

# 4AK19

Silicon N Channel MOS FET  
High Speed Power Switching

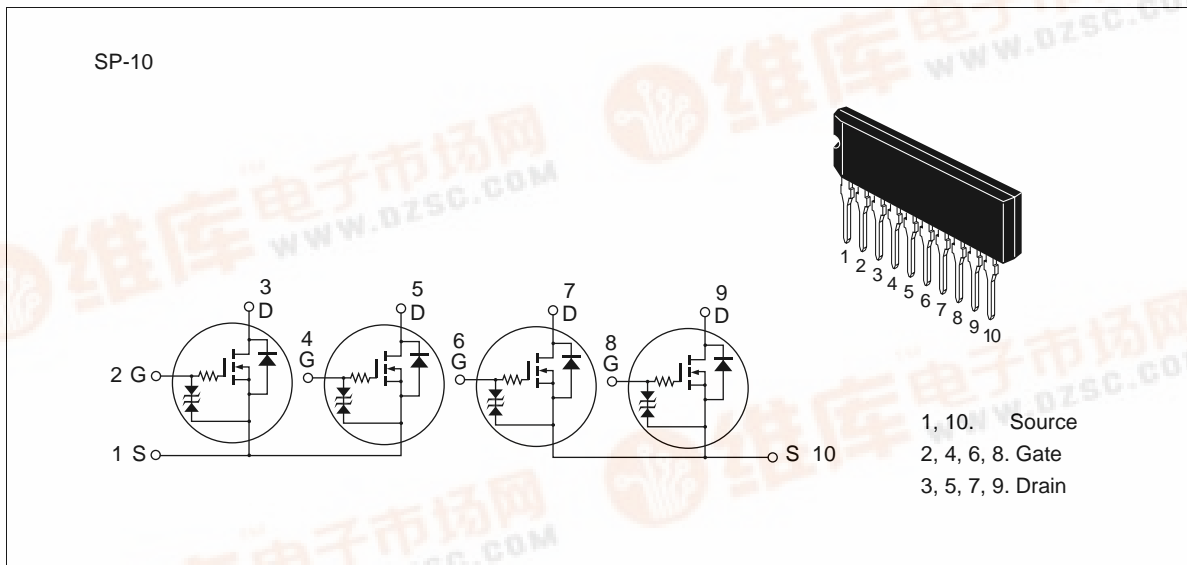
# HITACHI

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



## 4AK19

### 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	$I_{D(pulse)}$ <sup>Note1</sup>	10	A
Body-drain diode reverse drain current	$I_{DR}$	5	A
Channel dissipation	$Pch(Tc = 25°C)$ <sup>Note2</sup>	28	W
Channel dissipation	$Pch$ <sup>Note2</sup>	3.5	W
Channel temperature	$Tch$	150	°C
Storage temperature	$Tstg$	-55 to +150	°C

