

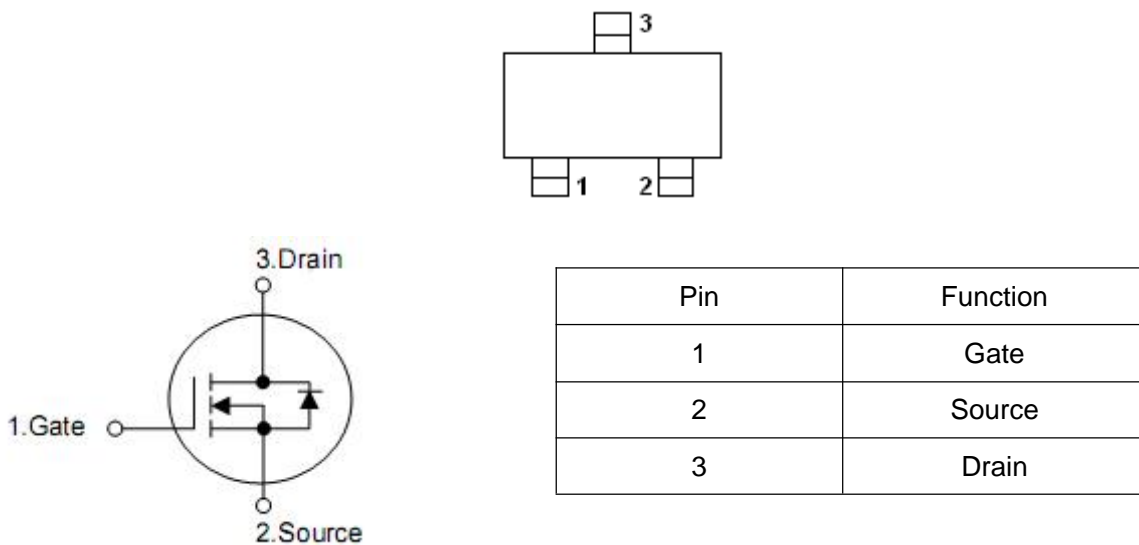
## 1. Description

The KIA3400 uses advanced trench technology to provide excellent  $R_{DS(on)}$ , low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a load switch or in PWM applications. Standard Product KIA3400 is Pb-free (meets ROHS & Sony 259 specifications). KIA3400 is a Green Product ordering option. KIA3400 is electrically identical.

## 2. Features

- n  $V_{DS}(V)=30V$
- n  $R_{DS(on)} < 40m\Omega (V_{GS}=10V, I_D=4.8A)$
- n  $R_{DS(on)} < 42m\Omega (V_{GS}=4.5V, I_D=4.0A)$
- n  $R_{DS(on)} < 55m\Omega (V_{GS}=2.5V, I_D=3.5A)$

## 3. Symbol



#### 4. Absolute maximum ratings

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

Parameter		Symbol	Rating	Units
Drain-source voltage		V <sub>DS</sub>	30	V
Gate-source voltage		V <sub>GS</sub>	±12	V
Continuous drain current <sup>A</sup>	T <sub>A</sub> =25°C	I <sub>D</sub>	4.8	A
Pulsed drain current <sup>B</sup>		I <sub>DM</sub>	30	A
Total power dissipation <sup>A</sup>	T <sub>A</sub> =25 °C	P <sub>D</sub>	1.4	W
	T <sub>A</sub> =70°C		1	W
Junction and storage temperature range		T <sub>J</sub> , T <sub>STG</sub>	-55 to 150	°C

#### 5. Thermal characteristics

Parameter	Symbol	Typ	Max	Unit
Maximum junction-ambient <sup>A</sup> (t≤10s)	R <sub>θJA</sub>	65	90	°C/W
Maximum junction-ambient <sup>A</sup>	R <sub>θJA</sub>	85	125	°C/W
Maximum junction-Lead <sup>C</sup>	R <sub>θJL</sub>	43	60	°C/W

