

SuperMOS –SOT-23 30V BV_{DSS} 16mΩ R_{DS(on)} 6.2A I_D, N-channel MOSFET

1. Description

The AO3404 is N-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent R_{DS(ON)} with low gate charge. Device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product AO3404 is Pb-free.

2. Features

- 30V, R_{DS(ON)}=16mΩ(Typ), V_{GS}=10V
- R_{DS(ON)}=26mΩ(Typ), V_{GS}=4.5V
- Use trench MOSFET technology
- High density cell design for low R_{DS(on)}
- Material: Halogen free
- Reliable and rugged
- Avalanche Rated
- Low leakage current

3. Applications

- PWM applications
- Load switch
- DC/DC conversion
- Power management in portable/desktop PCs

4. Ordering Information

Part Number	Package	Marking	Material	Packing	Quantity per reel	Flammability Rating	Reel Size
AO3404	SOT-23	R4	Halogen free	Tape & Reel	3,000 PCS	UL 94V-0	7 inches

Table-1 Ordering information

5. Pin Configuration and Functions

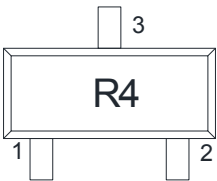
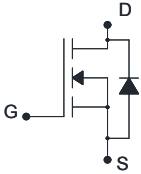
Pin	Function	Outline	Circuit Diagram
2	Source		
1	Gate		
3	Drain		

Table-2 Pin configuration

6. Specification

Absolute Maximum Rating & Thermal Characteristics

Ratings at 25 °C ambient temperature unless otherwise specified.

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	BV_{DSS}	30	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current	I_D	$T_A=25^{\circ}C$	6.2
		$T_A=75^{\circ}C$	4.7
Maximum Power Dissipation	P_D	$T_A=25^{\circ}C$	1.4
		$T_A=75^{\circ}C$	0.9
Pulsed Drain Current ^a	I_{DM}	24.8	A
Operating Junction Temperature	T_J	150	°C
Lead Temperature	T_L	260	°C
Storage Temperature Range	T_{stg}	-55 to 150	°C

Thermal resistance ratings

Single Operation				
Parameter	Symbol	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance ^a	$R_{\theta JA}$	72	90	°C/W

Note:

a: Surface mounted on FR4 Board using 1 square inch pad size, 1oz copper

Electrical Characteristics

At TA = 25°C unless otherwise specified

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	30			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=30V, V_{GS}=0V$			1.0	μA
Gate-to-source Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$			± 100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	1.0	1.5	2.2	V
Drain-to-source On-resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=6.2A$		16	24	m Ω
		$V_{GS}=4.5V, I_D=4A$		26	38	
Forward Trans conductance	g_{FS}	$V_{DS}=5.0V, I_D=5A$			40	S
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C_{ISS}	$V_{GS}=0V, f=1MHz, V_{DS}=15V$		255		pF
Output Capacitance	C_{OSS}			45		
Reverse Transfer Capacitance	C_{RSS}			35		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS}=10V, V_{DS}=15V, I_D=5A$		9.8	12	nC
Gate-to-Source Charge	Q_{GS}			1.8	2.2	
Gate-to-Drain Charge	Q_{GD}			2.2	3	
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$t_{d(ON)}$	$V_{GS}=10V, V_{DS}=15V, R_L=2\Omega, R_{GEN}=3\Omega$		5		ns
Rise Time	t_r			3.2		
Turn-Off Delay Time	$t_{d(OFF)}$			24		
Fall Time	t_f			6		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=1.0A$	0.45		1.2	V

