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Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

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4AK16

Silicon N-Channel Power MOS FET Array



ADE-208-1201 (Z)
1st. Edition
Mar. 2001

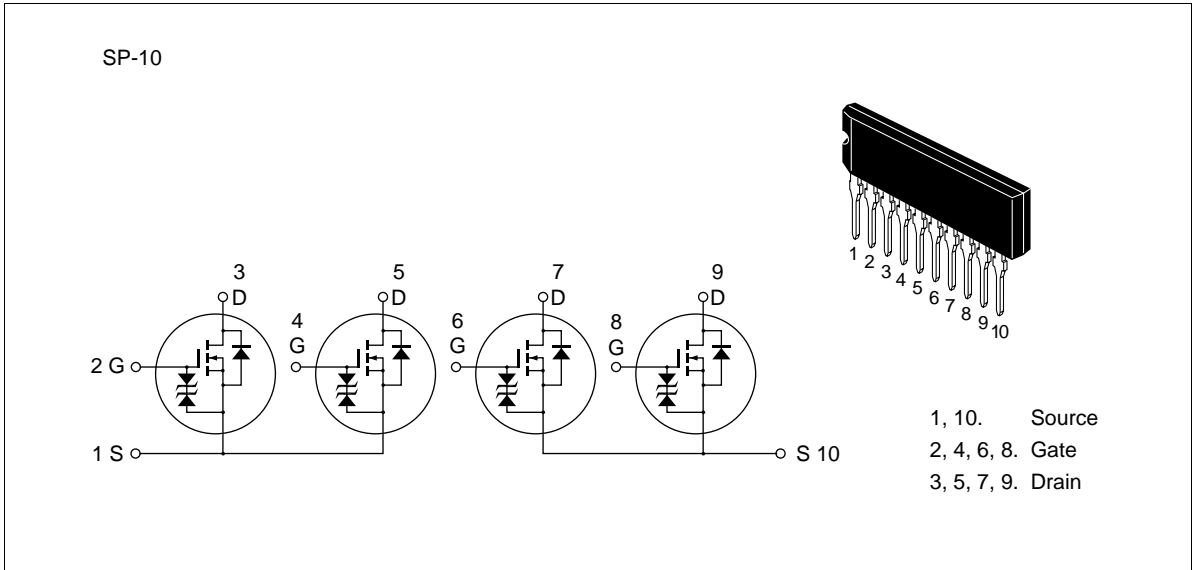
Application

High speed power switching

Features

- Low on-resistance
 $R_{DS(on)} \leq 0.18$, $V_{GS} = 10$ V, $I_D = 5$ A
 $R_{DS(on)} \leq 0.25$, $V_{GS} = 4$ V, $I_D = 5$ 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

Outline



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

Item	Symbol	Rating	Unit
Drain to source voltage	V _{DSS}	60	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 (T _c = 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%

