

2SK3151

Silicon N Channel MOS FET
High Speed Power Switching

HITACHI

ADE-208-747A (Z)

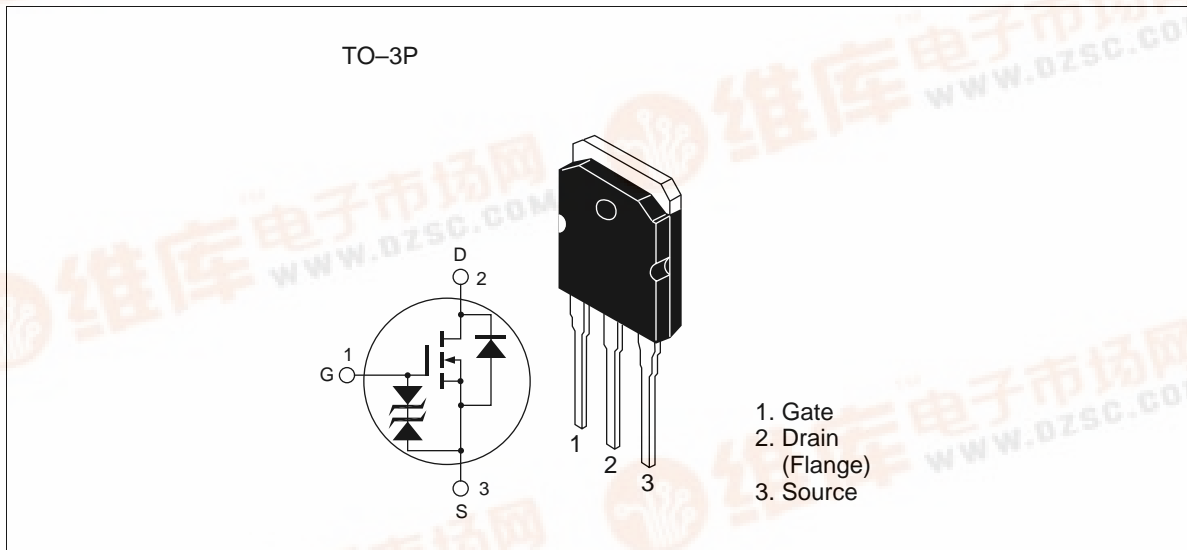
2nd. Edition

February 1999

Features

- Low on-resistance
 $R_{DS(on)} = 11.5 \text{ m}\Omega$ typ.
- High speed switching
- 4 V gate drive device can be driven from 5 V source

Outline



2SK3151

Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DSS}	100	V
Gate to source voltage	V_{GSS}	±20	V
Drain current	I_D	50	A
Drain peak current	$I_{D(pulse)}$ ^{Note1}	200	A
Body-drain diode reverse drain current	I_{DR}	50	A
Avalanche current	I_{AP} ^{Note3}	50	A
Avalanche energy	E_{AR} ^{Note3}	250	mJ
Channel dissipation	P_{ch} ^{Note2}	125	W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	-55 to +150	°C

