

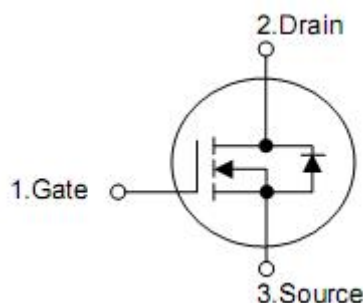
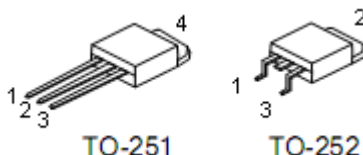
1. Description

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

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

3. Pin configuration



Pin	Function
1	Gate
2	Drain
3	Source
4	Drain

4. Absolute maximum ratings

(T_C= 25 °C , unless otherwise noted)

Parameter		Symbol	Rating	Units
Drain-source voltage		V _{DSS}	650	V
Gate-source voltage		V _{GSS}	±30	V
Drain current continuous	T _C =25°C	I _D	5*	A
	T _C =100°C		4*	A
Drain current pulsed (note1)		I _{DM}	16*	A
Avalanche energy	Repetitive (note1)	E _{AR}	34	mJ
	Single pulse (note2)	E _{AS}	67.5	mJ
Avalanche energy(note1)		I _{AR}	1	A
Peak diode recovery dv/dt (note3)		dv/dt	4.5	V/ns
Total power dissipation	T _C =25 °C	P _D	30	W
	derate above 25 °C		0.8	W/°C
Operating and storage temperature range		T _J , T _{STG}	-55~+150	°C
Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds		T _L	300	°C

* Drain current limited by maximum junction temperature

5. Thermal characteristics

Parameter	Symbol	Rating	Unit
Thermal resistance, Junction-ambient	R _{thJA}	62	°C/W
Thermal resistance, case-to-sink typ.	R _{thJS}	0.5	°C/W
Thermal resistance, Junction-case	R _{thJC}	4.17	°C/W

6. Electrical characteristics

(T_C=25°C, unless otherwise noted)

