

4AK19

Silicon N Channel MOS FET
High Speed Power Switching

HITACHI

ADE-208-727 (Z)

1st. Edition

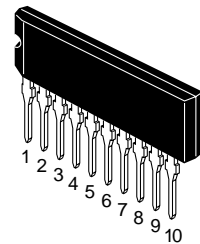
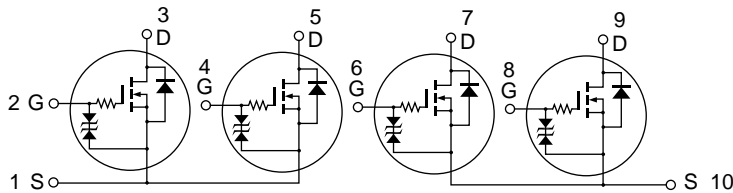
February 1999

Features

- Low on-resistance
N Channel: $R_{DS(on)} \leq 0.5 \Omega$, $V_{GS} = 10 \text{ V}$, $I_D = 2.5 \text{ A}$
 $R_{DS(on)} \leq 0.6 \Omega$, $V_{GS} = 4 \text{ V}$, $I_D = 2.5 \text{ A}$
- 4 V gate drive devices.
- High density mounting

Outline

SP-10



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

Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DSS}	120	V
Gate to source voltage	V_{GSS}	±20	V
Drain current	I_D	5	A
Drain peak current	$I_{D(pulse)}$ ^{Note1}	10	A
Body-drain diode reverse drain current	I_{DR}	5	A
Channel dissipation	$Pch(Tc = 25°C)$ ^{Note2}	28	W
Channel dissipation	Pch ^{Note2}	3.5	W
Channel temperature	Tch	150	°C
Storage temperature	$Tstg$	-55 to +150	°C

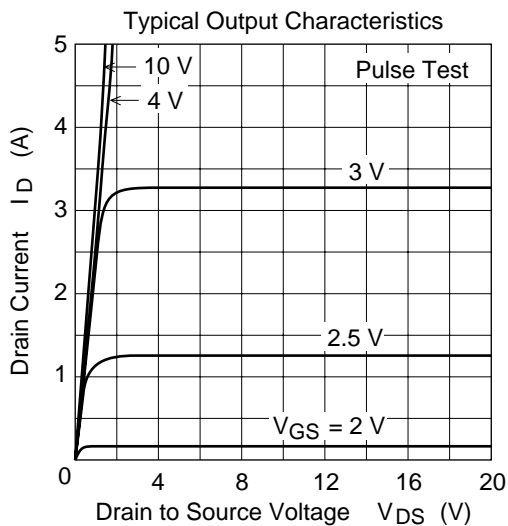
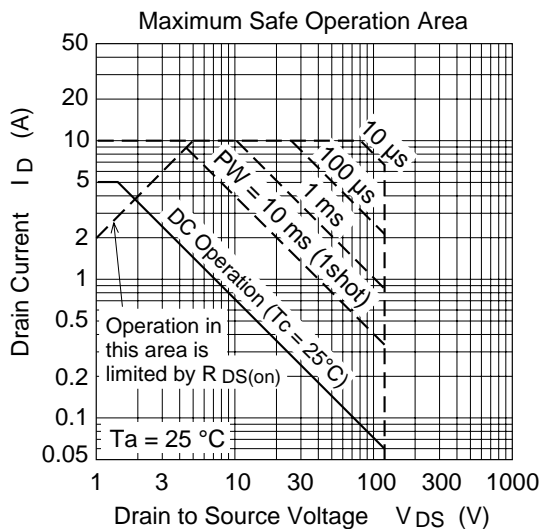
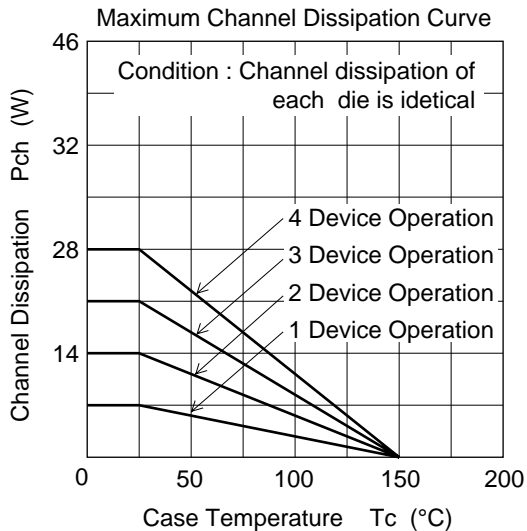
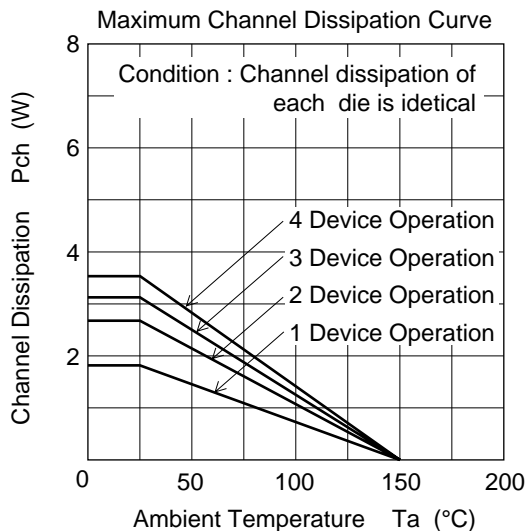
Note: 1. $PW \leq 10 \mu s$, duty cycle $\leq 1\%$
 2. 4 devices poeration

