



## -20V/-2.3A P-Channel Enhancement Mode MOSFET

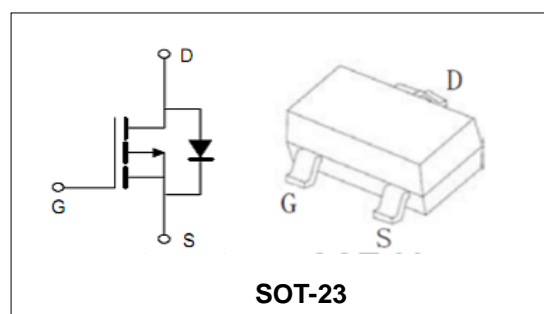
### Features

- Advanced trench process technology
- High Density Cell Design For Ultra Low On-Resistance

### Applications

- PWM application
- Load switch

BVDSS	-20	V
ID	-2.3	A
RDSON@VGS=-4.5V	93	mΩ
RDSON@VGS=-2.5V	114	mΩ



### Order Information

Product	Package	Marking	Reel Size	Reel	Carton
PT2301B	SOT-23	A1SHB	7inch	3000PCS	180000PCS

### Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit	
<b>Common Ratings (TC=25°C Unless Otherwise Noted)</b>				
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	-20	V	
$V_{GS}$	Gate-Source Voltage	±8	V	
$T_J$	Maximum Junction Temperature	150	°C	
$T_{STG}$	Storage Temperature Range	-55 to 150	°C	
$I_S$	Diode Continuous Forward Current	TA =25°C	-2.3	A
<b>Mounted on Large Heat Sink</b>				
$I_{DM}$	Pulse Drain Current Tested (Silicon Limit) (Note1)	TA =25°C	-8	A
$I_D$	Continuous Drain current	TA =25°C	-2.3	A
$P_D$	Maximum Power Dissipation	TA =25°C	1.25	W
$R_{θJA}$	Thermal Resistance Junction-to-Ambient (Note2)		100	°C/W

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Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
<b>Static Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated)</b>						
V <sub>(BR)DSS</sub>	Drain- Source Breakdown Voltage	VGS=0V ID=-250μA	-20	--	--	V
I <sub>DSS</sub>	Zero Gate Voltage Drain current	VDS=-16V,VGS=0V	--	--	-1	μA
I <sub>GSS</sub>	Gate-Body Leakage Current	VGS=±8V,VDS=0V	--	--	±100	uA
V <sub>GS(TH)</sub>	Gate Threshold Voltage	VDS=VGS,ID=-250μA	-0.45	--	--	V
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance (Note3)	VGS=-4.5V, ID=-2.3A	--	93	110	mΩ
		VGS=-2.5V, ID=-2A	--	114	160	mΩ
<b>Dynamic Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated) (Note4)</b>						
C <sub>iss</sub>	Input Capacitance	VDS= -6V, VGS=0V, F=1MHz	--	415	--	pF
C <sub>oss</sub>	Output Capacitance		--	223	--	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		--	87	--	pF
Q <sub>g</sub>	Total Gate Charge	VDS= -6V, ID= -2.3A, VGS= -4.5V	--	5.8	--	nC
Q <sub>gs</sub>	Gate-Source Charge		--	0.85	--	nC
Q <sub>gd</sub>	Gate-Drain Charge		--	1.7	--	nC
<b>Switching Characteristics (Note4)</b>						
t <sub>d(on)</sub>	Turn-on Delay Time	VDD=-6V, ID=-1A, RL=6Ω, RG=6Ω, VGS=-4.5V	--	13	--	nS
t <sub>r</sub>	Turn-on Rise Time		--	36	--	nS
t <sub>d(off)</sub>	Turn-off Delay Time		--	42	--	nS
t <sub>f</sub>	Turn-off Fall Time		--	34	--	nS
<b>Source- Drain Diode Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated)</b>						
V <sub>SD</sub>	Forward on voltage (Note3)	IS=-1A,VGS=0V	--	--	-1.2	V

Note:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec
3. Pulse Test: pulse width ≤ 300 us, duty cycle ≤ 2%.
4. Guaranteed by design, not subject to production testing.



