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# 2SK3163

Silicon N Channel MOS FET  
High Speed Power Switching

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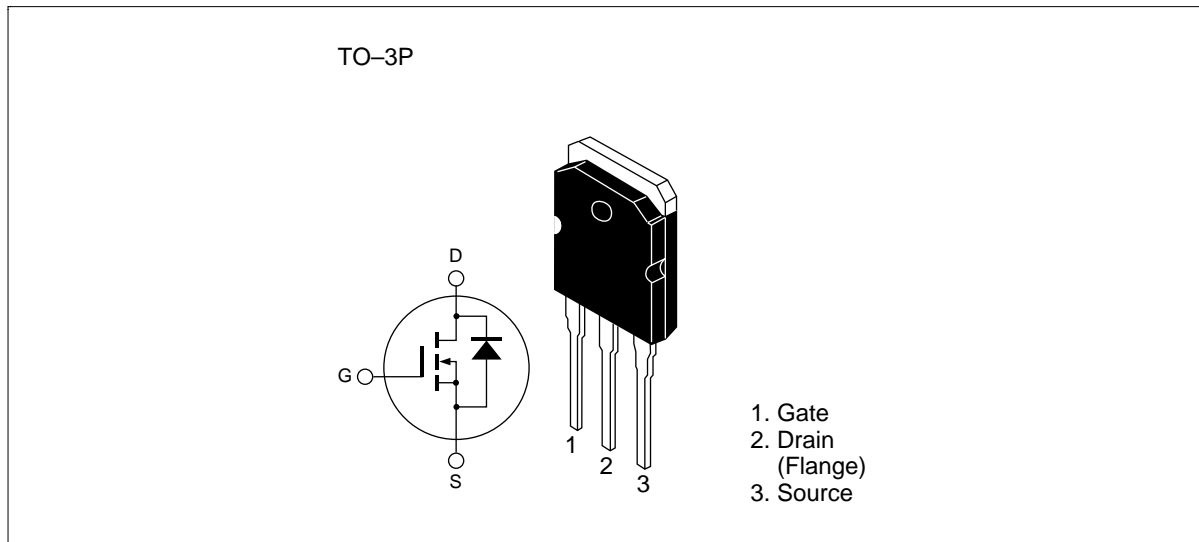
1th Edition  
December, 1998

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## Features

- Low on-resistance  
 $R_{DS(on)} = 6m\Omega$  typ.
- Low drive current
- 4V gate drive device can be driven from 5V source

## Outline



## 2SK3163

### 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	$I_D$	75	A
Drain peak current	$I_{D(pulse)}$ <sup>Note 1</sup>	300	A
Body-drain diode reverse drain current	$I_{DR}$	75	A
Avalanche current	$I_{AP}$ <sup>Note 3</sup>	50	A
Avalanche energy	$E_{AR}$ <sup>Note 3</sup>	214	mJ
Channel dissipation	$P_{ch}$ <sup>Note 2</sup>	110	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  $T_{ch} = 25^\circ C$ ,  $R_g = 50\Omega$

