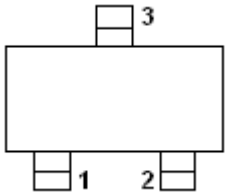
1. Description

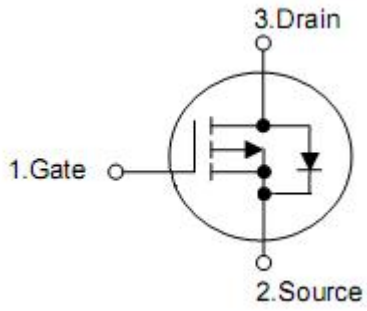
The KIA3409 uses advanced trench technology to provide excellent $R_{DS(on)}$ and low gate charge.This device is suitable for use as a load switch or in PWM applications.Standard Product KIA3409 is Pb-free(meets ROHS & Sony 259 specifications).

2. Features

- V_{DS}(V)=-30V
- I_D=-2.6A
- $R_{DS(on)}$<130mΩ(V_{GS}=-10V,I_D=-2.6A)
- $R_{DS(on)}$<200mΩ(V_{GS}=-4.5V,I_D=-2.0A)

3.Symbol





Pin	Function
1	Gate
2	Source
3	Drain

4. Absolute maximum ratings

(T_A=25°C,unless otherwise noted)

Parameter		Symbol	Rating	Units
Drain-source voltage		V_{DS}	-30	V
Gate-source voltage		V_{GS}	±20	V
Continuous drain current [A]	T_A=25ºC	I_D	-2.6	A
	T_A=70ºC		-2.2	
Pulsed drain current [B]		I_{DM}	-20	A
Total power dissipation [A]	T_A=25 ºC	P_D	1.4	W
	T_A=70ºC		1	W
Junction and storage temperature range		T_J,T_{STG}	-55 to150	ºC

5. Thermal characteristics

Parameter	Symbol	Typ	Max	Unit
Maximum junction-ambient [A](t≤10s)	$R_{\theta JA}$	70	90	ºC/W
Maximum junction-ambient [A]	$R_{\theta JA}$	100	125	ºC/W
Maximum junction-Lead [C]	$R_{\theta JL}$	63	80	ºC/W

6. Electrical characteristics

(T_A=25°C,unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Drain-source breakdown voltage	BV_{DSS}	V_{GS}=0V,I_D=-250μA	-30	-	-	V
Zero gate voltage drain current	I_{DSS}	V_{DS}=-24V, V_{GS}=0V	-	-	-1	μA
		T_J=55°C	-	-	-5	
Gate- body leakage current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250μA	-0.8	-1.9	-3	V
On state drain current	$I_{D(on)}$	V_{GS}=-4.5V, V_{DS}=-5V	-5	-	-	A
Static drain-source on-resistance	$R_{DS(on)}$	V_{GS}=-10V,I_D=-2.6A	-	97	130	mΩ
		T_J=125°C		135	150	
		V_{GS}=-4.5V,I_D=-2.0A	-	166	200	
Forward transconductance	gfs	V_{DS}=-5.0V, I_D=-2.5A	3	3.8	-	S
Diode forward voltage	V_{SD}	V_{GS}=0V,I_S=-1A	-	-0.82	-1.0	V
Maximum body-diode continuous current	I_S		-	-	-2.0	A
Input capacitance	C_{iss}	V_{DS}=-15V,V_{GS}=0V, f=1MHz	-	302	370	pF
Output capacitance	C_{oss}		-	50.3	-	
Reverse transfer capacitance	C_{rss}		-	37.8	53	
Gate resistance	R_g	V_{DS}=0V, V_{GS}=0V,f=1MHz	6	12	18	Ω
Total gate charge(10V)	Q_g(10)	V_{DS}=-15V, V_{GS}=-10V I_D =-2.6A	-	6.8	9	nC
Total gate charge(4.5V)	Q_g(4.5)			2.4	3.1	
Gate-source charge	Q_{gs}		-	1.6	-	
Gate-drain charge	Q_{gd}		-	0.95	-	
Turn-on delay time	$t_{d(on)}$	V_{DS}=-15V, R_L=5.8Ω,, R_G=3Ω, V_{GS}=-10V	-	7.5	-	ns
Rise time	t_r		-	3.2	-	
Turn-off delay time	$t_{d(off)}$		-	17	-	
Fall time	t_f		-	6.8	-	
Reverse recovery time	t_{rr}	IF=-2.6A,dI/dt=100A/μs,	-	16.8	22	nS
Reverse recovery charge	Q_{rr}		-	10	-	nC

