

4AK27

Silicon N Channel MOS FET
High Speed Power Switching

HITACHI

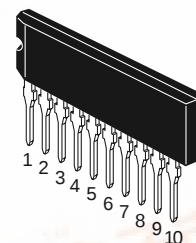
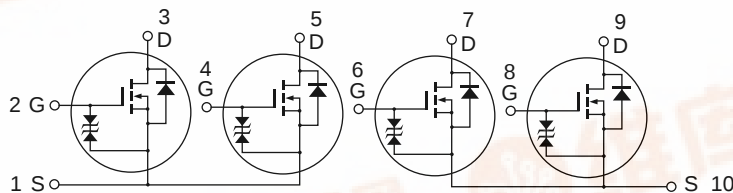
ADE-208-728 (Z)
1st. Edition
January 1999

Features

- Low on-resistance
 $R_{DS(on)} \leq 0.15\Omega$, $V_{GS} = 10V$, $I_D = 3.0A$
- 4V gate drive devices.
- High density mounting

Outline

SP-10



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

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Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	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)} ^{Note1}	20	A
Body-drain diode reverse drain current	I _{DR}	5	A
Avalanche current	I _{AP}	5	A
Avalanche energy1	E _{AR}	2.1	mJ
Channel dissipation	Pch(Tc=25°C) ^{Note2}	28	W
Channel dissipation	Pch ^{Note2}	4	W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	–55 to +150	°C

Note: 1. PW ≤ 10μs, duty cycle ≤ 1 %
2. 4 devices poeration
3. Value at Tch=25°C, Rg ≥ 50Ω

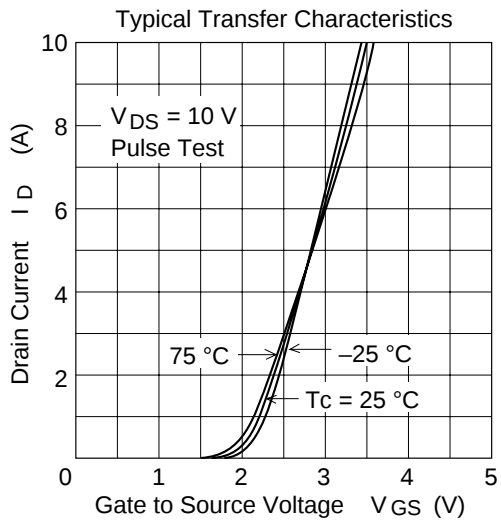
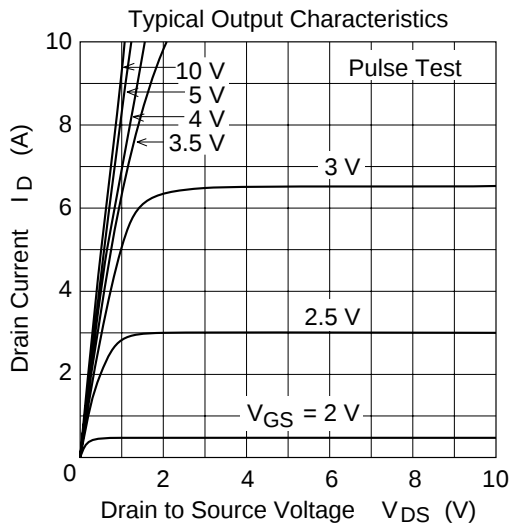
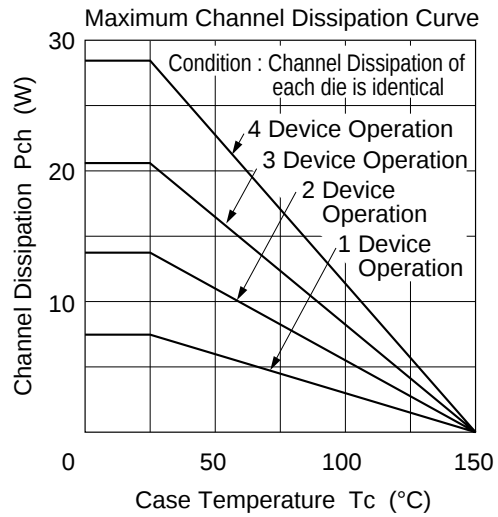
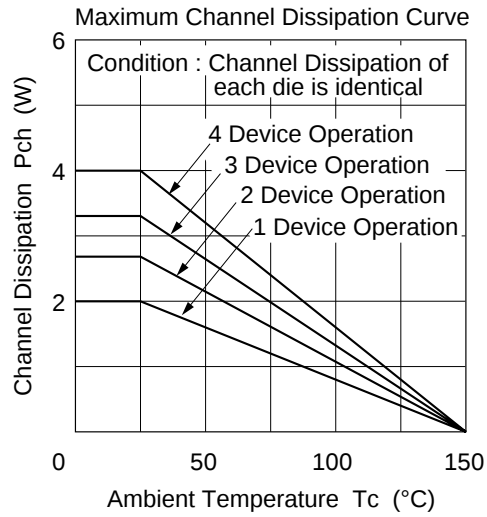
Electrical Characteristics (Ta = 25°C)