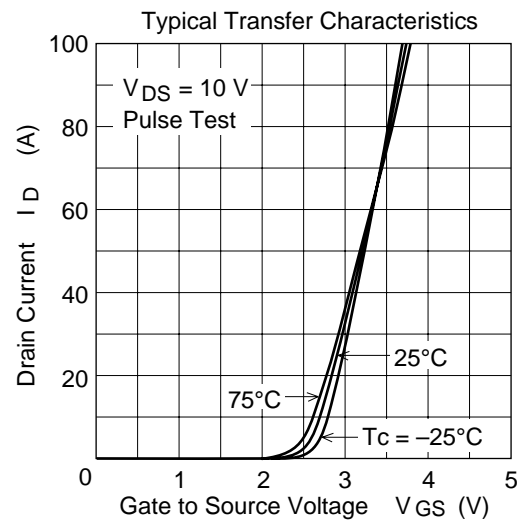
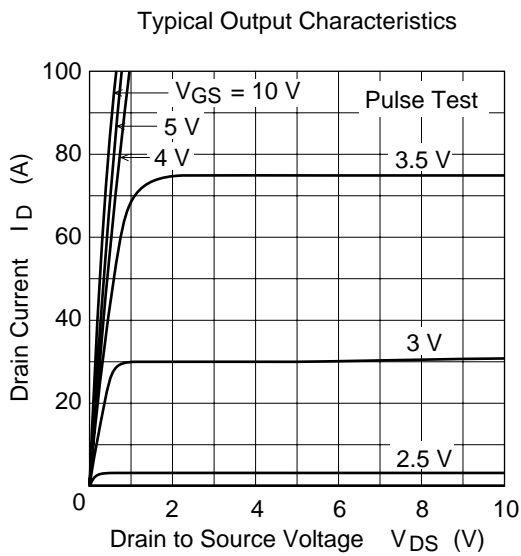
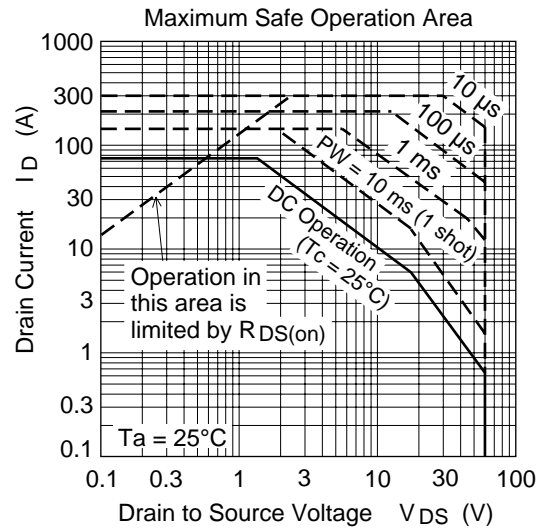
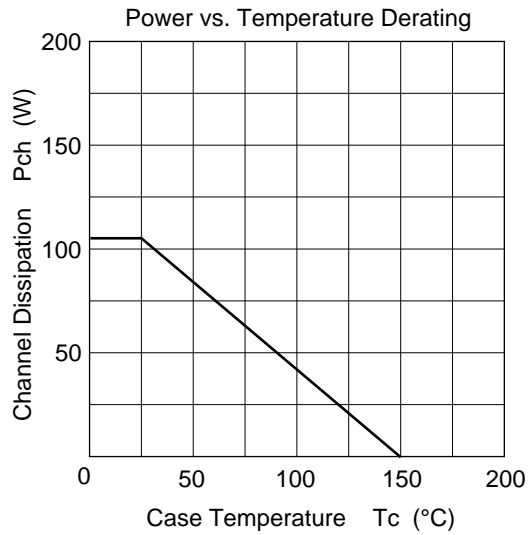
### Electrical Characteristics (Ta = 25°C)

