

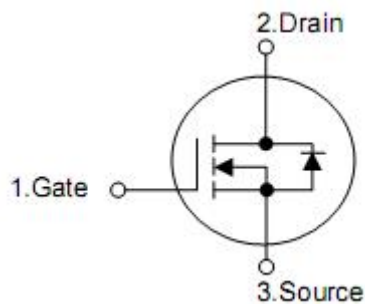
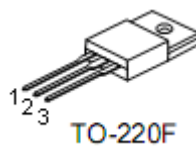
1. Description

This Power MOSFET is produced using KIA semi`s 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

- n $R_{DS(on)}=1.15\Omega @ V_{GS}=10V$
- n Low gate charge (typical 22nC)
- 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

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

Parameter	Symbol	Rating	Units
Drain-source voltage	V_{DSS}	600	V
Gate-source voltage	V_{GSS}	± 30	V
Drain current continuous	I_D	$T_C = 25\text{ }^\circ\text{C}$	7.0*
		$T_C = 100\text{ }^\circ\text{C}$	4.2*
Drain current pulsed (note1)	I_{DM}	28*	A
Avalanche energy	Repetitive (note1)	E_{AR}	17.6
	Single pulse (note2)	E_{AS}	280
Peak diode recovery dv/dt (note3)	dv/dt	4.5	V/ns
Total power dissipation	P_D	$T_C = 25\text{ }^\circ\text{C}$	39
		derate above 25 $^\circ\text{C}$	0.31
Operating and storage temperature range	T_J, T_{STG}	-55~+150	$^\circ\text{C}$
Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	T_L	300	$^\circ\text{C}$

* Drain current limited by maximum junction temperature

5. Thermal characteristics

Parameter	Symbol	Rating	Unit
Thermal resistance, Junction-ambient	R_{thJA}	62.5	$^\circ\text{C}/\text{W}$
Thermal resistance, case-to-sink typ.	R_{thCS}	-	$^\circ\text{C}/\text{W}$
Thermal resistance, Junction-case	R_{thJC}	3.2	$^\circ\text{C}/\text{W}$

6. Electrical characteristics

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

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Off characteristics						
Drain-source breakdown voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	600	-	-	V
Zero gate voltage drain current	I_{DSS}	$V_{DS}=600V, V_{GS}=0V$	-	-	1	μA
		$V_{DS}=480V, T_C=125^{\circ}\text{C}$	-	-	10	μA
Gate-body leakage current	Forward	I_{GSS}	-	-	100	nA
	Reverse				-100	nA
Breakdown voltage temperature coefficient	$\Delta BV_{DSS}/\Delta T_J$	$I_D=250\mu A$, referenced to 25°C	-	0.6	-	$V/^{\circ}\text{C}$
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	$R_{DS(on)}$	$V_{GS}=10V, I_D=3.5A$	-	1.15	1.4	Ω
Dynamic characteristics						
Input capacitance	C_{iss}	$V_{DS}=25V, V_{GS}=0V, f=1\text{MHz}$	-	1020	-	pF
Output capacitance	C_{oss}		-	90	-	pF
Reverse transfer capacitance	C_{rss}		-	10.5	-	pF
Switching characteristics						
Turn-on delay time	$t_{d(on)}$	$V_{DD}=300V, I_D=7A, R_G=25\Omega$ (note4,5)	-	15	-	ns
Rise time	t_r		-	9	-	ns
Turn-off delay time	$t_{d(off)}$		-	83	-	ns
Fall time	t_f		-	21	-	ns
Total gate charge	Q_g	$V_{DS}=480V, I_D=7A, V_{GS}=10V$ (note4,5)	-	22	-	nC
Gate-source charge	Q_{gs}		-	5	-	nC
Gate-drain charge	Q_{gd}		-	8	-	nC
Drain-source diode characteristics and maximum ratings						
Drain-source diode forward voltage	V_{SD}	$V_{GS}=0V, I_{SD}=7A$	-	-	1.4	V
Continuous drain-source current	I_{SD}		-	-	7	A
Pulsed drain-source current	I_{SM}		-	-	28	A
Reverse recovery time	t_{rr}	$V_{GS}=0V, I_{SD}=7A, di/dt=100A/\mu s$ (note4)	-	405	-	ns
Reverse recovery charge	Q_{rr}		-	3.3	-	μC

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

2. $L=9\text{mH}, I_{AS}=7A, V_{DD}=50V, R_G=25\Omega$, starting $T_J=25^{\circ}\text{C}$

