

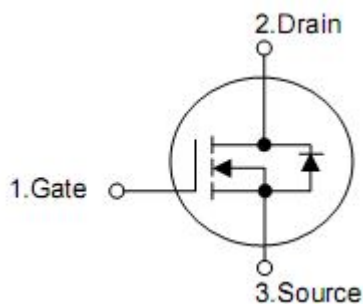
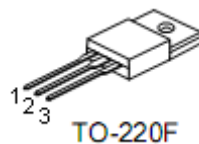
## 1. Description

This Power MOSFET is produced using KIA semi's advanced super-junction technology. This advanced technology has been especially tailored to minimize conduction loss, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for AC/DC power conversion in switching mode operation for higher efficiency.

## 2. Features

- $R_{DS(on)}=0.85\Omega @ V_{GS}=10V$
- Low gate charge ( typical 15nC)
- High ruggedness
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability

## 3. Pin configuration



Pin	Function
1	Gate
2	Drain
3	Source

## 4. Absolute maximum ratings

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

Parameter	Symbol	Rating	Units
Drain-source voltage	V <sub>DSS</sub>	650	V
Gate-source voltage	V <sub>GSS</sub>	+30	V
Drain current continuous	I <sub>D</sub>	T <sub>C</sub> =25°C	5*
		T <sub>C</sub> =100°C	4*
Drain current pulsed (note1)	I <sub>DM</sub>	16*	A
Avalanche energy	Repetitive (note1)	E <sub>AR</sub>	34
	Single pulse (note2)	E <sub>AS</sub>	67.5
Avalanche energy(note1)	I <sub>AR</sub>	1	A
Peak diode recovery dv/dt (note3)	dv/dt	4.5	V/ns
Total power dissipation	P <sub>D</sub>	T <sub>C</sub> =25 °C	35
		derate above 25 °C	0.3
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

\* Drain current limited by maximum junction temperature

## 5. Thermal characteristics

Parameter	Symbol	Rating	Unit
Thermal resistance, Junction-ambient	R <sub>thJA</sub>	62	°C/W
Thermal resistance, case-to-sink typ.	R <sub>thJS</sub>	-	°C/W
Thermal resistance, Junction-case	R <sub>thJC</sub>	3.6	°C/W

## 6. Electrical characteristics

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

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
<b>Off characteristics</b>						
Drain-source breakdown voltage	BV <sub>DSS</sub>	T <sub>J</sub> =25°C V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	650	-	-	V
		T <sub>J</sub> =125°C V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	-	700	-	V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> =650V, V <sub>GS</sub> =0V	-	-	1	μA
		V <sub>DS</sub> =480V, T <sub>C</sub> =125°C	-	-	10	μA
Gate-body leakage current	I <sub>GSS</sub>	V <sub>GS</sub> =30V, V <sub>DS</sub> =0V	-	-	100	nA
		V <sub>GS</sub> =-30V, V <sub>DS</sub> =0V	-	-	-100	nA
Breakdown voltage temperature coefficient	ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	I <sub>D</sub> =250μA, referenced to 25°C	-	0.6	-	V/°C
<b>On characteristics</b>						
Gate threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	2.5	-	4.5	V
Static drain-source on-resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =2.5A	-	0.85	0.95	Ω
Forward transconductance	g <sub>FS</sub>	V <sub>DS</sub> =40V, I <sub>D</sub> =2.5A (note4)	-	8	-	S
Gate resistance	R <sub>g</sub>	F=1.0MHZ, Open drain	-	3.5	-	Ω
<b>Dynamic characteristics</b>						
Input capacitance	C <sub>iss</sub>	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHZ	-	320	-	pF
Output capacitance	C <sub>oss</sub>		-	75	-	pF
Reverse transfer capacitance	C <sub>rss</sub>		-	4	-	pF
<b>Switching characteristics</b>						
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> =400V, I <sub>D</sub> =2.5A, R <sub>G</sub> =20Ω (note4,5)	-	18	-	ns
Rise time	t <sub>r</sub>		-	40	-	ns
Turn-off delay time	t <sub>d(off)</sub>		-	50	-	ns
Fall time	t <sub>f</sub>		-	30	-	ns
Total gate charge	Q <sub>g</sub>	V <sub>DS</sub> =480V, I <sub>D</sub> =5A, V <sub>GS</sub> =10V (note4,5)	-	15	-	nC
Gate-source charge	Q <sub>gs</sub>		-	3	-	nC
Gate-drain charge	Q <sub>gd</sub>		-	6	-	nC
<b>Drain-source diode characteristics and maximum ratings</b>						
Drain-source diode forward voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>SD</sub> =5A	-	-	1.5	V
Continuous drain-source current	I <sub>S</sub>		-	-	5	A
Pulsed drain-source current	I <sub>SM</sub>		-	-	16	A
Reverse recovery time	t <sub>rr</sub>	V <sub>GS</sub> =0V, I <sub>SD</sub> =5A	-	180	-	ns
Reverse recovery charge	Q <sub>rr</sub>	di <sub>F</sub> /dt=100A/μs (note4)	-	2.5	-	μC