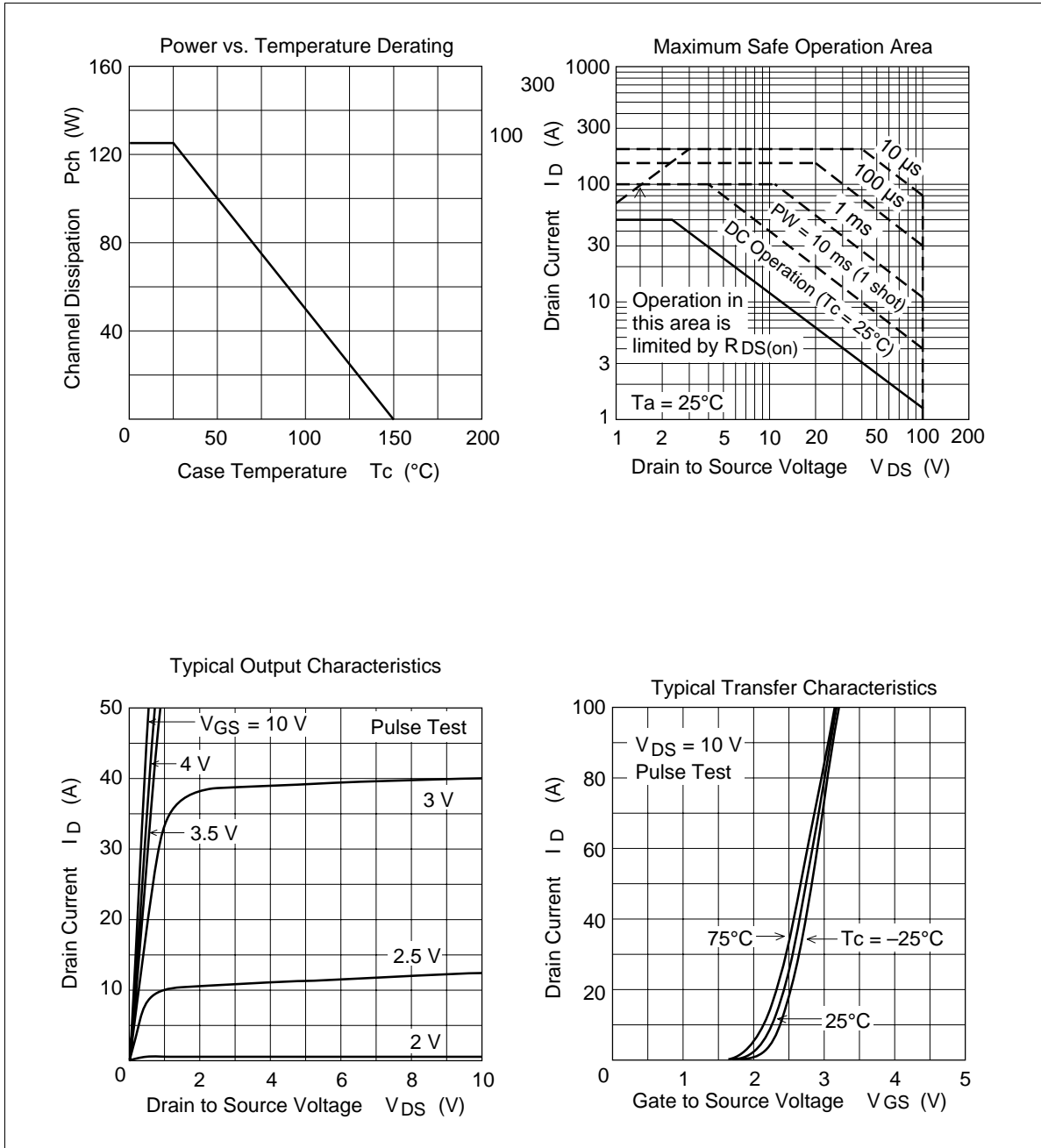
Note: 1. $PW \leq 10 \mu s$, duty cycle $\leq 1\%$
 2. Value at $T_c = 25^\circ C$
 3. Value at $T_{ch} = 25^\circ C$, $R_g \geq 50 \Omega$

Electrical Characteristics (Ta = 25°C)

