



AO3401

52mΩ, -30V, P-Channel Power MOSFET

Features

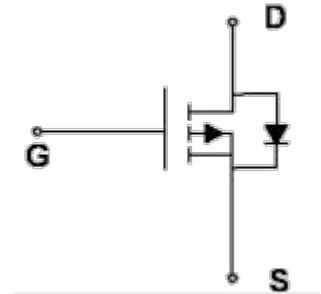
- Excellent package for good heat dissipation
- Advanced Trench technology
- Low Gate Charge

Description

$V_{(BR)DSS}$	$R_{DS(ON)_{max}}$	I_D
-30V	52mΩ@-4.5V	-4.4A
	64mΩ@-2.5V	

Application

- PWM applications
- Load switch
- Power Management



Ordering Information

Product Name	Package
AO3401	SOT-23



Absolute Maximum Ratings($T_A = 25^\circ\text{C}$, unless otherwise specified)

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	-30	V
Gate-Source Voltage		V_{GS}	±12	V
Continuous Drain Current ^{Note 1}	$T_C = 25^\circ\text{C}$	I_D	-4.4	A
Pulsed Drain Current ^{Note 2}	$T_C = 25^\circ\text{C}$	I_{DM}	-22	A
Max Power Dissipation ^{Note 3}	$T_C = 25^\circ\text{C}$	P_D	1.35	W
Avalanche Energy, Single Pulse ^{Note 4}		E_{AS}	14.4	mJ
Operating and Storage Temperature Range		T_J, T_{SGT}	-55 to 150	$^\circ\text{C}$

Thermal Resistance

Parameter	Symbol	Min	Typ	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	-	92.43	-	$^\circ\text{C/W}$

**Electrical Characteristics**($T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Statistic Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D = -250uA	-30	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = -30V, V _{GS} =0V	-	-	-1	uA
Gate-Body Leakage Current	I _{GSS}	V _{GS} = ±12V, V _{DS} =0V	-	-	±100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D = -250uA	-0.5	-0.85	-1.2	V
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} = -4.5V, I _D = -4.0A	-	43	52	mΩ
		V _{GS} = -2.5V, I _D = -2.0A	-	53	64	
Gate Resistance	R _g	f=1MHz, Open Drain	-	7.1	-	Ω
Forward Transconductance	g _{fs}	V _{DS} = -5.0V, I _D = -1.0A	-	10.1	-	S
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{GS} =0V V _{DS} = -15V f=1MHz	-	864	-	pF
Output Capacitance	C _{oss}		-	52	-	
Reverse Transfer Capacitance	C _{rss}		-	46	-	
Turn-on Delay Time	t _{d(on)}	V _{DD} = -15V V _{GS} = -10V I _D = -4.0A R _G =6.0Ω	-	5.6	-	ns
Rise Time	t _r		-	29.6	-	
Turn-off Delay Time	t _{d(off)}		-	47.6	-	
Fall Time	t _f		-	45.2	-	
Gate Charge Characteristics						
Total Gate Charge	Q _g	V _{GS} = -4.5V V _{DS} = -15V I _D = -4.0A	-	9.0	-	nC
Gate to Source Charge	Q _{gs}		-	2.8	-	
Gate to Drain Charge	Q _{gd}		-	1.5	-	
Reverse Diode Characteristics						
Drain-Source Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S = -4.0A	-	-0.7	-1.3	V
Reverse recovery time	trr	Isd= -4.0A , dI/dt=80A/us	-	9.2	-	ns
Reverse recovery charge	Qrr		-	2.6	-	nC

Notes:

- 1) Calculated continuous current based on maximum allowable junction temperature.
- 2) Repetitive rating; pulse width limited by max. junction temperature.
- 3) P_D is based on max. junction temperature, using junction-case thermal resistance.
- 4) $V_{DD}=-20V, V_{GS}=-4.5V, L=0.1\text{ mH}$, starting $T_J=25\text{ }^{\circ}\text{C}$.