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

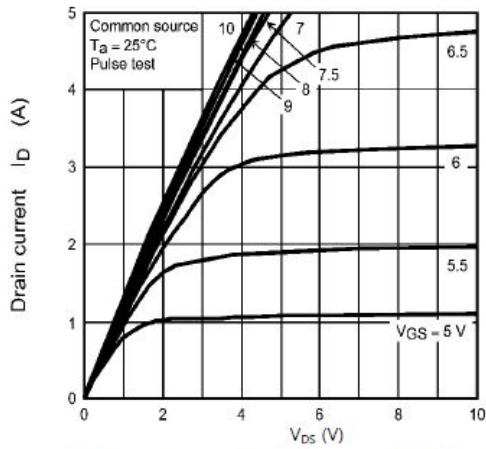
 2. L=60mH, I<sub>AS</sub>=1.5A, V<sub>DD</sub>=150V, starting T<sub>J</sub>=25°C

 3. I<sub>SD</sub>≤4.5A, di/dt≤200A/μs, V<sub>DD</sub>≤BV<sub>DSS</sub>, starting T<sub>J</sub>=25 °C

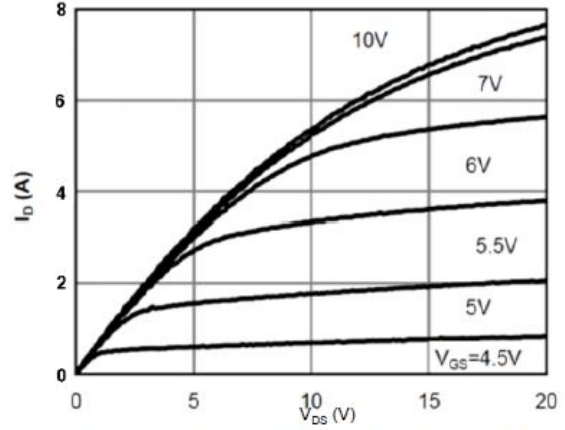
4. Pulse test: pulse width≤300μs, duty cycle≤2%

5. Essentially independent of operating temperature typical characteristics.

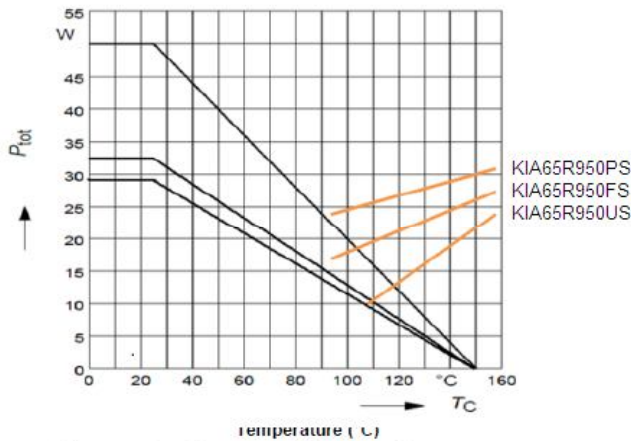
**Typical Characteristics**



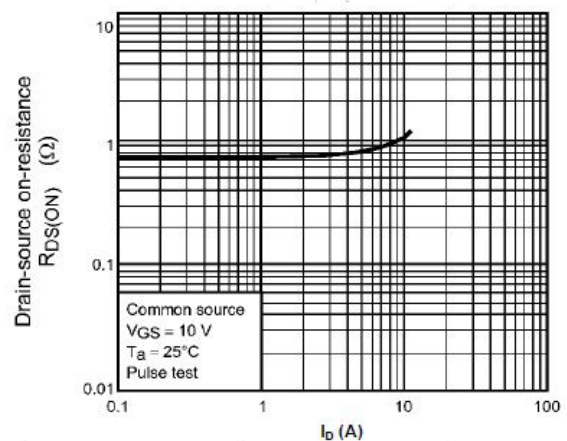
**Figure 1: On-Region Characteristics@25°C**



