

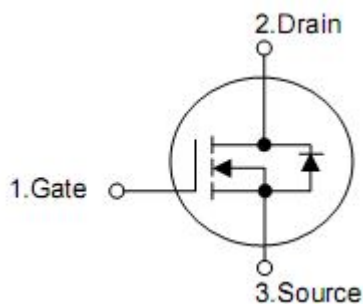
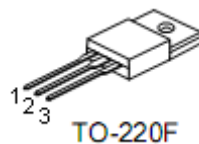
1. Description

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

- $R_{DS(on)}=0.6\Omega @ V_{GS}=10V$
- Low gate charge (typical 25nC)
- 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_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	I _D	T _C =25°C	7*
		T _C =100°C	5*
Drain current pulsed (note1)	I _{DM}	10*	A
Avalanche energy	Repetitive (note1)	E _{AR}	43
	Single pulse (note2)	E _{AS}	86
Avalanche energy(note1)	I _{AR}	1.7	A
Peak diode recovery dv/dt (note3)	dv/dt	4.5	V/ns
Total power dissipation	P _D	T _C =25 °C	35
		derate above 25 °C	0.3
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}	-	°C/W
Thermal resistance, Junction-case	R _{thJC}	3.6	°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	BV _{DSS}	T _J =25°C V _{GS} =0V, I _D =250μA	650	-	-	V
		T _J =125°C V _{GS} =0V, I _D =250μA	-	700	-	V
Zero gate voltage drain current	I _{DSS}	V _{DS} =650V, V _{GS} =0V	-	-	1	μA
		V _{DS} =480V, T _C =125°C	-	-	10	μA
Gate-body leakage current	I _{GSS}	V _{GS} =30V, V _{DS} =0V	-	-	100	nA
		V _{GS} =-30V, V _{DS} =0V	-	-	-100	nA
Breakdown voltage temperature coefficient	ΔBV _{DSS} /ΔT _J	I _D =250μA, referenced to 25°C	-	0.6	-	V/°C
On characteristics						
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	2.5	3.5	4.5	V
Static drain-source on-resistance	R _{DS(on)}	V _{GS} =10V, I _D =3.5A	-	0.6	0.7	Ω
Forward transconductance	g _{FS}	V _{DS} =40V, I _D =3.5A (note4)	-	16	-	S
Dynamic characteristics						
Input capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V, f=1MHz	-	360	-	pF
Output capacitance	C _{oss}		-	25	-	pF
Reverse transfer capacitance	C _{rss}		-	1.2	-	pF
Switching characteristics						
Turn-on delay time	t _{d(on)}	V _{DD} =400V, I _D =3.5A, R _G =20Ω (note4,5)	-	25	-	ns
Rise time	t _r		-	55	-	ns
Turn-off delay time	t _{d(off)}		-	70	-	ns
Fall time	t _f		-	40	-	ns
Total gate charge	Q _g	V _{DS} =480V, I _D =7A, V _{GS} =10V (note4,5)	-	8	-	nC
Gate-source charge	Q _{gs}		-	2.0	-	nC
Gate-drain charge	Q _{gd}		-	2.7	-	nC
Drain-source diode characteristics and maximum ratings						
Drain-source diode forward voltage	V _{SD}	V _{GS} =0V, I _{SD} =A	-	-	1.5	V
Continuous drain-source current	I _S		-	-	7	A
Pulsed drain-source current	I _{SM}		-	-	18	A
Reverse recovery time	t _{rr}	V _{GS} =0V, I _{SD} =7A di _F /dt=100A/μs (note4)	-	190	-	ns
Reverse recovery charge	Q _{rr}		-	2.3	-	μC

