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# 2SK1338

Silicon N-Channel MOS FET

# HITACHI

ADE-208-1275 (Z)  
1st. Edition  
Mar. 2001

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## Application

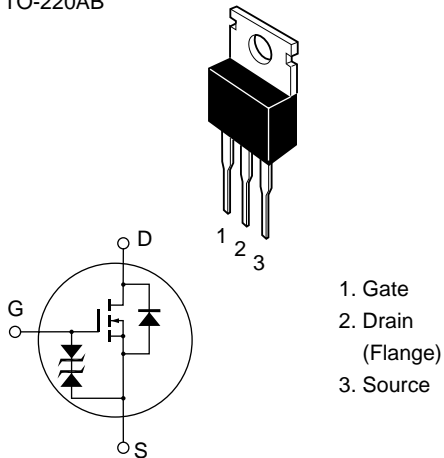
High speed power switching

## Features

- Low on-resistance
- High speed switching
- Low drive current
- No secondary breakdown
- Suitable for switching regulator and DC-DC converter

## Outline

TO-220AB



## Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	$V_{DSS}$	900	V
Gate to source voltage	$V_{GSS}$	±30	V
Drain current	$I_D$	2	A
Drain peak current	$I_{D(pulse)}^{*1}$	6	A
Body to drain diode reverse drain current	$I_{DR}$	2	A
Channel dissipation	$Pch^{*2}$	50	W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	-55 to +150	°C

Notes: 1. PW 10 μs, duty cycle 1%

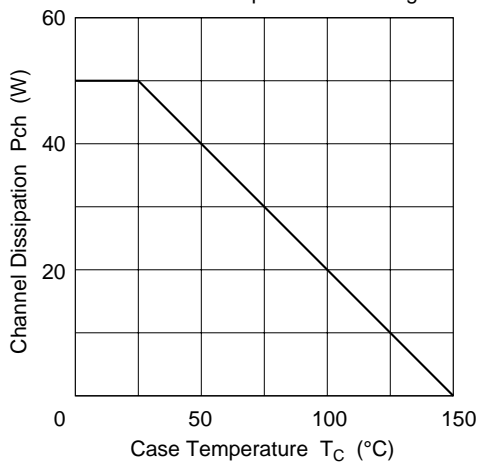
2. Value at T<sub>c</sub> = 25°C

## Electrical Characteristics (Ta = 25°C)

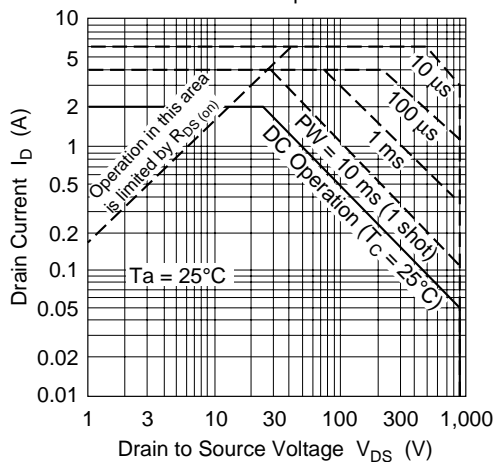
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	900	—	—	V	$I_D = 10 \text{ mA}, V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	±30	—	—	V	$I_G = \pm 100 \text{ } \mu\text{A}, V_{DS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	±10	μA	$V_{GS} = \pm 25 \text{ V}, V_{DS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	250	μA	$V_{DS} = 720 \text{ V}, V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	2.0	—	3.0	V	$I_D = 1 \text{ mA}, V_{DS} = 10 \text{ V}$
Static drain to source on state resistance	$R_{DS(on)}$	—	5.0	7.0		$I_D = 1 \text{ A}, V_{GS} = 10 \text{ V}^{*1}$
Forward transfer admittance	yfs	0.9	1.5	—	S	$I_D = 1 \text{ A}, V_{DS} = 20 \text{ V}^{*1}$
Input capacitance	Ciss	—	425	—	pF	$V_{DS} = 10 \text{ V}, V_{GS} = 0,$
Output capacitance	Coss	—	175	—	pF	f = 1 MHz
Reverse transfer capacitance	Crss	—	85	—	pF	
Turn-on delay time	$t_{d(on)}$	—	10	—	ns	$I_D = 1 \text{ A}, V_{GS} = 10 \text{ V},$
Rise time	$t_r$	—	35	—	ns	$R_L = 30$
Turn-off delay time	$t_{d(off)}$	—	60	—	ns	
Fall time	$t_f$	—	50	—	ns	
Body to drain diode forward voltage	$V_{DF}$	—	0.9	—	V	$I_F = 2 \text{ A}, V_{GS} = 0$
Body to drain diode reverse recovery time	$t_{rr}$	—	700	—	ns	$I_F = 2 \text{ A}, V_{GS} = 0,$ $di_F/dt = 100 \text{ A}/\mu\text{s}$