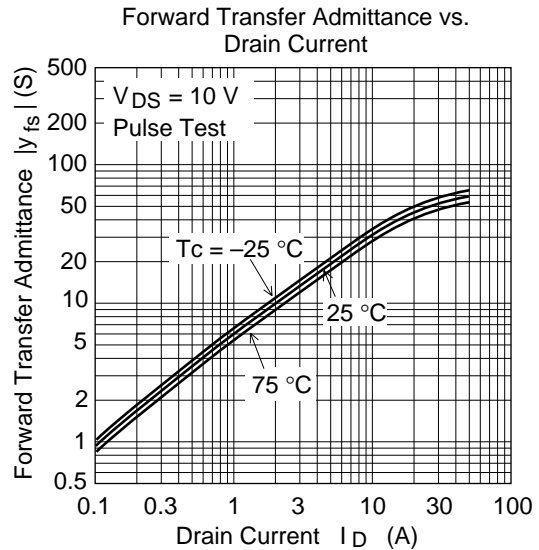
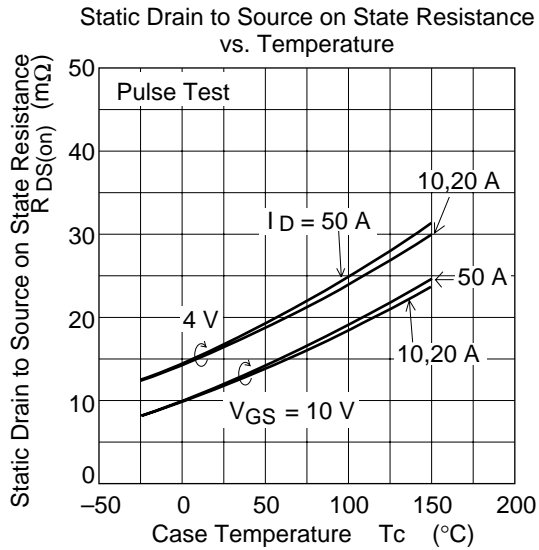
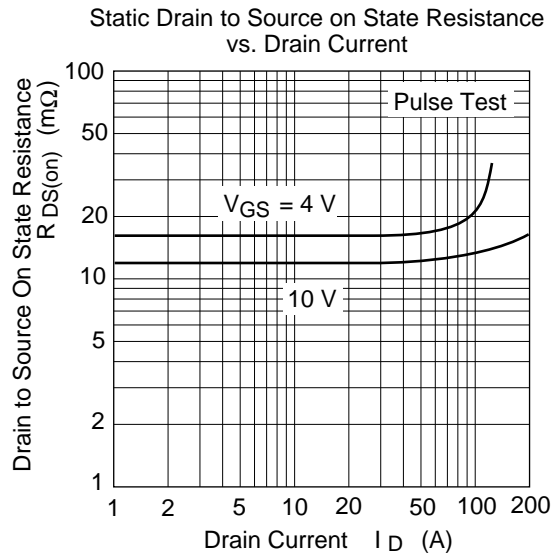
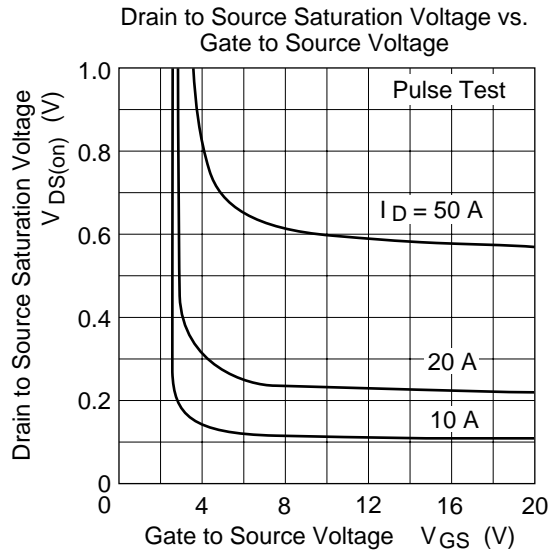
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	100	—	—	V	$I_D = 10 \text{ mA}$, $V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	±20	—	—	V	$I_G = \pm 100 \mu A$, $V_{DS} = 0$
Gate to source leak current	I_{GSS}	—	—	±10	μA	$V_{GS} = \pm 16 \text{ V}$, $V_{DS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	10	μA	$V_{DS} = 100 \text{ V}$, $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	1.0	—	2.5	V	$I_D = 1 \text{ mA}$, $V_{DS} = 10 \text{ V}$
Static drain to source on state resistance	$R_{DS(on)}$	—	11.5	15	mΩ	$I_D = 25 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note4}
	$R_{DS(on)}$	—	16	25	mΩ	$I_D = 25 \text{ A}$, $V_{GS} = 4 \text{ V}$ ^{Note4}
Forward transfer admittance	$ y_{fs} $	30	50	—	S	$I_D = 25 \text{ A}$, $V_{DS} = 10 \text{ V}$ ^{Note4}
Input capacitance	Ciss	—	4000	—	pF	$V_{DS} = 10 \text{ V}$
Output capacitance	Coss	—	1650	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	Crss	—	590	—	pF	$f = 1 \text{ MHz}$
Turn-on delay time	$t_{d(on)}$	—	30	—	ns	$I_D = 25 \text{ A}$, $V_{GS} = 10 \text{ V}$
Rise time	t_r	—	280	—	ns	$R_L = 1.2 \Omega$
Turn-off delay time	$t_{d(off)}$	—	830	—	ns	
Fall time	t_f	—	450	—	ns	
Body-drain diode forward voltage	V_{DF}	—	0.95	—	V	$I_F = 50 \text{ A}$, $V_{GS} = 0$
Body-drain diode reverse recovery time	t_{rr}	—	100	—	ns	$I_F = 50 \text{ A}$, $V_{GS} = 0$ $diF/dt = 50 \text{ A}/\mu s$

