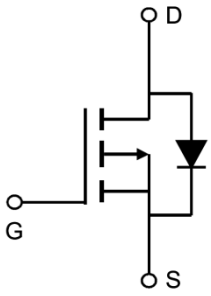
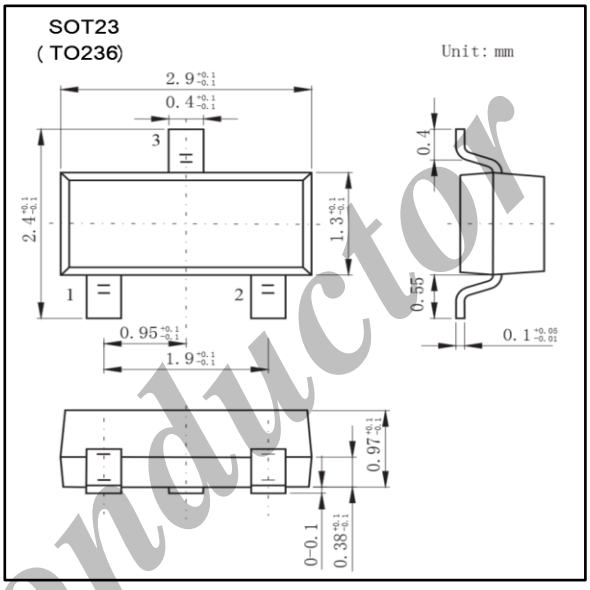
AP2301A
20V P-Channel Enhancement Mode MOSFET

- **General Description**

AP2301A combines advanced MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. This device is most suitable to load switch or PWM applications.

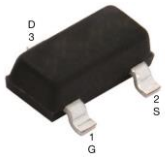




- **Applications**

- DC-DC converter for portable devices
- Load switch

Top View



- **Product Summary**

V_{DS}	-20V
I_D (at V_{GS} = -4.5V)	-2.2A
$R_{DS(ON)}$ (at V_{GS} = -4.5V)	< 100mΩ
$R_{DS(ON)}$ (at V_{GS} = -2.5V)	< 150mΩ

Pb-Free

RoHS COMPLIANT

- **Absolute Maximum Ratings Ta = 25℃**

Parameter		Symbol	Rating		Unit
			t = 5 s	Steady State	
Drain-Source Voltage		V_{DS}	-20		V
Gate-Source Voltage		V_{GS}	±8		V
Continuous Drain Current (T_J = 150 °C)	Ta = 25°C	I_D	-2.4	-2.2	A
	Ta = 70°C		-1.9	-1.8	
Pulsed Drain Current (Pulse width limited by maximum junction temperature)		I_{DM}	-10		
Power Dissipation	Ta = 25°C	P_D	0.9	0.7	W
	Ta = 70°C		0.57	0.45	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150		°C
Thermal Characteristics					
Thermal Resistance. Junction-to-Ambient (Surface Mounted on FR4 Board)		$R_{\theta JA}$	140	175	°C/W