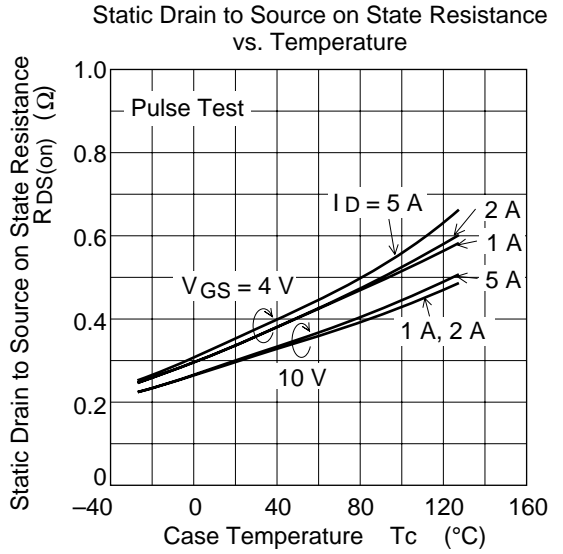
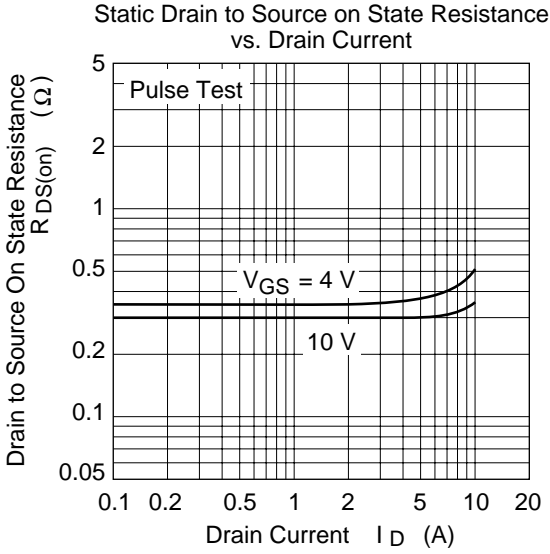
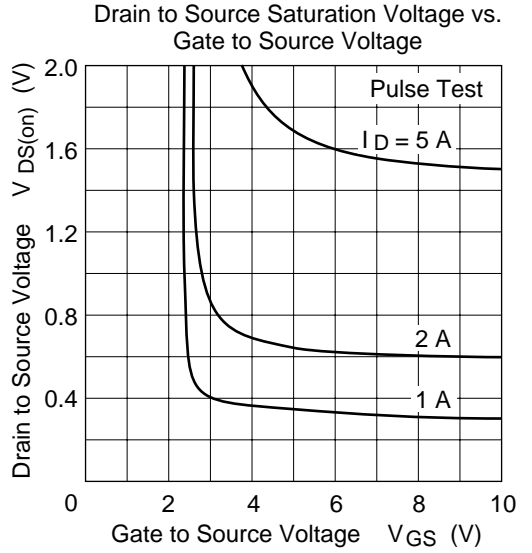
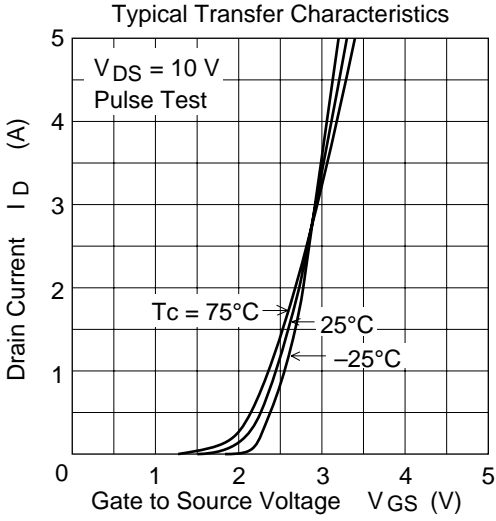
Electrical Characteristics (Ta = 25°C)

