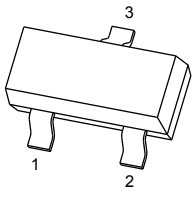
# SOT-23 Plastic-Encapsulate MOSFETS

P-Channel 20-V(D-S) MOSFET

| $V_{(BR)DSS}$ | $R_{DS(on)Typ}$ | $I_D$ |
|---|---|---|
| -20 V | 38mΩ@-4.5V | -4A |
| | 50mΩ@-2.5V | |
| | 70mΩ@-1.8V | |

**SOT-23**




1. GATE
2. SOURCE
3. DRAIN

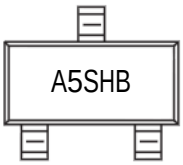
## FEATURE

- TrenchFET Power MOSFET

## APPLICATION

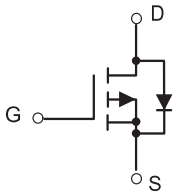
- PA Switch
- Load Switch

## MARKING




A5SHB= Device code

## Equivalent Circuit




## Maximum ratings ($T_a$=25℃ unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | -20 | V |
| Gate-Source Voltage | $V_{GS}$ | ±10 | |
| Continuous Drain Current | $I_D$ | -4 | A |
| Pulsed Drain Current | $I_{DM}$ | -15 | |
| Continuous Source-Drain Diode Current | $I_S$ | -0.59 | |
| Maximum Power Dissipation | $P_D$ | 0.35 | W |
| Thermal Resistance from Junction to Ambient | $R_{\theta JA}$ | 357 | ℃/W |
| Operation Junction and Storage Temperature Range | $T_J$,$T_{stg}$ | -50 ~+150 | ℃ |

## MOSFET ELECTRICAL CHARACTERISTICS

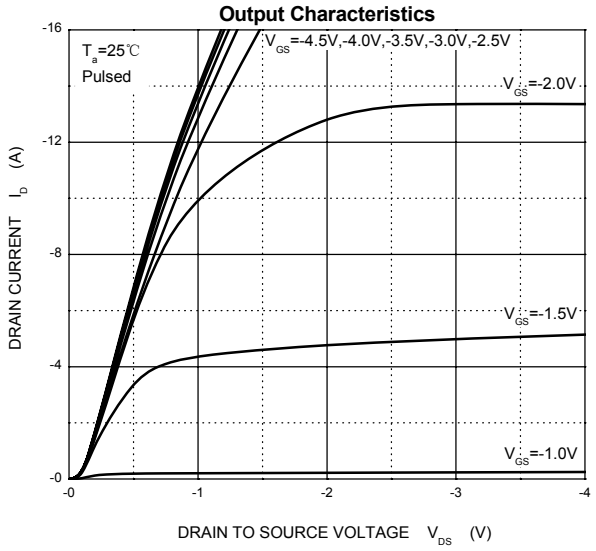
**$T_a$=25℃ unless otherwise specified**

