

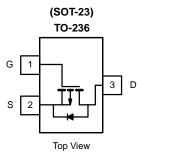
RoHS COMPLIANT HALOGEN

FREE

## **AP2315GEN-HF-VB Datasheet**

## P-Channel 30 V (D-S) MOSFET

PRODUCT SUMMARY					
V <sub>DS</sub> (V)	R <sub>DS(on)</sub> (Ω) Typ.	I <sub>D</sub> (A) <sup>a</sup>	Q <sub>g</sub> (Typ.)		
	0.046 at V <sub>GS</sub> = - 10 V	- 5.6			
- 30	0.049 at V <sub>GS</sub> = - 6 V	- 5	11.4 nC		
	0.054 at V <sub>GS</sub> = - 4.5 V	-4.5			





#### **FEATURES**

- Trench Power MOSFET
- 100 % R<sub>g</sub> Tested



- For Mobile Computing
  - Load Switch
  - Notebook Adaptor Switch
  - DC/DC Converter

Parameter		Symbol	Limit	Unit	
Drain-Source Voltage		V <sub>DS</sub>	- 30	V	
Gate-Source Voltage		V <sub>GS</sub>	± 20		
	T <sub>C</sub> = 25 °C		- 5.6		
Constitutions Desire Constants (T. 450.80)	T <sub>C</sub> = 70 °C		- 5.1		
Continuous Drain Current (T <sub>J</sub> = 150 °C)	T <sub>A</sub> = 25 °C	I <sub>D</sub>	- 5.4 <sup>b,c</sup>		
	T <sub>A</sub> = 70 °C		- 4.3 <sup>b,c</sup>	A	
Pulsed Drain Current (t = 100 µs)		I <sub>DM</sub>	- 18		
	T <sub>C</sub> = 25 °C		- 2.1		
Continous Source-Drain Diode Current	T <sub>A</sub> = 25 °C	I <sub>S</sub>	- 1 <sup>b,c</sup>		
	T <sub>C</sub> = 25 °C		2.5		
Maximum Power Dissipation	T <sub>C</sub> = 70 °C		1.6	14/	
	T <sub>A</sub> = 25 °C	P <sub>D</sub>	1.25 <sup>b,c</sup>	W	
	T <sub>A</sub> = 70 °C		0.8 <sup>b,c</sup>		
Operating Junction and Storage Temperature Range		T <sub>J</sub> , T <sub>stg</sub>	- 55 to 150	°C	

#### THERMAL RESISTANCE RATINGS

Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient <sup>b,d</sup>	$t \le 5 s$	R <sub>thJA</sub>	75	100	°C/W
Maximum Junction-to-Foot (Drain)	Steady State	R <sub>thJF</sub>	40	50	0/11

Notes:

a. Based on  $T_C = 25 \text{ °C}$ . b. Surface mounted on 1" x 1" FR4 board.

c. t = 5 s.

d. Maximum under steady state conditions is 166 °C/W.

