



AO3401

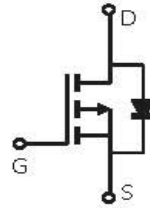
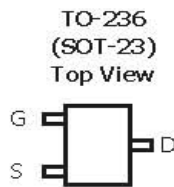
P-Channel Enhancement Mode Field Effect Transistor

General Description

The AO3401 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. *Standard product AO3401 is Pb-free (meets ROHS & Sony 259 specifications). AO3401L is a Green Product ordering option. AO3401 and AO3401L are electrically identical.*

Features

V_{DS} (V) = -30V
 I_D = -4.2 A (V_{GS} = -10V)
 $R_{DS(ON)} < 50m\Omega$ (V_{GS} = -10V)
 $R_{DS(ON)} < 65m\Omega$ (V_{GS} = -4.5V)
 $R_{DS(ON)} < 120m\Omega$ (V_{GS} = -2.5V)



Absolute Maximum Ratings $T_A=25^\circ\text{C}$ unless otherwise noted

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	± 12	V
Continuous Drain Current ^A	I_D	-4.2	A
$T_A=25^\circ\text{C}$		-3.5	
$T_A=70^\circ\text{C}$			
Pulsed Drain Current ^B	I_{DM}	-30	
Power Dissipation ^A	P_D	1.4	W
$T_A=25^\circ\text{C}$		1	
$T_A=70^\circ\text{C}$			
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	$^\circ\text{C}$

Thermal Characteristics

Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ^A	$t \leq 10s$	$R_{\theta JA}$	65	90	$^\circ\text{C/W}$
Maximum Junction-to-Ambient ^A	Steady-State		85	125	$^\circ\text{C/W}$
Maximum Junction-to-Lead ^C	Steady-State	$R_{\theta JL}$	43	60	$^\circ\text{C/W}$



Electrical Characteristics (T_J=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV _{DSS}	Drain-Source Breakdown Voltage	I _D =-250μA, V _{GS} =0V	-30			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-24V, V _{GS} =0V T _J =55°C			-1 -5	μA
I _{GSS}	Gate-Body leakage current	V _{DS} =0V, V _{GS} =±12V			±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} I _D =-250μA	-0.7	-1	-1.3	V
I _{D(ON)}	On state drain current	V _{GS} =-4.5V, V _{DS} =-5V	-25			A
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =-10V, I _D =-4.2A T _J =125°C		42	50	mΩ
					75	
		V _{GS} =-4.5V, I _D =-4A		53	65	mΩ
		V _{GS} =-2.5V, I _D =-1A		80	120	mΩ
g _{FS}	Forward Transconductance	V _{DS} =-5V, I _D =-5A	7	11		S
V _{SD}	Diode Forward Voltage	I _S =-1A, V _{GS} =0V		-0.75	-1	V
I _S	Maximum Body-Diode Continuous Current				-2.2	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-15V, f=1MHz		954		pF
C _{oss}	Output Capacitance			115		pF
C _{rss}	Reverse Transfer Capacitance			77		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz		6		Ω
SWITCHING PARAMETERS						
Q _g	Total Gate Charge	V _{GS} =-4.5V, V _{DS} =-15V, I _D =-4A		9.4		nC
Q _{gs}	Gate Source Charge			2		nC
Q _{gd}	Gate Drain Charge			3		nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =-10V, V _{DS} =-15V, R _L =3.6Ω, R _{GEN} =6Ω		6.3		ns
t _r	Turn-On Rise Time			3.2		ns
t _{D(off)}	Turn-Off DelayTime			38.2		ns
t _f	Turn-Off Fall Time			12		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =-4A, dI/dt=100A/μs		20.2		ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =-4A, dI/dt=100A/μs		11.2		nC

A: The value of R_{θJA} is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The value in any given application depends on the user's specific board design. The current rating is based on the t≤ 10s thermal resistance rating.

B: Repetitive rating, pulse width limited by junction temperature.

C: The R_{θJA} is the sum of the thermal impedance from junction to lead R_{θJL} and lead to ambient.

D: The static characteristics in Figures 1 to 6,12,14 are obtained using 80μs pulses, duty cycle 0.5% max.

