

# H5N5007P

Silicon N Channel MOS FET  
High Speed Power Switching

## RENESAS

ADE-208-1404B (Z)

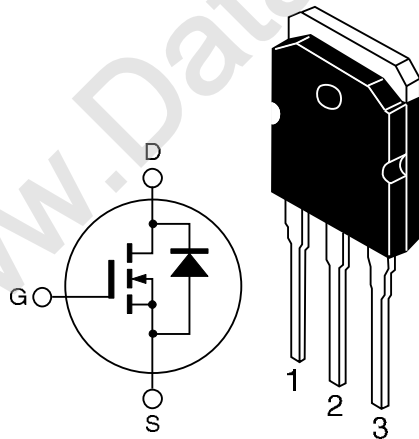
3rd. Edition  
Feb. 2002

### Features

- Low on-resistance
- Low leakage current
- High speed switching
- Low gate charge

### Outline

TO-3P



1. Gate
2. Drain (Flange)
3. Source

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

<b>Item</b>	<b>Symbol</b>	<b>Ratings</b>	<b>Unit</b>
Drain to source voltage	$V_{DSS}$	500	V
Gate to source voltage	$V_{GSS}$	±30	V
Drain current	$I_D$	25	A
Drain peak current	$I_{D(pulse)}^{Note1}$	100	A
Body-drain diode reverse drain current	$I_{DR}$	25	A
Avalanche current	$I_{AP}^{Note3}$	7	A
Channel dissipation	$P_{ch}^{Note2}$	150	W
Channel to case Thermal Impedance	$\theta_{ch-c}$	0.833	°C/W
Channel temperature	$T_{ch}$	150	°C
Storage temperature	$T_{stg}$	-55 to +150	°C

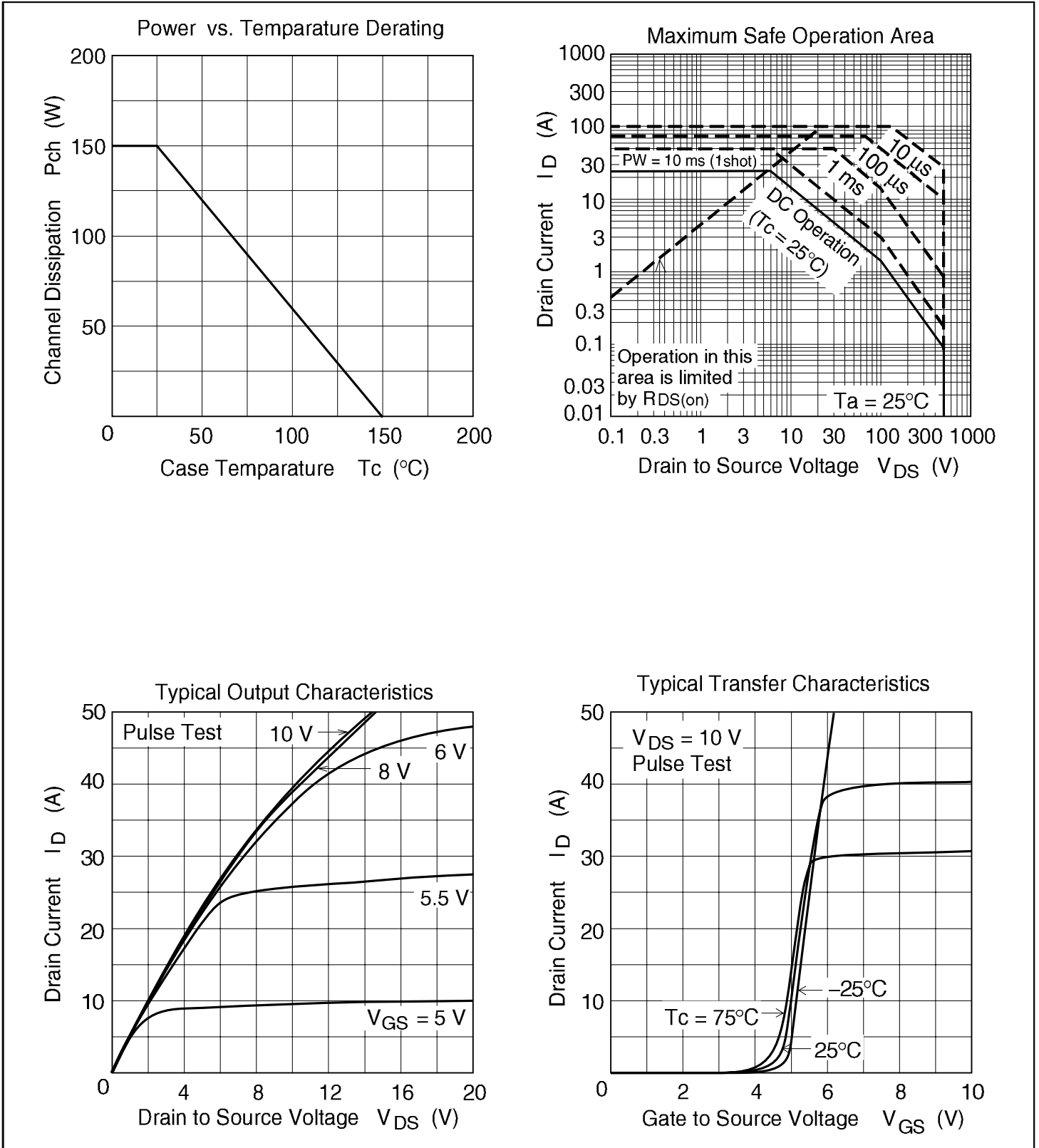
Note: 1.  $PW \leq 10\mu s$ , duty cycle  $\leq 1\%$   
2. Value at  $T_c = 25^\circ C$   
3.  $T_{ch} \leq 150^\circ C$