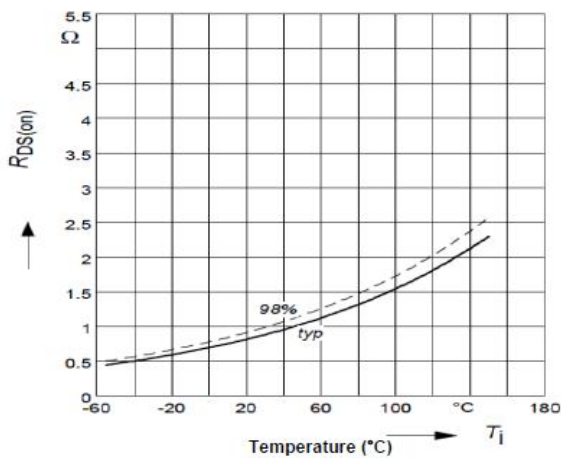
**Figure 2: On-Region Characteristics@125°C**



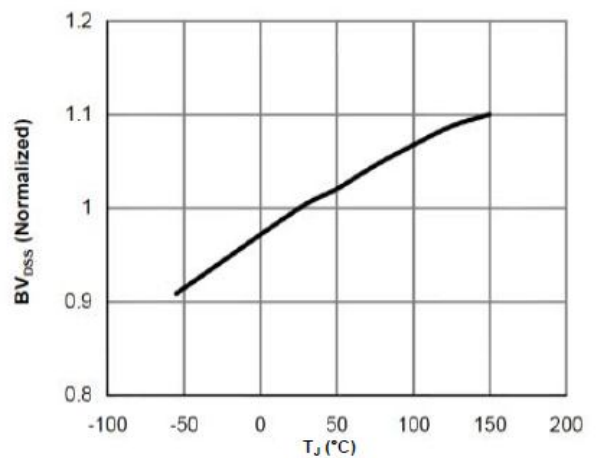
**Figure 3: Power Dissipation**



**Figure 4: On-Resistance vs. Drain Current and Gate Voltage**

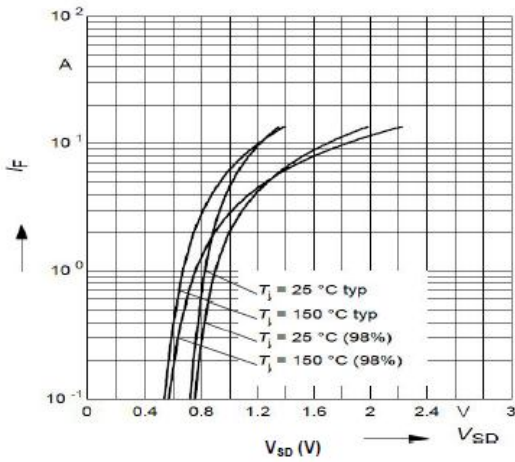


**Figure 5: On-Resistance vs. Junction Temperature**

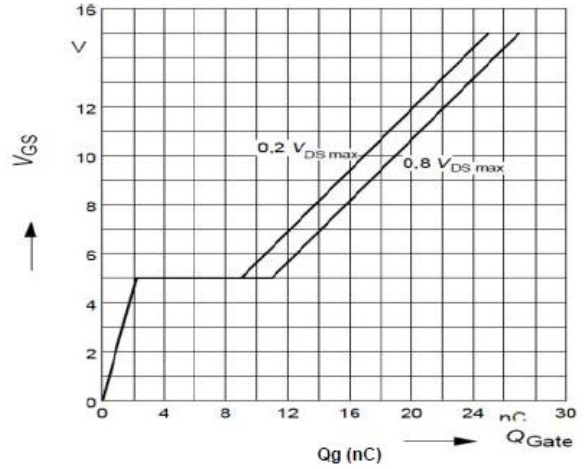


