



## DESCRIPTION

The AM3401 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.

The AM3401 is available in SOT-23 package.

## ORDERING INFORMATION

Package Type	Part Number	
SOT-23	E3	AM3401E3R
		AM3401E3VR
Note	V: Halogen free Package R: Tape & Reel	
AiT provides all RoHS products Suffix " V " means Halogen free Package		

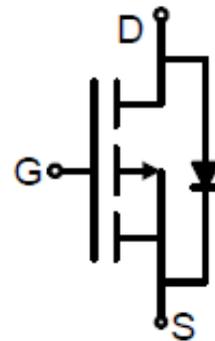
## FEATURES

- $V_{DS} = -30V$ ,  $I_D = -4.2A$   
 $R_{DS(ON)} < 120m\Omega$  @  $V_{GS} = -2.5V$   
 $R_{DS(ON)} < 72m\Omega$  @  $V_{GS} = -4.5V$   
 $R_{DS(ON)} < 55m\Omega$  @  $V_{GS} = -10V$
- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package
- Available in SOT-23 Package

## APPLICATIONS

- PWM applications
- Load switch
- Power management

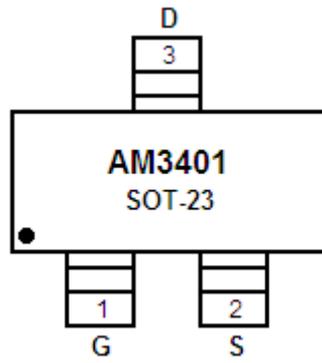
## PIN DESCRIPTION



Schematic diagram



## PIN DESCRIPTION



Top View

Pin #	Symbol	Function
1	G	Gate
2	S	Source
3	D	Drain



## ABSOLUTE MAXIMUM RATINGS

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

V <sub>DS</sub> , Drain-Source Voltage	-30V
V <sub>GS</sub> , Gate-Source Voltage	±20V
I <sub>D</sub> , Drain Current-Continuous	-4.2A
I <sub>DM</sub> , Drain Current-Pulsed <sup>NOTE1</sup>	-30A
P <sub>D</sub> , Maximum Power Dissipation	1.2W
T <sub>J</sub> , T <sub>STG</sub> , Operating Junction and Storage Temperature Range	-55°C~150°C

Stress beyond above listed "Absolute Maximum Ratings" may lead permanent damage to the device. These are stress ratings only and operations of the device at these or any other conditions beyond those indicated in the operational sections of the specifications are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

## THERMAL CHARACTERISTIC

Parameter	Symbol	Value	Units
Thermal Resistance, Junction-to-Ambient <sup>NOTE2</sup>	R <sub>θJA</sub>	104	°C/W



## ELECTRICAL CHARACTERISTICS

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA	-30	-	-	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = -24V, V <sub>GS</sub> = 0V	-	-	-1	μA
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V	-	-	±100	nA
<b>On Characteristics</b> <sup>NOTE3</sup>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA	-0.7	-	-1.3	V
Drain-Source On-State Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = -10V, I <sub>D</sub> = -4.2A	-	50	55	mΩ
		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -4A	-	64	72	
		V <sub>GS</sub> = -2.5V, I <sub>D</sub> = -1A	-	95	120	
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> = -5V, I <sub>D</sub> = -4.2A	-	10	-	S
<b>Dynamic Characteristics</b> <sup>NOTE4</sup>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = -15V, V <sub>GS</sub> = 0V F = 1.0 MHz	-	950	-	pF
Output Capacitance	C <sub>oss</sub>		-	115	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	75	-	
<b>Switching Characteristics</b> <sup>NOTE4</sup>						
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = -15V, I <sub>D</sub> = -3.2A, V <sub>GS</sub> = -10V, R <sub>GEN</sub> = 6Ω	-	7	-	ns
Turn-On Rise Time	t <sub>r</sub>		-	3	-	
Turn-Off Delay Time	t <sub>d(off)</sub>		-	30	-	
Turn-Off Fall Time	t <sub>f</sub>		-	12	-	
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = -15V, I <sub>D</sub> = -4A V <sub>GS</sub> = -4.5V	-	9.5	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	2	-	
Gate-Drain Charge	Q <sub>gd</sub>		-	3	-	
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage <sup>NOTE3</sup>	V <sub>SD</sub>	V <sub>GS</sub> = 0V, I <sub>S</sub> = -1A	-	-	-1.2	V

NOTE1: Repetitive Rating: Pulse width limited by maximum junction temperature

NOTE2: Surface Mounted on FR4 Board, t ≤ 10 sec.