7. Typical Characteristic

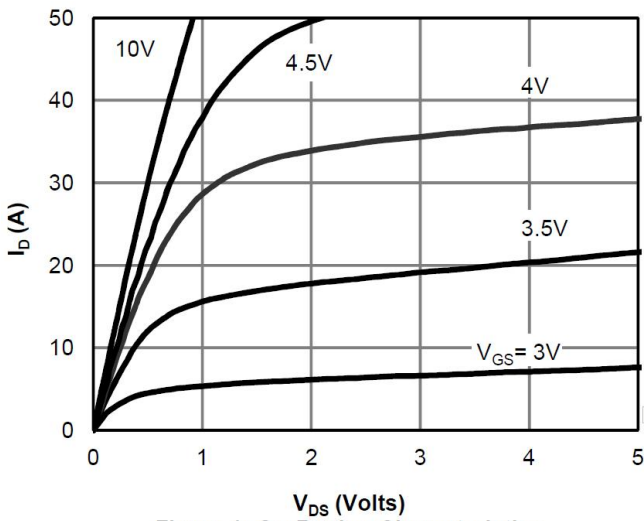


Figure 1: On-Region Characteristics

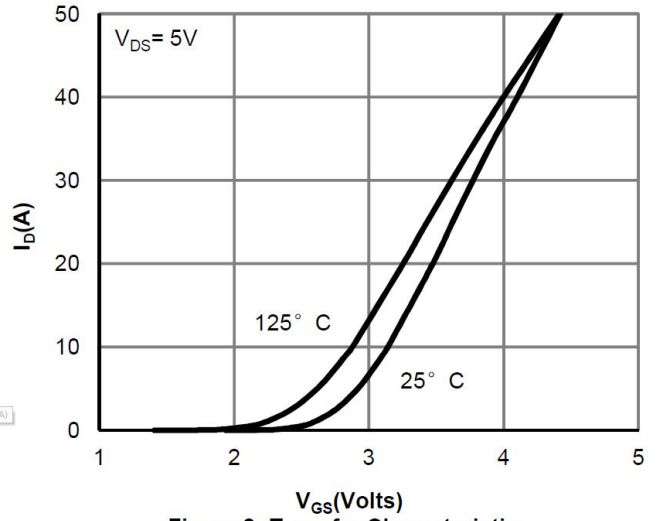


Figure 2: Transfer Characteristics

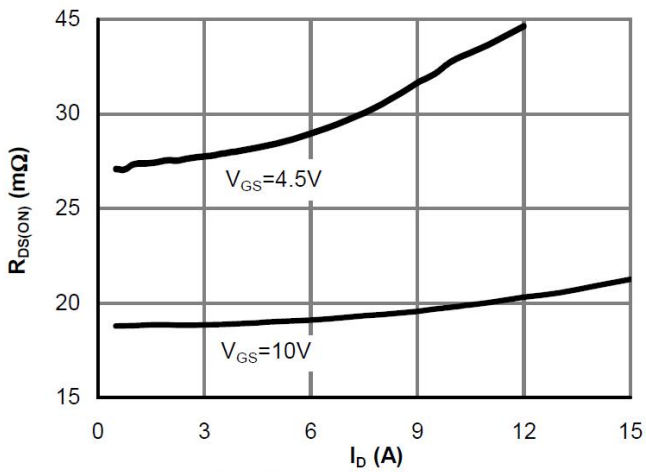


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

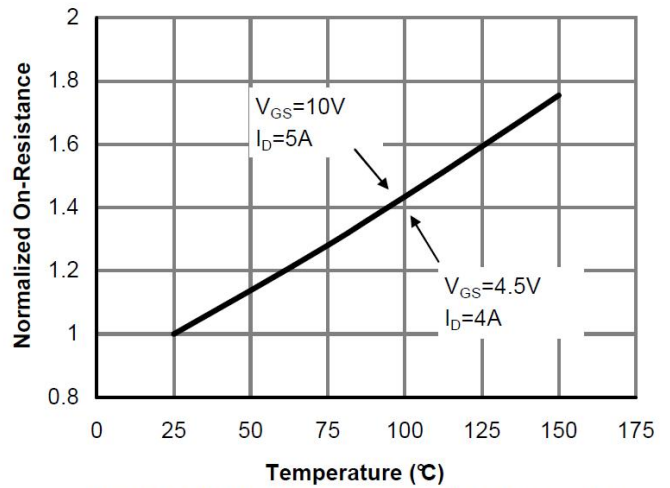


Figure 4: On-Resistance vs. Junction Temperature

