YK2305A

P-Channel Enhancement Mode Field Effect Transistor

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HORNBY ELECTRONIC

General Description

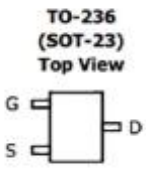
The YK2305A uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a battery protection or in other switching applications.

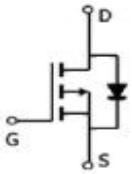
Application

- Battery protection
- Load switch
- Power management

Features

- V_{DS} = -20V,I_D = -4.1A
  $R_{DS(ON)}$ <60mΩ @V_{GS}=-2.5V
  $R_{DS(ON)}$ <45mΩ @V_{GS}=-4.5V
- High power and current handing capability
- Lead free product is acquired
- Surface mount package





Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
2305	YK2305A	SOT-23	Ø180mm	8mm	3000 units

Absolute Maximum Ratings (T_A=25°Cunless otherwise noted)

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DSS}	-20	V
Gate-Source Voltage	V_{GSS}	±12	V
Drain Current-Continuous V_{GS}=-4.5V，@Ta=25°C	I_D	-4.1	A
Drain Current –Pulsed[Note1]	I_{DM}	-20	A
Maximum Power Dissipation @Ta=25°C	P_D	1.7	W
Operating Junction and Storage Temperature Range	T_J	-55 ~ +150	°C

Thermal Characteristics

Thermal Resistance,Junction-to-Ambient[Note2]	$R_{\theta JA}$	125	°C/W

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Electrical Characteristics (T_A=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}= 0V, I_D = -250μA	-20	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = -20V, V_{GS} = 0V	-	-	-1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS} = ±12V,V_{DS} = 0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}= V_{GS}, I_{DS}= -250μA	-0.5	-0.7	-1	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}= -4.5V, I_{DS}= -4.1A	-	28	45	mΩ
		V_{GS}=-2.5V, I_{DS} = -3A	-	37	60	
Forward Transconductance	g_{FS}	V_{DS} =-5V, I_D=-4A	-	6	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{iss}	V_{DS}= -10V , V_{GS} = 0V, f =1.0MHz	-	1080	-	pF
Output Capacitance	C_{oss}		-	110	-	
Reverse Transfer Capacitance	C_{rss}		-	102	-	
Switching Characteristics (Note 4)						
Turn-on Delay Time	$T_{d(on)}$	V_{DS}=-10V , I_D=-1A RL=2.8Ω,V_{GEN} =-4.5V , R_G= 6Ω	-	11		ns
Turn-on Rise Time	T_r		-	52		
Turn-Off Delay Time	$T_{d(OFF)}$		-	17		
Turn-Off Fall Time	T_f		-	10		
Total Gate Charge	Q_g	VDS=-10V,ID=-4.1A, VGS=-4.5V	-	7.8	-	nC
Gate-Source Charge	Q_{gs}		-	1.2	-	
Gate-Drain Charge	Q_{gd}		-	1.6	-	
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	I_S =-4.1A, V_{GS}=0V Tj = 25°C	-	-	-1.2	V
Diode Forward Current (Note 2)	I_S		-	-	-4.1	A