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

2. L=60mH, I_{AS}=1.7A, V_{DD}=150V, starting T_J=25°C

3. I_{SD}≤7.0A, 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

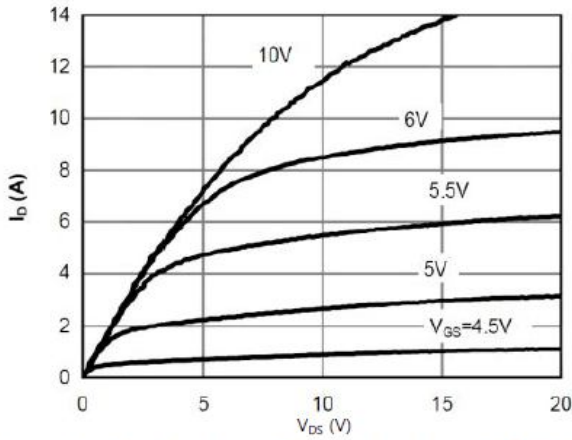


Figure 1: On-Region Characteristics@25°C

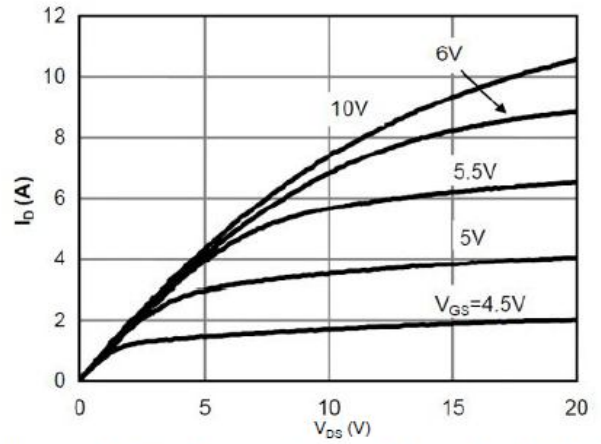


Figure 2: On-Region Characteristics@125°C

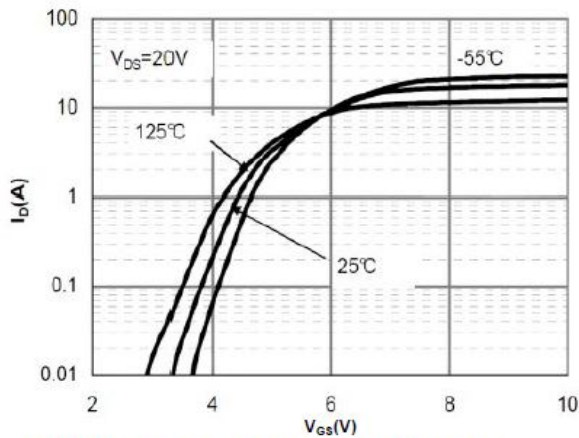