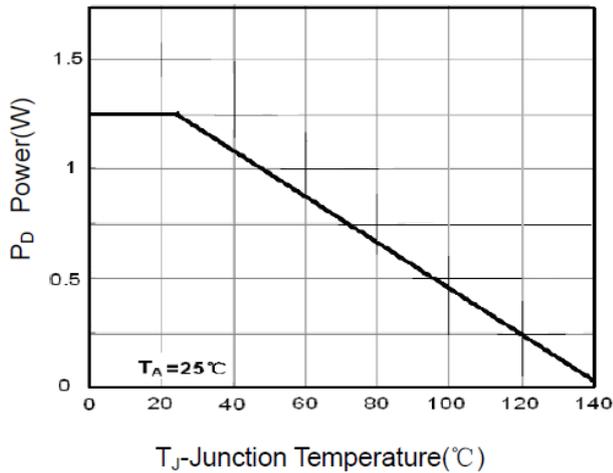
NOTE3: Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

NOTE4: Guaranteed by design, not subject to production

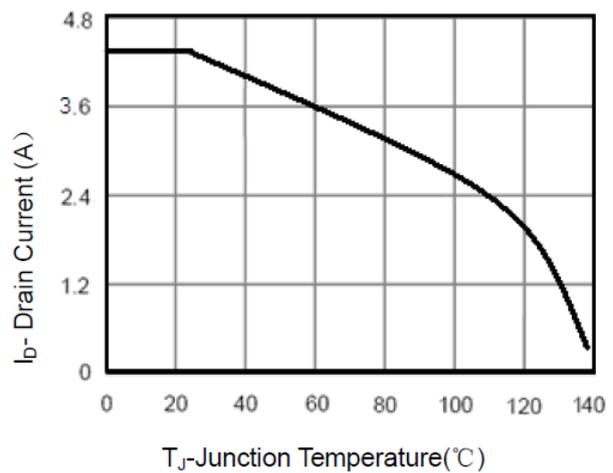


## TYPICAL CHARACTERISTICS

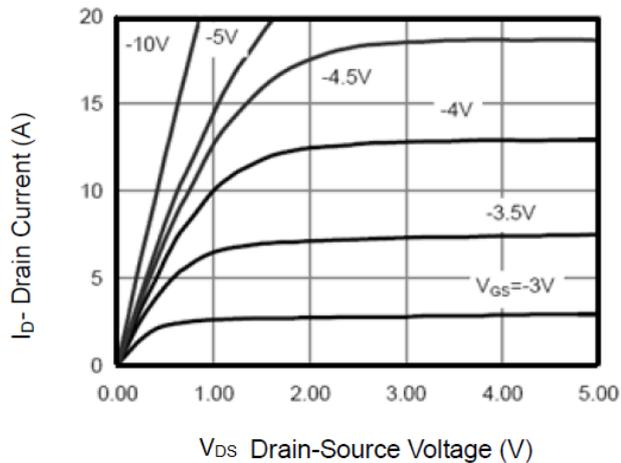
### 1. Power Dissipation



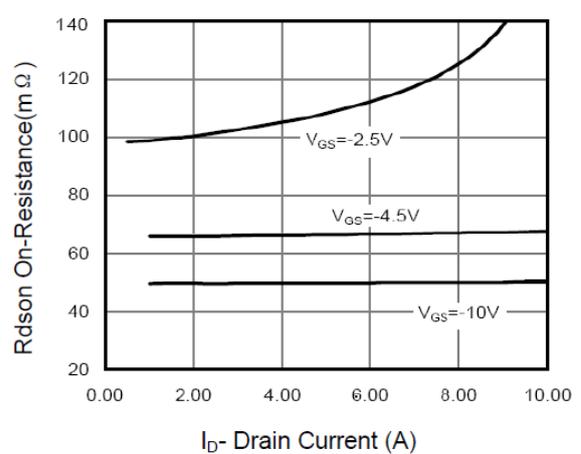
### 2. Drain Current



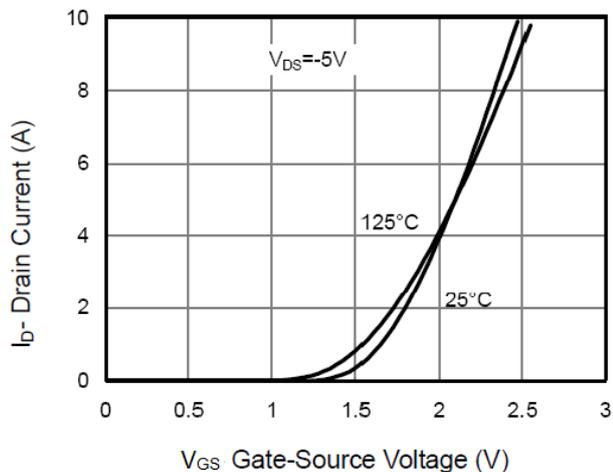
