
4AM16

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

HITACHI

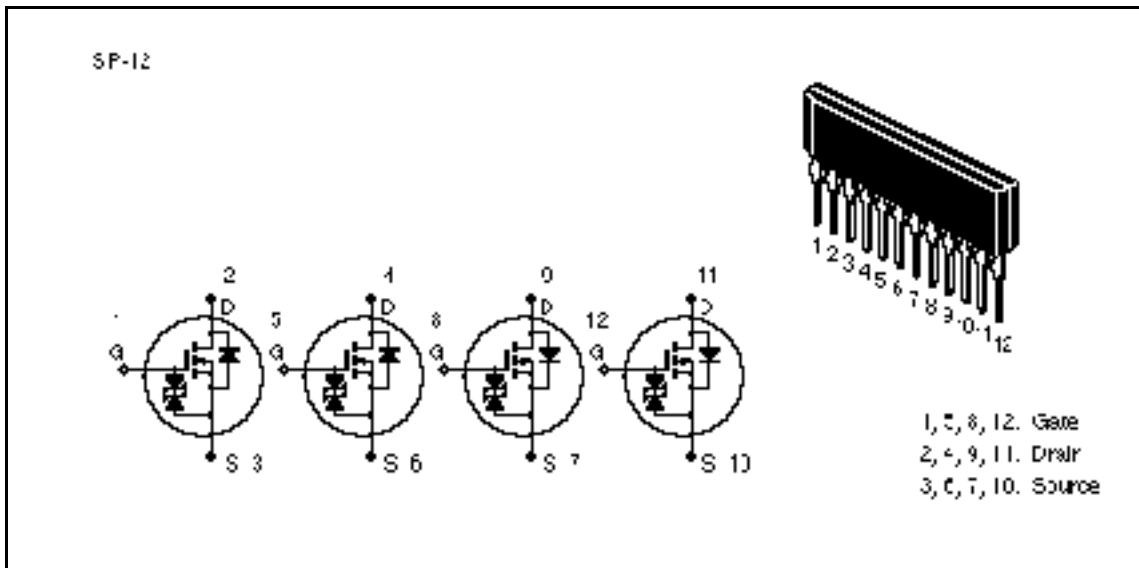
Application

High speed power switching

Features

- Low on-resistance
N Channel: $R_{DS(on)} = 0.17 \Omega$, $V_{GS} = 10 \text{ V}$, $I_D = 4 \text{ A}$
P Channel: $R_{DS(on)} = 0.2 \Omega$, $V_{GS} = -10 \text{ V}$, $I_D = -4 \text{ A}$
- High speed switching
- High density mounting
- Suitable for H-bridged motor driver

Outline



4AM16

Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings		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	$Pch (T_C = 25°C)^{*2}$	28		W
	Pch^{*2}	4.0		W
Channel temperature	T_{ch}	150		°C
Storage temperature	T_{stg}	-55 to +150		°C

Notes: 1. PW 10 μs, duty cycle 1%

2. 4 Device Operation

Electrical Characteristics (Ta = 25°C)

Item	Symbol	N channel			Unit	Test conditions
		Min	Typ	Max		
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	$R_{DS(on)}$	—	0.13	0.17		$I_D = 4 \text{ A}, V_{GS} = 10 \text{ V}^{*1}$
		—	0.18	0.24		$I_D = 4 \text{ A}, V_{GS} = 4 \text{ V}^{*1}$
Forward transfer admittance	$ y_{fs} $	3.5	5.5	—	S	$I_D = 4 \text{ A}$ $V_{DS} = 10 \text{ V}^{*1}$
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	$I_D = 4 \text{ A}$
Rise time	t_r	—	45	—	ns	$V_{GS} = 10 \text{ V}$
Turn-off delay time	$t_{d(off)}$	—	150	—	ns	$R_L = 7.5$
Fall time	t_f	—	85	—	ns	
Body to drain diode forward voltage	V_{DF}	—	1.2	—	V	$I_F = 8 \text{ A}, V_{GS} = 0$
Body to drain diode reverse recovery time	t_{rr}	—	120	—	ns	$I_F = 8 \text{ A}, V_{GS} = 0,$ $diF/dt = 50 \text{ A}/\mu\text{s}$

