

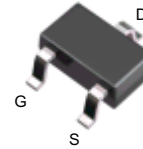
## Features

- -20V/-3A ,  
 $R_{DS(ON)}=72m\Omega(\text{typ.}) @ V_{GS}=-4.5V$   
 $R_{DS(ON)}=98m\Omega(\text{typ.}) @ V_{GS}=-2.5V$
- Super High Dense Cell Design
- Reliable and Rugged
- Lead Free Available (RoHS Compliant)

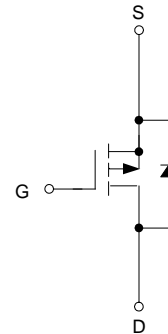
## Applications

- Power Management in Notebook Computer ,  
 Portable Equipment and Battery Powered  
 Systems.

## Pin Description



Top View of SOT-23



P-Channel MOSFET

## Ordering and Marking Information

<p>APM2301A □□-□□□</p> <ul style="list-style-type: none"> <li>□□□ : Lead Free Code</li> <li>□□ : Handling Code</li> <li>□ : Temp. Range</li> <li>□ : Package Code</li> </ul>	<p>Package Code                  A : SOT-23                  Operating Junction Temp. Range                  C : -55 to 150°C                  Handling Code                  TU : Tube    TR : Tape &amp; Reel                  Lead Free Code                  L : Lead Free Device    Blank : Original Device</p>
<p>APM2301A A : <span style="border: 1px solid black; padding: 2px;">A01X</span></p>	<p>XXXXX - Date Code</p>

Note: TY lead-free products contain molding compounds/die attach materials and 100% matte in plate termination finish; which are fully compliant with RoHS and compatible with both SnPb and lead-free soldering operations. TY lead-free products meet or exceed the lead-free requirements of IPC/JEDEC J STD-020C for MSL classification at lead-free peak reflow temperature.

# APM2301AA

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

Symbol	Parameter	Rating	Unit	
$V_{DSS}$	Drain-Source Voltage	-20	V	
$V_{GSS}$	Gate-Source Voltage	$\pm 12$		
$I_D^*$	Continuous Drain Current	-3	A	
$I_{DM}^*$	300 $\mu$ s Pulsed Drain Current			-10
$I_S^*$	Diode Continuous Forward Current	-1	A	
$T_J$	Maximum Junction Temperature	150	$^\circ\text{C}$	
$T_{STG}$	Storage Temperature Range	-55 to 150		
$P_D^*$	Maximum Power Dissipation	$T_A=25^\circ\text{C}$	0.83	W
		$T_A=100^\circ\text{C}$	0.3	
$R_{\theta JA}^*$	Thermal Resistance-Junction to Ambient	150	$^\circ\text{C}/\text{W}$	

Note:

\*Surface Mounted on 1in<sup>2</sup> pad area,  $t \leq 10\text{sec}$ .

## Electrical Characteristics $(T_A = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Test Condition	APM2301AA			Unit
			Min.	Typ.	Max.	
<b>Static Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0\text{V}, I_{DS}=-250\mu\text{A}$	-20			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=-16\text{V}, V_{GS}=0\text{V}$ $T_J=85^\circ\text{C}$			-1	$\mu\text{A}$
					-30	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=-250\mu\text{A}$	-0.5	-0.6	-1	V
$I_{GSS}$	Gate Leakage Current	$V_{GS}=\pm 12\text{V}, V_{DS}=0\text{V}$			$\pm 100$	nA
$R_{DS(ON)}^a$	Drain-Source On-state Resistance	$V_{GS}=-4.5\text{V}, I_{DS}=-3\text{A}$		72	90	m $\Omega$
		$V_{GS}=-2.5\text{V}, I_{DS}=-2\text{A}$		98	115	
$V_{SD}^a$	Diode Forward Voltage	$I_{SD}=-1.25\text{A}, V_{GS}=0\text{V}$		-0.7	-1.3	V
<b>Gate Charge Characteristics<sup>b</sup></b>						
$Q_g$	Total Gate Charge	$V_{DS}=-10\text{V}, V_{GS}=-4.5\text{V},$ $I_{DS}=-3\text{A}$		9	12	nC
$Q_{gs}$	Gate-Source Charge			3		
$Q_{gd}$	Gate-Drain Charge			1.2		

# APM2301AA

## Electrical Characteristics (Cont.) ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Test Condition	APM2301AA			Unit
			Min.	Typ.	Max.	
<b>Dynamic Characteristics<sup>b</sup></b>						
$R_G$	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$		11		$\Omega$
$C_{iss}$	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=-15V,$ Frequency=1.0MHz		550		pF
$C_{oss}$	Output Capacitance			120		
$C_{rss}$	Reverse Transfer Capacitance			80		
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=-10V, R_L=10\Omega,$ $I_{DS}=-1A, V_{GEN}=-4.5V,$ $R_G=6\Omega$		13	24	ns
$T_r$	Turn-on Rise Time			36	66	
$t_{d(OFF)}$	Turn-off Delay Time			45	82	
$T_f$	Turn-off Fall Time			37	68	

Notes:

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

b : Guaranteed by design, not subject to production testing.