## Electrical Characteristics (Ta = 25°C)

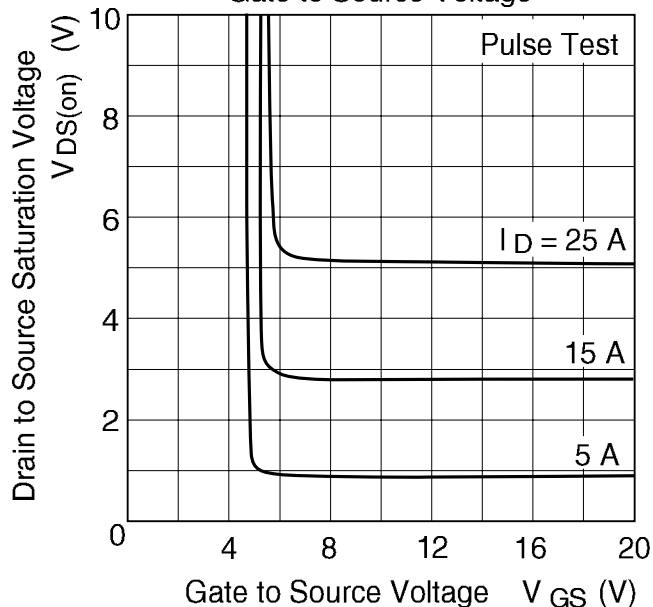
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown Voltage	$V_{(BR)DSS}$	500	—	—	V	$I_D = 10mA, V_{GS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	±0.1	μA	$V_{GS} = \pm 30V, V_{DS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	1	μA	$V_{DS} = 500V, V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	3.0	—	4.0	V	$I_D = 1mA, V_{DS} = 10V$
Static drain to source on state Resistance	$R_{DS(on)}$	—	0.18	0.225	Ω	$I_D = 12.5A, V_{GS} = 10V$ <sup>Note4</sup>
Forward transfer admittance	$ y_{fs} $	14	24	—	S	$I_D = 12.5A, V_{DS} = 10V$ <sup>Note4</sup>
Input capacitance	Ciss	—	3900	—	pF	$V_{DS} = 25V$
Output capacitance	Coss	—	375	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	Crss	—	78	—	pF	f = 1MHz
Turn-on delay time	$t_{d(on)}$	—	55	—	ns	$I_D = 12.5A$
Rise time	$t_r$	—	110	—	ns	$V_{GS} = 10V$
Turn-off delay time	$t_{d(off)}$	—	225	—	ns	$R_L = 20\Omega$
Fall time	$t_f$	—	110	—	ns	$R_g = 10\Omega$
Total gate charge	Qg	—	135	—	nC	$V_{DD} = 400V$
Gate to source charge	Qgs	—	22	—	nC	$V_{GS} = 10V$
Gate to drain charge	Qgd	—	74	—	nC	$I_D = 25A$
Body–drain diode forward voltage	$V_{DF}$	—	0.9	1.4	V	$I_F = 25A, V_{GS} = 0$
Body–drain diode reverse recovery time	$t_{rr}$	—	390	—	ns	$I_F = 25A, V_{GS} = 0$ diF/ dt = 100A/μs
Body–drain diode reverse recovery charge	$Q_{rr}$	—	5	—	μC	

