
2SK3136

Silicon N Channel MOS FET
High Speed Power Switching

HITACHI

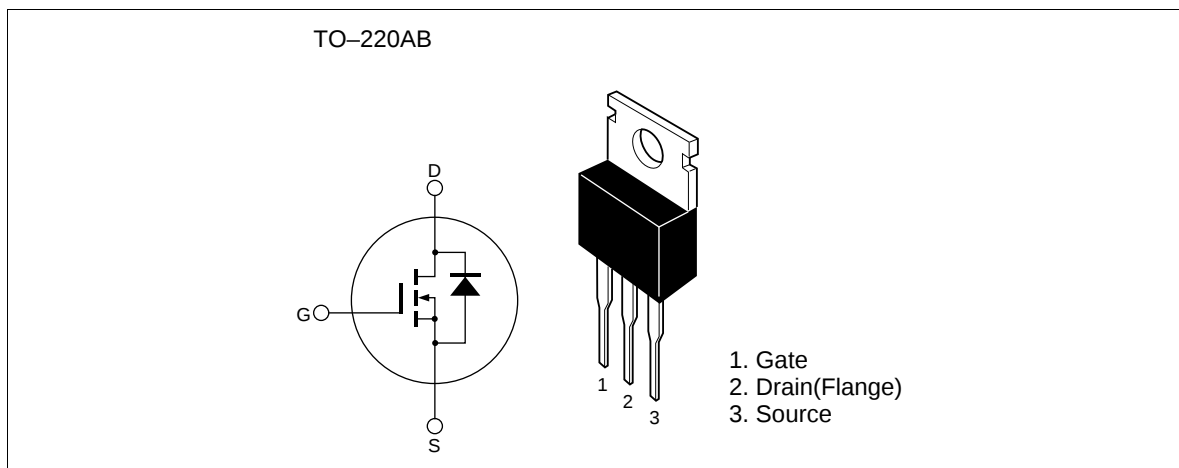
ADE-208-696A (Z)
2nd. Edition
Nov. 1998

Features

- Low on-resistance
 $R_{DS(on)} = 4.5m\Omega$ typ.
- Low drive current
- 4V gate drive device can be driven from 5V source

2SK3136

Outline



Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DSS}	40	V
Gate to source voltage	V_{GSS}	± 20	V
Drain current	I_D	75	A
Drain peak current	$I_{D(pulse)}^{*1}$	300	A
Body-drain diode reverse drain current	I_{DR}	75	A
Avalanche current	I_{AP}^{*3}	50	A
Avalanche energy	E_{AR}^{*3}	333	mJ
Channel dissipation	P_{ch}^{*2}	100	W
Channel temperature	T_{ch}	150	°C
Storage temperature	T_{stg}	-55 to +150	°C

