

2SK2978

Silicon N Channel MOS FET
High Speed Power Switching

HITACHI

ADE-208-659B (Z)

3rd. Edition

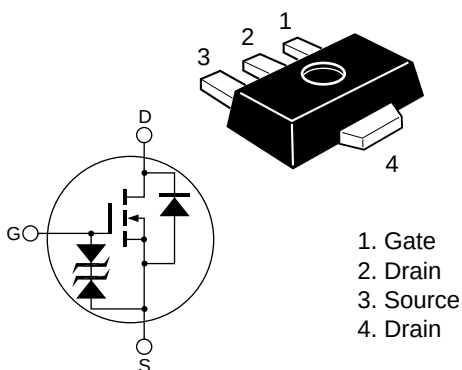
Jun 1998

Features

- Low on-resistance
 $R_{DS(on)} = 0.09\Omega$ typ. ($V_{GS} = 4\text{ V}$, $I_D = 1.5\text{ A}$)
- Low drive current
- High speed switching
- 2.5V gate drive devices.

Outline

UPAK



Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DSS}	20	V
Gate to source voltage	V_{GSS}	±10	V
Drain current	I_D	2.5	A
Drain peak current	$I_{D(pulse)}$ ^{Note1}	5	A
Body-drain diode reverse drain current	I_{DR}	2.5	A
Channel dissipation	P_{ch} ^{Note2}	1	W
Channel temperature	T_{ch}	150	°C
Storage temperature	T_{stg}	–55 to +150	°C

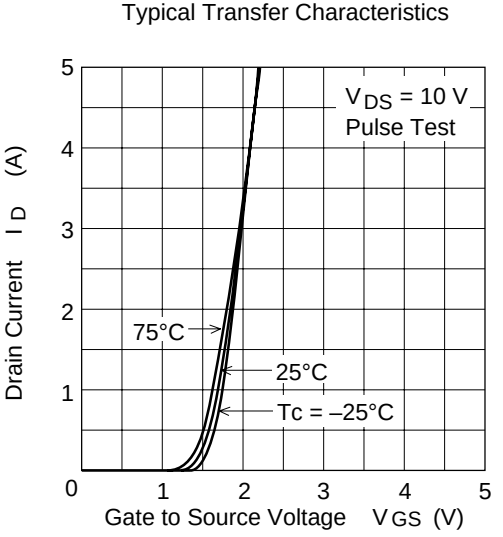
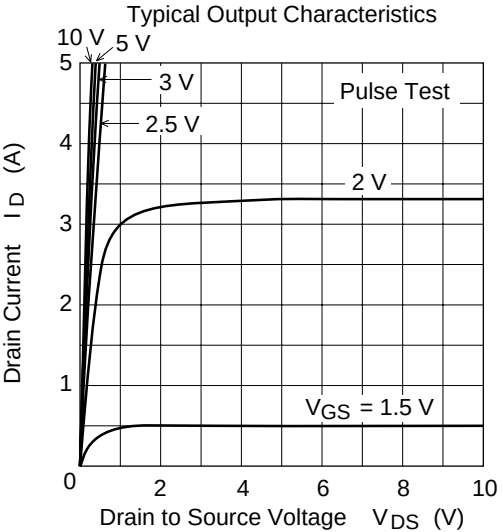
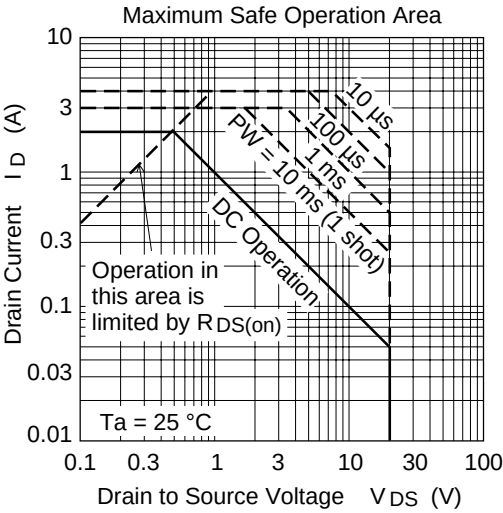
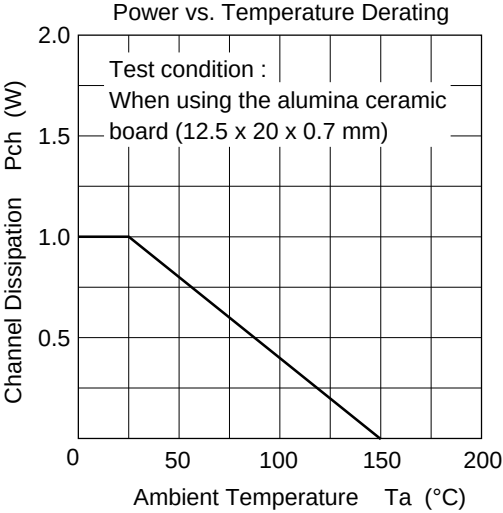
Note: 1. $PW \leq 10\mu s$, duty cycle $\leq 1\%$
2. When using the alumina ceramic board (12.5 x 20 x 0.7 mm)