Typical Performance Characteristics

Figure 1: Typ. Output Characteristics

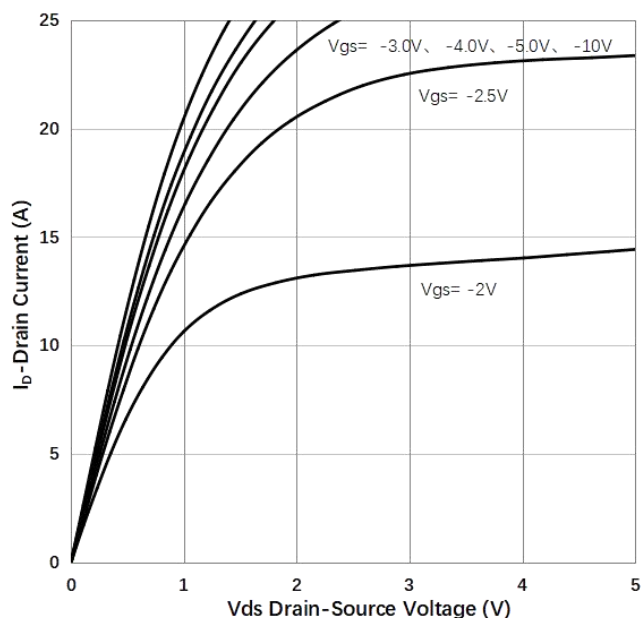


Figure 2: Typ. Transfer Characteristics

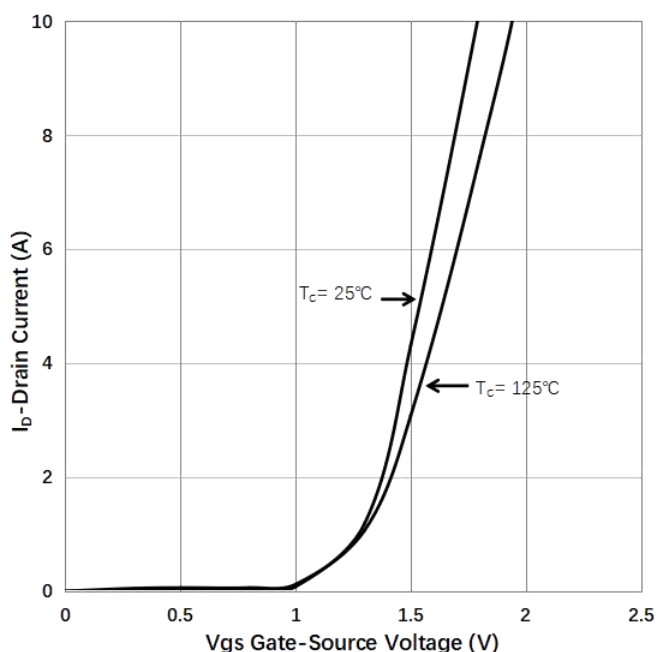


Figure 3: Typ. On-Resistance vs. Drain Current

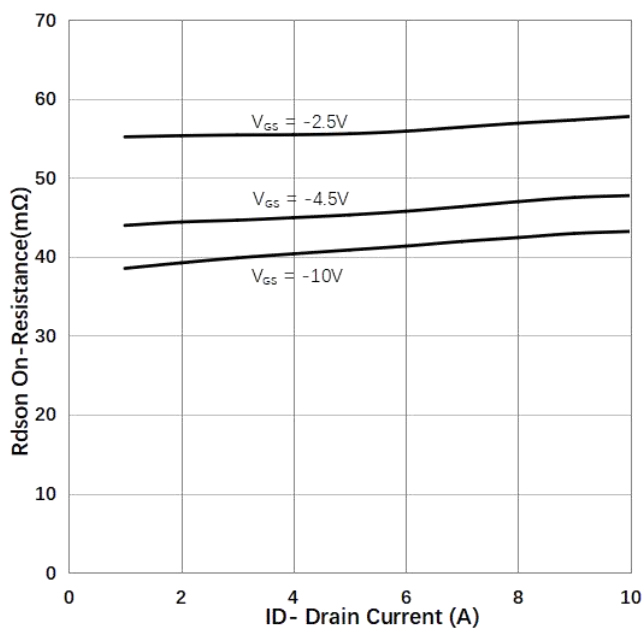
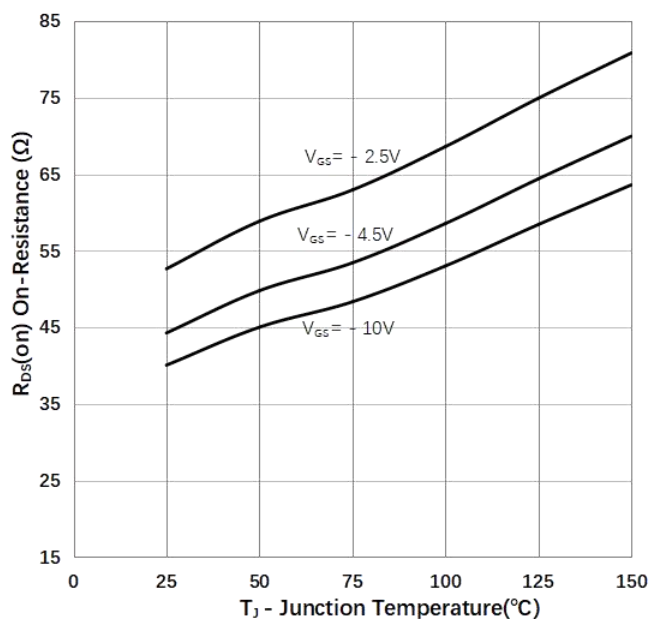


