YK3401A

P-Channel Enhancement Mode Field Effect Transistor

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HORNBY ELECTRONIC

General Description

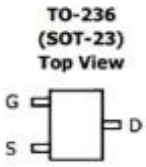
The YK3401A uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a load switch or in PWM applications.

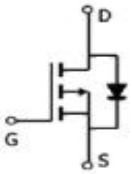
Application

- PWM application
- Load switch
- Power management

Features

- V_{DS} = -30V,I_D = -4.4A
  $R_{DS(ON)}$ <85mΩ @V_{GS}=-2.5V
  $R_{DS(ON)}$ <65mΩ @V_{GS}=-4.5V
  $R_{DS(ON)}$ <52mΩ @V_{GS}=-10V
- 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
A19T	YK3401A	SOT-23	Ø180mm	8mm	3000 units

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

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DSS}	-30	V
Gate-Source Voltage	V_{GSS}	±12	V
Drain Current-Continuous V_{GS}=-4.5V，@Ta=25°C	I_D	-4.4	A
Drain Current –Pulsed[Note1]	I_{DM}	-30	A
Maximum Power Dissipation @Ta=25°C	P_D	1.3	W
Operating Junction and Storage Temperature Range	T_J	-55 ~ +150	°C

Thermal Characteristics

Thermal Resistance,Junction-to-Ambient[Note2]	$R_{\theta JA}$	95	°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	-30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = -30V, 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	-0.7	-1	-1.3	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}= -10V, I_{DS}= -4.2A	-	45	52	mΩ
		V_{GS}= -4.5V, I_{DS}= -4.2A	-	52	65	
		V_{GS}=-2.5V, I_{DS}= -1A	-	68	85	
Forward Transconductance	g_{FS}	V_{DS} =-5V, I_D=-1A	-	10	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{iss}	V_{DS}= -15V , V_{GS} = 0V, f =1.0MHz	-	920	-	pF
Output Capacitance	C_{oss}		-	105	-	
Reverse Transfer Capacitance	C_{rss}		-	70	-	
Switching Characteristics (Note 4)						
Turn-on Delay Time	$T_{d(on)}$	V_{DS}=-15V , I_D=-4A V_{GS} =-10V , R_{Gen}= 6Ω	-	7		ns
Turn-on Rise Time	T_r		-	3		
Turn-Off Delay Time	$T_{d(OFF)}$		-	30		
Turn-Off Fall Time	T_f		-	12		
Total Gate Charge	Q_g	VDS=-15V,ID=-4A,VGS=-4.5V	-	8.8	-	nC
Gate-Source Charge	Q_{gs}		-	2	-	
Gate-Drain Charge	Q_{gd}		-	2.9	-	
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	I_S =4.4A, V_{GS}=0V Tj = 25°C	-	-	-1.2	V

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

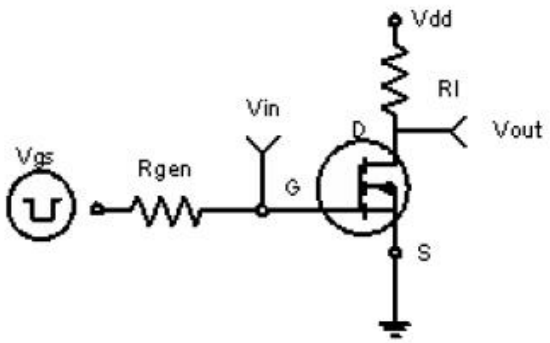


Figure 1:Switching Test Circuit

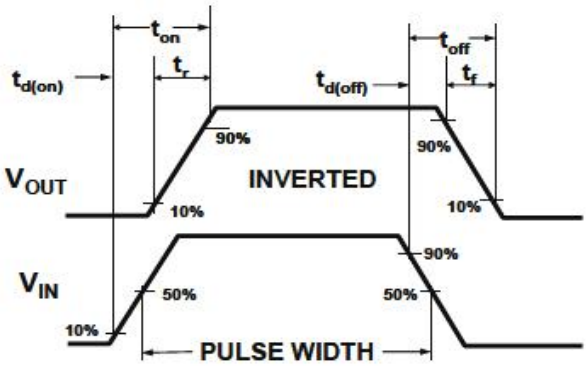
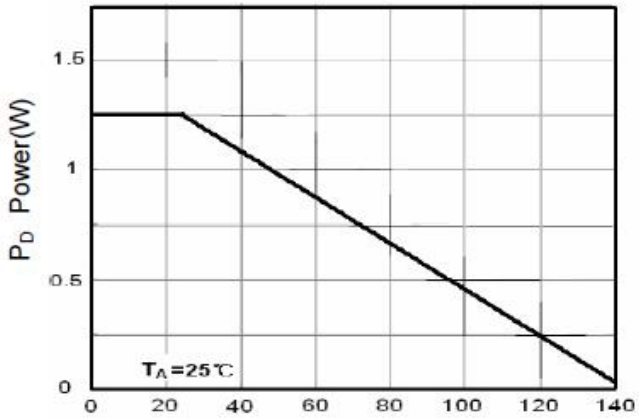
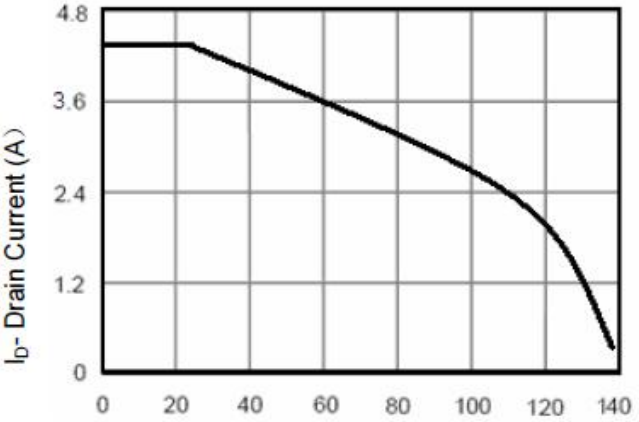


