# 4AK20

Silicon N-Channel Power MOS FET Array

HITACHI

## Application

High speed power switching

## Features

- Low on-resistance
  $R_{DS(on)}$ 0.25 , $V_{GS}$ = 10 V, $I_D$ = 2.5 A
  $R_{DS(on)}$ 0.35 , $V_{GS}$ = 4 V, $I_D$ = 2.5 A
- Capable of 4 V gate drive
- Low drive current
- High speed switching
- High density mounting
- Suitable for motor driver, solenoid driver and lamp driver
- Discrete packaged devices of same die: 2SK1300, 2SK1305



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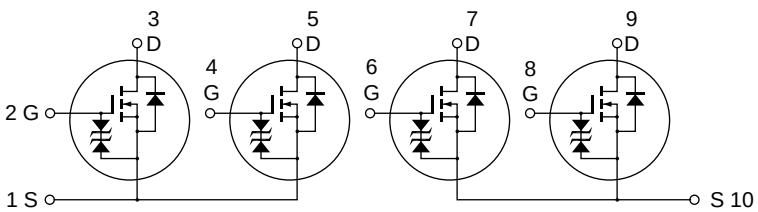
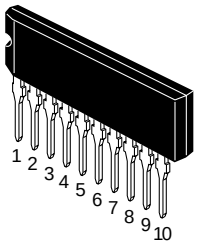
# 4AK20

## Outline

SP-10




1, 10. Source
2, 4, 6, 8. Gate
3, 5, 7, 9. Drain

## Absolute Maximum Ratings (Ta = 25°C) (1 Unit)

| Item | Symbol | Rating | Unit |
|---|---|---|---|
| Drain to source voltage | $V_{DSS}$ | 100 | V |
| Gate to source voltage | $V_{GSS}$ | ±20 | V |
| Drain current | $I_D$ | 5 | A |
| Drain peak current | $I_{D(pulse)}$*[1] | 20 | A |
| Body to drain diode reverse drain current | $I_{DR}$ | 5 | A |
| Channel dissipation | Pch (Tc = 25°C)*[2] | 28 | W |
| Channel dissipation | Pch*[2] | 4 | W |
| Channel temperature | Tch | 150 | °C |
| Storage temperature | Tstg | –55 to +150 | °C |

Notes: 1. PW ≤ 10 μs, duty cycle ≤ 1%
2. 4 devices operation

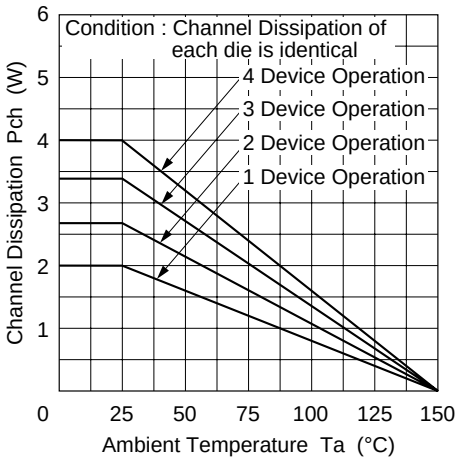
## Electrical Characteristics (Ta = 25°C) (1 Unit)

| Item | Symbol | Min | Typ | Max | Unit | Test conditions |
|---|---|---|---|---|---|---|
| Drain to source breakdown voltage | $V_{(BR)DSS}$ | 100 | — | — | V | $I_D$ = 10 mA, $V_{GS}$ = 0 |
| Gate to source breakdown voltage | $V_{(BR)GSS}$ | ±20 | — | — | V | $I_G$ = ±100 µA, $V_{DS}$ = 0 |
| Gate to source leak current | $I_{GSS}$ | — | — | ±10 | µA | $V_{GS}$ = ±16 V, $V_{DS}$ = 0 |
| Zero gate voltage drain current | $I_{DSS}$ | — | — | 250 | µA | $V_{DS}$ = 80 V, $V_{GS}$ = 0 |
| Gate to source cutoff voltage | $V_{GS(off)}$ | 1.0 | — | 2.0 | V | $I_D$ = 1 mA, $V_{DS}$ = 10 V |
| Static drain to source on state resistance | $R_{DS(on)}$ | — | 0.2 | 0.25 | Ω | $I_D$ = 2.5 A<br>$V_{GS}$ = 10 V*[1] |
| | | — | 0.25 | 0.35 | Ω | $I_D$ = 2.5 A<br>$V_{GS}$ = 4 V*[1] |
| Forward transfer admittance | $\|y_{fs}\|$ | 3.0 | 5.0 | — | S | $I_D$ = 2.5 A<br>$V_{DS}$ = 10 V*[1] |
| Input capacitance | Ciss | — | 525 | — | pF | $V_{DS}$ = 10 V |
| Output capacitance | Coss | — | 205 | — | pF | $V_{GS}$ = 0 |
| Reverse transfer capacitance | Crss | — | 60 | — | pF | f = 1 MHz |
| Turn-on delay time | $t_{d(on)}$ | — | 5 | — | ns | $I_D$ = 2.5 A |
| Rise time | $t_r$ | — | 30 | — | ns | $V_{GS}$ = 10 V |
| Turn-off delay time | $t_{d(off)}$ | — | 180 | — | ns | $R_L$ = 12 Ω |
| Fall time | $t_f$ | — | 65 | — | ns | |
| Body to drain diode forward voltage | $V_{DF}$ | — | 1.0 | — | V | $I_F$ = 5 A, $V_{GS}$ = 0 |
| Body to drain diode reverse recovery time | $t_{rr}$ | — | 170 | — | ns | $I_F$ = 5 A, $V_{GS}$ = 0<br>dIF/dt = 50 A/µs |

