

• General Description

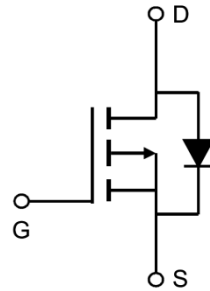
AP2305A combines advanced MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. This device is most suitable to load switch or PWM applications.

• Applications

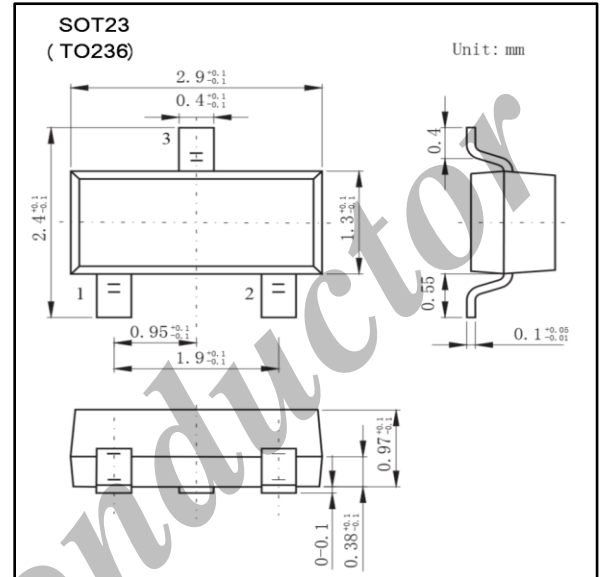
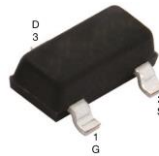
- DC-DC converter for portable devices
- Load switch

• Product Summary

V_{DS}	-8V
I_D (at $V_{GS} = -4.5V$)	-3.5A
$R_{DS(ON)}$ (at $V_{GS} = -4.5V, I_D = -3.5A$)	< 52m Ω
$R_{DS(ON)}$ (at $V_{GS} = -2.5V, I_D = -3A$)	< 71m Ω
$R_{DS(ON)}$ (at $V_{GS} = -1.8V, I_D = -2A$)	< 108m Ω



Top View



• Absolute Maximum Ratings $T_a = 25^\circ C$

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	-8	V
Gate-Source Voltage	V_{GS}	± 8	V
Continuous Drain Current ($T_j = 150^\circ C$)	I_D	$T_a = 25^\circ C$	-3.5
		$T_a = 70^\circ C$	-2.8
Pulsed Drain Current	I_{DM}	-12	A
Power Dissipation ** Note (i) & (ii)	P_D	$T_a = 25^\circ C$	1.25
		$T_a = 70^\circ C$	0.8
Junction and Storage Temperature Range	T_j, T_{STG}	-55 to 150	$^\circ C$
Thermal Characteristics			
Thermal Resistance, Junction-to-Ambient ** Note (i) & (ii)	$R_{\theta JA}$	100	$^\circ C/W$

Notes
 (i) Surface Mounted on FR4 Board
 (ii) $t \leq 5s$

• **Electrical Characteristics Ta = 25°C**

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static Parameters						
Drain-Source Breakdown Voltage	V_{DSS}	$V_{GS}=0V, I_D=-10\mu A$	-8			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-8V, V_{GS}=0V$			-1	μA
		$V_{DS}=-8V, V_{GS}=0V, T_J=55^\circ C$			-10	
Gate-Body Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 8V$			± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.45		-0.8	V
On-State Drain Current ** Note (a)	$I_{D(ON)}$	$V_{DS} \leq -5V, V_{GS}=-4.5V$	-6			A
		$V_{DS} \leq -5V, V_{GS}=-2.5V$	-3			
Static Drain-Source On-Resistance ** Note (a)	$R_{DS(ON)}$	$V_{GS}=-4.5V, I_D=-3.5A$		44	52	m Ω
		$V_{GS}=-2.5V, I_D=-3.0A$		60	71	
		$V_{GS}=-1.8V, I_D=-2.0A$		87	108	
Forward Transconductance ** Note (a)	g_{FS}	$V_{DS}=-5V, I_D=-3.5A$		8.5		S
Diode Forward Voltage	V_{SD}	$I_S=-1.6A, V_{GS}=0V$			-1.2	V
Maximum Body-Diode Continuous Current ** Note (i) & (ii)	I_S				-1.6	A
Dynamic Parameters ** Note (b)						
Input Capacitance	C_{iss}	$V_{DS}=-4V, V_{GS}=0V, f=1MHz$		1245		pF
Output Capacitance	C_{oss}			375		
Reverse Transfer Capacitance	C_{rss}			210		
Switching Parameters ** Note (b)						
Total Gate Charge	Q_g	$V_{DS}=-4V, V_{GS}=-4.5V, I_D=-3.5A$		10	15	nC
Gate Source Charge	Q_{gs}			2		
Gate Drain Charge	Q_{gd}			2		
Turn-On Delay Time	$t_{D(on)}$	$V_{DD}=-4V, R_L=4\Omega, I_D=-1A, V_{GEN}=-4.5V, R_{GEN}=6\Omega,$		13	20	ns
Turn-On Rise Time	t_r			25	40	
Turn-Off Delay Time	$t_{D(off)}$			55	80	
Turn-Off Fall Time	t_f			19	35	