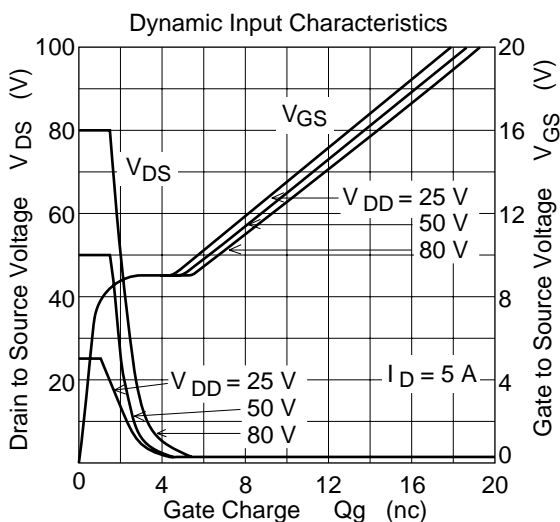
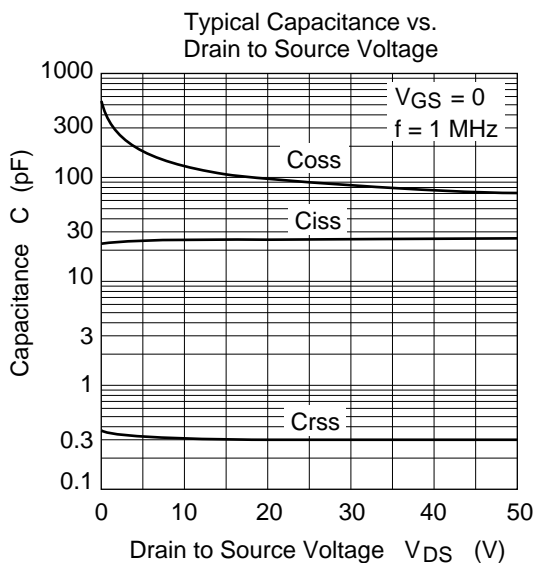
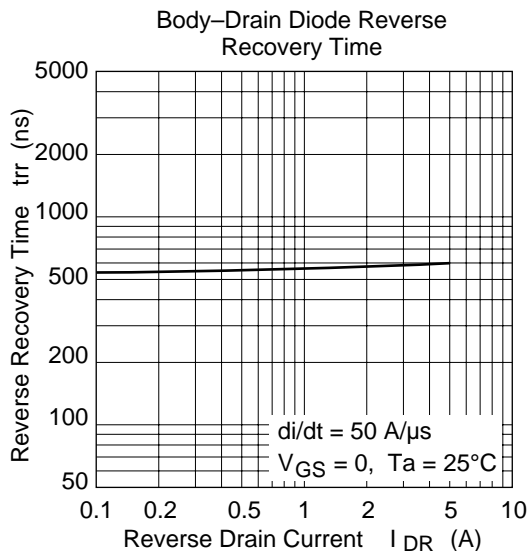
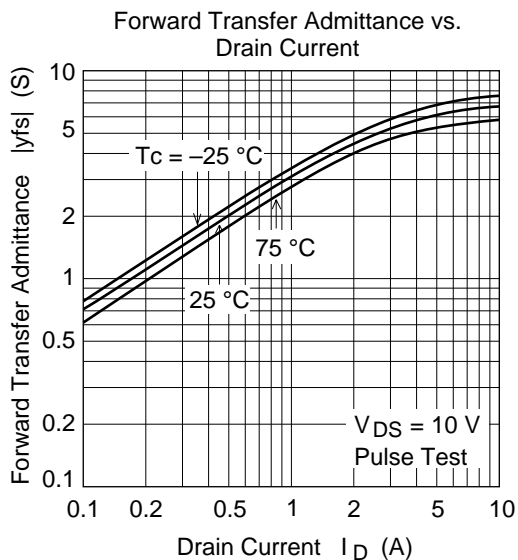
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	120	—	—	V	$I_D = 10 \text{ mA}$, $V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	±20	—	—	V	$I_G = \pm 100 \mu A$, $V_{DS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	100	μA	$V_{DS} = 100 \text{ V}$, $V_{GS} = 0$
Gate to source leak current	I_{GSS}	—	—	±10	μA	$V_{GS} = \pm 16 \text{ V}$, $V_{DS} = 0$
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	$R_{DS(on)}$	—	0.3	0.5	Ω	$I_D = 2.5 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note3}
Static drain to source on state resistance	$R_{DS(on)}$	—	0.35	0.6	Ω	$I_D = 2.5 \text{ A}$, $V_{GS} = 4 \text{ V}$ ^{Note3}
Forward transfer admittance	$ y_{fs} $	3	5	—	S	$I_D = 2.5 \text{ A}$, $V_{DS} = 10 \text{ V}$ ^{Note3}
Input capacitance	C_{iss}	—	25	—	pF	$V_{DS} = 10 \text{ V}$
Output capacitance	C_{oss}	—	140	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	C_{rss}	—	3	—	pF	$f = 1 \text{ MHz}$
Gate series resistance	R_g	—	2.5	—	kΩ	$V_{DS} = 0$, $V_{GS} = 0$, $f = 1 \text{ MHz}$
Turn-on delay time	$t_{d(on)}$	—	0.3	—	μs	$V_{GS} = 10 \text{ V}$, $I_D = 2.5 \text{ A}$
Rise time	t_r	—	0.45	—	μs	$R_L = 12 \Omega$
Turn-off delay time	$t_{d(off)}$	—	6.6	—	μs	
Fall time	t_f	—	1.4	—	μs	
Body–drain diode forward voltage	V_{DF}	—	1.1	—	V	$I_F = 5 \text{ A}$, $V_{GS} = 0$
Body–drain diode reverse recovery time	t_{rr}	—	600	—	ns	$I_F = 5 \text{ A}$, $V_{GS} = 0$ $diF/dt = 50A/\mu s$