Figure 3: Transfer Characteristics

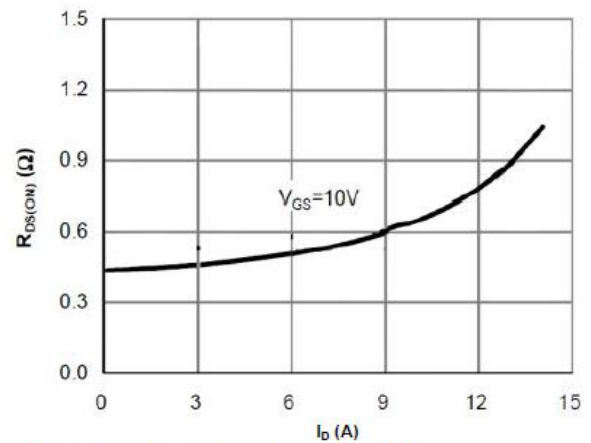


Figure 4: On-Resistance vs. Drain Current and Gate Voltage

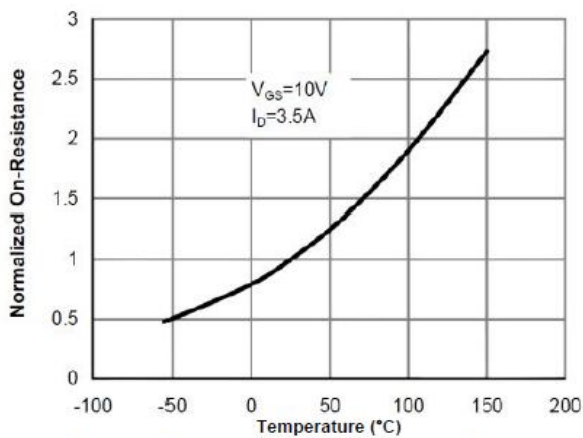


Figure 5: On-Resistance vs. Junction Temperature

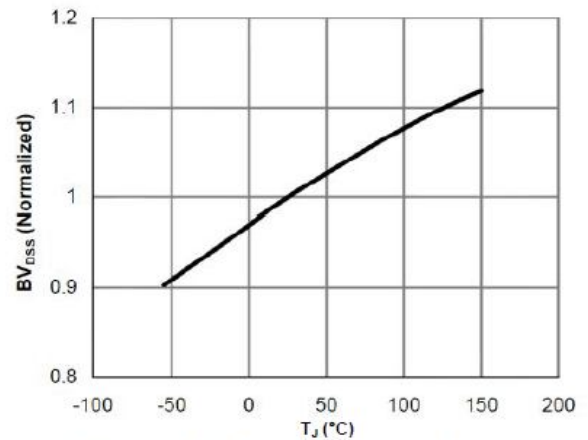


Figure 6: Break Down vs. Junction Temperature

Typical Characteristics

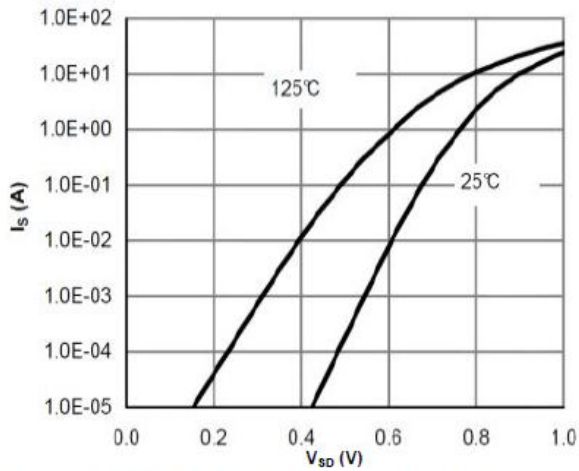