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

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

2. L=60mH, I_{AS}=1.5A, V_{DD}=150V, starting T_J=25°C

3. I_{SD}≤4.5A, di/dt≤200A/μs, V_{DD}≤BV_{DSS}, starting T_J=25 °C

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

5. Essentially independent of operating temperature typical characteristics.

Typical Characteristics

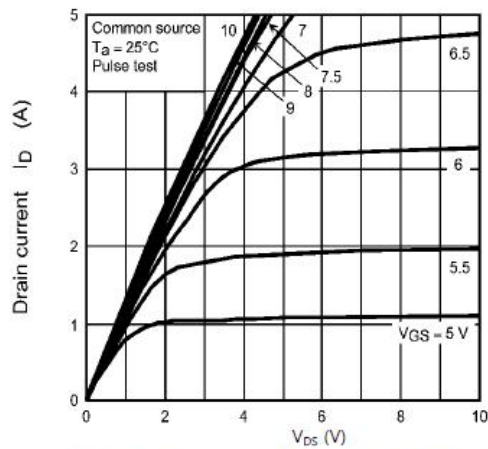


Figure 1: On-Region Characteristics@25°C

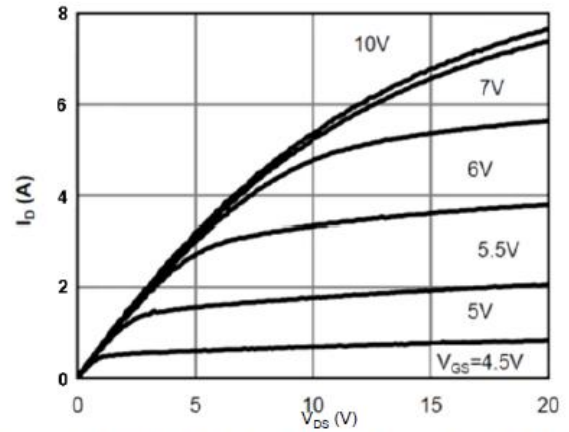


Figure 2: On-Region Characteristics@125°C

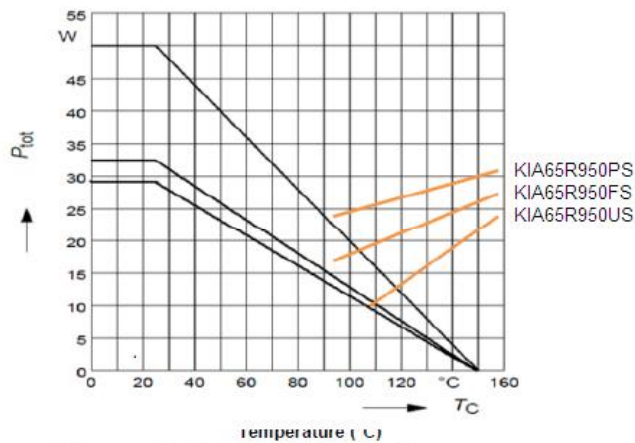


Figure 3: Power Dissipation

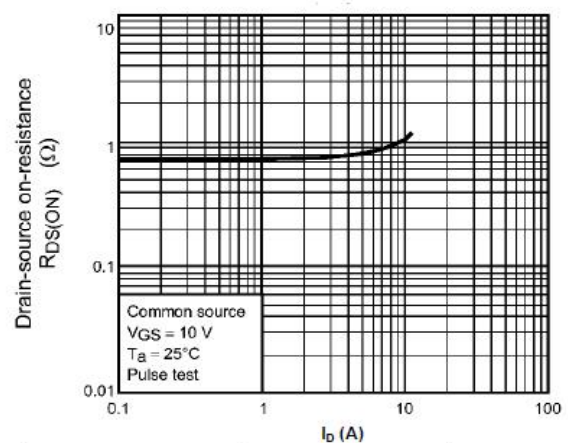