Figure 4: On-Resistance vs. Temperature





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

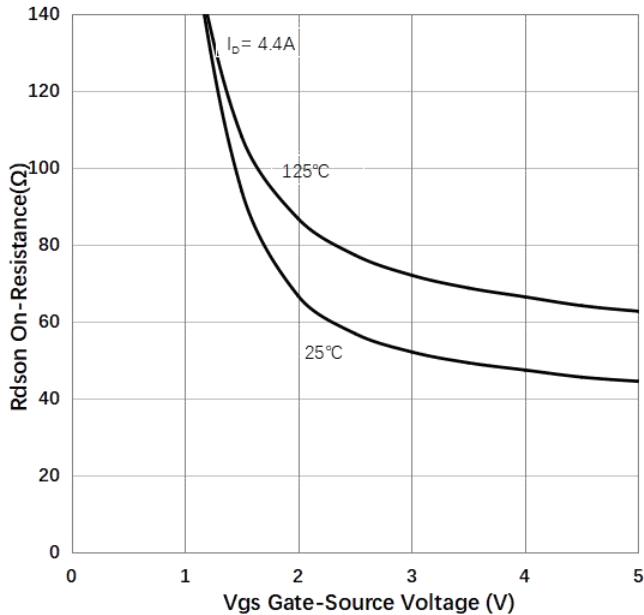


Figure 6: Forward Characteristics of Body Diode

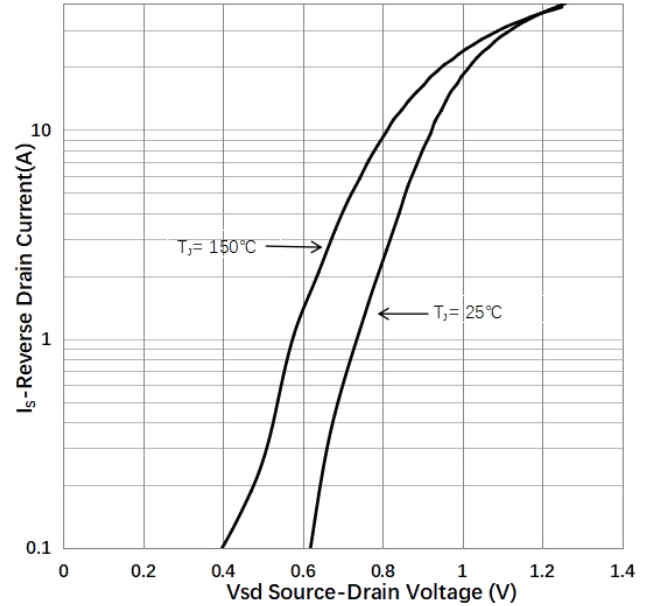


Figure 7: Gate Charge Characteristics

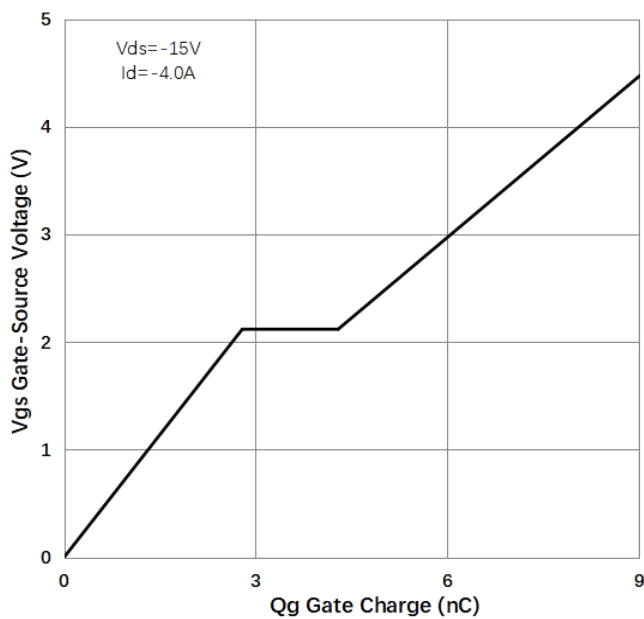


Figure 8: Typ. Capacitances