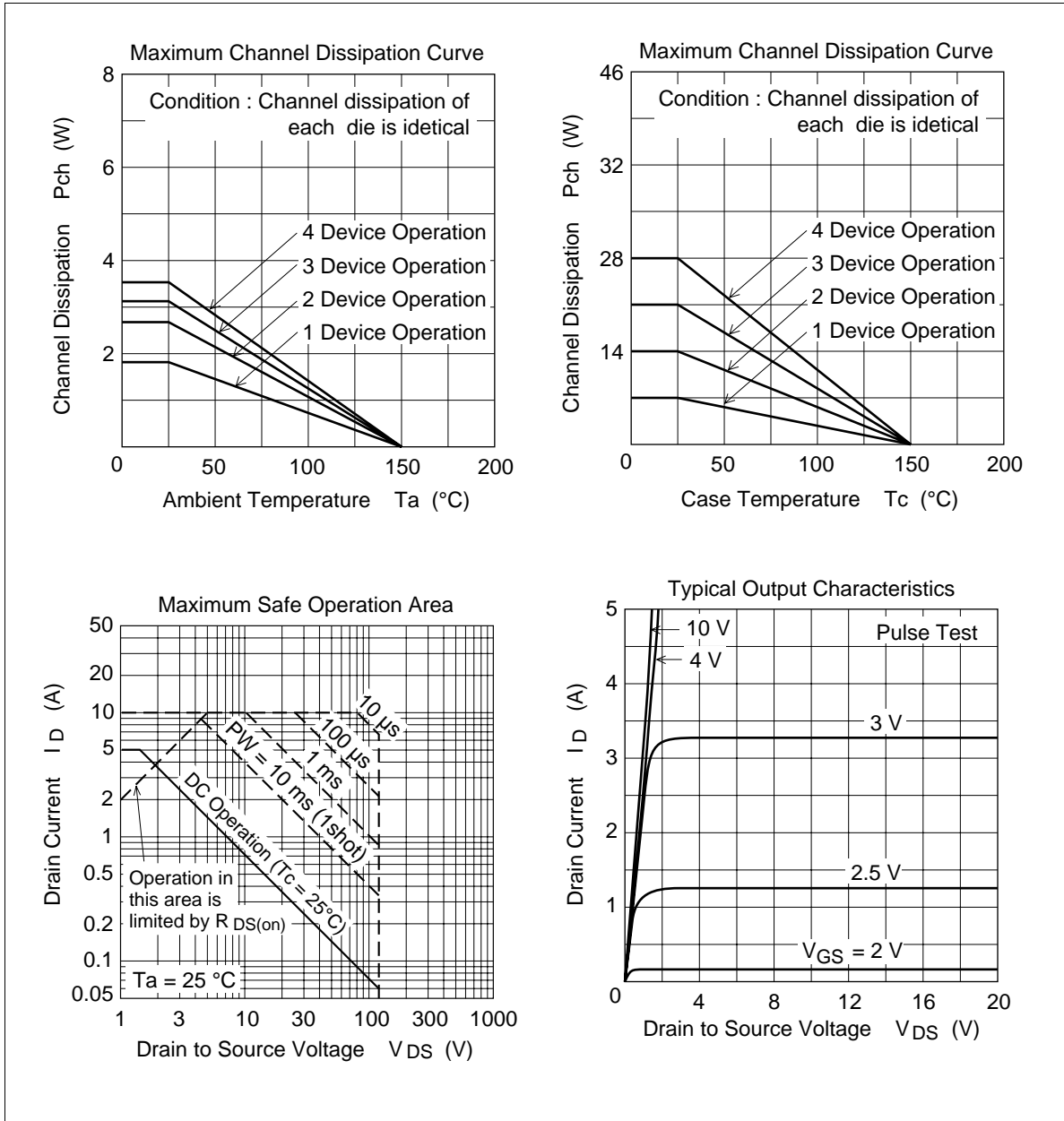
Note: 1.  $PW \leq 10 \mu s$ , duty cycle  $\leq 1\%$   
 2. 4 devices poeration