E: These tests are performed with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The SOA curve provides a single pulse rating.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

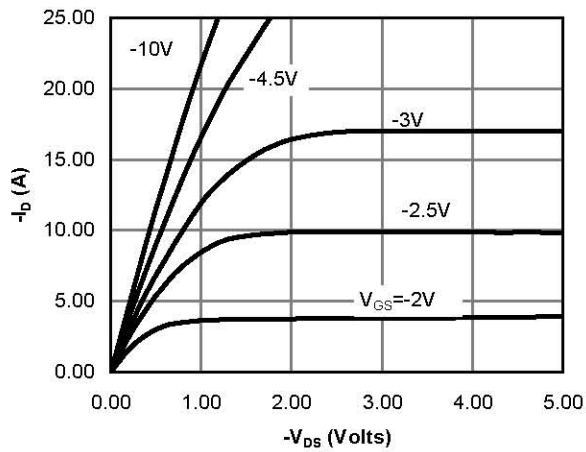


Fig 1: On-Region Characteristics

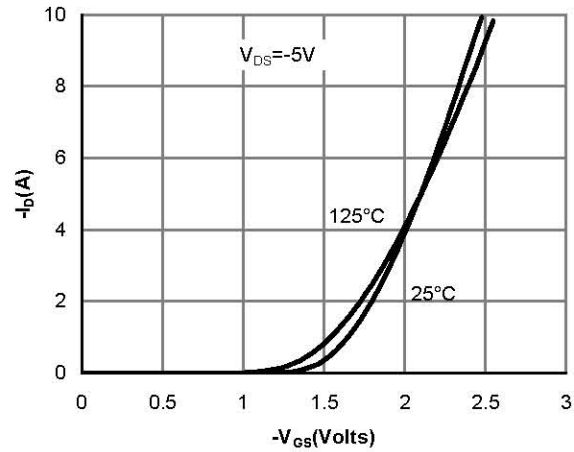


Figure 2: Transfer Characteristics

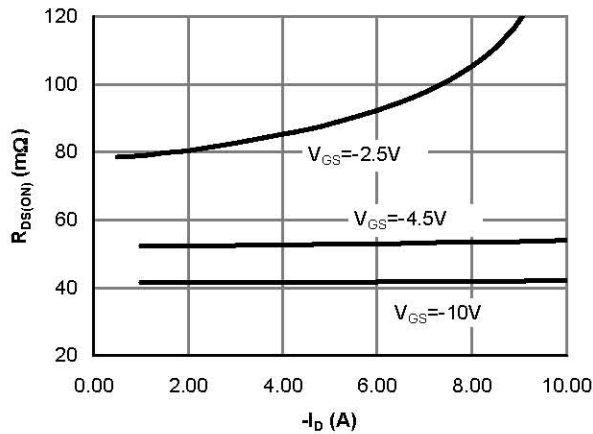


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