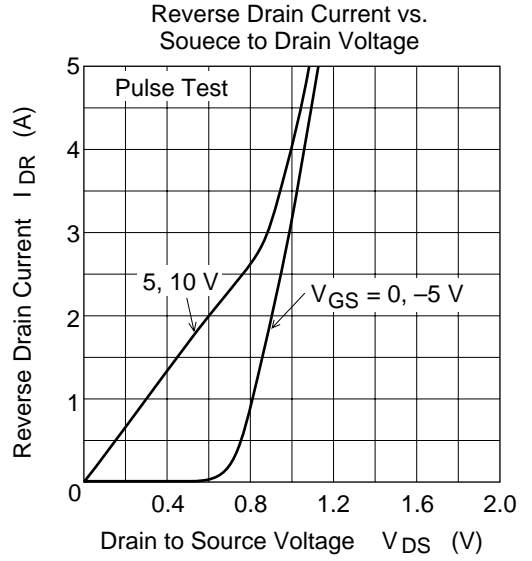
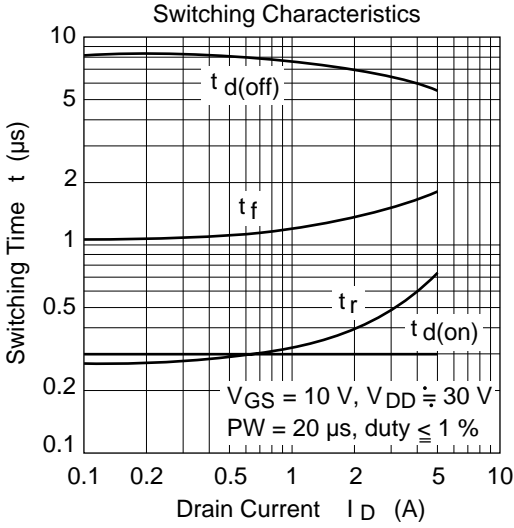
Note: 3. Pulse test