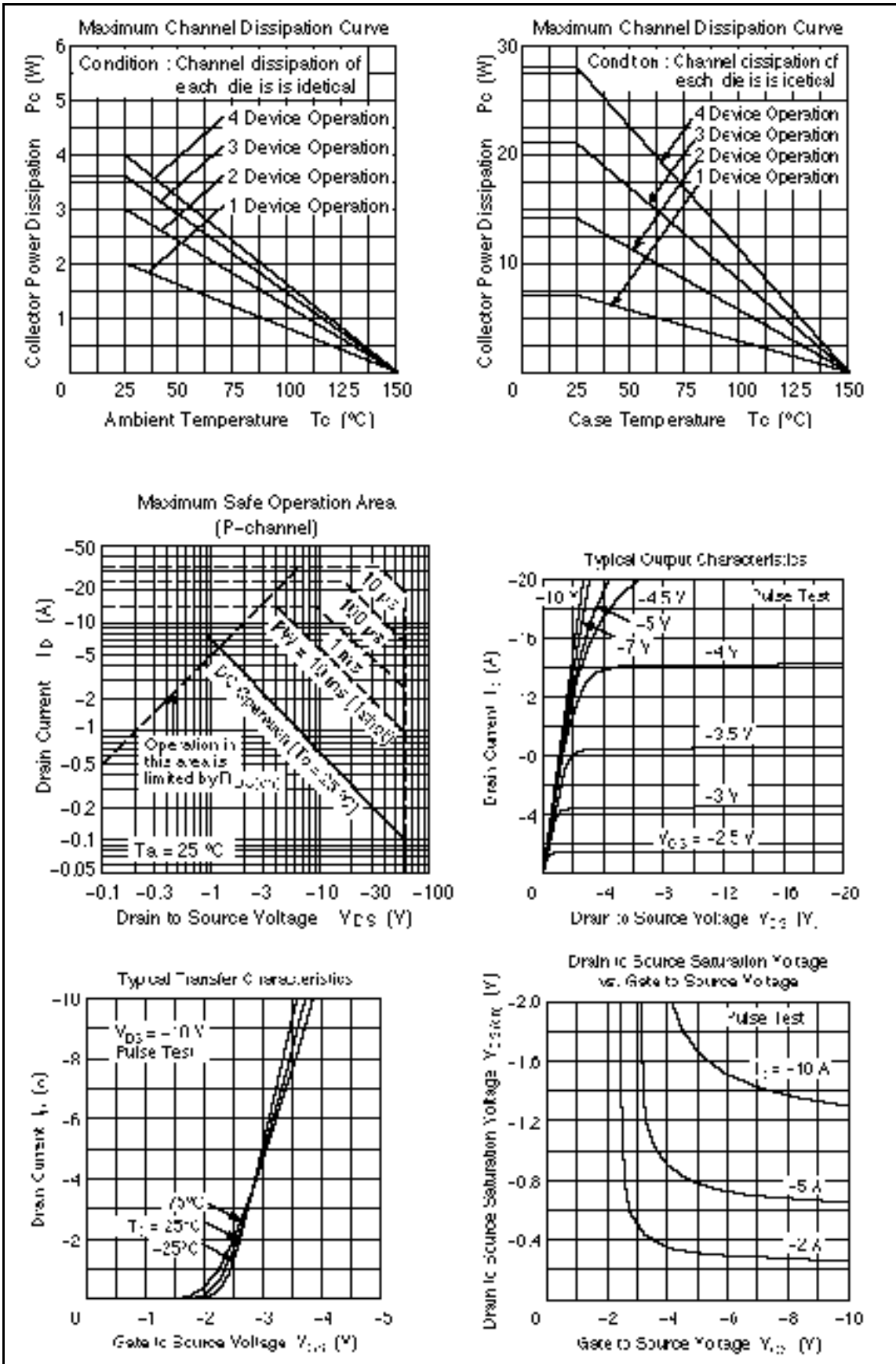
Note: 1. Pulse Test

4AM16

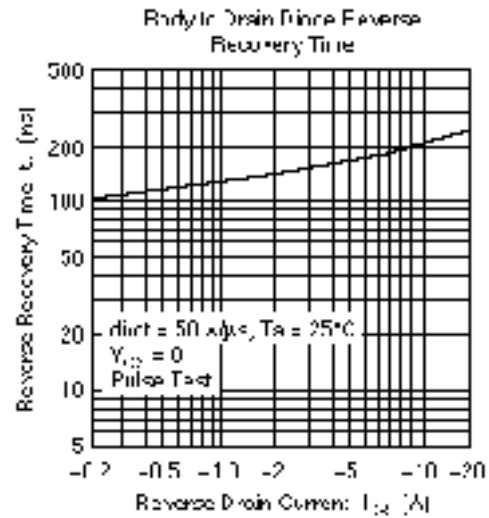
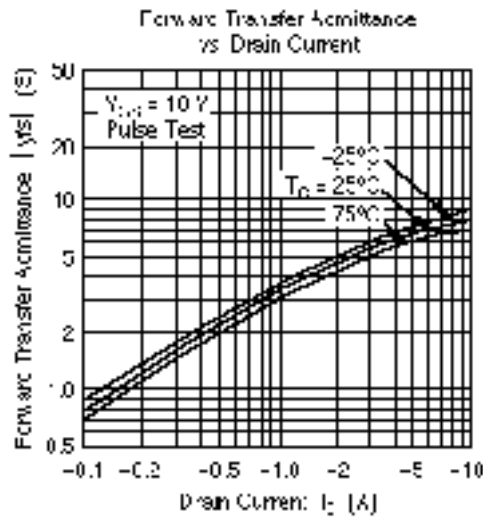