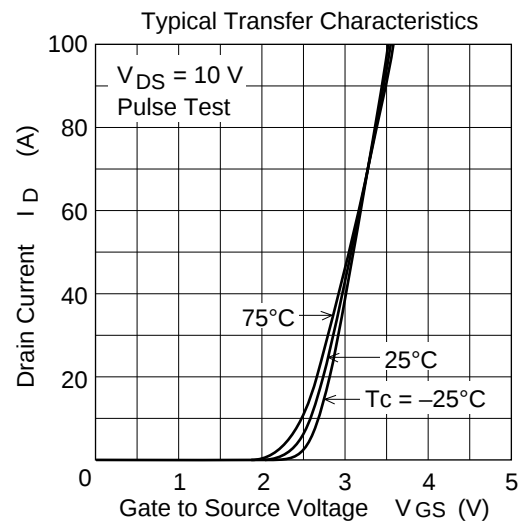
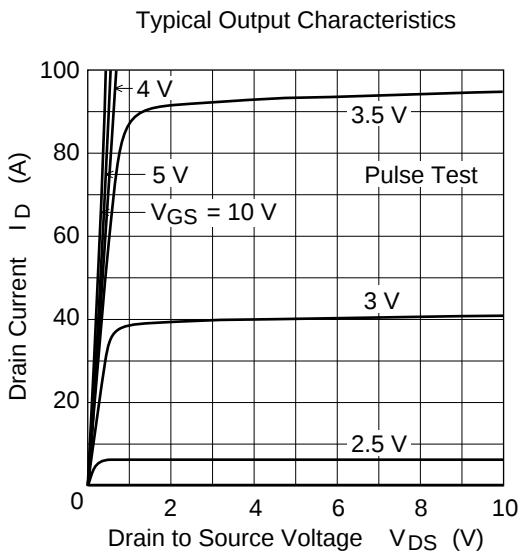
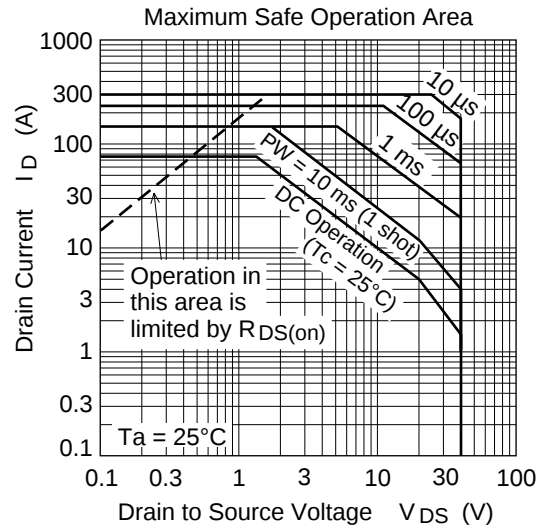
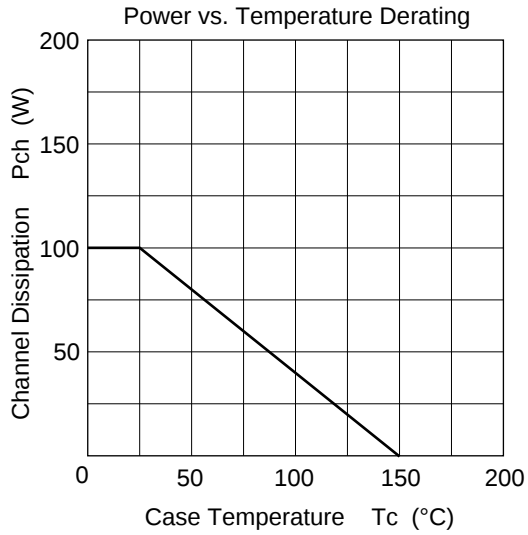
Note: 1. $PW \leq 10\mu s$, duty cycle $\leq 1\%$
 2. Value at $T_c = 25^\circ C$
 3. Value at $T_{ch} = 25^\circ C$, $R_g \geq 50\Omega$