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Typical Characteristics

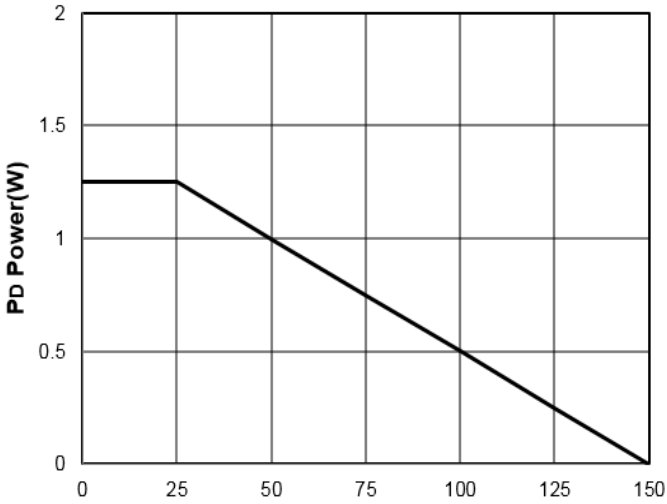


Figure1: T<sub>j</sub> Junction Temperature (°C)

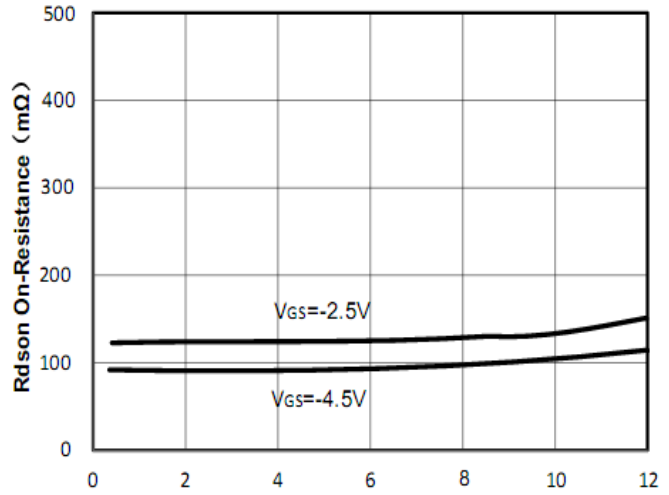


Figure2: -I<sub>d</sub> Drain Current (A)

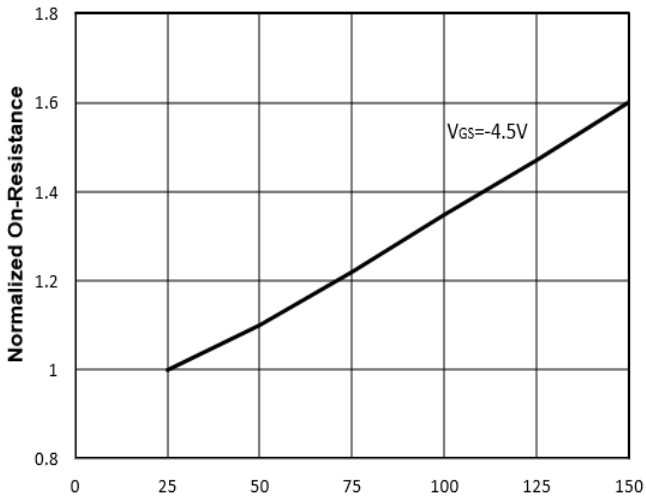


Figure3: T<sub>j</sub> Junction Temperature (°C)