Figure 2:Switching Waveforms



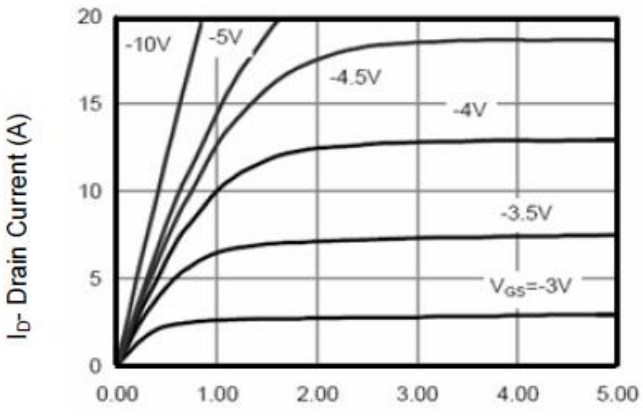
T_J-Junction Temperature(℃)

Figure 3 Power Dissipation



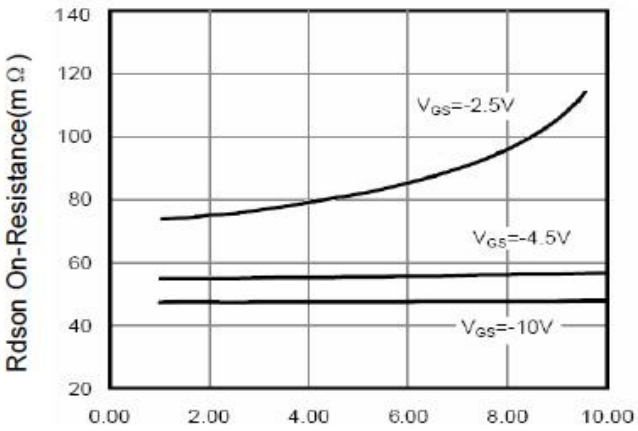
T_J-Junction Temperature(℃)

Figure 4 Drain Current



Vds Drain-Source Voltage (V)

Figure 5 Output Characteristics



I_D- Drain Current (A)