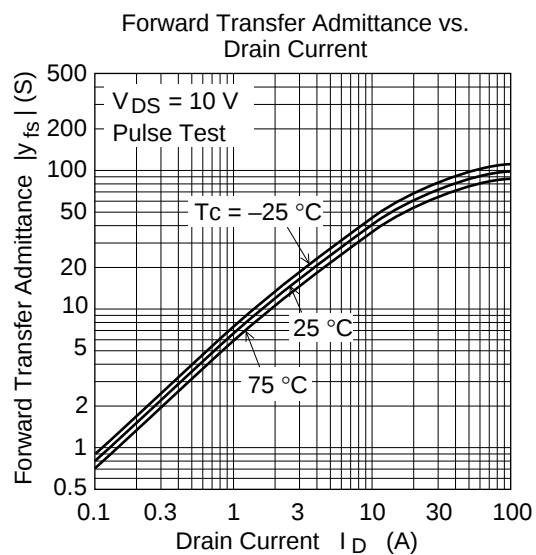
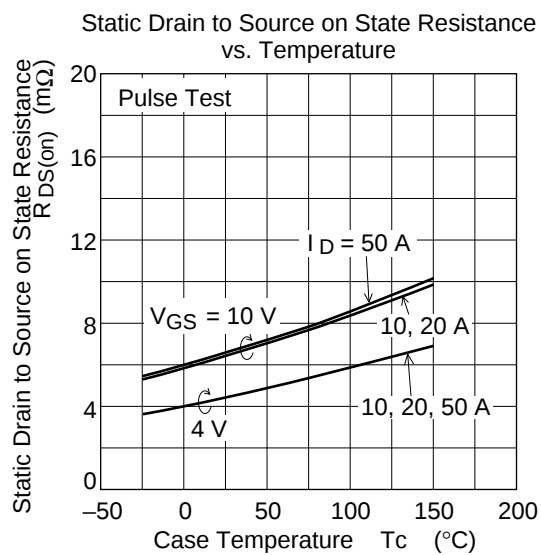
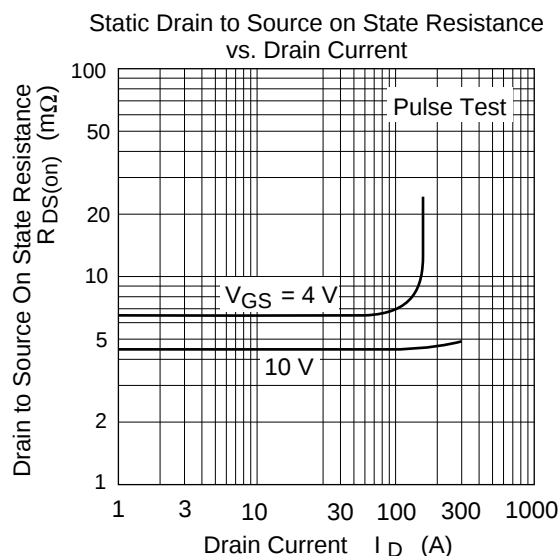
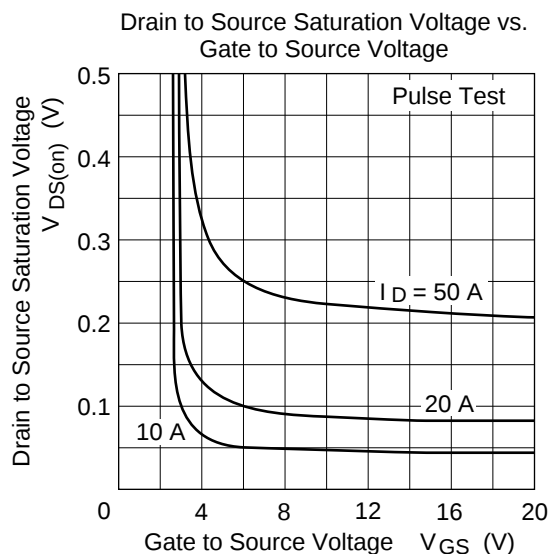
Electrical Characteristics (Ta = 25°C)