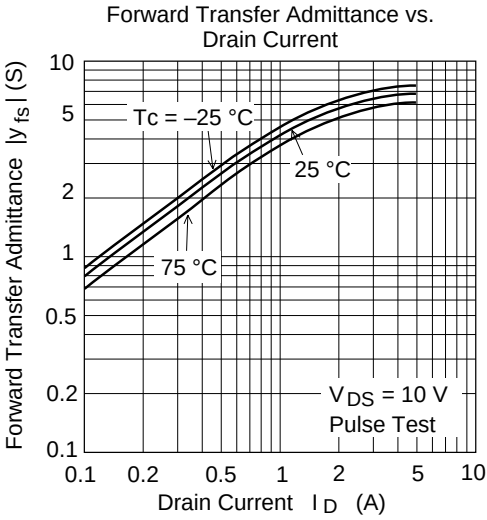
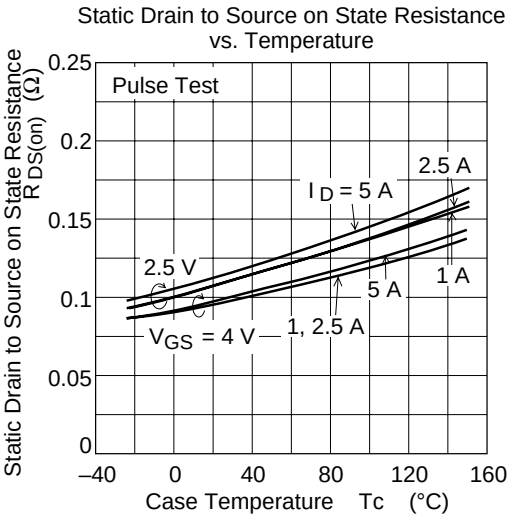
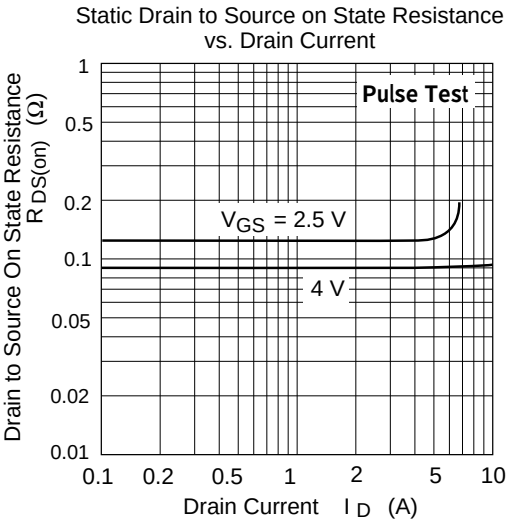
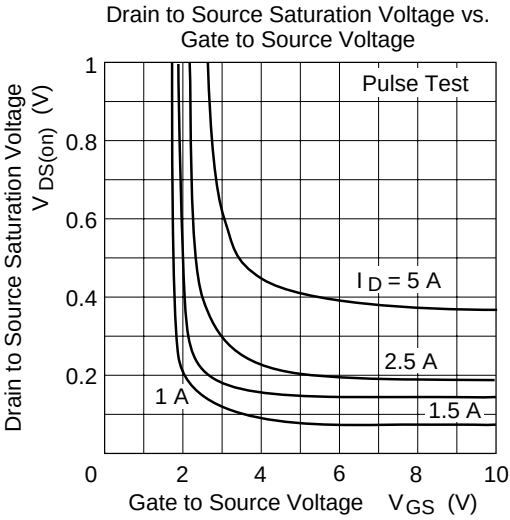
Electrical Characteristics (Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	20	—	—	V	$I_D = 10mA$, $V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	±10	—	—	V	$I_G = \pm 100\mu A$, $V_{DS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	10	μA	$V_{DS} = 20V$, $V_{GS} = 0$
Gate to source leak current	I_{GSS}	—	—	±10	μA	$V_{GS} = \pm 8V$, $V_{DS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	0.5	—	1.5	V	$I_D = 1mA$, $V_{DS} = 10V$
Static drain to source on state resistance	$R_{DS(on)}$	—	0.09	0.12	Ω	$I_D = 1.5A$, $V_{GS} = 4V$ ^{Note3}
Static drain to source on state resistance	$R_{DS(on)}$	—	0.12	0.20	Ω	$I_D = 1.5A$, $V_{GS} = 2.5V$ ^{Note3}
Forward transfer admittance	$ y_{fs} $	3.0	5.0	—	S	$I_D = 1.5A$, $V_{DS} = 10V$ ^{Note3}
Input capacitance	C_{iss}	—	260	—	pF	$V_{DS} = 10V$
Output capacitance	C_{oss}	—	150	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	C_{rss}	—	75	—	pF	$f = 1MHz$
Turn-on delay time	$t_{d(on)}$	—	15	—	ns	$V_{GS} = 4V$, $I_D = 1.5A$
Rise time	t_r	—	70	—	ns	$R_L = 6.67\Omega$
Turn-off delay time	$t_{d(off)}$	—	55	—	ns	
Fall time	t_f	—	70	—	ns	
Body–drain diode forward voltage	V_{DF}	—	0.9	—	V	$I_F = 2.5A$, $V_{GS} = 0$
Body–drain diode reverse recovery time	t_{rr}	—	75	—	ns	$I_F = 2.5A$, $V_{GS} = 0$ $diF/dt = 50A/\mu s$