7. Test circuits and waveforms

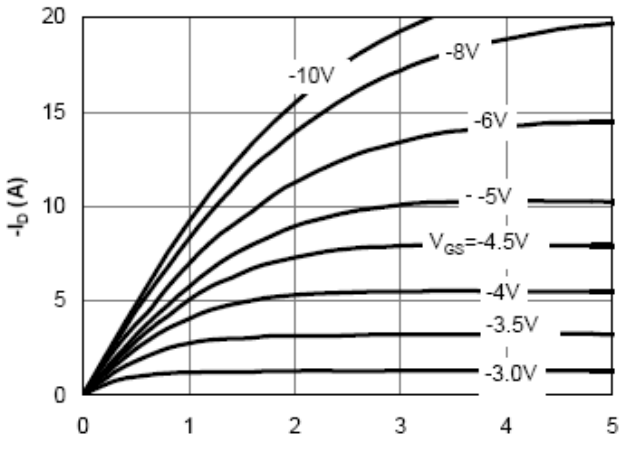


Fig 1: On-Region Characteristics

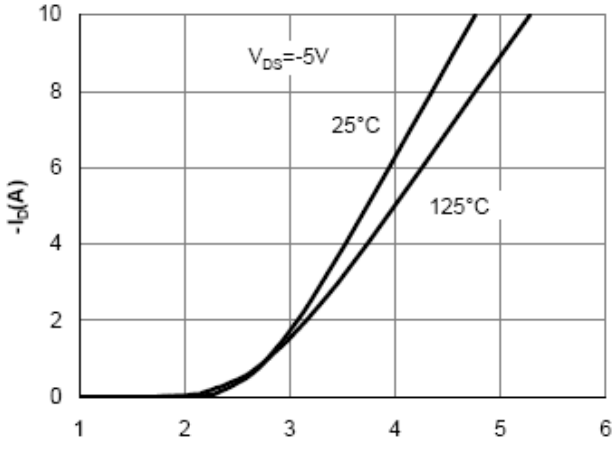


Figure 2: Transfer Characteristics

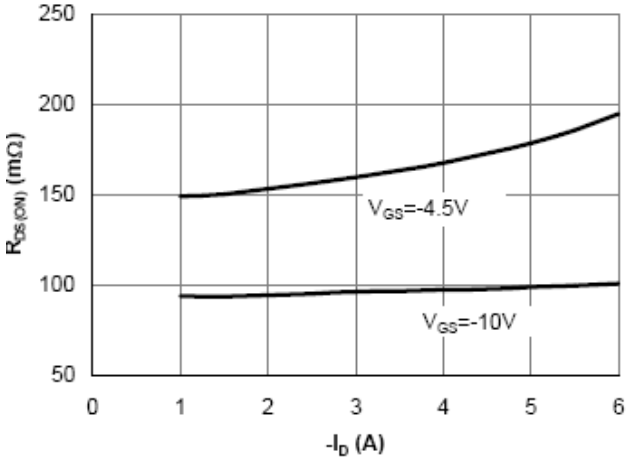


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

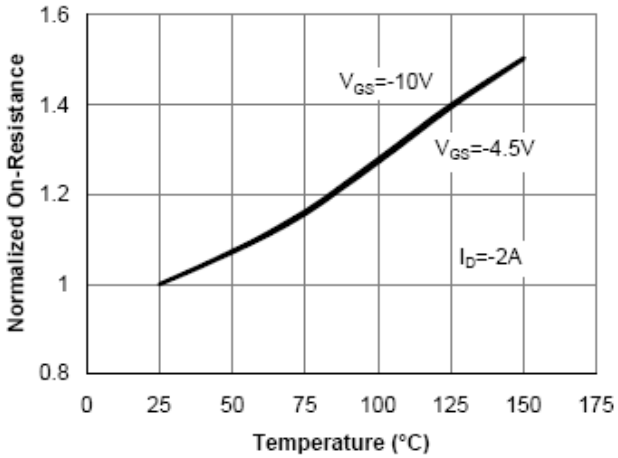