Note: 1. Pulse test

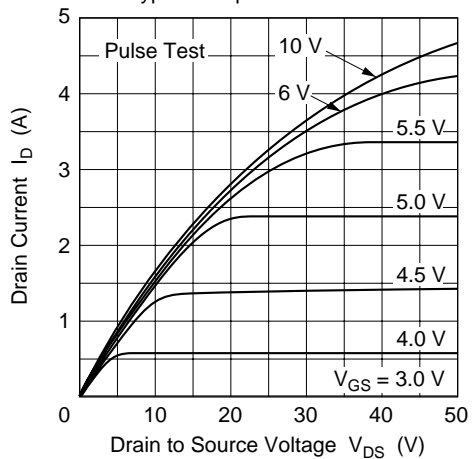
Power vs. Temperature Derating



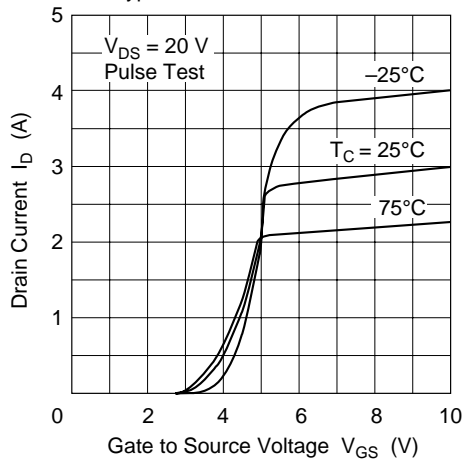
Maximum Safe Operation Area

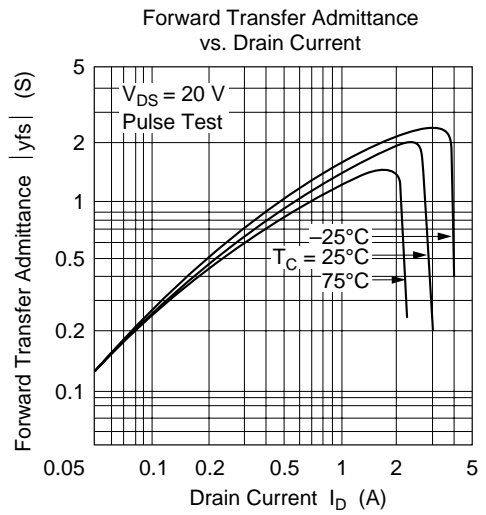
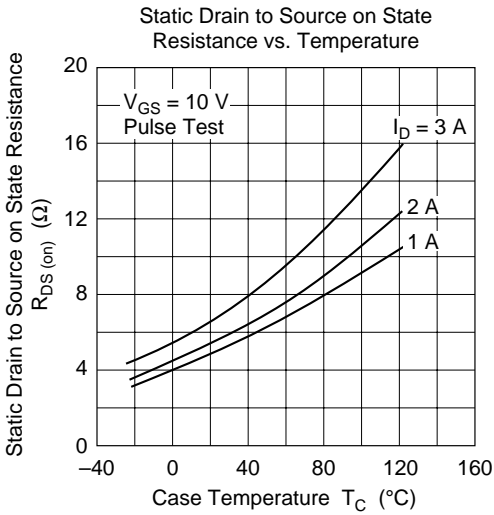
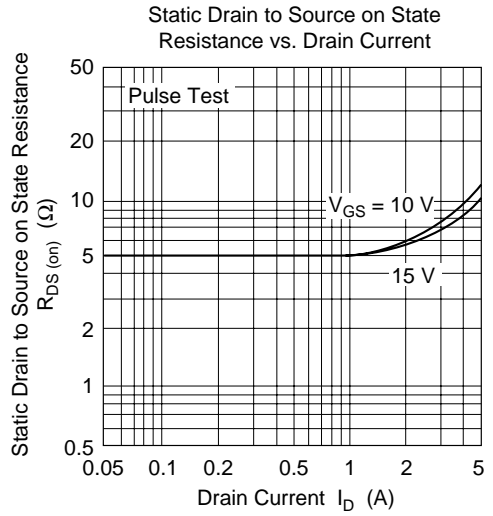
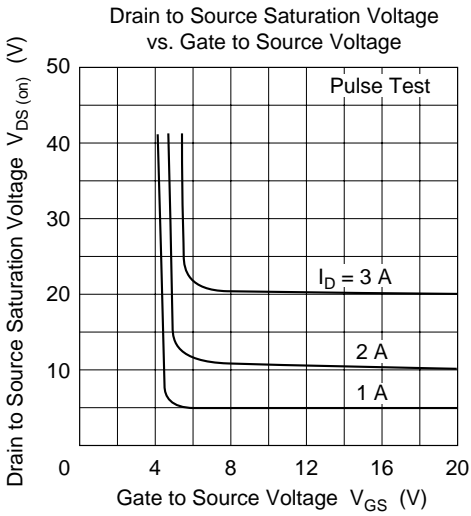