Figure 4: On-Resistance vs. Drain Current and Gate Voltage

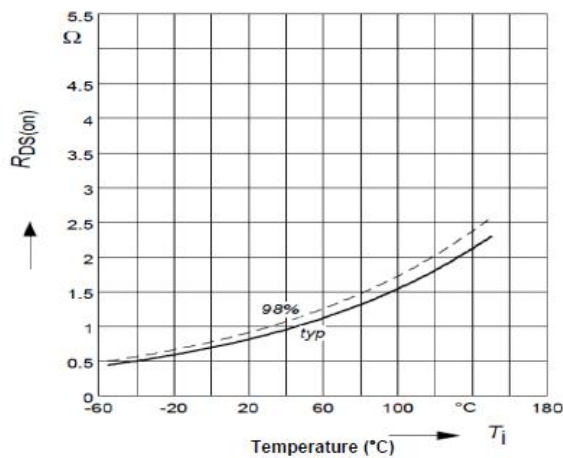


Figure 5: On-Resistance vs. Junction Temperature

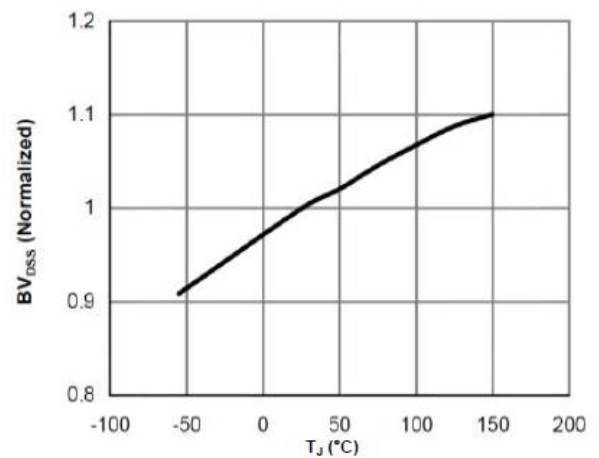


Figure 6: Break Down vs. Junction Temperature

Typical Characteristics

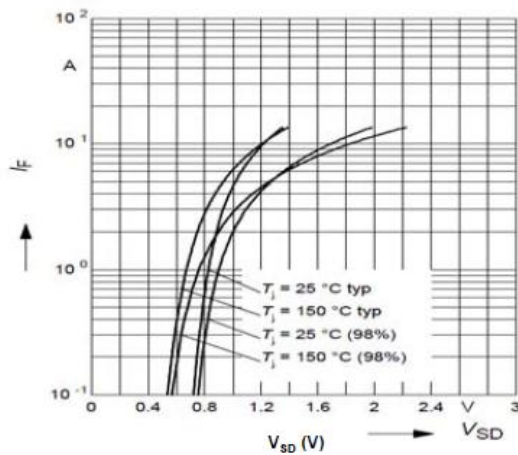


Figure 7: Body-Diode Characteristics

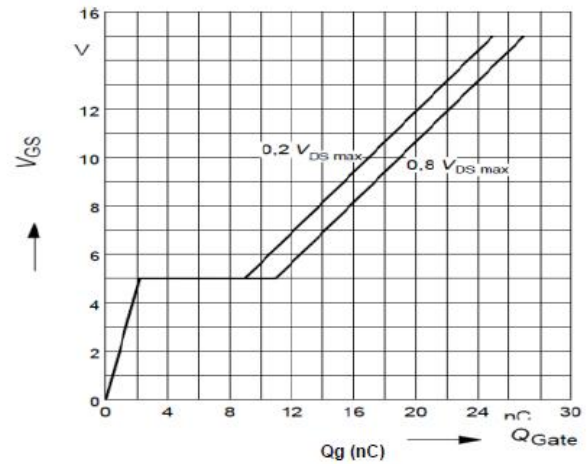


Figure 8: Gate-Charge Characteristics

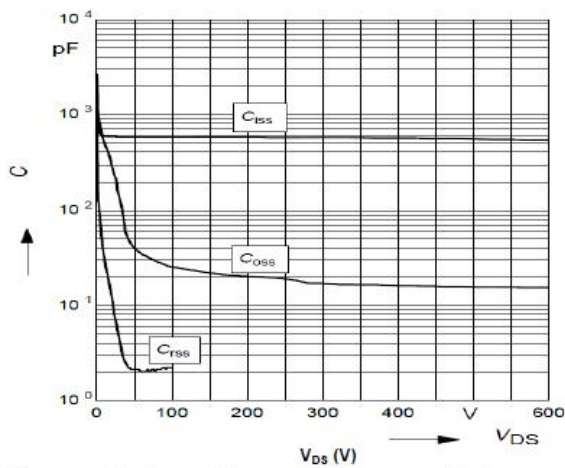


Figure 9: Capacitance Characteristics

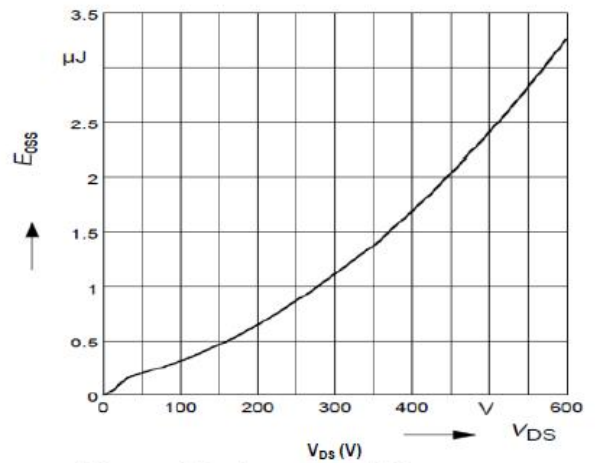
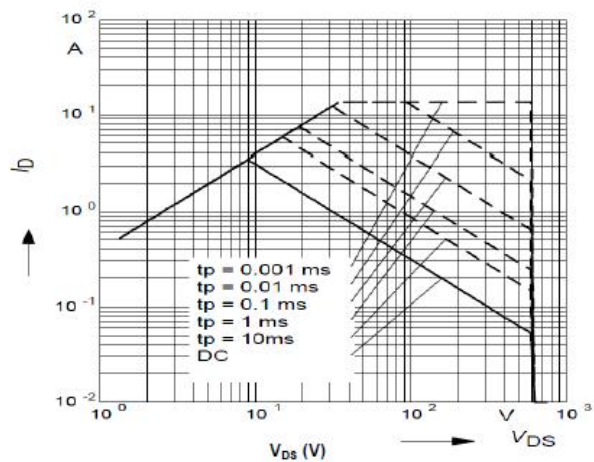
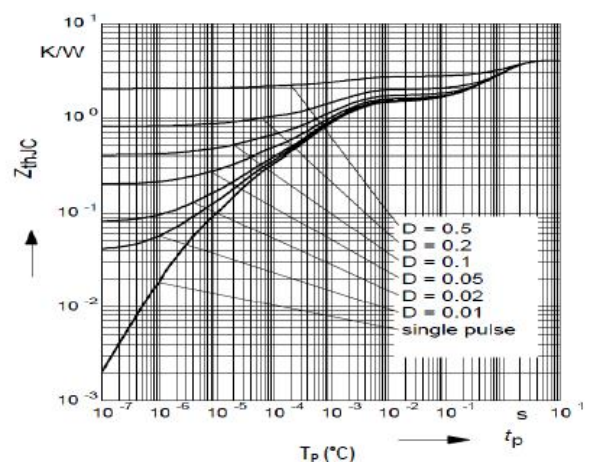