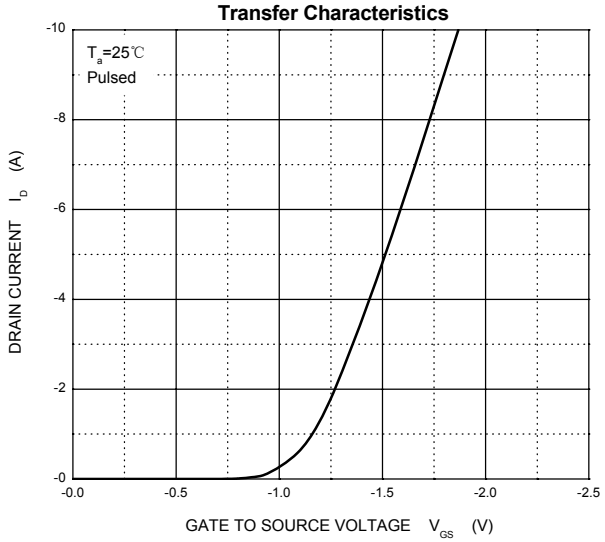
| Parameter | Symbol | Test Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Static** | | | | | | |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | $V_{GS}$ = 0V, $I_D$ =-10μA | -20 | | | V |
| Gate-source leakage | $I_{GSS}$ | $V_{DS}$ =0V, $V_{GS}$ =±12V | | | ±100 | nA |
| Zero Gate voltage drain current | $I_{DSS}$ | $V_{DS}$ =-16V, $V_{GS}$ =0V | | | -1.0 | μA |
| Gate-source threshold voltage | $V_{GS(th)}$ | $V_{DS}$ =$V_{GS}$, $I_D$ =-250μA | -0.4 | | -1.0 | V |
| Drain-source on-state resistance | $R_{DS(on)}$ | $V_{GS}$ =-4.5V, $I_D$ =-3.4A | | 0.038 | 0.060 | Ω |
| | | $V_{GS}$ =-2.5V, $I_D$ =-2.0A | | 0.050 | 0.075 | |
| | | $V_{GS}$ =-1.8V, $I_D$ =-2.5A | | 0.070 | 0.095 | |
| Forward tranconductance | $g_{fS}$ | $V_{DS}$ =-5V, $I_D$ =-3.4A | 3 | | | S |
| Forward diode voltage | $V_{SD}$ | $V_{GS}$ =0V,$I_S$=-1.6A | | | -1.2 | V |
| **Dynamic** | | | | | | |
| Input capacitance[a,b] | $C_{iss}$ | $V_{DS}$ =-6V,$V_{GS}$ =0V,f =1MHz | | 715 | | pF |
| Output capacitance[a,b] | $C_{oss}$ | | | 170 | | |
| Reverse transfer capacitance[a,b] | $C_{rss}$ | | | 120 | | |
| Total Gate charge[a] | $Q_g$ | $V_{DS}$ =-6V,$V_{GS}$ =-4.5V,$I_D$=-3.3A | | | 13 | nc |
| Gate-Source charge[a] | $Q_{gs}$ | | | 1.2 | | nc |
| Gate-Drain charge[a] | $Q_{gd}$ | | | 2.2 | | nc |
| **Switching**[a,b] | | | | | | |
| Turn-on delay Time | $t_{d(on)}$ | $V_{GEN}$=-4.5V,$V_{DD}$=-6V, $I_D$ =-1.0A,$R_G$=6Ω, $R_L$=6Ω | | | 25 | ns |
| Rise time | $t_r$ | | | | 55 | |
| Turn-off delay time | $t_{d(off)}$ | | | | 90 | |
| Fall time | $t_f$ | | | | 60 | |

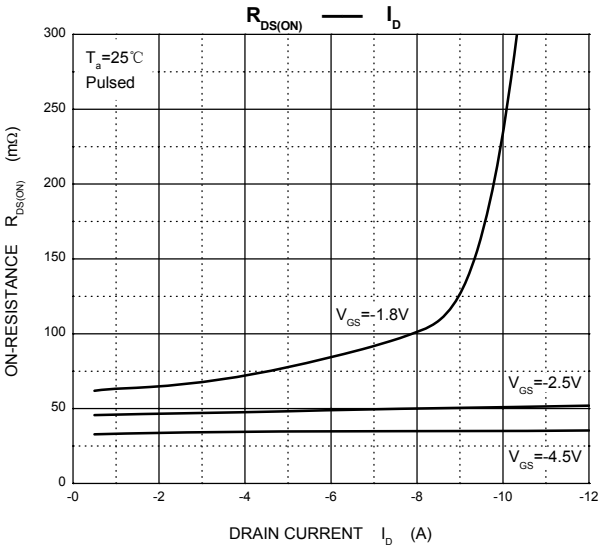
**Notes :**

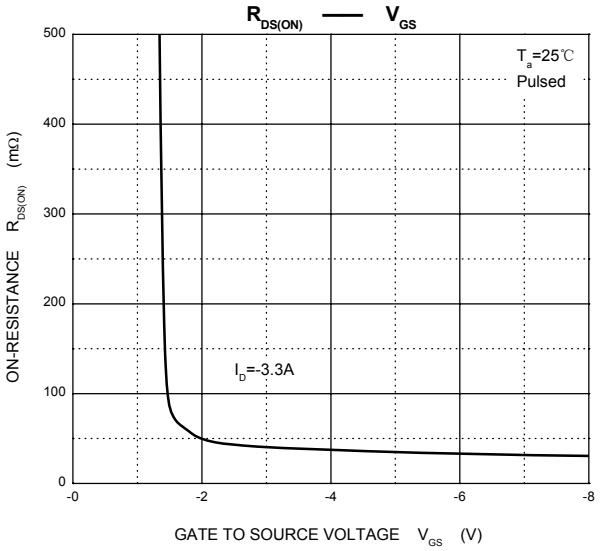
a. Pulse Test : pulse width ≤300μs, duty cycle ≤2%.