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production

Typical Electrical and Thermal Characteristics

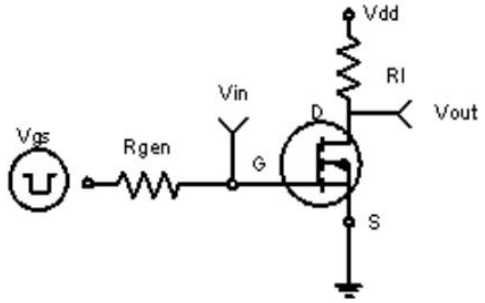

Figure 1:Switching Test Circuit

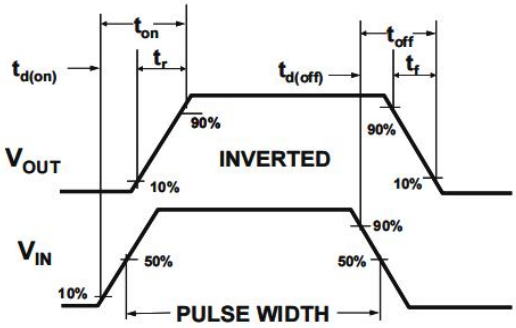

Figure 2:Switching Waveforms

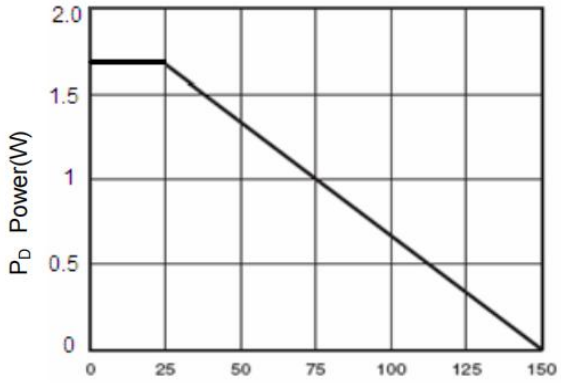

Figure 3 Power Dissipation

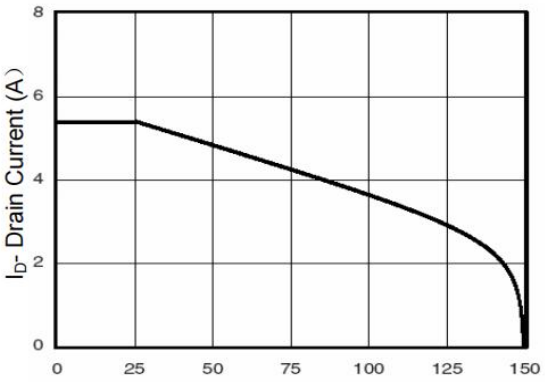

Figure 4 Drain Current

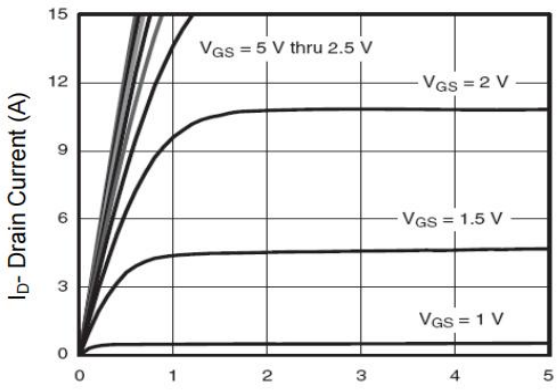

Figure 5 Output Characteristics

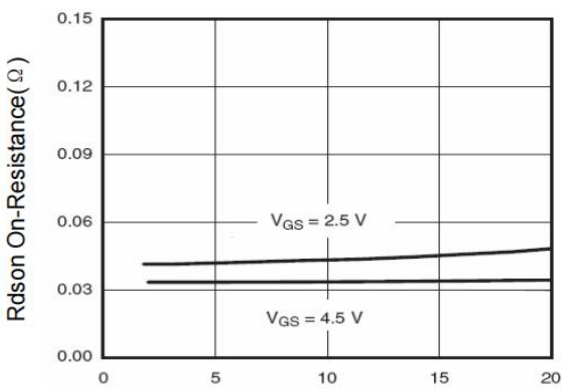

Figure 6 Drain-Source On-Resistance