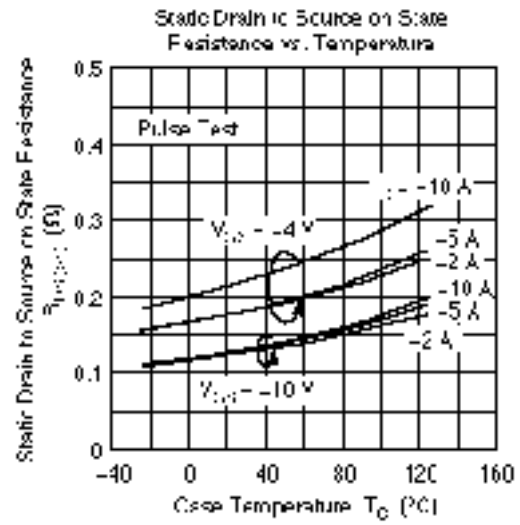
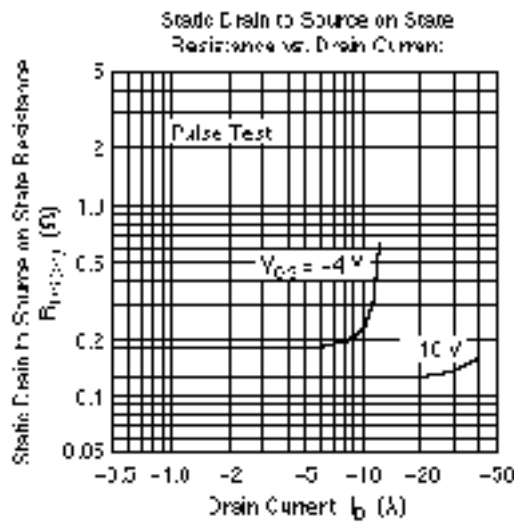
Electrical Characteristics (Ta = 25°C)