Figure 6 Drain-Source On-Resistance

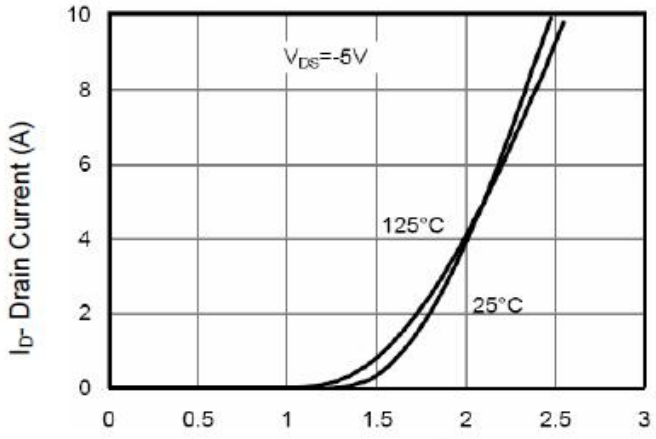


Figure 7 Transfer Characteristics

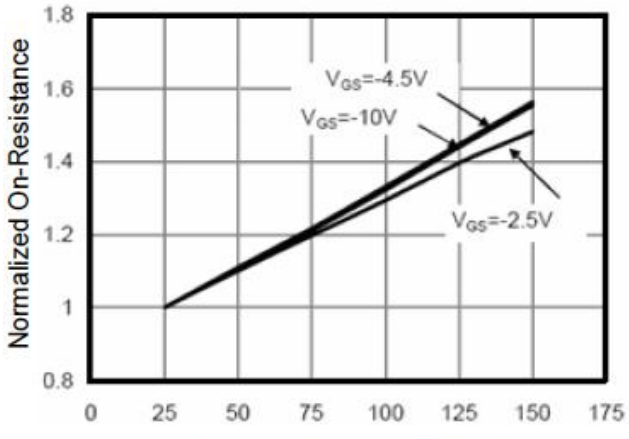


Figure 8 Drain-Source On-Resistance

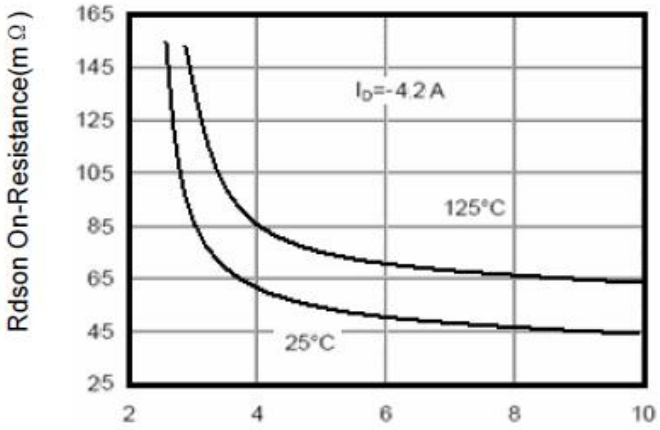


Figure 9 Rdson vs Vgs

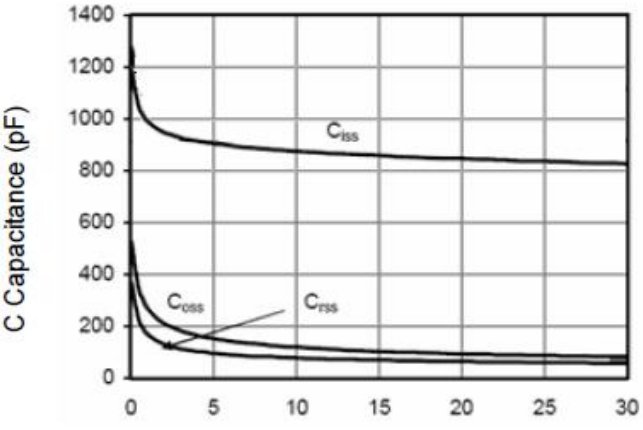


Figure 10 Capacitance vs Vds

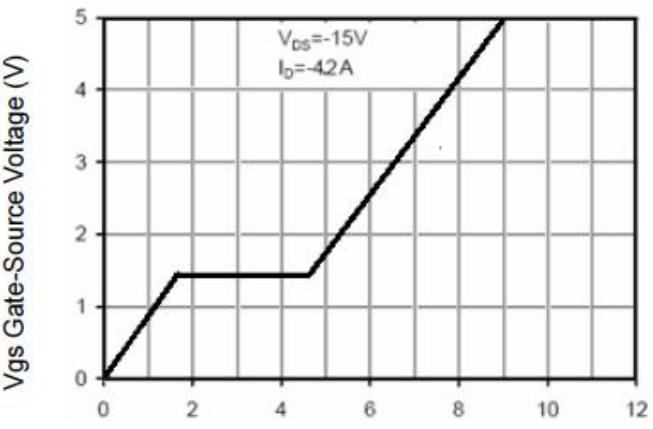


Figure 11 Gate Charge

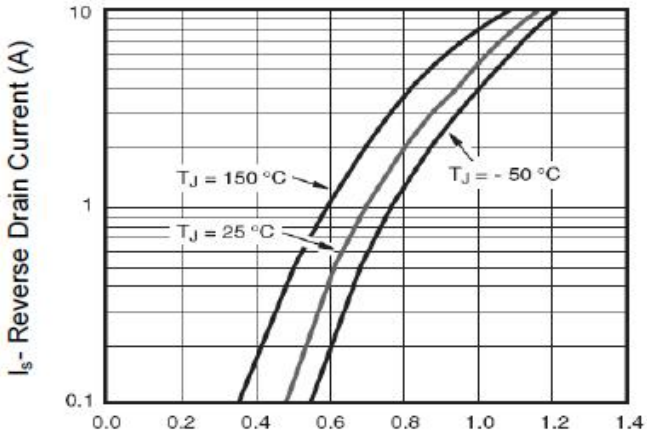