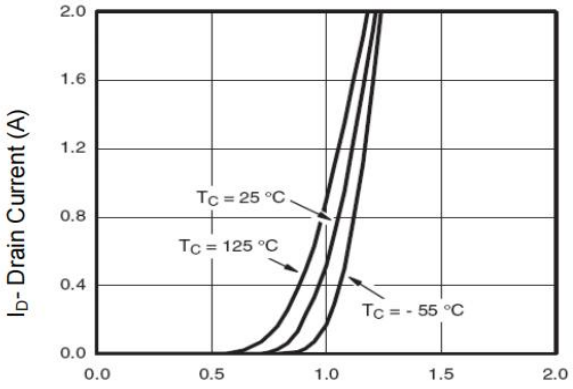

Figure 7 Transfer Characteristics

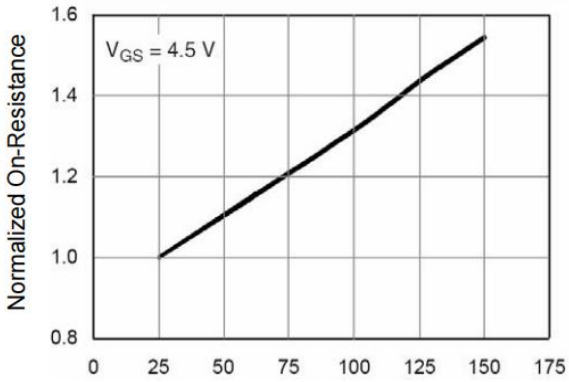

Figure 8 Drain-Source On-Resistance

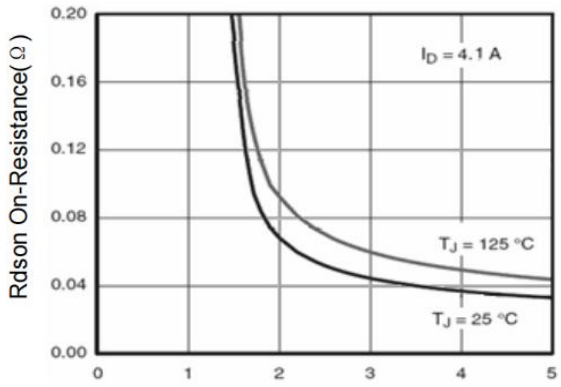

Figure 9 Rdson vs Vgs

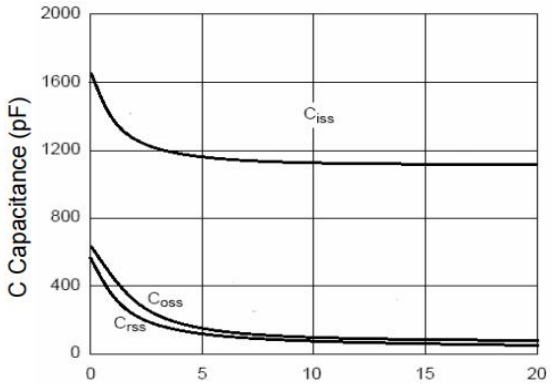

Figure 10 Capacitance vs Vds

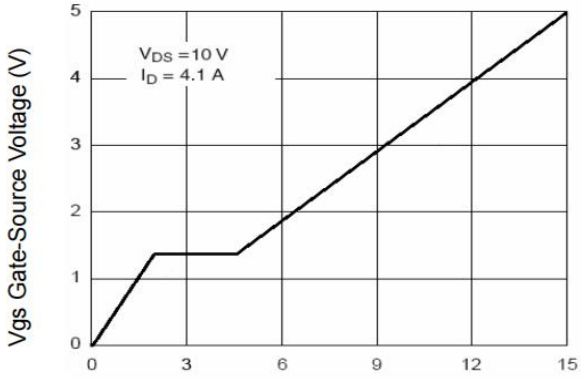

Figure 11 Gate Charge

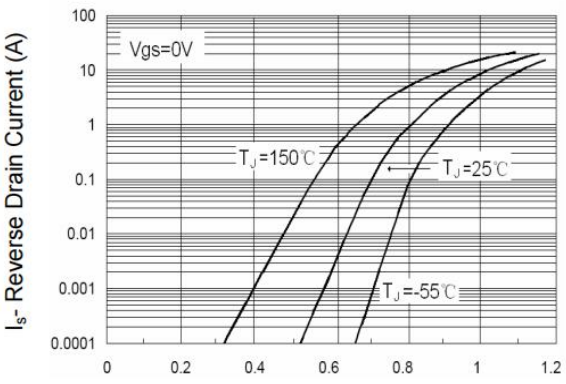

Figure 12 Source- Drain Diode Forward

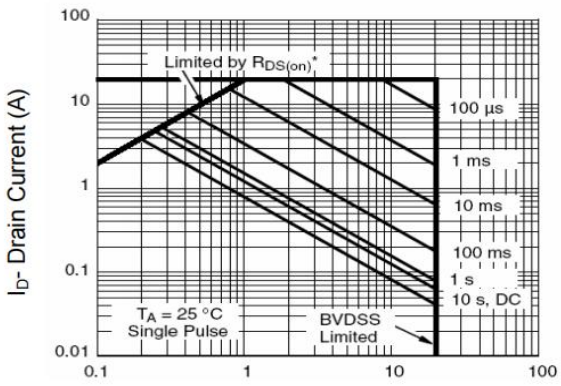

Figure 13 Safe Operation Area

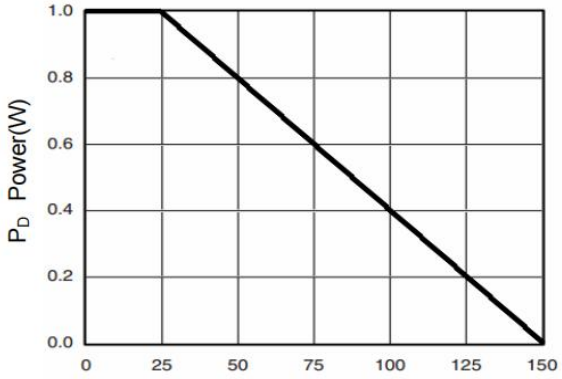

