

**DESCRIPTION**

The AM2301E is available in SOT-23 Package.

VDSS	RDSON	ID
-20V	95mΩ	-2A

APPLICATIONS

- Load Switch
- PWM Application
- Power Management

ORDERING INFORMATION

Package Type	Part Number	
SOT-23 SPQ: 3,000pcs/Reel	E3	AM2301E3R
Note	R: Tape & Reel	
AiT provides all RoHS products		

FEATURE

- -20V, -2A
- $R_{DS(ON)}$ Typ.= 95mΩ @ $V_{GS} = -4.5V$
- $R_{DS(ON)}$ Typ.= 125mΩ @ $V_{GS} = -2.5V$
- Advanced Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge

PIN DESCRIPTION

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

ABSOLUTE MAXIMUM RATINGS

$T_J = 25^{\circ}C$, unless otherwise specified.

V_{DS} , Drain-to-Source Voltage		-20V
V_{GS} , Gate-to-Source Voltage		±12V
I_D , Continuous Drain Current	$T_A = 25^{\circ}C$	-2A
	$T_A = 100^{\circ}C$	-1.3A
I_{DM} , Pulsed Drain Current ⁽¹⁾		-8A
P_D , Power Dissipation	$T_A = 25^{\circ}C$	0.8W
$R_{\theta JA}$, Thermal Resistance, Junction-to-Ambient ⁽²⁾		156°C/W
T_{STG} , Storage Temperature Range		-55°C ~ +150°C
T_J , Junction Temperature Range		-55°C ~ +150°C

Stresses above may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated in the Electrical Characteristics are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.

2. $R_{\theta JA}$ is measured with the device mounted on a 1inch² pad of 2oz copper FR4 PCB

**ELECTRICAL CHARACTERISTICS**T_J = 25°C, unless otherwise specified.

Parameter	Symbol	Conditions	Min	Typ.	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	V _{(BR)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						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} = V _{GS} , I _D = -250μA	-0.4	-0.7	-1.0	V
Static Drain-Source ON-Resistance *	R _{DS(ON)}	V _{GS} = -4.5V, I _D = -2A	-	95	125	mΩ
		V _{GS} = -2.5V, I _D =-1A	-	125	165	
Dynamic Characteristics						
Input Capacitance	C _{iSS}	V _{DS} = -10V, V _{GS} =0V, f=1.0MHZ	-	185	-	pF
Output Capacitance	C _{oSS}		-	35	-	
Reverse Transfer Capacitance	C _{rSS}		-	25	-	
Total Gate Charge	Q _g	V _{DS} = -10V , I _D =-2A V _{GS} = -4.5V ~ 0V	-	2.2	-	nC
Gate-Source Charge	Q _{gs}		-	0.5	-	
Gate-Drain (“Miller”) Charge	Q _{gd}		-	0.5	-	
Switching Characteristics						
Turn-On Delay Time	t _{d(on)}	V _{DD} = -10V, R _L =5Ω R _{GEN} =3Ω, V _{GS} = -4.5V	-	10	-	ns
Turn-On Rise Time	t _r		-	30	-	
Turn-Off Delay Time	t _{d(off)}		-	63	-	
Turn-Off Fall Time	t _f		-	50	-	
Drain-Source Diode Characteristics and Max Ratings						
Maximum Continuous Drain to Source Diode Forward Current	I _S	-	-	-	-2.0	A
Maximum Pulsed Drain to Source Diode Forward Current	I _{SM}	-	-	-	-8.0	A
Drain to Source Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S = -2A	-	-	-1.2	V

* Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 0.5%.