• Electrical Characteristics Ta = 25°C

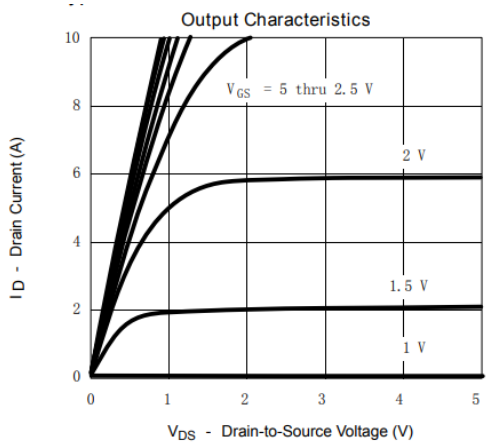
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static Parameters						
Drain-Source Breakdown Voltage	V_{DSS}	I_D=-250μA, V_{GS}=0V	-20			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-20V, V_{GS}=0V			-1	μA
		V_{DS}=-20V, V_{GS}=0V, T_J=55°C			-10	
Gate-Body Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±8V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250μA	-0.45		-0.95	V
On-State Drain Current (** Note a)	$I_{D(ON)}$	V_{DS} ≤ -5V , V_{GS}=-4.5V	-6			A
		V_{DS} ≤ -5V , V_{GS}=-2.5V	-3			
Static Drain-Source On-Resistance (** Note a)	$R_{DS(ON)}$	V_{GS}=-4.5V, I_D=-2.8A		80	100	mΩ
		V_{GS}=-2.5V, I_D=-2.0A		110	150	
Forward Transconductance (** Note a)	g_{FS}	V_{DS}=-5V, I_D=-2.8A		6.5		S
Diode Forward Voltage	V_{SD}	I_S=-0.75A, V_{GS}=0V		-0.8	-1.2	V
Maximum Body-Diode Continuous Current	I_S	t = 5 s			-0.72	A
		Steady State			-0.6	
Dynamic Parameters						
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=-6V, f=1MHz (** Note b)		375		pF
Output Capacitance	C_{oss}			95		
Reverse Transfer Capacitance	C_{rss}			65		
Switching Parameters						
Total Gate Charge (4.5V)	Q_g	V_{GS}=-4.5V, V_{DS}=-6V, I_D=-2.8A (** Note b)		4.5	10	nC
Gate Source Charge	Q_{gs}			0.7		
Gate Drain Charge	Q_{gd}			1.1		
Turn-On Delay Time	$t_{D(on)}$	V_{GS}=-4.5V, V_{DS}=-6V, R_L=6Ω, R_{GEN}=6Ω, ID=-1.0A (** Note c)		20	30	ns
Turn-On Rise Time	t_r			40	60	
Turn-Off Delay Time	$t_{D(off)}$			30	45	
Turn-Off Fall Time	t_f			20	30	

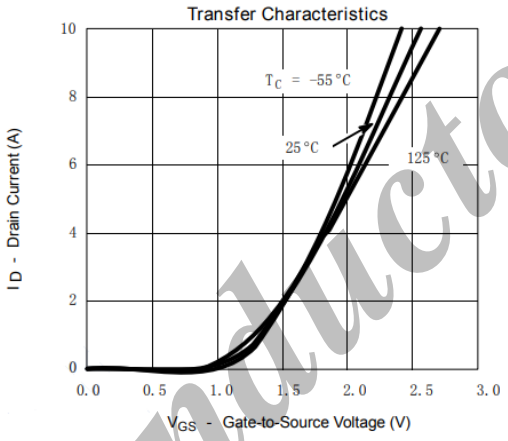
Notes
a. Pulse test: PW ≤ 300μs, duty cycle ≤ 2% .
b. For DESIGN AID ONLY, not subject to production testing.
c. Switching time is essentially independent of operating temperature.

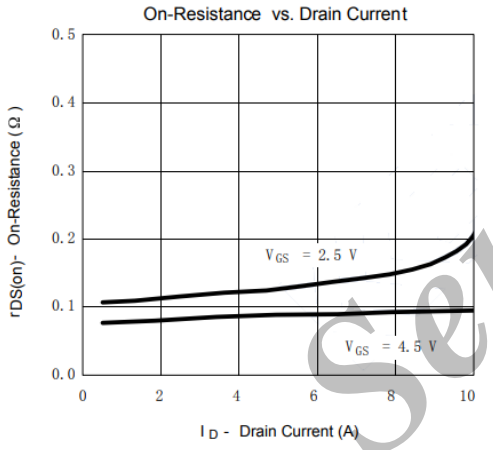
• Ordering Information

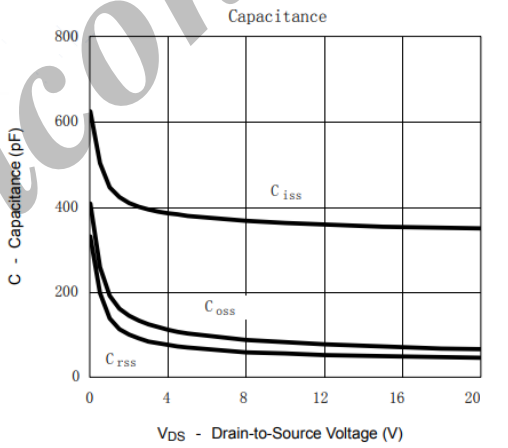
Ordering Part Number	Package	MOQ
AP2301A	SOT23 (TO236)	3,000 pcs / reel