Notes

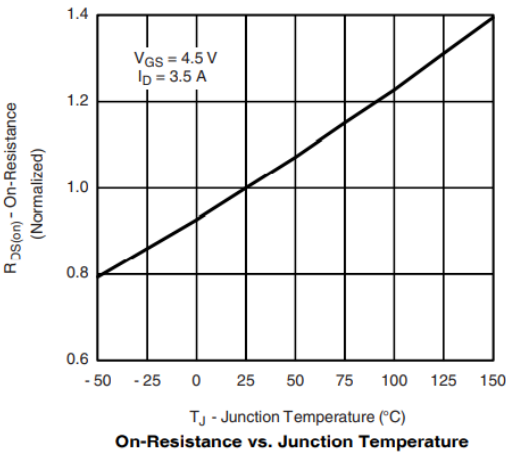
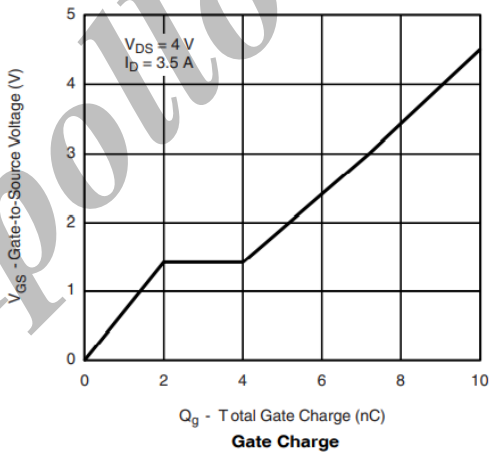
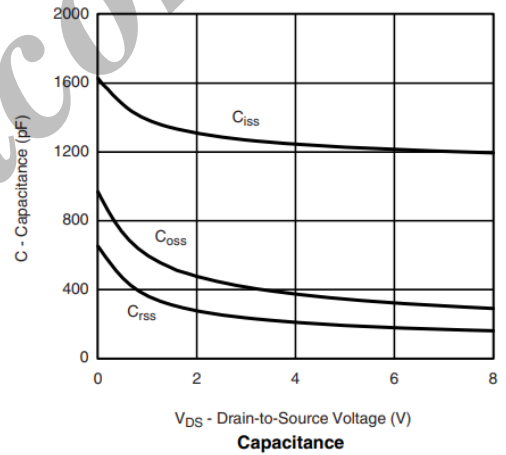
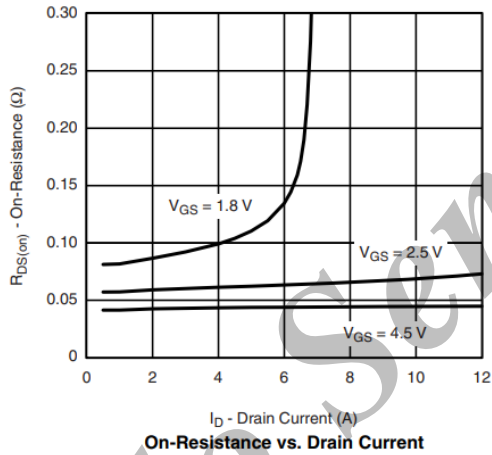
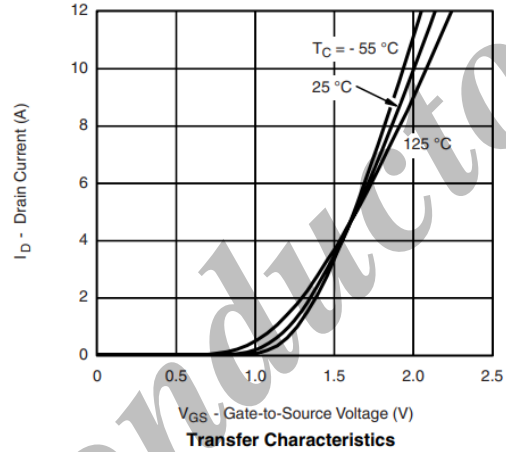
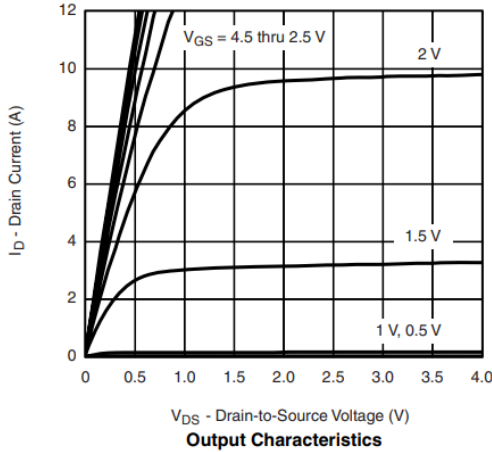
- (a) For DESIGN AID ONLY, not subject to production testing.
- (b) Pulse test: $PW \leq 300\mu s$, duty cycle $\leq 2\%$.
- (c) Switching time is essentially independent of operating temperature.

