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Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

Cautions

Keep safety first in your circuit designs!

1. Renesas Technology Corporation puts the maximum effort into making semiconductor products better and more reliable, but there is always the possibility that trouble may occur with them. Trouble with semiconductors may lead to personal injury, fire or property damage.

Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of nonflammable material or (iii) prevention against any malfunction or mishap.

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2SK2096

Silicon N-Channel MOS FET

RENESAS

ADE-208-1344 (Z)

1st. Edition

Mar. 2001

Application

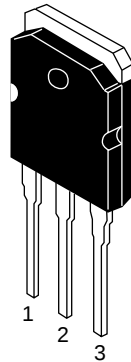
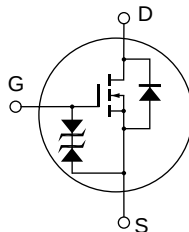
High speed power switching

Features

- Low on-resistance
- High speed switching
- Low drive current
- 4 V gate drive device can be driven from 5 V source
- Suitable for switching regulator, DC-DC converter
- Avalanche ratings

Outline

TO-3P



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

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	45	A
Drain peak current	$I_{D(pulse)}^{*1}$	180	A
Body to drain diode reverse drain current	I_{DR}	45	A
Avalanche current	I_{AP}^{*3}	45	A
Avalanche energy	E_{AR}^{*3}	173	mJ
Channel dissipation	P_{ch}^{*2}	100	W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	−55 to +150	°C

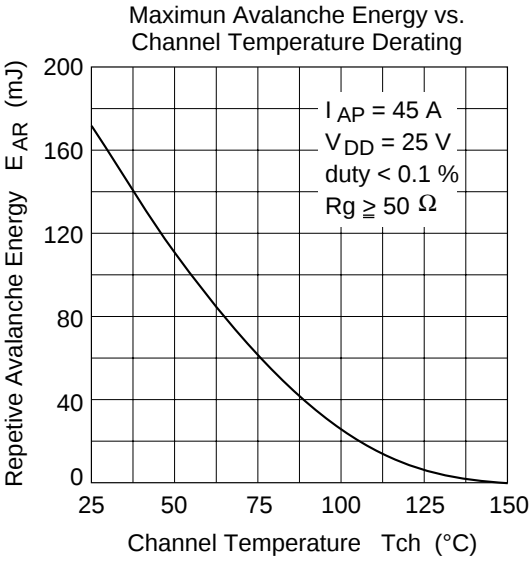
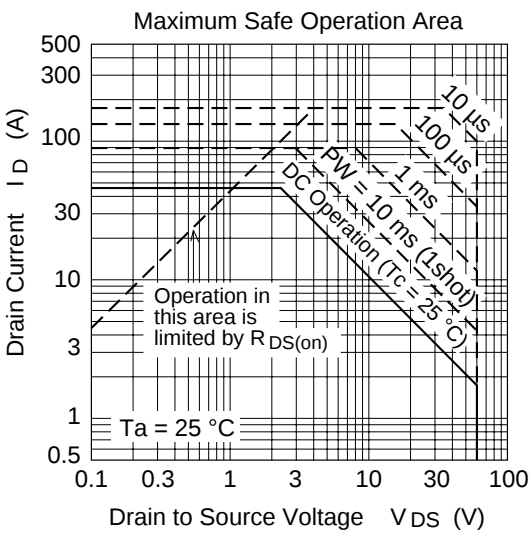
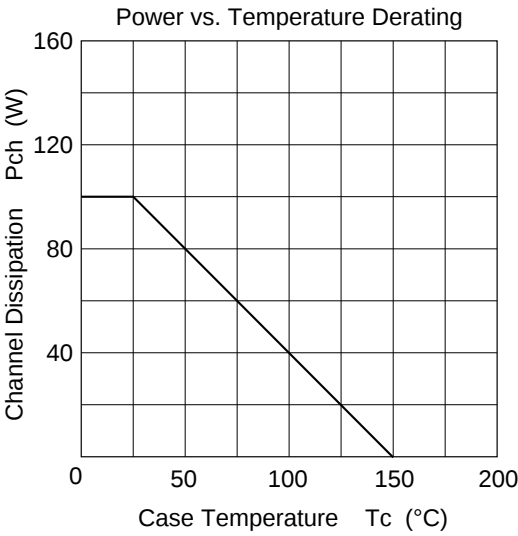
- Notes
- 1. PW 10 μs, duty cycle 1 %
 - 2. Value at Tc = 25°C
 - 3. Value at Tch = 25°C, Rg 50