Note: 4. Pulse test

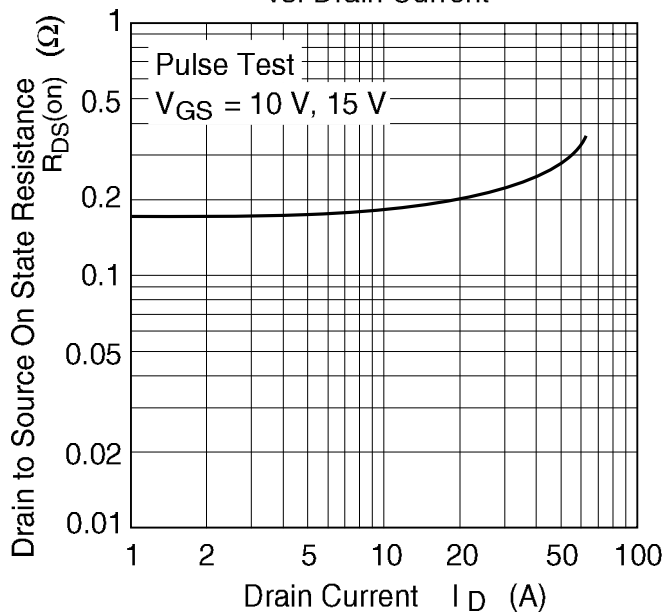
## Main Characteristics



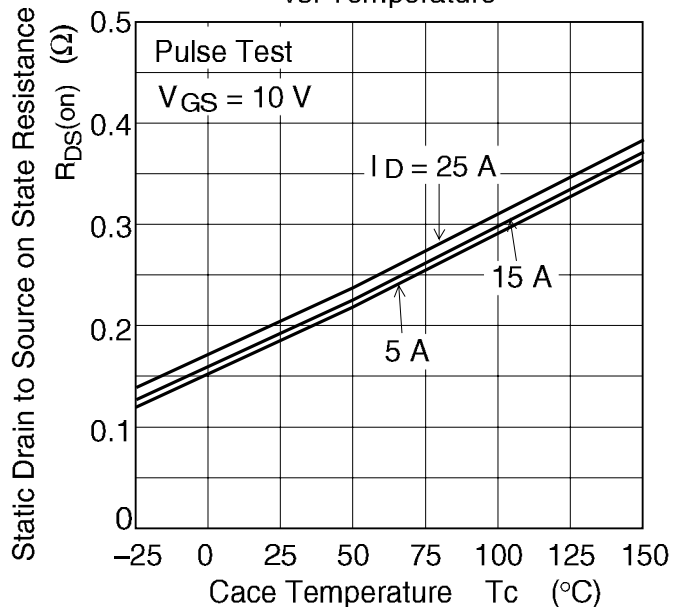
Drain to Source Saturation Voltage vs Gate to Source Voltage