**Figure 6: Break Down vs. Junction Temperature**

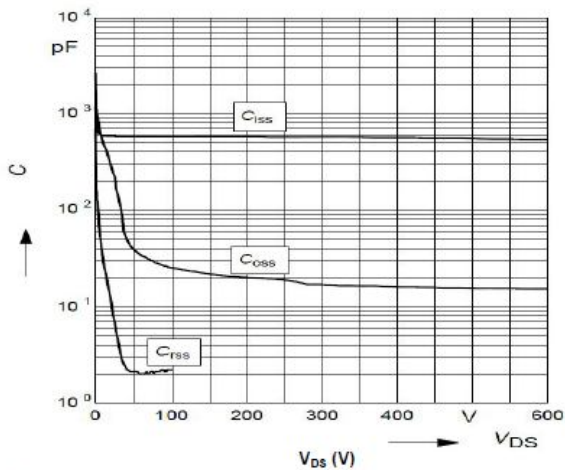
**Typical Characteristics**



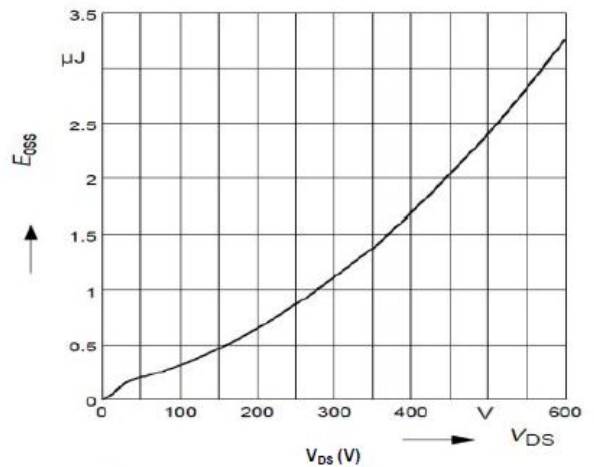
**Figure 7: Body-Diode Characteristics**



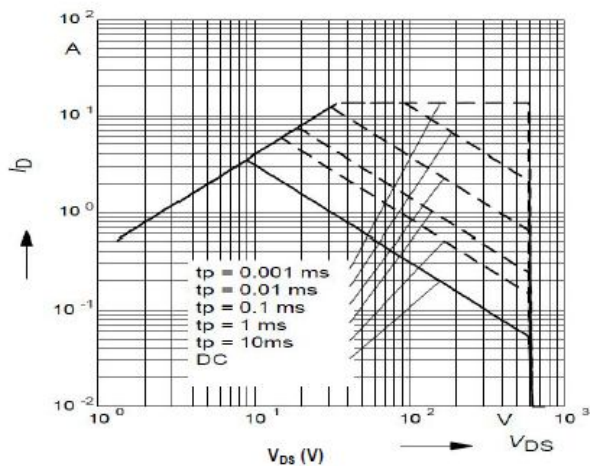
**Figure 8: Gate-Charge Characteristics**



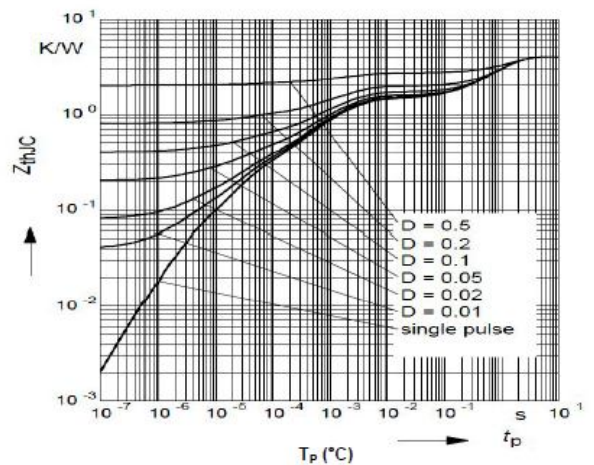
**Figure 9: Capacitance Characteristics**