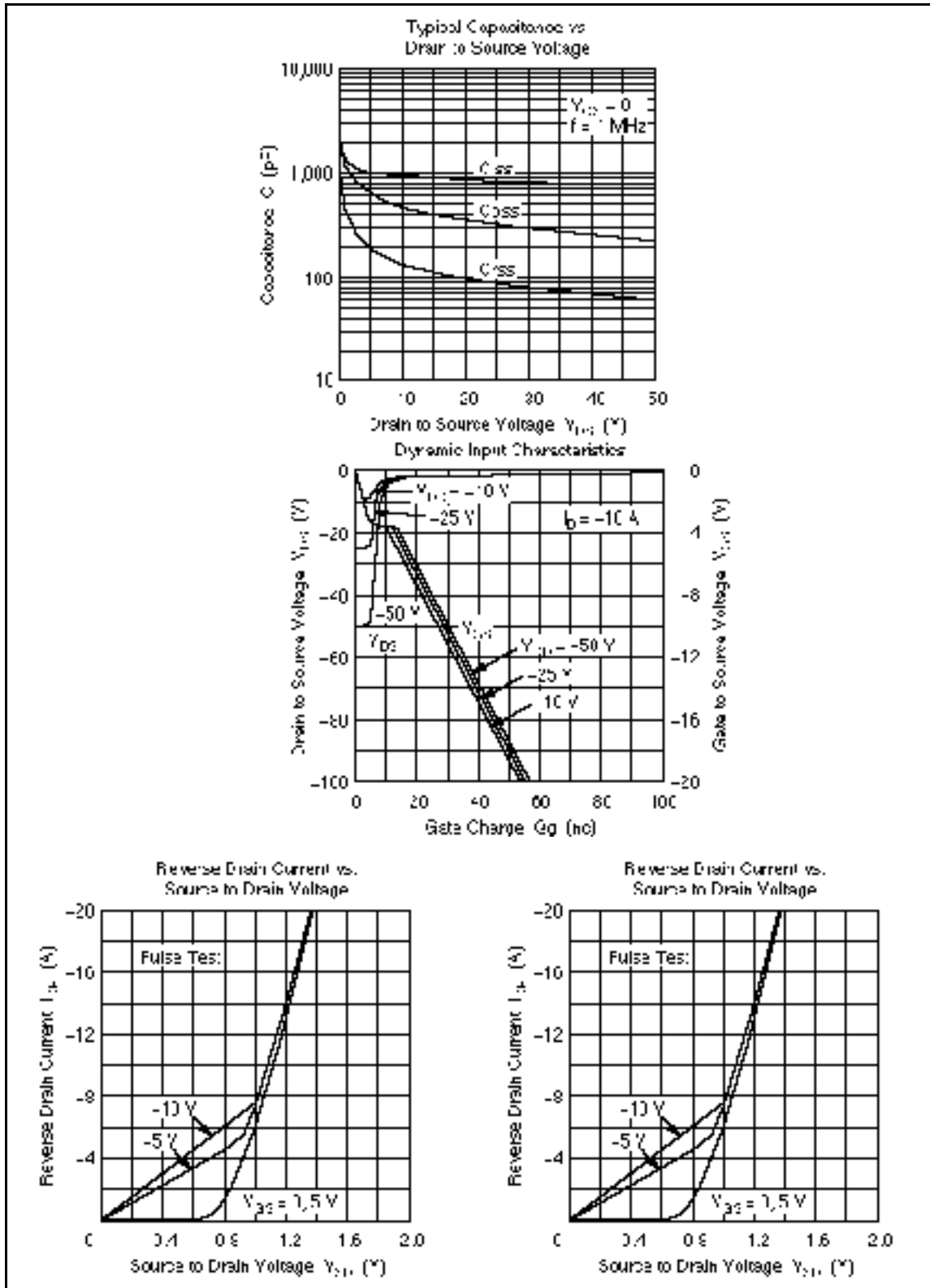
Item	Symbol	P channel			Unit	Test conditions
		Min	Typ	Max		
Drain to source breakdown voltage	$V_{(BR)DSS}$	-60	—	—	V	$I_D = -10 \text{ mA}, V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	± 20	—	—	V	$I_G = \pm 100 \text{ }\mu\text{A}, V_{DS} = 0$
Gate to source leak current	I_{GSS}	—	—	± 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	$R_{DS(on)}$	—	0.15	0.20		$I_D = -4 \text{ A}, V_{GS} = -10 \text{ V}^{*1}$
		—	0.20	0.27		$I_D = -4 \text{ A}, V_{GS} = -4 \text{ V}^{*1}$
Forward transfer admittance	$ y_{fs} $	3.5	6.0	—	S	$I_D = -4 \text{ A}$ $V_{DS} = -10 \text{ V}^{*1}$
Input capacitance	C_{iss}	—	900	—	pF	$V_{DS} = -10 \text{ V}$
Output capacitance	C_{oss}	—	460	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	C_{rss}	—	130	—	pF	$f = 1 \text{ MHz}$
Turn-on delay time	$t_{d(on)}$	—	8	—	ns	$I_D = -4 \text{ A}$
Rise time	t_r	—	50	—	ns	$V_{GS} = -10 \text{ V}$
Turn-off delay time	$t_{d(off)}$	—	180	—	ns	$R_L = 7.5$
Fall time	t_f	—	95	—	ns	
Body to drain diode forward voltage	V_{DF}	—	-1.2	—	V	$I_F = -8 \text{ A}, V_{GS} = 0$
Body to drain diode reverse recovery time	t_{rr}	—	185	—	ns	$I_F = -8 \text{ A}, V_{GS} = 0,$ $diF/dt = 50 \text{ A}/\mu\text{s}$