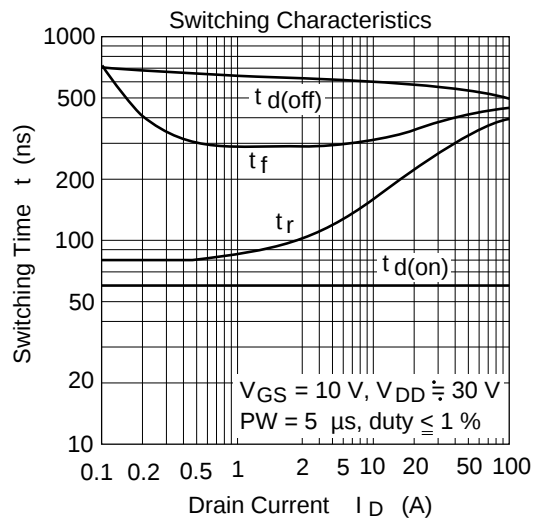
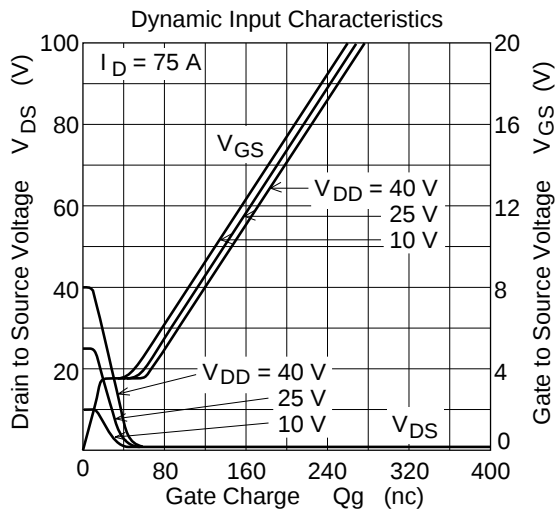
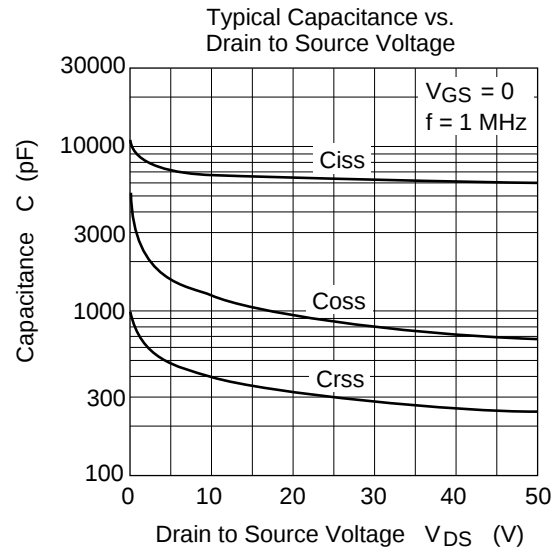
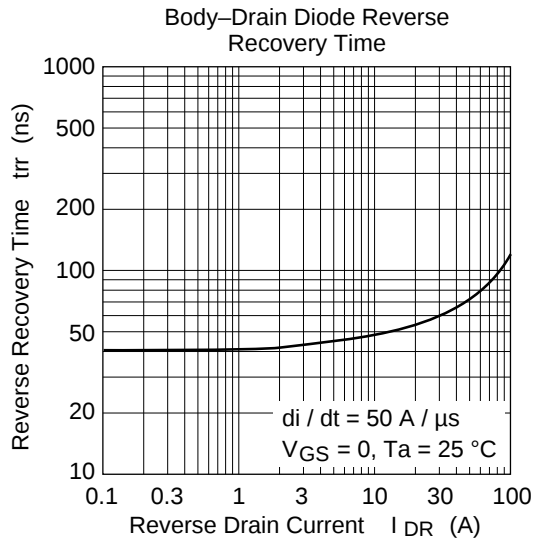
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	40	—	—	V	$I_D = 10\text{mA}$, $V_{GS} = 0$
Gate to source leak current	I_{GSS}	—	—	± 0.1	μA	$V_{GS} = \pm 20\text{V}$, $V_{DS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	10	μA	$V_{DS} = 40\text{V}$, $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	1.0	—	2.5	V	$I_D = 1\text{mA}$, $V_{DS} = 10\text{V}^{*1}$
Static drain to source on state resistance	$R_{DS(on)}$	—	4.5	5.8	$\text{m}\Omega$	$I_D = 40\text{A}$, $V_{GS} = 10\text{V}^{*1}$
		—	6.5	10	$\text{m}\Omega$	$I_D = 40\text{A}$, $V_{GS} = 4\text{V}^{*1}$
Forward transfer admittance	$ y_{fs} $	50	80	—	S	$I_D = 40\text{A}$, $V_{DS} = 10\text{V}^{*1}$
Input capacitance	C_{iss}	—	6800	—	pF	$V_{DS} = 10\text{V}$
Output capacitance	C_{oss}	—	1300	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	C_{rss}	—	380	—	pF	$f = 1\text{MHz}$
Total gate charge	Q_g	—	130	—	nc	$V_{DD} = 25\text{V}$
Gate to source charge	Q_{gs}	—	25	—	nc	$V_{GS} = 10\text{V}$
Gate to drain charge	Q_{gd}	—	30	—	nc	$I_D = 75\text{A}$
Turn-on delay time	$t_{d(on)}$	—	60	—	ns	$V_{GS} = 10\text{V}$, $I_D = 40\text{A}$
Rise time	t_r	—	300	—	ns	$R_L = 0.75\Omega$
Turn-off delay time	$t_{d(off)}$	—	550	—	ns	
Fall time	t_f	—	400	—	ns	
Body-drain diode forward voltage	V_{DF}	—	1.05	—	V	$I_F = 75\text{A}$, $V_{GS} = 0$
Body-drain diode reverse recovery time	t_{rr}	—	90	—	ns	$I_F = 75\text{A}$, $V_{GS} = 0$ $di_F/dt = 50\text{A}/\mu\text{s}$

