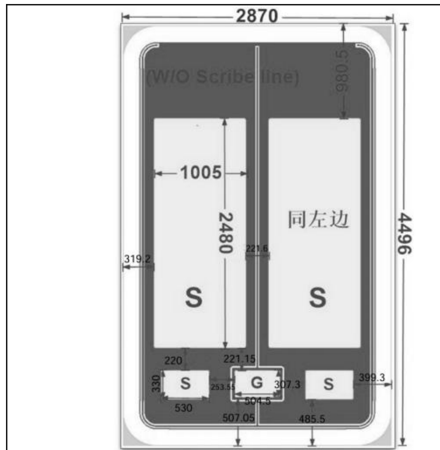
# ASWCZM080220A

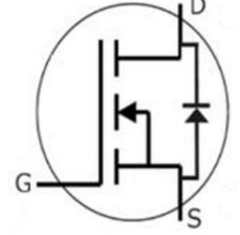
N-Channel Silicon Carbide Power MOSFET

## Physical Characteristics




Die size：2870 μm x 4496 μm (without scribe line)
Gate pad：504 μm x 307 μm
Gross die / per 6” wafer = 1119 pcs

Main characteristics：
$V_{DS}$ = 2200V
$I_D(T_C$=25°C ) = 48A
$R_{DS(on)TYP}$ = 80mΩ@18V




## Mechanical Data

| Parameter | Parameter |
|---|---|
| Nominal Back Metal Composition, Thickness | Ti- Ni - Ag |
| Nominal Front Metal Composition, Thickness | Al(4μm) |
| Wafer Diameter | 150mm |
| Wafer Thickness | 175μm±10μm |
| Scribe line width | 80μm |

## Absolute Maximum Ratings($T_C$=25°C,unless otherwise specified)

| Parameter | Symbol | Test Condition | Value | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | $V_{DSmax}$ | $V_{GS}$ = 0V, $I_D$ =100μA | 2200 | V |
| Gate-Source Voltage | $V_{GSmax}$ | AC (f > 1 Hz) | -10/+25 | V |
| Gate-Source Voltage | $V_{GSOP}$ | Static | -4/+18 | V |
| Continuous Drain Current | $I_D$ | $V_{GS}$=18V, $T_C$=25℃ | 48 | A |
| | $I_D$ | $V_{GS}$=18V, $T_C$=100℃ | 34 | A |
| Pulsed Drain Current | $I_{D,pulse}$ | Pulse with $t_p$ limited by $T_{jmax}$ at 1 ms<br>Pulse with $t_p$ limited by $T_{jmax}$ at 100 μs | 77<br>151 | A |
| Junction Temperature | $T_J$ | | -55 ~ +175 | ℃ |
| Storage Temperature | $T_{STG}$ | | -55 ~ +175 | ℃ |

Note1:Assumes a $R_{th(jc)}$ will be less than 0.44K/W.

## Electrical characteristics ($T_j$=25℃, unless otherwise noted)

| Parameter | Symbol | Test Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| **Static Characteristics** | | | | | | |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | $V_{GS}$ = 0V, $I_D$ =100μA | 2200 | | | V |
| Zero gate voltage drain current | $I_{DSS}$ | $V_{DS}$ =2200V,$V_{GS}$ = 0V | | 1 | 50 | μA |
| Gate-Source leakage current | $I_{GSS}$ | $V_{GS}$ =18V, $V_{DS}$ = 0V | | | 250 | nA |
| Gate threshold voltage | $V_{GS(th)}$ | $V_{DS}$ =$V_{GS}$, $I_D$ =5mA | | 3.2 | | V |
| | | $V_{DS}$ =$V_{GS}$, $I_D$ =5mA ,$T_J$=175℃ | | 2.3 | | |
| Drain-source on-resistance | $R_{DS(on)}$ | $V_{GS}$ =18V, $I_D$ =20A | | 80 | | mΩ |
| | | $V_{GS}$ =18V, $I_D$ =20A,$T_J$=175℃ | | 160 | | |
| Transconductance | $g_{fs}$ | $V_{DS}$ =18V, $I_D$ =20A | | 9 | | S |
| | | $V_{DS}$ =18V, $I_D$ =20A,$T_j$ = 175℃ | | 8 | | |
| **Dynamic characteristics** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$ =1000V,$V_{GS}$ =0V,f =100kHz $V_{AC}$=25mV | | 2442 | | pF |
| Output Capacitance | $C_{oss}$ | | | 74 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 7 | | |
| Total Gate Charge | $Q_g$ | $V_{DS}$ =1200V,$V_{GS}$ =-4V/18V, $I_D$ =20A | | 81 | | nC |
| Gate-Source Charge | $Q_{gs}$ | | | 24 | | |
| Gate-Drain Charge | $Q_{gd}$ | | | 35.5 | | |
| Internal Gate Resistance | $R_{G(int)}$ | f=1 MHz, $V_{AC}$ = 25mV | | 1.3 | | Ω |
| **Source-Drain Diode characteristics** | | | | | | |
| Diode Forward Current | $I_S$ | $V_{GS}$ =-4V,$T_C$=25℃ | | 65 | | A |
| Diode Forward voltage | $V_{SD}$ | $V_{GS}$ =-4V, $I_{SD}$=10A | | 3.8 | | V |
| | | $V_{GS}$ =-4V, $I_{SD}$=10A,$T_J$=175℃ | | 3.3 | | |
| Diode pulse Current | $I_{S,pulse}$ | $V_{GS}$ =-4V, pulse width $t_p$ limited by $T_{jmax}$ | | 77 | | A |