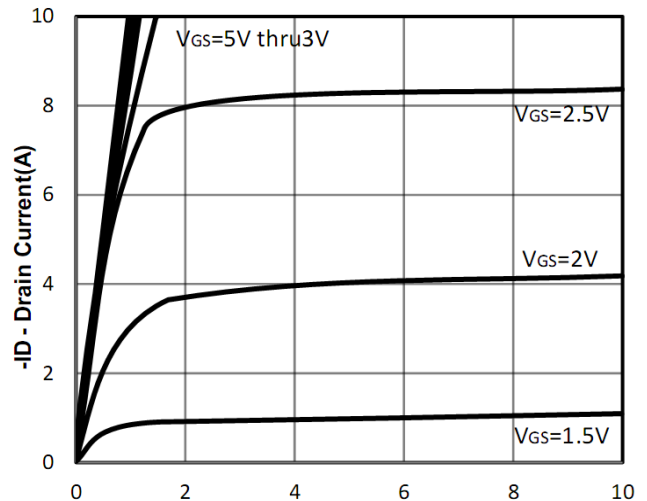


Figure4: -V<sub>ds</sub> Drain-Source Voltage (V)

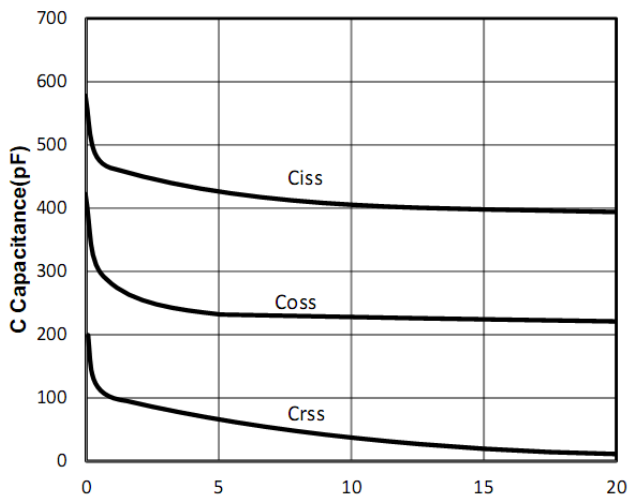


Figure5: -V<sub>ds</sub> Drain-Source Voltage (V)

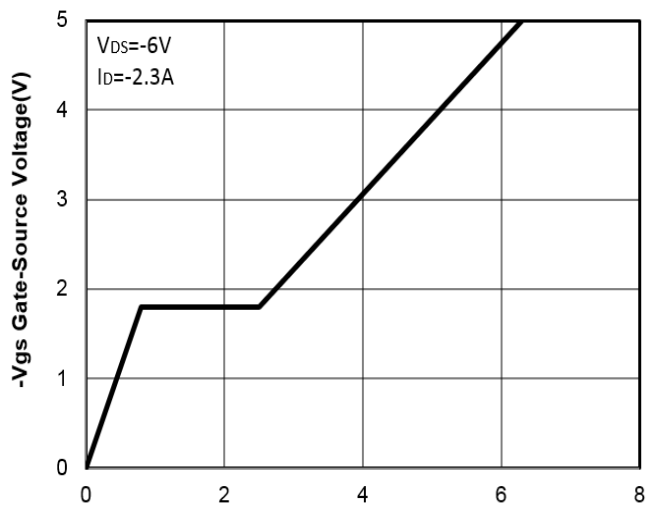


Figure6: Q<sub>g</sub> Gate Charge (nC)



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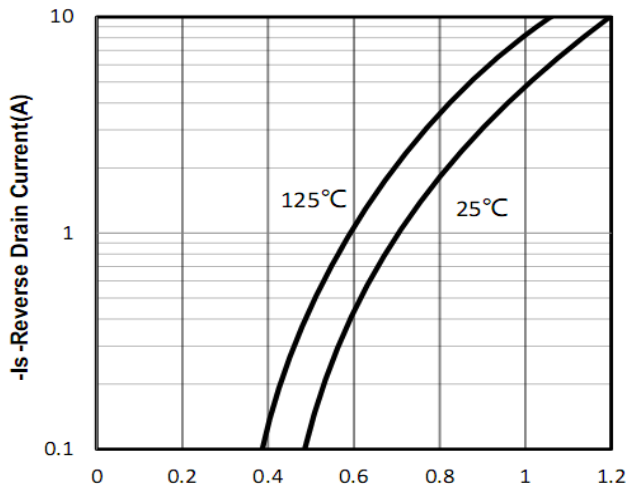