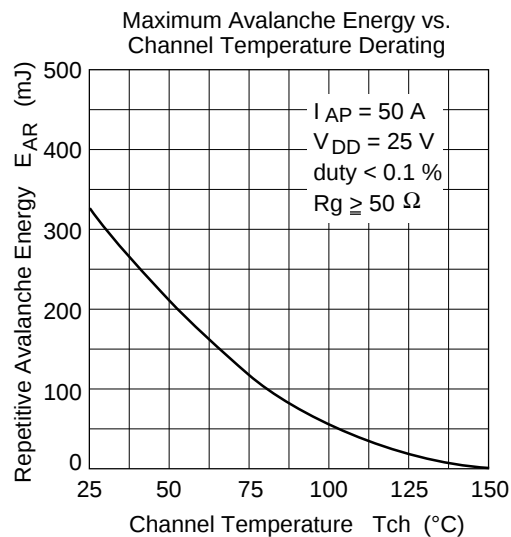
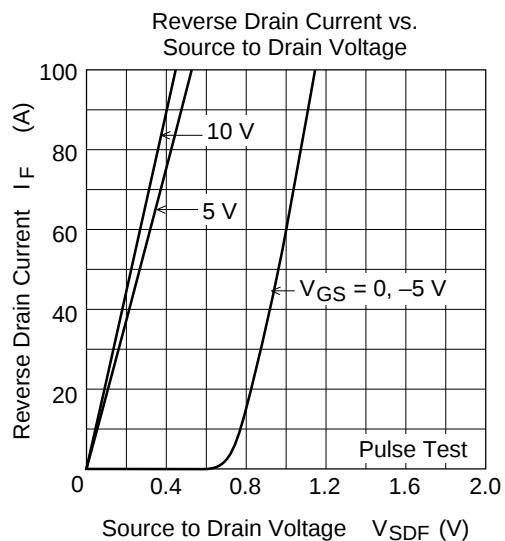
Note: 1. Pulse test