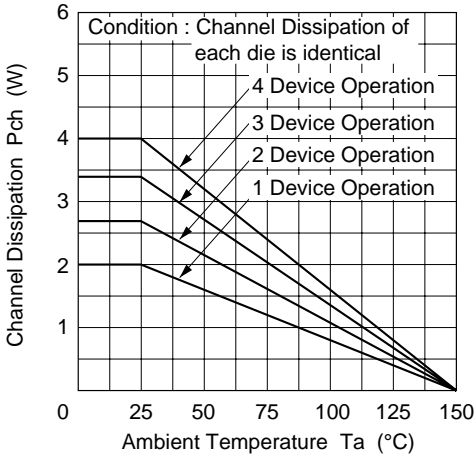
2. 4 devices operation

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

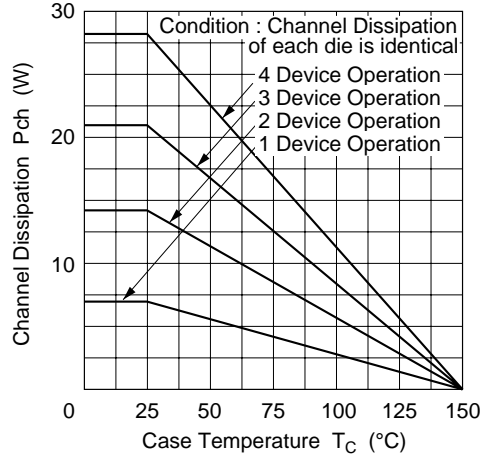
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	60	—	—	V	$I_D = 10 \text{ mA}$, $V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	± 20	—	—	V	$I_G = \pm 100 \text{ }\mu\text{A}$, $V_{DS} = 0$
Gate to source leak current	I_{GSS}	—	—	± 10	μA	$V_{GS} = \pm 16 \text{ V}$, $V_{DS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	250	μA	$V_{DS} = 50 \text{ V}$, $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	1.0	—	2.0	V	$I_D = 1 \text{ mA}$, $V_{DS} = 10 \text{ V}$
Static drain to source on state resistance	$R_{DS(on)}$	—	0.12	0.18	Ω	$I_D = 5 \text{ A}$ $V_{GS} = 10 \text{ V}^{*1}$
			—	0.17	0.25	Ω
Forward transfer admittance	$ y_{fs} $	3.5	6.0	—	S	$I_D = 5 \text{ A}$ $V_{DS} = 10 \text{ V}^{*1}$
Input capacitance	C_{iss}	—	400	—	pF	$V_{DS} = 10 \text{ V}$
Output capacitance	C_{oss}	—	220	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	C_{rss}	—	60	—	pF	$f = 1 \text{ MHz}$
Turn-on delay time	$t_{d(on)}$	—	5	—	ns	$I_D = 5 \text{ A}$
Rise time	t_r	—	55	—	ns	$V_{GS} = 10 \text{ V}$
Turn-off delay time	$t_{d(off)}$	—	140	—	ns	$R_L = 6 \text{ }\Omega$
Fall time	t_f	—	90	—	ns	
Body to drain diode forward voltage	V_{DF}	—	1.0	—	V	$I_F = 5 \text{ A}$, $V_{GS} = 0$
Body to drain diode reverse recovery time	t_{rr}	—	100	—	ns	$I_F = 5 \text{ A}$, $V_{GS} = 0$ $dI_F/dt = 50 \text{ A}/\mu\text{s}$