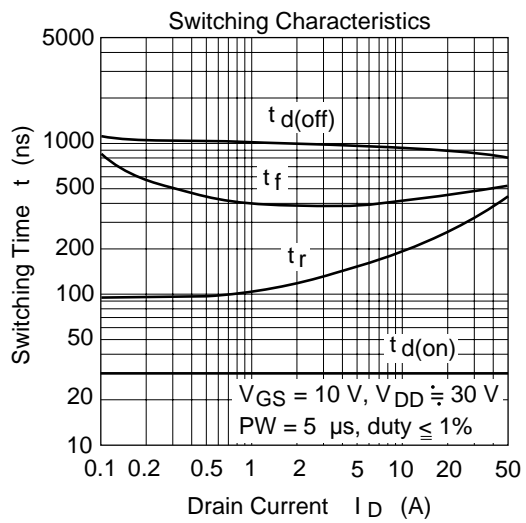
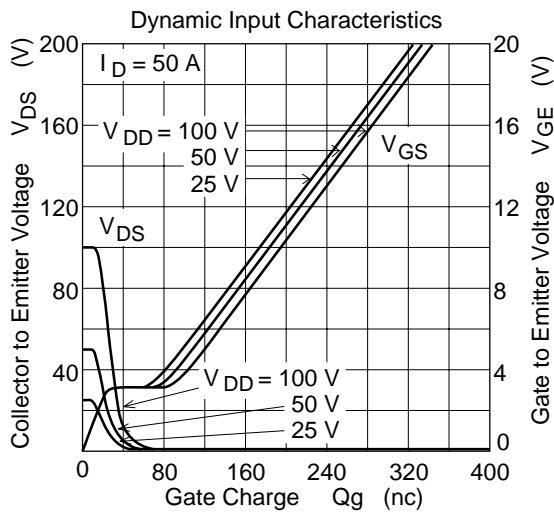
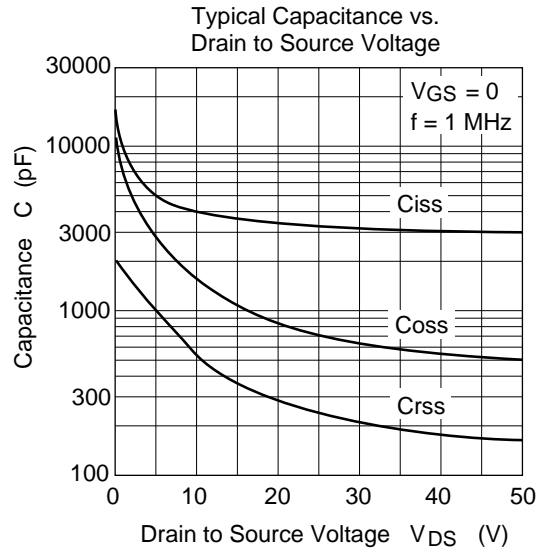
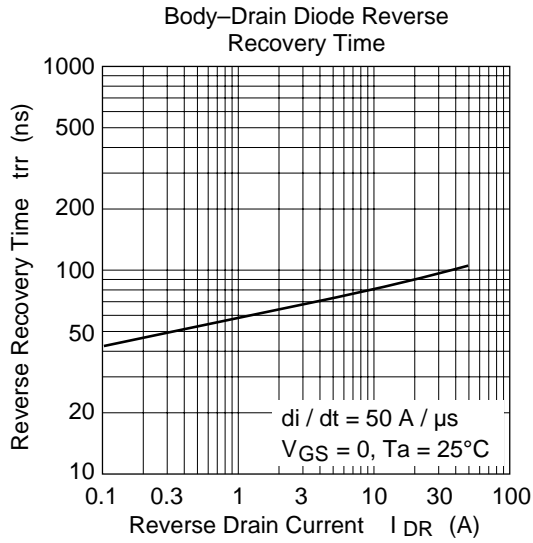
Note: 4. Pulse test