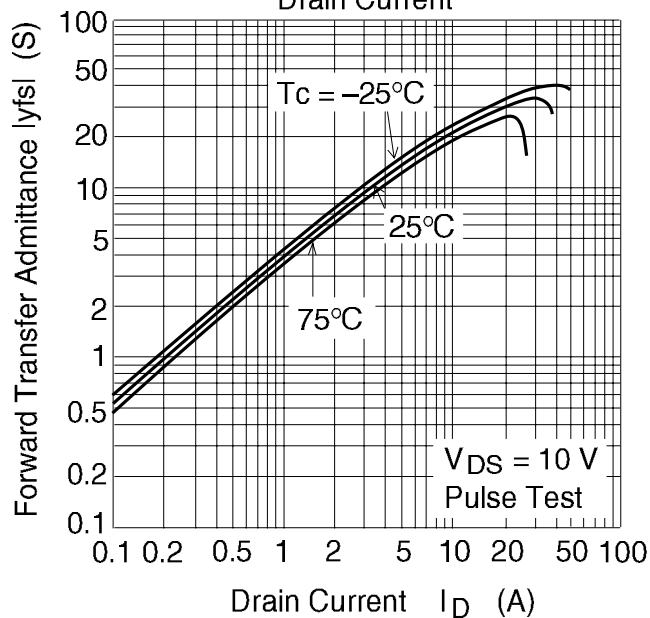
Static Drain to Source on State Resistance vs. Drain Current



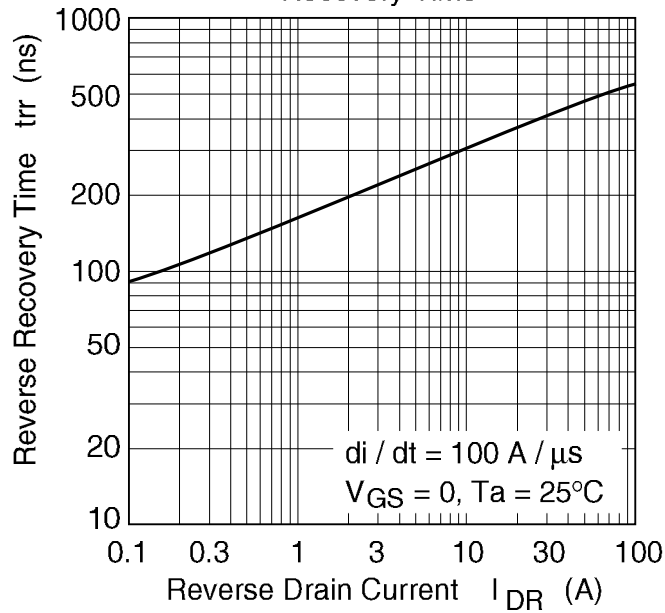
Static Drain to Source on State Resistance vs. Temperature