Note: 1. Pulse test

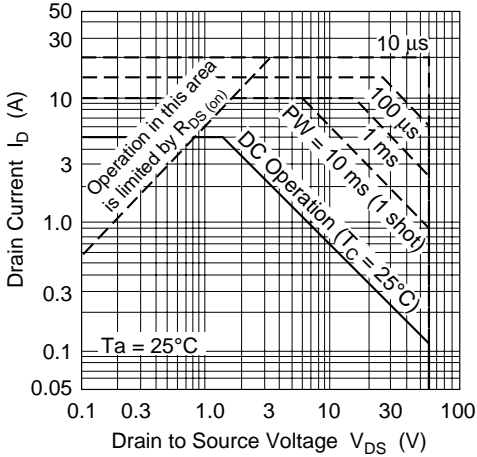
Maximum Channel Dissipation Curve



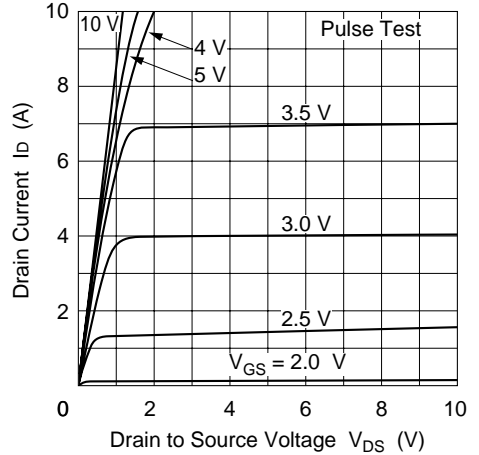
Maximum Channel Dissipation Curve

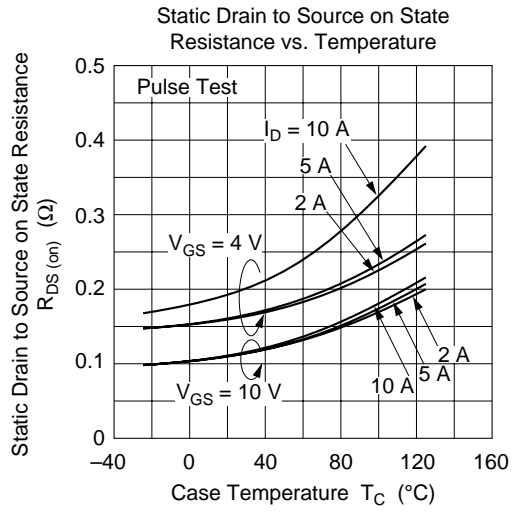
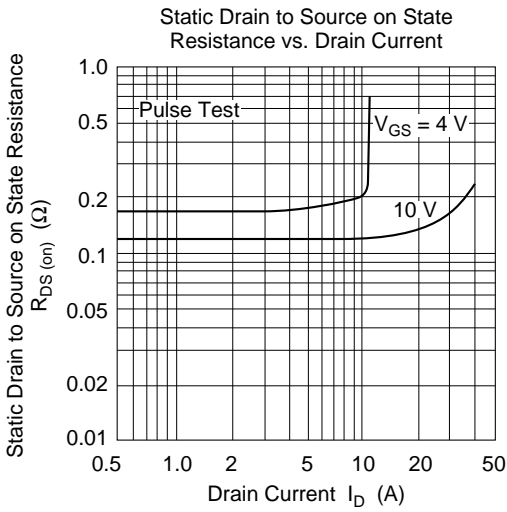
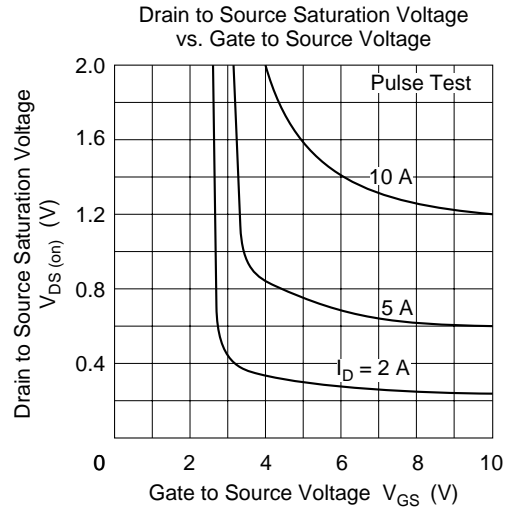
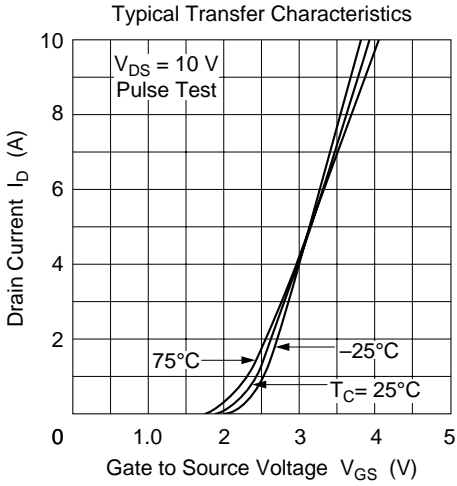