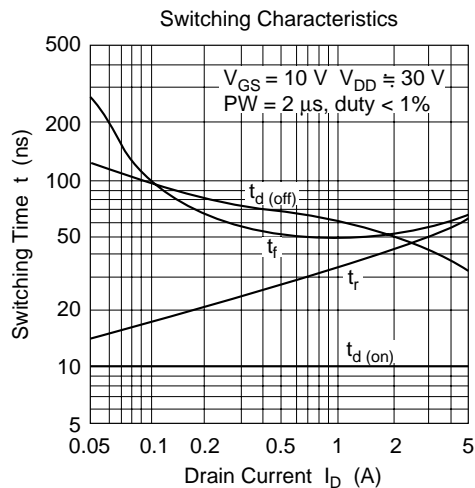
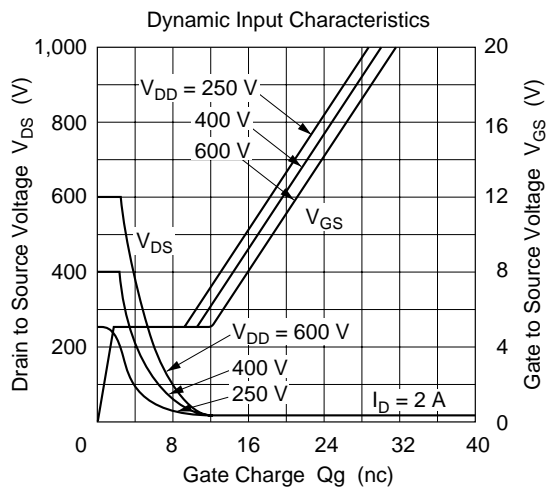
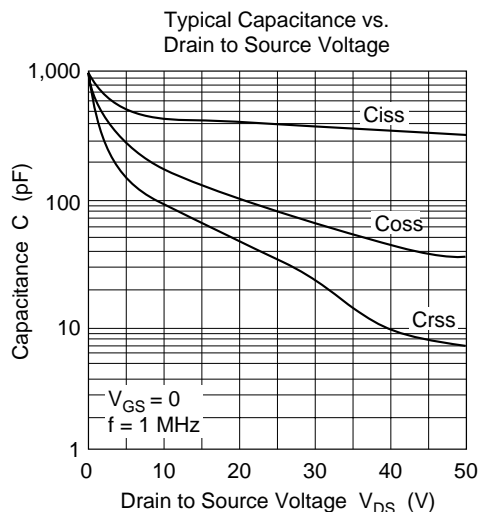