Note: 1. Pulse Test

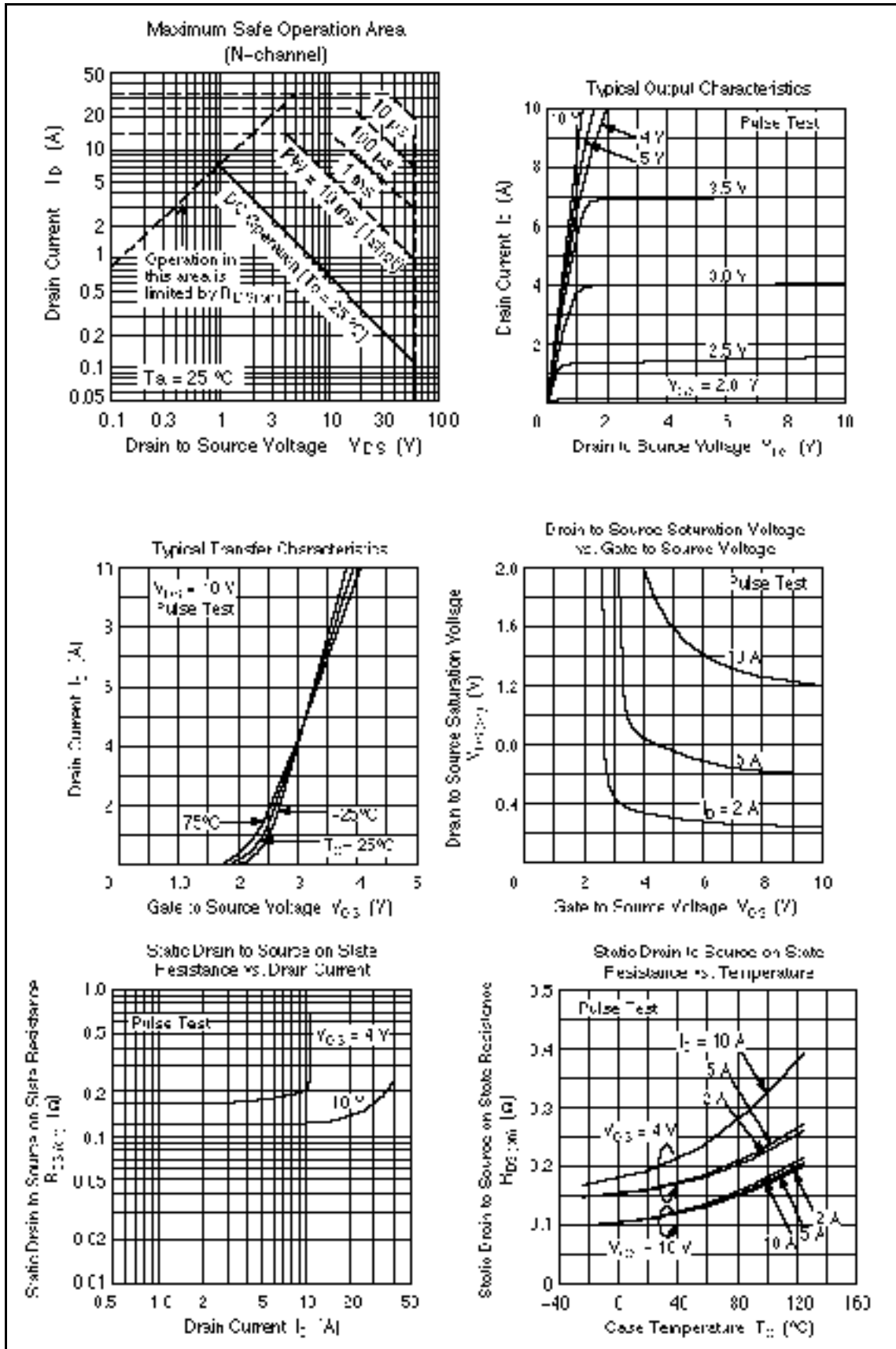


4AM16

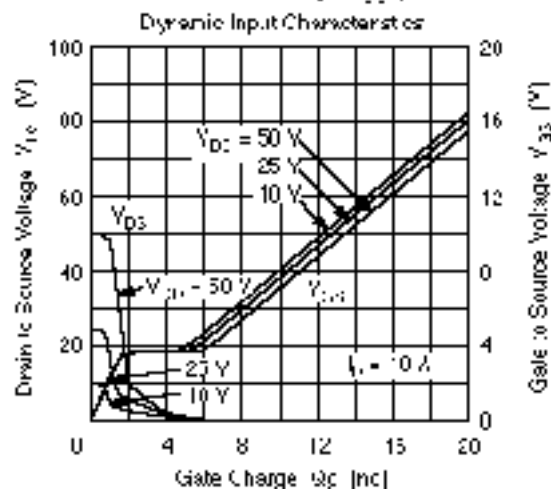