Figure7: -Vsd Source-Drain Voltage (V)

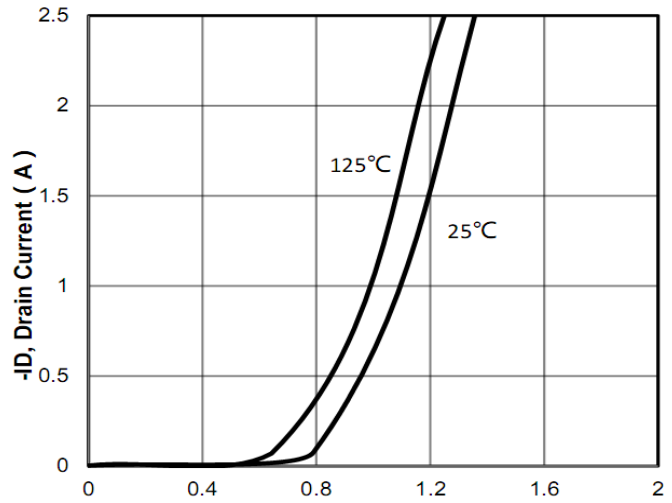


Figure8: -Vgs Gate-Source Voltage (V)

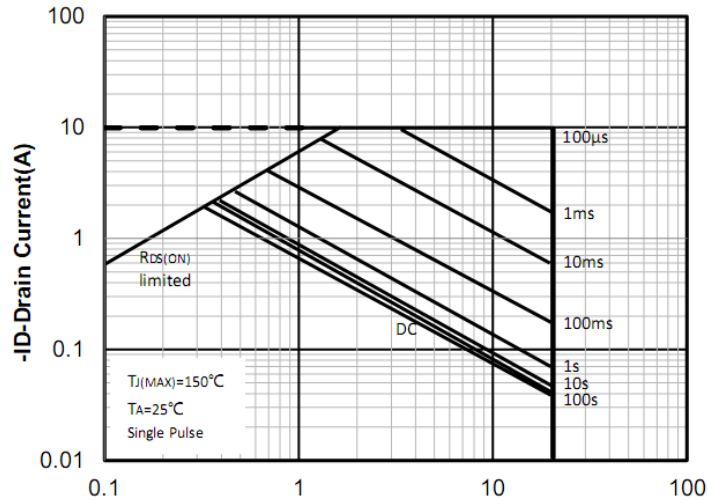


Figure9: -Vds Drain -Source Voltage (V)