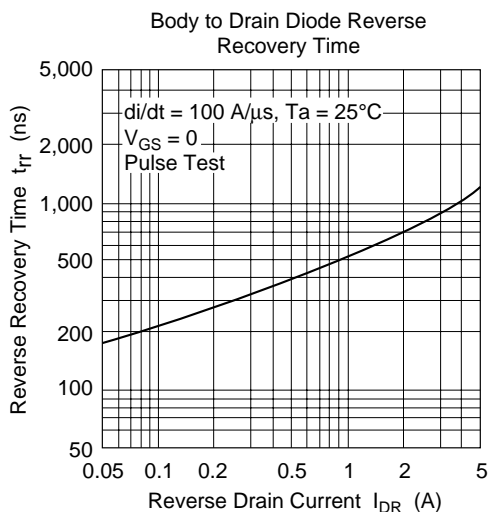
Typical Output Characteristics

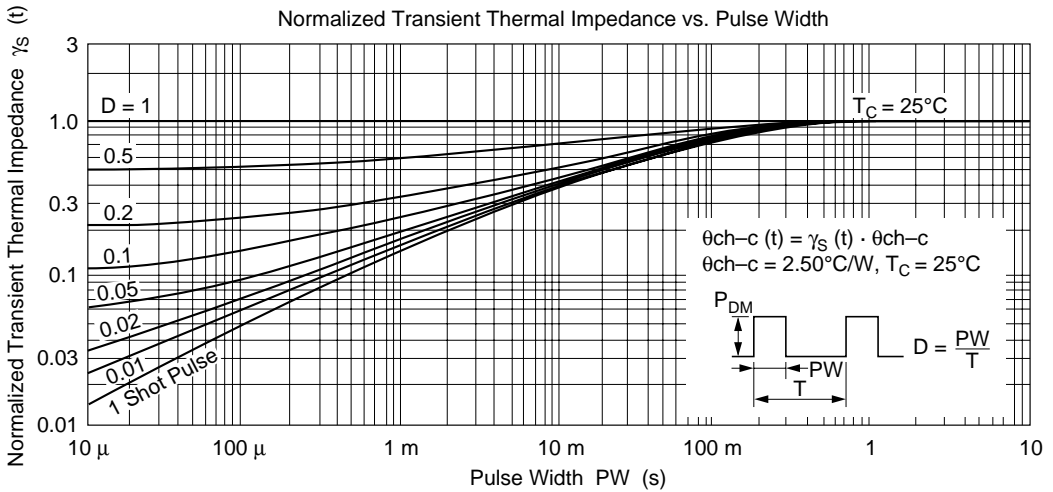
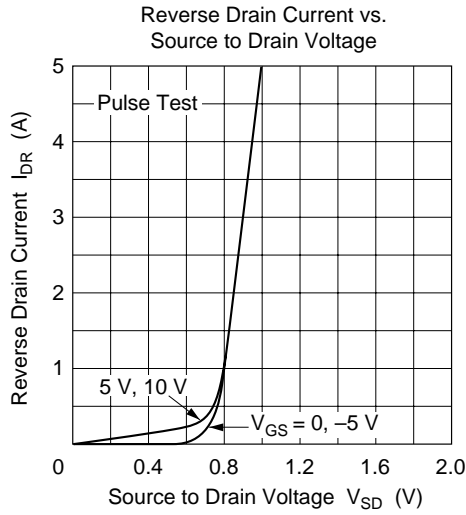