### Electrical Characteristics (Ta = 25°C)

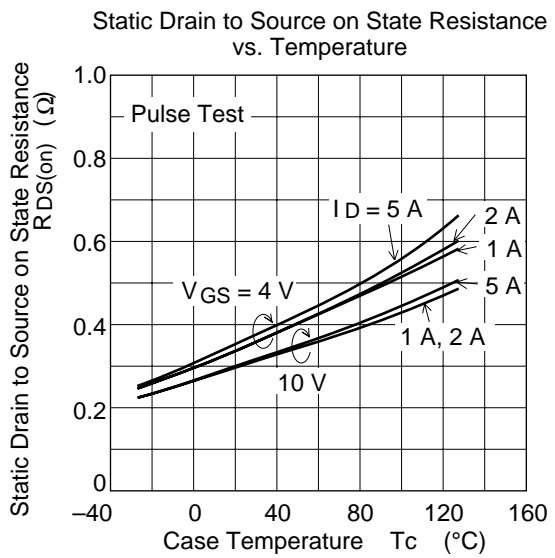
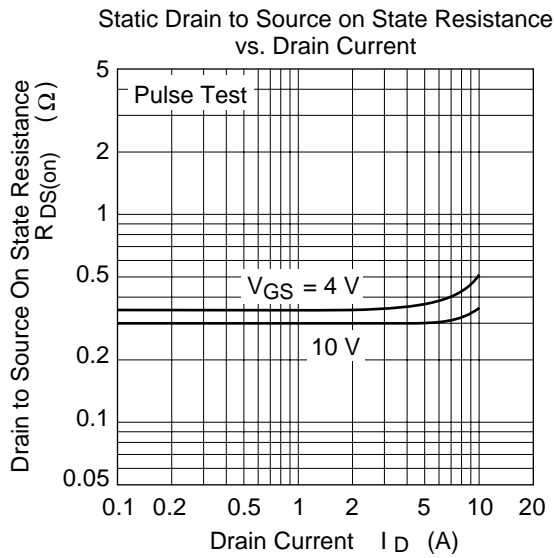
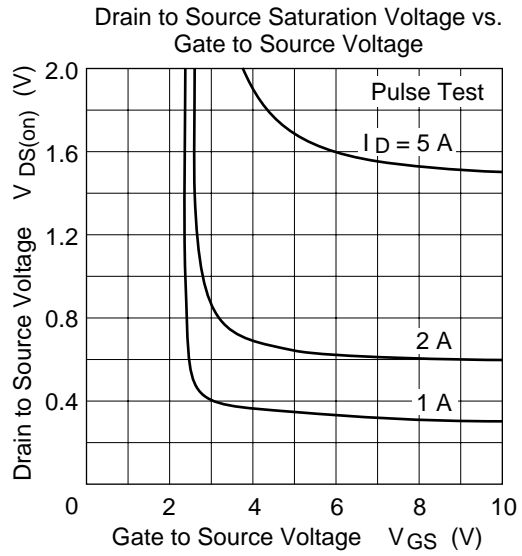
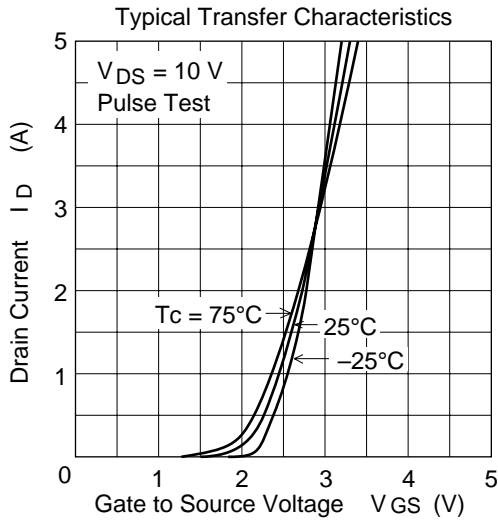
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	120	—	—	V	$I_D = 10 \text{ mA}$ , $V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	±20	—	—	V	$I_G = \pm 100 \mu A$ , $V_{DS} = 0$
Zero gate voltege drain current	$I_{DSS}$	—	—	100	μA	$V_{DS} = 100 \text{ V}$ , $V_{GS} = 0$
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	$I_D = 2.5 \text{ A}$ , $V_{GS} = 10 \text{ V}$ <sup>Note3</sup>
Static drain to source on state resistance	$R_{DS(on)}$	—	0.35	0.6	Ω	$I_D = 2.5 \text{ A}$ , $V_{GS} = 4 \text{ V}$ <sup>Note3</sup>
Forward transfer admittance	$ y_{fs} $	3	5	—	S	$I_D = 2.5 \text{ A}$ , $V_{DS} = 10 \text{ V}$ <sup>Note3</sup>
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	$I_F = 5 \text{ A}$ , $V_{GS} = 0$ $diF/dt = 50A/\mu s$