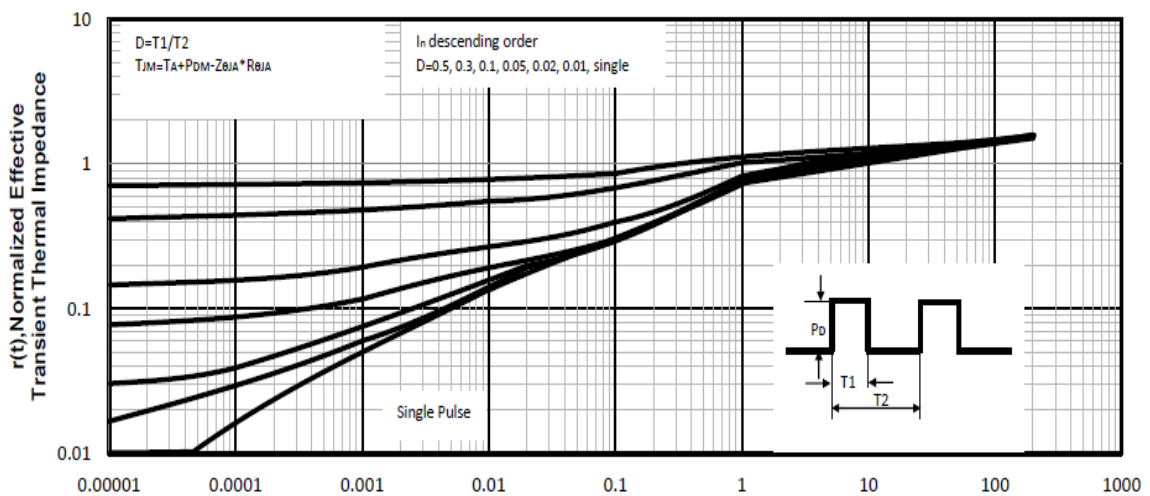
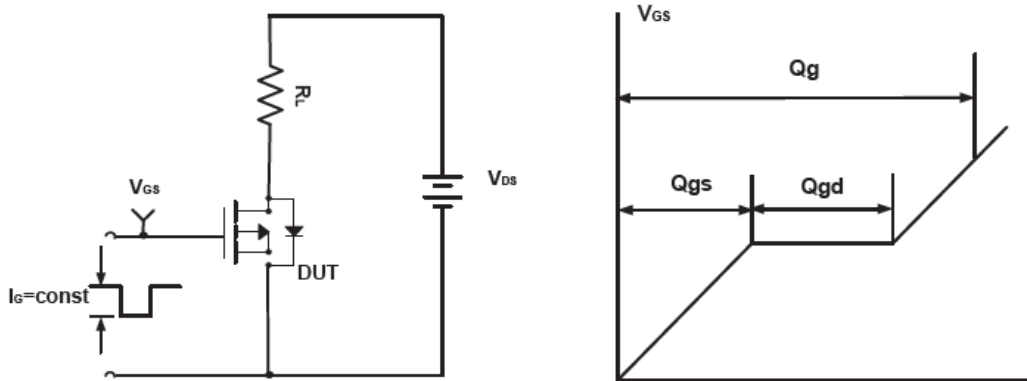
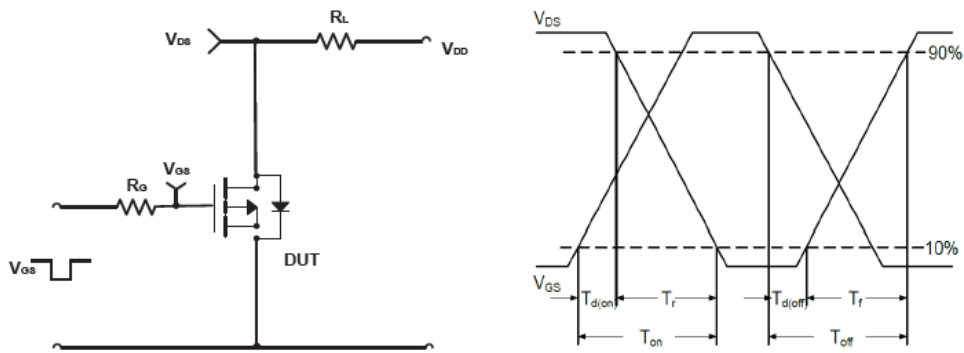
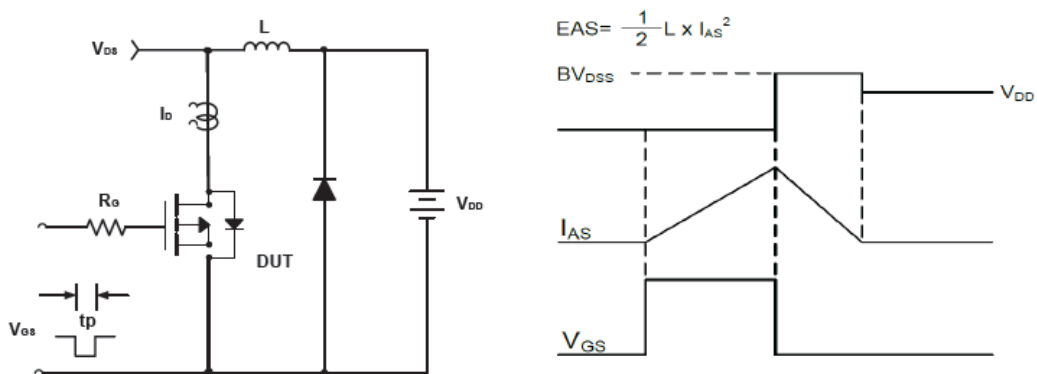


