4AM12

Silicon N-Channel/P-Channel Power MOS FET Array

HITACHI

Application

High speed power switching

Features

- Low on-resistance
  N-channel: $R_{DS(on)} \leq 0.075\ \Omega$, $V_{GS} = 10$ V, $I_D = 4$ A
  P-channel: $R_{DS(on)} \leq 0.12\ \Omega$, $V_{GS} = -10$ V, $I_D = -4$ A
- Capable of 4 V gate drive
- Low drive current
- High speed switching
- High density mounting
- Suitable for H-bridged motor driver
- Discrete packaged devices of same die
  N-channel: 2SK971, 2SK1094
  P-channel: 2SJ173, 2SJ176

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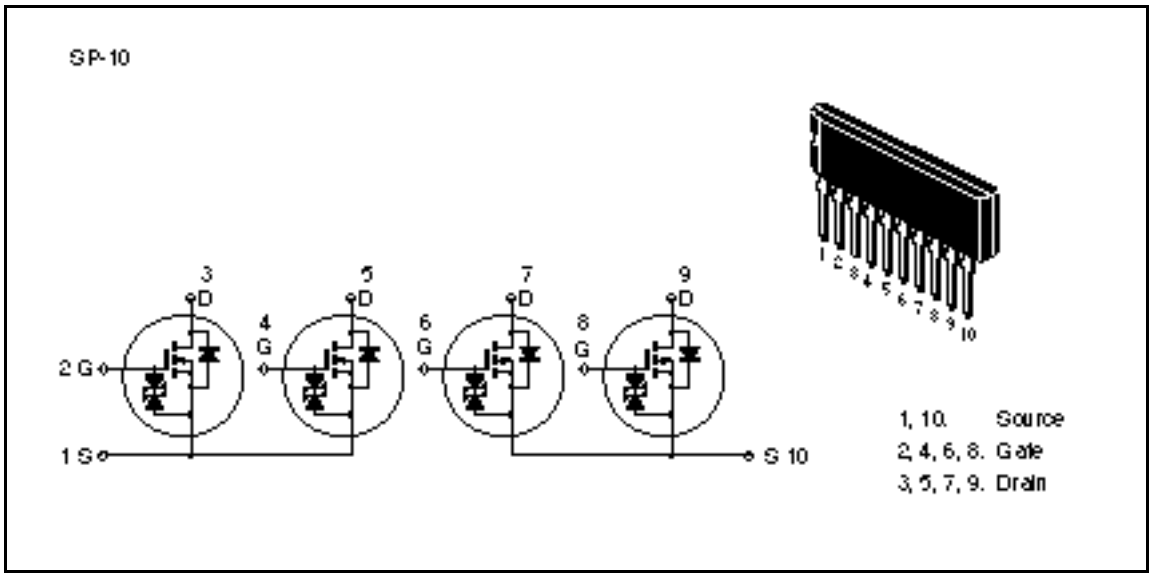
Outline



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

Item	Symbol	Rating		Unit
		Nch	Pch	
Drain to source voltage	V_{DSS}	60	–60	V
Gate to source voltage	V_{GSS}	±20	±20	V
Drain current	I_D	8	–8	A
Drain peak current	$I_{D(pulse)}$*[1]	32	–32	A
Body to drain diode reverse drain current	I_{DR}	8	–8	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)