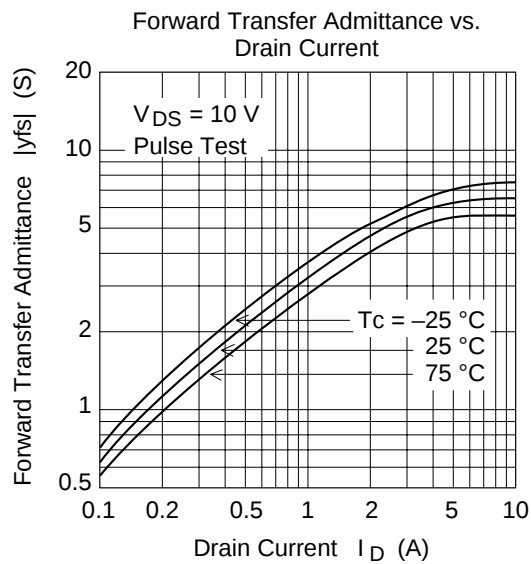
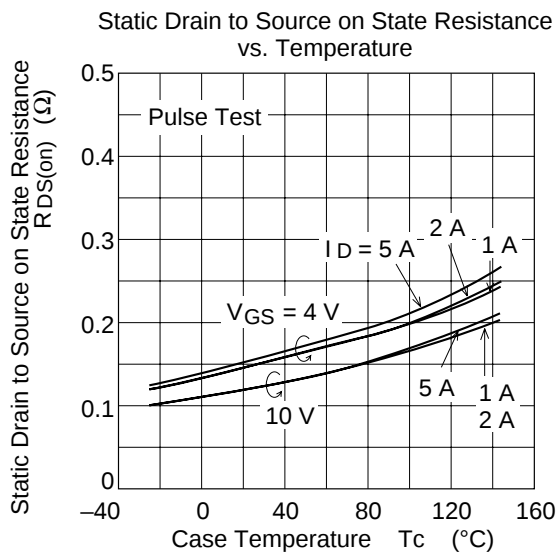
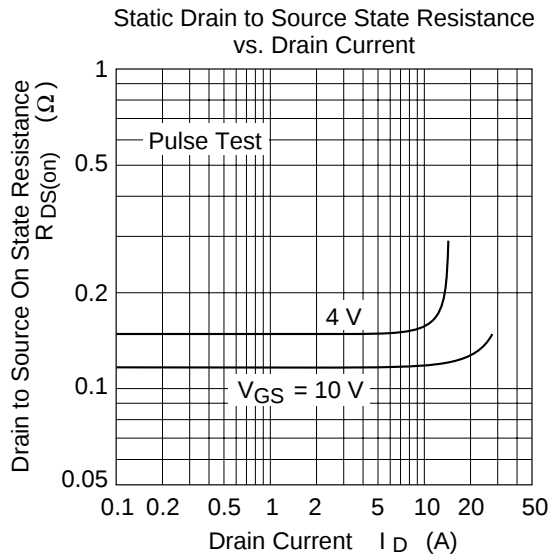
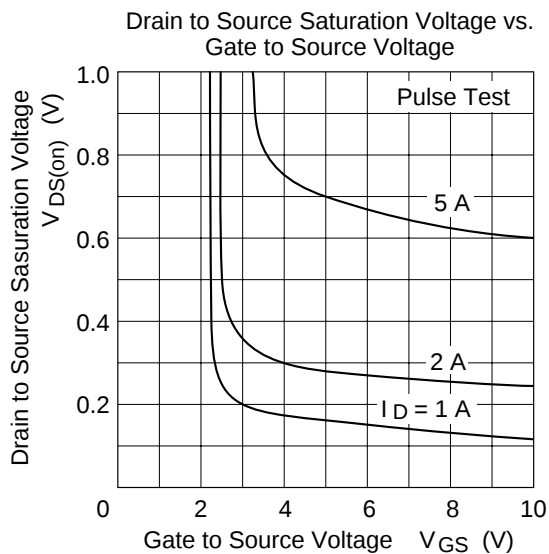
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	60	—	—	V	$I_D = 10\text{mA}$, $V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	± 20	—	—	V	$I_G = \pm 100\mu\text{A}$, $V_{DS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	100	μA	$V_{DS} = 50\text{V}$, $V_{GS} = 0$
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	—	2.25	V	$I_D = 1\text{mA}$, $V_{DS} = 10\text{V}$
Static drain to source on state resistance	$R_{DS(on)}$	—	0.12	0.15	Ω	$I_D = 3\text{A}$, $V_{GS} = 10\text{V}$ ^{Note4}
Static drain to source on state resistance	$R_{DS(on)}$	—	0.15	0.2	Ω	$I_D = 3\text{A}$, $V_{GS} = 4\text{V}$ ^{Note4}
Forward transfer admittance	$ y_{fs} $	3.0	5.5	—	S	$I_D = 3\text{A}$, $V_{DS} = 10\text{V}$ ^{Note4}
Input capacitance	C_{iss}	—	390	—	pF	$V_{DS} = 10\text{V}$
Output capacitance	C_{oss}	—	190	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	C_{rss}	—	45	—	pF	$f = 1\text{MHz}$
Turn-on delay time	$t_{d(on)}$	—	10	—	ns	$V_{GS} = 10\text{V}$, $I_D = 3\text{A}$
Rise time	t_r	—	42	—	ns	$R_L = 10\Omega$
Turn-off delay time	$t_{d(off)}$	—	90	—	ns	
Fall time	t_f	—	55	—	ns	
Body-drain diode forward voltage	V_{DF}	—	1.0	—	V	$I_F = 5\text{A}$, $V_{GS} = 0$
Body-drain diode reverse recovery time	t_{rr}	—	60	—	ns	$I_F = 5\text{A}$, $V_{GS} = 0$ $di_F/dt = 50\text{A}/\mu\text{s}$