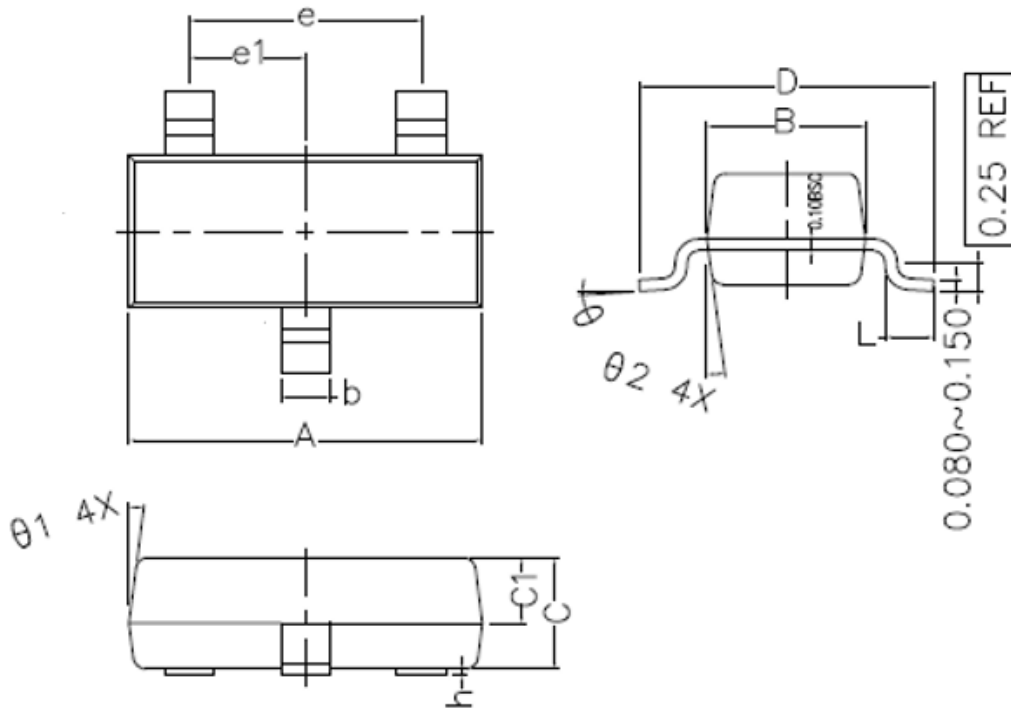
Figure10: Square Wave Pulse Duration (sec)

**-20V/-2.3A P-Channel Enhancement Mode MOSFET**
**Test Circuit and Waveform:**

**Figure A Gate Charge Test Circuit & Waveforms**

**Figure B Switching Test Circuit & Waveforms**

**Figure C Unclamped Inductive Switching Circuit & Waveforms**



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SOT-23 Package Outline Dimensions (Units: mm)



COMMON DIMENSIONS (UNITS OF MEASURE IS mm)			
	MIN	NORMAL	MAX
A	2.800	2.900	3.000
B	1.200	1.300	1.400
C	0.900	1.000	1.100
C1	0.500	0.550	0.600
D	2.250	2.400	2.550
L	0.300	0.400	0.500
h	0.010	0.050	0.100
b	0.300	0.400	0.500
e	1.90 TYPE		
e1	0.95 TYPE		
θ <sub>1</sub>	7° TYPE		
θ <sub>2</sub>	7° TYPE		
θ	0° ~ 7°		