

20V P-Channel Enhancement Mode MOSFET

■ Features

- Advanced trench process technology
- High density cell design for ultra low on-resistance
- Excellent thermal and electrical capabilities
- Compact and low profile SOT-23 package

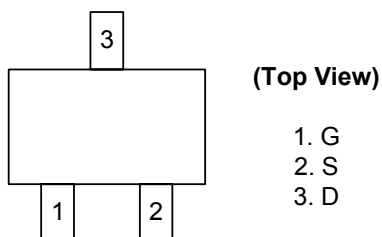
■ Product Summary

$V_{DS} = -20V$

$R_{DS(on)}, V_{GS}@-4.5V, I_{DS}@-2.8A = 130m\Omega$.

$R_{DS(on)}, V_{GS}@-2.5V, I_{DS}@-2.0A = 190m\Omega$.

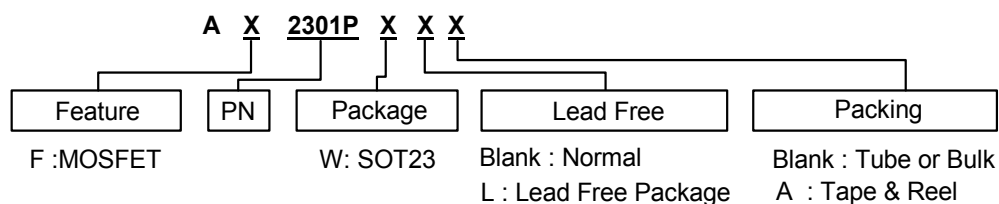
■ Pin Assignments



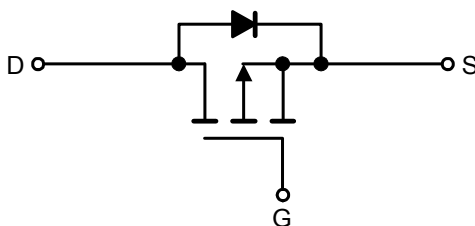
■ Pin Descriptions

Pin No.	Pin Name	Description
1	G	Gate
2	S	Source
3	D	Drain

■ Ordering information



■ Block Diagram



**20V P-Channel Enhancement Mode MOSFET****■ Absolute Maximum Ratings** ($T_A=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-20	V
V_{GS}	Gate-Source Voltage	± 8	V
I_D	Continuous Drain Current	-2.3	A
I_{DM}	Pulsed Drain Current	-10	A
P_D	Maximum Power Dissipation	$T_A=25^\circ\text{C}$	W
		$T_A=70^\circ\text{C}$	
T_J	Operating Junction Temperature	+150	$^\circ\text{C}$
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 to +150	$^\circ\text{C}$

■ Thermal Performance

Symbol	Parameter	Limit	Units
T_L	Lead Temperature (1/8" from case)	5	S
$R_{\theta JA}$	Junction to Ambient Thermal Resistance (PCB mounted)	100	$^\circ\text{C/W}$

Note: Surface mounted on FR4 board $t \leq 5$ sec.

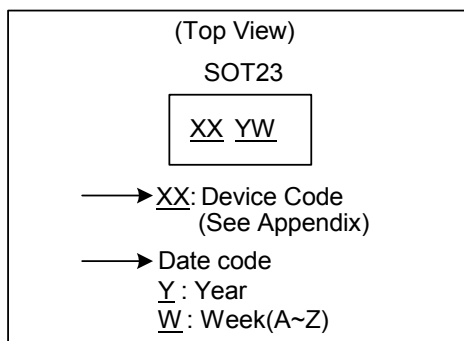
■ Electrical Characteristics Rate $I_D=-2.3\text{A}$, ($T_A=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Test Conditions	Limits			Unit
			Min.	Typ.	Max.	
Static						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250uA	-20	-	-	V
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =-4.5V, I _D =-2.8A	-	95	130	mΩ
		V _{GS} =-2.5V, I _D =-2.0A	-	122	190	
V _{GS(TH)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D =-250uA	-0.45	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-16V, V _{GS} =0V	-	-	-1.0	uA
I _{GSS}	Gate Body Leakage	V _{GS} =±8V, V _{DS} =0V	-	-	±100	nA
I _{D(ON)}	On-State Drain Current	V _{DS} =-5V, V _{GS} =-10V	-6	-	-	A
g _{fs}	Forward Tranconductance	V _{DS} =-5V, I _D =-2.8A	-	6.5	-	S
Dynamic						
Q _g	Total Gate Charge	V _{DS} =-6V, I _D =-2.8A, V _{GS} =-4.5V	-	5.4	10	nC
Q _{gs}	Gate-Source Charge		-	0.8	-	
Q _{gd}	Gate-Drain Charge		-	1.1	-	
t _{d(on)}	Turn-On Delay Time	V _{DD} =-6V, R _L =6Ω, I _D =-1A, V _{GEN} =-4.5V, R _G =6Ω	-	5	25	nS
t _r	Turn-On Rise Time		-	19	60	
t _{d(off)}	Turn-Off Delay Time		-	95	110	
t _f	Turn-Off Fall-Time		-	65	80	
C _{iss}	Input Capacitance	V _{DS} =-6V, V _{GS} =0V, f=1.0MHz	-	447	-	pF
C _{oss}	Output Capacitance		-	127	-	
C _{rss}	Reverse Transfer Capacitance		-	80	-	
Source-Drain Diode						
I _s	Max. Diode Forward Current		-	-	-1.6	A
V _{SD}	Diode Forward Voltage	I _s =-1.6A, V _{GS} =0V	-	-0.8	-1.2	V