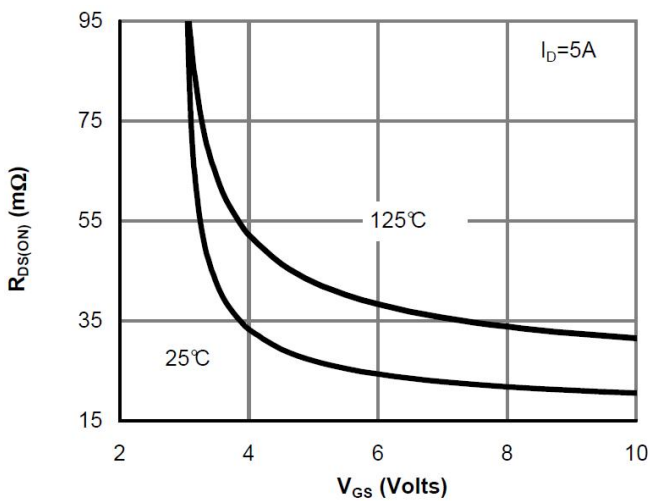


Figure 5: On-Resistance vs. Gate-Source Voltage

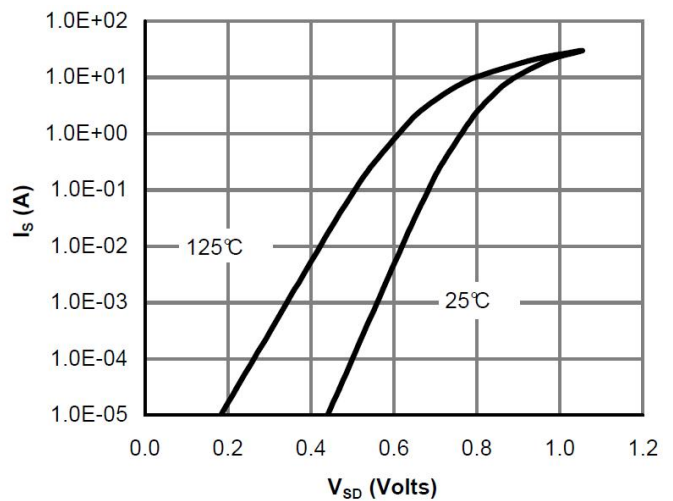


Figure 6: Body-Diode Characteristics

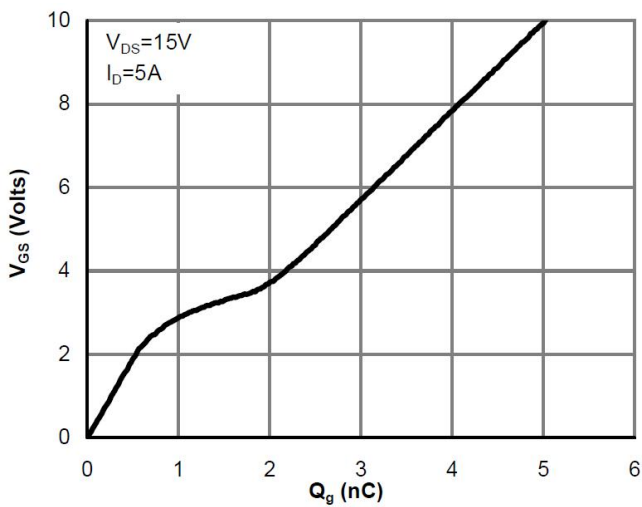


Figure 7: Gate-Charge Characteristics

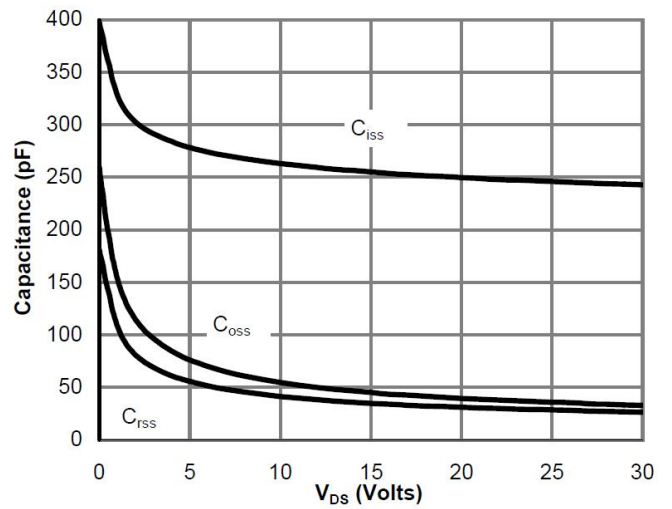


Figure 8: Capacitance Characteristics

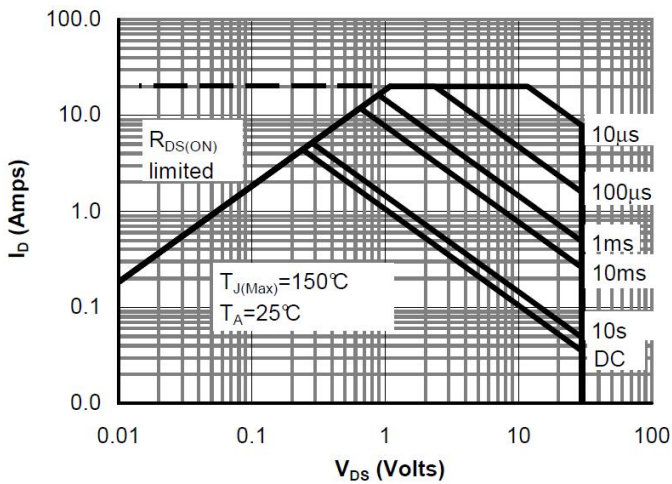