<b>SPECIFICATIONS</b> ( $T_J = 25 \ ^{\circ}C$ ,	unless othe	erwise noted)					
Parameter	Symbol	Test Conditions	Min.	Тур.	Max.	Unit	
Static				•	•	•	
Drain-Source Breakdown Voltage	V <sub>DS</sub>	$V_{GS} = 0 V, I_D = -250 \mu A$	- 30			V	
V <sub>DS</sub> Temperature Coefficient	$\Delta V_{DS}/T_{J}$	I <sub>D</sub> = - 250 μA		- 19		mV/°C	
V <sub>GS(th)</sub> Temperature Coefficient	$\Delta V_{GS(th)}/T_J$	i <sub>D</sub> = - 230 μA		4			
Gate-Source Threshold Voltage	V <sub>GS(th)</sub>	$V_{DS} = V_{GS}$ , $I_D = -250 \ \mu A$	- 0.5		- 2.0	V	
Gate-Source Leakage	I <sub>GSS</sub>	$V_{DS} = 0 V, V_{GS} = \pm 20 V$			± 100	nA	
Zara Cata Valtaga Drain Current	1	$V_{DS} = -30 \text{ V}, \text{ V}_{GS} = 0 \text{ V}$			- 1	μA	
Zero Gate Voltage Drain Current	IDSS	V <sub>DS</sub> = - 30 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 55 °C			- 5		
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	$V_{DS} \leq$ - 5 V, $V_{GS}$ = - 10 V	- 2.5			А	
		V <sub>GS</sub> =- 10 V, I <sub>D</sub> = - 4.4 A		0.046			
Drain-Source On-State Resistance <sup>a</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> =- 6 V, I <sub>D</sub> = - 4 A		0.049		Ω	
		V <sub>GS</sub> =- 4.5 V, I <sub>D</sub> = - 3.6 A		0.054			
Forward Transconductance <sup>a</sup>	9 <sub>fs</sub>	V <sub>DS</sub> = - 15 V, I <sub>D</sub> = - 3.4 A		18		S	
Dynamic <sup>b</sup>				•	•	•	
Input Capacitance	C <sub>iss</sub>			1295			
Output Capacitance	C <sub>oss</sub>	V <sub>DS</sub> = - 15 V, V <sub>GS</sub> = 0 V, f = 1 MHz		150		pF	
Reverse Transfer Capacitance	C <sub>rss</sub>			130			
T + 1 0 + 01		V <sub>DS</sub> = - 15 V, V <sub>GS</sub> = - 10 V, I <sub>D</sub> = - 5.4 A		24	36	<u> </u>	
Total Gate Charge	Qg			11.4	17		
Gate-Source Charge	Q <sub>gs</sub>	V <sub>DS</sub> = - 15 V, V <sub>GS</sub> = - 4.5 V, I <sub>D</sub> = - 5.4 A		3.4		nC	
Gate-Drain Charge	Q <sub>gd</sub>			3.8			
Gate Resistance	R <sub>g</sub>	f = 1 MHz	1.5	7.7	15.4	Ω	
Turn-On Delay Time	t <sub>d(on)</sub>			13	20		
Rise Time	t <sub>r</sub>	$V_{DD}$ = - 15 V, R <sub>L</sub> = 3.5 $\Omega$		4	8		
Turn-Off Delay Time	t <sub>d(off)</sub>	$I_D \cong$ - 4.3 A, $V_{GEN}$ = - 10 V, $R_g$ = 1 $\Omega$		38	57	1	
Fall Time	t <sub>f</sub>			6	12		
Turn-On Delay Time	t <sub>d(on)</sub>			28	42	ns	
Rise Time	t <sub>r</sub>	$V_{DD} = -15 \text{ V}, \text{ R}_{1} = 3.5 \Omega$		16	24		
Turn-Off Delay Time	t <sub>d(off)</sub>	$I_D \cong$ - 4.3 A, $V_{GEN}$ = - 4.5 V, $R_g$ = 1 $\Omega$		30	45	-	
Fall Time	t <sub>f</sub>			10	20		
Drain-Source Body Diode Characteristic	s					1	
Continuous Source-Drain Diode Current	۱ <sub>S</sub>	T <sub>C</sub> = 25 °C			- 2.1		
Pulse Diode Forward Current (t = $100 \mu s$ )	I <sub>SM</sub>				- 80	A	
Body Diode Voltage	V <sub>SD</sub>	I <sub>S</sub> = - 4.3 A, V <sub>GS</sub> = 0 V		- 0.8	- 1.2	V	
Body Diode Reverse Recovery Time	t <sub>rr</sub>			15	23	ns	
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>			7	14	nC	
Reverse Recovery Fall Time	t <sub>a</sub>	$I_F = -4.3 \text{ A}, \text{ dI/dt} = 100 \text{ A/}\mu\text{s}, T_J = 25 \text{ °C}$		8		ns	
Reverse Recovery Rise Time	t <sub>b</sub>	1 1		7			

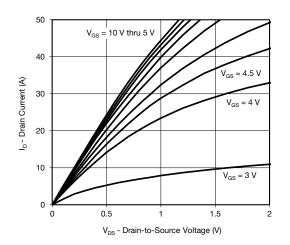
Notes:

a. Pulse test; pulse width  $\leq$  300 µs, duty cycle  $\leq$  2 %.

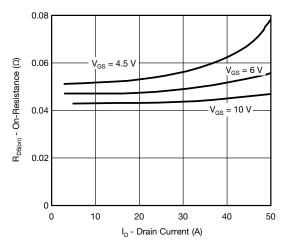
b. Guaranteed by design, not subject to production testing.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