## 6. Electrical characteristics

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Drain-source breakdown voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS}=25V, V_{GS}=0V$	-	-	1	$\mu A$
Gate- body leakage current	$I_{GSS}$	$V_{GS}=\pm 12V, V_{DS}=0V$	-	-	100	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.6	-	-	V
On state drain current	$I_{D(on)}$	$V_{GS}=4.5V, V_{DS}=5V$	30	-	-	A
Static drain-source on-resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=4.8A$	-	-	40	m $\Omega$
		$V_{GS}=4.5V, I_D=4.0A$	-	-	42	
		$V_{GS}=2.5V, I_D=3.5A$	-	-	55	
Forward transconductance	$g_{fs}$	$V_{DS}=5V, I_D=4.8A$	10	15	-	S
Diode forward voltage	$V_{SD}$	$V_{GS}=0V, I_S=1A$	-	0.71	1.2	V
Maximum body-diode continuous current	$I_S$		-	-	2.5	A
Input capacitance	$C_{iss}$	$V_{DS}=15V, V_{GS}=0V,$ $f=1\text{MHz}$	-	823	1030	pF
Output capacitance	$C_{oss}$		-	99	-	
Reverse transfer capacitance	$C_{rss}$		-	77	-	
Gate resistance	$R_g$	$V_{DS}=0V,$ $V_{GS}=0V, f=1\text{MHz}$	-	1.2	3.6	$\Omega$
Total gate charge	$Q_g$	$V_{DS}=15V, V_{GS}=4.5V$ $I_D=5.8A$	-	9.7	12	nC
Gate-source charge	$Q_{gs}$		-	1.6	-	
Gate-drain charge	$Q_{gd}$		-	3.1	-	
Turn-on delay time	$t_{d(on)}$	$V_{DS}=15V, R_L=2.7\Omega,$ $R_G=3\Omega, V_{GS}=10V$	-	3.3	5	ns
Rise time	$t_r$		-	4.8	7	
Turn-off delay time	$t_{d(off)}$		-	26.3	40	
Fall time	$t_f$		-	4.1	6	
Reverse recovery time	$t_{rr}$	$I_F=5A, di/dt=100A/\mu s,$	-	16	20	nS
Reverse recovery charge	$Q_{rr}$		-	8.9	12'	nC

Note:A.The value of  $R_{\theta JA}$  is measured with the device mounted on 1 in<sup>2</sup> FR-4 board with 2oz.Copper,in a still air environment with  $T_A=25^\circ\text{C}$ .The value in any given application depends on the user's specific board design.The current rating is based on the  $t \leq 10s$  thermal resistance rating.

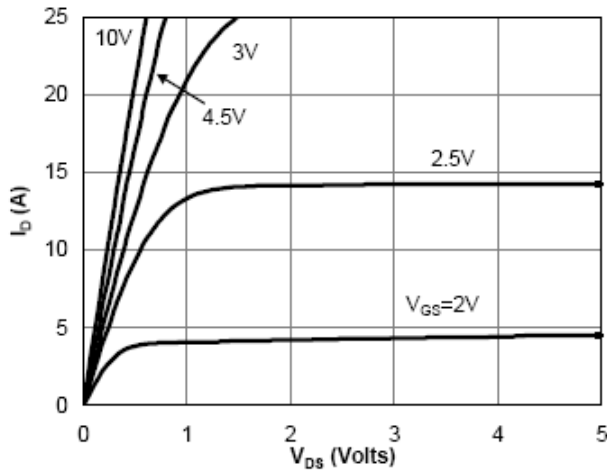
B.Repetitive rating,pulse width limited by junction temperature.

C.The  $R_{\theta JA}$  the sum of the thermal inpedence from junction to lead  $R_{\theta JI}$  and lead to ambient.

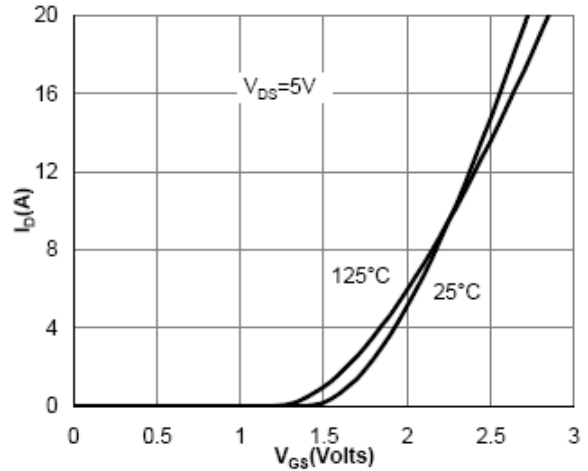
D.The static characteristics in Figures 1 to 6,12,14 are obtained using 80 $\mu s$  pulses,duty cycle 0.5% max.

E.These tests are performed with the device mounted on 1 in<sup>2</sup> FR-4 board with 2oz. Copper,in a still air environment with  $T_A=25^\circ\text{C}$ .The SOA curve provides a single pulse rating.