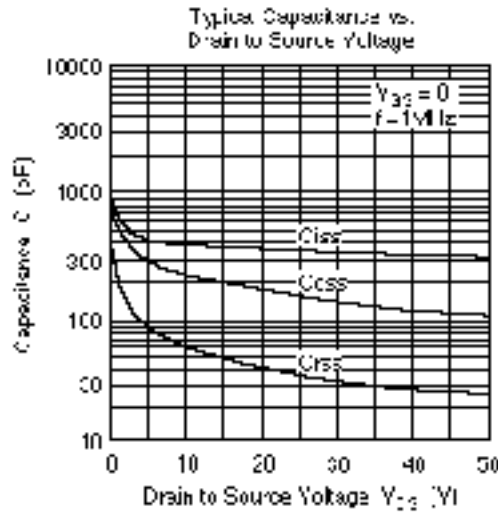
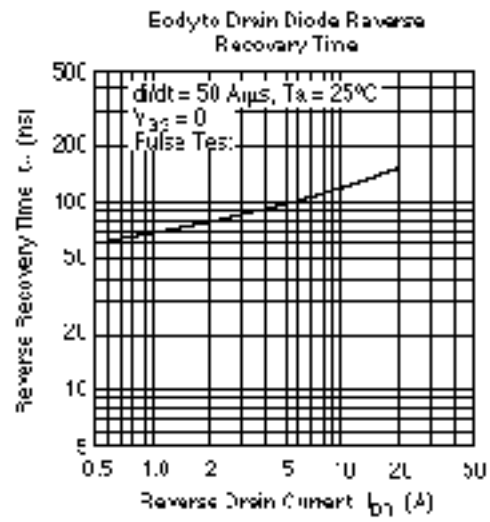
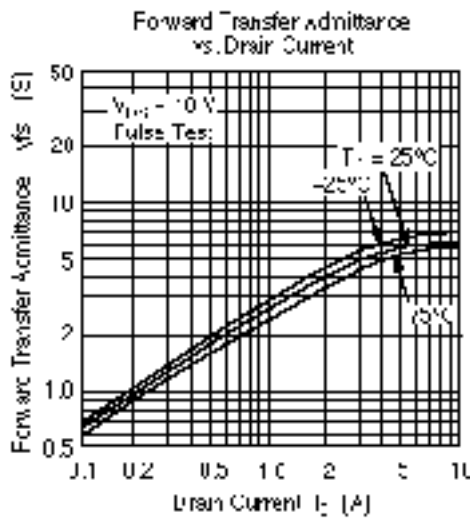