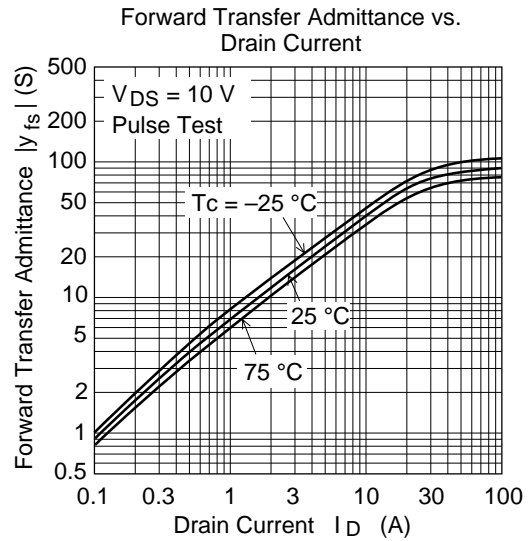
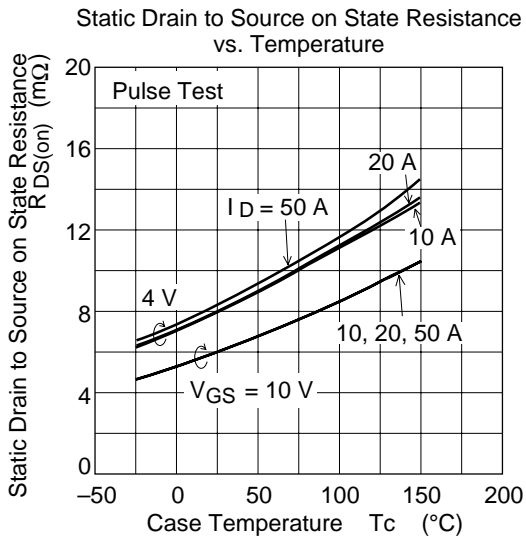
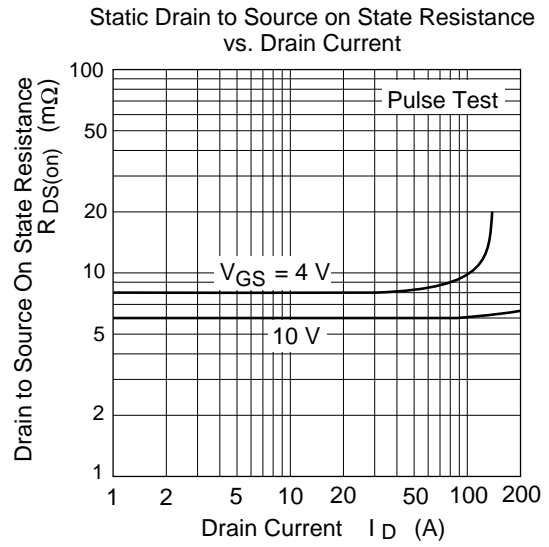
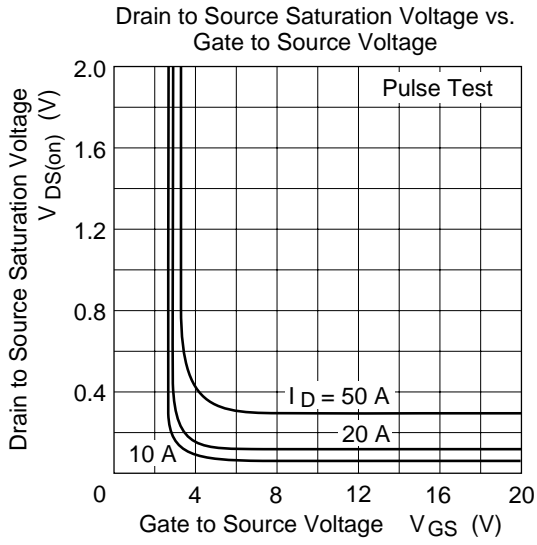
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	60	—	—	V	$I_D = 10mA$ , $V_{GS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	±0.1	μA	$V_{GS} = \pm 20V$ , $V_{DS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	10	μA	$V_{DS} = 60V$ , $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	1.0	—	2.5	V	$I_D = 1mA$ , $V_{DS} = 10V$ <sup>Note 1</sup>
Static drain to source on state resistance	$R_{DS(on)}$	—	6.0	7.5	mΩ	$I_D = 40A$ , $V_{GS} = 10V$ <sup>Note 1</sup>
		—	8.0	12	mΩ	$I_D = 40A$ , $V_{GS} = 4V$ <sup>Note 1</sup>
Forward transfer admittance	$ y_{fs} $	50	80	—	S	$I_D = 40A$ , $V_{DS} = 10V$ <sup>Note 1</sup>
Input capacitance	$C_{iss}$	—	7100	—	pF	$V_{DS} = 10V$
Output capacitance	$C_{oss}$	—	1000	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	$C_{rss}$	—	280	—	pF	$f = 1MHz$
Total gate charge	$Q_g$	—	125	—	nc	$V_{DD} = 25V$
Gate to source charge	$Q_{gs}$	—	25	—	nc	$V_{GS} = 10V$
Gate to drain charge	$Q_{gd}$	—	25	—	nc	$I_D = 75A$
Turn-on delay time	$t_{d(on)}$	—	60	—	ns	$V_{GS} = 10V$ , $I_D = 40A$
Rise time	$t_r$	—	300	—	ns	$R_L = 0.75\Omega$
Turn-off delay time	$t_{d(off)}$	—	520	—	ns	
Fall time	$t_f$	—	330	—	ns	
Body-drain diode forward voltage	$V_{DF}$	—	1.05	—	V	$I_F = 75A$ , $V_{GS} = 0$
Body-drain diode reverse recovery time	$t_{rr}$	—	90	—	ns	$I_F = 75A$ , $V_{GS} = 0$ $diF/dt = 50A/\mu s$

