4AK23

Silicon N-Channel Power MOS FET Array

HITACHI

Application

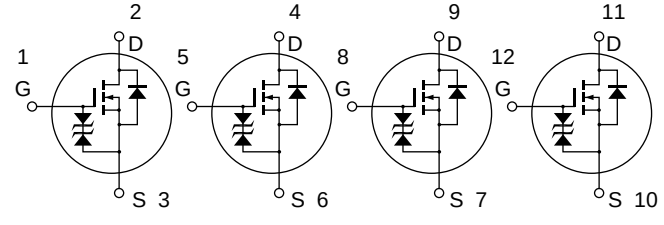
High speed power switching

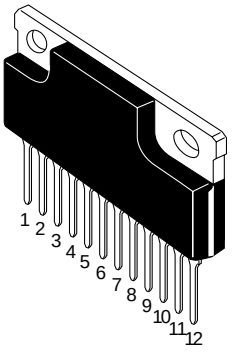
Features

- Low on-resistance
  $R_{DS(on)}$ 0.25 , V_{GS} = 10 V, I_D = 2.5 A
- Low drive current
- High speed switching
- High density mounting
- Suitable for H-bridged motor driver

Outline

SP-12TA





1, 5, 8, 12. Gate
2, 4, 9, 11. Drain
3, 6, 7, 10. Source

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Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	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]	32	W
Channel dissipation	Pch*[2]	4	W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	–55 to +150	°C

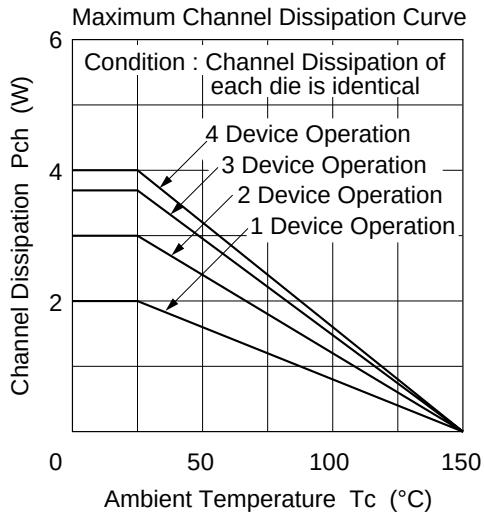
Notes: 1. PW ≤ 10 µs, duty cycle ≤ 1%
2. 4 Devices operation

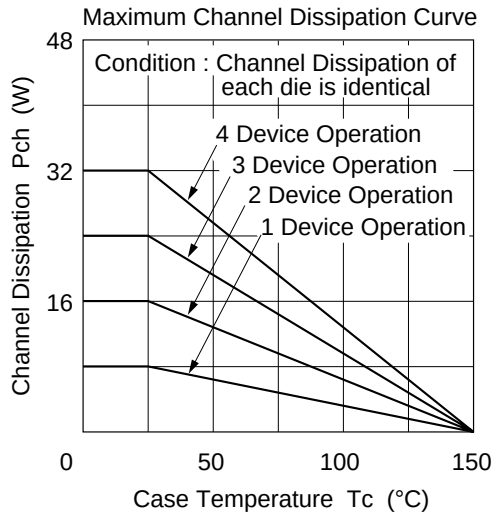
Electrical Characteristics (Ta = 25°C)

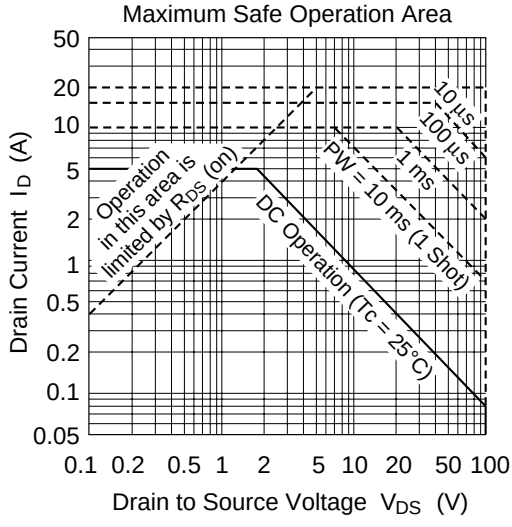
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	100	—	—	V	I_D = 10 mA, V_{GS} = 0
Gate to source breakdown voltage	$V_{(BR)GSS}$	±20	—	—	V	I_G = ±100 µA, V_{DS} = 0
Gate to source leak current	I_{GSS}	—	—	±10	µA	V_{GS} = ±16 V, V_{DS} = 0
Zero gate voltage 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 V_{GS} = 10 V*[1]
		—	0.25	0.35	Ω	I_D = 2.5 A V_{GS} = 4 V*[1]
Forward transfer admittance	$\|y_{fs}\|$	3	5	—	S	I_D = 2.5 A 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	—	µs	I_F = 5 A, V_{GS} = 0, dIF/dt = 50 A/µs