Maximum Safe Operation Area

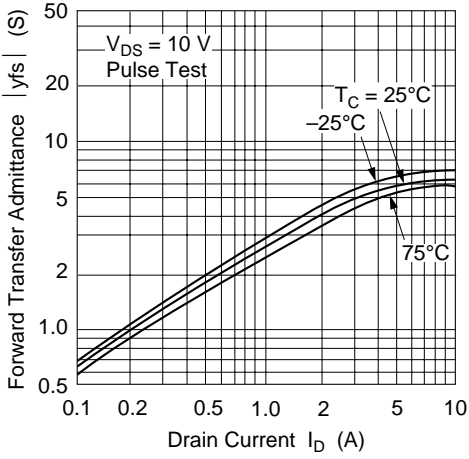


Typical Output Characteristics

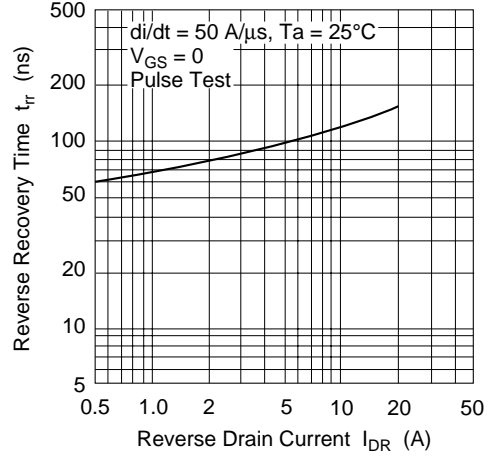




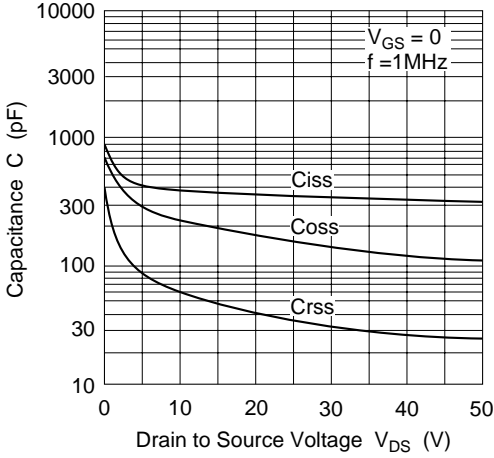
Forward Transfer Admittance vs. Drain Current



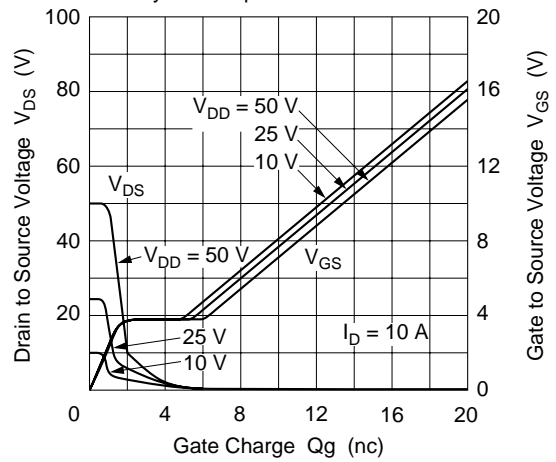
Body to Drain Diode Reverse Recovery Time

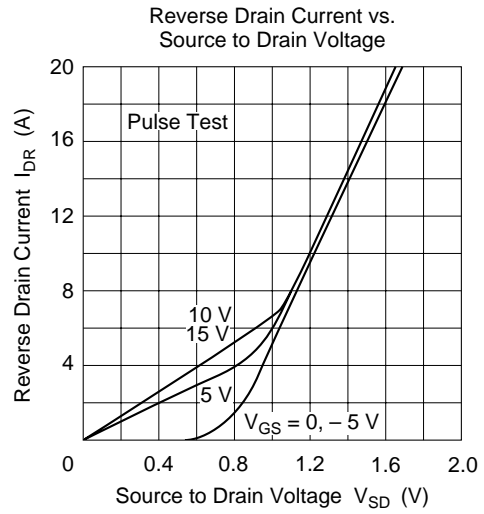
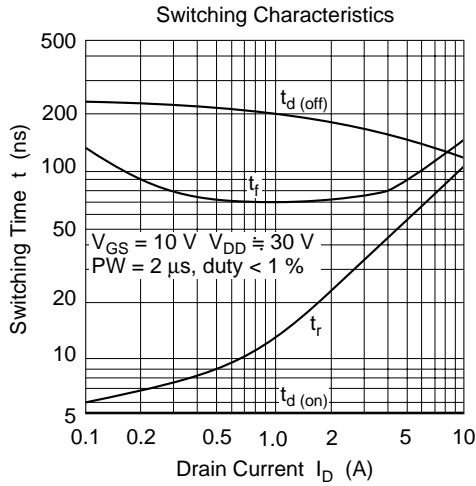