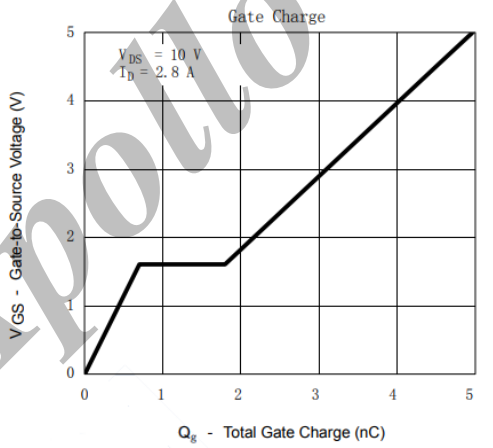
- **Typical Electrical and Thermal Characteristics**

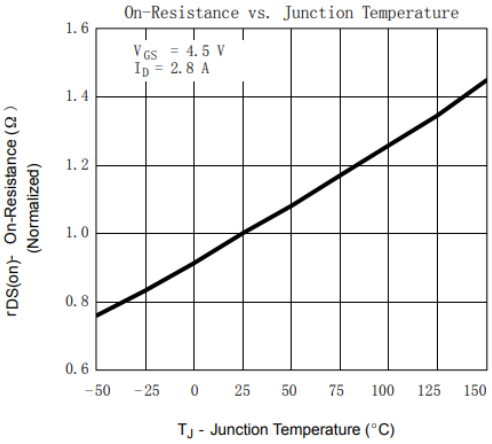




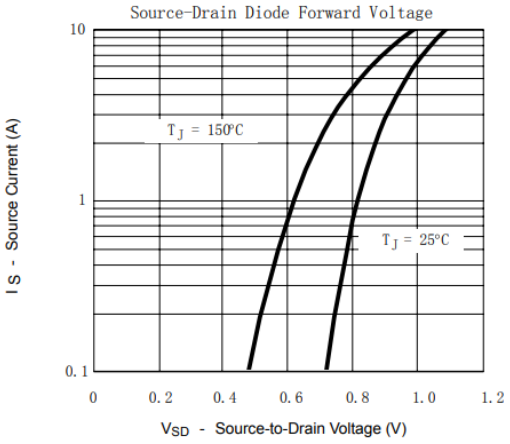


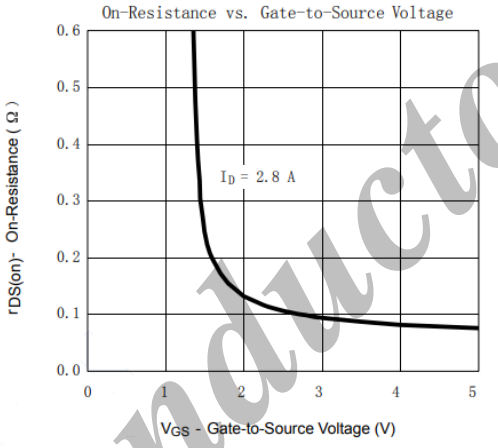


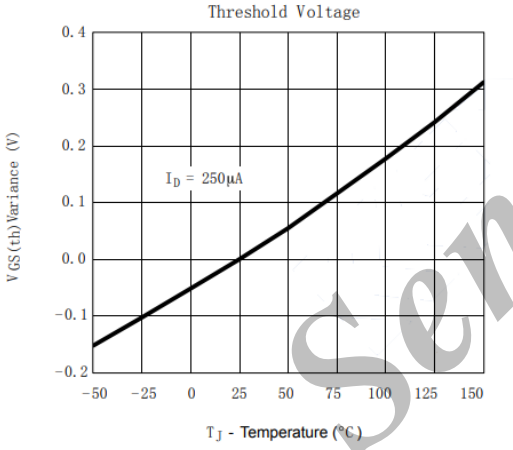


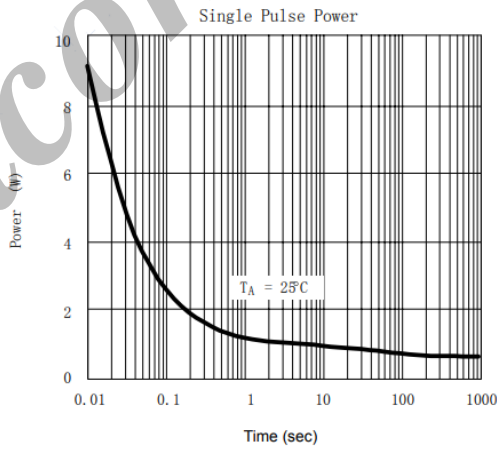


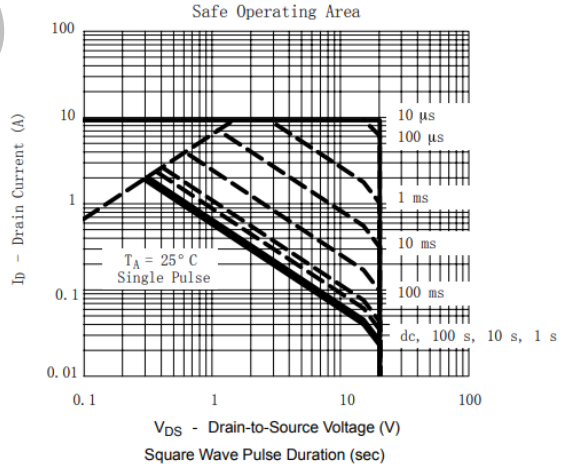
- **Typical Electrical and Thermal Characteristics**



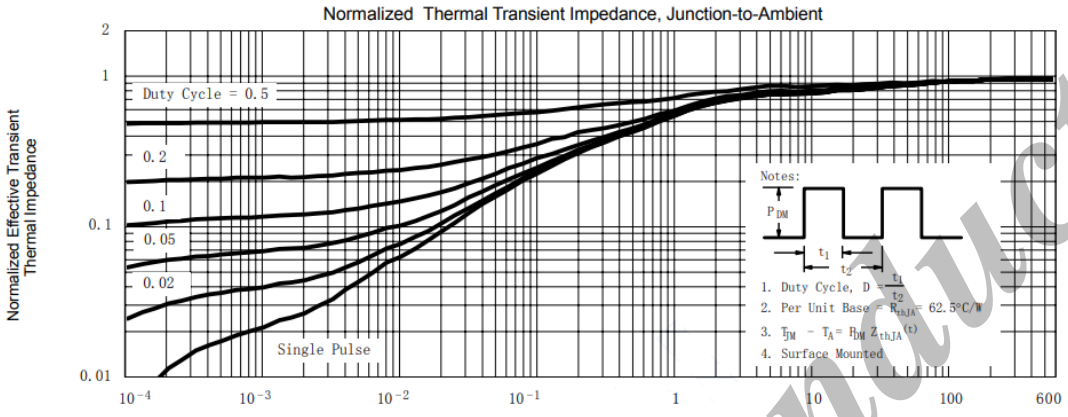








- **Typical Electrical and Thermal Characteristics**



Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Apollo Semiconductor Ltd., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Apollo"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Apollo makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Apollo disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Apollo's knowledge of typical requirements that are often placed on Apollo products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Apollo's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Apollo products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Apollo product could result in personal injury or death. Customers using or selling Apollo products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Apollo personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Apollo. Product names and markings noted herein may be trademarks of their respective owners.