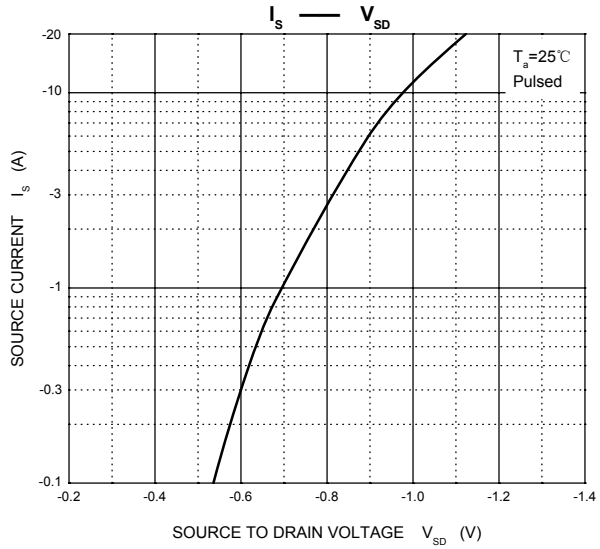
b. These parameters have no way to verify.


Output Characteristics
Ta=25℃
Pulsed
VGS=-4.5V,-4.0V,-3.5V,-3.0V,-2.5V
VGS=-2.0V
VGS=-1.5V
VGS=-1.0V
DRAIN CURRENT ID (A)
DRAIN TO SOURCE VOLTAGE VDS (V)
-16
-12
-8
-4
-0
-0
-1
-2
-3
-4

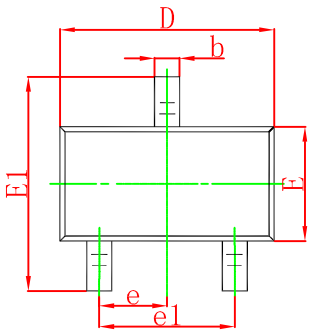

Transfer Characteristics
Ta=25℃
Pulsed
DRAIN CURRENT ID (A)
GATE TO SOURCE VOLTAGE VGS (V)
-10
-8
-6
-4
-2
-0
-0.0
-0.5
-1.0
-1.5
-2.0
-2.5

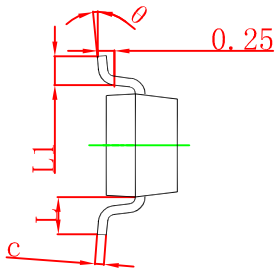

RDS(ON) —— ID
Ta=25℃
Pulsed
VGS=-1.8V
VGS=-2.5V
VGS=-4.5V
ON-RESISTANCE RDS(ON) (mΩ)
DRAIN CURRENT ID (A)
300
250
200
150
100
50
0
-0
-2
-4
-6
-8
-10
-12

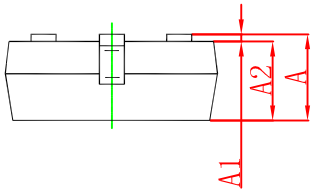

RDS(ON) —— VGS
Ta=25℃
Pulsed
ID=-3.3A
ON-RESISTANCE RDS(ON) (mΩ)
GATE TO SOURCE VOLTAGE VGS (V)
500
400
300
200
100
0
-0
-2
-4
-6
-8


IS —— VSD
Ta=25℃
Pulsed
SOURCE CURRENT IS (A)
SOURCE TO DRAIN VOLTAGE VSD (V)
-20
-10
-3
-1
-0.3
-0.1
-0.2
-0.4
-0.6
-0.8
-1.0
-1.2
-1.4

## SOT-23 Package Outline Dimensions

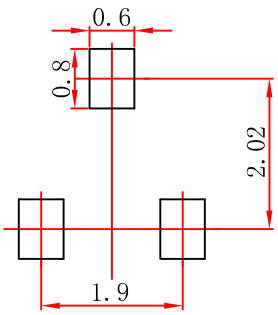



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| A | 0.900 | 1.150 | 0.035 | 0.045 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 0.900 | 1.050 | 0.035 | 0.041 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.080 | 0.150 | 0.003 | 0.006 |
| D | 2.800 | 3.000 | 0.110 | 0.118 |
| E | 1.200 | 1.400 | 0.047 | 0.055 |
| E1 | 2.250 | 2.550 | 0.089 | 0.100 |
| e | 0.950 TYP | | 0.037 TYP | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.550 REF | | 0.022 REF | |
| L1 | 0.300 | 0.500 | 0.012 | 0.020 |
| θ | 0° | 8° | 0° | 8° |

## SOT-23 Suggested Pad Layout




Note:
1.Controlling dimension:in millimeters.
2.General tolerance:± 0.05mm.
3.The pad layout is for reference purposes only.