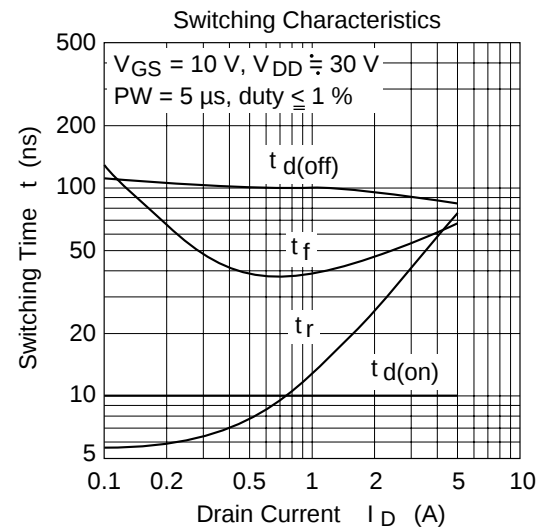
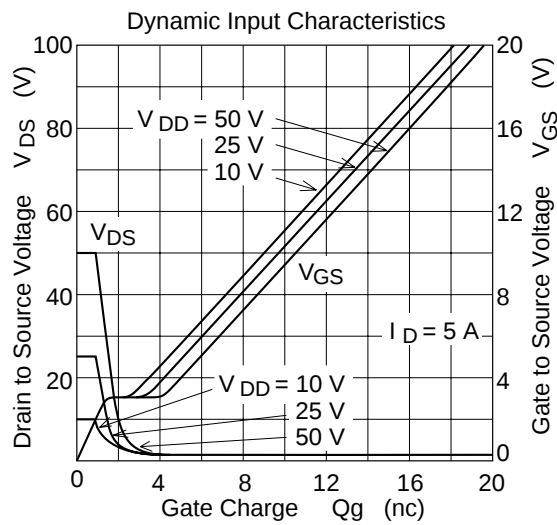
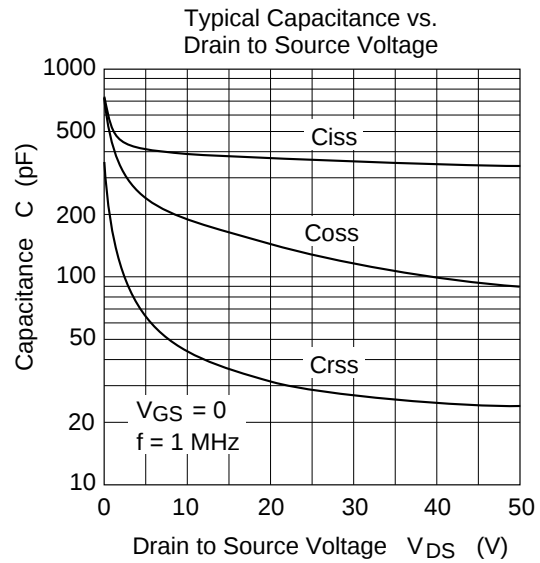
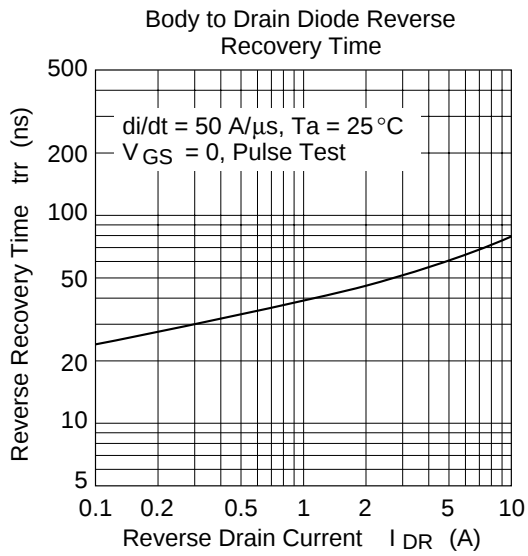
Note: 4. Pulse test