3. $I_{SD}\leq 7.0A, di/dt\leq 200A/\mu s, V_{DD}\leq BV_{DSS}$, 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

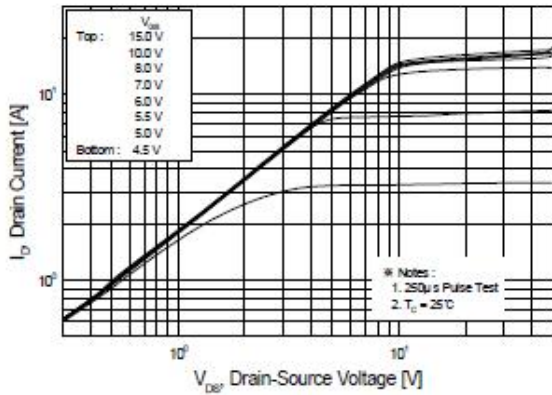


Figure 1. On-Region Characteristics

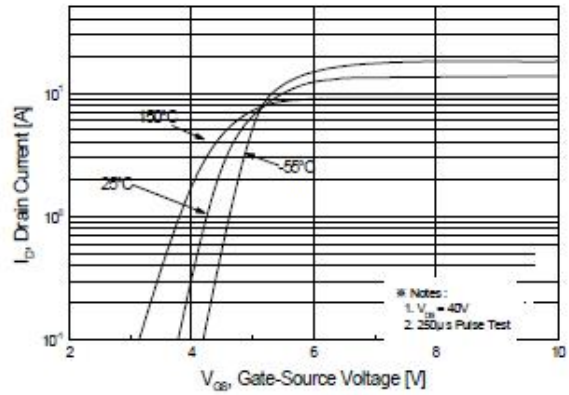


Figure 2. Transfer Characteristics

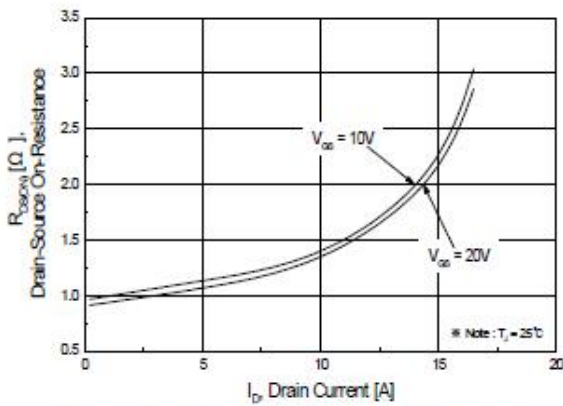


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

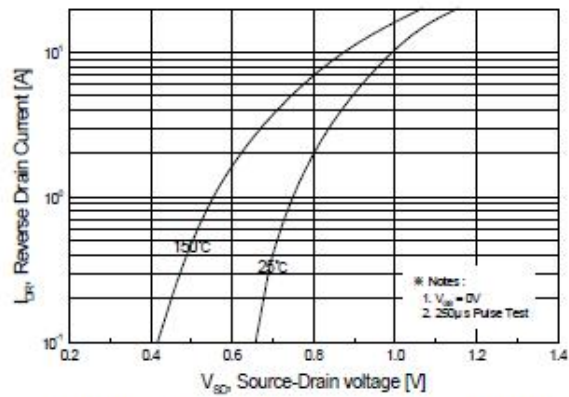