Main Characteristics

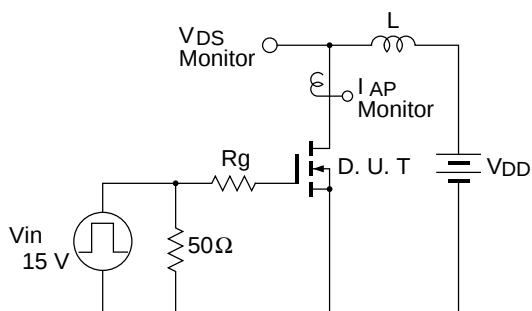






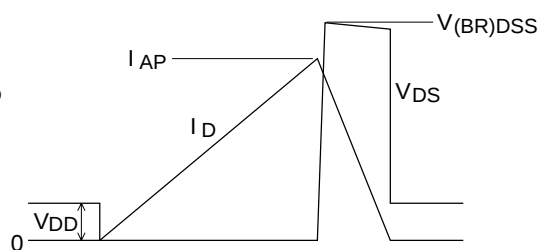


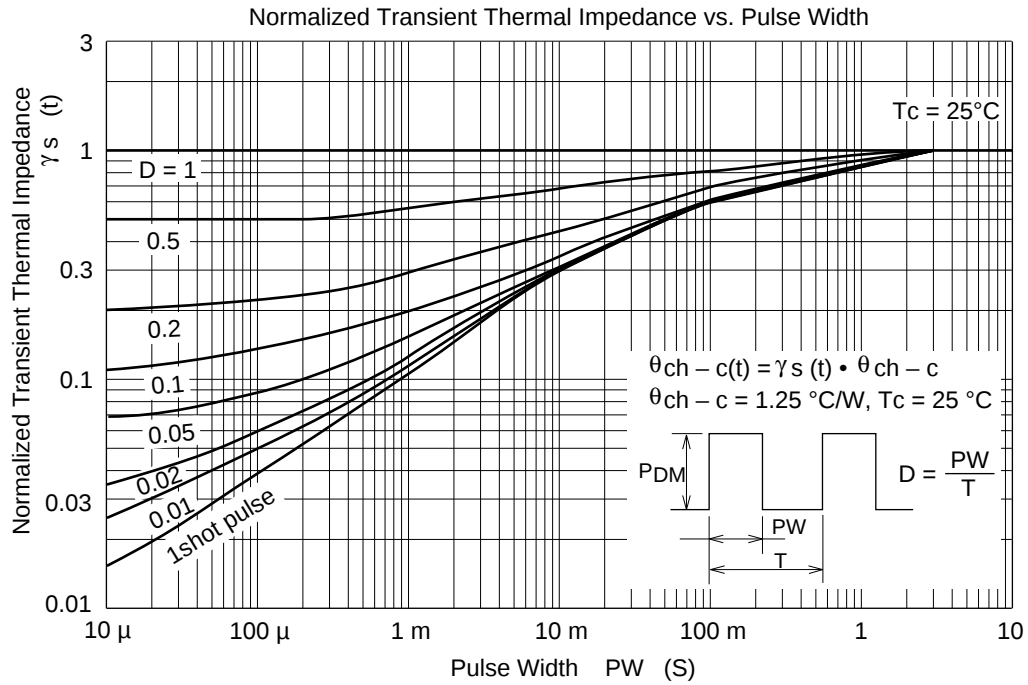
Avalanche Test Circuit



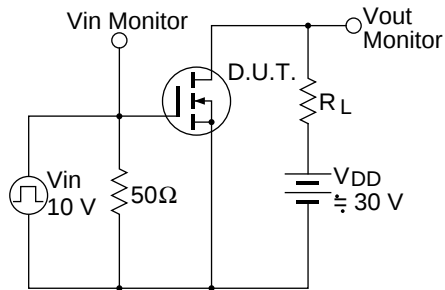
Avalanche Waveform

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

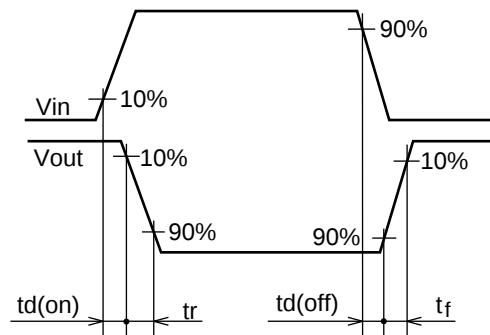




Switching Time Test Circuit

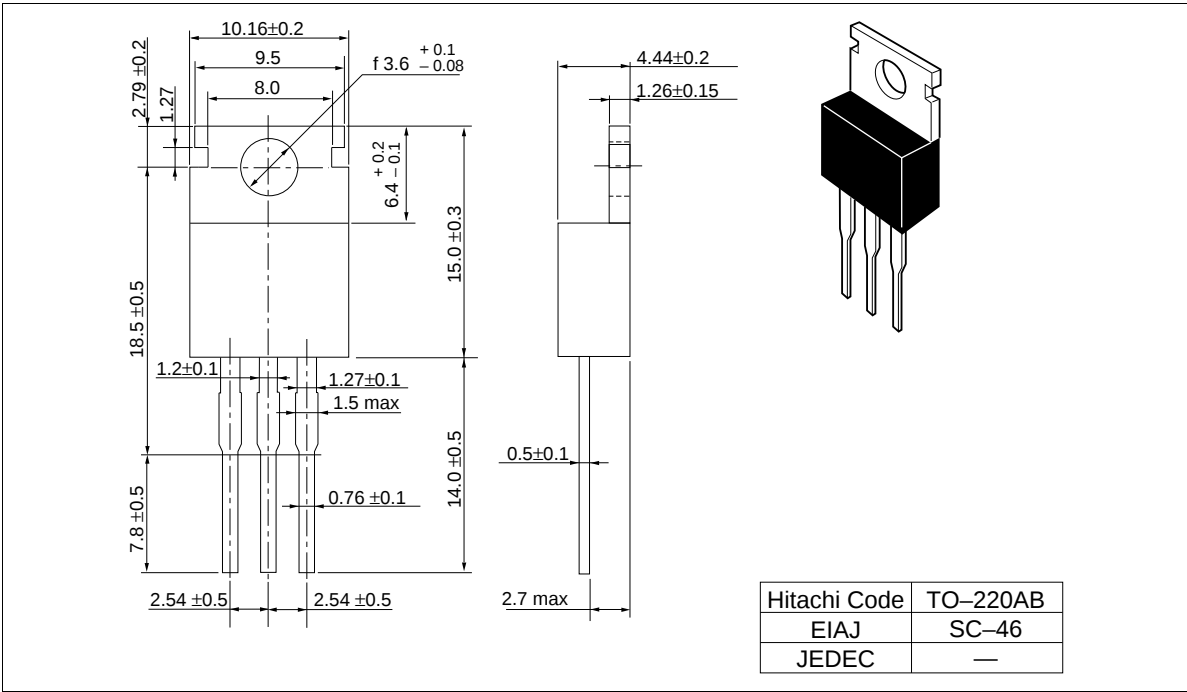


Waveform



Package Dimensions

Unit: mm



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HITACHI

Hitachi, Ltd.

Semiconductor & IC Div.
Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan
Tel: Tokyo (03) 3270-2111 Fax: (03) 3270-5109

URL NorthAmerica : <http://semiconductor.hitachi.com/>
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For further information write to:

Hitachi Semiconductor
(America) Inc.
2000 Sierra Point Parkway
Brisbane, CA 94005-1897
Tel: <1> (800) 285-1601
Fax: <1> (303) 297-0447

Hitachi Europe GmbH
Electronic components Group
Dornacher Straße 3
D-85622 Feldkirchen, Munich
Germany
Tel: <49> (89) 9 9180-0
Fax: <49> (89) 9 29 30 00

Hitachi Europe Ltd.
Electronic Components Group.
Whitebrook Park
Lower Cookham Road
Maidenhead
Berkshire SL6 8YA, United Kingdom
Tel: <44> (1628) 585000
Fax: <44> (1628) 778322

Hitachi Asia Pte. Ltd.
16 Collyer Quay #20-00
Hitachi Tower
Singapore 049318
Tel: 535-2100
Fax: 535-1533

Hitachi Asia Ltd.
Taipei Branch Office
3F, Hung Kuo Building, No.167,
Tun-Hwa North Road, Taipei (105)
Tel: <886> (2) 2718-3666
Fax: <886> (2) 2718-8180

Hitachi Asia (Hong Kong) Ltd.
Group III (Electronic Components)
7/F., North Tower, World Finance Centre,
Harbour City, Canton Road, Tsim Sha Tsui,
Kowloon, Hong Kong
Tel: <852> (2) 735 9218
Fax: <852> (2) 730 0281
Telex: 40815 HITEC HX

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