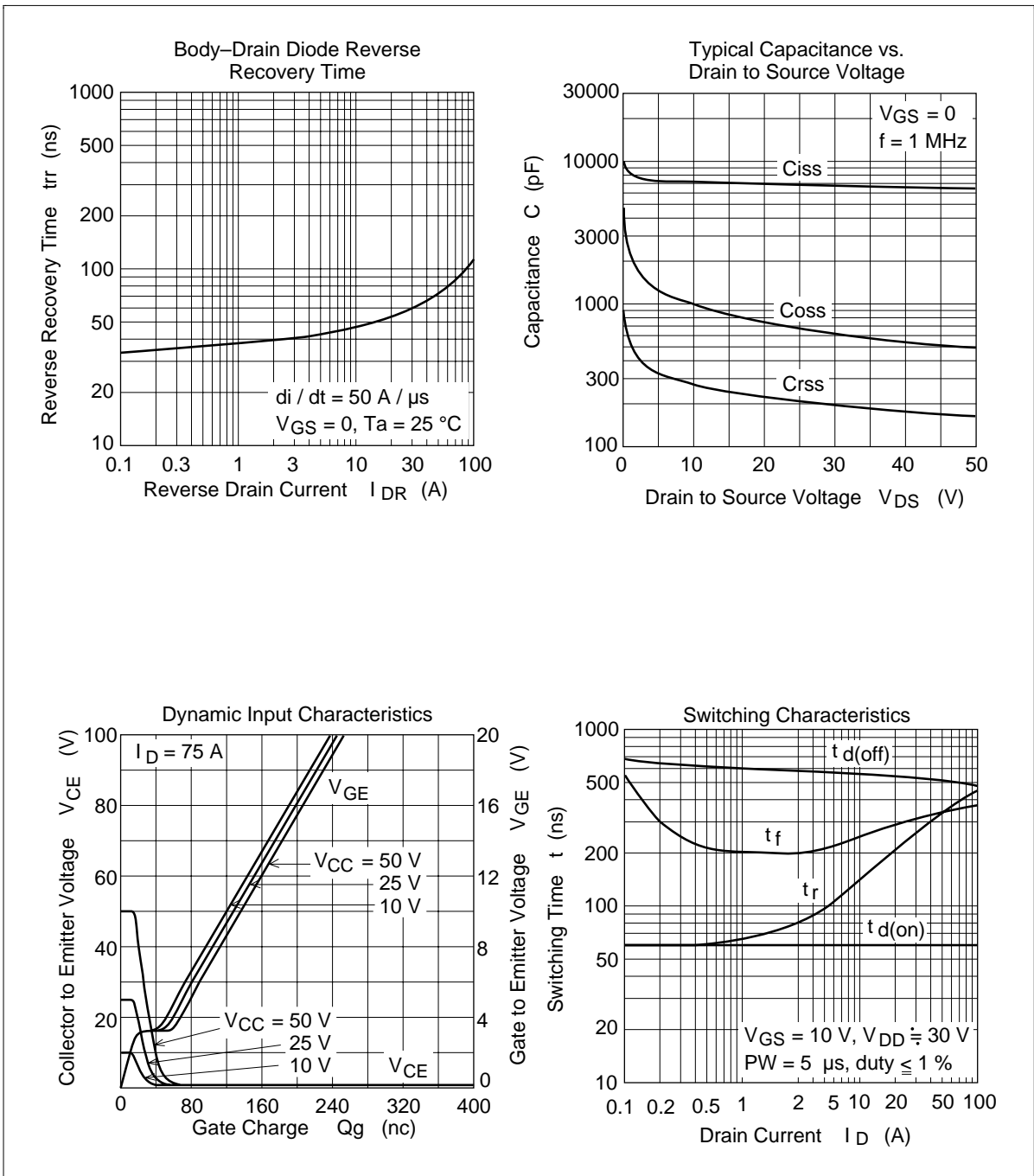
Note: 1. Pulse test

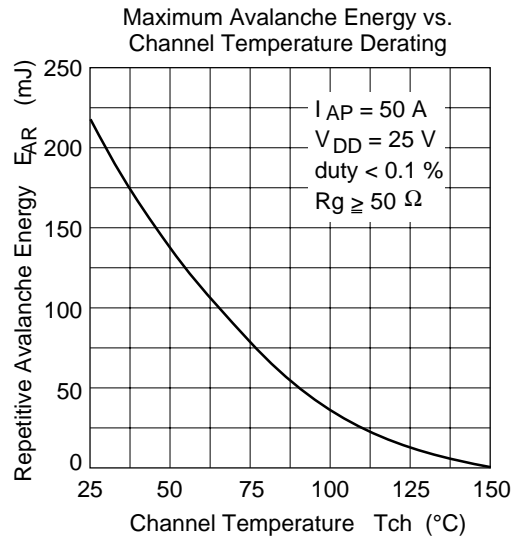
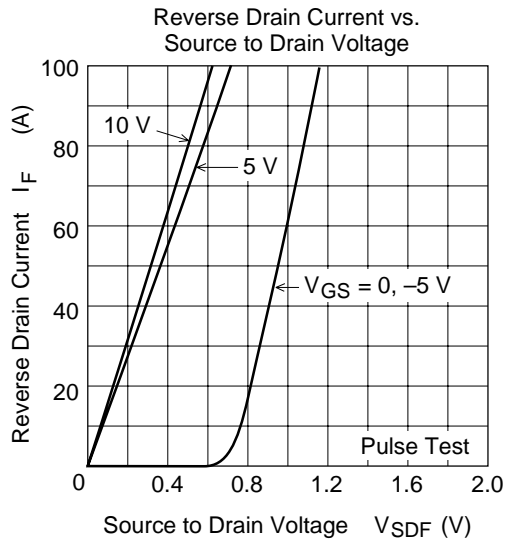
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Main Characteristics