### 3. Output Characteristics



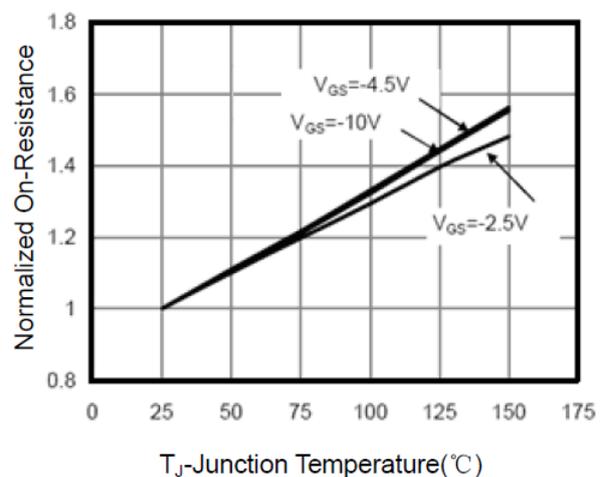
### 4. Drain-Source On-Resistance



### 5. Transfer Characteristics

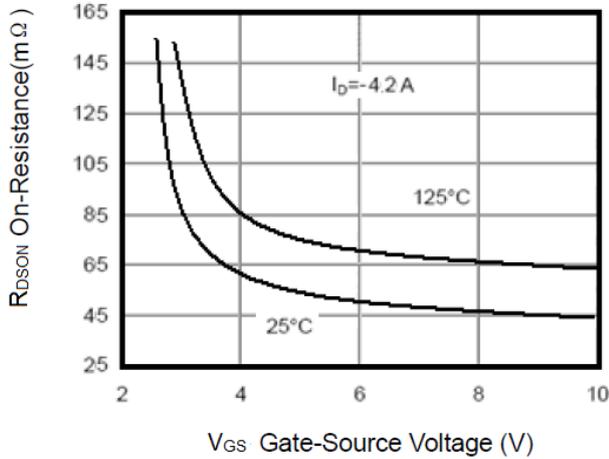


### 6. Drain-Source On-Resistance

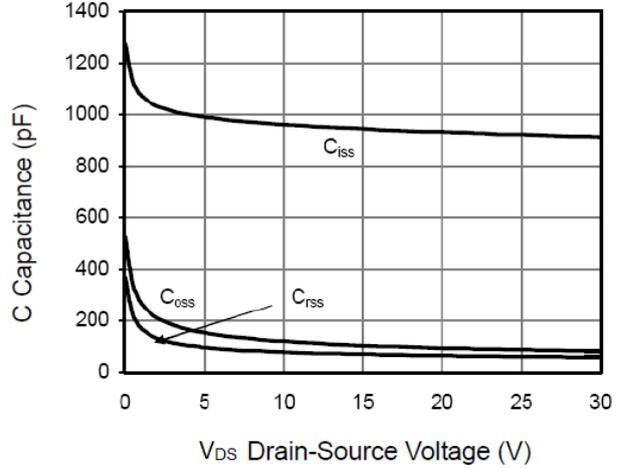




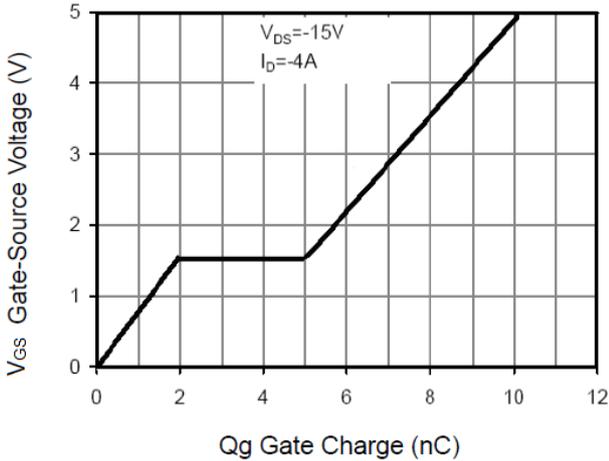
7.  $R_{DS(ON)}$  vs.  $V_{GS}$