Note: 1. Pulse Test

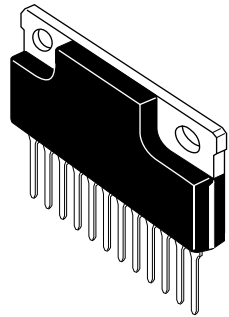
See characteristic curves of 2SK1300

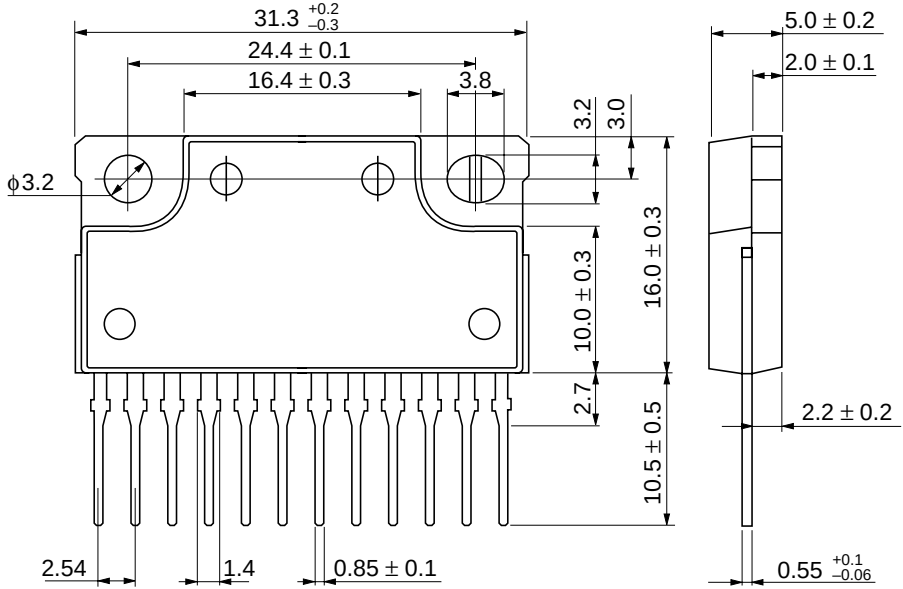

Maximum Channel Dissipation Curve
Condition : Channel Dissipation of each die is identical
4 Device Operation
3 Device Operation
2 Device Operation
1 Device Operation
Channel Dissipation Pch (W)
6
4
2
0
50
100
150
Ambient Temperature Tc (°C)

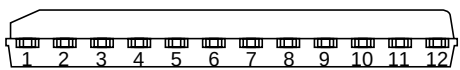

Maximum Channel Dissipation Curve
Condition : Channel Dissipation of each die is identical
4 Device Operation
3 Device Operation
2 Device Operation
1 Device Operation
Channel Dissipation Pch (W)
48
32
16
0
50
100
150
Case Temperature Tc (°C)


Maximum Safe Operation Area
Drain Current I_D (A)
50
20
10
5
2
1
0.5
0.2
0.1
0.05
0.1
0.2
0.5
1
2
5
10
20
50
100
Drain to Source Voltage V_{DS} (V)
Operation in this area is limited by R_{DS} (on)
10 µs
100 µs
1 ms
PW = 10 ms (1 Shot)
DC Operation (Tc = 25°C)

Unit: mm







Hitachi Code	SP-12TA
JEDEC	—
EIAJ	—
Weight (reference value)	6.1 g

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