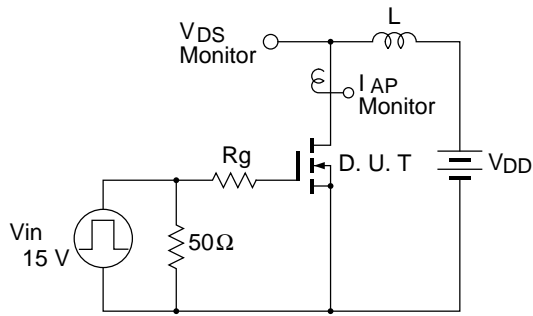






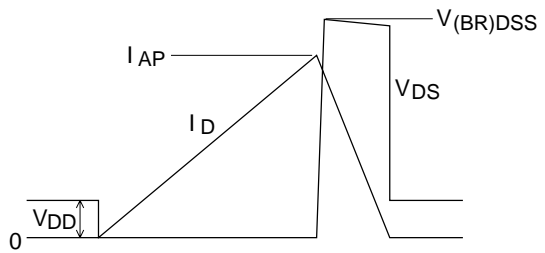


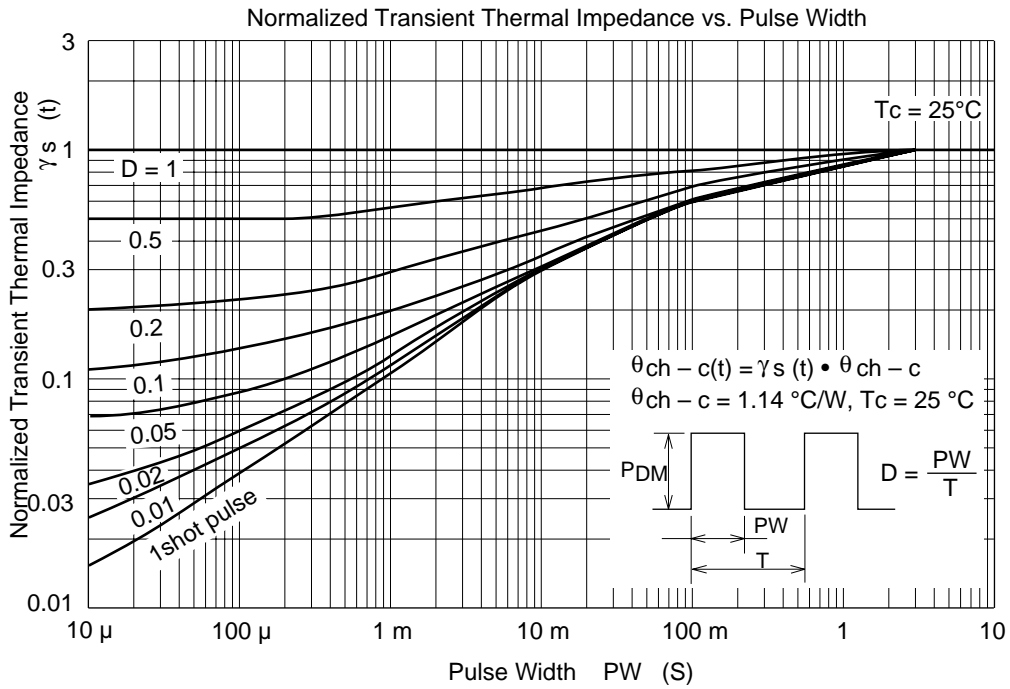
Avalanche Test Circuit



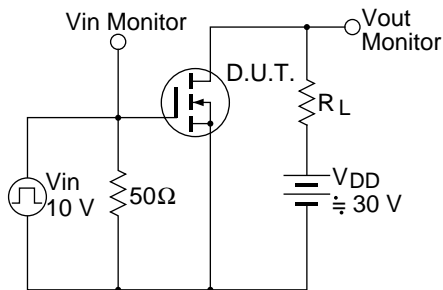
Avalanche Waveform

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