Typical Transfer Characteristics

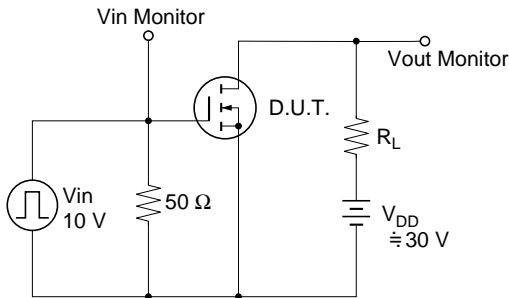




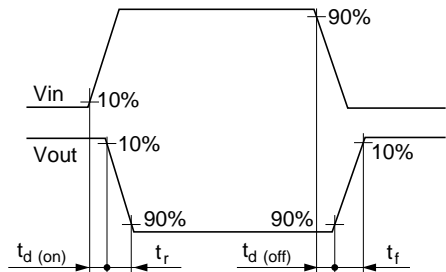




Switching Time Test Circuit



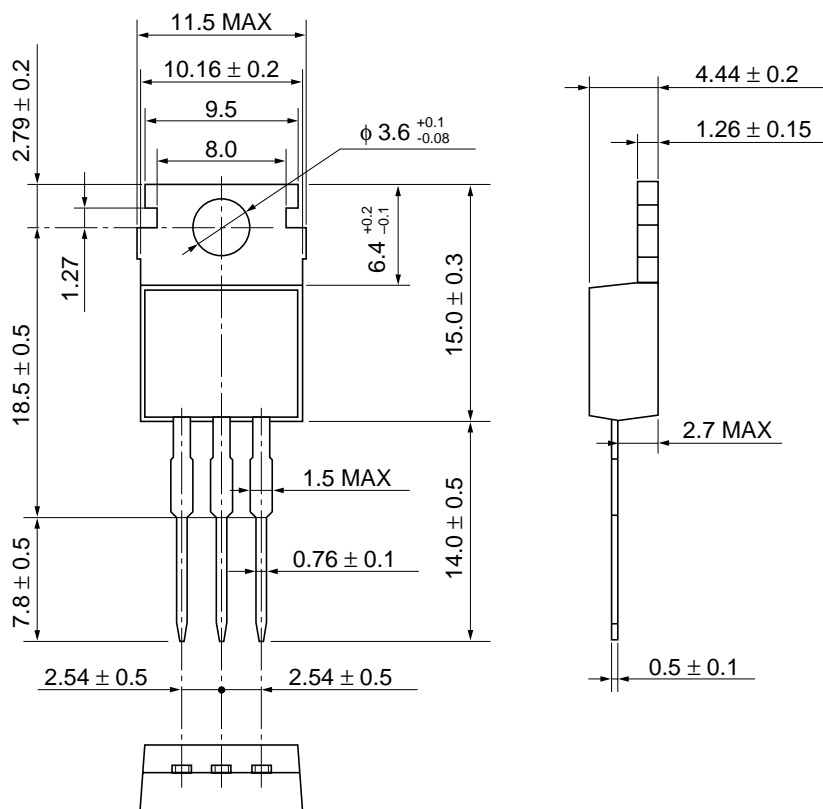
Waveforms



## Package Dimensions

As of January, 2001

Unit: mm



Hitachi Code	TO-220AB
JEDEC	Conforms
EIAJ	Conforms
Mass (reference value)	1.8 g

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