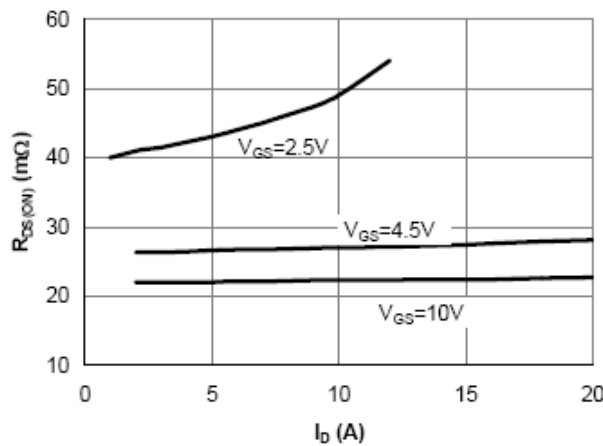
**7. Test circuits and waveforms**



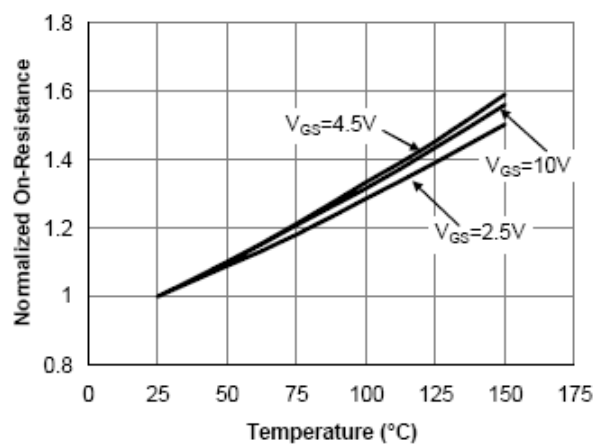
**Fig 1: On-Region Characteristics**



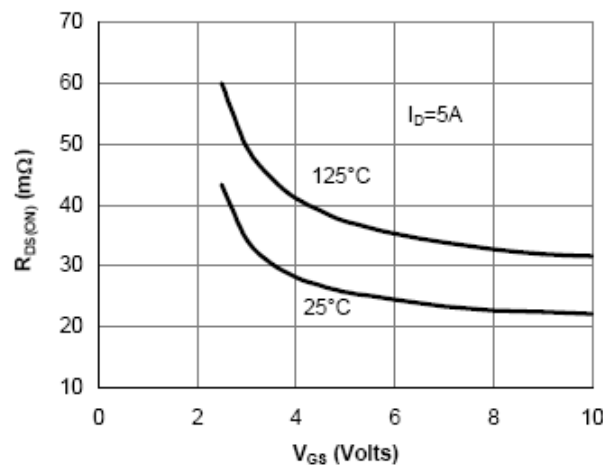
**Figure 2: Transfer Characteristics**



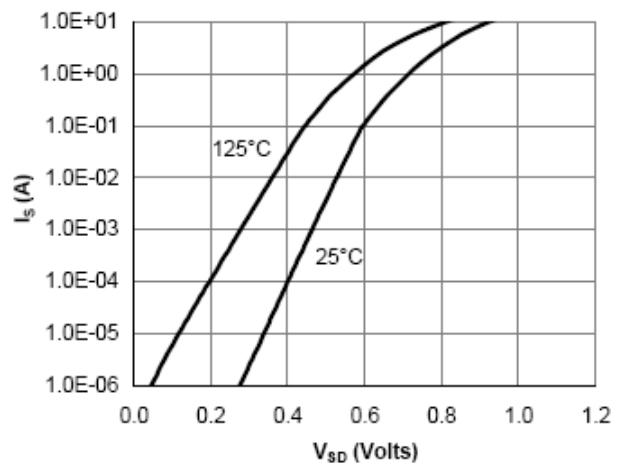
**Figure 3: On-Resistance vs. Drain Current and Gate Voltage**