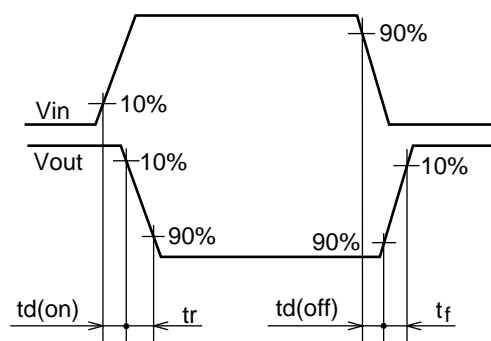




Switching Time Test Circuit



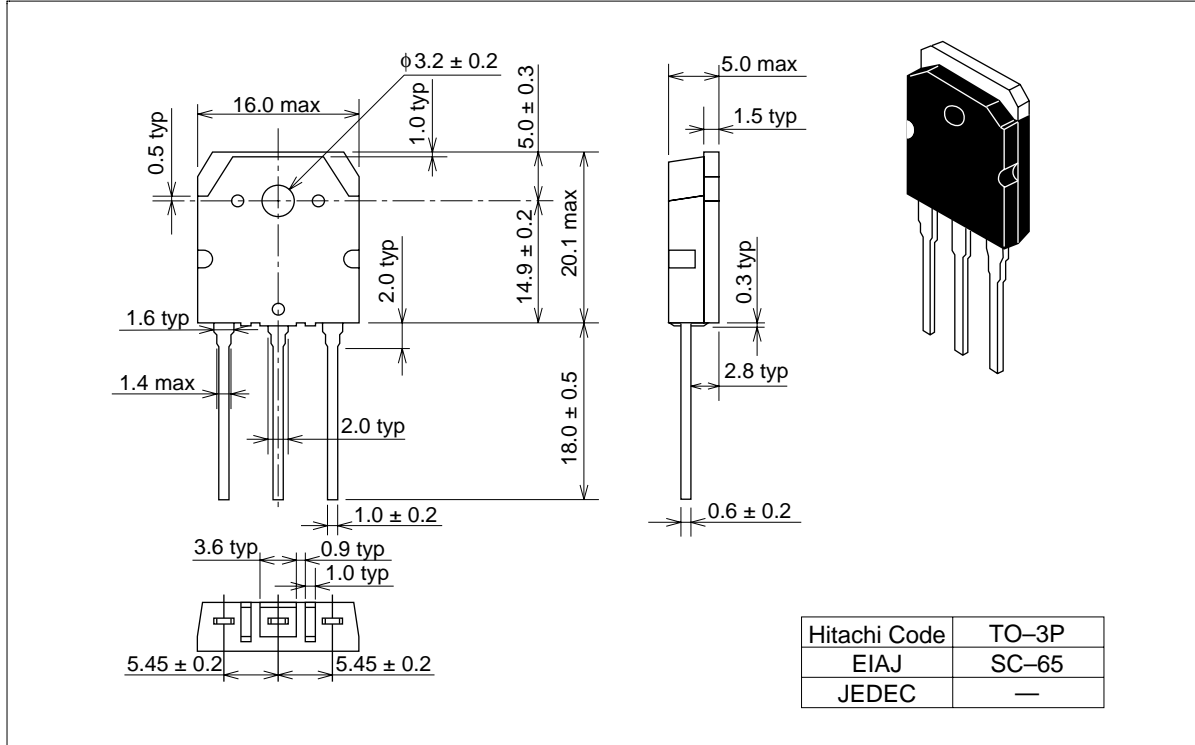
Waveform



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## Package Dimensions

Unit: mm





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