Main Characteristics

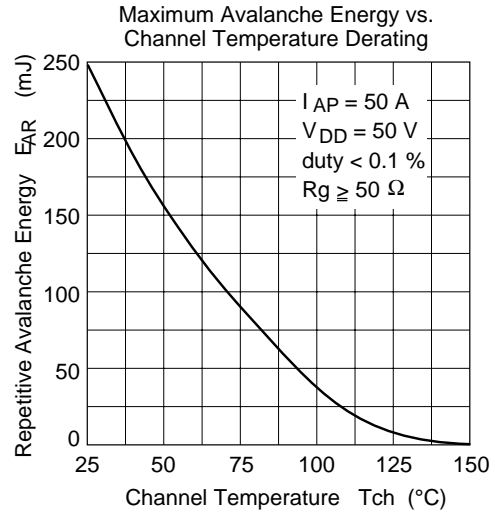
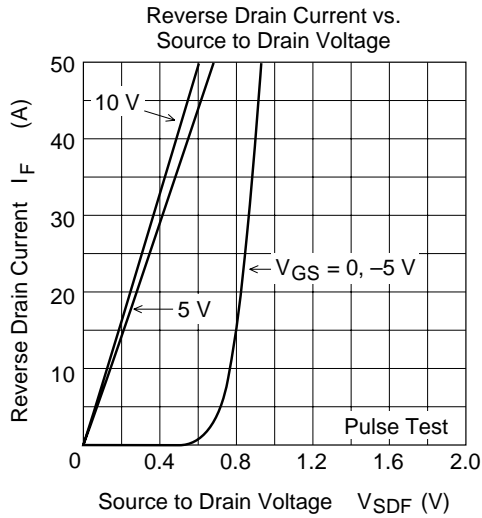


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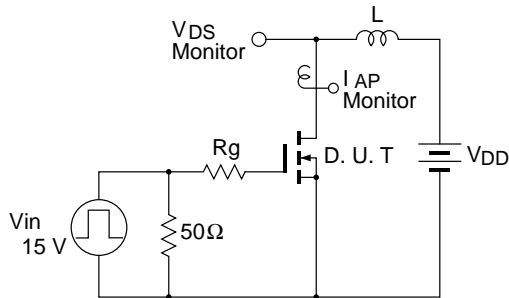




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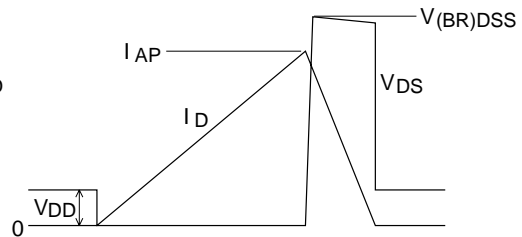


