

## 1. Description

The KIA2302 is a N-Channel Power MOS FET with low on-state resistance and ultra high-speed switching characteristics. Because high-speed switching is possible, the IC can be efficiently set thereby saving energy. In order to counter static, a gate protect diode is built-in. The small SOT23 package makes high density mounting possible.

## 2. Features

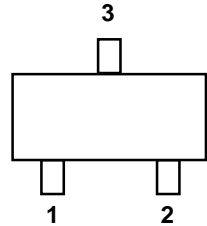
- Low on-state resistance:  $R_{ds(on)}=0.055\text{ohm}(V_{gs}=4.5\text{V})$   
:  $R_{ds(on)}=0.082\text{ohm}(V_{gs}=2.5\text{V})$
- Rugged and reliable
- Lead free product is acquired
- SOT23 package

## 2. Applications

- Notebook PCs
- Cellular and portable phones
- On-board power supplies
- Li-ion battery systems

## 4. Pinning Information

Table1: Pinning-SOT23,simplified outline

Pin	Description SOT23	Simplified outline
1	Gate	 <p>(SOT23 Front View)</p>
2	Source	
3	Drain	

## 5. Ordering Information

Table2: Ordering Information

Number	Description	Marking
1	KIA2302	2A

## 6.Package Information

SOT23:3K/Reel 30K/Box 360K/CTN

## 7.Maximum Ratings(Ta=25°C)

Table3: Maximum Ratings

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	20	V
Gate-Source Voltage	$V_{GS}$	± 8	V
Drain Current-continus	$I_D$	3.0	A
Drain Current-Pulsed <sup>a</sup>	$I_{DM}$	10	A
Power dissipation	$P_D$	1.25	W
Operating and Storage temperature	$T_J, T_{STG}$	-55~+150	°C

## 8.Thermal Characteristics

Table4: Thermal Characteristics

Parameter	Symbol	Min	Max	Unit
Thermal Resistance,Junction-to-Ambient <sup>b</sup>	$R_{THJA}$		100	°C/W

## 9.Electrical Characteristics (T<sub>A</sub>=25 °C,Unless otherwise noted)

Table5: Off Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=-10\mu A$	20			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=20V, V_{GS}= 0V$			1	uA
Gate Body Leakage Current,Forward	$I_{GSSF}$	$V_{GS}= 8V, V_{DS}= 0V$			100	nA
Gate Body Leakage Current,Reverse	$I_{GSSR}$	$V_{GS}= -8V, V_{DS}= 0V$			-100	nA

**Table6: On Characteristics<sup>c</sup>**

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=50\mu A$	0.65		1.20	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=3.6A$		0.055	0.072	ohm
		$V_{GS}=2.5V, I_D=3.1A$		0.082	0.110	ohm
Forward Transconductance	$g_{FS}$	$V_{DS}=5V, I_D=3.6A$		8.5		S

**Table7: Dynamic Characteristics<sup>d</sup>**

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Input Capacitance	$C_{iss}$	$V_{DS}=10V, V_{GS}=0V, f=1.0MHz$		237		pF
Output Capacitance	$C_{oss}$	$V_{DS}=10V, V_{GS}=0V, f=1.0MHz$		120		pF
Reverse Transfer Capacitance	$C_{rss}$	$V_{DS}=10V, V_{GS}=0V, f=1.0MHz$		45		pF

**Table8: Switching Characteristics<sup>d</sup>**

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=10V, I_D=3.6A, V_{GS}=4.5V, R_{GEN}=6.0ohm$		23	45	ns
Turn-On Rise Time	$t_r$	$V_{DD}=10V, I_D=3.6A, V_{GS}=4.5V, R_{GEN}=6.0ohm$		11	30	ns
Turn-Off Delay Time	$t_{d(off)}$	$V_{DD}=10V, I_D=3.6A, V_{GS}=4.5V, R_{GEN}=6.0ohm$		34	70	ns
Turn-Off Fall Time	$t_f$	$V_{DD}=10V, I_D=3.6A, V_{GS}=4.5V, R_{GEN}=6.0ohm$		36	70	ns
Total Gate Charge	$Q_g$	$V_{DS}=10V, I_D=3.6A, V_{GS}=4.5V$		6	10	nC
Gate-Source Charge	$Q_{gs}$	$V_{DS}=10V, I_D=3.6A, V_{GS}=4.5V$		1.4		nC
Gate-Drain Charge	$Q_{gd}$	$V_{DS}=10V, I_D=3.6A, V_{GS}=4.5V$		1.8		nC

**Table9: Drain-Source Diode Characteristics and Maximun Ratings**

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Drain-Source Diode Forward Current <sup>b</sup>	$I_S$				0.94	A
Drain-Source Diode Forward Voltage <sup>c</sup>	$V_{SD}$	$V_{GS}=0V, I_S=0.94A$			1.2	V

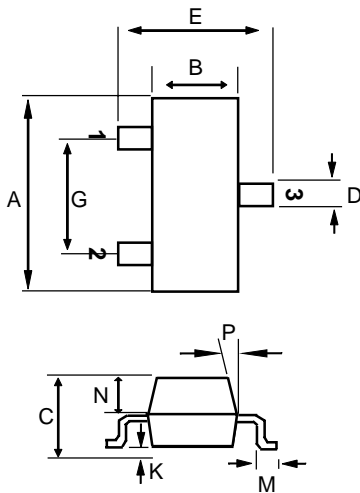
**Notes:**

- a.Repetitive Rating:Pulse width limited by maximum junction temperature.
- b.Surface Mounted on FR4 Board, $t<5$  sec.
- c.Pulse Test:Pulse width $\leq 300\mu s$ ,Duty Cycle $\leq 2\%$ .
- d.Guaranteed by design,not subject to production testing.

## 10.Package Outline

Dimensions(mm are the original dimensions)

Table10: SOT23 package outline



Dim	Min	Max
A	2.85	3.04
B	1.20	1.40
C	0.90	1.10
D	0.40	0.50
E	2.20	2.70
G	1.80	2.00
K	0.00	0.10
M	0.20	
N	0.50	0.70
P	5°	9°