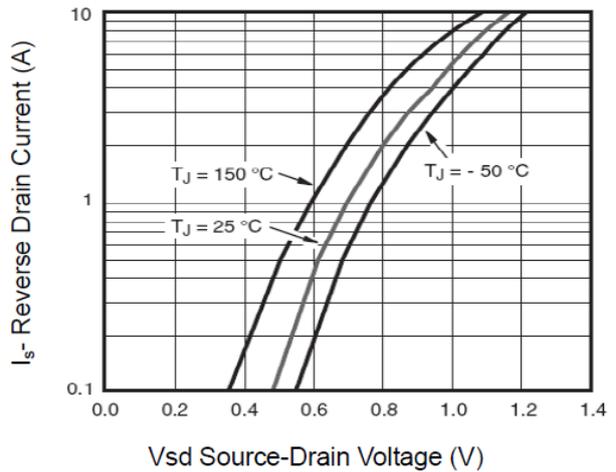
8. Capacitance vs.  $V_{DS}$



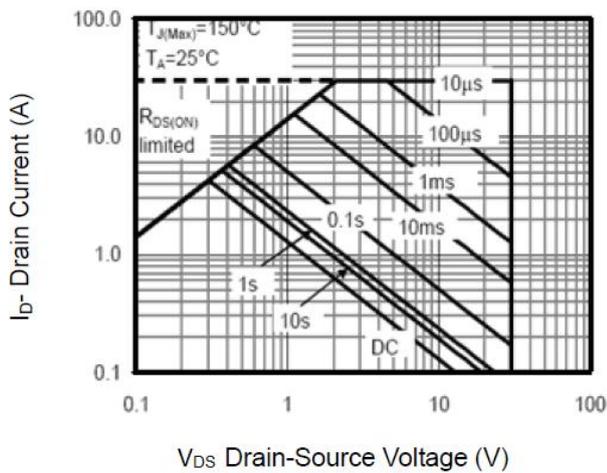
9. Gate Charge



10. Source- Drain Diode Forward

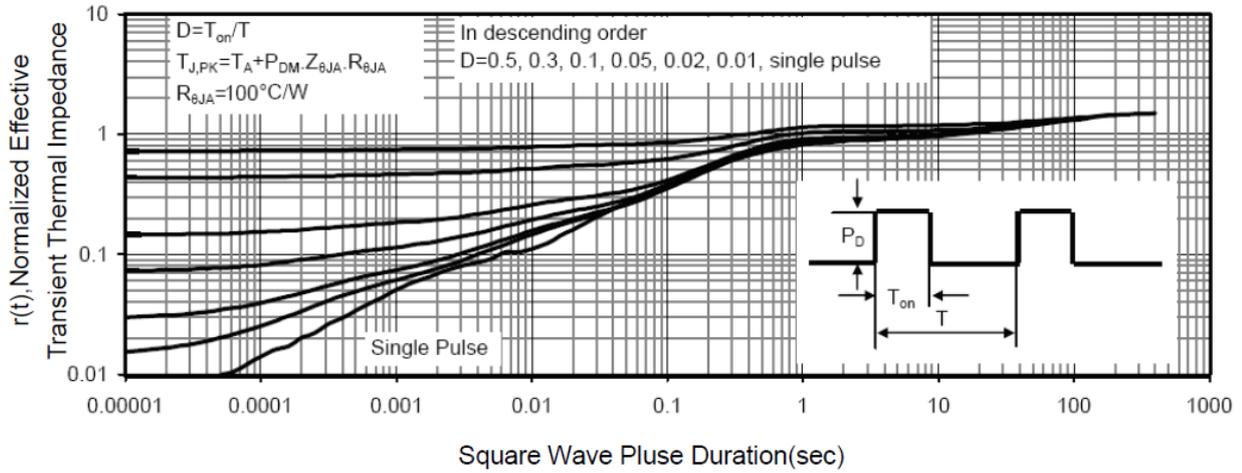


11. Safe Operation Area



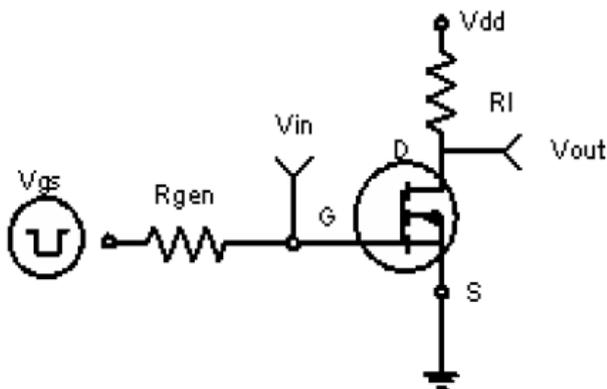


12. Normalized Maximum Transient Thermal Impedance

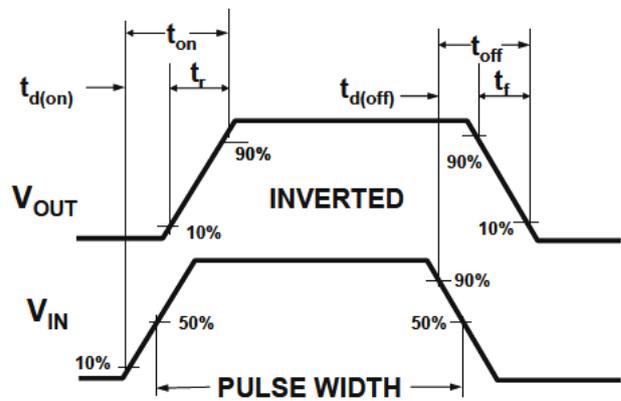