Note: Pulse test: pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$

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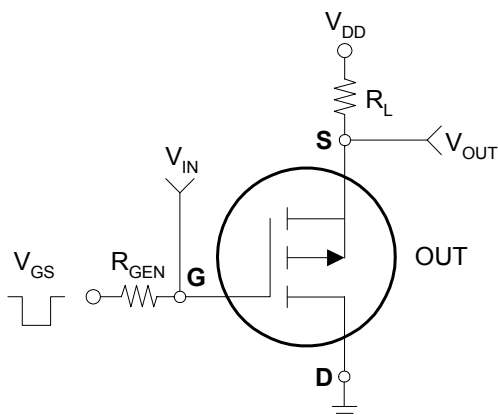
■ Marking Information



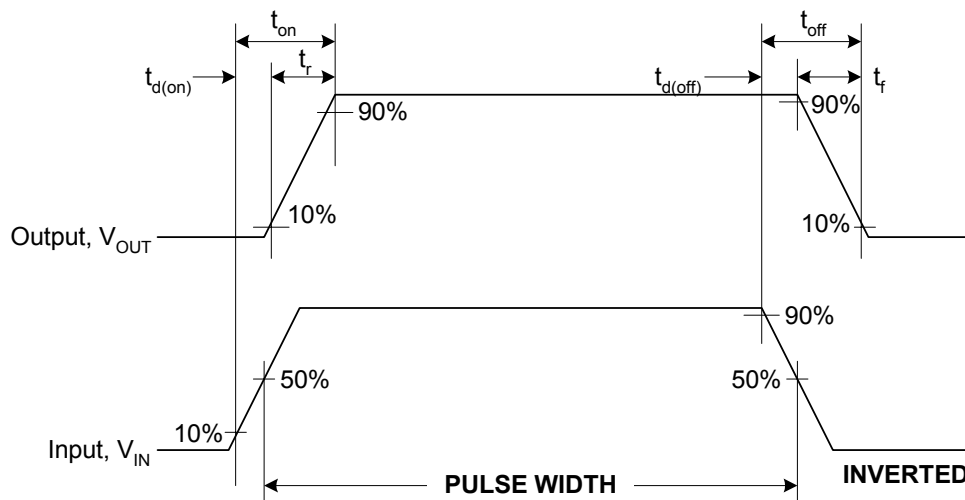
Appendix

Part Number	Package	Device Code
AF2301P	SOT23-3	01

■ Switching Test Circuit

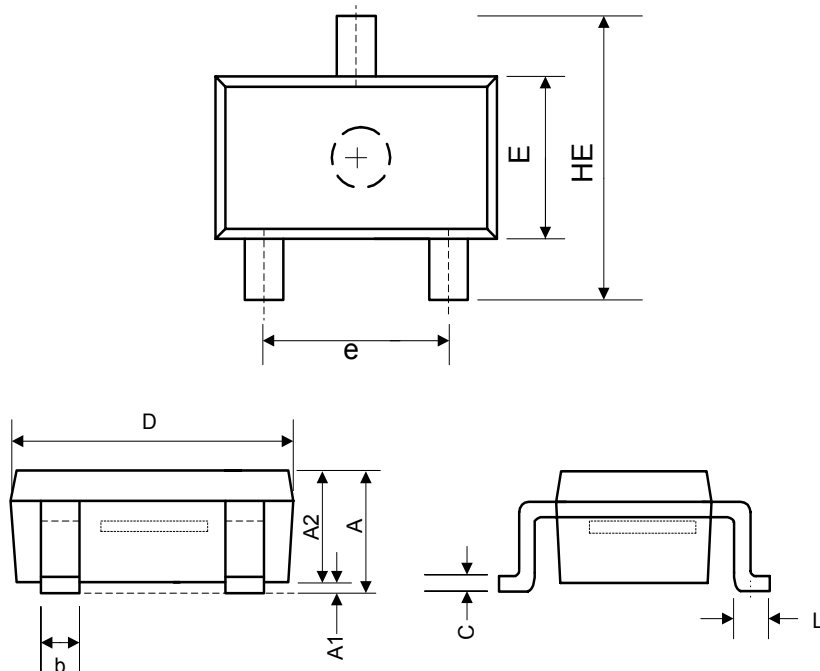


■ Switching Waveforms



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■ Package Information



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	1.00	1.20	1.40	0.039	0.047	0.055
A1	0.00	-	0.10	0.000	-	0.004
A2	1.00	1.15	1.30	0.039	0.045	0.051
b	0.35	-	0.50	0.014	-	0.020
C	0.10	0.175	0.25	0.004	0.007	0.010
D	2.70	2.90	3.10	0.106	0.114	0.122
E	1.40	1.60	1.80	0.055	0.063	0.071
e	1.70	2.00	2.30	0.067	0.079	0.091
HE	2.40	2.70	3.00	0.094	0.106	0.118
L	0.30	-	0.55	0.012	-	0.022