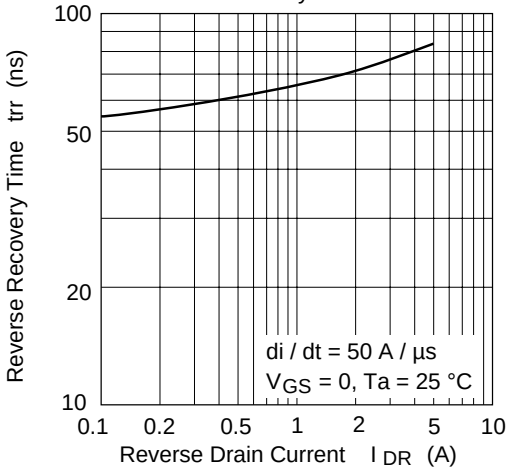
Note: 3. Pulse test
4. Marking is “ZY”

Main Characteristics

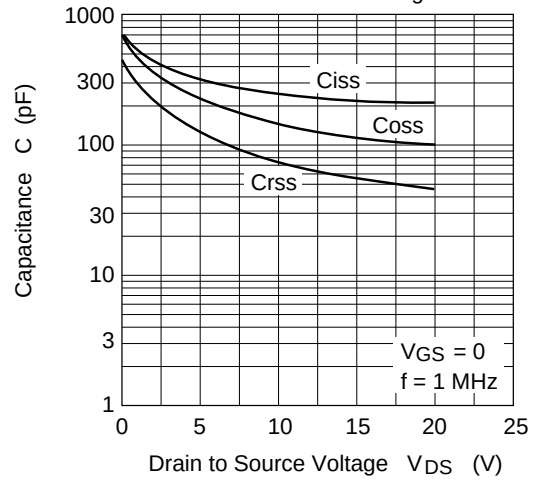




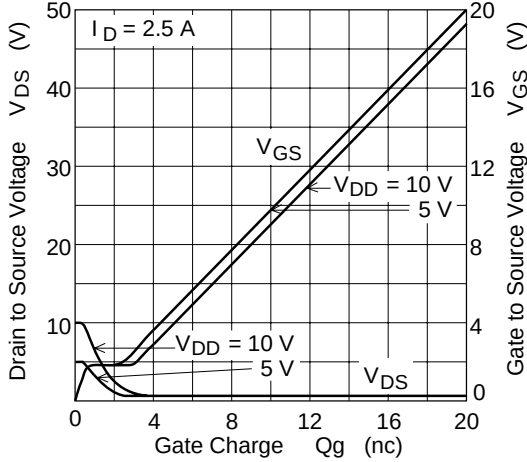
Body-Drain Diode Reverse Recovery Time



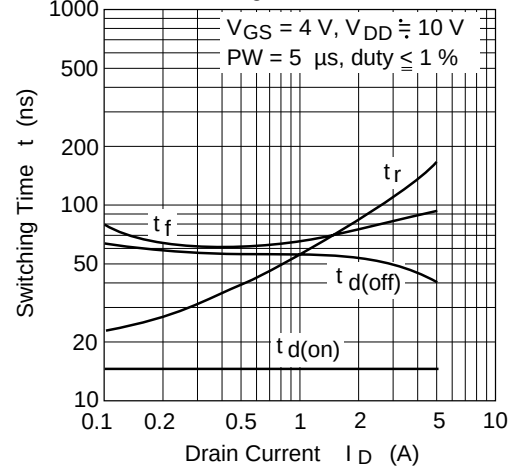
Typical Capacitance vs. Drain to Source Voltage

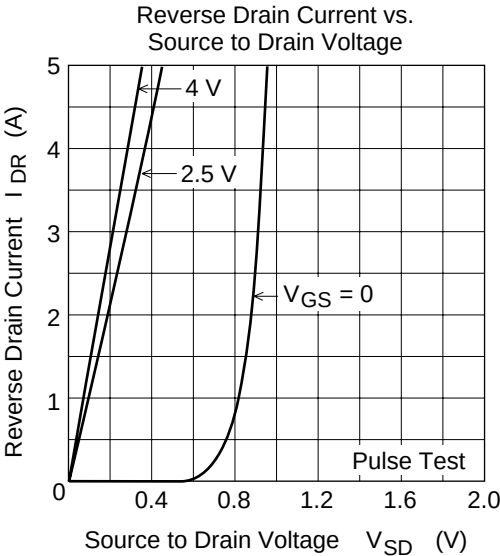