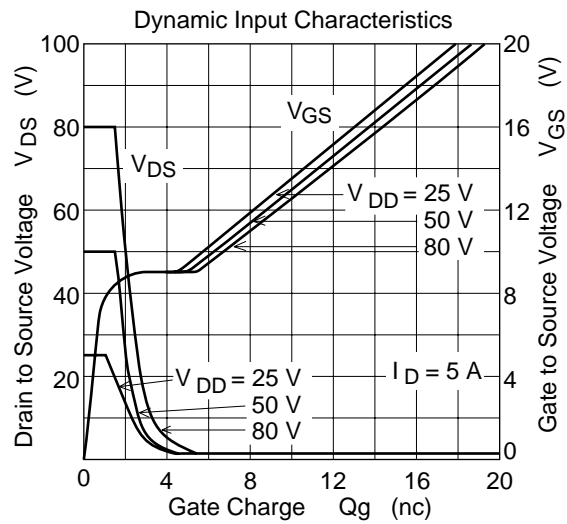
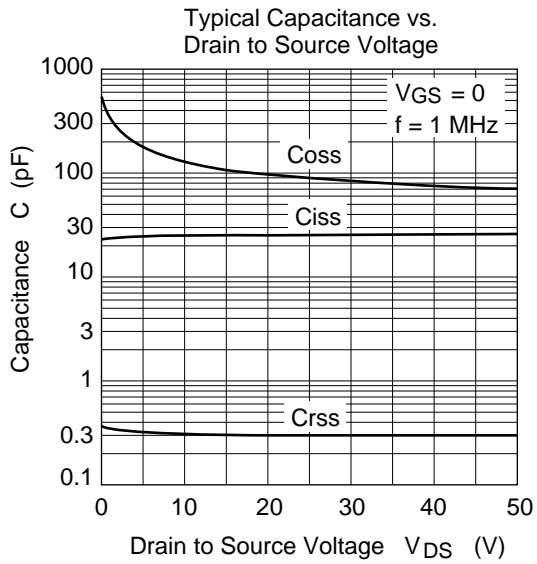
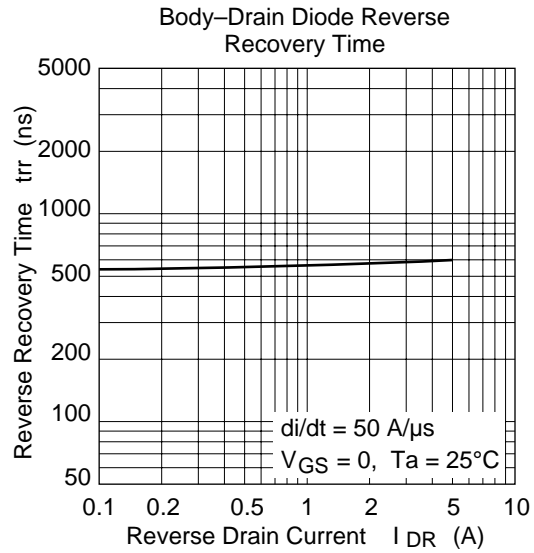
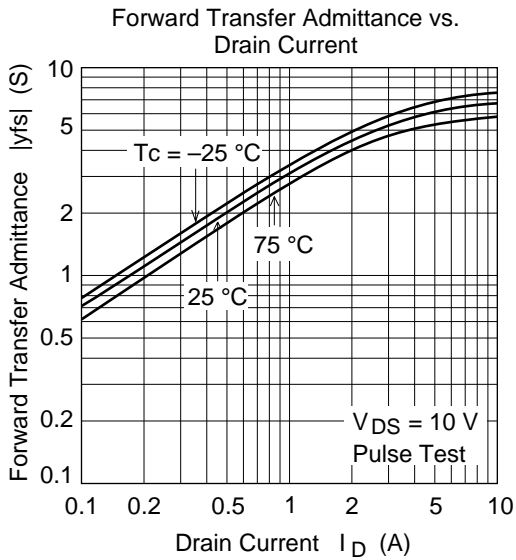
Note: 3. Pulse test

Main Characteristics

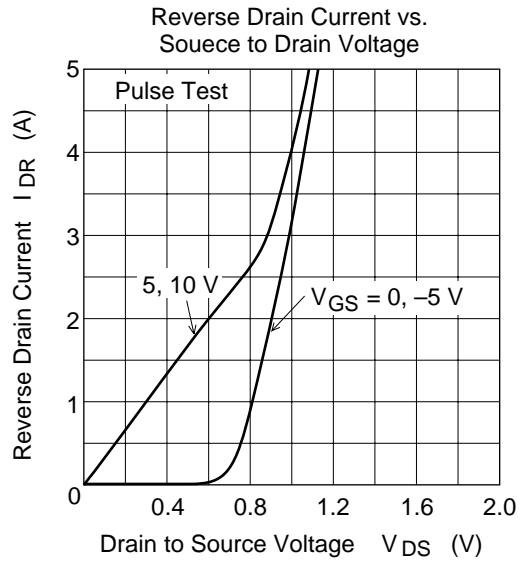
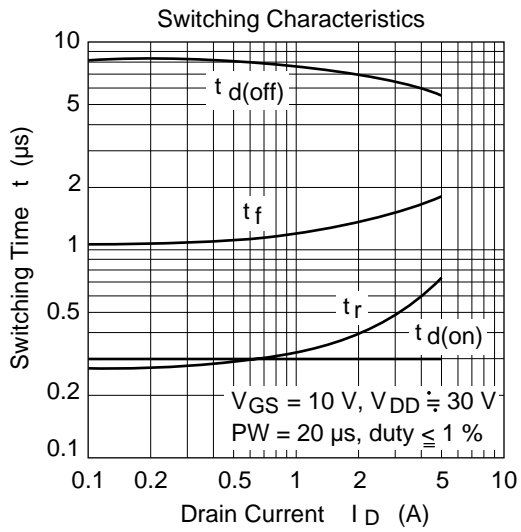