• **Ordering Information**

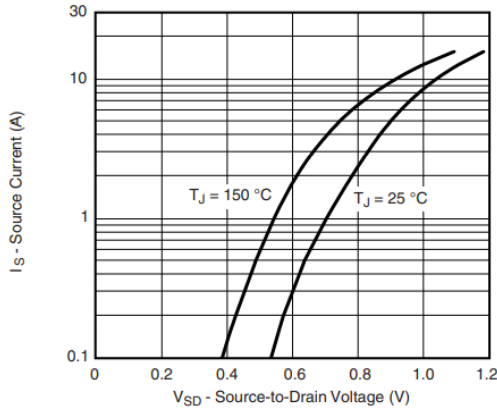
Ordering Part Number	Package	MOQ
AP2305A	SOT23 (T0236)	3,000 pcs / reel

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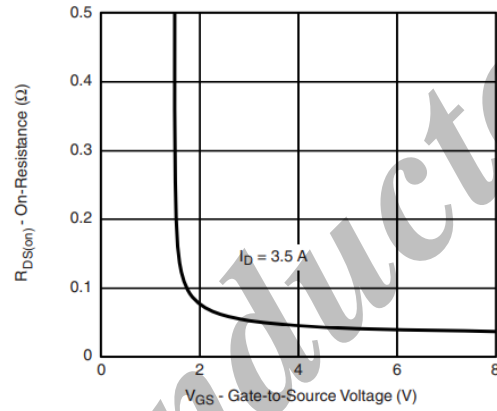
• Typical Electrical and Thermal Characteristics



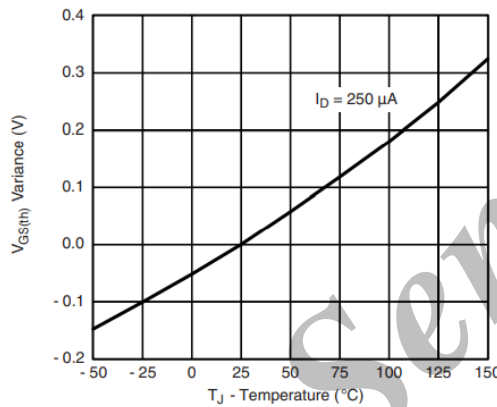
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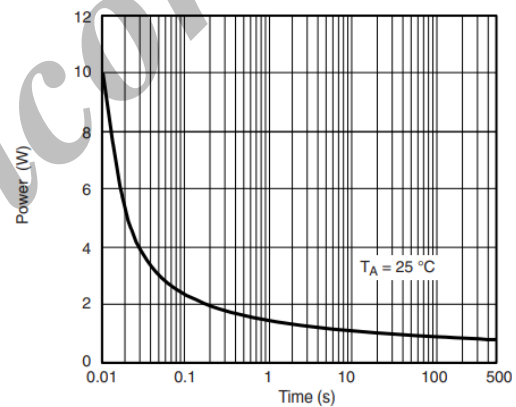
Source-Drain Diode Forward Voltage



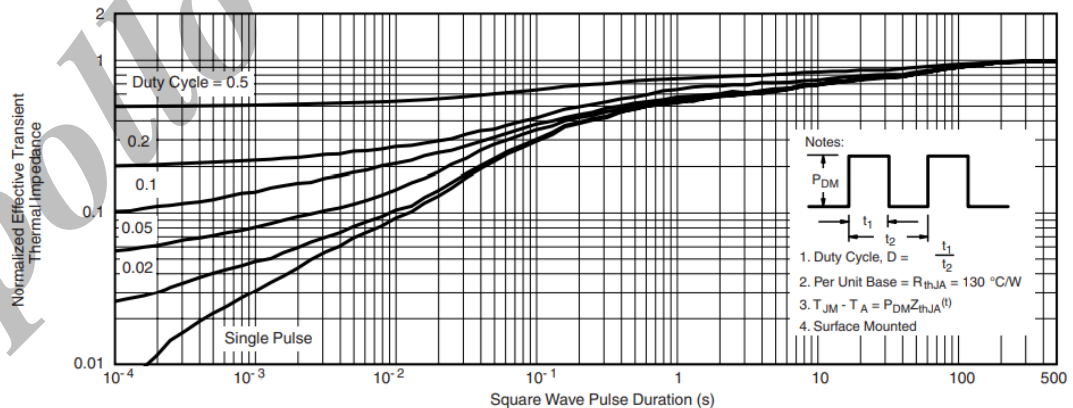
On-Resistance vs. Gate-to-Source Voltage



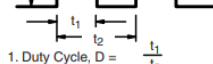
Threshold Voltage



Single Pulse Power



Normalized Thermal Transient Impedance, Junction-to-Ambient

Notes:

 1. Duty Cycle, $D = \frac{t_1}{t_2}$
 2. Per Unit Base = $R_{thJA} = 130^\circ\text{C/W}$
 3. $T_{JM} - T_A = P_{DM} Z_{thJA}^{(t)}$
 4. Surface Mounted

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