TYPICAL PERFORMANCE CHARACTERISTICS

Fig 1. Output Characteristics

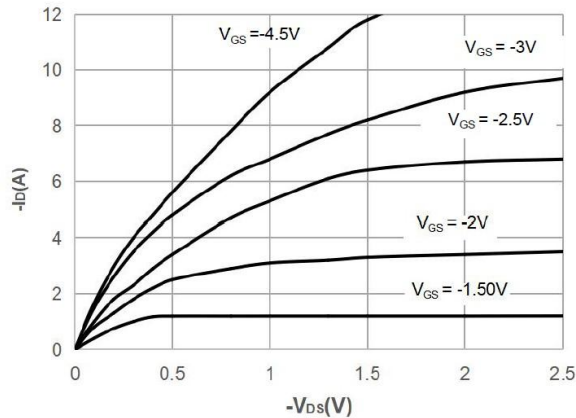


Fig 2. Typical Transfer Characteristics

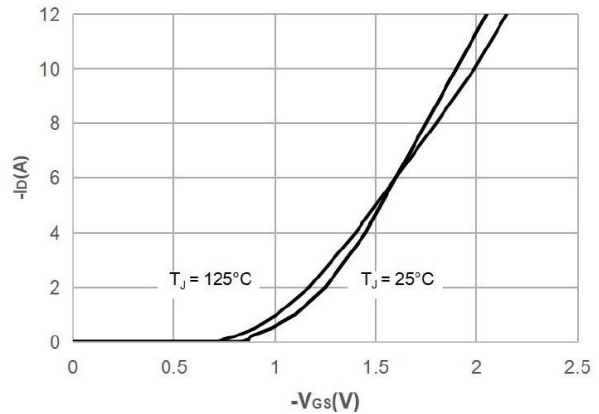


Fig 3. On-Resistance vs. Drain Current

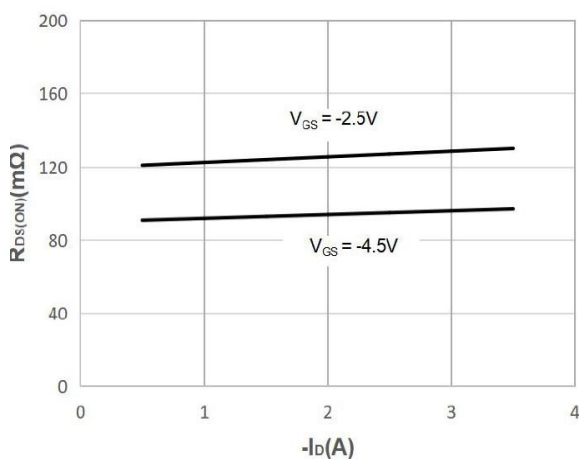


Fig 4. Body Diode Characteristics

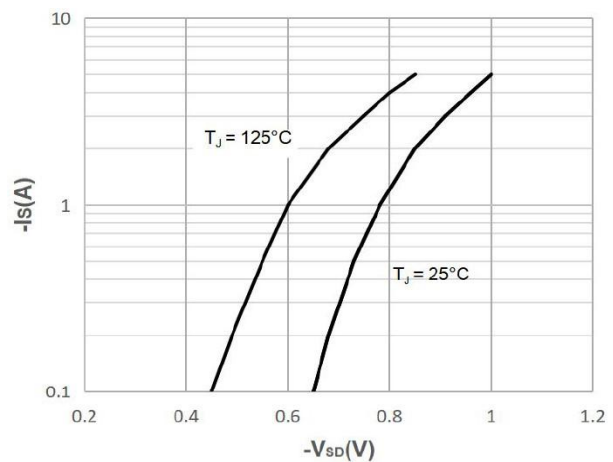


Fig 5. Gate Charge Characteristics

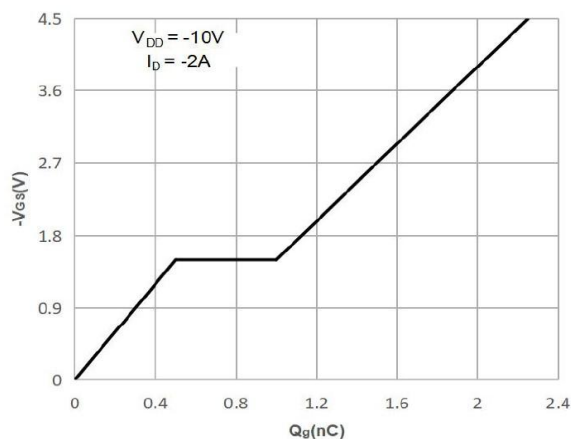