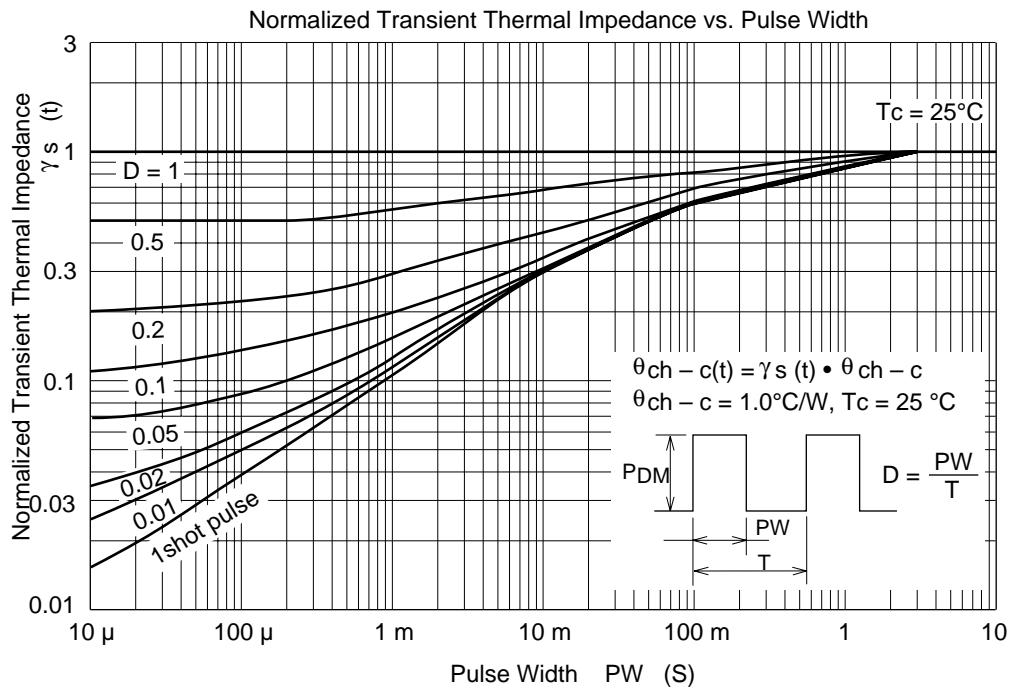
Avalanche Test Circuit



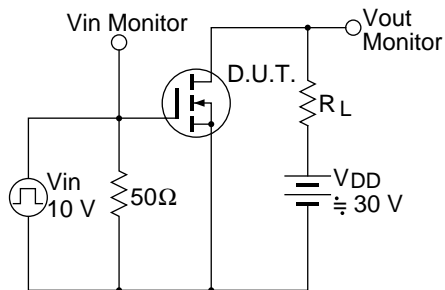
Avalanche Waveform

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

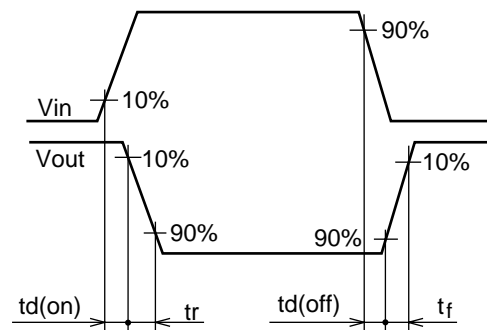




Switching Time Test Circuit



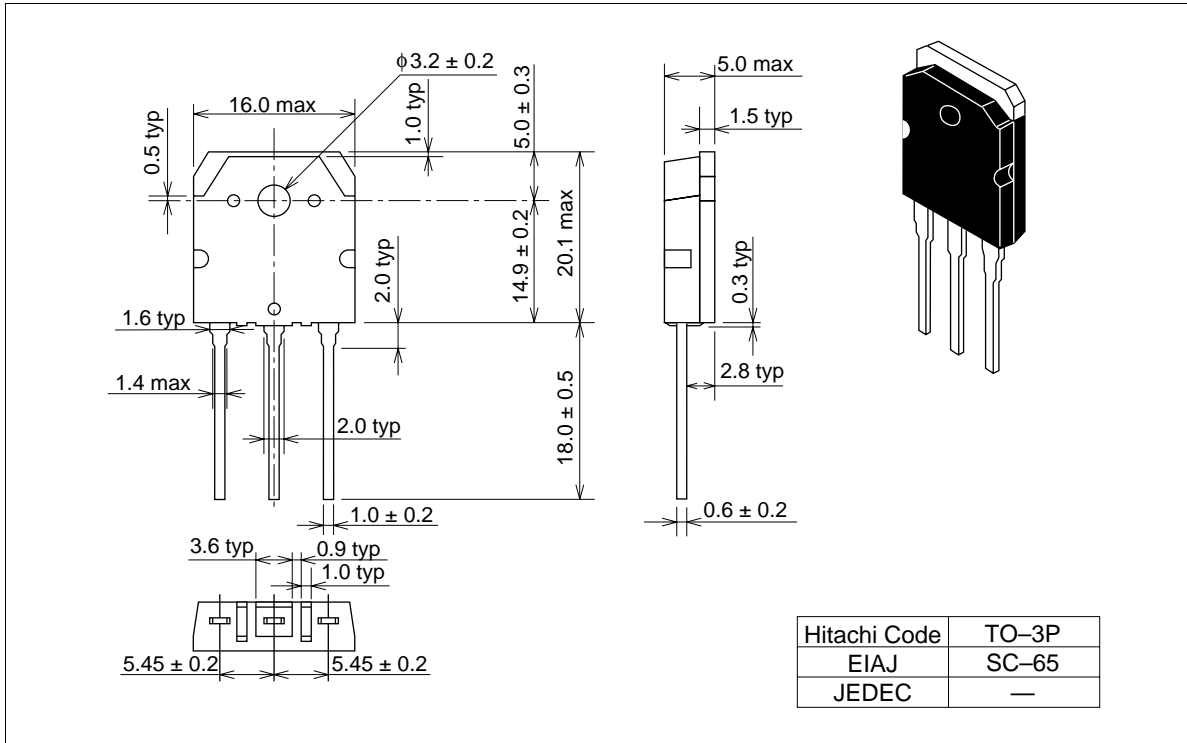
Waveform



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Package Dimensions

Unit: mm



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