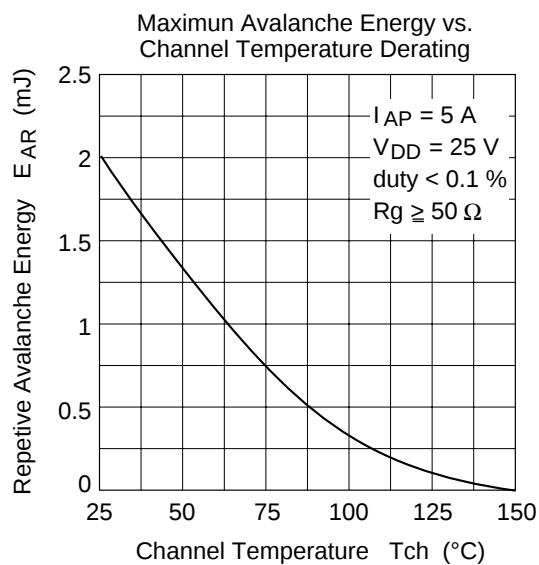
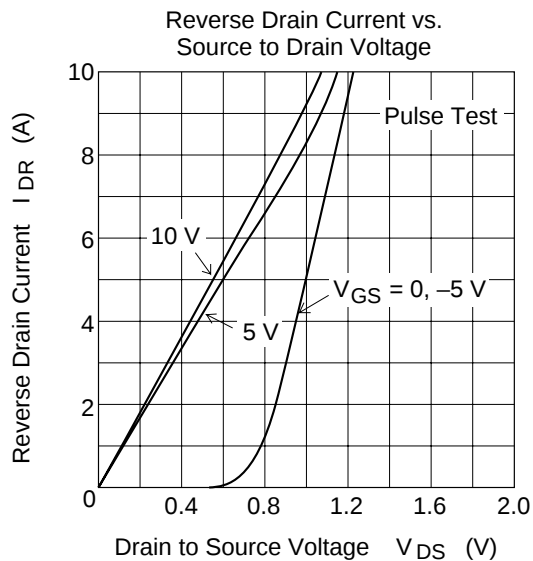
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Main Characteristics