Fig 6. Capacitance Characteristics

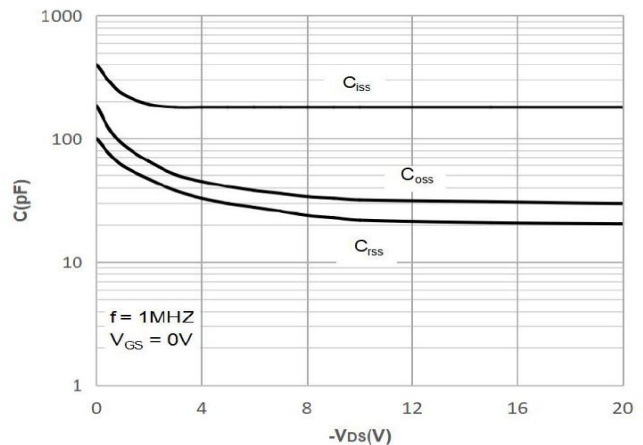




Fig 7. Normalized Breakdown voltage vs. Junction Temperature

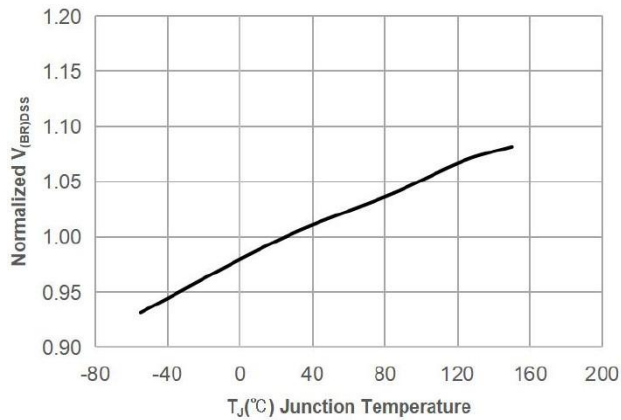


Fig 8. Normalized on Resistance vs. Junction Temperature

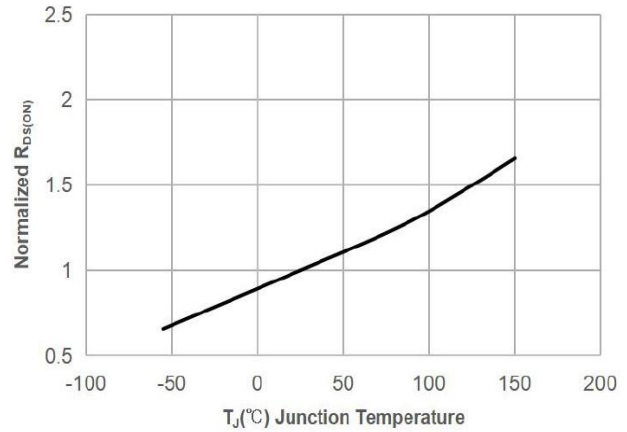


Fig 9. Maximum Safe Operating Area

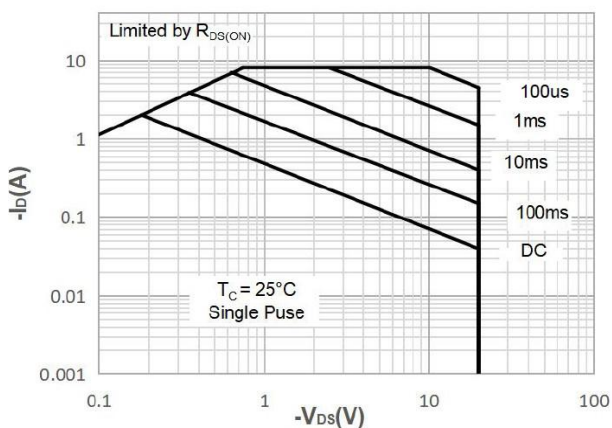


Fig 10. Maximum Continuous Drain Current vs. Case Temperature