Figure 10: C_{OSS} stored Energy



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



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

Typical Characteristics

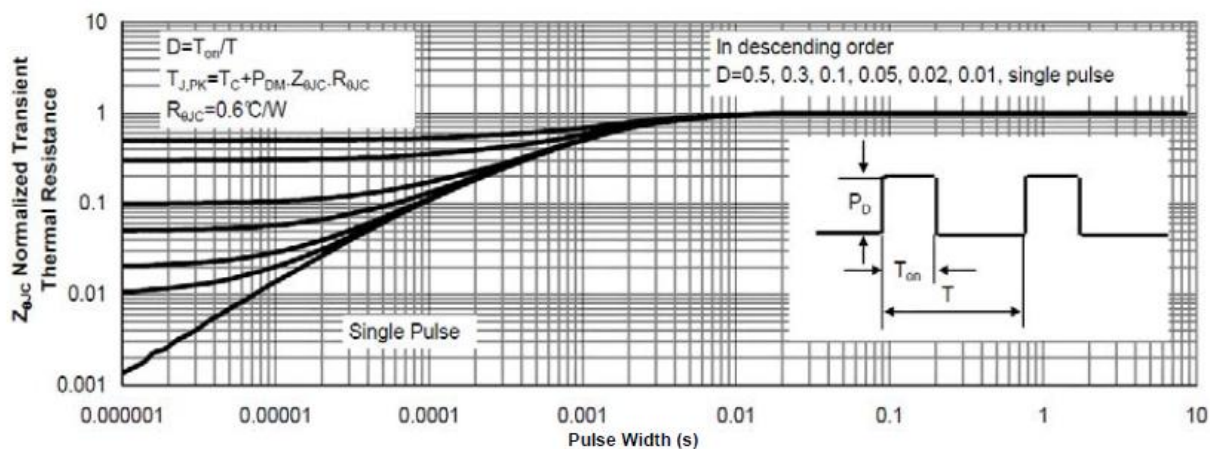


Figure 13: Normalized Maximum Transient Thermal Impedance

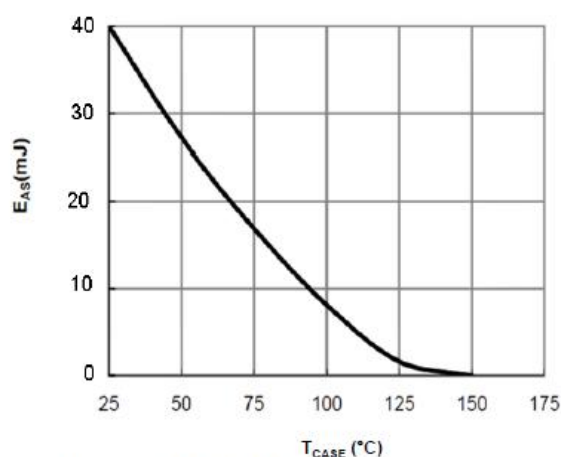


Figure 14: Avalanche energy

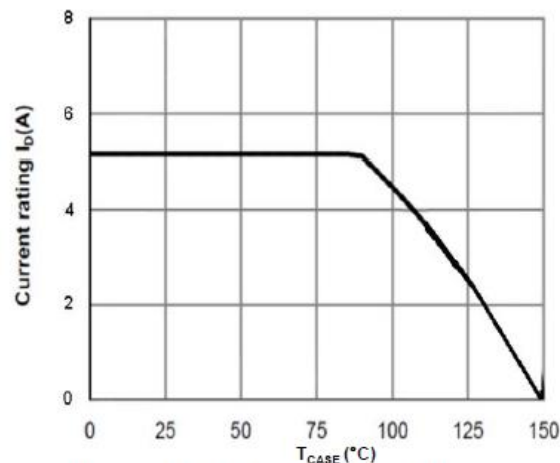


Figure 15: Current De-rating

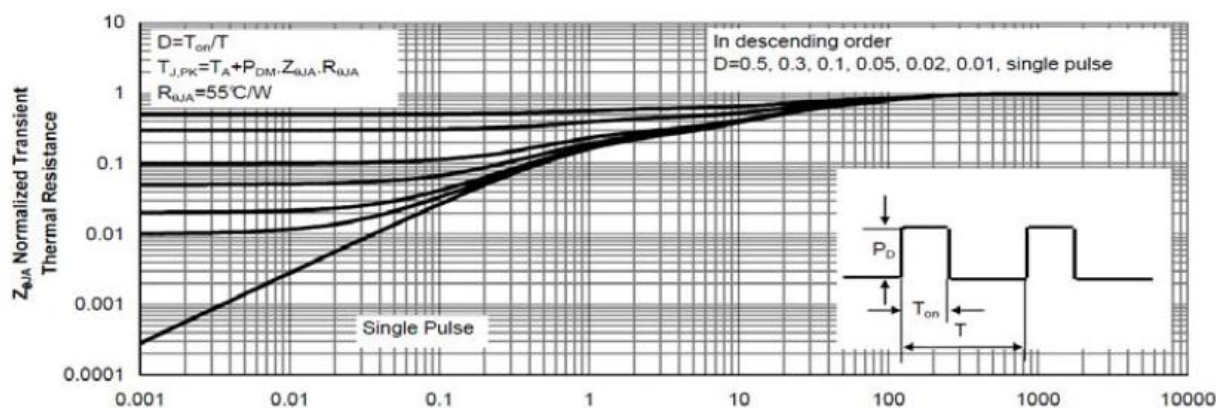


Figure 16: Normalized Maximum Transient Thermal Impedance