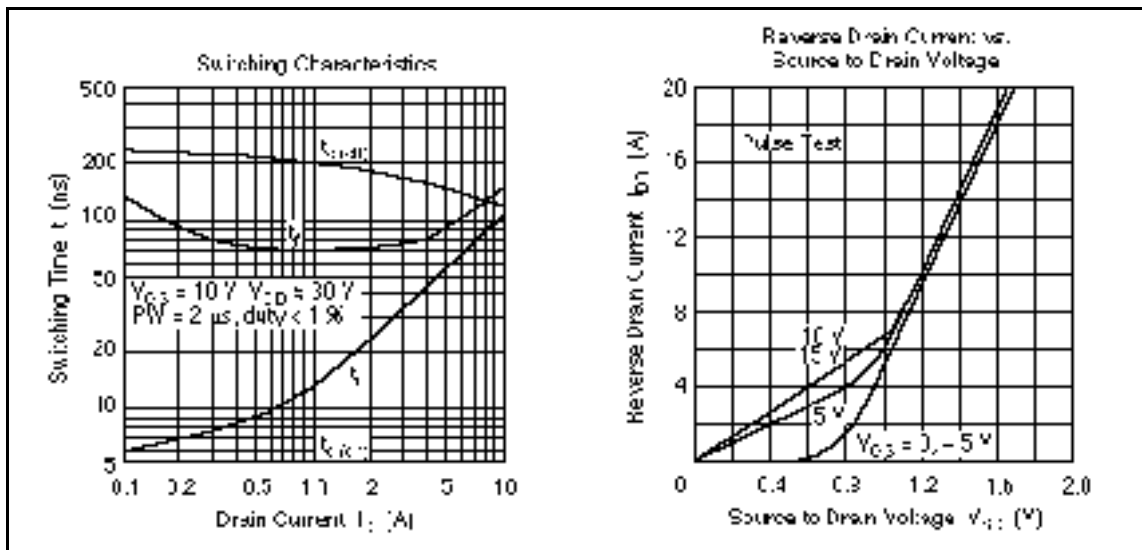
4AM16



HITACHI



4AM16



When using this document, keep the following in mind:

1. This document may, wholly or partially, be subject to change without notice.
2. All rights are reserved: No one is permitted to reproduce or duplicate, in any form, the whole or part of this document without Hitachi's permission.
3. Hitachi will not be held responsible for any damage to the user that may result from accidents or any other reasons during operation of the user's unit according to this document.
4. Circuitry and other examples described herein are meant merely to indicate the characteristics and performance of Hitachi's semiconductor products. Hitachi assumes no responsibility for any intellectual property claims or other problems that may result from applications based on the examples described herein.
5. No license is granted by implication or otherwise under any patents or other rights of any third party or Hitachi, Ltd.
6. **MEDICAL APPLICATIONS:** Hitachi's products are not authorized for use in **MEDICAL APPLICATIONS** without the written consent of the appropriate officer of Hitachi's sales company. Such use includes, but is not limited to, use in life support systems. Buyers of Hitachi's products are requested to notify the relevant Hitachi sales offices when planning to use the products in **MEDICAL APPLICATIONS**.

HITACHI

Hitachi, Ltd.

Semiconductor & IC Div.

Nippon Bldg., 2-5-2, Ohite-machi, Chiyoda-ku, Tokyo 100, Japan

Tel Tokyo (03) 3270-2111

Fax (03) 3270-5109

For further information write to:

Hitachi America, Ltd.

Semiconductor & IC Div.

2000 Sierra Point Parkway

Folsom, CA 94005-4835

U.S.A.

Tel 415-589-8300

Fax 415-589-4207

Hitachi Europe GmbH

Electronic Components Group

Continental Europe

Darnecker Straße 3

D-85622 Feldkirchen

München

Tel 089-9 91 80-0

Fax 089-9 29 30 00

Hitachi Europe Ltd.

Electronic Components Div.

Northern Europe Headquarters

Whitebrook Park

Lower Cookham Road

High Wycombe

Berkshire SL6 6YA

United Kingdom

Tel 0628-885000

Fax 0628-778322

Hitachi Asia Pte. Ltd.

15 Collyer Quay #20-00

Hitachi Tower

Singapore 0104

Tel 535-2100

Fax 535-1533

Hitachi Asia (Hong Kong) Ltd.

Unit 705, North Tower,

World Finance Centre

Harbour City, Canton Road

Tsim Sha Tsui, Kowloon

Hong Kong

Tel 27359218

Fax 27308074