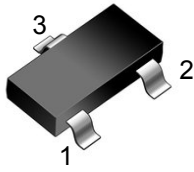
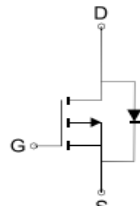


**SOT-23**



**MARKING: A1SHB**



P-Channel MOSFET

**Features**

- Advanced trench process technology
- High density cell design for Ultra Low On-Resistance
- Halogen free and RoHS compliant

**Mechanical Data**

SOT-23 Small Outline Plastic Package  
EpoxyUL:94V-0

**Summary of Packing Options**

Package	Packing Description	Packing Quantity	Industry Standard
SOT-23	Tape/Reel,7" reel	3000	EIA-481-1

**Maximum Ratings & Thermal Characteristics**

(Ratings at 25°C ambient temperature unless otherwise specified.)

Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	$V_{DS}$	-20	V	
Gate-Source Voltage	$V_{GS}$	±12		
Continuous Drain Current	$I_D$	-4.1	A	
Pulsed Drain Current <sup>1)</sup>	$I_{DM}$	-15		
Maximum Power Dissipation <sup>2)</sup>	$P_D$	TA = 25°	1.25	W
		TA = 75°C	0.8	
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55 to 150	°C	
Junction-to-Ambient Thermal Resistance (PCB mounted) <sup>2)</sup>	$R_{thJA}$	100		°C/W
Junction-to-Ambient Thermal Resistance (PCB mounted) <sup>3)</sup>		166		

Notes

- 1) Pulse width limited by maximum junction temperature.
- 2) Surface Mounted on FR4 Board, t ≤ 5 sec.
- 3) Surface Mounted on FR4 Board.

**Electrical Characteristics**

(Ratings at 25°C ambient temperature unless otherwise specified).

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-20			V
Drain-Source On-State Resistance <sup>1)</sup>	$R_{DS(on)}$	$V_{GS} = -4.5V, I_D = -4.1A$		46	52	mΩ
		$V_{GS} = -2.5V, I_D = -3.0A$		60	75	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	0.4		1	V
Zero Gate Voltage Drain Current $I_{D0}$	$I_{DSS}$	$V_{DS} = -20V, V_{GS} = 0V$			-1	μA
		$V_{DS} = -20V, V_{GS} = 0V, T_J = 55°C$			-10	
Gate Body Leakage	$I_{GSS}$	$V_{GS} = \pm 12V, V_{DS} = 0V$			±100	nA
Forward Transconductance <sup>1)</sup>	$g_{fs}$	$V_{DS} = -5V, I_D = -3.5A$		6.5	—	S



## Electrical Characteristics

(Ratings at 25°C ambient temperature unless otherwise specified).

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
<b>Dynamic</b>						
Total Gate Charge	$Q_g$	$V_{DS} = -6V, I_D \cong -3.5A$ $V_{GS} = -4.5V$		5.8	10	nC
Gate-Source Charge	$Q_{gs}$			0.85		
Gate-Drain Charge	$Q_{gd}$			1.7		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -6V, R_L = 6\Omega$ $I_D \cong -1.1A, V_{GEN} = -4.5V$ $R_G = 6\Omega$		13	25	ns
Turn-On Rise Time	$t_r$			36	60	
Turn-Off Delay Time	$t_{d(off)}$			42	70	
Turn-Off Fall Time	$t_f$			34	60	
Input Capacitance	$C_{iss}$	$V_{DS} = -6V, V_{GS} = 0V$ $f = 1.0\text{ MHz}$		415		pF
Output Capacitance	$C_{oss}$			223		
Reverse Transfer Capacitance	$C_{rss}$			87		
<b>Source-Drain Diode</b>						
Max. Diode Forward Current	$I_S$				-1.6	A
Diode Forward Voltage	$V_{SD}$	$I_S = -1.6A, V_{GS} = 0V$		-0.8	-1.2	V