Figure 4: On-Resistance vs. Junction Temperature

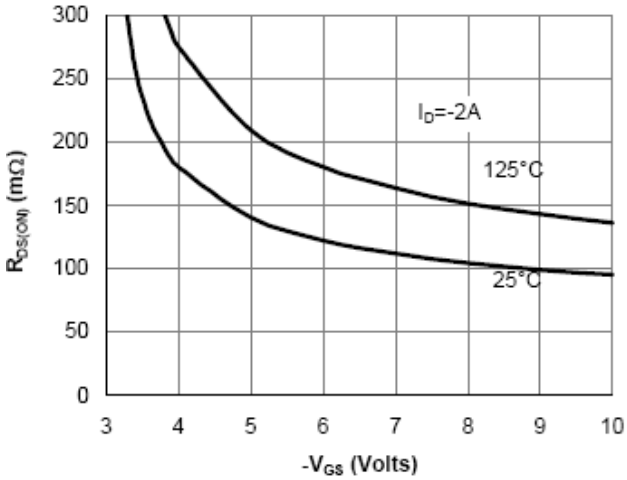


Figure 5: On-Resistance vs. Gate-Source Voltage

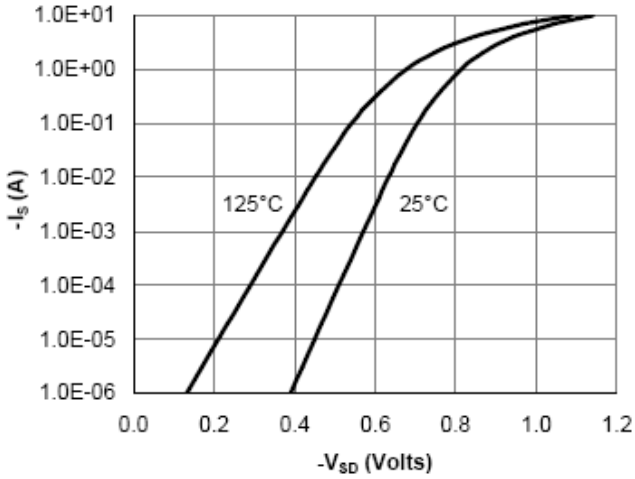


Figure 6: Body-Diode Characteristics

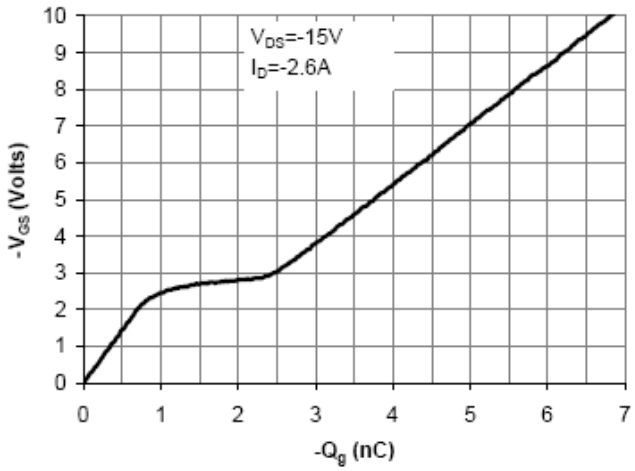


Figure 7: Gate-Charge Characteristics

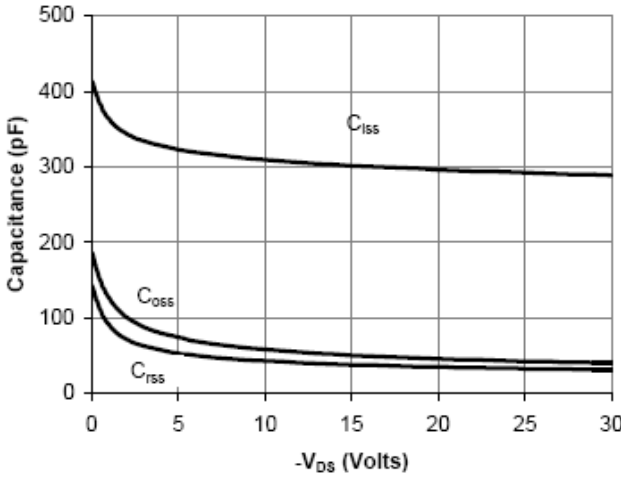