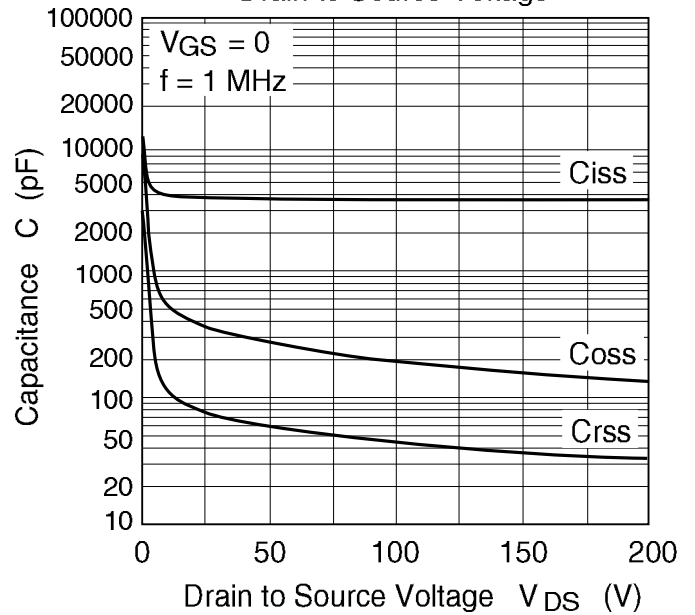
Forward Transfer Admittance vs. Drain Current



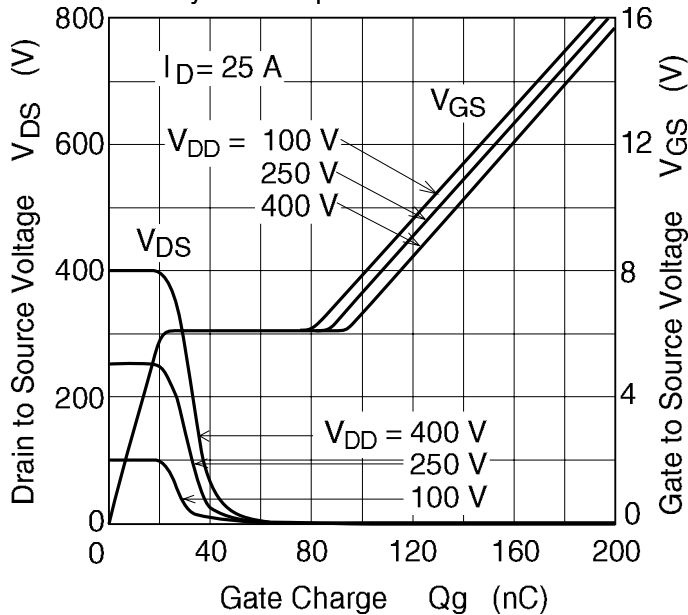
Body-Drain Diode Reverse Recovery Time



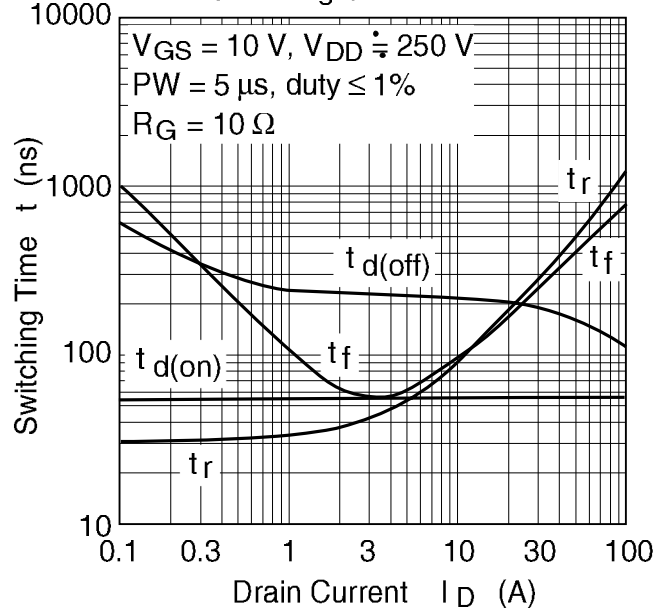
Typical Capacitance vs. Drain to Source Voltage