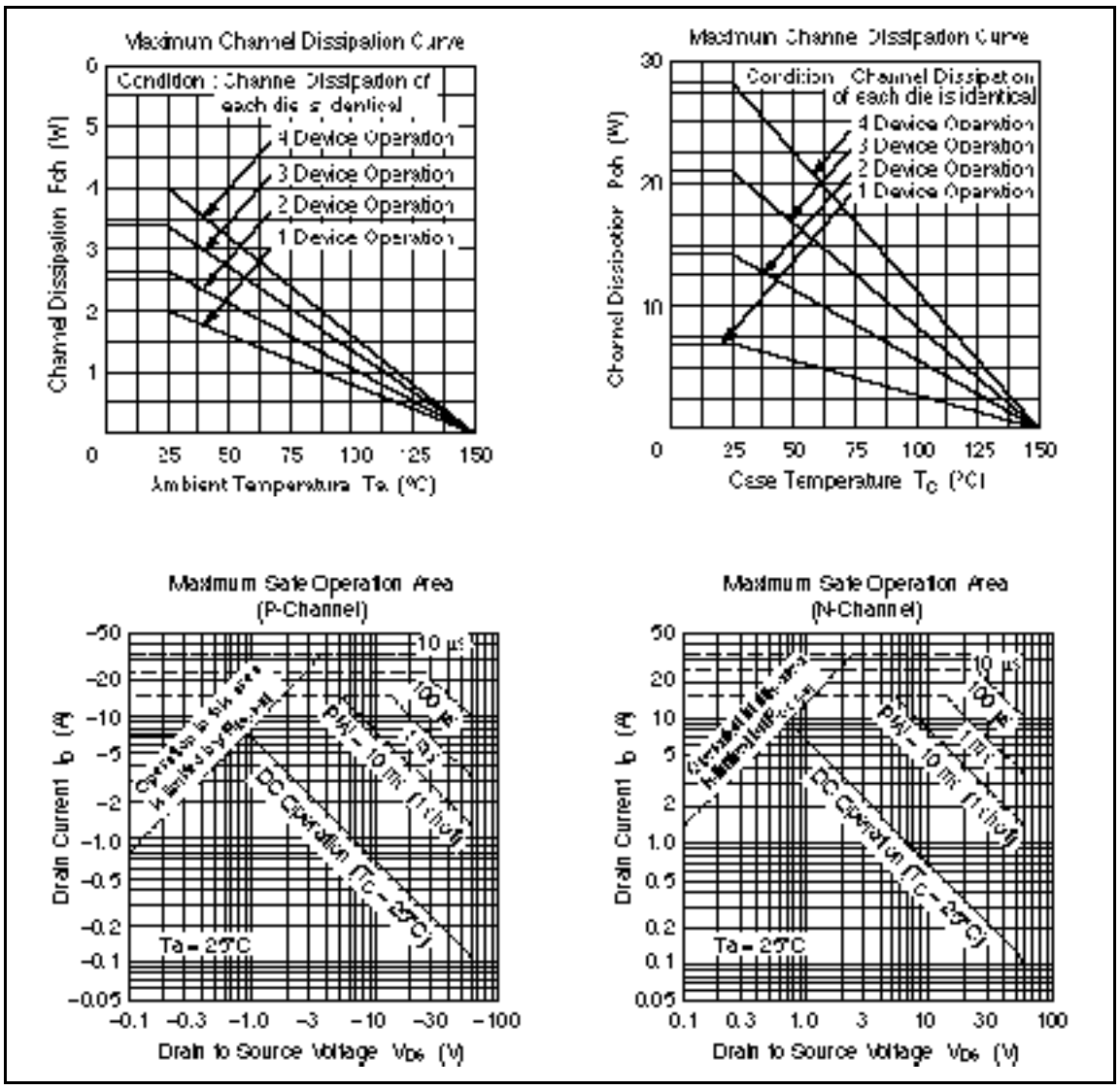
		N channel			P channel				
Item	**Symbol**	**Min**	**Typ**	**Max**	**Min**	**Typ**	**Max**	**Unit**	**Test conditions**
Drain to source breakdown voltage	$V_{(BR)DSS}$	60	—	—	–60	—	—	V	I_D = 10 mA, V_{GS} = 0
Gate to source breakdown voltage	$V_{(BR)GSS}$	±20	—	—	±20	—	—	µA	I_G = ±100 µA, V_{DS} = 0
Gate to source leak current	I_{GSS}	—	—	±10	—	—	±10	µA	V_{GS} = ±16 V, V_{DS} = 0
Zero gate voltage drain current	I_{DSS}	—	—	250	—	—	–250	V	V_{DS} = 50 V, V_{GS} = 0
Gate to source cutoff voltage	$V_{GS(off)}$	1.0	—	2.0	–1.0	—	–2.0	V	I_D = 1 mA, V_{DS} = 10 V
Static drain to source	$R_{DS(on)}$	—	0.06	0.075	—	0.09	0.12	Ω	I_D = 4 A, V_{GS} = 10 V*[1]
on state resistance		—	0.08	0.11	—	0.12	0.18	Ω	I_D = 4 A, V_{GS} = 4 V*[1]
Forward transfer admittance	$\|y_{fs}\|$	5.5	9.0	—	5.5	7.5	—	S	I_D = 4 A, V_{DS} = 10 V*[1]
Input capacitance	Ciss	—	860	—	—	1400	—	pF	V_{DS} = 10 V, V_{GS} = 0, f = 1 MHz
Output capacitance	Coss	—	450	—	—	720	—	pF	
Reverse transfer capacitance	Crss	—	140	—	—	220	—	pF	
Turn-on delay time	$t_{d(on)}$	—	10	—	—	15	—	ns	I_D = 4 A, V_{GS} = 10 V, R_L = 7.5 Ω
Rise time	t_r	—	45	—	—	90	—	ns	
Turn-off delay time	$t_{d(off)}$	—	200	—	—	250	—	ns	
Fall time	t_f	—	100	—	—	150	—	ns	
Body to drain diode forward voltage	V_{DF}	—	1.05	—	—	–1.05	—	V	I_F = 8 A, V_{GS} = 0
Body to drain diode reverse recovery time	t_{rr}	—	110	—	—	180	—	ns	I_F = 8 A, V_{GS} = 0, dIF/dt = 50 A/µs

Note: 1. Pulse Test

Polarity of test conditions for P channel device is reversed.

Nch: See characteristic curves of 2SK971

Pch: See characteristic curves of 2SJ173


Maximum Channel Dissipation Curve
Condition : Channe Dissipation of each die is identical
4 Device Operation
3 Device Operation
2 Device Operation
1 Device Operation
Channel Dissipation Pch (W)
Ambient Temperature Ta (°C)
Maximum Channe 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)
Case Temperature Tc (°C)
Maximum Safe Operation Area
(P-Channel)
10 µs
100 µs
1 ms
PW = 10 ms (1 shot)
DC Operation (Tc = 25°C)
Operation in this area is limited by RDS(on)
Ta = 25°C
Drain Current ID (A)
Drain to Source Voltage VDS (V)
Maximum Safe Operation Area
(N-Channel)
10 µs
100 µs
1 ms
PW = 10 ms (1 shot)
DC Operation (Tc = 25°C)
Ta = 25°C
Drain Current ID (A)
Drain to Source Voltage VDS (V)

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