Figure 14 Power Dissipation

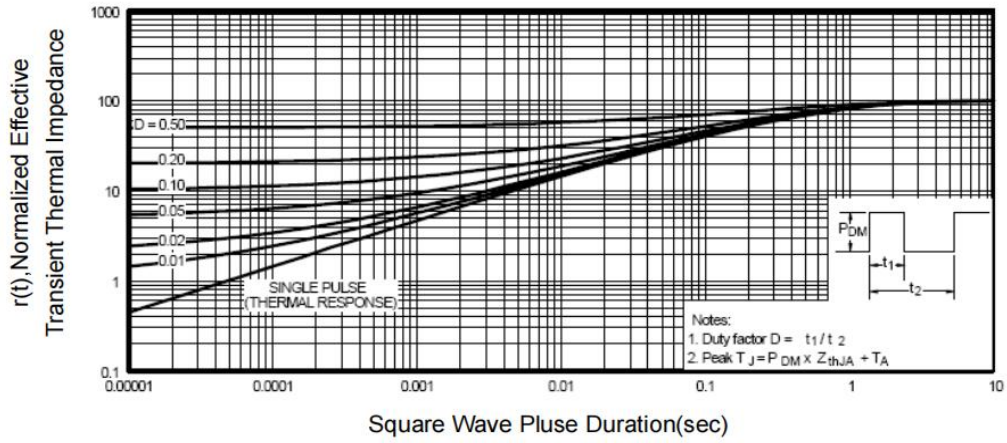

Figure 15 Normalized Maximum Transient Thermal Impedance

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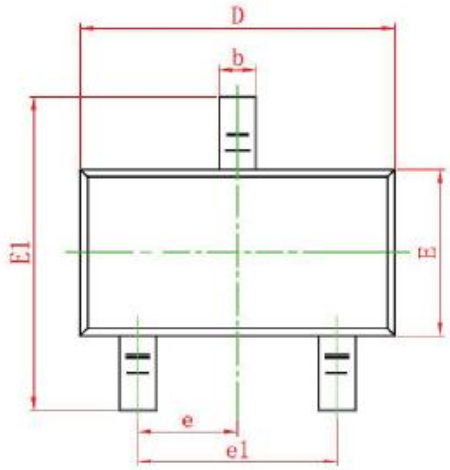
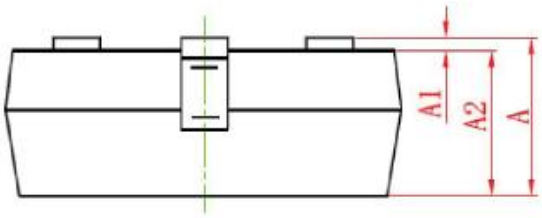
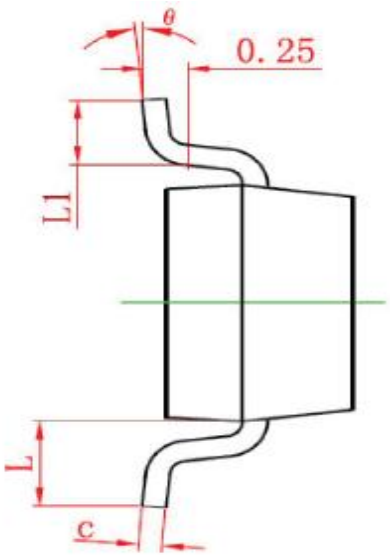
SOT-23 Package Information







Symbol	Dimensions in Millimeters	
	MIN	MAX
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
C	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950 TYP	
e1	1.800	2.000
L	0.550 REF	
L1	0.300	0.500
θ	0°	8°