1) Pulse test: pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$

## Ratings and Characteristic Curves

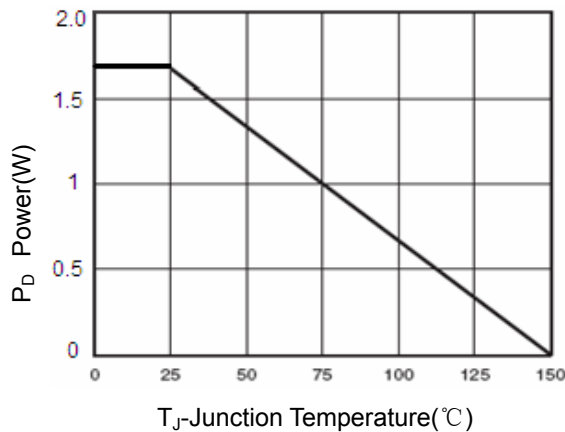


Figure 1 Power Dissipation

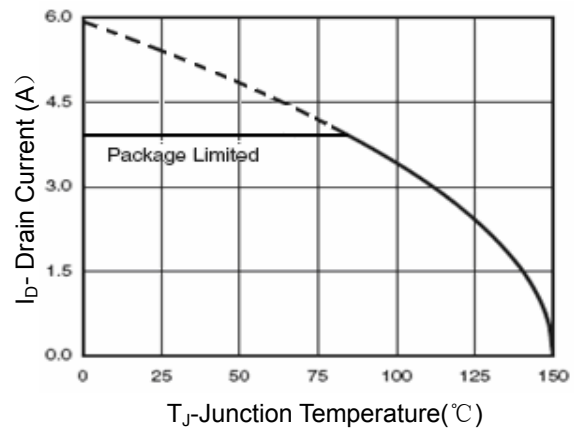


Figure 2 Drain Current

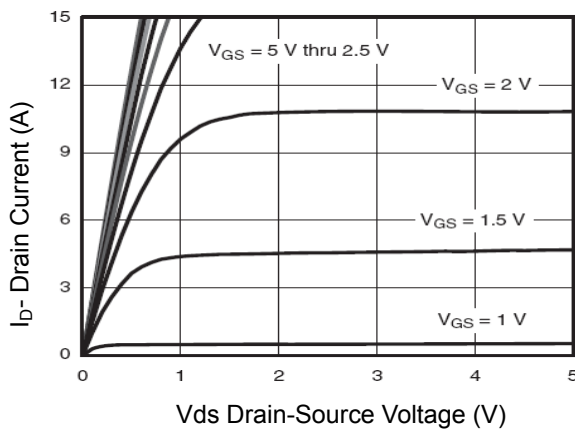


Figure 3 Output Characteristics

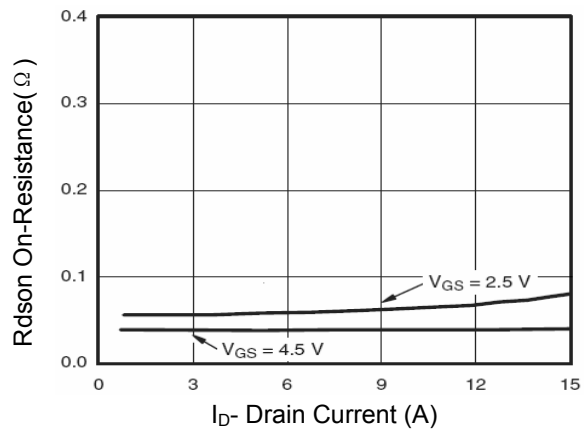


Figure 4 Drain-Source On-Resistance

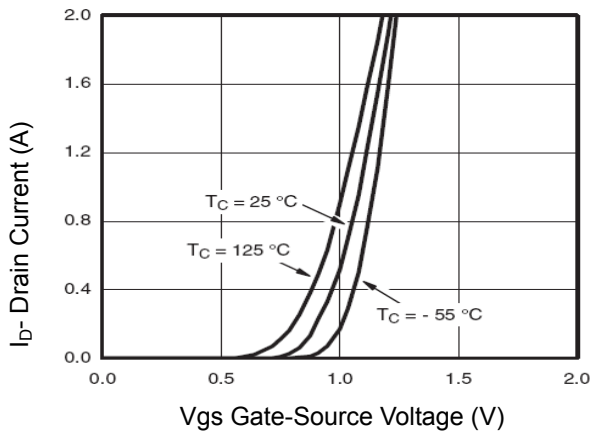


Figure 5 Transfer Characteristics

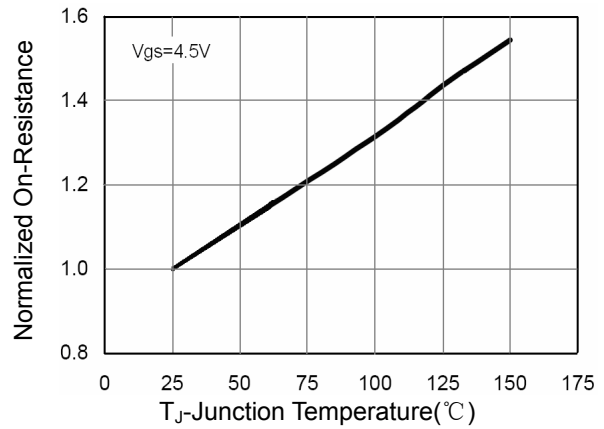


Figure 6 Drain-Source On-Resistance

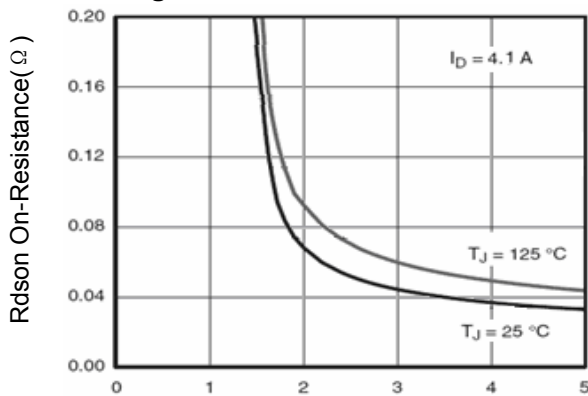


Figure 7 Rdson vs Vgs