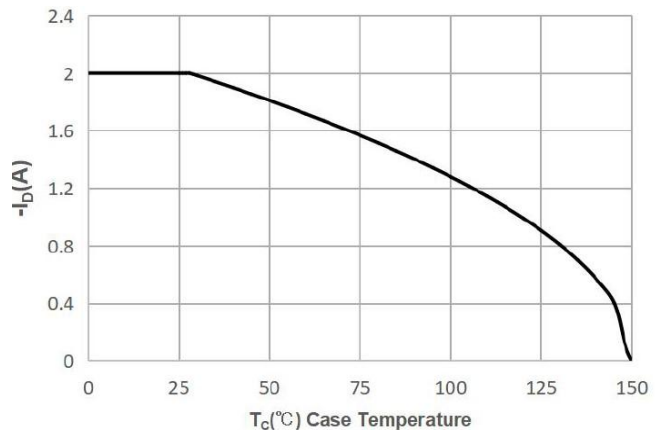


Fig 11. Normalized Maximum Transient Thermal Impedance

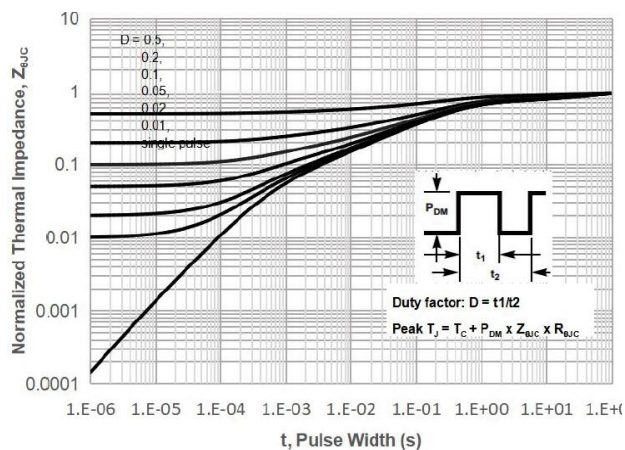


Fig 12. Peak Current Capacity

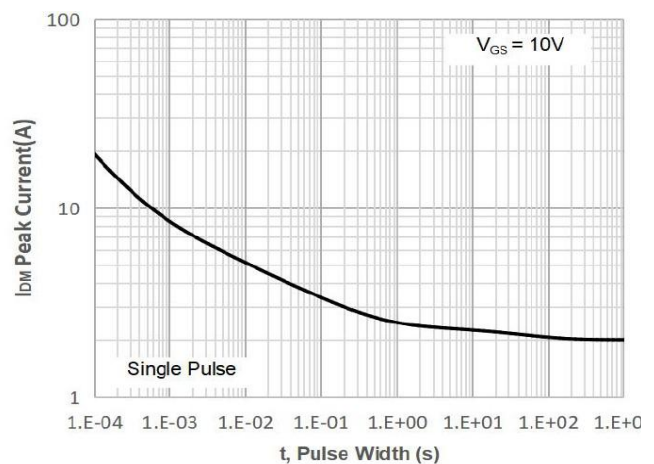




Fig 13. Gate Charge Test Circuit & Waveform

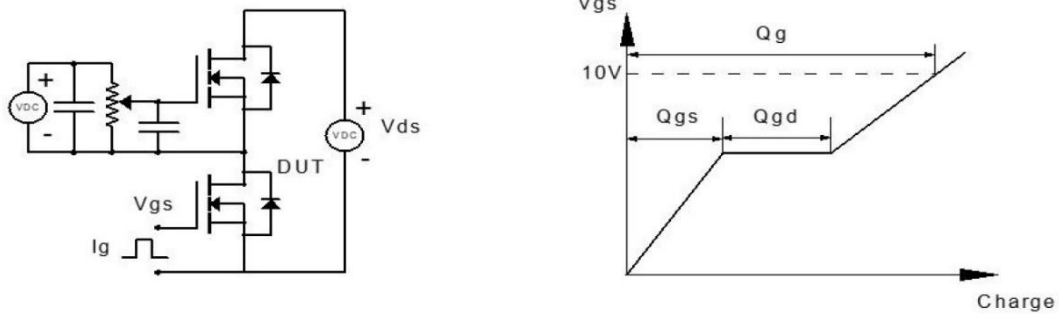


Fig 14. Resistive Switching Test Circuit & Waveform

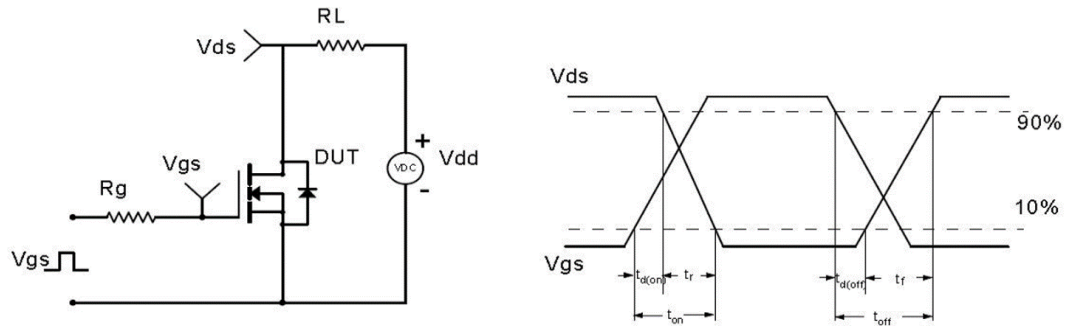