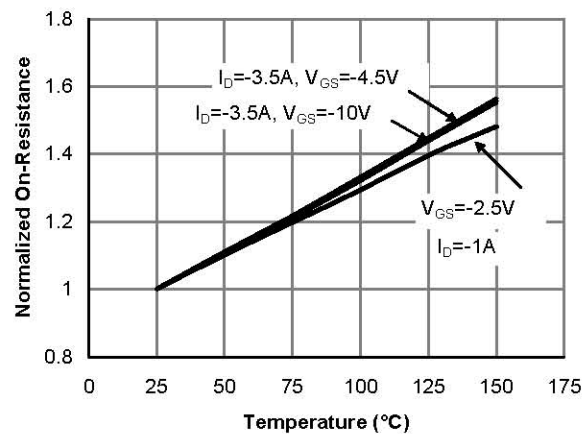


Figure 4: On-Resistance vs. Junction Temperature

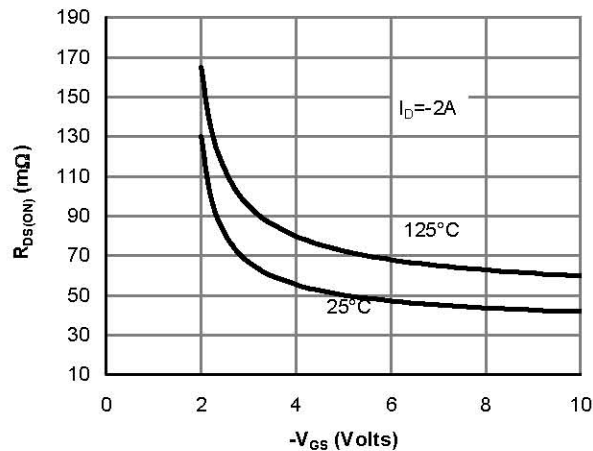


Figure 5: On-Resistance vs. Gate-Source Voltage

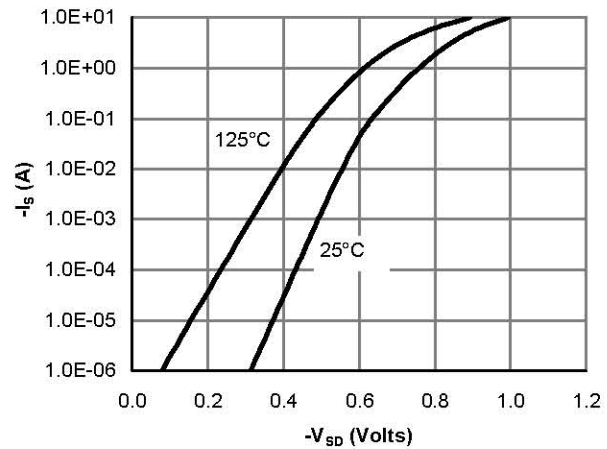
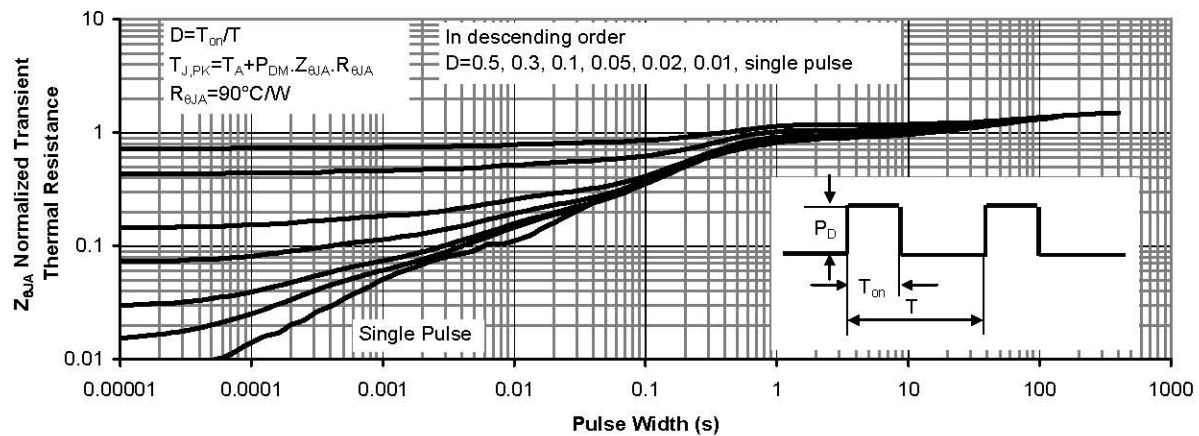
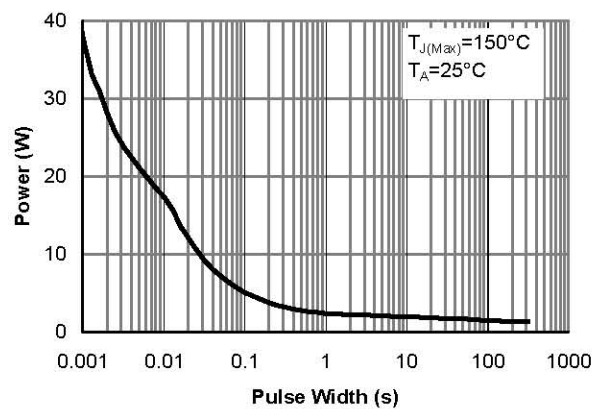
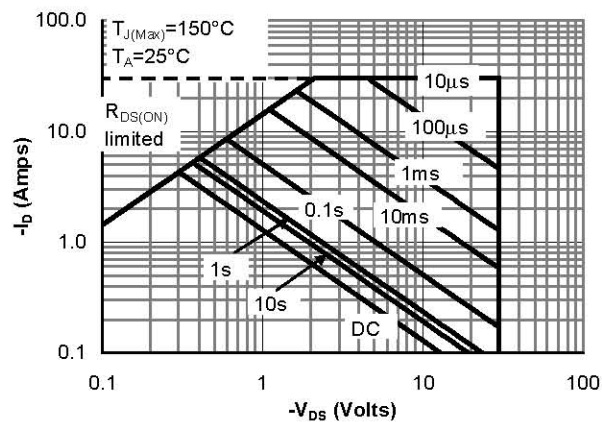
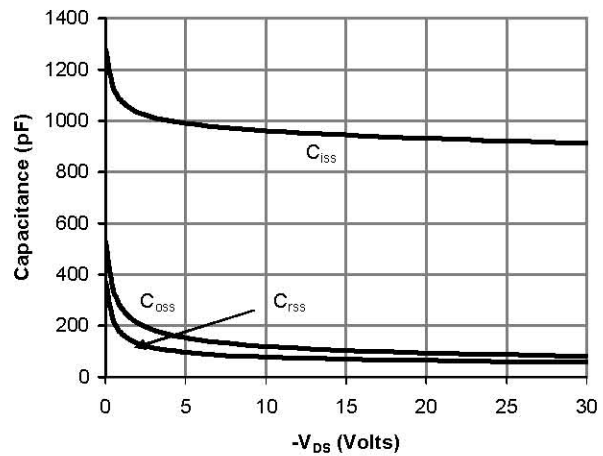
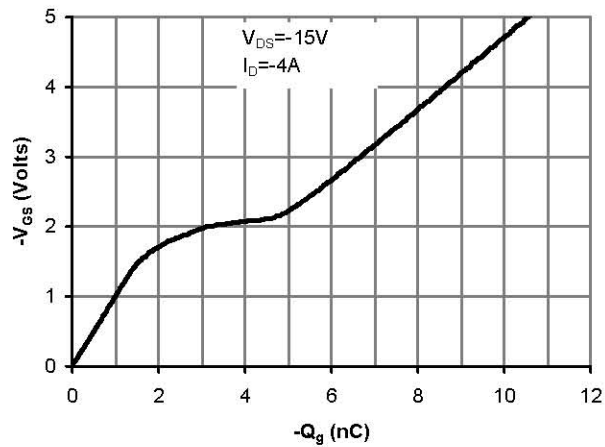