**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**

1. Switching Test Circuit



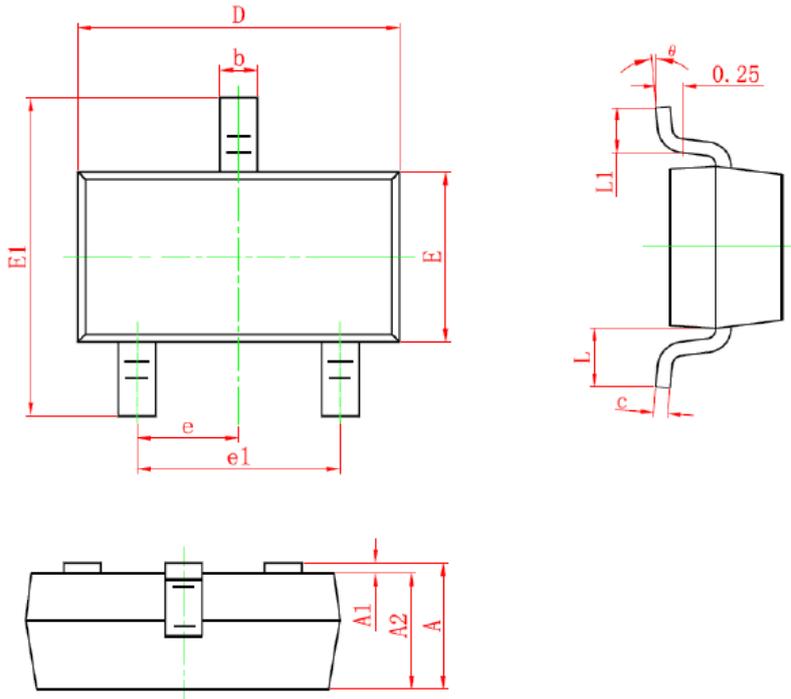
2. Switching Waveforms





## PACKAGE INFORMATION

Dimension in SOT-23 Package (Unit: mm)



SYMBOL	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	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.500
$\theta$	0°	8°



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