Figure 7: Body-Diode Characteristics

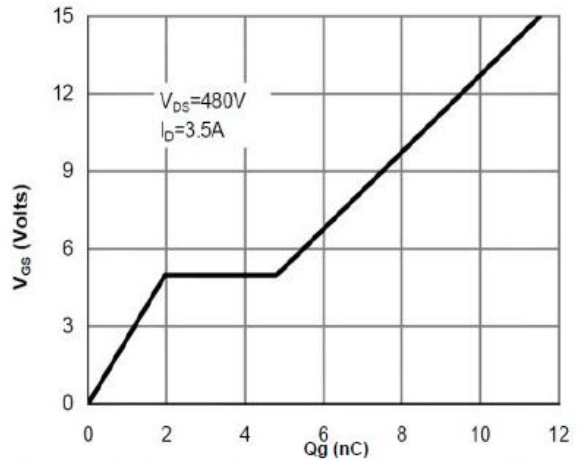


Figure 8: Gate-Charge Characteristics

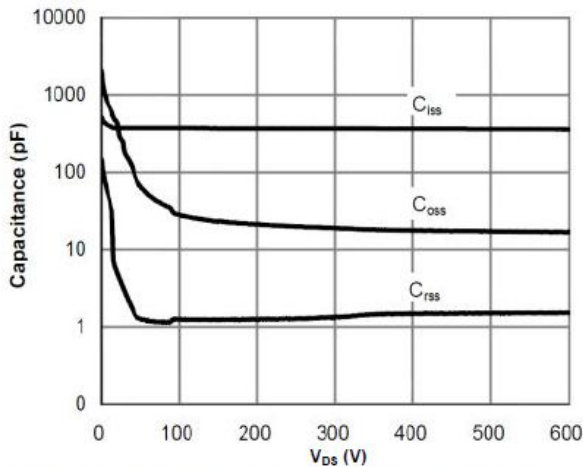


Figure 9: Capacitance Characteristics

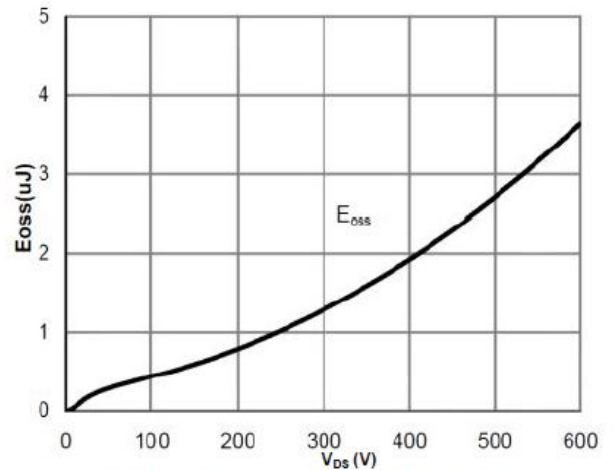


Figure 10: C_{oss} stored Energy

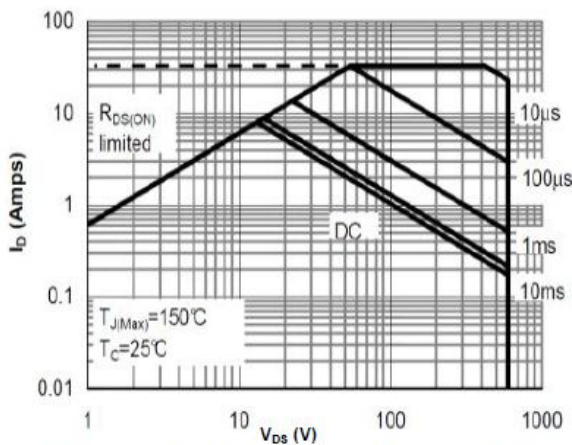


Figure 11: Maximum Forward Biased Safe Operating Area

Typical Characteristics