Figure 6: Body-Diode Characteristics



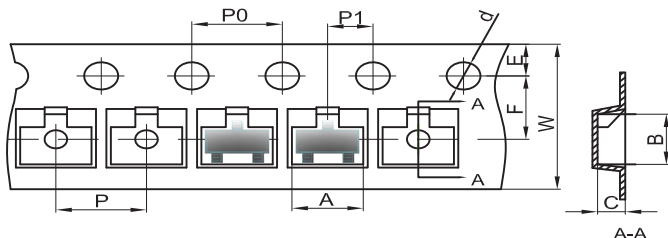
TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS





SOT-23 Tape and Reel

SOT-23 Embossed Carrier Tape

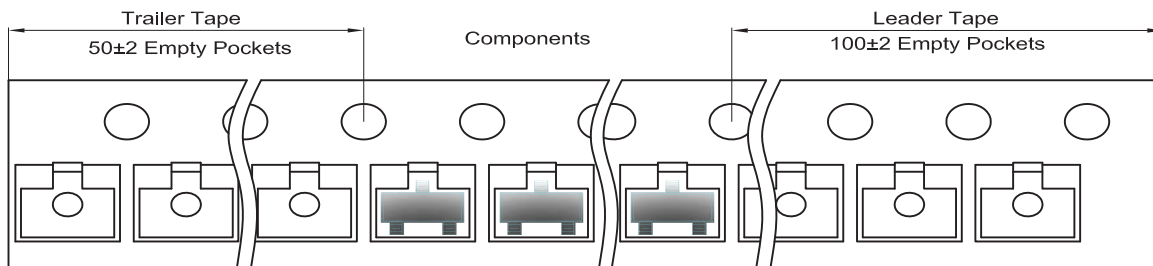


Packaging Description:

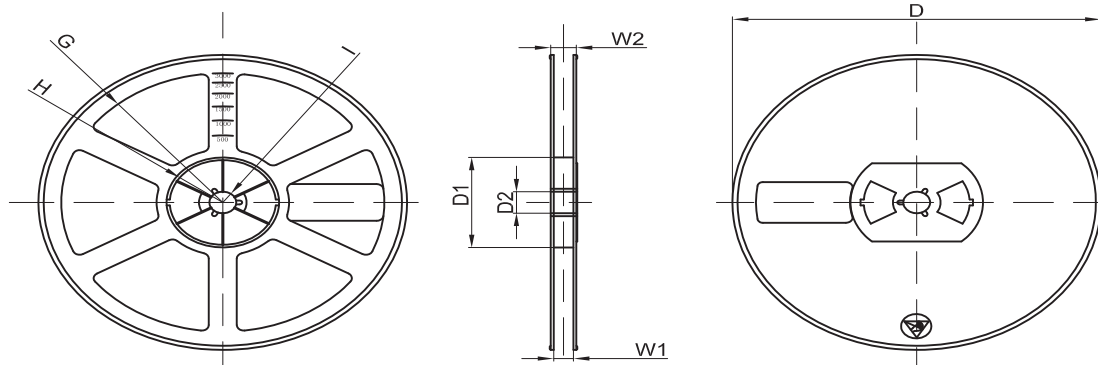
SOT-23 parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 3,000 units per 7" or 17.8cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

Dimensions are in millimeter										
Pkg type	A	B	C	d	E	F	P0	P	P1	W
SOT-23	3.15	2.77	1.22	Ø1.50	1.75	3.50	4.00	4.00	2.00	8.00

SOT-23 Tape Leader and Trailer



SOT-23 Reel



Dimensions are in millimeter							
Reel Option	D	D1	D2	G	H	I	W1
7" Dia	Ø178.00	54.40	13.00	R78.00	R25.60	R6.50	9.50

REEL	Reel Size	Box	Box Size(mm)	Carton	Carton Size(mm)	G.W.(kg)
3000 pcs	7 inch	45,000 pcs	203×203×195	180,000 pcs	438×438×220	