Figure 8: Capacitance Characteristics

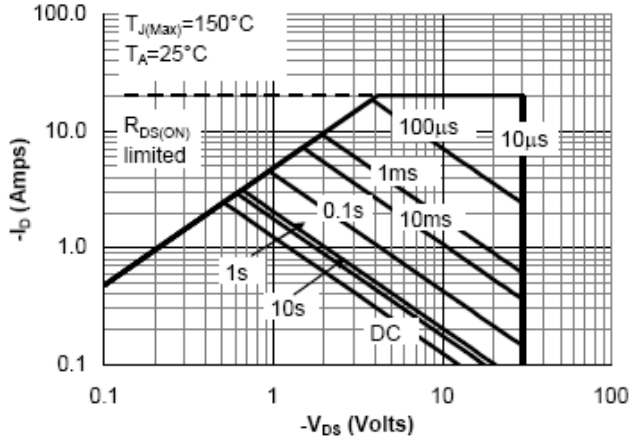


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

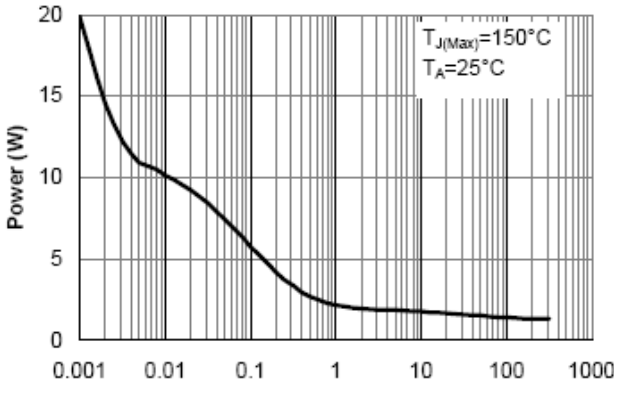


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

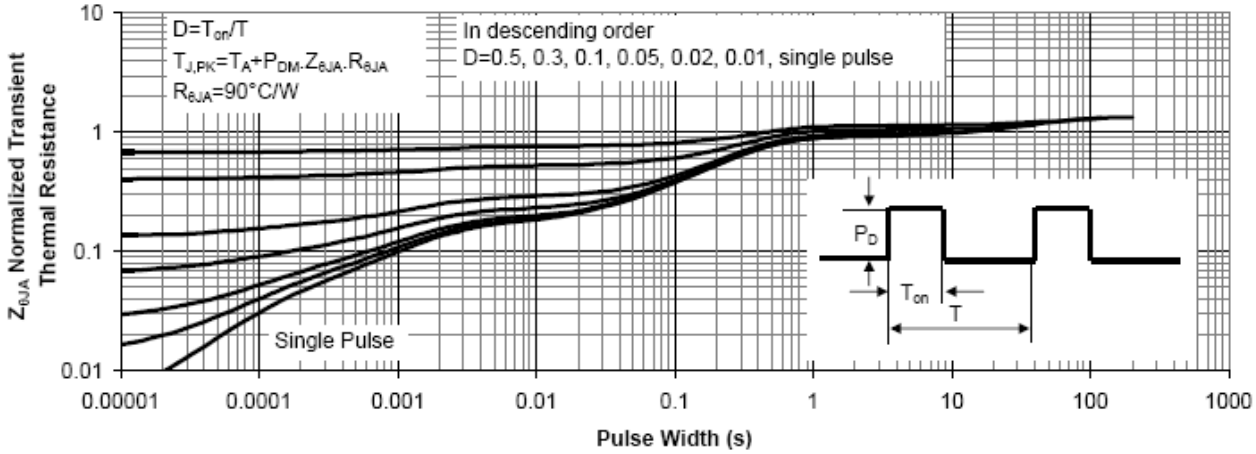


Figure 11: Normalized Maximum Transient Thermal Impedance