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

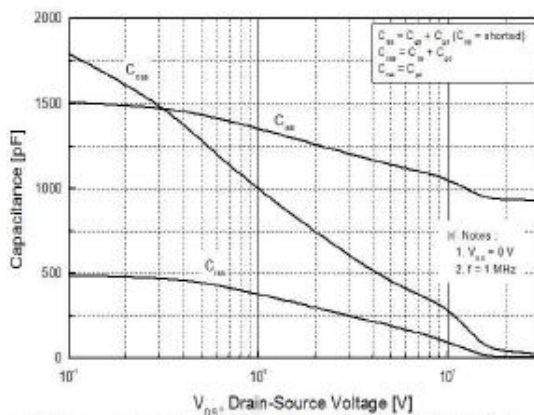


Figure 5. Capacitance Characteristics

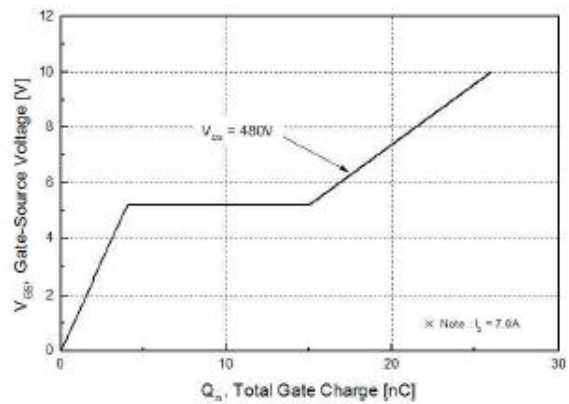


Figure 6. Gate Charge Characteristics

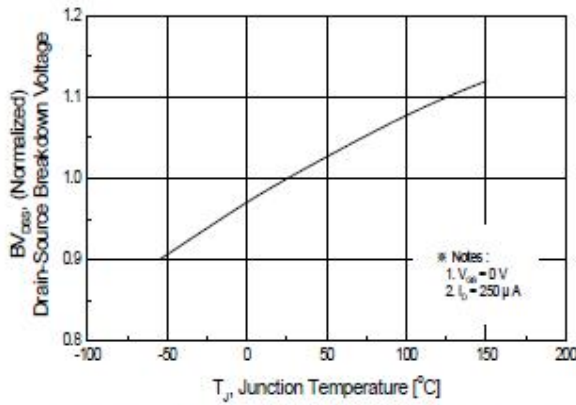


Figure 7. Breakdown Voltage Variation vs Temperature

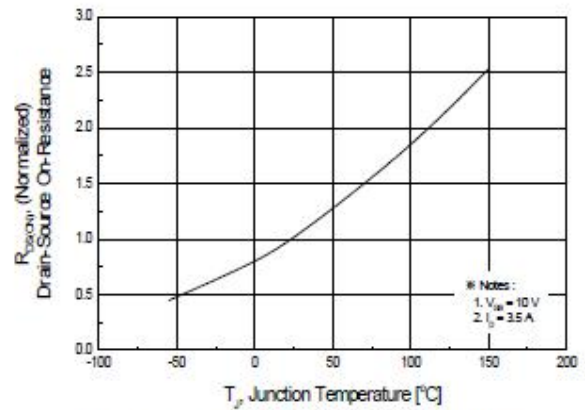


Figure 8. On-Resistance Variation vs Temperature

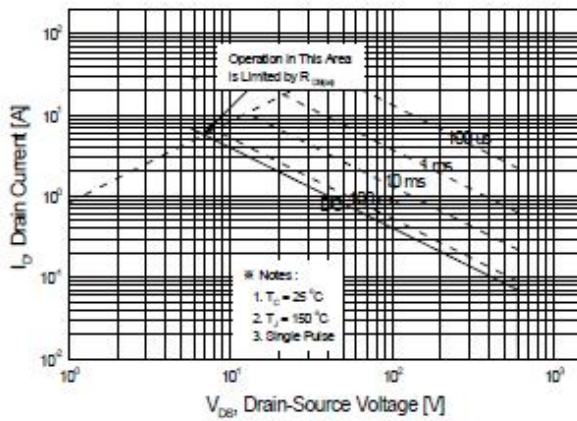


