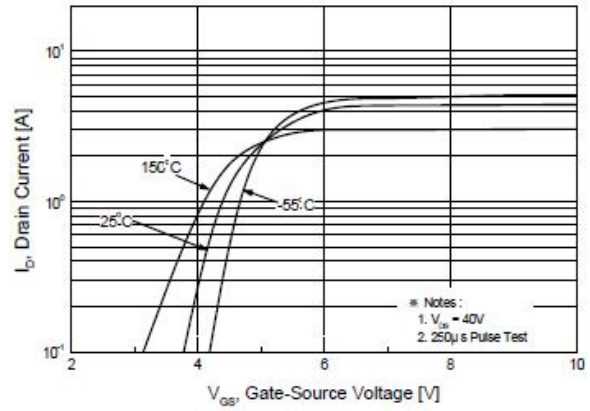
Note:1. Repetitive rating: pulse width limited by maximum junction temperature

2.  $I_{AS}=2.0A, V_{DD}=50V, R_G=25\Omega$ , starting  $T_J=25^{\circ}\text{C}$
3.  $I_{SD}\leq 2.0A, di/dt \leq 200A/\mu s, V_{DD}\leq BV_{DSS}$ , starting  $T_J=25^{\circ}\text{C}$
4. Pulse test: pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$
5. Essentially independent of operating temperature

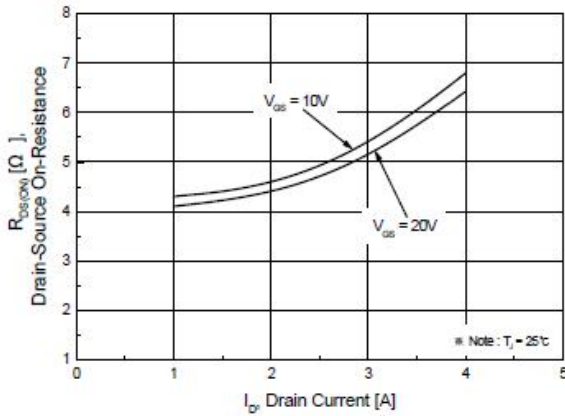
**7. Test circuits and waveforms**



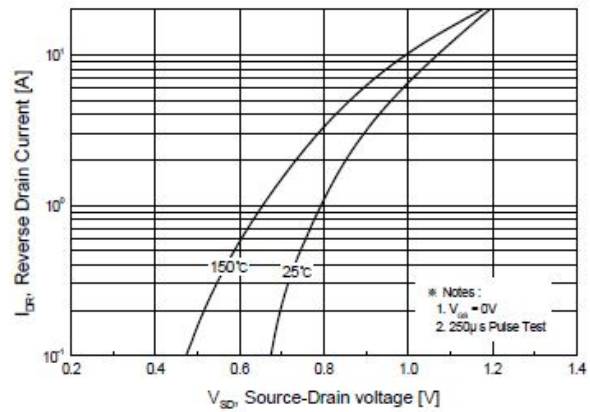
**Figure 1. On-Region Characteristics**



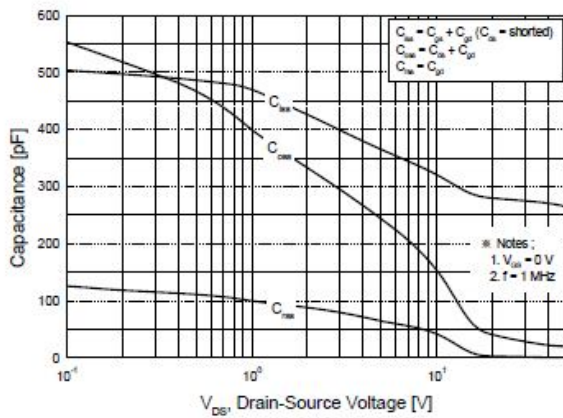
**Figure 2. Transfer Characteristics**



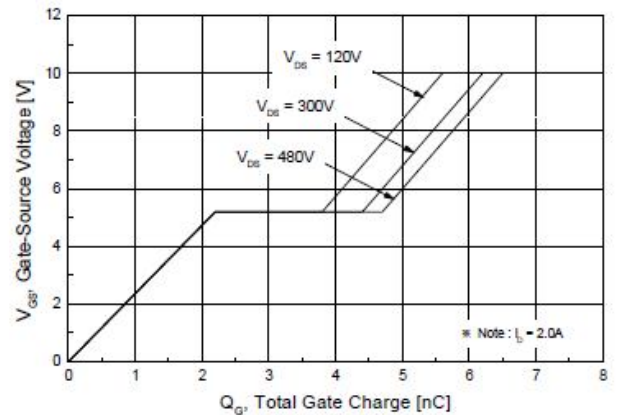
**Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage**