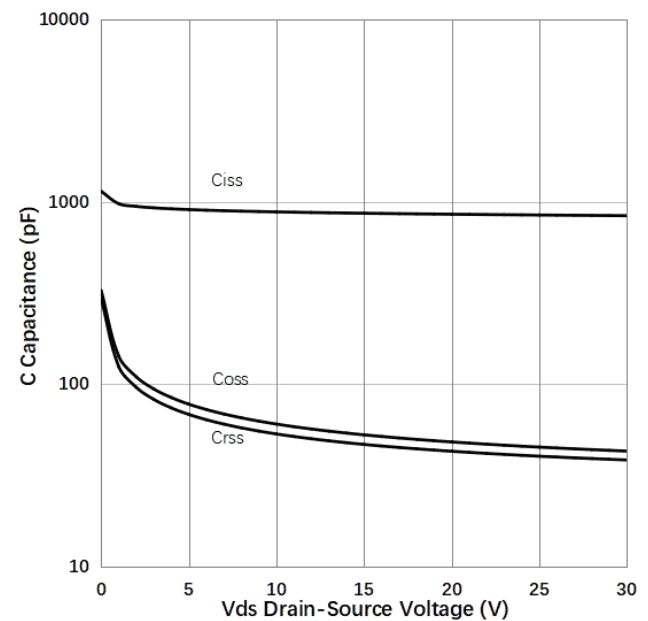




Figure 9: Power Dissipation

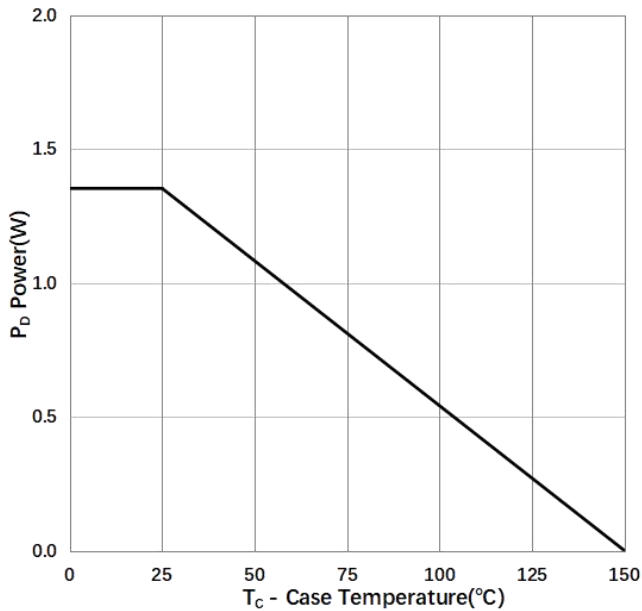


Figure 10: Safe Operating Area

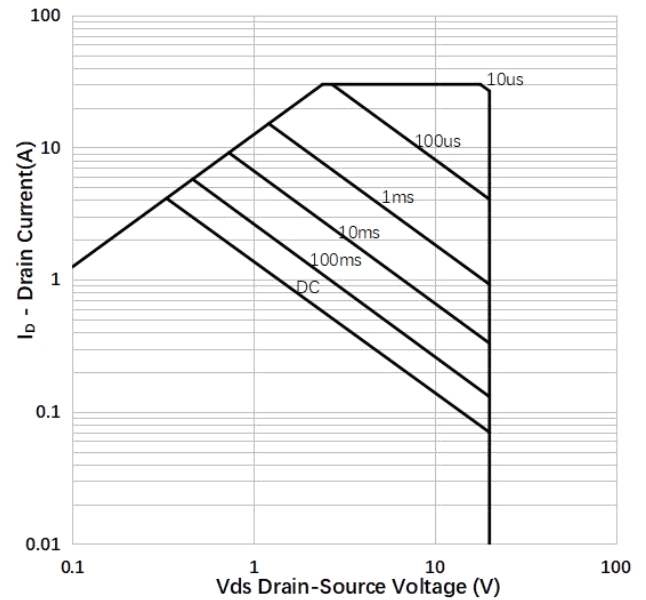
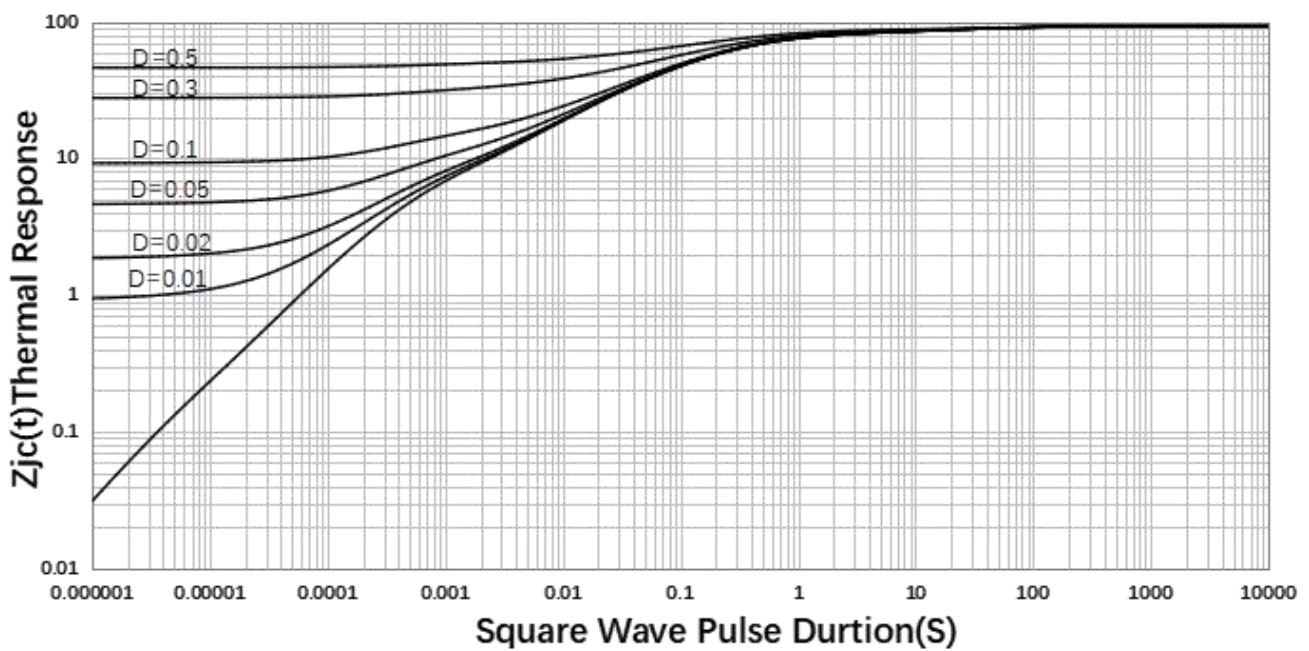


Figure 11: Normalized Max Transient Thermal Impedance





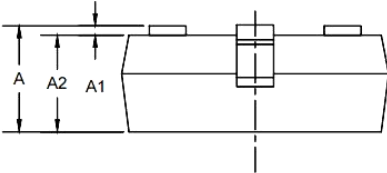
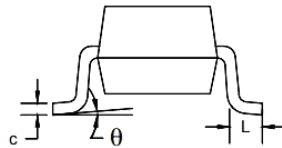
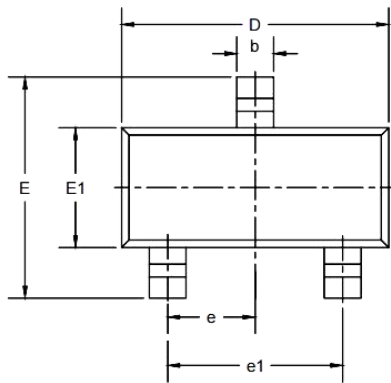
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Mechanical Dimensions

SOT-23 Package Information

COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)



SYMBOL	MIN	MAX
A	0.9	1.15
A1	0	0.1
A2	0.9	1.05
b	0.3	0.5
c	0.08	0.15
D	2.8	3
E	2.25	2.55
E1	1.2	1.4
e	0.95TYP	
e1	1.8	2
L	0.3	0.5
θ	0°	8°