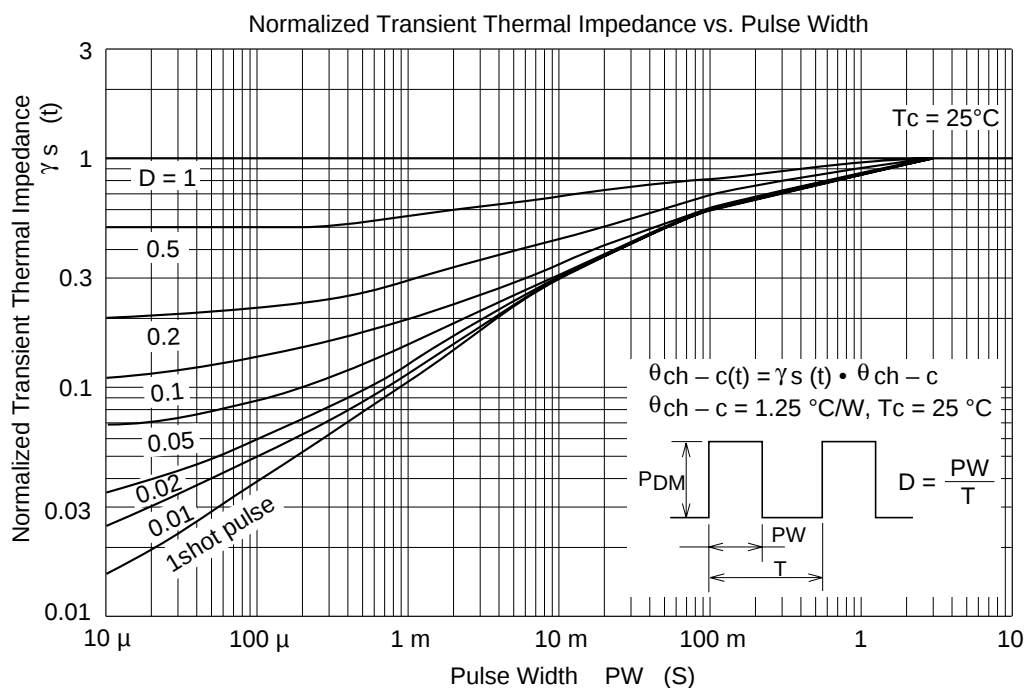
Electrical Characteristics (Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	60	—	—	V	$I_D = 10 \text{ mA}$, $V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	± 20	—	—	V	$I_G = \pm 100 \text{ }\mu\text{A}$, $V_{DS} = 0$
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}	—	—	250	μA	$V_{DS} = 50 \text{ V}$, $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	1.0	—	2.25	V	$I_D = 1 \text{ mA}$, $V_{DS} = 10 \text{ V}$
Static drain to source on state resistance	$R_{DS(on)}$	—	0.018	0.022		$I_D = 25 \text{ A}$ $V_{GS} = 10 \text{ V}^{*1}$
			0.023	0.028		$I_D = 25 \text{ A}$ $V_{GS} = 4 \text{ V}^{*1}$
Forward transfer admittance	$ y_{fs} $	25	37	—	S	$I_D = 25 \text{ A}$ $V_{DS} = 10 \text{ V}^{*1}$
Input capacitance	C_{iss}	—	3530	—	pF	$V_{DS} = 10 \text{ V}$
Output capacitance	C_{oss}	—	1480	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	C_{rss}	—	300	—	pF	$f = 1 \text{ MHz}$
Turn-on delay time	$t_{d(on)}$	—	33	—	ns	$I_D = 25 \text{ A}$
Rise time	t_r	—	160	—	ns	$V_{GS} = 10 \text{ V}$
Turn-off delay time	$t_{d(off)}$	—	450	—	ns	$R_L = 1.5$
Fall time	t_f	—	230	—	ns	
Body to drain diode forward voltage	V_{DF}	—	1.3	—	V	$I_F = 45 \text{ A}$, $V_{GS} = 0$
Body to drain diode reverse recovery time	t_{rr}	—	130	—	ns	$I_F = 45 \text{ A}$, $V_{GS} = 0$, $di_F / dt = 50 \text{ A} / \mu\text{s}$