Figure 9: Maximum Forward Biased Safe Operating Area

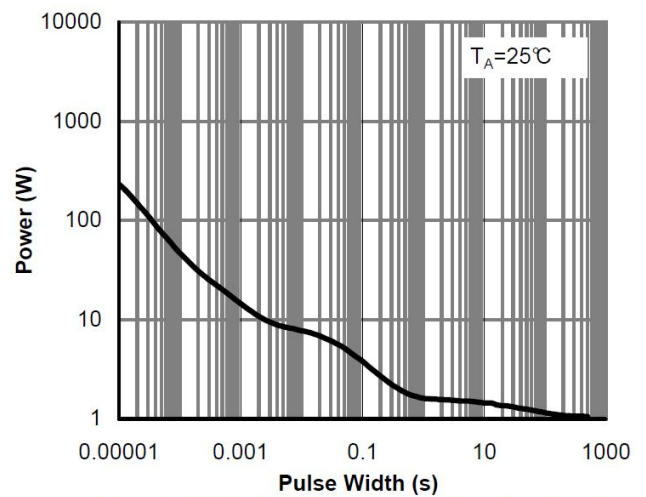


Figure 10: Single Pulse Power Rating Junction-to-Ambient

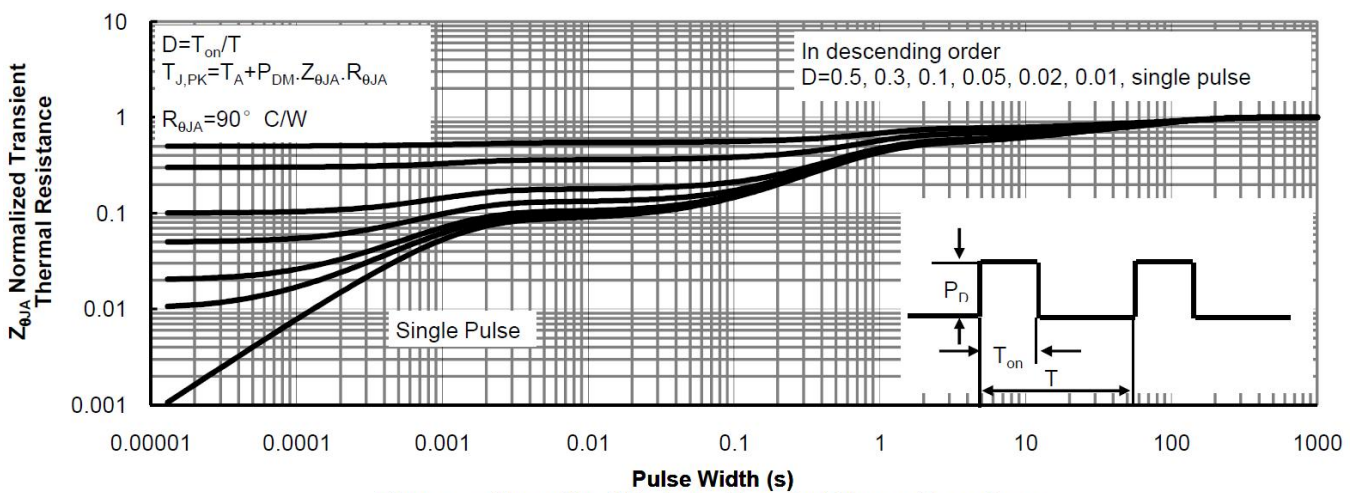
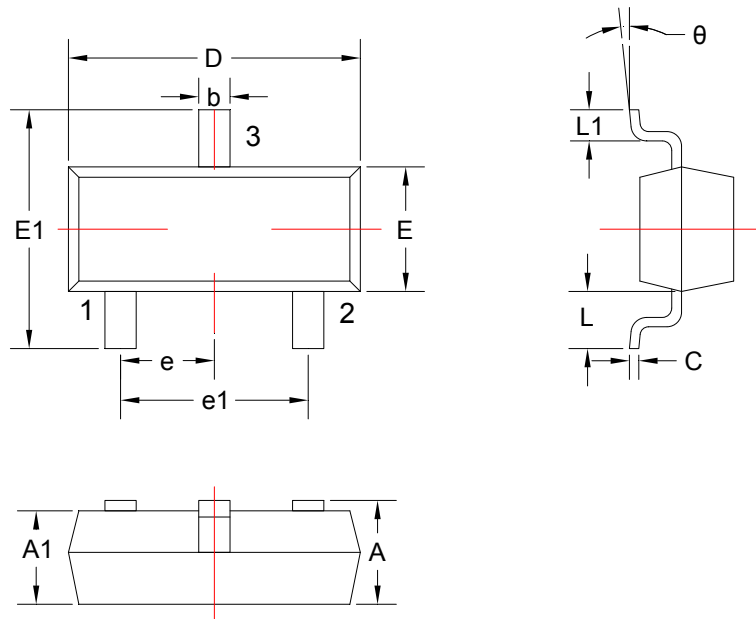


Figure 11: Normalized Maximum Transient Thermal Impedance

8. Dimension (SOT-23)



Units: mm

Symbol	Dimensions		Symbol	Dimensions	
	Min.	Max.		Min.	Max.
A	0.900	1.150	E1	2.250	2.550
A1	0.900	1.050	e	0.950TYP	
b	0.300	0.500	e1	1.800	2.000
c	0.080	0.150	L	0.550REF	
D	2.800	3.00	L1	0.300	0.500
E	1.200	1.400	θ	0°	8°



Note:

1. Controlling dimension: in millimeters
2. General tolerance: $\pm 0.05\text{mm}$
3. The pad layout is for reference only
4. Unit: mm

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