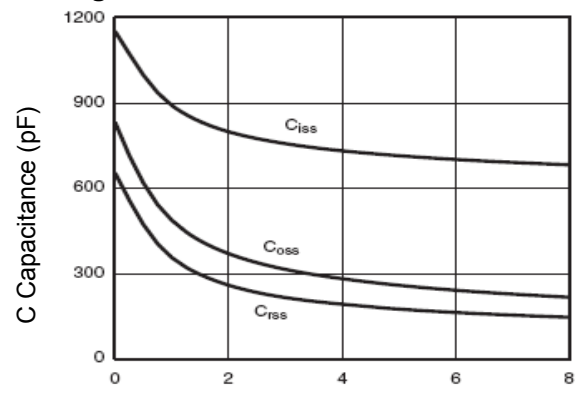


Figure 8 Capacitance vs Vds

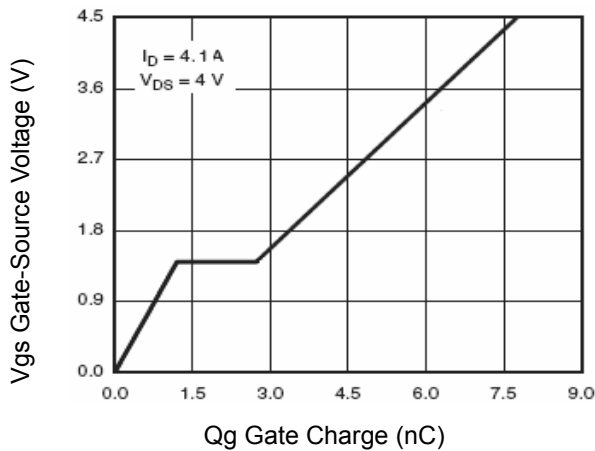


Figure 9 Gate Charge

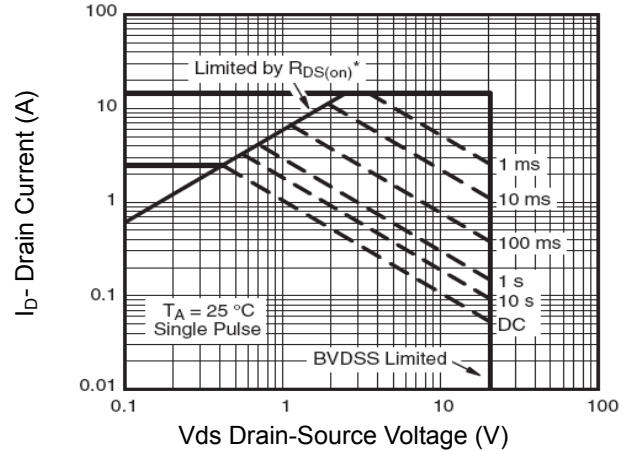
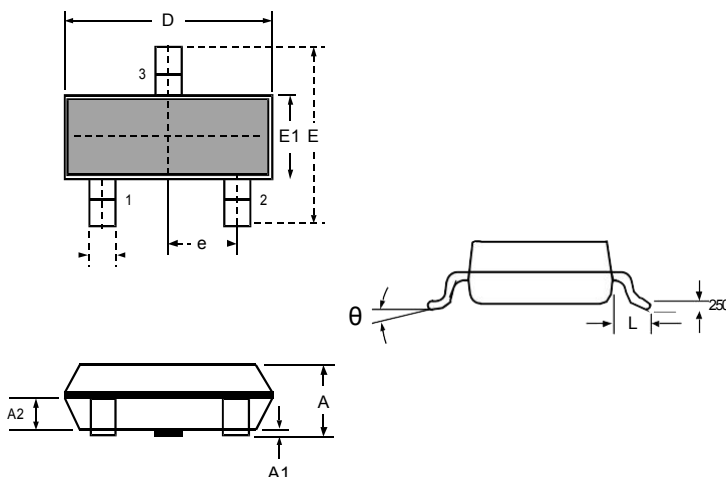


Figure 10 Safe Operation Area

Package Outline Dimensions: SOT-23



DIMENSIONS

SYMBOL	MILLIMETER		INCHES	
	MIN	MAX	MIN	MAX
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
D	2.800	3.000	0.110	0.118
b	0.300	0.500	0.012	0.020
E	2.250	2.550	0.089	0.100
E1	1.200	1.400	0.047	0.055
e	0.950 BSC		0.037 BSC	
L	0.300	0.500	0.012	0.020
θ	0	8°	0	8°

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