Typical Capacitance vs. Drain to Source Voltage



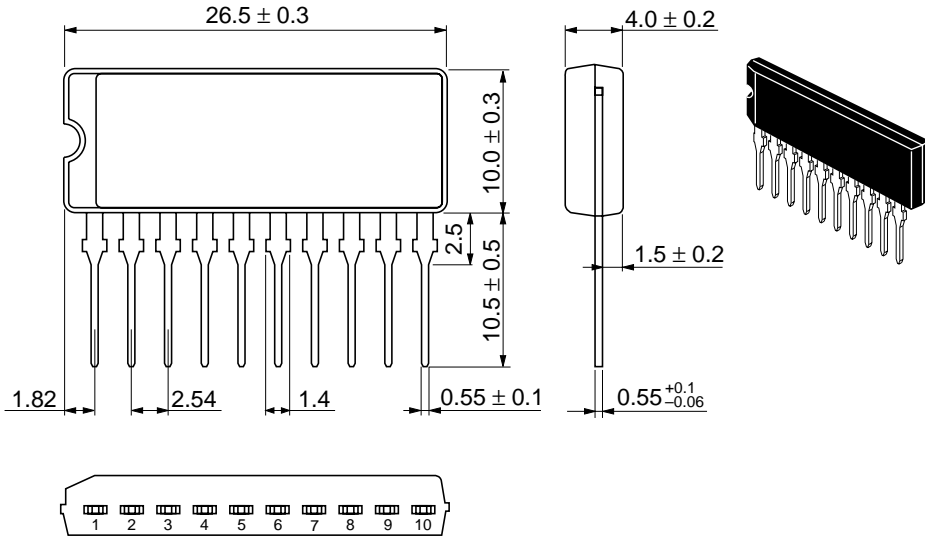
Dynamic Input Characteristics





Package Dimensions

As of January, 2001
Unit: mm



Hitachi Code	SP-10
JEDEC	—
EIAJ	—
Mass (reference value)	2.9 g

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HITACHI

Hitachi, Ltd.

Semiconductor & Integrated Circuits.

Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan

Tel: Tokyo (03) 3270-2111 Fax: (03) 3270-5109

URL	NorthAmerica	: http://semiconductor.hitachi.com/
	Europe	: http://www.hitachi-eu.com/hel/ecg
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For further information write to:

Hitachi Semiconductor
(America) Inc.
179 East Tasman Drive,
San Jose, CA 95134
Tel: <1> (408) 433-1990
Fax: <1> (408) 433-0223

Hitachi Europe GmbH
Electronic Components Group
Dornacher Straße 3
D-85622 Feldkirchen, Munich
Germany
Tel: <49> (89) 9 9180-0
Fax: <49> (89) 9 29 30 00

Hitachi Europe Ltd.
Electronic Components Group.
Whitebrook Park
Lower Cookham Road
Maidenhead
Berkshire SL6 8YA, United Kingdom
Tel: <44> (1628) 585000
Fax: <44> (1628) 585160

Hitachi Asia Ltd.
Hitachi Tower
16 Collyer Quay #20-00,
Singapore 049318
Tel : <65>-538-6533/538-8577
Fax : <65>-538-6933/538-3877
URL : <http://www.hitachi.com.sg>

Hitachi Asia Ltd.
(Taipei Branch Office)
4/F, No. 167, Tun Hwa North Road,
Hung-Kuo Building,
Taipei (105), Taiwan
Tel : <886>-(2)-2718-3666
Fax : <886>-(2)-2718-8180
Telex : 23222 HAS-TP
URL : <http://www.hitachi.com.tw>

Hitachi Asia (Hong Kong) Ltd.
Group III (Electronic Components)
7/F., North Tower,
World Finance Centre,
Harbour City, Canton Road
Tsim Sha Tsui, Kowloon,
Hong Kong
Tel : <852>-(2)-735-9218
Fax : <852>-(2)-730-0281
URL : <http://www.hitachi.com.hk>