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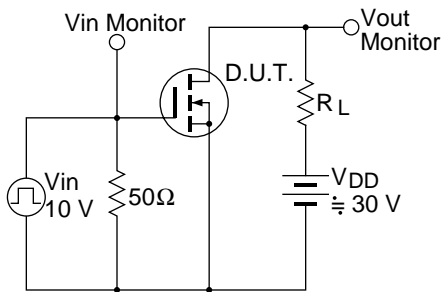




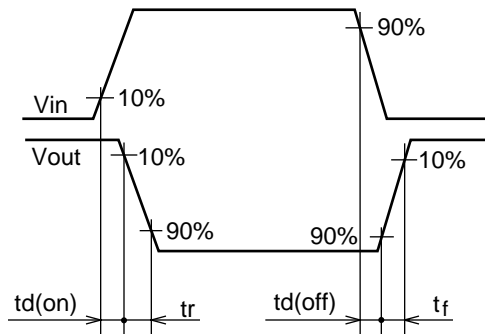
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Switching Time Test Circuit



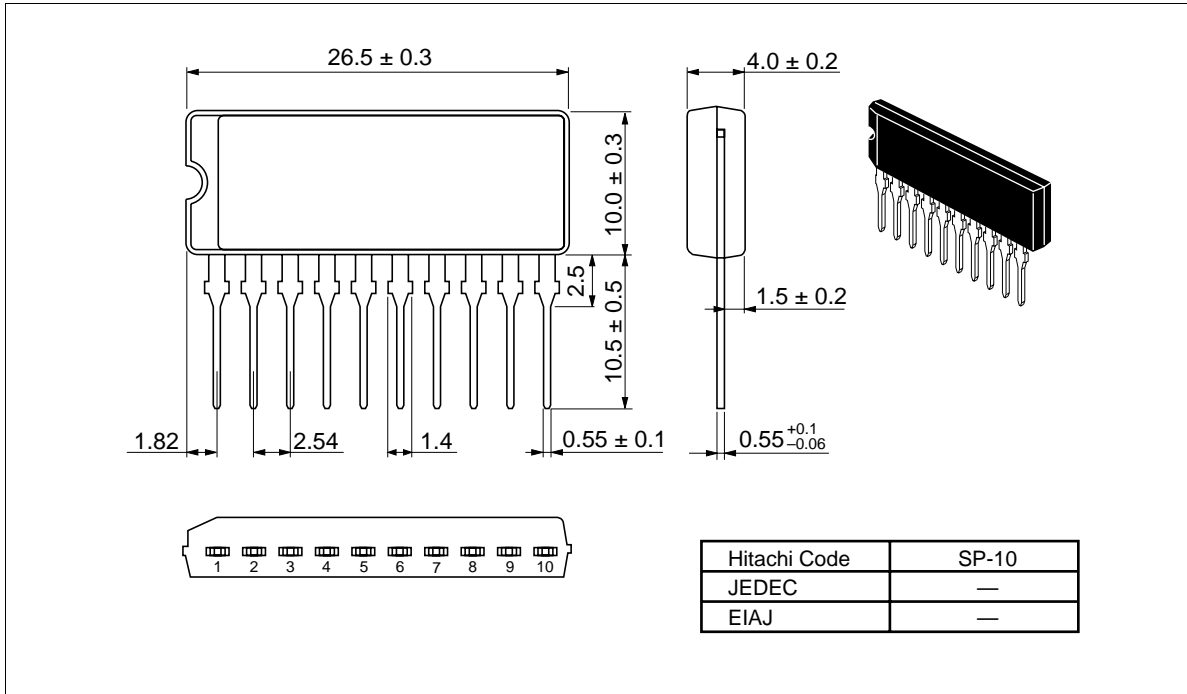
Waveform



**4AK19**

**Package Dimensions**

**Unit: mm**



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