Dynamic Input Characteristics

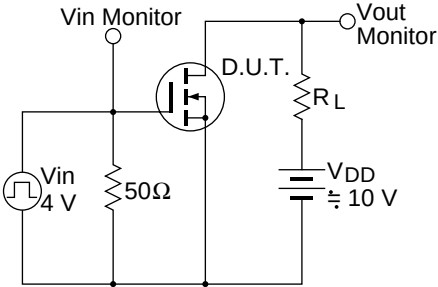


Switching Characteristics

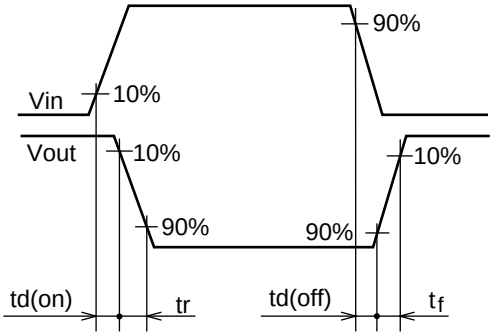




Switching Time Test Circuit

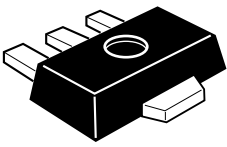
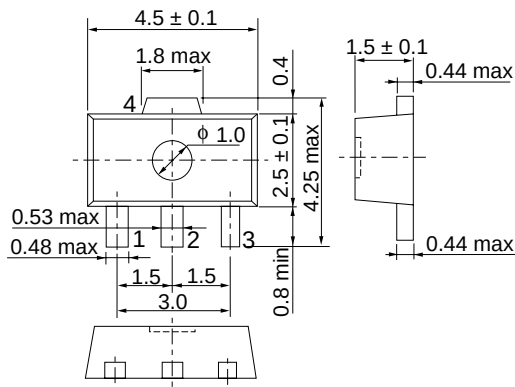


Waveform



Package Dimensions

Unit: mm



Hitachi Code	UPAK
EIAJ	SC-62
JEDEC	—

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