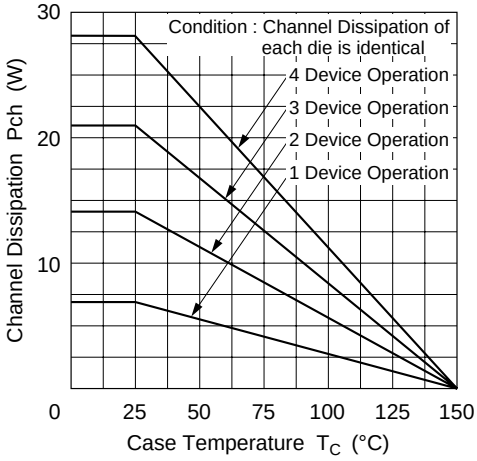
Note: 1. Pulse Test

See characteristic curves of 2SK1300

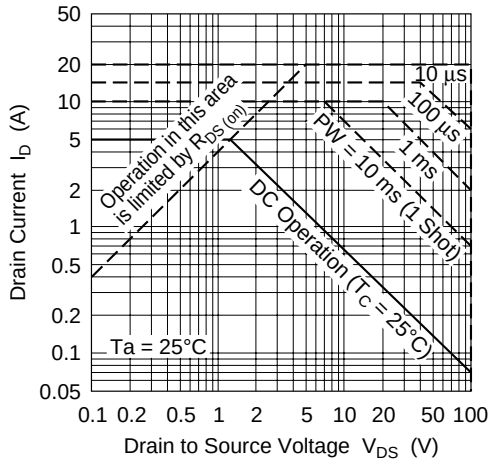
Maximum Channel Dissipation Curve



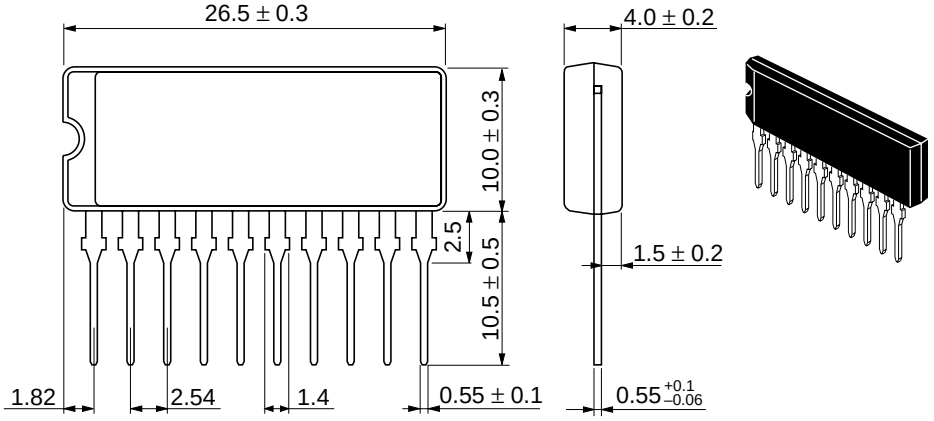

Maximum Channel Dissipation Curve

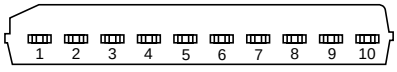



Maximum Safe Operation Area



Unit: mm


26.5 ± 0.3
4.0 ± 0.2
10.0 ± 0.3
2.5
10.5 ± 0.5
1.5 ± 0.2
1.82
2.54
1.4
0.55 ± 0.1
0.55 +0.1 −0.06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