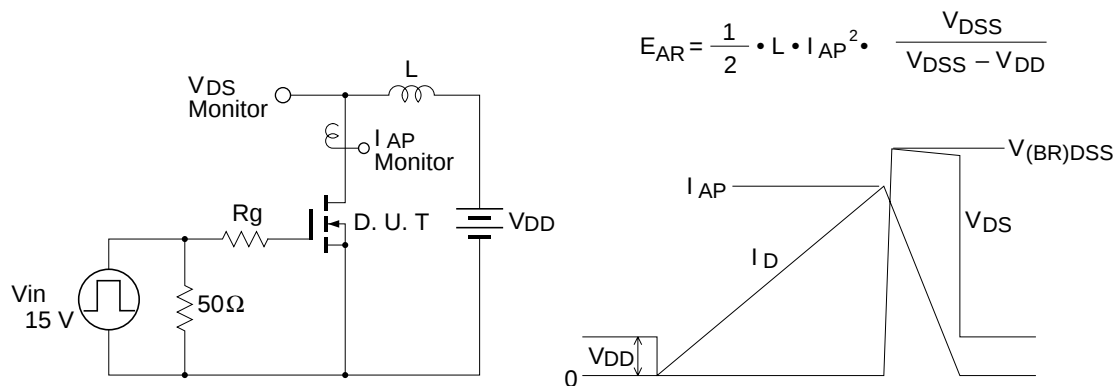
Note 1. Pulse Test

See characteristic curve of 2SK1911.



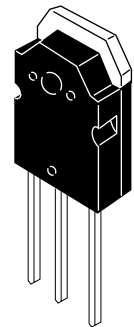
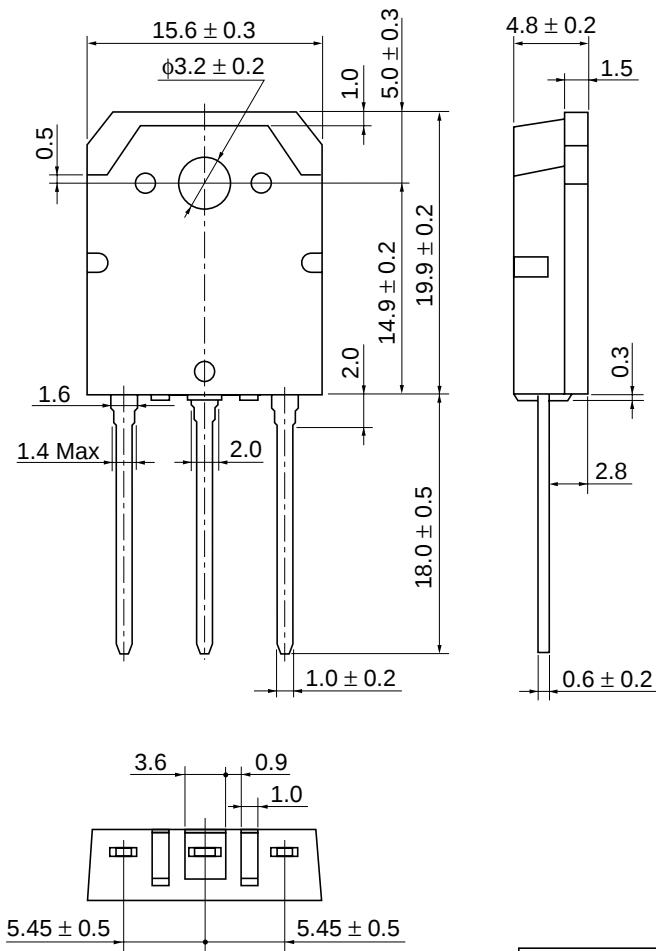


Avalanche Test Circuit and Waveform



Package Dimensions

As of January, 2001
Unit: mm



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

Cautions

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