Fig 15. Unclamped Inductive Switching Test Circuit & Waveform

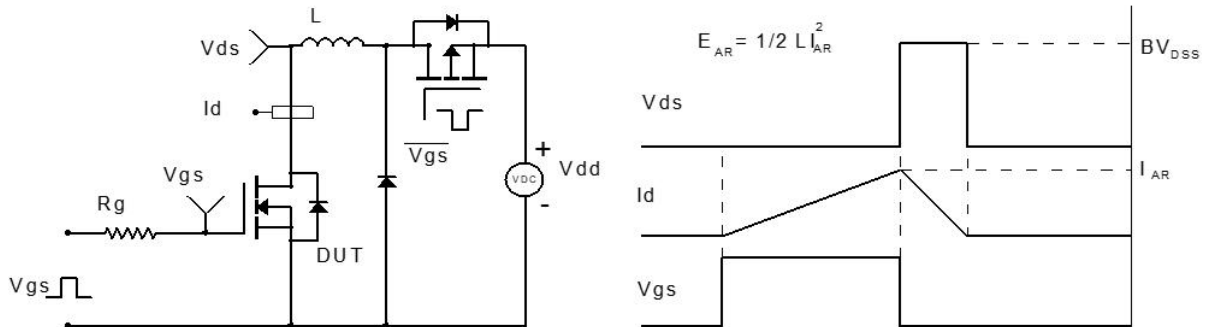
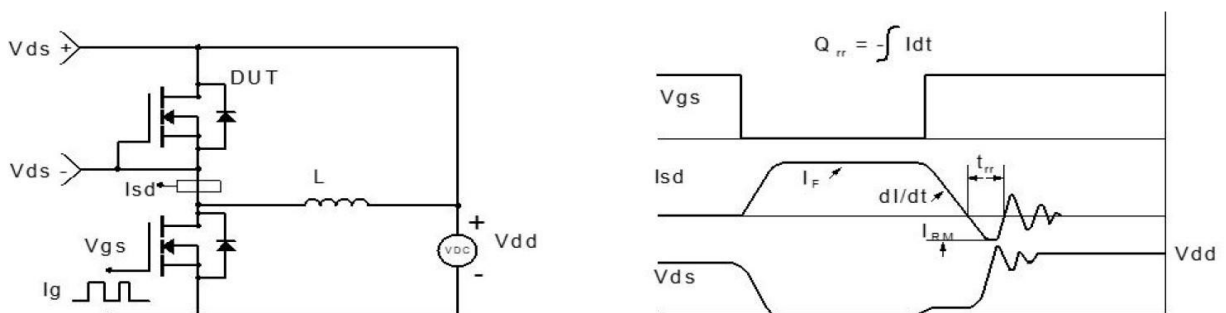


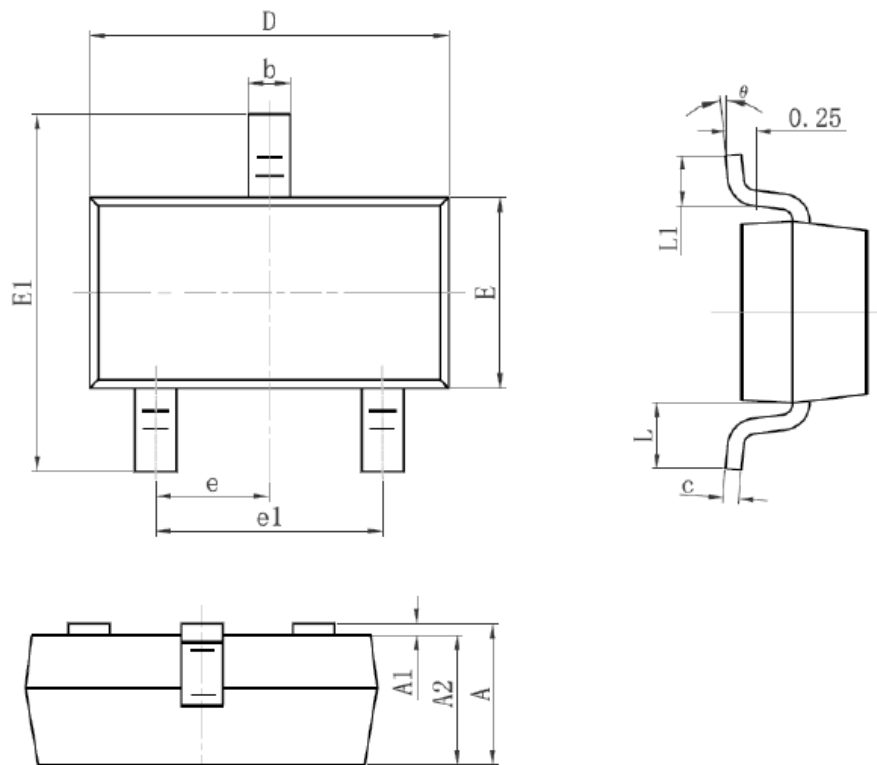
Fig 16. Diode Recovery Test Circuit & Waveform





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	0.950 TYP.	
e1	1.800	2.000
L	0.550 REF.	
L1	0.300	0.500
θ	0°	8°



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