Main Characteristics

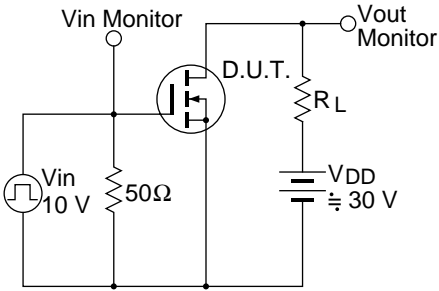




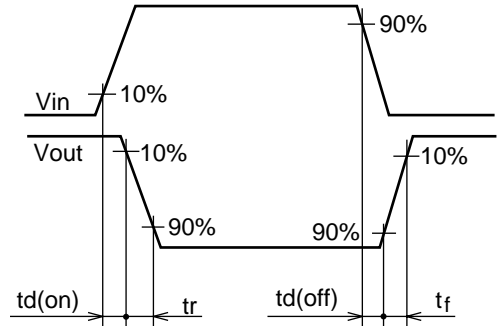




Switching Time Test Circuit

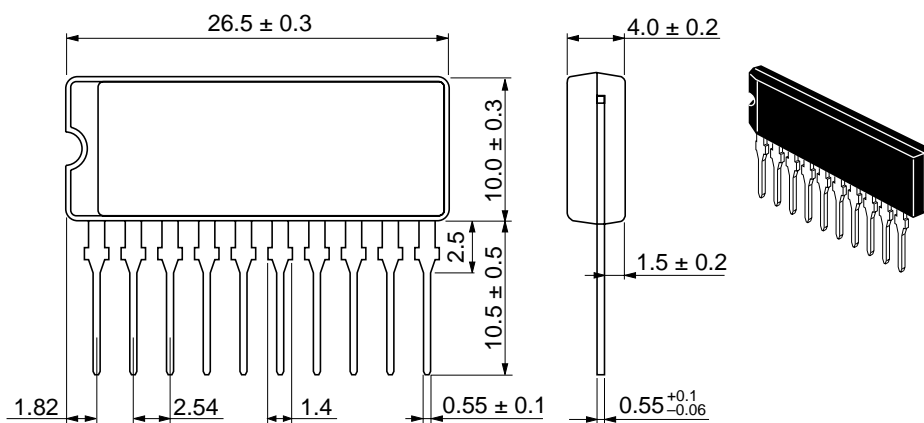


Waveform



Package Dimensions

Unit: mm



Hitachi Code	SP-10
JEDEC	—
EIAJ	—

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