**Figure 4: On-Resistance vs. Junction Temperature**



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



**Figure 6: Body-Diode Characteristics**

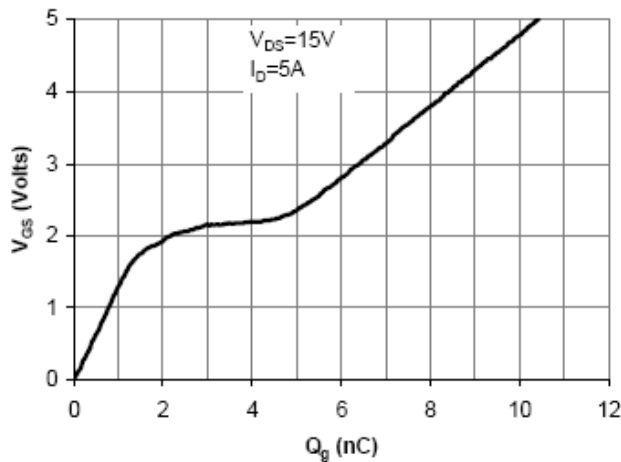


Figure 7: Gate-Charge Characteristics

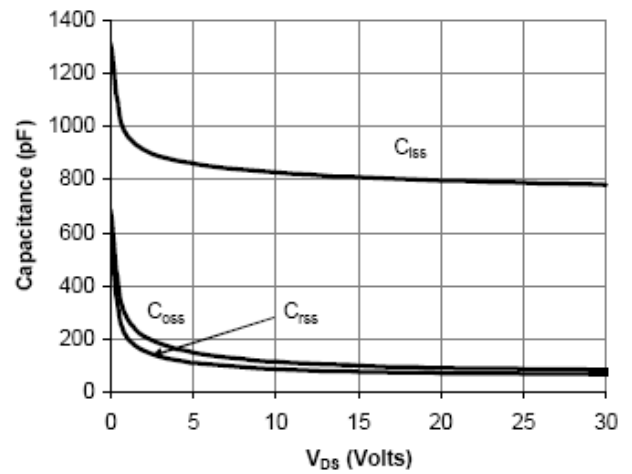


Figure 8: Capacitance Characteristics

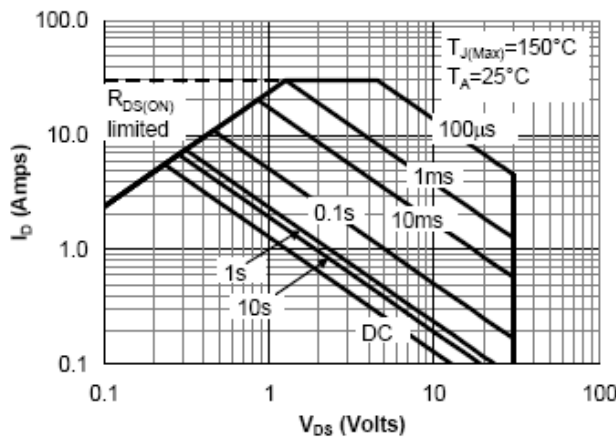


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

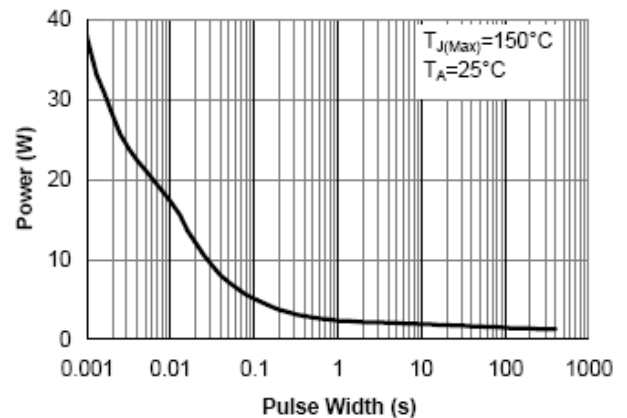


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

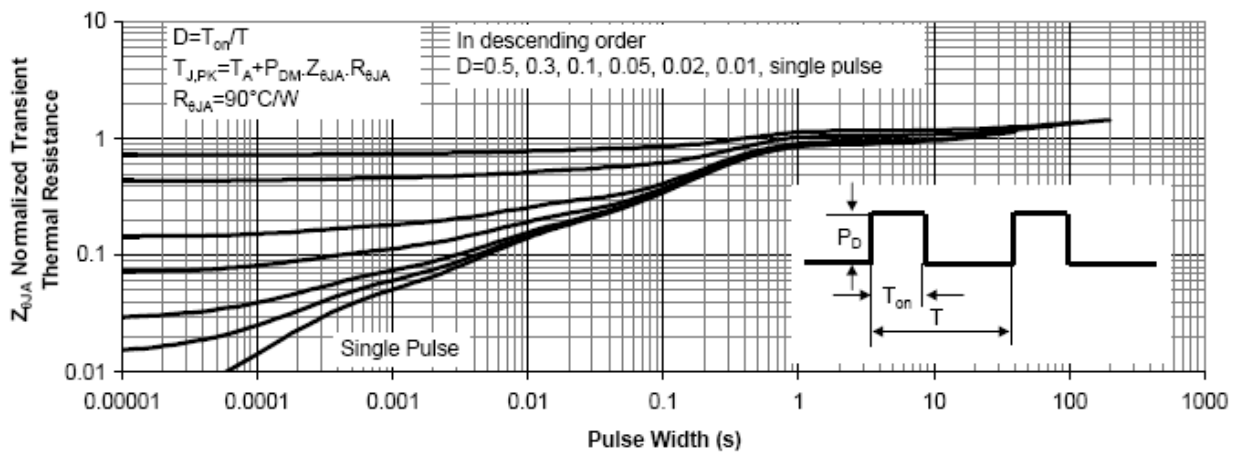


Figure 11: Normalized Maximum Transient Thermal Impedance