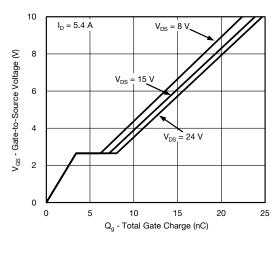




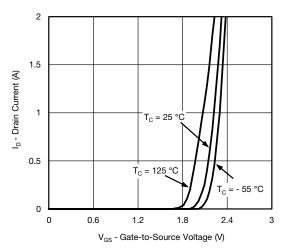




**On-Resistance vs. Drain Current** 



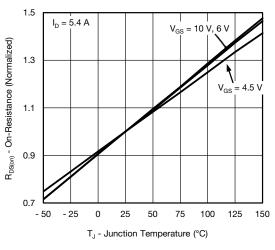
**Gate Charge** 



**Transfer Characteristics** 

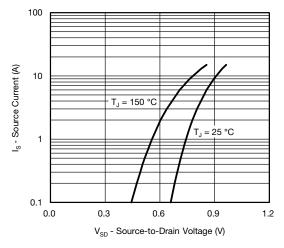






**On-Resistance vs. Junction Temperature** 

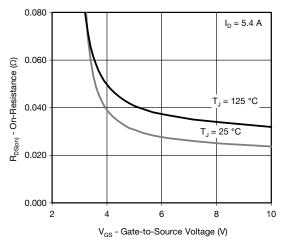




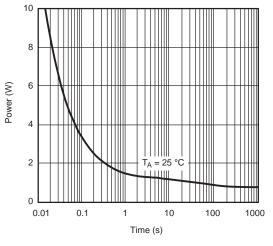
Source-Drain Diode Forward Voltage







On-Resistance vs. Gate-to-Source Voltage

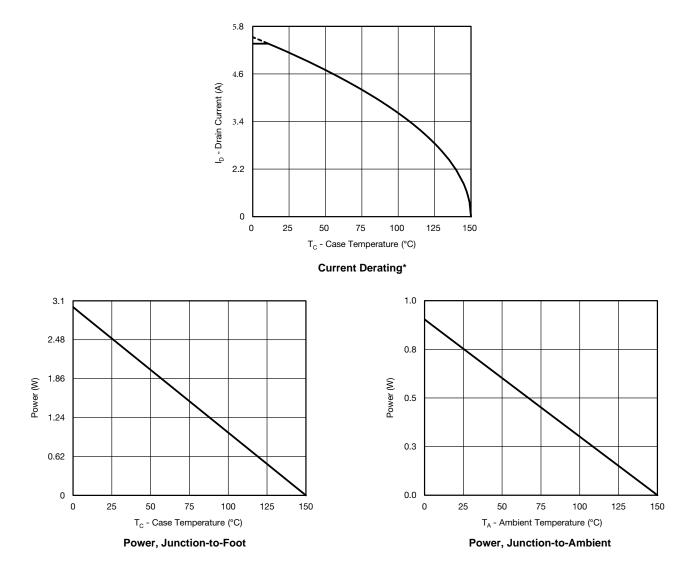


Single Pulse Power (Junction-to-Ambient)



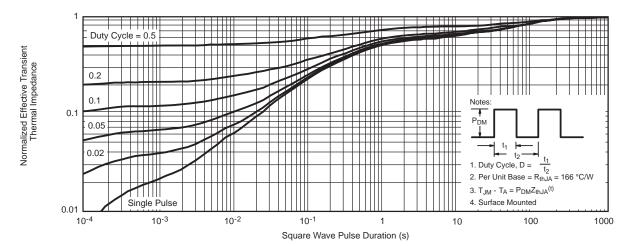
Safe Operating Area, Junction-to-Ambient





\* The power dissipation  $P_D$  is based on  $T_{J(max.)} = 150$  °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.





Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Foot



### SOT-23 (TO-236): 3-LEAD





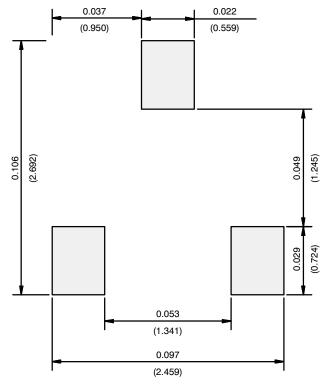


Dim	MILLIN	<b>METERS</b>	INCHES		
	Min	Max	Min	Мах	
Α	0.89	1.12	0.035	0.044	
A <sub>1</sub>	0.01	0.10	0.0004	0.004	
A <sub>2</sub>	0.88	1.02	0.0346	0.040	
b	0.35	0.50	0.014	0.020	
С	0.085	0.18	0.003	0.007	
D	2.80	3.04	0.110	0.120	
E	2.10	2.64	0.083	0.104	
E <sub>1</sub>	1.20	1.40	0.047	0.055	
е	0.95 BSC		0.0374 Ref		
e <sub>1</sub>	1.90 BSC		0.0748 Ref		
L	0.40	0.60	0.016	0.024	
L <sub>1</sub>	0.64 Ref		0.025 Ref		
S	0.50 Ref		0.020 Ref		
q	3°	8°	3°	8°	

## AP2315GEN-HF-VB



#### **RECOMMENDED MINIMUM PADS FOR SOT-23**



Recommended Minimum Pads Dimensions in Inches/(mm)



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