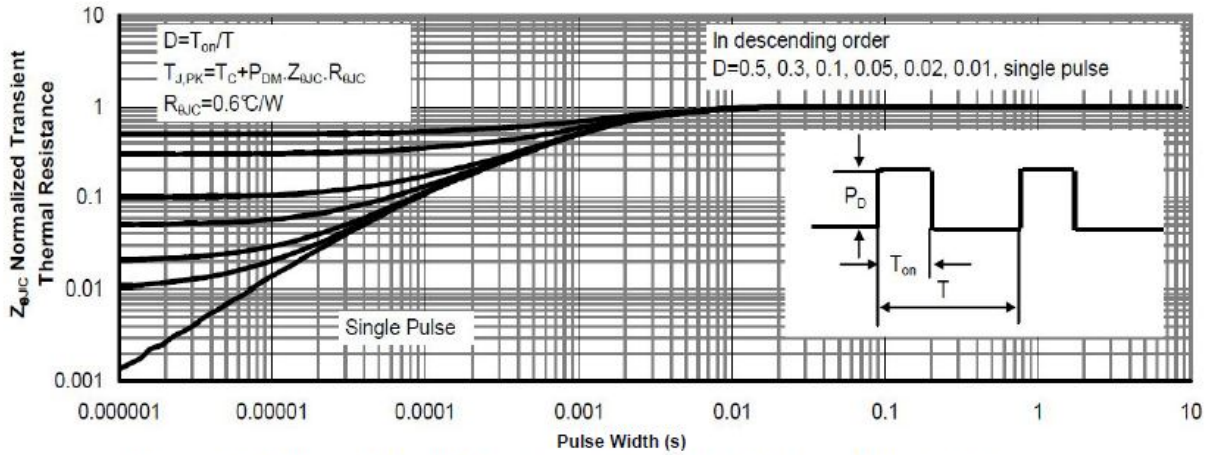


Figure 12: Normalized Maximum Transient Thermal Impedance

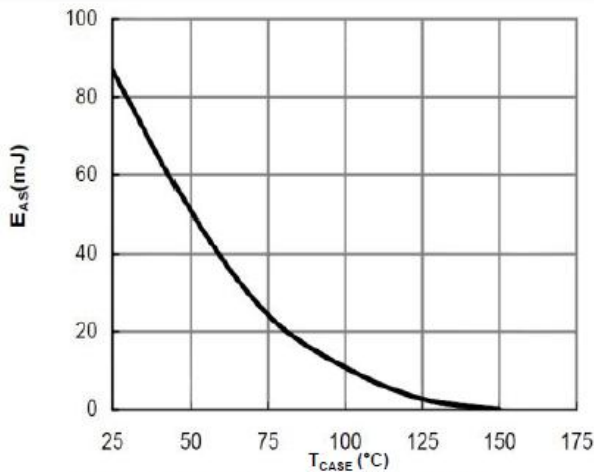


Figure 13: Avalanche energy

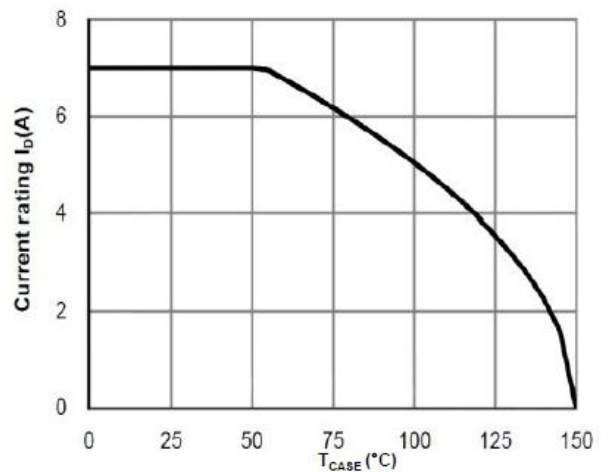


Figure 14: Current De-rating

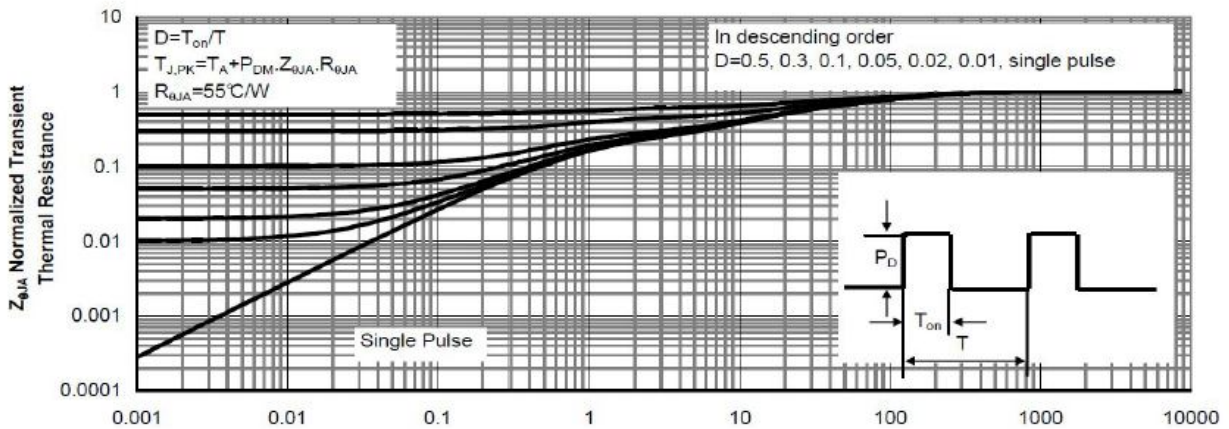


Figure 15: Normalized Maximum Transient Thermal Impedance

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