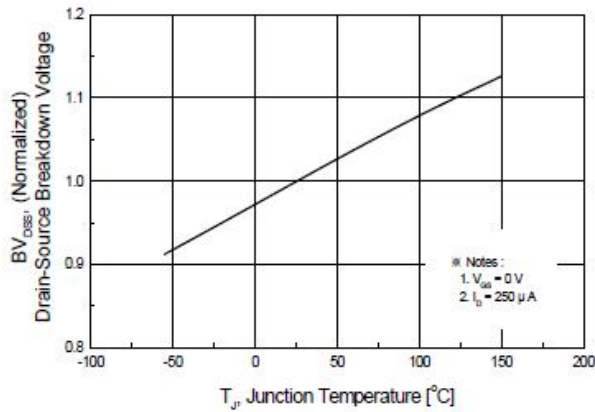
**Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature**



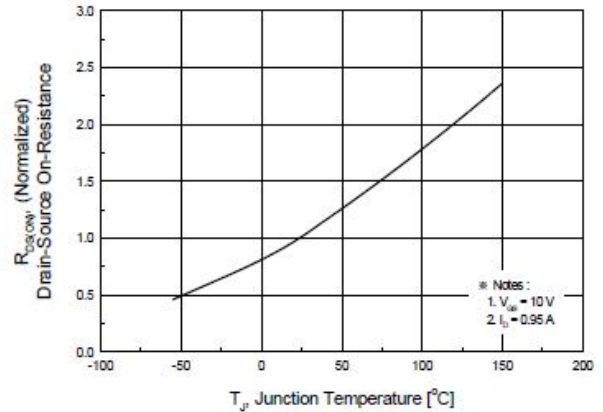
**Figure 5. Capacitance Characteristics**



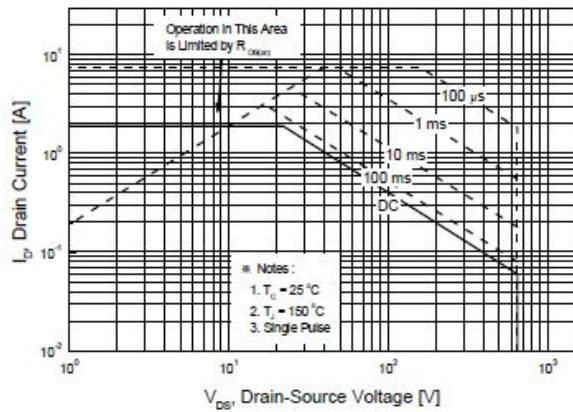
**Figure 6. Gate Charge Characteristics**



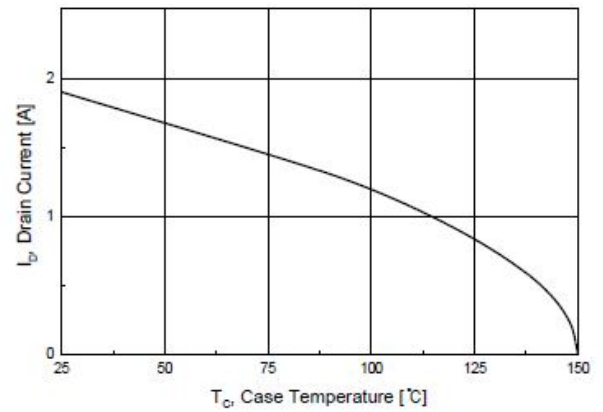
**Figure 7. Breakdown Voltage Variation vs Temperature**



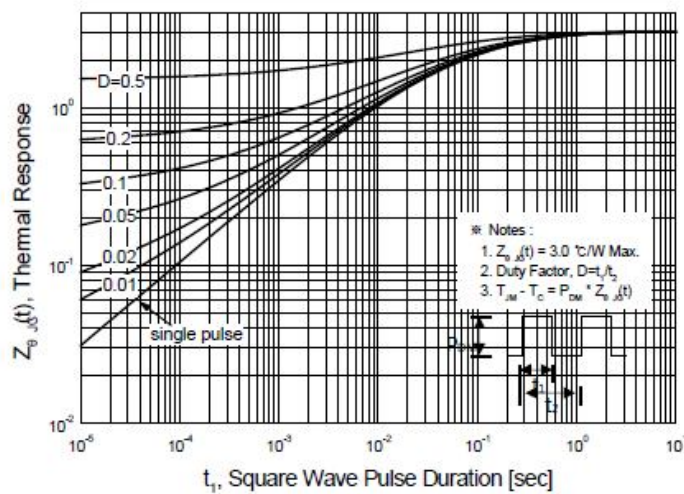
**Figure 8. On-Resistance Variation vs Temperature**



**Figure 9. Maximum Safe Operating Area**



**Figure 10. Maximum Drain Current vs Case Temperature**



**Figure 11. Transient Thermal Response Curve**