Figure 9 Maximum Safe Operating Area

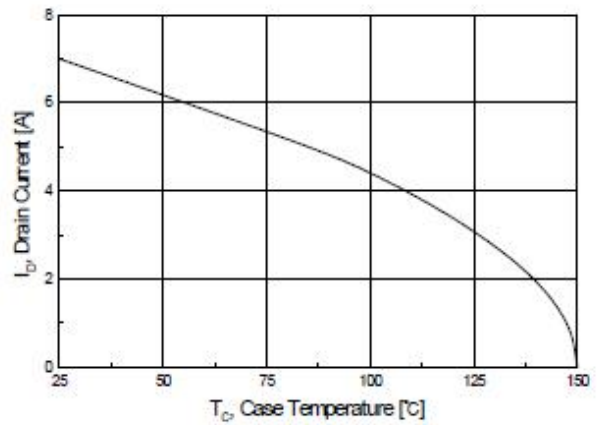


Figure 10. Maximum Drain Current vs Case Temperature

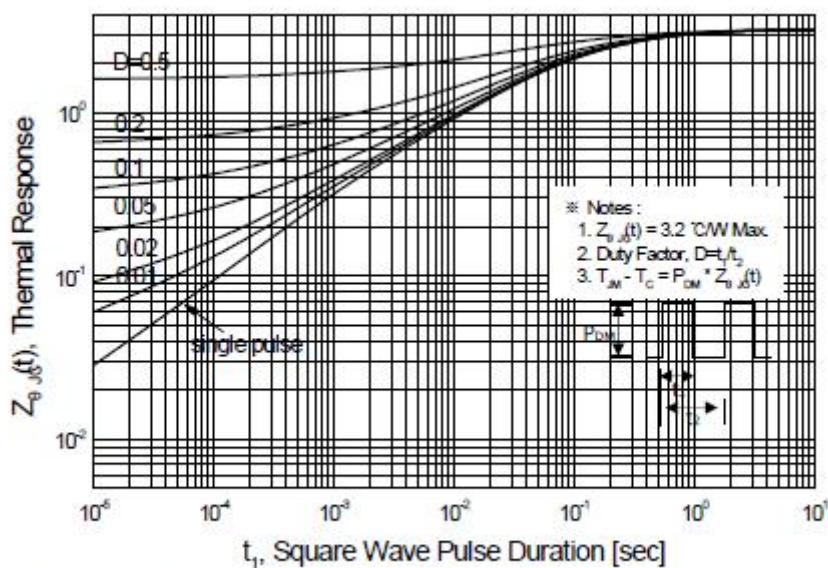
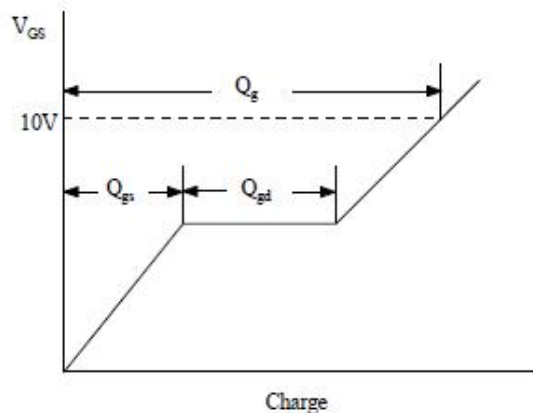
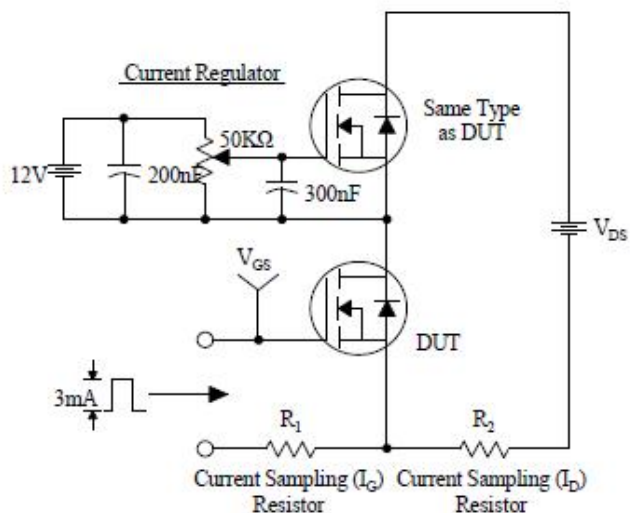
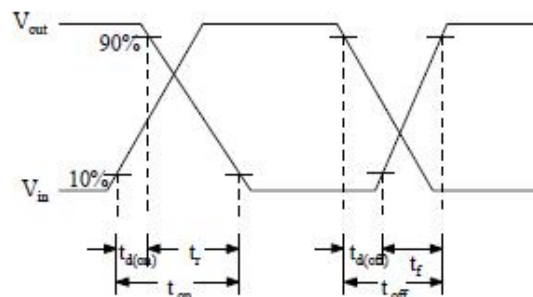
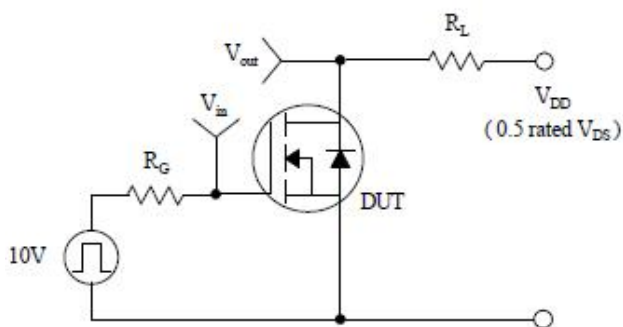


Figure 11 Transient Thermal Response Curve

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms