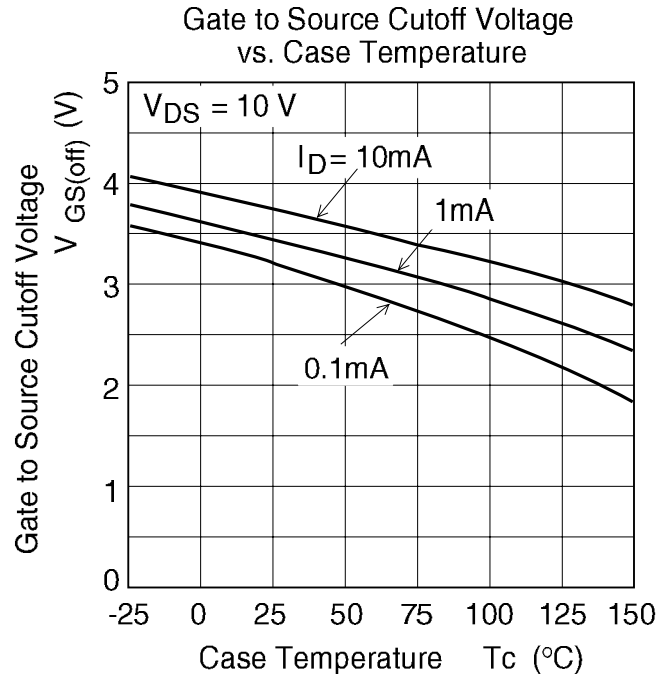
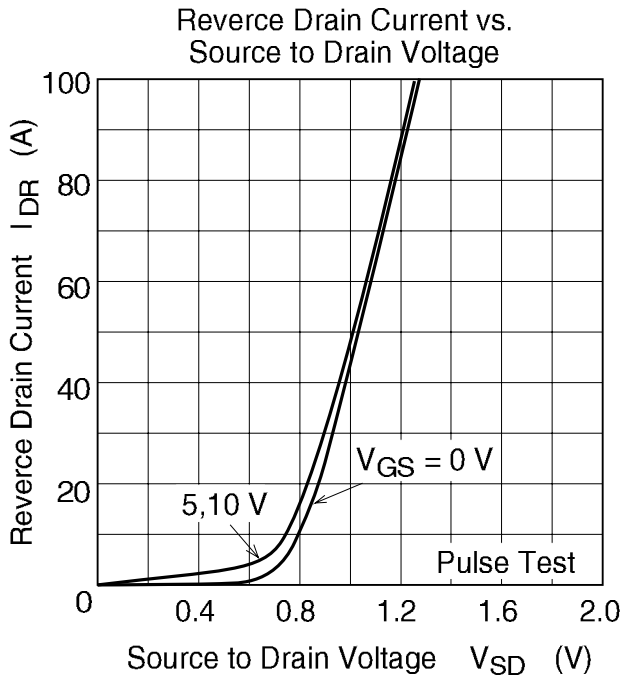


Dynamic Input Characteristics

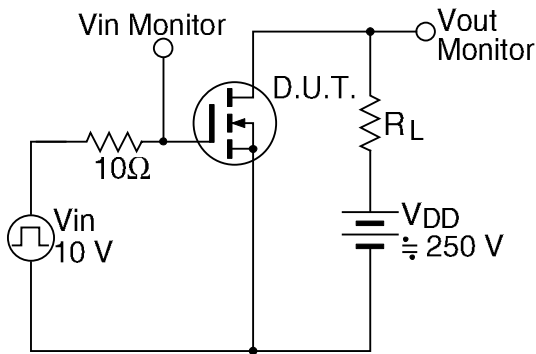


Switching Characteristics

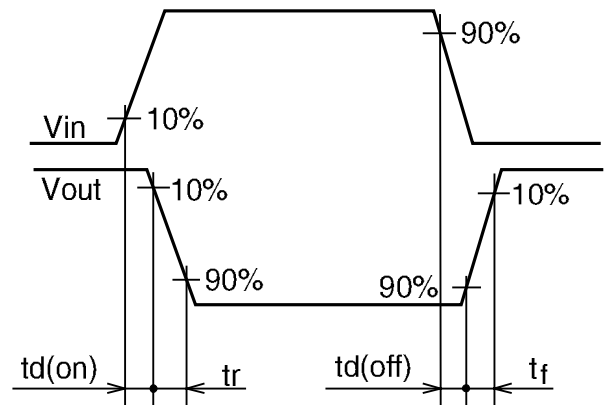


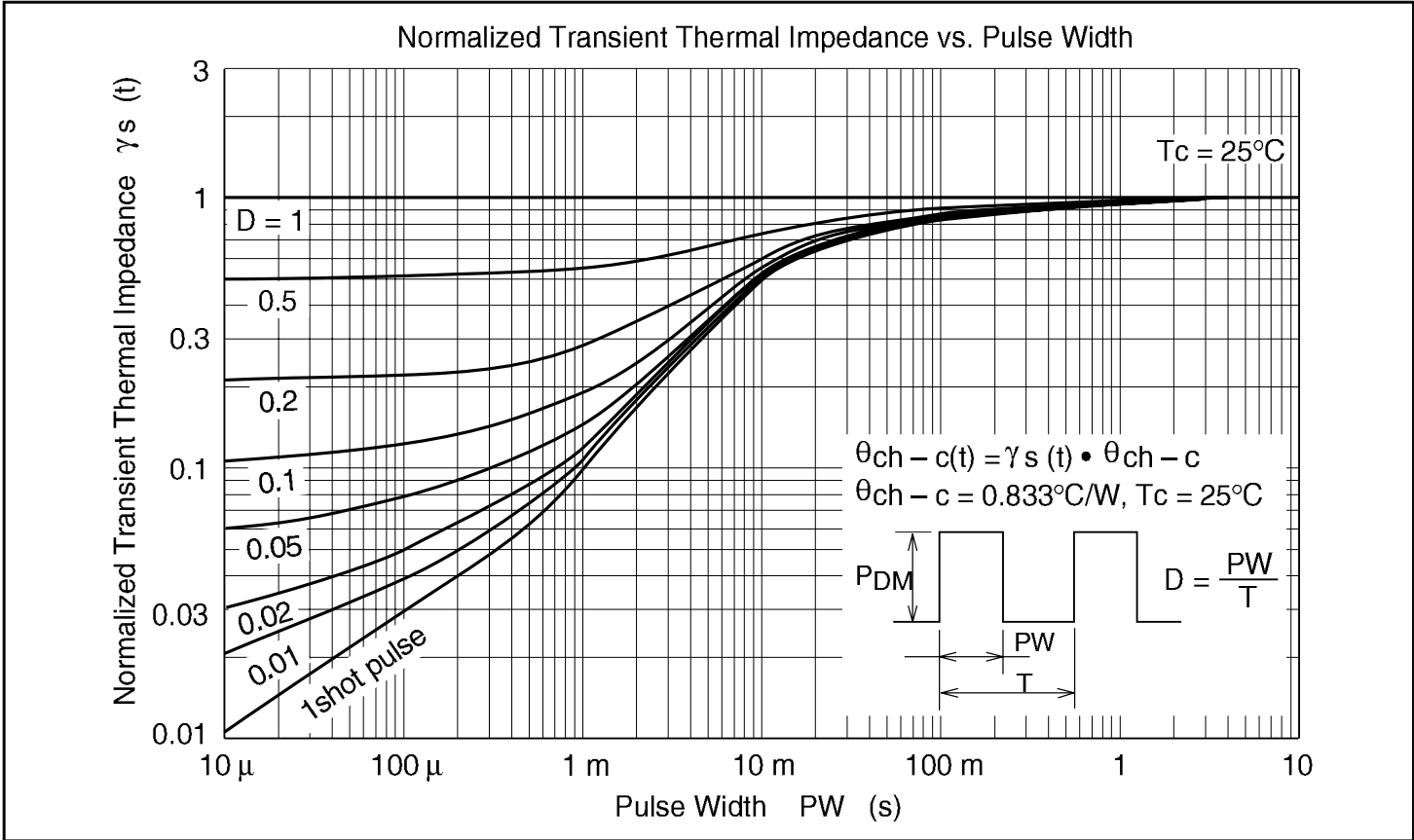


Switching Time Test Circuit



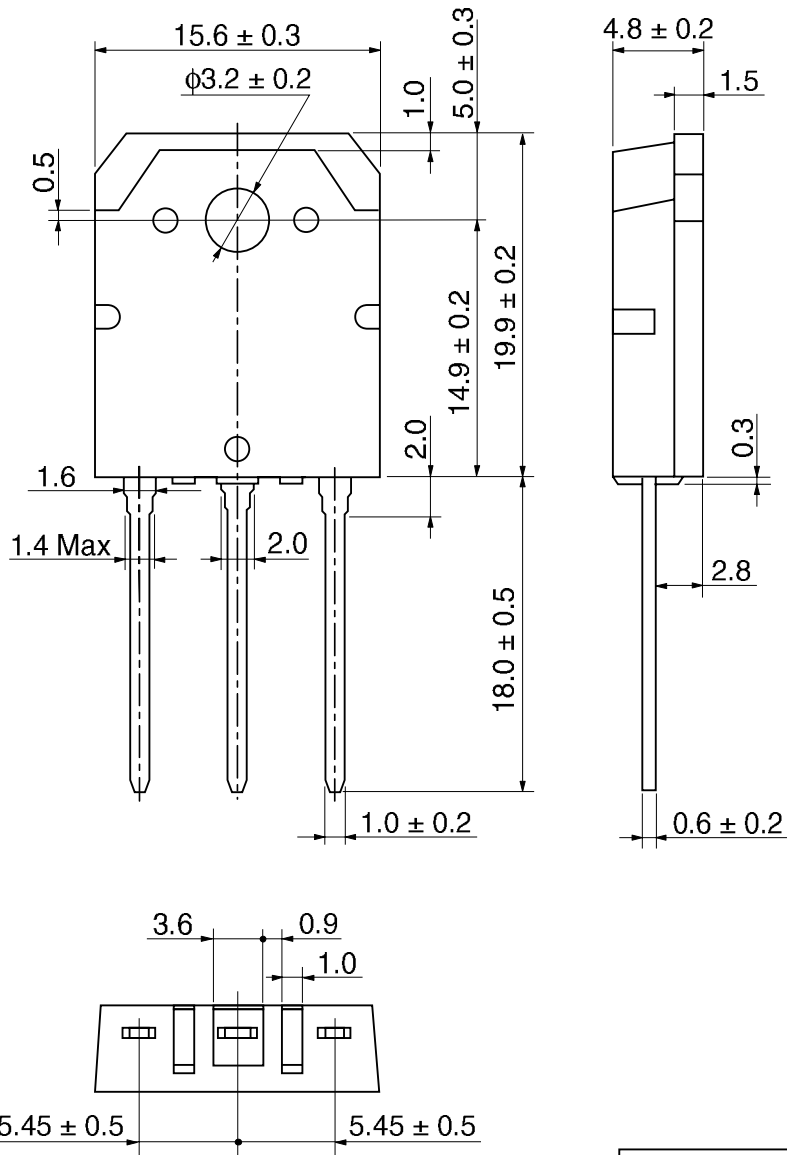
Waveform



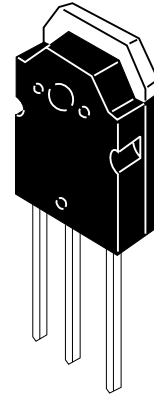




Package Dimensions



As of July, 2001  
Unit: mm



Hitachi Code	TO-3P
JEDEC	—
JEITA	Conforms
Mass (reference value)	5.0 g

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