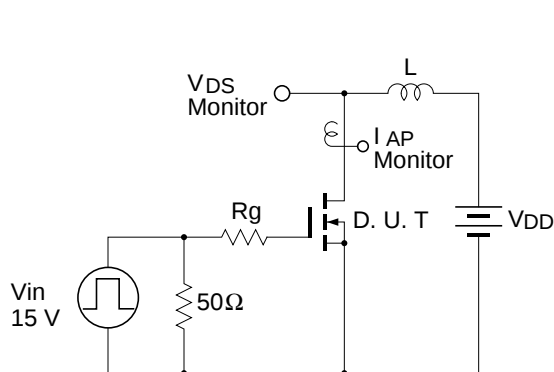




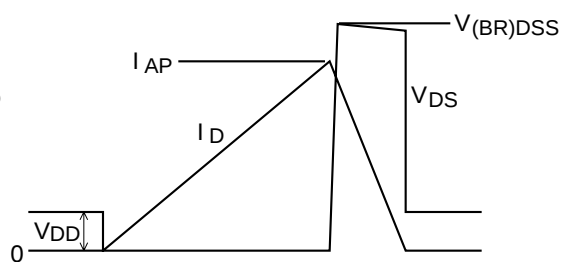




Avalanche Test Circuit and Waveform



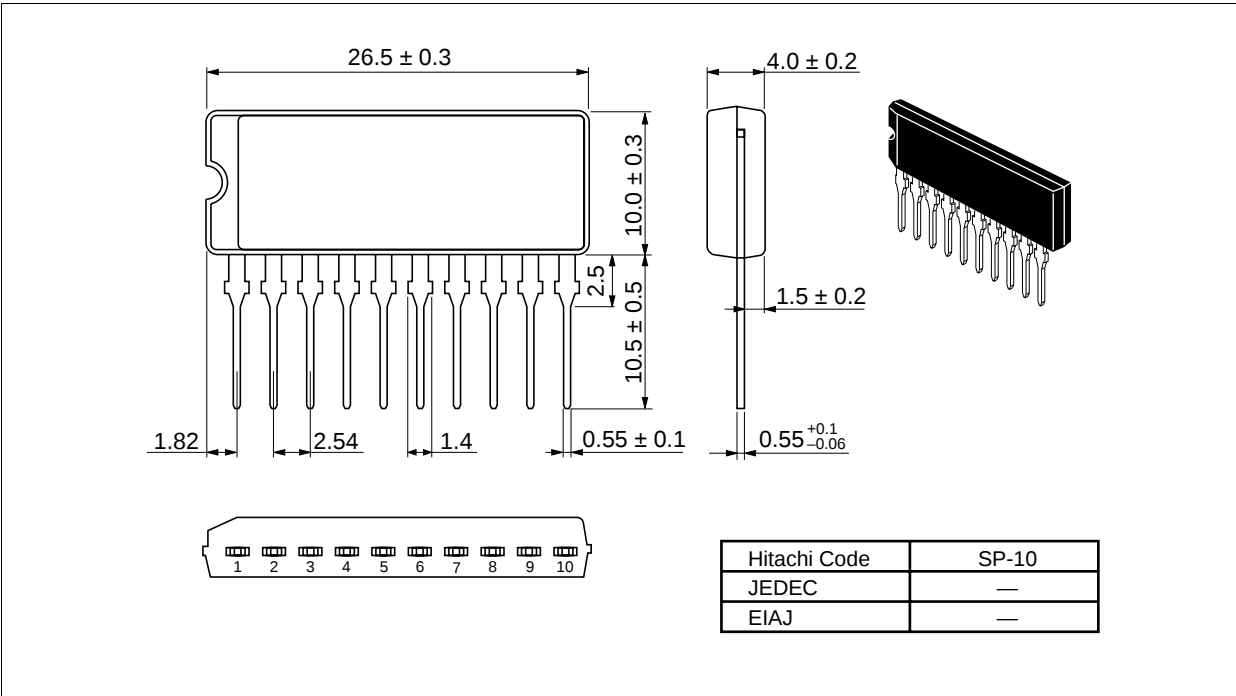
$$E_{AR} = \frac{1}{2} \cdot L \cdot I_{AP}^2 \cdot \frac{V_{DSS}}{V_{DSS} - V_{DD}}$$



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Package Dimensions

Unit: mm



Cautions

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