Figure 12 Source- Drain Diode Forward

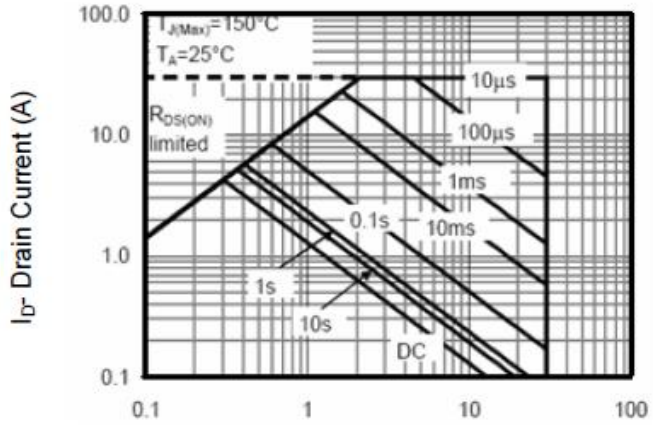


Figure 13 Safe Operation Area

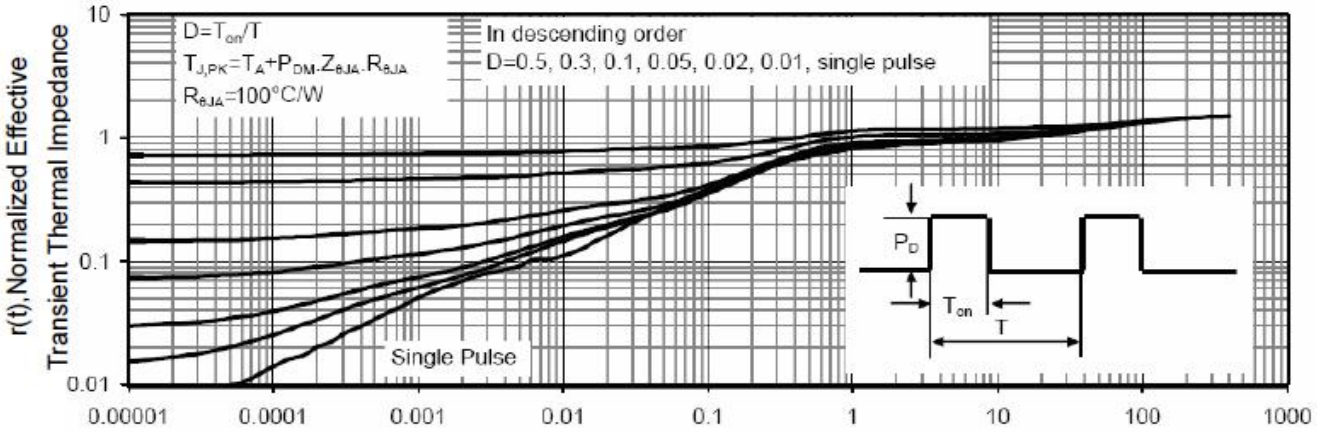


Figure 14 Normalized Maximum Transient Thermal Impedance

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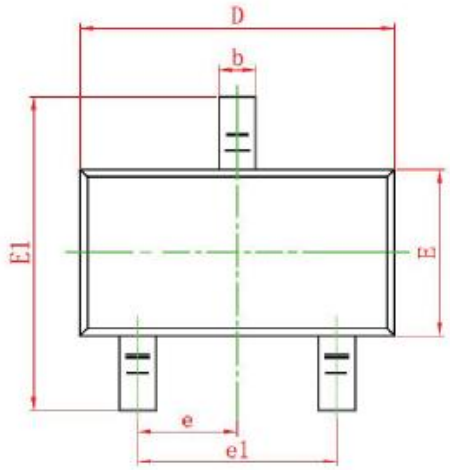
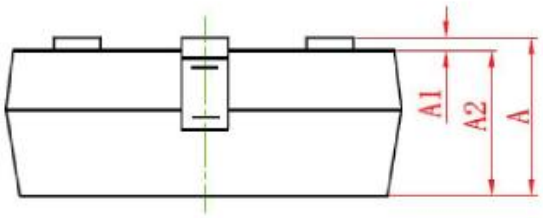
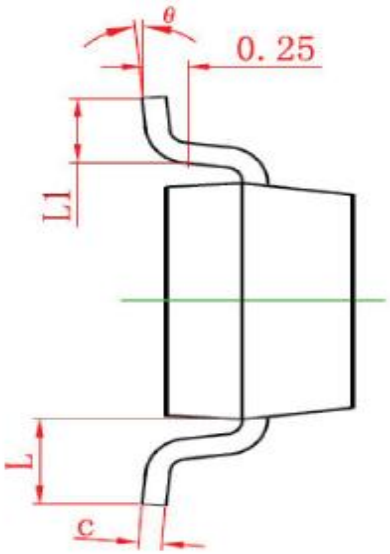
SOT-23 Package Information







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°