**Figure 10: C<sub>oss</sub> stored Energy**

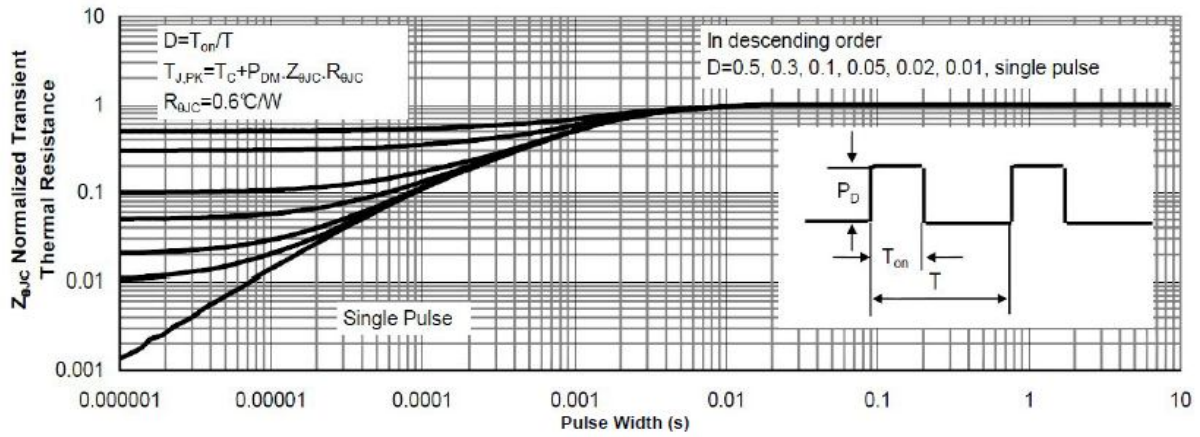


**Figure 11: Maximum Forward Biased Safe Operating Area (FullPAK)**

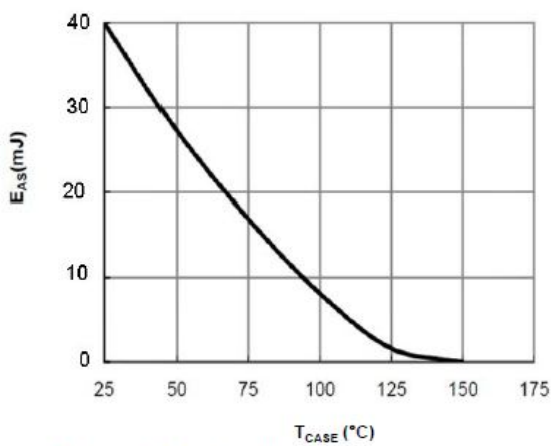


**Figure 12: Sing Pulse Power Rating Junction to Case (FullPAK)**

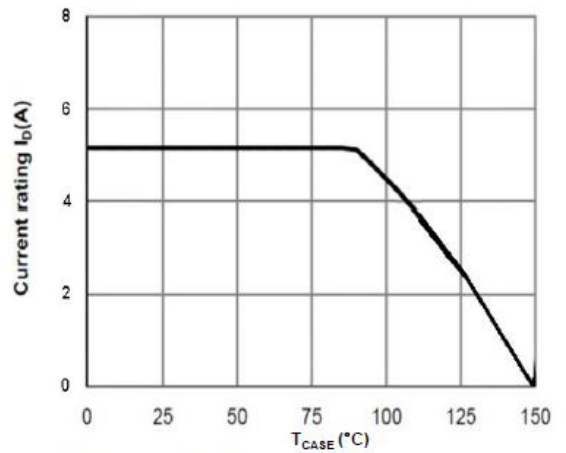
**Typical Characteristics**



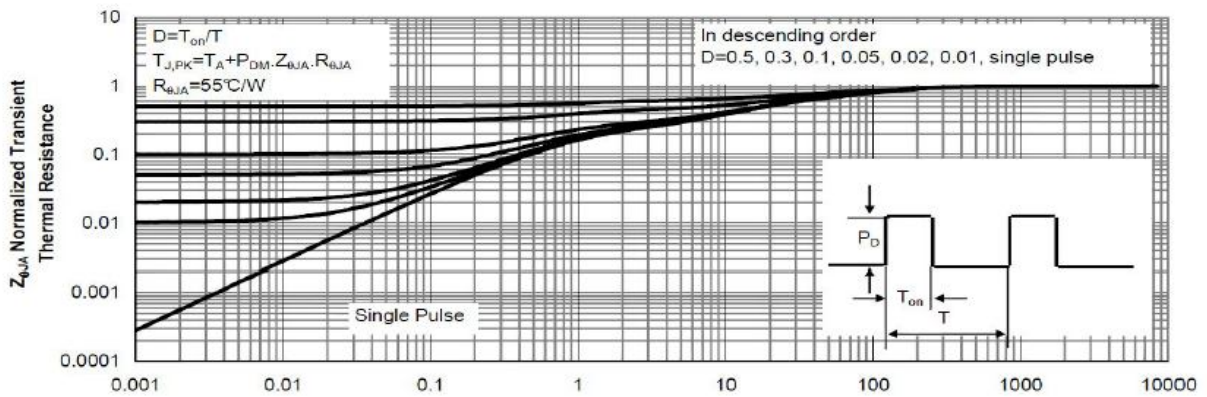
**Figure 13: Normalized Maximum Transient Thermal Impedance**



**Figure 14: Avalanche energy**



**Figure 15: Current De-rating**



**Figure 16: Normalized Maximum Transient Thermal Impedance**

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